INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

Bell & Howell Information and Learning
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
800-521-0600

UMI[®]

NOTE TO USERS

**Page(s) missing in number only; text follows.
Microfilmed as received.**

67

**The diskette is not included in this original
manuscript. It is available for consultation at the
authors graduate school library.**

This reproduction is the best copy available.

UMI

**Petrological and mineralogical study of Cu-Ni-PGE-bearing ores within the 100
orebody, Copper Cliff North mine, Sudbury, Ontario**

by

Jason H. Rickard

A thesis submitted to the Faculty of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of Master of Science

Department of Earth Sciences

Carleton University
Ottawa-Carleton Geoscience Centre
May 12, 2000

© copyright

2000 Jason H. Rickard

National Library
of Canada

Acquisitions and
Bibliographic Services

395 Wellington Street
Ottawa ON K1A 0N4
Canada

Bibliothèque nationale
du Canada

Acquisitions et
services bibliographiques

395, rue Wellington
Ottawa ON K1A 0N4
Canada

Your file *Votre référence*

Our file *Notre référence*

The author has granted a non-exclusive licence allowing the National Library of Canada to reproduce, loan, distribute or sell copies of this thesis in microform, paper or electronic formats.

The author retains ownership of the copyright in this thesis. Neither the thesis nor substantial extracts from it may be printed or otherwise reproduced without the author's permission.

L'auteur a accordé une licence non exclusive permettant à la Bibliothèque nationale du Canada de reproduire, prêter, distribuer ou vendre des copies de cette thèse sous la forme de microfiche/film, de reproduction sur papier ou sur format électronique.

L'auteur conserve la propriété du droit d'auteur qui protège cette thèse. Ni la thèse ni des extraits substantiels de celle-ci ne doivent être imprimés ou autrement reproduits sans son autorisation.

0-612-52404-3

Canada

The undersigned recommend to the Faculty of Graduate Studies
and Research acceptance of the thesis

**Petrological and mineralogical study of Cu-Ni-PGE-bearing ores within the 100
orebody, Copper Cliff North Mine, Sudbury, Ontario.**

submitted by Jason H. Rickard, B.Sc.,

in partial fulfillment of the degree of Master of Science

Thesis Supervisor

Chairman, Department of Earth Sciences

Carleton University

May 12, 2000

ABSTRACT

Petrographic and quantitative (Electron microprobe, SEM-EDS) mineral-chemical analyses have been completed on sulphides of all ore types from the 100 orebody at the Copper Cliff North mine, Copper Cliff, Ontario. This study has characterized the orebody, consisting predominantly of pyrrhotite, pentlandite, chalcopyrite, with minor michenerite, cobaltite/gersdorffite, irarsite, hessite, tsumoite, and bismuth tellurides. Sharp contacts between weakly mineralized quartz diorite and blebby to massive sulphides have been identified, indicating multiple intrusive phases within the Copper Cliff offset dyke. A spatial association between sulphides and hydrous minerals such as amphibole, biotite, chlorite, and epidote, suggests that most primary ore has been affected by later hydrothermal fluids.

A comparative geological and petrological study between the 100 orebody and the adjacent 900 and 890 orebodies has revealed distinct similarities in ore distribution, but the 100 orebody is depleted in PGE and has higher Po/Ni ratios relative to the 900 orebody. PGE from the 100 orebody may have been hydrothermally remobilized into the 900 orebody. Assay analyses of approximately 2000 ore samples have been used to describe the Cu, Ni, and PGE distribution between the eight different ore textures in the orebody. It has also been demonstrated that, unlike many other deposits in the Sudbury region, there is little correlation between chalcopyrite rich ore and PGE in the 100 orebody.

ACKNOWLEDGEMENTS

First I would like to thank my supervisor Dr. David Watkinson, whose insight and guidance in all things geological has allowed me to finish this thesis.

Financial support for this thesis was provided by INCO Ltd. Thanks go out to Dueane Sly for allowing me unlimited underground access to Copper North Mine, and to Dan Cooper, Rick Bourget and Brian Huston for trips underground and compilation of assay data and section maps. I would also like to thank Tim Lloyd and Rick Lacroix for their Datamine tutorials, and Chris Davis for giving me a chance to work throughout the Sudbury Basin and gain a greater appreciation for the geology.

I could not have completed this the work without the help of Peter Jones who provided me with excellent probe data, and Mike Jackson who did a wonderful job on my polished thin sections and was always willing to help with countless tasks. Mineralogical and geochemical aspects of this thesis benefited from discussions with Dr. André Lalonde and Dr. Richard Taylor.

My colleagues Matt, Darwin, and Zsuzsi provided me with both enlightening discussions on geology and ongoing entertainment throughout the year, and of course the office just wouldn't have been the same without Wanda.

I could not have gotten through this without the support and encouragement of Anastasia, who had to put up with me for the past couple of months. Finally, I'd like to thank my parents who have supported me through all my endeavors.

TABLE OF CONTENTS

THESIS TITLE	i
ACCEPTANCE FORM	ii
ABSTRACT	iii
ACKNOWLEDGMENTS	iv
TABLE OF CONTENTS	v
LIST OF FIGURES	vii
LIST OF PLATES	ix
LIST OF TABLES	xiii
LIST OF APPENDICES	xiv

CHAPTER 1: INTRODUCTION Page

1-1 PURPOSE OF STUDY	1
----------------------	---

CHAPTER 2: REGIONAL GEOLOGICAL SETTING

2-1 INTRODUCTION	4
2-2 REGIONAL GEOLOGY	6

CHAPTER 3: LOCAL GEOLOGY OF THE COPPER CLIFF NORTH MINE

3-1 INTRODUCTION	16
3-2 STOBIE FORMATION	21
3-3 ELSIE MOUNTAIN FORMATION	21
3-4 CREIGHTON GRANITE	22
3-5 SUDBURY MAIN MASS	
i. NORITE/QUARTZ DIORITE TRANSITION (FUNNEL)	23
ii. QUARTZ DIORITE	24
3-6 SUDBURY BRECCIA	33
3-7 FELSIC DYKES	37

CHAPTER 4: MINERALOGY AND MINERAL CHEMISTRY OF THE 100 ORE BODY, COPPER CLIFF NORTH MINE

4-1 INTRODUCTION	42
4-2 PETROGRAPHY AND COMPOSITION OF SULPHIDES AND OXIDES	
i. Pyrrhotite (hexagonal and monoclinic polymorphs)	45
ii. Pentlandite	48
iii. Chalcopyrite	53
iv. Magnetite	55
v. Sphalerite	58
vi. Pyrite	58

4-3 SILICATE ASSEMBLAGES	59
i. Amphibole	59
ii. Biotite	60
iii. Chlorite	61
iv. Epidote	61
4-4 INCLUSION MINERALOGY	62
4-5 PLATINUM GROUP MINERALS, ARSENIDES, SULPH-ARSENIDES AND TELLURIDES	65
 CHAPTER 5: MINERALOGY OF THE 890 AND 900 ORE BODIES, COPPER CLIFF NORTH MINE	
5-1 INTRODUCTION	75
5-2 PRECIOUS METAL MINERALS	76
 CHAPTER 6: ASSAY GEOCHEMISTRY	
6-1 INTRODUCTION	84
6-2 WHOLE-ROCK SULPHIDE ANALYSES BY ICP-MS (100 OREBODY)	85
6-3 GEOCHEMISTRY OF THE 100 OREBODY	87
6-4 DATAMINE MODELING OF THE 100 AND 900 ORE BODIES	94
 CHAPTER 7: DISCUSSION AND CONCLUSION	
7-1 INTRODUCTION	99
7-2 CONCLUSION	105
 REFERENCES	 110

	LIST OF FIGURES	Page
Figure 2-1	Regional geologic map of the Sudbury Basin, with Copper Cliff North mine location.	5
Figure 2-2	Metamorphic zones mapped within the Sudbury Basin, believed to be a mappable continuation of the nodal pattern in the rocks south of the Basin. After Magyarosi (1998).	10
Figure 3-1	Simplified geological map of the Copper Cliff offset, showing the location of the detailed mapping area.	17
Figure 3-2	Longitudinal section of the Copper Cliff North mine looking west. The surface mapping area and the 100, 900, and 890 orebodies are shown.	18
Figure 3-3	Development of clinopyroxene perpendicular to an intrusive contact between weakly mineralized quartz diorite and massive sulphide, 100 orebody, 3500 ft. level, Copper Cliff North mine. Microscope photograph at 2.5x.	31
Figure 3-4	Simplified geologic map of the 100 orebody at the 2700 ft. level of CCN mine.	34
Figure 3-5	Chondrite-normalized REE plot of the six felsic dykes from the CCN mine detailed mapping area.	40
Figure 4-1	a) Histogram of pyrrhotite Ni contents from the 100 orebody, CCN mine. b) Ni contents in pyrrhotite grains from the 100 orebody CCN mine. Analyses plotted as a function of ore texture. Blebby sulphide (BLBS), massive sulphide (MASU), stringers (STRS).	47
Figure 4-2	a) Histogram of the Co contents in pentlandite from the 100 orebody. b) Histogram of the Ni contents in pentlandite throughout the 100 orebody. c) Covariation between pentlandite flames and subhedral grains in two stringers from the 100 orebody.	51
Figure 4-3	a) Photograph of net-textured argentopentlandite and pentlandite in chalcopyrite in reflected light. 100 orebody, CCN mine. Magnification 20x. b) Photograph of argentopentlandite in and around pentlandite, within chalcopyrite. 100 orebody, CCN mine. Magnification 20x. c) Ternary plot of argentopentlandites from the 100, 900, and 890 orebodies.	52

Figure 4-4a	Composition of cobaltite grains analyzed from the 100, 900, and 890 orebodies. Analyses are in atomic percent. Massive sulphide (MASU), ragged disseminated sulphide (RGDI).	69
Figure 4-4b	Composition of zoned cobaltite grains from the 100, 900, and 890 orebodies. The grains are typically Co-rich relative to the grain cores, suggesting that the grains were formed by an evolving fluid.	69
Figure 4-5a	Zoned cobaltite in pyrrhotite from the 100 orebody, which has a Co-rich rim and a Ni-rich core.	71
Figure 4-5b	Zoned cobaltite in pyrrhotite from the 100 orebody, which has a Co-poor rim and a Co-rich core. A small amount of Rh is present in the inner rim.	71
Figure 4-6	a) Michenerite (Michenerite) grain with a tsumoite (Ts) along a silicate/pyrrhotite grain boundary. From a sulphide stringer in the 100 orebody. b) Michenerite with tsumoites from a different stringer in the 100 orebody. c) Michenerite from the 100 orebody can be divided into two groups based on Sb content. Sb appears to substitute for Bi in the michenerite structure.	72
Figure 4-7	Michenerite and tsumoite from two different stringers in drillcore from the 100 orebody, CCN mine.	74
Figure 5-1	a) Au-bearing froodite (Fd), bismuth telluride (BiTe), argentopentlandite (AgPn), and chalcopyrite (Cp) in gersdorffite (Ger), hosted by a carbonate/quartz vein within footwall metasedimentary rocks. b) Au-bearing froodite and parkerite (Pk) in gersdorffite hosted by the same carbonate/quartz vein. c) Ternary plot of Au-bearing froodite compositions from the 900 orebody, CCN mine. Au substitutes for Pd in the more Au-rich grains. Analyses are in atomic percent.	82
Figure 6-1	a) Ni and Co contents of four whole rock samples from the 3500 ft. level of the 100 orebody, CCN mine. b) Scatterplot of Fe versus Cu/Cu+Ni from four samples taken at the 3500 ft. level of the 100 orebody, CCN mine. mineralogical composition of pyrrhotite, pentlandite, and chalcopyrite are plotted for comparison. Disseminated sulphide (DISS), inclusion massive sulphide (INMS), massive sulphide (MASU).	86
Figure 6-2	a) Scatterplot of Fe-Cu-Ni contents of 2016 samples from the 100 orebody. All samples plotted as a function of ore texture.	88
Figure 6-2	b) Bar plot of the average Cu-Ni-Co contents of assay samples from the 100 orebody. Cu-Ni contents for SPKS based on 520 samples.	88

Co contents of SPKS based on 103 samples.

Figure 6-3	a) Scatterplot of Pt/Pt+Pd versus Cu/Cu+Ni from 729 assay samples from the 100 orebody. Each sample is divided as a function of ore texture.	92
Figure 6-3	b) Upper bar graph is a plot of the average Pt and Pd contents of 729 samples from the 100 orebody. The lower bar graph is a plot of the average Au contents of 542 samples from the 100 orebody. Each sample is divided as a function of ore texture.	92
Figure 6-4	a) Datamine image of CCN mine orebodies (longitudinal section) - boreholes filtered for mineralized zones. Colour-code refers to Cu/Ni ratios within zones (see legend for ranges). b) Datamine image of CCN mine orebodies (longitudinal section) - boreholes filtered for mineralized zones. Colour-code refers to Po/Ni ratios (see legend for ranges).	96
Figure 6-5	a) Datamine image of CCN mine orebodies (longitudinal section) - boreholes filtered for mineralized zones. Colour-code refers to Cu abundance (see legend for ranges). b) Datamine image highlighting the 100 and 900 orebodies (longitudinal section) - boreholes filtered for mineralized zones. Colour-code refers to TPM abundance (see legend for ranges).	97
Figure 7-1	Inclusion massive sulphide from the 3500 ft. level of the 100 orebody, Copper Cliff North mine. Note the accumulation of chalcopyrite around the ultramafic clast.	106

LIST OF PLATES

Plate 3-1a	Outcrop from the detailed mapping area, just south of the CCN mine. Most of the outcrop is covered by a black coating from open pit roasting of the ores during the first thirty years of processing at Sudbury. Much is also stained orange/red by oxidized sulphides and oxides.	20
Plate 3-1b	View of the super stack located at the Copper Cliff smelter, adjacent to the mapping area.	20
Plate 3-1c	Typical Creighton granite that is medium to coarse grained, with feldspar megacrysts up to 3.0 cm long.	20
Plate 3-1d	The contact of the Creighton pluton and the older Stobie Formation.	20

marked by a poorly sorted, contact breccia zone. The zone is characterized by large, sub-round, randomly oriented blocks (up to 1.0 m) of greenstone and granite set in a fine-grained groundmass.

Plate 3-2a	Quartz diorite (top) contact with the Creighton granite (bottom), marked by a thin chilled margin. Small rounded inclusions of granite are often found in the quartz diorite adjacent to the contact.	27
Plate 3-2b	At surface, greater concentrations of sulphide always coincide with larger and more abundant inclusions. This is reflected in exposures underground.	27
Plate 3-2c	At surface the contact between the blebby disseminated sulphides (abundant inclusions) and the barren or sulphide-poor quartz diorite (few inclusions) is sharp in many places.	27
Plate 3-2d	The outcrop surface is red/orange gossan with many spherical-shaped void spaces left after dissolution of sulphides from weathering. The sulphide blebs are 1-2 cm and composed mostly of pyrrhotite with lesser chalcopyrite and pentlandite.	27
Plate 3-3a	A knife sharp contact between blebby sulphide and massive sulphide. This is seen throughout the 100 orebody, representing an intrusive relationship between the early (sulphide-poor) quartz diorite and the later massive sulphide.	30
Plate 3-3b	Typical INMS that may contain 5-15% quartz diorite, with a variable amount of mafic and ultramafic inclusions. 3500 ft. level of the 100 orebody.	30
Plate 3-3c	Pyrrhotite- and pentlandite-rich massive sulphide stringers (up to 0.5 m wide) that extend into the surrounding amphibolites on the 3500 level of the 100 orebody.	30
Plate 3-3d	Transmitted light photomicrograph of a typical trap dyke (plane light) that displays a seriate to glomeroporphyritic texture in which medium-grained plagioclase and lesser pyroxene phenocrysts occur as clots within a fine-grained groundmass.	30
Plate 3-4a	An exposure of the 900 cross-fault on the 2700 ft level. It is dipping at approximately 50 degrees, with an upper 1.5 m thick sheared section and a lower 0.5 m thick more intensely sheared section. Hangingwall (HW), footwall (FW).	36

Plate 3-4b.	The upper portion of the 900 cross-fault that is less sheared than the lower portion. It is very biotitic, friable, and contains one large (25 cm), angular, potassium feldspar-rich fragment.	36
Plate 3-4c	A narrow felsic dyke (FD) within the quartz diorite. Many of these dykes pinch and swell along strike with a width that varies from 1.0 m to <1.0 cm.	36
Plate 3-4d	Sharp contact between a felsic dyke (FD) and the quartz diorite. Note the lower weathering profile of the biotite-rich quartz diorite.	36
Plate 3-4e	Sudbury breccia occurs in the NW corner of the map area. Large sub-round to sub-angular blocks of Creighton granite are found in a medium- to very fine-grained matrix.	36
Plate 3-4f	An undeformed Sudbury Breccia stringer appears to extend out from the edge of this feature into the granite	36
Plate 4-1a	Blebbly sulphide (BLBS) from the 100 orebody that displays 1-2 cm, sub-round blebs of pyrrhotite and pentlandite set in QD with some chalcopyrite occurring as grains in the blebs or as veinlets joining many of the blebs.	44
Plate 4-1b	Interstitial sulphide (INSU) in QD, where the sulphide is found interstitial to silicate grain boundaries. This ore is typically enriched in chalcopyrite.	44
Plate 4-1c	Chalcopyrite-rich quartz/carbonate veins and stringers within Stobie Formation rocks, adjacent to the 100 orebody. The vein rimmed by hydrous minerals, which is typical throughout the offset.	44
Plate 4-1d	Ragged disseminated sulphide (RGDI), characterized by angular and "drawn-out" blebs joined by veins. This is dissimilar to the RGDI ore described in the sublayer and refers to the jagged, cusp-like edges on all of the blebs.	44
Plate 4-2a	Exsolution flames of pentlandite in chalcopyrite along a pyrrhotite grain margins.	50
Plate 4-2b	Cubanite (Cub) as individual, euhedral lamellae with distinct gray to brown pleochroism. Chalcopyrite in interstitial sulphide contained the only cubanite observed in this study.	50
Plate 4-2c	Magnetite (Mag) grain in massive sulphide sub-round, with exsolution lamellae of ilmenite. The outer rim of magnetite is	50

interpreted as a later phase.

Plate 4-2d	Elongate, parallel crystals of ilmenite within chalcopyrite. The magnetite that originally enveloped the ilmenite appears to have been partially assimilated by the chalcopyrite.	50
Plate 4-3a	Magnetites surrounded by a thick rim of alteration minerals that include biotite, amphibole, and chlorite.	57
Plate 4-3b	Pyrite in a sample collected 0.5 m from the 900 cross-fault is euhedral to subhedral and readily forms long undulating chains in pyrrhotite. Some of the mica, pentlandite, and pleochroic lamellae of pyrrhotite are sub-parallel to the pyrite chains, indicating that the chains are a structural feature.	57
Plate 4-3c	Pyrite as very fine- to fine-grained subhedral masses filling in space between brecciated silicate inclusions. The pyrite may have formed from an oxidizing fluid.	57
Plate 4-3d	Amphibole and biotite surrounding sulphides in quartz diorite. This association is seen throughout the CCN offset deposits.	57
Plate 4-4a	Cobaltite (Cob) observed in polished-thin section that occurs as a discrete, euhedral grain in pyrrhotite.	68
Plate 4-4b	Cobaltite partially enveloped by sphalerite (Sph), with a small hessites (Hess) (Ag_2Te) at the grain margins.	68
Plate 4-4c	Cobaltite completely enveloped by sphalerite, with a small hessites near the grain margins.	68
Plate 4-4d	Cobaltite along a silicate/sulphide/oxide grain boundary adjacent to bismuth-tellurides (BiTe). Gersdorffite (Gers).	68
Plate 4-4e	Crystals of the sulpharsenide irarsite $[(\text{Ir.Ru.Rh.Pt})\text{AsS}]$, at the core of cobaltite grains.	68
Plate 4-4f	Crystals of the sulpharsenide irarsite, at the core of a cobaltite grain.	68
Plate 4-4g	Altaite (Alt) (PbTe) as anhedral grains in pyrrhotite and magnetite.	68
Plate 4-4h	An anhedral sperrylite (Sper) as a discrete grain in weakly disseminated QD.	68
Plate 5-1a	Argentopentlandite along the vein boundary of a chalcopyrite-rich	78

stringer from the 890 orebody. The majority of these grains are adjacent to silicate minerals (mostly amphibole), and border bismuth-tellurides and lead-tellurides.

Plate 5-1b	Hessite and altaite in the same stringer from the 890 orebody (see plate 5-1a). These tellurides occur as long anhedral grains in pyrrhotite.	78
Plate 5-1c	Pyrrhotite partially replaced by irregular blebs of bismuth-telluride, and adjacent to a small froodite [PdBi ₂]. Chalcopyrite has replaced pyrrhotite along the margins of a stringer from the 890 orebody.	78
Plate 5-1d	Cobaltite from the 890 orebody displays a Co-rich rim and a Ni-rich core and has irarsite at the core, similar to cobaltites from the 100 orebody.	78
Plate 5-1e	Zoned cobaltite from the 900 orebody that has a Co-rich rim and a Rh-rich core.	78
Plate 5-1f	Zoned cobaltite from the 900 orebody that has a Co-rich rim and a Rh-rich core.	78
Plate 5-2a	A carbonate/quartz vein in metasedimentary rock adjacent to the 900 orebody has an assemblage of chalcopyrite, pyrrhotite, nickeline (NiAs), Au-bearing froodite (PdBi ₂), parkerite (Ni ₃ (Bi,Pb) ₂ S ₂), bismuth-telluride, hessite, galena (PbS), argentopentlandite, and native bismuth in large masses of gersdorffite (NiAsS).	81
Plate 5-2b	Nickeline from the above carbonate/quartz vein occurs as a symplectic intergrowth or as subhedral masses with pyrrhotite in the gersdorffite. A calcium mineral (opaque in reflected and transmitted light) sometimes forms as a symplectic intergrowth with nickeline proximal to the gersdorffite/carbonate margin. Magnification 10x.	81

LIST OF TABLES

Table 2-1	The interpreted chronology of geologic events in the Sudbury region.	11
Table 2-2	Glossary of terms for the Sudbury region.	12
Table 6-1	Average Cu, Ni, and Co contents of each ore texture from the CCN mine.	90
Table 6-2	Pearson correlation coefficients for 684 assay samples from the 100 orebody, CCN mine. Includes all textural types.	90

Table 6-3	Pearson correlation coefficients for MASU and INSU samples from the 100 orebody, CCN mine. Data based on 17 MASU and 5 INSU samples.	93
Table 6-4	Average Pt, Pd, and Au contents of each ore texture from the CCN mine.	93

LIST OF APPENDICES

Appendix 1-1	List of abbreviations.	114
Appendix 3-1a	Underground map of the 100 orebody at the 2800 ft. level with sample locations, adapted from INCO level plans.	115
Appendix 3-1b	Underground map of the 100 orebody at the 3500 ft. level with sample locations, adapted from INCO level plans.	116
Appendix 4-2a	Diamond drill hole log for BH100105, drilled upwards at approximately 30° through the QD dyke from the 2400 ft. level (9300 N section).	117
Appendix 4-2b	Diamond drill hole log for BH100106, drilled upwards at approximately 45° through the QD dyke from the 2400 ft. level (9300 N section).	119
Appendix 4-5	List of all samples collected both at surface and underground at the CCN mine. Details on polished thin sections, electron microprobe and SEM-EDS analyses, petrography, X-ray diffraction analyses, and whole rock geochemistry are included.	120
Appendix 4-6	Comparison of the 100 orebody to other orebodies in the Copper Cliff offset dyke.	121
Disk	Electron microprobe and SEM-EDS analytical data, INCO assay data, and whole rock geochemical data.	

CHAPTER 1: INTRODUCTION

1-1 PURPOSE OF STUDY

The Copper Cliff North (CCN) mine is located approximately 4 km west of Sudbury, Ontario in the town of Copper Cliff. CCN mine is one of two mines currently in production along the mineralized Copper Cliff offset dyke. Operations at CCN mine have produced 44.8 million tons of ore (grading 0.83% Cu. and 0.83% Ni) from initiation of mining in 1960 to the end of 1996. Currently available ore reserves calculated above the 6000 ft level give an estimate of 19.8 million tons grading 1.40% Cu and 1.29% Ni. The seven main orebodies have variable sulphide contents and metal ratios, with an average copper to nickel ratio of 1.10:1, and a pyrrhotite to nickel ratio ranging from 9.7:1 to 20.5:1 (INCO Ltd., internal report).

It is generally believed that the quartz diorite (QD) offset dykes were intruded into rocks of the Southern and Superior provinces during the early stages of formation of the Sudbury Igneous Complex (SIC). Sulphides in the Copper Cliff offset form large "pod-like" orebodies that may be found at the centre or near the edges of the dyke. Each of the orebodies at CCN mine has a designated number that roughly refers to its position on one of several grid coordinate systems. The 100 orebody is the focus of this study, with lesser attention paid to the 900 and 890 orebodies. Field work for this study included detailed surface mapping (1:200 scale) of the 100 orebody around the CCN mine, to better understand the geological relationships between sulphides and host rocks with particular attention on sulphide distribution and mineralogy. Underground sampling and mapping

of all three orebodies provided additional insight into spatial and textural relationships between sulphides and hosts rocks, and structural aspects of the sulphide-rich veins.

Data from underground workings and diamond drill logs have been examined using a previously constructed Datamine[®] model provided by INCO Ltd. Datamine[®] is a computer modeling tool that enables the user to examine boreholes, assay data, lithological data, and orebody wireframes in 3-dimensional space. Access to this information in a modeling program provides the means to model both geochemical and structural trends within the mine. Observed trends in metal content may prove useful in future exploration drilling programs or in selecting ore zones for mining.

Petrographic and mineral-chemical analyses of ore minerals are the most effective way to interpret assay geochemistry and provide an insight into the genesis of the deposit. Important questions that are addressed include controls on the location of sulphides with respect to the quartz diorite host, and the controls on and extent of hydrothermal remobilization of Cu and platinum-group elements (PGE) within the orebodies and surrounding quartz diorite. This follows the work by Farrow and Watkinson (1997, 1996) and Everest (1999) in the north range of the Sudbury Basin, which suggests that the interaction of magmatic sulphides with saline fluids resulted in stripping and remobilization of metals into footwall rocks. The close spatial association of Cl-bearing hydrous minerals, occurrence of fluid inclusions, and the distinct texture of the sulphides is used as evidence for this interpretation.

A significant part of this study involves the relative proportion and distribution of the two major pyrrhotite phases (monoclinic and hexagonal). Monoclinic pyrrhotite is

typically ferromagnetic whereas hexagonal pyrrhotite tends to be non-magnetic. The great proportion of the latter phase in the 100 orebody, and its non-magnetic properties, has caused problems in the Ni recovery process. Hexagonal pyrrhotite is not separated from the sulphides sent to the flotation cells as part of the pyrrhotite rejection process, which results in low Ni recoveries. For this reason it is important to determine which domainal distributions of pyrrhotite polymorph. The identification of pyrrhotite proportions is also useful in understanding the history of sulphide concentration. Another area of interest is the Ni and Co contents of pyrrhotite and pentlandite within the ore. Quantitative analyses (electron microprobe) of these sulphides throughout the ore zone provide an insight into textural and genetic relationships.

A list of common abbreviations used in the Sudbury region is provided in Appendix 1-1. These include ore texture and mineral abbreviations found throughout the thesis.

CHAPTER 2: REGIONAL GEOLOGICAL SETTING

2-1 INTRODUCTION

The Sudbury Structure includes all rocks affected by the Sudbury event, which is a catastrophic episode that occurred at approximately around 1850 Ma. Emplaced into the structure is the Sudbury Igneous Complex (SIC) that outcrops as an oval-shaped feature (Figure 2-1), approximately 58 km long and 26 km wide that occupies the contact area between Archean rocks of the Superior province and Proterozoic rocks of the Southern province. The Superior province rocks are dominantly composed of gneisses and migmatites. The Southern province forms a belt of metasedimentary and mafic metavolcanic rocks that extends from the north shore of Lake Huron, through the Sudbury area and northeast towards Kirkland Lake. This sequence is bounded to the south and southeast by gneisses of the Grenville province, and the contact between them is defined by a sequence of folded metasedimentary rocks termed the Grenville front (Card, 1964; Card, 1978; Fleet, 1987).

The SIC can be subdivided into several units listed stratigraphically from bottom to top: footwall breccia, contact sublayer, norite, quartz gabbro, and granophyre. Sulphide ore is typically found within the contact sublayer, footwall breccias, Sudbury Breccia, and in quartz diorite offset dykes that extend radially into the footwall rocks from the main mass norite. Rocks within the basin are termed the Whitewater Group, and consist of three formations: Onaping (oldest), Onwatin, and Chelmsford (youngest) (see Dressler, 1984).

Figure 2-1: Regional geologic map of the Sudbury Basin, with Copper Cliff North Mine location.

2-2 REGIONAL GEOLOGY

The oldest rocks in the area are the granodioritic-quartz dioritic gneisses of the Levack complex (Superior province), which comprise the footwall rocks to the SIC in the north range. According to Dressler (1984), the compositional layering of mafic (amphibolite and granulite) and felsic phases suggest that the gneisses originated from a supracrustal sedimentary-volcanic protolith. Archean-aged metavolcanic and metasedimentary rocks form small belts north of the basin and have been metamorphosed to greenschist and amphibolite facies. The unconformably overlying Southern province is dominantly composed of Early Proterozoic volcanic and sedimentary rocks (Huronian Supergroup). This Supergroup is subdivided from oldest to youngest into the Elliot Lake Group, Hough Lake Group, Quirke Lake Group, and the Cobalt Group. The Huronian is characterized by cyclical units of mudstone, wacke, arenite, and conglomerate, with mafic and felsic flows and pyroclastic rocks restricted to the Elliot Lake Group. Three large granitic plutons intrude the Huronian rocks in the South Range, namely the Creighton, Murray, and Skead plutons. All are of Early Proterozoic age (~2333 Ma) and precede the formation of the Sudbury structure. Gabbroic dykes and sills of Early Proterozoic age (2160 Ma) intrude Huronian rocks throughout the Southern province and are younger than the granitic plutons (Dressler, 1984). These are described regionally as Nipissing diabase, but in the Sudbury area they are referred to as Sudbury gabbro.

Two hypotheses exist for the formation to the SIC: an impact origin (meteorite impact) and an endogenic origin (volcanic event) (see Peredery and Morrison, 1984). The more widely accepted impact model has been modified by several workers, but for the

most part suggests that the Sudbury region was impacted by a large meteorite that produced a huge explosion and resulted in the formation of a large basin and a unit of brecciated material (Onaping Formation). Sudbury Breccia (pseudo-tachylite), observed throughout the perimeter of the basin is interpreted as a shock feature and is proposed as evidence for an impact, as are shatter cones and shock-metamorphic (planar) features in quartz .

Peredery and Morrison (1984) suggested that subsequent sedimentation formed the rest of the Whitewater Group; unstable conditions in the lower part of the crust and mantle allowed basaltic magma to rise and intruded the perimeter of the basin, generating the SIC at around 1.85 Ga. A recent hypothesis by Marsh and Zieg (1999) proposes that the entire SIC is an impact melt sheet derived mostly from the crust. They give two possible scenarios: either 1) the granophyre was produced by melting of the granitic upper crust, while the underlying norite was from the lower crust, or 2) both are differentiates of the same melted body. Marsh and Zieg (1999) prefer emulsion mixing and crystal compaction over magmatic differentiation to explain the layered complex at Sudbury. The cross-cutting nature of the quartz diorite offset dykes through Sudbury Breccia indicates that they were injected into the surrounding country rocks after the impact event. Lightfoot et al. (1997) showed that the quartz diorite fills the compositional gap between the felsic norite and the granophyre. Therefore the quartz diorite may correspond to either the original magma that formed the SIC, or a later phase of intermediate composition produced from the main mass of the SIC.

Most of the ore within the sublayer, footwall breccia, and offset dykes have magmatic textures and resulted from segregation of a sulphide liquid from a silicate melt. In many cases the density contrast between the sulphide and silicate liquids has resulted in the formation of deposits at or near the base of the sublayer, especially in large embayments. The footwall breccia deposits in the North Range and to a lesser extent in the South Range became mineralized by mobilization of the primary sulphide liquid into the more permeable breccia unit. These ores generally have Cu/Ni ratios less than or equal to 1 and have low PGE values (Morrison et al., 1994; Binney et al., 1994). The Cu-rich vein deposits in the footwall of the North Range typically contain more abundant platinum group minerals (PGM) and may be formed by hydrothermal remobilization processes (see Farrow and Watkinson, 1996; Farrow and Watkinson, 1997; Everest, 1999; Watkinson, 1999)

Metamorphism and deformation of the Sudbury structure are important aspects that must be considered when studying the Sudbury ore deposits. Metamorphic grade is of lower amphibolite facies in most of the Southern province rocks and gradually decreases northward from upper greenschist facies in the South Range to lower- or sub-greenschist facies in the North Range (Card, 1978; Fleet et al., 1987; Magyarosi, 1998). Structural and metamorphic evidence indicate that the South Range rocks have been uplifted relative to the North Range. Rousell (1975) suggested that the Sudbury basin was never circular but deformation related to the Penokean orogeny through thrusting from the southeast, and folding in the South Range left the North Range relatively undeformed. The resultant fold axes and regional foliation are parallel to the long axis of the basin.

The timing of the major metamorphic event affecting the Sudbury Basin is still a matter of debate. Card (1978) argued that major metamorphism was related to the Penokean orogeny and occurred before intrusion of the SIC, citing geochronological evidence and some field relationships. Fleet et al. (1987) and Magyarosi (1998) suggested that metamorphism (Penokean) occurred after intrusion of the SIC. Both agree that the isograd between greenschist facies and amphibolite facies rocks crosses the SIC into the Southern province. Metamorphic zones within the Sudbury Basin are therefore believed to be a mappable continuation of the nodal pattern observed in the rocks south of the Basin (Figure 2-2). Further evidence is given by chlorite porphyroblasts in Sudbury Breccia that grow across the clast/matrix boundary, indicating that metamorphism occurred after formation of the Sudbury structure (Magyarosi, 1998). The interpreted chronology of events is presented in Table 2-1. Riller and Schwerdtner (1997) presented evidence that suggests amphibolite facies metamorphism and deformation was caused by early Blezardian tectonism (2.4-2.2 Ga), and greenschist metamorphism and deformation of the SIC was produced by later Penokean thrusting from the southeast.

As previously mentioned, it is generally accepted that the primary sulphide deposits within the sublayer resulted from the separation of an immiscible sulphide liquid from a silicate melt. However, recent studies of the Ni-Cu-PGE deposits in the Sudbury structure indicate that contact metamorphism and later adjustments to the Sudbury structure may have played a role in the redistribution of base and precious metals and other elements as chloride complexes in fluids. Chlorine-bearing hydrous minerals and calcic minerals occur together with ore minerals, and fluid

Figure 2-2: Metamorphic zones mapped within the Sudbury Basin, believed to be a mappable continuation of the nodal pattern in the rocks south of the Basin. After Magyarosi (1998)

Table 2-1: The interpreted chronology of geologic events in the Sudbury region (adapted from Magyarosi (1998), and Card (1978)).

Event	Associated Rock Unit	Age (Ga)
Pleistocene and Recent	Till, glaciofluvial deposits	
Unconformity		
Paleozoic (Ordovician to Silurian)	Limestone, shale	
Unconformity		
Late Precambrian Grenville orogeny Mafic intrusion	Late diabase dykes	1.28
Middle Precambrian Hudsonian orogeny? Deformation, metamorphism	Grenville front and Cutler plutons	1.6-1.75
Sudbury event	Nickel Irruptive Whitewater Group	1.85
Penokean orogeny - metamorphism and deformation (continues until after Sudbury event?)		1.9
Mafic intrusion	Nipissing diabase	2.15
Early metamorphism and low grade metamorphism		
Felsic intrusion	Murray, Creighton, Skead plutons	2.2
Bleazardian tectonism (Amphibolite grade metamorphism?)		2.2-2.4
Sedimentation	Huronian Supergroup	
Unconformity		
Early Precambrian (Archean) Mafic intrusion Felsic intrusion Kenoran orogeny		2.6

Table 2-2: Glossary of terms for the Sudbury region.

<i>Quartz diorite (QD)</i>	Quartz diorite is the main igneous rock type within the Offset dykes that extend radially or concentrically from the main mass of the SIC. These may also be termed offset sublayer and are host to many of the major ore deposits in the Sudbury region. Mineralogy of the quartz diorite varies slightly between the dykes and is dependent on crystallization conditions and metamorphic alteration.
<i>Inclusion quartz diorite (IQD)</i>	Quartz diorite that contains inclusions is termed inclusion quartz diorite. These inclusions are of variable size and composition, dependent on the source rocks from which they were derived and on flow differentiation within the dyke. Ore mineralization is typically associated with inclusion bearing QD.
<i>Sudbury Igneous Complex (SIC)</i>	Is a large differentiated, layered igneous complex consisting of granophyre, quartz gabbro, felsic norite, mafic norite, and contact sublayer. This complex defined the shape of the Sudbury Basin and is host to many of the Ni-Cu-PGE deposits.
<i>Contact sublayer</i>	Stratigraphically it is the lowermost unit in the SIC and is the main ore-bearing rock in the Sudbury Basin. It is a noritic unit characterized by mafic and ultramafic inclusions of variable size.
<i>Footwall breccia</i>	A term that encompasses breccias found in the footwall of the SIC. It is characterized by abundant footwall derived fragments, with or without sulphides. Many of the deposits in the North Range are hosted by these breccias.
<i>Sudbury Breccia</i>	This is a pseudotachylitic rock formed as a result of the propagation of shock waves through the country rocks. This is directly related to the major impact event that formed the Sudbury Basin. The rock consists of rounded rock fragments in a finely comminuted grey- to dark-coloured matrix.

<i>Sudbury Basin</i>	This is a general term to encompass the layered SIC that defines the Basin, the Offset dykes and the Whitewater Group sediments that fill the Basin.
<i>South Range</i>	The southern part of the SIC defined by a higher degree of deformation and metamorphism relative to the northern portion of the SIC. The footwall rocks in the south are generally those of the Southern province, while the footwall rocks in the north are of the Superior province gneisses.
<i>Inclusion massive sulphide (INMS)</i>	The major ore type found along the Copper Cliff Offset dyke. This is characterized by rounded, mafic and ultramafic inclusions set in massive sulphide and QD. It is similar to gabbro peridotite inclusion sulphide (GPIS) and breccia sulphide (BXSU). BXSU is typically sub-divided based on the angularity of inclusions and a slightly lower sulphide content.
<i>Interstitial sulphide (INSU)</i>	An ore type defined by sulphides that fill in the interstices between euhedral plagioclase, amphibole, and pyroxene.
<i>Ragged disseminated sulphide (RGDI)</i>	An ore type found along the Copper Cliff Offset that is characterized by crescent or cusp-like sulphide masses in IQD. This is slightly different from the RGDI typically described within the contact sublayer.
<i>Massive sulphide (MASU)</i>	A common ore type in Copper Cliff Offset deposits that is characterized by 85-95% sulphide. Contains variable amounts of pyrrhotite, pentlandite and chalcopyrite.
<i>Stringer sulphide (STRS)</i>	Sulphide mineralization in narrow veins. Contains variable amounts of pyrrhotite, pentlandite and chalcopyrite.
<i>Copper Cliff funnel</i>	This is a funnel-shaped igneous body at the northern portion of the Copper Cliff Offset that joins the dyke to the main mass. The transition from norite to quartz diorite occurs within the southern part of the funnel.

inclusion studies reveal that saline fluids were in contact with sulphides. The presence of these assemblages in both the North and South Ranges indicates that their formation cannot be exclusively related to regional metamorphic processes in the South Range (Molnar et al., 1997).

The intrusion of the SIC produced a contact metamorphic aureole which extends up to 1.5 km into the surrounding rocks. Riller et al. (1996) presented detailed magnetic fabric and microstructural evidence which indicates that amphibolite-grade metamorphism of the Murray pluton adjacent to the SIC was a contact metamorphic effect. In the NW portion of the Murray pluton, adjacent to the SIC, a structural overprint is recorded by a magnetic fabric parallel to the contact with the SIC. In the SE portion of the pluton away from the SIC, the rocks are not recrystallized, are of greenschist facies, and the magnetic fabric is subparallel to the mineral foliation in the granite.

A number of workers have presented evidence that suggests Cl-rich brines, originating in the footwall rocks of the North and South Range, stripped metals from deposits in the sublayer and footwall breccia and redeposited them in the footwall. These secondary deposits are generally enriched in Cu and PGE (Farrow and Watkinson, 1996; Farrow and Watkinson, 1997; Molnar et al., 1997; Molnar et al., 1998; Everest, 1999; Watkinson, 1999). Sudbury Breccia and fracture systems provided suitable zones for fluid circulation (Molnar et al., 1997; Molnar et al., 1998). These saline, Cl-rich fluids produced variable alteration assemblages that consist mainly of epidote, chlorite, $\pm$ magnetite, $\pm$ quartz, $\pm$ K-feldspar, $\pm$ titanite, $\pm$ garnet (Farrow and Watkinson, 1996; Farrow and Watkinson, 1997). The relative timing of the intrusive phases in the SIC is

controversial, but considering that essentially no sulphides are present in the overlying noritic rocks, it may be assumed that the sublayer was intruded first and the subsequent heat engine for circulation of hydrothermal fluids was provided by the later norite (Molnar et al., 1997; Watkinson, 1999). This is also consistent with Riller et al. (1996) who suggest an intrusive origin of the norite.

CHAPTER 3: GEOLOGY OF THE COPPER CLIFF NORTH MINE AREA

3-1 INTRODUCTION

The Copper Cliff offset dyke extends south from the SIC into rocks of the Southern province. This quartz diorite dyke begins as a 2 km wide funnel-shaped embayment that gradually thins to approximately 40 m, and continues a further 6 km to the south (Figure 3-1). The dyke dips steeply to the west, with a strike varying from SE to directly S. The area mapped in this study begins at the south end of the Clarabelle open pit, adjacent to the North mine headframe, and extends 400 m to the south (Map 1). The ore exposed within this area is of low grade but is considered to be the surface expression of the 100 orebody (Figure 3-2). The western edge of the dyke is in contact with the Creighton granite throughout the field area, but contacts both the Stobie Formation and the Creighton granite on the eastern side. The dyke cross-cuts every unit in the area except an E-W striking, 14 m wide quartz diabase ("trap") dyke that offsets the QD by 41 m to the east. There is an extensive amount of outcrop in the area but much is covered by a black coating (Plate 3-1a), resulting from open pit roasting of the ores in the first thirty years of processing at Sudbury. Despite the lack of pristine outcrops, this is an excellent area to observe geological relationships that are not readily seen in underground workings.

Figure 3-1: Simplified geological map of the Copper Cliff Offset, showing the location of the detailed mapping area.

Figure 3-2: Longitudinal section of the Copper Cliff North Mine looking west. The surface mapping area, and the 100, 900, and 890 orebodies are shown.

- Plate 3-1a Outcrop from the detailed mapping area, just south of the CCN mine. Most of the outcrop is covered by a black coating from open pit roasting of the ores during the first thirty years of processing at Sudbury. Much is also stained orange/red by oxidized sulphides and oxides.
- Plate 3-1b View of the super stack located at the Copper Cliff smelter, adjacent to the mapping area.
- Plate 3-1c Typical Creighton granite that is medium to coarse grained, with feldspar megacrysts up to 3.0 cm long.
- Plate 3-1d The contact of the Creighton pluton and the older Stobie Formation, marked by a poorly sorted, contact breccia zone. The zone is characterized by large, sub-round, randomly oriented blocks (up to 1.0 m) of greenstone and granite set in a fine-grained groundmass.

b

d

a

c

3-2 ELSIE MOUNTAIN FORMATION

The Elsie Mountain Formation is a sequence of metavolcanic and metasedimentary rocks that occur to the north of the detailed map area along the eastern contact of the funnel. They are the footwall rocks to the sublayer-type deposits seen within the funnel and the footwall deposits of the Little Stobie mine. According to Davis (1984), the formation consists mainly of medium to coarse grained, dark green to black metabasaltic flows that dip vertically and face southward. These greenstones have undergone greenschist and amphibolite facies metamorphism, probably related to the Penokean orogeny. The metasedimentary rocks are typically dark grey arkose and wacke.

3-3 STOBIE FORMATION

The footwall rocks to the 100 orebody at depth are typically those of the Stobie Formation. Like the Elsie Mountain, the Stobie Formation is part of the Elliot Lake Group and is composed of metavolcanic and metasedimentary rocks. It has an estimated true thickness of up to 1500 metres (Dressler, 1984) and is stratigraphically above the Elsie Mountain Formation. All the rocks have been metamorphosed to greenschist and locally amphibolite facies, and are commonly referred to as greenstone and amphibolite within the mine. These rocks are generally medium to dark green, fine to coarse grained, and show a moderate to strong schistosity. The mineral assemblage is characterized by chlorite, biotite, feldspar, quartz, $\pm$ amphibole. Staurolite-rich beds occur within the greenstone immediately to the east of the map area. Protoliths to the metavolcanic rocks

are thought to be basaltic and andesitic flows with intercalated pyroclastic rocks (Owen and Coats, 1984), and the metasedimentary rocks were probably arenites and argillites.

3-4 CREIGHTON GRANITE

The hangingwall rock to the QD dyke within the map area is the Creighton granite. This holds true only for the surface exposure, since it is more common to have the Stobie Formation greenstones along the hangingwall contact within the mine. The granite is medium to coarse grained and typically has feldspar megacrysts up to 3.0 cm (Plate 3-1c). It is generally pink to white, but medium to dark grey phases exist. It has the usual granitic mineralogy of plagioclase, potassic feldspar, quartz, and biotite. Secondary veinlets of chlorite and epidote may be seen throughout. The rock is for the most part massive, but may display a weak to strong foliation.

The intrusive boundary between the Creighton pluton and the older Stobie Formation is marked by a poorly sorted, contact breccia zone (Plate 3-1d). Large sub-round blocks (up to 1.0 m) of greenstone and granite occur in a breccia zone (extending up to 10 m from granite contact) in which these blocks are randomly oriented within a fine-grained groundmass. The fine-grained breccia matrix between the blocks may vary in thickness from 0.1 cm to 10 cm. One 2-3 m block of amphibolite was found 75 m away from the contact within the granitic rocks. This may be an inclusion of the Stobie Formation picked up during intrusion of the Creighton pluton.

3-5 QUARTZ DIORITE OFFSET DYKE

i. Main Mass Norite/Quartz Diorite Transition (Funnel)

The so-called “funnel” found at the northern extent of the offset is an interesting feature, both in terms of the ore deposits and in the little-understood transition from norite and contact sublayer to quartz diorite. The quartz diorite is commonly termed offset sublayer, but is distinct from the contact sublayer that is the lowermost unit in the main mass of the SIC. Economically significant sulphide mineralization within the funnel is generally restricted to the contact sublayer in the northern parts, and in QD towards the south (see also Cochrane, 1984). Green norite is stratigraphically the upper most unit in the funnel, which with increasing depth grades into alternating layers of green norite and quartzose green norite. Green norite is so-called because of the development of chlorite after pyroxene, and is restricted to the South Range of the Sudbury structure. These layers of green norite and quartzose green norite vary in thickness and contain sporadic amounts of small mafic inclusions that are observed in greater abundance in some units. The deeper parts of the funnel contain only repeating layers of quartzose green norite and at the base come in relatively sharp contact with sublayer-type rocks. These are characterized by larger mafic (greenstone) and mafic inclusions within a medium grained noritic groundmass. The contact sublayer occurs at the margins of the funnel in contact with the footwall rocks, but with increasing distance south and in some cases depth, changes to quartz diorite in composition. The transition between the quartzose green norite and QD is gradational over several metres (Cochrane, 1984; Lightfoot et al., 1997).

ii. Quartz Diorite

Quartz diorite dykes occur throughout the Sudbury basin near the margins of the SIC, and may be subdivided into three types: a) radial offset dykes (like the Copper Cliff offset), b) parallel or concentric dykes that are either continuous or discontinuous and strike sub-parallel to the contact of the SIC, and c) small discontinuous bodies of quartz diorite that occur in "failed" offset or embayment structures of the main mass (Creighton offset). The mineralogical composition varies within and among QD dykes and may be divided into hypersthene QD, pyroxene QD, amphibole-biotite QD, biotite QD and spherulitic QD (Grant and Bite, 1984). The quartz diorite in the Copper Cliff area is composed dominantly of plagioclase, quartz, amphibole, biotite, chlorite, epidote, $\pm$ stilpnomelane, $\pm$ apatite, $\pm$ orthopyroxene. The predominant opaque minerals are pyrrhotite, pentlandite, chalcopyrite, magnetite, pyrite, cubanite, ilmenite, $\pm$ argentopentlandite, $\pm$ sphalerite, $\pm$ galena.

Cochrane (1984) pointed out that the sulphides occur within elongate, pipe-like orebodies either near the centre of the dyke or along the eastern edge. Sulphides tend to be associated with inclusion-bearing quartz diorite (IQD), so named for the presence of mafic and ultramafic inclusions. The inclusions are derived from the surrounding country rocks, an unknown ultramafic source, and the QD itself. Smaller inclusions tend to be amphibolite, metasedimentary rocks, quartzite, feldspathic rocks (anorthosites?), biotitites (fine-grained biotite with quartz), and granites, while larger inclusions are metagabbro, metaperidotite, quartz diorite, norite, and Sudbury Breccia (see also Cochrane, 1984).

In the mapping area, the QD contacts with the Creighton granite are generally barren of sulphides and marked by a thin chilled margin (Plate 3-2a). The QD is fine-grained for at least 5-10 cm from the contact, then it may develop into a zone of spherulitic QD at about 15-20 cm from the granite. This zone of spherulitic QD (~30 cm wide) consists of long, randomly oriented blades of amphibole (up to 2.0 cm) in a medium-grained plagioclase/quartz groundmass. The margins of the dyke are typically sulphide-poor, medium-grained QD with occasional subangular to subrounded granitic and quartzo-feldspathic inclusions (<2.0 cm), and some small, fine-grained greenstone inclusions. Greater concentrations of sulphide always coincide with larger and more abundant inclusions (Plate 3-2b). These inclusions may be up to 7.0 cm long and vary in composition from amphibolites to metasedimentary rocks. Inclusions are commonly rimmed by medium-grained biotite, probably from reaction with the primary magma. The contact between the blebby disseminated sulphides (abundant inclusions) and the barren or sulphide-poor QD (few inclusions) is obscured in most places but appears sharp (Plate 3-2c).

The sulphide assemblage exposed at surface is finely disseminated to blebby disseminated and of low grade (<1-5% sulphide). Sulphide blebs are 1-2 cm and composed mostly of pyrrhotite with less abundant chalcopyrite and pentlandite. The outcrop surface is red/orange gossan with many spherical-shaped void spaces (Plate 3-2d), left after dissolution of sulphides from weathering. The weathering rind is 0.5 to 1 cm thick, and sulphides have become oxidized up to 2 or 3 cm below this rind.

- Plate 3-2a Quartz diorite (top) contact with the Creighton granite (bottom), marked by a thin chilled margin. Small rounded inclusions of granite are commonly found in the quartz diorite adjacent to the contact.
- Plate 3-2b At surface, greater concentrations of sulphide always coincide with larger and more abundant inclusions. This is reflected in exposures underground.
- Plate 3-2c At surface the contact between the blebby disseminated sulphides (abundant inclusions) and the barren or sulphide-poor quartz diorite (few inclusions) is sharp in many places.
- Plate 3-2d The outcrop surface is red/orange gossan with many spherical-shaped void spaces left after dissolution of sulphides from weathering. The sulphide blebs are 1-2 cm in diameter and composed mostly of pyrrhotite with lesser chalcopyrite and pentlandite.

Three staurolite pseudomorphs varying in size from 1.0 to 3.0 cm long were found as inclusions within the dyke. These were light grey, euhedral and showed the typical staurolite interpenetrant twin. Each was replaced by fine- to medium-grained epidote, muscovite, and chlorite and rimmed by a halo of medium-grained biotite. The source of the staurolite may be the metasedimentary rocks of the Stobie or Elsie Mountain Formations, picked up and incorporated into the QD during intrusion. The staurolite-rich beds in the Stobie Formation adjacent to the mapping area are a possible source for the crystals. Similar pseudomorphs have also been recorded at the Copper Cliff South mine and in drill core from the funnel near Pump Lake.

Underground workings provide an excellent opportunity to observe sulphide distribution within the dyke and “fresh” sulphide textures. The 100 orebody generally occupies the centre of the dyke, but this is not always the case. Some parts of the orebody are located at the edge of the dyke and may extend a short distance into the country rocks.

When the ore body is in the centre (see Appendices 3-1a and b), the outer edge contains weakly disseminated sulphide that gradually increases into blebby disseminated or ragged disseminated (RGDI) ore toward the centre (from the footwall toward the hangingwall). The blebby disseminated ore contains more inclusions and the blebs are slightly more abundant away from the footwall. The contact between the blebby sulphide and the massive sulphide (MASU) is knife sharp (Plate 3-3a), showing a transition from ~5% total sulphide to 80 or 90% sulphide. This grades (metres) into INMS that may contain 5-15% quartz diorite, with a variable amount of mafic and ultramafic inclusions

- Plate 3-3a A knife sharp contact between disseminated sulphide and massive sulphide (MASU). This is seen throughout the 100 orebody, representing an intrusive relationship between the early (sulphide-poor) quartz diorite and the later MASU. Sample CCN99-24.
- Plate 3-3b Typical inclusion massive sulphide that may contain 5-15% quartz diorite, with a variable amount of mafic and ultramafic inclusions. 3500 ft. level of the 100 orebody.
- Plate 3-3c Pyrrhotite- and pentlandite-rich massive sulphide stringers (up to 0.5 m wide) that extend into the surrounding amphibolites on the 3500 level of the 100 orebody.
- Plate 3-3d Transmitted light photomicrograph of a typical trap dyke that displays a seriate to glomeroporphyritic texture in which medium-grained plagioclase and less abundant pyroxene phenocrysts occur as clots within a fine-grained groundmass. Field of view 3.5 mm in length. Sample CCN98-11.

(Plate 3-3b). The centre part of the orebody may also have sections of MASU, which contains only a few small inclusions.

In some cases, the orebody is in contact with the footwall metasedimentary rocks. In one exposure at the 3500 foot level, the orebody is dominantly composed of INMS that grades into MASU toward the footwall. This is in sharp contact with a narrow section of interstitial sulphide-bearing QD (Figure 3-3) that shows a 2.0 cm wide margin at the contact. The margin is medium grained, relatively barren of sulphides, and has large crystals of clinopyroxene oriented perpendicular to the contact. The clinopyroxene is found with medium-grained plagioclase, biotite, amphibole, chlorite, and quartz. These textural features suggest an intrusive contact between the MASU and the weakly mineralized QD. Further toward the footwall, massive sulphide stringers (up to 0.5 m wide) extend into the surrounding amphibolites (Plate 3-3c). A few chalcopyrite-rich quartz/carbonate veins continue into the footwall rocks and represent the limit of sulphide assemblages.

Trap dykes cross-cut both sulphides and QD in these areas, probably occupying structural pathways at the QD dyke margins. The trap dykes (Plate 3-3d) display a seriate to glomeroporphyritic texture in which medium-grained plagioclase and less abundant pyroxene phenocrysts occur as clots within a fine-grained to devitrified glassy groundmass. These dykes are typically less than 10-15 cm wide and may have an aphanitic chilled margin.

Major faulting has occurred locally within the mine, displacing both the 100 and 900 orebodies. The number 2 cross-fault and the 900 orebody cross-fault are steeply-

Figure 3-3: Development of clinopyroxene perpendicular to an intrusive contact between weakly mineralized quartz diorite and MASU, 100 orebody, 3500 ft. level, CCN Mine. Microscope photograph at 2.5x.

dipping, approximately parallel brittle/ductile faults that intersect the 100 orebody at the 2000 ft and 2700 ft. levels, respectively. Dip-slip movement along the 900 cross-fault displaces the 100 orebody by approximately 25 metres (Dan Cooper-INCO mine geologist, personal communication). An exposure of the fault on the 2700 ft. level (Figure 3-4, and Plate 3-4a) shows it dipping at approximately 50 degrees, with an upper 1.5 m thick sheared section and a lower 0.5 m thick more intensely sheared section. The upper part is very biotitic, friable, and contains one large (25 cm), angular, potassic feldspar-rich fragment (Plate 3-4b). The lower section contains long breccia fragments of both the surrounding country rock and some pink feldspathic clasts. Barren carbonate veins are found sub-parallel to foliation. The lower contact with the INMS is sharp, and one chalcopyrite-bearing quartz/carbonate vein extends into the INMS, perpendicular to the fault. Petrographic examination of the INMS proximal to the fault reveals extensive brecciation, and development of parallel chains of pyrite. The formation of pyrite may indicate oxidation of sulphides by fluids that moved along the fault. The occurrence of these grains in pyrrhotite suggests that the pyrite formed by oxidation of pyrrhotite.

3-5 SUDBURY BRECCIA

Sudbury Breccia is quite common at or near the contact between the granite and QD. This breccia occurs mostly as 1.0 cm to 0.5 m wide stringers in the granite. The average stringer orientation is roughly NE-SW, which appears to coincide with the regional-scale NE trending Frood-Sudbury breccia zone. The breccia at surface contains little or no sulphide, but according to Cochrane (1984), breccias adjacent to the offset

Figure 3-4: Simplified geological map of the 100 orebody at the 2700 ft. level of the CCN Mine.

- Plate 3-4a An exposure of the 900 cross-fault on the 2700 ft level. It is dipping at approximately 50 degrees, with an upper 1.5 m thick sheared section and a lower 0.5 m thick more intensely sheared section. Hangingwall (HW), footwall (FW).
- Plate 3-4b. The upper portion of the 900 cross-fault that is less sheared than the lower portion. It is very micaceous, friable, and contains one large (25 cm), angular, potassium feldspar-rich fragment.
- Plate 3-4c A narrow felsic dyke (FD) within the quartz diorite (QD). Many of these dykes pinch and swell along strike with a width that varies from 1.0 m to <1.0 cm.
- Plate 3-4d Sharp contact between a felsic dyke (FD) and the quartz diorite. Note the lower weathering profile of the biotite-rich quartz diorite. Blebby sulphide (BLBS).
- Plate 3-4e Sudbury breccia occurs in the NW corner of the map area. Large sub-round to sub-angular blocks of Creighton granite are found in a medium- to very fine-grained matrix.
- Plate 3-4f An undeformed Sudbury Breccia (SUBX) stringer appears to extend out from the edge of this feature into the granite

often contain chalcopyrite-rich stringers. One large zone of Sudbury Breccia occurs in the NW corner of the map area (Plate 3-4c), where enormous sub-round to sub-angular blocks of Creighton granite occur in a very fine-grained matrix. There, most blocks are greater than 1-2 m.

An unusual feature found within the Creighton granite, previously mapped as a "trap" dyke (Szentpéteri, 1999), is most certainly not a diabasic dyke and is probably not a dyke at all. The rock is dark green to black, fine- to medium-grained, contains numerous quartz and granitic inclusions, is in sharp contact with the granitic country rocks, and is composed of amphibole, biotite, plagioclase and quartz. Biotite is in greater abundance near inclusions. Unlike typical trap dykes of this area, this rock has a strong foliation sub-parallel and parallel to contacts, contains large (breccia?) inclusions, and is metamorphosed to amphibolite grade. An undeformed Sudbury Breccia stringer appears to extend out from the edge of this feature into the granite (Plate 3-4d), therefore it cannot be older than the Sudbury event. Given this evidence, it may be a long sheared section of the Stobie Formation picked up during intrusion of the Creighton granite prior to the Sudbury event.

3-6 FELSIC DYKES

The quartz diorite is host to several felsic dykes (see also Szentpéteri, 1999) that strike sub-parallel to the QD and appear to pinch and swell along strike (Plate 3-4e). Width varies from 1.0 m to <1.0 cm and they may be traced for as much as 5 to 15 metres, at which point they are discontinuous. Most of the dykes may be correlated along

strike, suggesting that they are a late magmatic differentiate and were intruded into a zone of weakness in the partly crystallized magma. Contacts with the QD are sharp (Plate 3-4f) and most evident on surfaces where the more biotite-rich QD displays a lower weathering profile. Most dykes are light to medium white/grey, fine- to medium-grained, equigranular, with local aplitic texture. The occurrence of pink feldspar is quite common and is the result of hematite staining of plagioclase. The more pink-coloured dykes are found toward the northern part of the mapping area. A thin chilled margin occurs at contacts, but no significant sulphides surround this contact or are disseminated within it. One dyke examined petrographically contains 40-45% plagioclase (albite), 35% quartz, 15% biotite, 5-10% microcline and minor perthite, 3% epidote, 1% chlorite, <1% muscovite. Subhedral to euhedral epidote is disseminated through the plagioclase, and is also commonly associated with biotite. A 0.5 cm weathering rind is common, shown by the alteration of plagioclase to sericite and clay minerals. Fractures and some quartz veins are continuous through the QD and the felsic dykes, sometimes associated with chalcopyrite and epidote (and/or chlorite) alteration.

An unusual pegmatitic dyke also occurs within the QD and has a similar orientation to that of the felsic dykes. In hand-sample this rock is dark pink to white, fine- to coarse-grained, locally equigranular, with large "pods" of pegmatitic plagioclase feldspar and quartz. Granophyric intergrowths of feldspar and quartz are obvious in the pegmatite. The pegmatitic areas contain little or no biotite, whereas other sections have fairly abundant biotite that is typically less than 1.0 mm. Quartz often occurs as clots or in veinlets. The rock consists of 45% plagioclase feldspar, 40% quartz, 7% biotite, 7%

chlorite, and 1% epidote. The plagioclase is speckled with fine-grained hematite, but is identifiable by its albite twins and tabular habit. Most quartz grains have an undulatory extinction and serrated grain boundaries. Biotite and chlorite occur throughout and are often associated with fine-grained epidote. A felsic dyke is in close spatial association with this pegmatite body, and appears to be much more biotitic than the other dykes. This suggests a higher degree of alteration or a variation in the original fluid/magma composition. Small, centimetre-scale, micropegmatitic dykes also occur within the QD, but in an orientation that is almost perpendicular to the QD and the felsic dykes. These have a uniform width, sharp contacts, and do not appear to extend into the Creighton granite.

Rare earth element (REE) geochemical data was obtained from six of these dykes by inductively coupled plasma-mass spectrometry (ICP-MS) performed at the Geological Survey of Canada. The weathered surfaces of the rock samples were cut off with a rock saw, then the fresh pieces were crushed in a small jaw crusher. A portion of this was pulverized into a powder in a quartz agate ring mill.

Chondrite normalized plots reveal that three of the dykes have very similar REE patterns, while the others have somewhat different patterns (Figure 3-5). Samples 74, 72, and 45 have patterns characteristic of intermediate igneous rocks: the slope of the pattern from La to Lu is consistent with the process of fractional crystallization. The bottom three samples [70, 40, and 41(pegmatite)] are depleted in LREE and slightly enriched in HREE. This may be due to reaction with a later fluid phase resulting in preferential removal of LREE. These three samples are found both at the northern and southern

Figure 3-5: Chondrite-normalized REE plot of the six felsic dykes from the CCN Mine detailed mapping area.

extents of the detailed map area, and in hand sample appear to be more altered than the others. All three show variable amounts of hematization of the feldspars. The $(\text{La/Lu})_{\text{CN}}$ ratio is useful in determining the overall slope of the normalized plot. Samples 74, 72, and 45 have $(\text{La/Lu})_{\text{CN}}$ ratios between 3.33 and 5.65, whereas samples 70, 40, and 41 have markedly lower ratios between 0.81 and 1.90. The Eu/Eu^* ratio is used for calculating the europium anomaly, which is an enrichment or depletion in Eu relative to samarium (Sm) and gadolinium (Gd). A Eu/Eu^* ratio greater than 1.05 indicates enrichment, whereas values less than 0.95 indicate depletion relative to the adjacent REE (Taylor and McLennan, 1985). All the samples had Eu/Eu^* values less than 0.65, revealing a negative Eu anomaly. According to Taylor and McLennan (1985), mantle-derived igneous rocks do not have an Eu anomaly unless they have undergone late-stage addition or removal of feldspar or have been affected by hydrothermal alteration. Due to the divalent nature of europium (Eu^{3+} and Eu^{2+}), the larger Eu^{2+} ion may be incorporated into feldspar during partial melting. Given the degree of alteration in these rocks, some Eu^{2+} may have been removed during hydrothermal processes.

CHAPTER 4: MINERALOGY AND MINERAL CHEMISTRY OF THE 100 ORE BODY, COPPER CLIFF NORTH MINE

4-1 INTRODUCTION

The most common sulphide type at North mine is INMS, which is dominantly composed of pyrrhotite with small blebs or subhedral grains of pentlandite and lesser chalcopyrite. Massive sulphide is generally 90-95% sulphide/oxide, consisting of massive pyrrhotite with small blebs of pentlandite and magnetite and rare chalcopyrite. Blebby sulphide (BLBS) displays 1-2 cm, sub-round blebs of pyrrhotite and pentlandite set in QD with some chalcopyrite occurring as grains in the blebs or as veinlets joining the blebs (Plate 4-1a). Disseminated sulphide (DISS) rarely contains more than 5% total sulphide and is typically chalcopyrite-rich (Plate 4-1b). A variation of disseminated sulphide is interstitial sulphide (INSU), characterized by sulphides that fill in the interstices between euhedral plagioclase, amphibole, quartz, and pyroxene grains. All of these textures indicate that they were derived from a primary sulphide magma, but hydrous minerals around the sulphides suggest that a hydrothermal event has taken place. Several other textural types support this concept on a slightly larger scale. Chalcopyrite-rich quartz/carbonate veins and stringers (Plate 4-1c) are typically rimmed by hydrous minerals and occasionally show zonation of the sulphides. A rare feature in the orebody is ragged disseminated sulphide (RGDI), characterized by jagged, cusp-like edges on all of the blebs (Plate 4-1d). This is dissimilar to the RGDI or net-textured ore described in the contact sublayer.

- Plate 4-1a Blebby sulphide (BLBS) from the 100 orebody that displays 1-2 cm. sub-round blebs of pyrrhotite and pentlandite set in QD with some chalcopyrite occurring as grains in the blebs or as veinlets joining many of the blebs. Sample CCN98-02.
- Plate 4-1b Interstitial sulphide (INSU) in QD, where the sulphide is found interstitial to silicate grain boundaries. This ore is typically enriched in chalcopyrite. Sample CCN98-06.
- Plate 4-1c Chalcopyrite-rich quartz/carbonate veins and stringers within Stobie Formation rocks, adjacent to the 100 orebody. The vein rimmed by hydrous minerals, which is typical throughout the offset. 3500 ft. level, 100 orebody.
- Plate 4-1d Ragged disseminated sulphide (RGDI), characterized by angular and "drawn-out" blebs joined by veins. This is dissimilar to the RGDI ore described in the sublayer and refers to the jagged, cusp-like edges on all of the blebs. Sample CCN99-17.

a

2.5 cm

b

2.0 cm

c

10 cm

d

3.0 cm

4-2 -PETROGRAPHY AND COMPOSITION OF SULPHIDES AND OXIDES

i. Pyrrhotite (hexagonal and monoclinic polymorphs)

As mentioned previously, pyrrhotite $[\text{Fe}_{1-x}\text{S}]$ is the most abundant sulphide mineral within the orebody. It is the dominant sulphide phase in MASU, INMS, and in many STRS, and BLBS. The two major polymorphs of pyrrhotite are hexagonal pyrrhotite and monoclinic pyrrhotite, both of which are found in the deposit. High temperature pyrrhotites have hexagonal symmetry while lower temperatures yield both hexagonal and monoclinic types (Klein and Hurlbut, 1985). Distinguishing between either phase petrographically or by electron microprobe is not possible without an etchant or magnetic colloid. Therefore, the 17 samples collected from different levels in the mine and from boreholes 100505/100506 (see Appendix 4-2a and b) were analyzed with an automated Philips PW 3710 powder X-ray diffractometer at the University of Ottawa. All the samples contained 75-90% sulphide, and were composed mostly of pyrrhotite and pentlandite with lesser amounts of magnetite and chalcopyrite. The samples were crushed manually in alcohol to minimize pyrrhotite oxidation, and a magnet was passed over the grains to remove magnetite. Examination of the magnetic portion showed that no magnetic pyrrhotite was removed. Pyrrhotite was then picked under a microscope to separate the sulphide and silicate grains. A thin film mount was prepared by crushing the almost pure pyrrhotite grains (with some intergrown pentlandite) into a powder, and sprinkling onto a Vaseline-covered glass plate. The samples were then analyzed individually in the X-ray diffractometer.

The critical peak in determining pyrrhotite polytypes is at $43\text{-}44^\circ$ 2-theta for a Cu source (CuK-alpha). Hexagonal pyrrhotite yields a single peak whereas monoclinic pyrrhotite produces a doublet (Graham, 1969; Scott, 1974). Matches for the analyzed minerals were obtained using either "Philips Analytical PC-APD Diffraction software", or "JADE XRD Pattern-Processing for the PC". Both software packages compare the resultant X-ray peaks to ICDD data cards and provide the best statistical match. These qualitative analyses do not provide an accurate estimate of the relative proportion of hexagonal to monoclinic pyrrhotite, but those with the best statistical fit are considered the dominant phase(s) in the sample.

Quantitative analyses of pyrrhotite samples from BH100505 and BH100506 produced by Farrow (1998) revealed that hexagonal pyrrhotite is the most abundant phase in the ore, and it is more abundant in massive sulphides. Qualitative analyses of 17 samples from the 3500, 3000, 2700 ft. levels and BH100505/BH100506 confirm that hexagonal pyrrhotite is the dominant polymorph. Hexagonal pyrrhotite was predominant in 14 samples, and the remaining three samples were mostly monoclinic. The monoclinic samples were distributed sporadically within the deposit.

Figure 4-1a is a histogram representing the Ni content of all the pyrrhotite grains analyzed by electron microprobe in the 100 orebody. Most pyrrhotites have Ni values between 0.2 and 0.3 atm% (approx. 0.4 to 0.6 a.p.f.u., and 0.3 to 0.6 wt%). Figure 4-1b shows that the average Ni contents in pyrrhotite from MASU (9 analyses) and in BLBS (6 analyses) is higher than in pyrrhotite from STRS (15 analyses) and one vein.

Figure 4-2: a) Histogram of pyrrhotite Ni contents from the 100 orebody, CCN mine.
 b) Average Ni contents in pyrrhotite grains from the 100 orebody, CCN mine. Analyses plotted as a function of ore texture.

Batt (1972) found in one sample from the Sudbury region that monoclinic pyrrhotite contained slightly less Ni than hexagonal pyrrhotite.

ii. Pentlandite

Pentlandite $[(\text{Fe}, \text{Ni})_9\text{S}_8]$ is the most important Ni-bearing mineral in the South Range, as other Ni-bearing sulphides such as millerite are typically restricted to the North Range. It most often occurs as blocky, anhedral masses or veins within pyrrhotite and sometimes chalcopyrite. The pentlandite may form spherical rosettes (0.2-0.5 cm) and always has characteristic octahedral parting. Exsolution flames and lamellae of pentlandite are common in both pyrrhotite and chalcopyrite, and are regularly seen as flames in chalcopyrite along pyrrhotite grain margins (Plate 4-2a). Pentlandite is present in all sulphide textural types, but is rare within chalcopyrite-rich quartz veins. Unlike pyrrhotite and chalcopyrite, it is not found in veinlets. The average Ni content of pentlandite determined by electron microprobe analyses of 41 grains is 4.54 a.p.f.u., S.D.=0.14 a.p.f.u. (34.43 wt%, S.D.=1.09 wt%) and the average Co content is 0.21 a.p.f.u., S.D.=0.10 a.p.f.u. (1.57 wt%, S.D.=0.79 wt%). Histograms of Co and Ni contents are presented in Figures 2 a and b.

Argentopentlandite $[\text{Ag}(\text{Fe}, \text{Ni})_8\text{S}_8]$ is a common phase in many of the sulphide textural types, but appears to be restricted to chalcopyrite. This association has been noted by Cabri et al. (1976). It often forms a branching texture with pentlandite along presumed chalcopyrite parting planes (Figures 4-3a and b). In blebby to massive sulphides, it may also form in chalcopyrite along magnetite grain boundaries.

- Plate 4-2a Exsolution flames of pentlandite (Pn) in chalcopyrite (Cp) along a pyrrhotite (Po) grain margins. Reflected light, field of view 0.75 mm in length. Sample CCN99-35.
- Plate 4-2b Cubanite (Cub) as individual, euhedral lamellae with distinct gray to brown pleochroism. Chalcopyrite in interstitial sulphide contained the only cubanite observed in this study. Reflected light, field of view 0.75 mm in length. Sample CCN98-06.
- Plate 4-2c Magnetite (Magnetite) grain in massive sulphide sub-round, with exsolution lamellae of ilmenite (Ilm). The magnetite is partially rimmed by ilmenite. Reflected light, field of view 0.75 mm in length. Sample CCN98-01.
- Plate 4-2d Elongate, parallel crystals of ilmenite within chalcopyrite. The magnetite that originally enveloped the ilmenite appears to have been partially assimilated by the chalcopyrite. Reflected light, field of view 0.75 mm in length. Sample CCN99-35.

Figure 4-2: a) Histogram of Co contents in pentlandites from the 100 orebody. b) Histogram of Ni contents in pentlandites throughout the 100 orebody. c) Co variation between pentlandite flames and subhedral grains in two stringers from the 100 orebody.

Figure 4-3: a) Photograph of argentopentlandite (AgPn) and pentlandite (Pn) in chalcopyrite, 100 orebody, CCN Mine. Magnification 20x. b) Photograph of argentopentlandite in and around pentlandite, within chalcopyrite, 100 orebody, CCN Mine. Magnification 20x. c) Ternary plot of argentopentlandites from the 100, 900, and 890 orebodies.

Argentopentlandite is a common mineral in many Sudbury ores and was also identified in samples from the 890 orebody. Electron microprobe analyses of all the argentopentlandites, from both orebodies, shows they are virtually identical in composition (Figure 4-3c). Analyses also show the mineral is stoichiometric, with Ag substituting for Fe and Ni (see Cabri et al., 1976).

iii. Chalcopyrite

Many textures associated with chalcopyrite [CuFeS_2] suggest that it was the latest sulphide phase crystallized and/or has been remobilized by secondary processes. Within INMS the chalcopyrite is generally seen as large sub-round masses or blebs around silicate inclusions. The zonation of chalcopyrite relative to the other major sulphides is obvious on any well exposed rock face. Most sulphide blebs are joined by thin veinlets of chalcopyrite ($\approx$ pyrrhotite), suggesting that the chalcopyrite has been hydrothermally remobilized. Fractures in brecciated inclusions provide excellent pathways for later fluids and are commonly filled by chalcopyrite, lesser pyrrhotite and sometimes magnetite. Chalcopyrite and pyrrhotite are the most prevalent sulphide phases within DISS. Chalcopyrite in INSU forms small irregular- to angular- shaped disseminations that regularly conform to euhedral silicate grain boundaries. Chalcopyrite in INSU is host to the only cubanite observed in this orebody, and is seen as individual, euhedral lamellae with distinct gray to brown pleochroism (Plate 4-2b).

Chalcopyrite is a minor phase in MASU, found as small, subhedral grains in pyrrhotite and pentlandite, or more commonly at the grain boundary between the

aforementioned minerals. It is also found in veins adjacent to the MASU. Chalcopyrite-rich stringers proximal to the orebody often have abundant pyrrhotite ($\pm$ pentlandite) at the centre, whereas the more distal chalcopyrite-rich quartz/carbonate veins have very little pyrrhotite. Two of these stringers were examined in detail. The margin of one is dominated by chalcopyrite with small, irregularly-shaped masses of partially replaced pyrrhotite. The dominant sulphides in the other stringer are pyrrhotite and pentlandite, and minor chalcopyrite is restricted to the marginal zones. Pyrrhotite and pentlandite at the core of the stringers are coarse grained and blocky. The grain boundary between chalcopyrite and the inner pyrrhotite is irregular and often marked by flames or skeletal grains of pentlandite. Even the partially replaced pyrrhotite at the margins is rimmed by pentlandite flames. This texture suggests that pentlandite flames are exsolved after a Cu-rich fluid has infiltrated and partially replaced sulphides at the stringer margins. Electron microprobe analyses shows that there is a distinct difference in Co contents between subhedral pentlandite grains at the centre of stringers and pentlandite exsolution flames in contact with marginal chalcopyrite (see Figure 4-2c). Twelve analyses of the inner subhedral pentlandite grains in two thin sections reveal Co abundances of 0.21 a.p.f.u., S.D.=0.01 a.p.f.u. (1.6 wt%, S.D.=0.1 wt%), whereas eleven analyses of marginal pentlandite flames give a Co range of 0.13 a.p.f.u., S.D.=0.01 a.p.f.u. (1.0 wt%, S.D.=0.4 wt%).

Unlike chalcopyrite-rich veins in the north range and some south range deposits, no platinum or palladium minerals have been found in chalcopyrite-rich stringers or

quartz/carbonate veins from the 100 orebody. This is not the situation for the 900 orebody, which will be discussed later.

iv. Magnetite

Magnetite [Fe_3O_4] is a major phase in MASU and INMS, with lesser amounts in BLBS, INSU, STRS, and chalcopyrite-rich quartz/carbonate veins. The magnetite in MASU forms sub-round, blebs with or without exsolution lamellae of ilmenite, and may account for 7-10% of the rock. In some cases, a rim of ilmenite is found around the magnetite grain. In Plate 4-2c, the magnetite has ilmenite exsolution lamellae oriented along internal octahedral crystallographic planes, and is also partially enveloped by ilmenite. The outer ilmenite likely exsolved to the margin of the magnetite grain.

Magnetite in other sulphide textures occurs as sub-round blebs or kidney-shaped groups. It is usually found in chalcopyrite (sometimes pyrrhotite) associated with elongate, parallel crystals of ilmenite. This magnetite appears to have been partially assimilated by the chalcopyrite (Plate 4-2d). Magnetite is not common or is completely absent from stringers and chalcopyrite-rich veins. One stringer has partially destroyed magnetite in the chalcopyrite-rich margins. A third type of magnetite, observed in only one polished thin section, occurs with chalcopyrite in veinlets that cross-cut amphiboles in the QD. Small magnetite blebs are also found as discrete grains in weakly mineralized QD. Like sulphides in the deposit, these magnetites are always surrounded by a thick rim of biotite and amphibole (Plate 4-3a).

- Plate 4-3a Magnetite surrounded by a thick rim of alteration minerals that include biotite, amphibole, and chlorite. Plane-polarized light, field of view 3.5 mm in length. Sample CCN99-52.
- Plate 4-3b Pyrite in a sample collected 0.5 m from the 900 cross-fault is euhedral to subhedral and readily forms long undulating chains in pyrrhotite. Some of the mica, pentlandite, and pleochroic lamellae of pyrrhotite are sub-parallel to the pyrite chains, indicating that the chains are a structural feature. Reflected light, field of view 0.75 mm in length. Sample CCN99-32.
- Plate 4-3c Pyrite as very fine- to fine-grained subhedral masses filling in space between brecciated silicate inclusions. The pyrite may have formed from an oxidizing fluid. Reflected light, field of view 0.75 mm in length. Sample CCN99-25.
- Plate 4-3d Amphibole and biotite surrounding sulphides in quartz diorite. This association is seen throughout the CCN Offset deposits. Plane-polarized light, field of view 3.5 mm in length. Sample CCN99-51.

v. Sphalerite

Sphalerite [ZnS] is a fairly common phase in Sudbury ores, but occurs in very minor amounts. Sphalerite stars in chalcopyrite have been identified in some ragged disseminated sulphide samples from the 100 orebody. Tiny grains of sphalerite are also in blebby sulphides and disseminated sulphides. Electron microprobe analyses reveal that sphalerite is often associated with sulpharsenides, arsenides, bismuth tellurides, and hessite. The sphalerite either partially or completely envelops the sulpharsenides.

vi. Pyrite

Pyrite [FeS₂] is a minor phase in south range ore and is seldom seen in the 100 orebody. It was observed in only two samples, one of which was collected 0.5 m from the 900 cross-fault. The pyrite in this sample is euhedral to subhedral and forms long undulating chains in pyrrhotite (Plate 4-3b). Some of the mica, pentlandite, and pleochroic lamellae of pyrrhotite are sub-parallel to the pyrite chains, indicating that the chains are a structural feature. Late chlorite-filled veinlets cross-cut all the sulphides and some of the amphiboles and quartz in the QD proximal to the pyrite. Fluids moving along the 900 cross-fault may be responsible for oxidation and replacement of sulphides by pyrite proximal to the fault. This oxidation feature has been documented by Dr. David Watkinson (personal communication) in North Range deposits.

It can be assumed that the second sample was also collected near a structure, given the brecciated nature of the ore and silicates. In this case, the pyrite occurs as very fine- to fine-grained subhedral masses infilling space between brecciated silicate

inclusions (Plate 4-3c). The presence of abundant sulphide around both the pyrite and inclusions, suggesting oxidation of sulphide has occurred here as well.

4-3 SILICATE ASSEMBLAGES

The silicate mineral assemblages found within the QD at the North mine are similar throughout the dyke, but occur in varying proportions depending on sulphide texture. Plagioclase often has albite twins, and is altered in varying proportions to sericite and overgrown by amphibole, chlorite, and biotite. Small, stubby grains of orthopyroxene may be intergrown with plagioclase and quartz in the less altered QD. These show distinct pink to green pleochroism and are relatively unaltered. Quartz is common in both the altered and unaltered QD, and may display structurally induced features such as undulating extinction and grain-size reduction. As mentioned previously, an unmistakable feature is the spatial association of hydrous minerals such as amphibole, biotite, chlorite, and occasionally epidote with all of the sulphides (Plate 4-3d). These typically occur as dark green to black haloes in QD or country rocks, around blebs of sulphide or along vein/stringer margins.

i. Amphibole

Amphibole is one of the principal minerals of the quartz diorite. The amphibole is fine- to medium-grained, euhedral, green to yellow-green in plane-polarized light, with two distinct cleavages. In some cases, the amphibole is partially altered to fine-grained

chlorite. Despite this, it is obvious that the modal proportion of amphibole increases significantly proximal to sulphide minerals.

Two amphibole crystals analyzed near an inclusion plot in the ferro-pargasite field, and one sits in the actinolite hornblende field. Eight amphibole grains proximal to sulphides and five directly adjacent to sulphides straddle the Fe-edenite hornblende and Fe-pargasite hornblende fields. One amphibole surrounded completely by sulphide plots in the actinolite hornblende field, and one grain within relatively unaltered QD is of ferro-hornblende composition.

ii. Biotite

Biotite is the one of the most common hydrous minerals in the QD. The proportion of biotite in any given sample is variable, but similar to amphibole, there is a distinct spatial correlation with sulphides and oxides. Biotite is sparsely distributed throughout the QD, but is more concentrated around sulphides and inclusions. The inclusions would not have been in equilibrium with the melt and thus would have formed a reaction rim.

A large mass of medium-grained biotite (0.5-1.0 cm wide) was observed at the margin between a quartz/feldspar vein and a wide MASU stringer. The quartz/feldspar vein marks the contact between the sulphide stringer and the QD. Small blebs and disseminations of chalcopyrite are found near the outer contact of the vein with the quartz diorite. Fine-grained chlorite and biotite are disseminated throughout the vein, but are much larger and euhedral around the outer chalcopyrite-rich blebs. Medium-grained,

green (plane-polarized light), amphibole is the dominant phase in the QD proximal to the vein.

iii. Chlorite

Chlorite forms long bladed crystals around and often is often intergrown with sulphide. It may be the most abundant alteration mineral proximal to the sulphides but is not nearly as common in unmineralized QD. Thin chlorite-filled fractures sometimes cross-cut the sulphides. A plot of four chlorite analyses from crystals both adjacent to sulphides and in chlorite veins reveals a ripidolite composition.

Large masses of green to yellow-green chlorite are in a quartz vein at the margin between a MASU stringer and QD. These fibrous to fan-shaped chlorite is found throughout the vein and actually extends from one side to the other (1.0 cm wide). The chlorite contacts, and occasionally extends into sulphide on either side of the vein, but does not continue into the QD. Green to blue-green (plane-polarized light), euhedral amphibole is the dominant mineral in the QD adjacent to the vein.

iv. Epidote

Epidote is a common mineral both in barren quartz/carbonate veins, sulphide-bearing quartz/carbonate veins, and in some stringers. Unlike amphibole, biotite, and chlorite, it is not often seen in alteration rims adjacent to sulphides in MASU or BLBS, but may occur in rather high abundance around RGDI sulphides. The epidote grains are typically subhedral to euhedral with a strong yellow pleochroism in plane-polarized light.

In one chalcopyrite-bearing quartz/carbonate vein intruding amphibolites adjacent to the 100 orebody on the 3500 ft. level, abundant elongate biotite infills a fracture in the vein. Associated with the biotite is bladed chlorite and lesser epidote. Small titanite grains were found adjacent to the fracture.

4-4 INCLUSION MINERALOGY

Inclusions in the QD vary in mineralogy, depending on their source and degree of alteration. Inclusions observed most commonly in thin section include amphibolites, biotitites, feldspathic rocks, and quartz diorite. The amphibolites are the largest inclusions and are typically found in INMS near the centre of the orebody. These contain relatively equigranular, medium-grained, subhedral, randomly oriented amphibole with minor biotite and interstitial magnetite. The reaction rims around the inclusions vary in thickness from 0.3-0.5 cm, and are composed mostly of biotite and amphibole that are slightly coarser grained than the minerals in the inclusion.

The biotitites are composed predominantly of medium-grained, equigranular biotite and quartz, with or without chlorite, and rare garnet. These inclusions were likely picked up from the surrounding Huronian-aged sediments. Coarser grained biotite forms mono-mineralic blebs, or rims sulphides and oxides within the inclusion. Chlorite is occasionally intergrown with this coarser grained biotite, or may infill cross-cutting veins. Coarse-grained, euhedral amphibole and biotite form a reaction rim around the one inclusion. One small, euhedral garnet was found in one of these inclusions, completely surrounded by biotite. One biotite grain is partially grown into the outer margin of the

garnet. This suggests that the garnet and biotite equilibrated at the same temperature and pressure conditions.

If this relationship is true, the garnet - biotite geothermometer can be used. This thermometer uses the partitioning of Fe and Mg between biotite and garnet to estimate the temperature of equilibration. The cation exchange reaction according to Ferry and Spear (1978) is:

almandine

phlogopite

pyrope

annite

The distribution coefficient for the reaction is:

$$K_D = (\text{Fe/Mg})_{\text{biotite}} / (\text{Fe/Mg})_{\text{garnet}}$$

The temperature of equilibration calibration (Hodges and Spear, 1982) calculation is:

$$T(\text{K}) = (12454 + 0.047p(\text{bars}) + 3 \cdot 3300 \cdot (X_{\text{grs}}^2 + X_{\text{alm}} \cdot X_{\text{grs}} + X_{\text{grs}} \cdot X_{\text{sps}} + X_{\text{prp}} \cdot X_{\text{grs}}) / \\ (4.662 - 3 \cdot R \cdot \ln((X_{\text{prp}} \cdot X_{\text{ann}}) / (X_{\text{phl}} \cdot X_{\text{alm}}))) + 3 \cdot 1.5 \cdot (X_{\text{grs}}^2 + X_{\text{alm}} \cdot X_{\text{grs}} + X_{\text{grs}} \cdot X_{\text{sps}} \\ + X_{\text{prp}} \cdot X_{\text{grs}})$$

where the mole fraction compositions in garnet are:

$$X_{\text{alm}} = \text{Fe} / (\text{Fe} + \text{Mg} + \text{Mn} + \text{Ca})$$

$$X_{\text{grs}} = \text{Ca} / (\text{Fe} + \text{Mg} + \text{Mn} + \text{Ca})$$

$$X_{\text{prp}} = \text{Mg} / (\text{Fe} + \text{Mg} + \text{Mn} + \text{Ca})$$

$$X_{\text{sps}} = \text{Mn} / (\text{Fe} + \text{Mg} + \text{Mn} + \text{Ca})$$

and the mole fraction compositions in biotite are:

$$X_{\text{ann}} = \text{Fe} / (\text{Fe} + \text{Mg} + \text{Ti} + \text{Al}^{\text{VI}})$$

$$X_{\text{phl}} = \text{Mg} / (\text{Fe} + \text{Mg} + \text{Ti} + \text{Al}^{\text{VI}})$$

Metamorphic temperatures calculated for varying pressures with this garnet-biotite thermometer are:

	p=500b	p=1000b	p=2000b	p=4000b	p=5000b	p=6000b	p=8000b	p=10000b
GT1-1	512.3	512.7	513.5	515.0	515.8	516.6	518.2	519.7
GT1-2	513.1	513.5	514.3	515.9	516.6	517.4	519.0	520.6
GT1-3	513.5	513.9	514.7	516.3	517.1	517.9	519.5	521.1
Average	513.0	513.4	514.2	515.7	516.5	517.3	518.9	520.5
St. Dev.	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7

Three electron microprobe analyses were made on the single garnet, and three analyses were made on separate biotite grains. Each calculation is based on one garnet and one biotite analysis. Temperatures are in degrees Celsius.

Quartz diorite-type inclusions are rounded to sub-angular and are commonly observed in INMS. Alteration of the inclusions seems to depend on size, with the smaller <0.5 cm inclusions almost completely altered, and the larger inclusions have about 50% primary minerals intact. The larger inclusions contain relatively fresh plagioclase, minor quartz, secondary amphibole and biotite. The plagioclase still exhibits good albite twinning but grain boundaries are altered and they are commonly overgrown by larger amphiboles. Fractures through the inclusions are filled by chlorite and disseminated sulphide.

Feldspathic inclusions, commonly referred to as “felsic sweats” by INCO geologists, are composed of feldspar with less abundant in quartz. The feldspar (plagioclase?) in the one inclusion appears to have been large and tabular, but is now completely altered to very fine-grained sericite. The quartz forms fine-grained, rounded grains interstitial to the larger feldspar. The edges of the inclusion are irregular and generally undefined. Amphibole and chlorite are abundant around the margin and occur sporadically in the inclusion. Chalcopyrite, pyrrhotite, and magnetite are also disseminated throughout.

4-5 PLATINUM GROUP MINERALS, ARSENIDES, SULPH-ARSENIDES AND TELLURIDES

Investigation of thirty eight polished thin sections (Appendix 4-5, list of samples) from the 100 orebody indicates that the major platinum group element associated with the ore is iridium with lesser rhodium. This is reflected in assay data provided by INCO Ltd. that shows low overall Total Precious Metals (TPM, typically Pt, Pd, Rh, and Au) contents in the orebody. Low TPM contents appear to be unique to this orebody, since the adjacent 120, 900 orebodies have fairly reasonable Pt+Pd values. A detailed petrographic and mineral chemical discussion of the platinum group minerals in the 890 and 900 orebodies is provided in section 5-2.

Cobaltite [CoAsS] has a very distinct euhedral crystal shape, a bright-white colour in reflected light, and is harder than the surrounding sulphides. There were no end-member cobaltite or gersdorffite (NiAsS) found, but there appears to be a solid solution

between, the them. The vast majority of cobaltite crystals (>35) observed in polished-thin section occur as discrete grains in pyrrhotite and occasionally in chalcopyrite (~12) and pentlandite (1) (Plate 4-4a). These may also be found in contact with all the aforementioned sulphides. In two cases cobaltite is found in chalcopyrite, near to or along a silicate mineral grain boundary. These are completely or partially enveloped by sphalerite, with small hessite crystals (Ag_2Te) at or near the grain margins (Plate 4-4 b and c). In two other situations, cobaltite occurs along silicate/sulphide grain boundaries adjacent to bismuth-tellurides (Plate 4-4d). Most cobaltite grains are seen in MASU and INMS and less commonly in sulphide stringers and veins. This may be related to a genetic process or simply the volume of sulphide found in the different textural types. Figure 4-4a shows the composition of all cobaltite/gersdorffite grains analyzed from the 100, 900, and 890 orebodies, subdivided according to the sulphide texture in which they occur. Most of the cobaltite analyzed by the electron microprobe has compositions that are clustered in the Fe-Ni-Co-ternary system. Some are more Ni-rich and fall within the gersdorffite compositional field.

Cobaltite contains the only Ir-bearing phase in the ores. This Ir occurs in crystals of the sulpharsenide irarsite $[(\text{Ir},\text{Ru},\text{Rh},\text{Pt})\text{AsS}]$ at the core of cobaltite grains (Plates 4-4 e and f). Those with no appreciable Ir may have a very small amount of Rh at the core, and in one crystal the centre was host to five tiny bismuth-tellurides. Many of the cobaltite crystals are zoned with Co-rich rims and more Ni-rich cores (just barely gersdorffite composition), with or without irarsite (Figure 4-4b). This zonation is not commonly seen in reflected light, but is very distinct with sharp contacts in backscattered electron images.

NOTE TO USERS

**Page(s) missing in number only; text follows.
Microfilmed as received.**

67

This reproduction is the best copy available.

UMI

- Plate 4-4a Cobaltite (Cob) observed in polished-thin section that occurs as a discrete, euhedral grain in pyrrhotite. Reflected light, field of view 0.5 mm wide. Sample CCN99-56.
- Plate 4-4b Cobaltite partially enveloped by sphalerite (Sph), with a small hessite (Hess) grains (Ag_2Te) at the grain margins. Back-scattered electron image. Sample CCN98-02a.
- Plate 4-4c Cobaltite completely enveloped by sphalerite, with a small hessites near the grain margins. Back-scattered electron image. Sample CCN98-03b.
- Plate 4-4d Cobaltite along a silicate/sulphide/oxide grain boundary adjacent to bismuth-tellurides (BiTe). Gersdorffite (Gers). Back-scattered electron image. Sample CCN98-05.
- Plate 4-4e Crystals of the sulpharsenide irarsite $[(\text{Ir,Ru,Rh,Pt})\text{AsS}]$, at the core of cobaltite grains. Back-scattered electron image. Sample CCN98-01.
- Plate 4-4f Crystals of the sulpharsenide irarsite, at the core of a cobaltite grain. Back-scattered electron image. Sample CCN98-3b.
- Plate 4-4g Altaite (Alt) (PbTe) as anhedral grains in pyrrhotite and magnetite. Back-scattered electron image. Sample CCN98-07.
- Plate 4-4h A subhedral sperrylite (Sper) as a discrete grain in weakly disseminated QD. Back-scattered electron image. Sample CCN98-06.

The contrasting shades of grey correspond to variation in mean atomic number, thus highlighting compositional differences in the grains. Figure 4-5a is based on three microprobe analyses taken within each zone of a cobaltite crystal from core to rim. One unusual cobaltite has a barren Co-rich core enveloped by Rh and an outer Co-poor rim (Figure 4-5b). The associated ternary diagram is based on three separate analyses within the single crystal. Smaller cobaltite grains are not zoned, but one may assume that they are tips of larger crystals cut off when producing the thin section.

Michenerite [PdBiTe], although fairly rare, is the main Pd-bearing phase in the orebody. Small michenerite grains are found in two sulphide stringers and in one MASU sample. The latter sample contains only one subhedral michenerite grain in sulphide along a silicate grain boundary. The michenerite in one of the stringers is in pyrrhotite adjacent to a silicate mineral with a small tsumoite (BiTe) attached to it (Figure 4-6a). In the other stringer, the michenerite is found with tsumoites along amphibole grain boundaries in pyrrhotite and pentlandite (Figure 4-6b). Both minerals are subhedral to anhedral masses that conform to the shape of the silicate grains and often in-fill small embayments or fractures. The chemical composition of all the michenerite grains is virtually identical, except for antimony (Sb) contents (Figure 4-6c). Six michenerite grains from the MASU sample and one from the stringers have an average Sb content of 0.18 a.p.f.u. (S.D.=0.02 a.p.f.u.), whereas five michenerites from the other stringer have an average Sb content of 0.08 a.p.f.u. (S.D.=0.01 a.p.f.u.). Analyses recalculated to 3 atoms. Cabri and Harris (1973) found that Sb may substitute for Bi in the michenerite structure, which appears to be the case in these samples.

Figure 4-5a: Zoned cobaltite in pyrrhotite from the 100 orebody, which has a Co-rich rim and a Ni-rich core.

Figure 4-5b: Zoned cobaltite in pyrrhotite from the 100 orebody, which has a Co-poor rim and a Co-rich core. A small amount of Rh is present in the inner rim.

Figure 4-6: a) Michenerite (Mich) grain with a tsumoite (Ts) along a silicate/pyrrhotite grain boundary. From a sulphide stringer in the 100 orebody. b) Michenerite with tsumoites from a different stringer in the 100 orebody. c) Michenerites from the 100 orebody can be divided into two groups based on Sb content. Sb appears to substitute for Bi in the michenerite structure.

The relationship between the michenerites and tsumoites in each of the stringers is quite similar. In both cases, the michenerite and tsumoite are found spatially associated with each other at a sulphide silicate grain boundary. Hoffman and Maclean (1976) present evidence that michenerite and tsumoite coexist as stable phases at 489°C in the Pd-Bi-Te ternary system. The michenerites and tsumoites from the stringers plot comparably in the same ternary system (Figure 4-7). Given this and the petrographic association between these minerals, a tie line can be drawn between the two.

Very minor minerals in the ore are altaite (PbTe) and sperrylite (PtAs₂), both of which were only found by backscattered electron imaging in a Scanning Electron Microscope (SEM). The altaite occurs as anhedral grains in pyrrhotite and magnetite (Plate 4-4g). It appears to be a later phase because it forms veinlets and fills in the fractured magnetite. It does not however cross the boundary between the magnetite and the pyrrhotite. Only one anhedral sperrylite grain was identified and it occurs as a discrete grain in weakly disseminated QD (Plate 4-4h).

The PGM and sulpharsenide contents of orebodies throughout the Copper Cliff offset are similar but show some distinct differences. Comparison between deposits is essential to understanding the mineralization throughout the offset. Mineralogical data and a short discussion are provided in Appendix 4-6.

Figure 4-7: Michenerites and tsumoites from two different stringers in drillcore from the 100 orebody, CCN Mine.

CHAPTER 5: MINERALOGY OF THE 890 AND 900 ORE BODIES, COPPER CLIFF NORTH MINE

5-1 INTRODUCTION

The 890 and 900 orebodies are mineralogically and texturally quite similar, but there are some subtle differences in accessory minerals and sulphide distribution. Field study of both orebodies was limited, but it is apparent that each contains the same ore textures as the 100 orebody and the distribution of sulphides within the QD dyke is comparable. For example, at the 2800 ft. level of the 890 orebody, the ore is found at the centre of the dyke. The middle of the orebody is INMS that grades into MASU toward the footwall (or hangingwall), which is in knife sharp contact with blebby disseminated sulphide. The blebs become less abundant toward the footwall until barren QD is encountered. Ragged disseminated ore and chalcopyrite-rich quartz veins also occur in the blebby disseminated area.

The 900 orebody was studied on the 2400 ft level of the mine. Mapping completed by INCO geologists and observations by the author indicate that the ore is at the margin of the dyke and partially intrudes the footwall metasedimentary rocks. Unlike other parts of the mine, this drift is parallel to the strike of the dyke and only the margins of the orebody remain intact. The INMS, toward the hangingwall of the orebody (centre of the QD), has abundant large inclusions occasionally surrounded by chalcopyrite. The contact with the metasedimentary rocks is marked by abundant stringers (up to 1 m wide) of pyrrhotite and pentlandite. The presence of inclusions (up to 2.0 cm) in some of the

large stringers implies that they have formed by intrusion of a sulphide magma. However, extensive silicification of the FW rocks and the abundance of quartz/carbonate veins suggests that some of the stringers and sulphide veins are a product of sulphide remobilization.

5-2 PRECIOUS METAL MINERALS

Platinum group minerals and telluride assemblages in samples taken from the 890 and 900 orebodies have some distinct differences in comparison to those from the adjacent 100 orebody. One chalcopyrite-rich stringer from the 890 orebody contained abundant argentopentlandite along the vein margin (Plate 5-1a) adjacent to silicate minerals (mostly amphibole). Most grains were bordering bismuth-tellurides and lead-tellurides, an association which has been recognized in the north range (Watkinson, 1999). The tellurides also occur as long anhedral grains in pyrrhotite (Plate 5-1b). As in stringers from the 100 orebody, it appears that chalcopyrite has replaced pyrrhotite at the margins. Textural observations indicate that the tellurides and argentopentlandite were precipitated as pyrrhotite was resorbed. Plate (5-1c) shows a partially replaced pyrrhotite with disseminated, irregular blebs of bismuth-telluride, and adjacent to a small froodite [PdBi_2]. Electron microprobe analyses of zoned cobaltite grains from a sample of INMS reveal Co-rich rims and Ni-rich cores (Plate 5-1d), similar to cobaltite grains from the 100 orebody. Most of these are barren of PGE, but two did contain trace Ir and Rh at the core.

Plate 5-1 Back-scattered electron images of precious metal minerals.

- Plate 5-1a Argentopentlandite along the vein boundary of a chalcopyrite-rich stringer from the 890 orebody. The majority of these grains are adjacent to silicate minerals (mostly amphibole), and border bismuth-telluride and lead-telluride grains. Sample CCN99-19.
- Plate 5-1b Hessite and altaite in the same stringer from the 890 orebody (see plate 5-1a). These tellurides occur as long anhedral grains in pyrrhotite. Sample CCN99-19.
- Plate 5-1c Pyrrhotite partially replaced by irregular blebs of bismuth-telluride, and adjacent to a small froodite [PdBi₂]. Chalcopyrite has replaced pyrrhotite along the margins of a stringer from the 890 orebody. Sample CCN99-19.
- Plate 5-1d Cobaltite from the 890 orebody displays a Co-rich rim and a Ni-rich core and has irarsite at the core, similar to cobaltite from the 100 orebody. Sample CCN99-16.
- Plate 5-1e Zoned cobaltite from the 900 orebody that has a Co-rich rim and a Rh-rich core. Sample CCN99-60.
- Plate 5-1f Zoned cobaltite from the 900 orebody that has a Co-rich rim and a Rh-rich core. Sample CCN99-60.

Cobaltite is a fairly common phase in an INMS sample from the 900 orebody. Most of these euhedral crystals occur as discrete grains in pyrrhotite, but two grains are in pentlandite and two others have tiny chalcopyrite and pentlandite grains attached to them. The cobaltite grains have Co-rich rims, and the cores may contain up to 5 wt% Rh (Plates 5-1e and 5-1f). Despite the lack of platinum group minerals in this section, INCO Ltd. assay data shows that the 900 orebody is enriched in TPM relative to the 100.

A carbonate/quartz vein (Plate 5-2a) from the 900 orebody has an interesting assemblage of chalcopyrite, pyrrhotite, nickeline (NiAs), Au-bearing froodite (PdBi_2), parkerite ($\text{Ni}_3(\text{Bi,Pb})_2\text{S}_2$), bismuth-telluride, hessite, galena (PbS), argentopentlandite, and native bismuth in 2-3 mm wide masses of gersdorffite (NiAsS). The vein is 1-2.5 cm wide, is composed mainly of dolomite, calcite, and quartz, and intrudes footwall metasedimentary rocks adjacent to the ore. The metallic minerals are in masses that may be at one side of the vein or span the whole thickness. The host metasedimentary rocks are intensely silicified and composed mainly of fine-grained muscovite, calcite, and quartz with medium- to coarse-grained biotite and chlorite distributed individually or in small clusters throughout. The gersdorffite forms large euhedral masses within and around chalcopyrite and is host to many of the other metallic minerals. Unlike the gersdorffite found at the core of most cobaltite grains in the studied orebodies, this gersdorffite is Co-poor. Nickeline occurs as symplectic intergrowths or as subhedral masses with pyrrhotite in the gersdorffite. A calcium mineral (opaque in reflected and transmitted light) sometimes forms a symplectic intergrowth with nickeline proximal to the gersdorffite/dolomite margin (Plate 5-2b). The spatial association of this feature

Plate 5-2a A carbonate/quartz vein in metasedimentary rock adjacent to the 900 orebody has an assemblage of chalcopyrite, pyrrhotite, nickeline (NiAs), Au-bearing froodite (PdBi_2), parkerite ($\text{Ni}_3(\text{Bi,Pb})_2\text{S}_2$), bismuth-telluride, hessite, galena (PbS), argentopentlandite, and native bismuth in large masses of gersdorffite (NiAsS). Sample CCN99-64.

Plate 5-2b Nickeline from the above carbonate/quartz vein occurs as a branching intergrowth or as subhedral masses with pyrrhotite in the gersdorffite. A calcium mineral (opaque in reflected and transmitted light) sometimes forms as a branching intergrowth with nickeline proximal to the gersdorffite/carbonate margin. Reflected light. field of view 1.0 mm in length. Sample CCN99-64b.

Figure 5-1: a) Au-bearing fersmanite (Fr), bismuth telluride (BiTe), argentopentlandite (AgPn) and chalcopyrite (Cp) in gersdorffite (Ger), hosted by a carbonate/quartz vein within footwall metasedimentary rocks. b) Au-bearing fersmanite and parkerite (Pk) in gersdorffite hosted by the same carbonate/quartz vein. c) Ternary plot of Au-bearing fersmanite compositions from the 900 orebody, CCN Mine. Au substitutes for Pd in the more Au-rich grains. Analyses are in atomic percent.

indicates that it may have exsolved from the carbonate during precipitation of the metals by a hydrothermal fluid. The only platinum group mineral, froodite, is found as small euhedral grains in gersdorffite (Figure 5-1a) and may be solitary or intergrown with parkerite $[\text{Ni}_3(\text{Bi.Pb})_2\text{S}_2]$ (Figure 5-1b), galena, bismuth telluride, or native bismuth. Small groupings of these minerals, with or without hessite, occur throughout the carbonate/quartz vein. Froodite has been found with parkerite at the Levack West and Frood mines (Cabri, 1976). Electron microprobe analyses reveal that most froodite contains small amounts (up to 6.0 wt%) of Au in its structure. Given the balanced stoichiometry of the froodite and that Au has a similar ionic radius to Pd, it is reasonable to assume that the Au is substituting for Pd and is not a thin coating on the grain. Cabri et al. (1973) identified froodite associated with gold and michenerite in a sample from the Vermilion mine, but the gold was not in the froodite structure. Figure 5-1c reveals that froodite may also be divided into two groups: those that are Au-rich, and those relatively barren of Au. The five Au-rich grains analyzed have an average Au content of 0.14 a.p.f.u. (S.D.= 0.03 a.p.f.u.), and the 8 Au-poor grains have an average Au content of 0.04 a.p.f.u. (S.D.=0.02 a.p.f.u.).

CHAPTER 6: ASSAY GEOCHEMISTRY

6-1 INTRODUCTION

The assay data on more than 2000 samples of ore provided by INCO Ltd. has enabled the author to make comparisons between petrographic observations and quantitative analyses of Cu, Ni, Co, and TPM. Some of these are straight-forward, but never the less provide insight into how the base and precious metals are distributed within the orebody. The host minerals for PGE are important with respect to PGE recovery by normal smelting and refining techniques. Some of the precious metals in South Range offset environments are spatially associated with arsenides, thus arsenic minerals are problematic in metallurgical treatment of ores. Therefore, a good whole-rock geochemical and petrographic understanding of PGM associations within the sulphides and silicates may allow geologists to judge the probability of the occurrence of desirable PGE-bearing ore.

Assay data may also be evaluated to better characterize the orebodies along the Copper Cliff offset. Each orebody has unique geochemical features that may be compared or contrasted with adjacent orebodies. This may lead to a better understanding of the relative importance of primary magmatic processes and later processes such as hydrothermal remobilization of sulphides, metamorphism, and deformation.

6-2 WHOLE-ROCK SULPHIDE ANALYSES BY ICP-MS (100 ORE BODY)

When studying a particular orebody it is important to consider overall geochemical trends and relate them to mineral chemistry and petrography. One should be able to apply small-scale observations to the entire orebody. For instance, in whole-rock analyses (4 samples) of well documented sulphides of varied ore textures from the 100 orebody there is a linear correlation of Ni and Co. Electron microprobe analyses indicate that Co is found mostly in pentlandite; therefore, it is reasonable to assume that the massive sulphides contain more Co than the disseminated sulphides that are chalcopyrite-rich, because of their greater pentlandite content. Figure 6-1a shows the Ni and Co contents of the four samples. In these particular samples the inclusion massive sulphide has more Ni and Co than does the massive sulphide, indicating that the pentlandite to pyrrhotite ratio is higher in the inclusion massive sulphide.

A useful plot for discriminating sulphides is Fe against Cu/Cu+Ni, since pyrrhotite- and pentlandite-rich samples contain more Fe than chalcopyrite-rich samples. Pyrrhotite and pentlandite have an average Fe content of 60 wt%, and 30 wt% respectively, whereas chalcopyrite has an average Fe content of 30 wt%. From this, one can make assumptions concerning the mineralogy of samples and gain an understanding of the relative abundance of sulphide phases in the orebody. In figure 6-1b the MASU and INMS samples plot in the upper left of the diagram while the DISS sample plots in the lower right, reflecting its high Cu/Cu+Ni ratio and lower Fe content. The INMS from the centre of the ore zone has a lower Fe content and a slightly higher Cu/Cu+Ni ratio

Figure 6-1a: Ni and Co contents of four whole rock samples from the 3500 ft level of the 100 orebody, CCN Mine.

Figure 6-1b: Scatterplot of Fe versus Cu/Cu+Ni from four samples taken at the 3500 ft level of the 100 orebody, CCN Mine. Mineralogical composition of pyrrhotite, pentlandite, and chalcopyrite are plotted for comparison. Disseminated sulphide (DISS), inclusion massive sulphide (INMS), massive sulphide (MASU).

than the INMS close to the outer MASU zone. This is due to the lower modal abundance of sulphide (confirmed in hand-sample), and possibly lower pyrrhotite/pentlandite ratio.

6-3 GEOCHEMISTRY OF THE 100 OREBODY

A large number of assay data (>6000 samples) from the 100 orebody was supplied by INCO Ltd., but since the dataset was compiled over several years or decades there are discrepancies between much of the it. For example, the 23 variables presently analyzed or recorded for in each sample, were not always included in older samples. Therefore, the reader may notice an inconsistency in the number of samples used in each data plot.

Mapping, core logging and petrographic observations show that there are variable amounts of the major sulphides in each of the sulphide textural types. Many of these variations are readily distinguished using the percentage of Cu, Ni, and Fe contents of the samples and relating them to sulphide textures recorded during logging. Figure 6-2a shows the Fe contents of 2016 samples plotted against Cu/Cu+Ni. MASU samples form a tight cluster in the top left of the diagram, revealing a tendency to be Fe-rich and Cu-poor. The average Cu grade from 35 MASU samples is 3.34 wt% (S.D.=7.15 wt%), and the average Ni grade is 3.34 wt% (S.D.=1.09 wt%) (Figure 6-2b). There are Cu-rich massive sulphides, but as in underground and drill hole observations, the Cu content is quite variable (reflected in the large standard deviation). INMS composes the largest percentage of mineable ore and may be either Fe- or Cu-rich, with the greatest number of samples in the Fe-rich zone. This is reasonable considering that this ore is typically composed of pyrrhotite and pentlandite with lesser amounts of chalcopyrite around

Figure 6-2a: Scatterplot of Fe-Cu-Ni contents of 2016 assay samples from the 100 orebody. All samples plotted as a function of ore texture. Blebby sulphide (BLBS), disseminated sulphide (DISS), inclusion massive sulphide (INMS), massive sulphide (MASU), ragged disseminated sulphide (RGDI), sulphide specks (SPKS), sulphide stringers (STRS).

Figure 6-2b: Bar plot of the average Cu-Ni-Co contents of assay samples from the 100 orebody. Cu-Ni contents for SPKS based on 520 samples. Co contents of SPKS based on 103 samples.

inclusions. The average Cu grade from 239 samples is 1.68 wt% (S.D.=1.94 wt%), and the average Ni grade is 2.39 wt% (S.D.=0.84 wt%). Blebby sulphides may be mineable depending on the abundance of blebs in the inclusion quartz diorite. In some places underground the ore cut-off is somewhere in the middle of the blebby disseminated zones. The chalcopyrite to pyrrhotite+pentlandite ratio is generally 1:1, with slightly more pyrrhotite+pentlandite. Most of the BLBS plot in the centre of the diagram. The average Cu grade from 435 samples is 0.76 wt% (S.D.=0.67 wt%), and the average Ni grade is 0.66 wt% (S.D.=0.76 wt%).

Stringer sulphides plot throughout the diagram, but there is a general linear correlation. Most of the stringers are Cu-rich and have very little Fe (Table 6-1). Many of these plot in the lower right of the diagram, probably because of the low modal abundance of sulphide in the assay sample. This is somewhat skewed because the minimum drill core sample size is approximately 15 cm in length, while most stringers in the offset are much narrower. Ragged disseminated sulphides have fairly low Cu and Ni grades. Field and microscopic examination of disseminated, interstitial sulphide, and sulphide specks shows that chalcopyrite is the dominant sulphide phase, and the assay data reveals a high Cu to Ni ratio. In these ore types with a low modal abundance of sulphide, the Fe content is very low from dilution by the silicate phases in the assay sample. One must also consider the amount of Fe contribution from oxide and some silicate minerals. See figure 6-2b for a graphical representation of the average Cu and Ni contents in each of the sulphide textural types. When relating metal assays to mineralogy

Table 6-1: Average Cu, Ni, and Co contents of each ore texture from the CCN Mine.

	Cu (wt%)		Ni (wt%)		n	Co (wt%)		
	X	1s	X	1s		X	1s	n
BLBS	0.76	0.67	0.66	0.76	435	0.03	0.04	435
DISS	0.76	0.71	0.45	0.52	315	0.02	0.02	350
INMS	1.68	1.94	2.39	0.84	239	0.10	0.04	257
INSU	1.10	0.69	0.40	0.41	69	0.02	0.02	69
MASU	3.34	7.15	3.34	1.09	35	0.12	0.05	47
RGDI	1.07	0.80	1.09	0.66	145	0.05	0.03	145
SPKS	0.19	0.25	0.07	0.10	520	0.01	0.01	103
STRS	1.25	1.88	0.65	0.68	258	0.03	0.03	262

Note: X - mean, 1s - standard deviation.

Table 6-2: Pearson correlation coefficients for 684 assay samples from the 100 orebody, CCN Mine. Includes all textural types.

	Fe	Cu	Ni	Co	Pt	Pd	Au
Fe	1.000						
Cu	0.285	1.000					
Ni	0.952	0.220	1.000				
Co	0.919	0.205	0.913	1.000			
Pt	0.158	0.291	0.266	0.154	1.000		
Pd	0.041	0.211	0.080	0.323	0.170	1.000	
Au	-0.029	0.145	-0.007	0.112	0.207	0.489	1.000

one must realize that there is 0.3% Cu present in 1.0% chalcopyrite, and only about 0.05% Ni in 1.0% pyrrhotite/pentlandite (assuming a 5:1 pyrrhotite/pentlandite ratio).

As seen previously in the four whole-rock samples taken from the 3500 level in CCN Mine, there is an association of Co with pentlandite and pyrrhotite. This is also reflected in 1668 assay samples from throughout the orebody (see Figure 6-2b). As expected the MASU and INMS samples contain the greatest amount of Co, with grades of 0.12% (S.D.=0.05%) and 0.10% (S.D.=0.04%) respectively. The other sulphide groups have lower Co grades (see Table 6-1). The high standard deviations reflect the variable amounts of pentlandite in the samples.

The most abundant PGE in the 100 orebody is Ir in the PGM irarsite, although Ir is not typically analyzed by INCO. Pt and Pd are typically the most economically important metals, but they are not found in great abundance. Figure 6-3a shows 729 assay samples plotted with Pt/Pt+Pd against Cu/Cu+Ni. The greatest separation in the data appears to be associated with the relative Cu content in the different sulphide textural types. There is not a distinct correlation between PGE and Cu, which is often seen in North Range deposits (Table 6-2). However, examination of the average Pt and Pd contents relative to sulphide texture reveals a stronger association between Pt and interstitial sulphide, and to a lesser extent massive sulphide (see Figure 6-3b, and Table 6-3). Most MASU contains little PGE, the high average Pt content in MASU is due to high counts in a few samples. The average Pt and Pd contents in 23 MASU samples is 0.03 oz/ton (S.D.=0.06 oz/ton) and is 0.01 oz/ton (S.D.=0.02 oz/ton) respectively. In 5 INSU samples the average is 0.03 oz/ton (S.D.=0.02 oz/ton) Pt and 0.01oz/ton (S.D.=0.01

Figure 6-3a: Scatterplot of Pt/(Pt+Pd) versus Cu/(Cu+Ni) from 729 assay samples from the 100 orebody. Each sample is divided as a function of ore texture. Blebby sulphide (BLBS), disseminated sulphide (DISS), gabbro-peridotite inclusion sulphide (GPIS), inclusion massive sulphide (INMS), interstitial sulphide (INSU), massive sulphide (MASU), ragged disseminated sulphide (RGDI), sulphide specks (SPKS).

Figure 6-3b: Upper bar graph is a plot of the average Pt and Pd contents of 729 samples from the 100 orebody. The lower bar graph is a plot of the average Au contents of 542 samples from the 100 orebody. Each sample is divided as a function of ore texture.

Table 6-3: Pearson correlation coefficients for MASU and INSU samples from the 100 orebody, CCN Mine. Data based on 17 MASU and 5 INSU samples.

MASU	Fe	Cu	Ni	Co	Pt	Pd	Au
Fe	1.000						
Cu	-0.338	1.000					
Ni	0.483	-0.619	1.000				
Co	0.763	-0.743	0.696	1.000			
Pt	-0.129	0.147	0.487	-0.063	1.000		
Pd	-0.367	0.242	-0.269	-0.185	0.015	1.000	
Au	-0.275	0.543	-0.532	-0.296	-0.151	0.669	1.000

INSU	Fe	Cu	Ni	Co	Pt	Pd	Au
Fe	1.000						
Cu	0.442	1.000					
Ni	0.362	0.584	1.000				
Co	0.694	0.839	0.859	1.000			
Pt	0.743	0.699	0.099	0.580	1.000		
Pd	-0.044	0.797	0.498	0.559	0.402	1.000	
Au	0.693	0.819	0.182	0.650	0.975	0.494	1.000

Table 6-4: Average Pt, Pd, and Au contents of each ore texture from the CCN Mine.

	Pt (oz/ton)		Pd (oz/ton)			Au (oz/ton)		
	X	1s	X	1s	n	X	1s	n
BLBS	0.010	0.012	0.006	0.007	168	0.009	0.042	125
DISS	0.016	0.015	0.007	0.010	177	0.003	0.001	146
GPIS	0.016	0.009	0.007	0.002	6	0.006	0.003	5
INMS	0.012	0.013	0.014	0.054	111	0.008	0.033	90
INSU	0.029	0.020	0.012	0.007	5	0.013	0.009	5
MASU	0.031	0.067	0.012	0.018	23	0.007	0.012	20
RGDI	0.008	0.004	0.007	0.005	29	0.006	0.005	10
SPKS	0.003	0.005	0.003	0.006	103	0.004	0.005	58
STRS	0.010	0.017	0.010	0.025	107	0.011	0.020	83

Note: X - mean, 1s - standard deviation.

oz/ton) Pd. The lower analytical detection limit for Pt and Pd is 0.002 oz/ton, and the upper limit is 15.0 oz/ton (Brian Huston, Senior Staff Geologist, CCN Mine; personal communication). Only one tiny Pt-bearing mineral (sperrylite) was found in all of the polished thin sections analyzed and it was in INSU. The only Pd mineral found was michenerite in one MASU sample and one stringer sulphide sample.

Au content in the 100 orebody is also limited, but analysis of average abundances reveals that most Au is associated with INSU and stringer sulphides (see figure 6-3b). No native gold was observed in polished thin section. The average Au contents in 5 INSU samples is 0.013 oz/ton (S.D.=0.009 oz/ton), and in 83 stringer sulphide samples the average is 0.011 oz/ton (S.D.=0.020 oz/ton). The total precious metal content in the 100 orebody is presented in Table 6-4.

6-4 DATAMINE MODELING OF THE 100, and 900 OREBODIES

Data from underground workings and diamond drill logs have been examined using a Datamine model previously constructed by INCO Ltd. Datamine is a powerful computer modeling tool because it enables the user to examine boreholes, assay data, lithological data, and orebody wireframes in 3-dimensional space. Access to this information provides the means to model both geochemical and structural trends within the mine. Observed trends in metal content are routinely used in exploration drilling programs to outline possible targets. An understanding of the pyrrhotite to Ni ratios within a deposit is important for grade estimations in drill core and in mine development.

This information is used to a great extent in block modeling of ore zones in mines throughout the Sudbury region.

The existing Datamine model includes the adjacent 120, 100, 900, and 890 orebodies, within the QD dyke from north to south. The orebodies may or may not be connected by weakly disseminated sulphides and are generally divided based on sulphide concentrations. Preliminary investigation has revealed distinct differences in total precious metal (TPM) contents, Cu/Ni ratios, Po/Ni ratios, and Cu contents. Figure 6-4a shows that the Cu/Ni ratios of mineralized intersections are quite different among the orebodies (Note: wireframe outline shows the 100 and 900 orebodies as one orebody). Some of the higher Cu/Ni ratios may be misleading because assays containing a low percentage of sulphide were not filtered out. For example, samples with 1 wt% Cu and no Ni will be plotted but are not significant in terms of Cu zonations. Most of the ore in the 100 orebody has a Cu/Ni ratio of about 2.5 to 3.0, whereas the 900 orebody has a wide range of values from 0 to >5.0. Given many of the observed textures and alteration minerals associated with chalcopyrite in both of the orebodies, much of the chalcopyrite was probably remobilized. Chalcopyrite may have been hydrothermally remobilized from the 100 orebody and precipitated in ores of the 900 orebody.

Figure 6-4b shows that there is also a distinct difference in Po/Ni ratios between the 100 and 900 orebodies. The diagram indicates that most of the ore in the 100 orebody has a Po/Ni ratio of about 20:1; probably the highest Po/Ni ratio of all the orebodies at CCN Mine. There are well defined zonations in the 120, 100, and 900 orebodies, in which the Po/Ni ratio changes laterally but not vertically.

Figure 6-4: a) Datamine image of CCN Mine orebodies (Longitudinal section)-boreholes filtered to show mineralized zones. Colour-code refers to Cu/Ni ratios within zones (see legend for ranges). b) Datamine image of CCN Mine orebodies (Longitudinal section)-boreholes filtered to show mineralized zone. Colour-code refers to Pb/Ni ratios (see legend for ranges).

Figure 6-5a: a) Datamine image of CCN Mine orebodies (longitudinal section)-boreholes filtered for mineralized zones. Colour-code refers to Cu abundance (see legend for ranges).
 b) Datamine image highlighting the 100 and 900 orebodies (longitudinal section)-boreholes filtered for mineralized zones. Colour-code refers to TPM abundance (see legend for ranges).

Figure 6-5a shows that the average Cu content of the 100 orebody is 1 to 2 wt%. The higher Cu values do not coincide with higher TPM concentrations. TPM contents in parts of the 900 orebody are clearly higher than those in the 100 orebody (Figure 6-5b). TPM values are typically less than 0.025 oz/ton, with a maximum between 0.05 and 0.075 oz/ton. whereas the 900 orebody contains a wide range of TPM values from <0.02 to >0.2 oz/ton.

CHAPTER 7: DISCUSSION AND CONCLUSION

7-1 DISCUSSION

The orebodies in the Copper Cliff offset are similar to many of the deposits within the offset dykes throughout the Sudbury region. However, there are many important differences in sulphide distribution, intrusive contacts, and inclusion mineralogy that makes them quite unique. An understanding of these differences is useful in applying genetic models to the deposits.

The Worthington offset is a quartz diorite offset dyke that extends radially from the south-west contact of the SIC, near the town of Worthington. Three different mines (Totten, Kidd Copper, and Victoria) have been in production along the dyke, but all are currently inactive. Recent exploration by INCO Ltd. around Worthington has been promising and may lead to the re-opening of the Totten mine. It is a useful dyke to compare with the Copper Cliff offset because of its pristine outcrops and well defined flow banding. A detailed study by Lightfoot et al. (1997) revealed that formation of the dyke involved multiple closely-spaced intrusive phases. Marginal phases consist of quartz diorite barren of inclusions, while rocks toward the centre contain progressively larger sub-round inclusions derived from the adjacent country rocks. The largest concentrations of ore are associated with the largest inclusions.

Unlike contacts in the Worthington offset, sharp contacts between intrusive phases in the Copper Cliff offset are not readily identifiable at surface, but do exist. These tend to be sharp contacts between barren and sulphide-bearing inclusion quartz

diorite, or blebby sulphide and massive sulphide. Zoning within the dyke has long been thought to be the result of flow differentiation (see Cochrane, 1984). The association of sulphides and inclusions together at the centre of the dyke is explained by flow dynamics in the dyke, whereby larger inclusions are associated with magma moving at a greater velocity. This argument does not account for inclusions found near dyke margins. Observations made in this study suggest a much more complex intrusive history for the dyke.

Separate bands within the dyke likely resulted from several closely-spaced intrusions that took advantage of planes of weakness in the previously intruded magmas. This resulted in unevenly distributed intrusive phases throughout the dyke. In some cases, quartz diorite along the margins of the dyke exhibits a "spherulitic" texture and may have been the first magma to intrude those areas. Despite the name, these so-called spherulites are not typically spherical in shape but resemble sheaves of wheat tied at the centre (Lofgren, 1971). Macroscopically, spherulites in the quartz diorite are similar in appearance to the bow-tie or plumose morphologies described by Lofgren (1974). Spherulites develop within rapidly quenched rocks, but may grow under other conditions provided the temperature remains within the spherulite-formation range. Growth of spherulite crystals is dependent on the presence of a lower temperature component found at the interface of the growth phase (or impurity). The presence of this component is a function of the "diffusion rate of the impurity and the growth rate of the crystal" (Lofgren, 1971). Therefore, conditions for growth of spherulites were only optimal near the margins of the dyke.

In other cases the marginal quartz diorite may be a later phase with or without sulphides. Evidence for this is the development of elongate clinopyroxene crystals perpendicular to the contact between quartz diorite and massive sulphide (see Figure 3-2). Oriented clinopyroxene is often seen in ultramafic rocks and it may be likened to spinifex textures in komatiite flows. Spinifex textured clinopyroxene from pyroxenitic komatiites has been described in detail by Arndt et al. (1977), who attribute the growth of the crystals to the same process by which olivine spinifex is formed. Spinifex textured olivine is always found at the top of flows and is ascribed to rapid cooling from the top down. Suitable nuclei are only present at the top, which results in supersaturation of the magma and rapid crystallization of olivine blades downward in the melt (Arndt et al., 1977). Shore and Fowler (1999) suggest that spinifex olivine grows by thermally constrained crystallization, whereby crystals grow into a hotter fluid. In this process the olivine crystals would act as heat sinks, absorbing heat from the surrounding liquid. This is based on the estimate that the thermal conductivity of olivine would be three to five times greater than that of the surrounding liquid. Therefore, in the case of clinopyroxene found at the quartz diorite contact, it is likely that the quartz diorite was intruded after the massive sulphide in order to accommodate growth of these elongate crystals. The lack of a chilled margin at this contact, commonly seen in komatiites, is because there would not have been as great a contrast in temperature between the quartz diorite and massive sulphide as there is between sub-aqueous komatiite flows and sea water.

One consideration that should be addressed is the timing of crystallization of silicate and sulphide phases in the offset. Textures such as blebby sulphides and

disseminated sulphides indicate that the sulphide liquid crystallized first and the surrounding quartz diorite second. For spherical sulphide blebs to retain their shape they must be solid before the crystallization and growth of silicate crystals in the quartz diorite that would impinge on their borders. Interstitial sulphide seems to show the opposite relationship, in which the sulphides are interstitial to the silicate grain boundaries.

There is a considerable change in the style of mineralization in the 100 orebody from the surface to the 3500 level of the mine. At depth the deposit sometimes encompasses almost the full width of the dyke and is composed mostly of inclusion massive sulphide with lesser massive sulphide, blebby sulphides, and disseminated sulphides. This appears to be the case from the 3500 ft. level up to at least the 2700 ft. level. The diamond drill core obtained from the 2400 ft. level reveals a change in the distribution of sulphides into intermittent stringers of massive sulphide with some blebby sulphides, ragged disseminated sulphide, and disseminated sulphides, and very little inclusion massive sulphide (see diamond drill logs in Appendix 4-2a and b). The surface expression of the mineralization defined in the detailed mapping area may not be part of the 100 orebody. It is separated from the 100 orebody by the No. 2 cross-fault, and mineralization there (see Map 1) is of low grade and is limited to some blebby and disseminated sulphides. The continuation of the 100 orebody has not been traced above this displacement. Despite this, the mineralization at surface indicates that ore at shallower depths near the 100 orebody may be of lower grade.

Since many of the orebodies in the offset are steeply dipping, pipe-like deposits, this variation with depth likely represents pinching out of the orebody closer to the

surface. East-west cross-sections of the 100 orebody show that above the 3000 ft. level it is thickest between sections 93 and 95 (100 ft. between sections), and below the 3000 ft. level it is thickest between sections 95 and 96. In all cases the orebody gradually becomes narrower and pinches out to the north and south. Diamond drill hole data indicates wide sulphide zones at least to the 4000 ft. level. Given these trends, one would expect the orebody to continue with increasing depth, possibly marked by a change in mineralization to stringers with very little inclusion massive sulphide at its lower limits.

The felsic dykes within the QD are the latest phase formed from late magmatic fluids and provides support for multiple intrusive phases in the QD dyke. The dykes all have the same orientation and pinch and swell through the QD aligned in a linear fashion. This relationship indicates that a late magma infilled small linearly oriented fissures or dilation zones in the crystallizing QD magma.

Hydrothermal remobilization of sulphides within the 100, 900, and 890 orebodies is spatially limited but is a significant feature in most of the sulphides. The consistent link between sulphides and hydrous minerals like amphibole, chlorite, biotite, and epidote throughout the orebodies can only be explained by a hydrothermal event. These minerals always occur at the margins of sulphide veins and veinlets, a texture which can only develop by remobilization of sulphides into fractures after solidification of the QD. Similar features have also been identified by Magyarosi et al. (1999) at Copper Cliff South Mine, and Stewart et al. (1999) in deposits south of Kelly Lake.

The hydrothermal events affecting the Sudbury structure have been outlined by Molnar et al. (1997 and 1999). Fluid inclusion, petrographic, and microthermometric

studies indicate that five stages of hydrothermal activity are associated with the Sudbury deposits. These episodes are represented, for example, by a number of primary and secondary fluid inclusions in K-feldspar from the Murray granite and quartz intergrown with sulphides at the Lindsley mine (Molnar, 1997). At least two of these phases can be delineated petrographically in ores from the 100 orebody. The first hydrothermal event is revealed by the remobilization of chalcopyrite that often replaces pyrrhotite in stringers, magnetite in inclusion massive sulphide, and infills fractures. Precipitation of cobaltite/gersdorffite grains around PGM may also be associated with this event. Evidence for a second hydrothermal episode is given by the development of sphalerite, hessite, and bismuth tellurides around or at the margins of cobaltite grains.

The zonation of cobaltite/gersdorffite grains suggests that the core was formed first with successive growth zones of sulpharsenide proceeding outward. Zonation of sulpharsenides is common throughout the Copper Cliff offset (Magyarosi et al., 1999; Stewart et al., 1999; Szentpéteri, 1999; Carter, 2000). The cobaltite/gersdorffite likely nucleated on irarsite or bismuth telluride found at the centre of the crystals. Diffuse, iridium-rich zones are found in the cobaltite around the irarsite cores. This suggests that iridium has diffused out of the irarsite into the surrounding cobaltite, possibly being incorporated into the cobaltite structure. Similar iridium-bearing cores in sulpharsenides have been reported by Cabri (1981). Zoning in sulpharsenides has been documented by Ohnenstetter and Watkinson (1991) in hollingworthite [RhAsS] from the Two Duck Lake Intrusion. Analyses suggested that they had become complexly zoned through modification by fluids that post-dated crystallization of the sulphide magma. Unlike the

zoned minerals at Two Duck Lake, the cobaltite is not spatially associated with veins and alteration minerals. However, as outlined by the Ohnenstetter and Watkinson (1991), this type of zonation cannot be explained by simple exsolution from magmatic sulphide.

A common relationship within the inclusion massive sulphide ore is of chalcopyrite with inclusions. Chalcopyrite in this ore seems to form amalgamated blebs around the inclusions (Figure 7-1). This could be a primary feature associated with the Cu-rich phase (Ebel and Naldrett, 1996; Naldrett, 1984) of the original sulphide liquid, in which the liquid moved into areas of low pressure around inclusions. In this situation there would have to be some unexplained control on the segregation of a Cu-rich liquid into these zones. Conversely, these textures could be the result of hydrothermal replacement of pyrrhotite and pentlandite by chalcopyrite. Chalcopyrite-filled veinlets join many of the sulphide blebs in inclusion massive sulphide, and each bleb is surrounded by hydrous minerals. Therefore, weak tectonic pressures on the QD may have forced fluids into low pressure zones around the inclusions, much like pressure shadows associated with porphyroblasts in strongly deformed rocks.

7-2 CONCLUSION

Petrographic examination, electron microprobe analyses, and underground study of ores from the 100, 900, and 890 orebodies suggest a number of stages for mineralization. The quartz diorite dyke was formed by multiple intrusions of magma related to the Sudbury event, and most of the sulphide textures were derived from an

Figure 7-1 : Inclusion massive sulphide from the 3500 ft. Level of the 100 orebody, Copper Cliff North Mine. Note the accumulation of of chalcopyrite around the ultramafic clast.

immiscible sulphide liquid. *Stage 1* of ore genesis included the formation of magnetite (with ilmenite exsolution lamellae), pyrrhotite, pentlandite, chalcopyrite, and cubanite from a primary magma. This would account for ore textures such as inclusion massive sulphide, massive sulphide, blebby sulphide, interstitial sulphide, and disseminated sulphide. *Stage 2* is likely a hydrothermal process or processes that resulted in remobilization of sulphides, sulpharsenides, and PGM. These include chalcopyrite in veins and stringers, pyrrhotite in veinlets, pentlandite flames in chalcopyrite near the margins of stringers, zoned cobaltite/gersdorffite, nickeline, PGM (michenerite, sperrylite, froodite), and bismuth tellurides (tsumoite). *Stage 3* resulted from another hydrothermal event in which sphalerite, and hessite were precipitated around sulpharsenides. *Stage 4* involves the local remobilization of sulphides by an oxidizing fluid related to structural features, leaving pyrite chains or solitary grains.

The Sudbury Igneous Complex itself, may have been the heat engine responsible for circulation of the hydrothermal fluids related to *stages 2 and 3*. Molnar et al. (1997 and 1999) suggest that the source of saline fluids associated with hydrothermal activity is formational brines in the footwall rocks of both the North and South Ranges. Multiple intrusive phases of the SIC may have driven these fluids, stripping metals from the primary deposits and remobilizing them within the quartz diorite or into the footwall. The later oxidizing fluids associated with the 900 cross-fault (*stage 4*) could be related to the Penokean orogenic event. Penokean metamorphism may have begun before and continued until sometime after the Sudbury event. Molnar et al. (1999) identified late

fluids that could be related to this orogen that would have been channeled along deep faults.

An association between sulphides and hydrous minerals such as amphibole, biotite, chlorite, and epidote has been identified, similar to that recorded by other workers in the Copper Cliff offset (Magyarosi et al., 1999; Stewart et al., 1999; Szentpéteri, 1999) and throughout the Sudbury structure (Farrow and Watkinson, 1996; Farrow and Watkinson, 1997; Molnar et al., 1997; Molnar et al., 1998; Everest, 1999; Watkinson, 1999). This relationship suggests that hydrothermal fluids have interacted with the host rocks and precipitated the sulphides.

Comparison between the 100 orebody and the adjacent 900 and 890 orebodies has revealed distinct similarities in ore distribution, and some differences in platinum group mineralization. The section of the 890 orebody (2800 ft. level) studied in this thesis shows the same ore distribution as the 100 orebody near that depth. The deposit is at the centre of the dyke and characterized by sharp contacts between the marginal blebby sulphide and disseminated ore with the central massive sulphide and inclusion massive sulphide ore. The sulphides in the 900 orebody at the 2400 ft. level are at the margin of the QD dyke, and large stringers extend into the footwall metasedimentary rocks. This is similar to the ore seen in drill core from the 100 orebody at the 2400 ft. level, but much more inclusion massive sulphide is present in the 900 orebody. PGM observed in the 100 orebody are michenerite and sperrylite, whereas the PGM found in carbonate/quartz veins in the 900 orebody are froodite.

Assay analysis of approximately 2000 ore samples has shown that the main Ni-bearing ore types are massive sulphide, inclusion massive sulphide, and to a lesser extent ragged disseminated sulphide. The Cu-rich ores are stringers, interstitial sulphide, and disseminated sulphide. The overall PGE content of the 100 orebody is low, and is associated predominantly with interstitial sulphide and massive sulphide. The Datamine model shows that ore from the 100 orebody has a significantly higher pyrrhotite to Ni ratio and depleted PGE contents compared to the adjacent 900 orebody. This large-scale zonation of platinum group minerals in the orebodies could have resulted from remobilization of PGE from the 100 orebody into the 900 orebody.

REFERENCES

- Arndt, N.T., Naldrett, A.J., Pyke, D.R., 1977. Komatiitic and iron-rich tholeiitic lavas of Munro Township, Northeast Ontario. *Journal of Petrology*, 18, p. 319-369.
- Batt, A.P., 1972. Nickel distribution in hexagonal and monoclinic pyrrhotite. *Can. Mineral.*, 11, p. 892-897.
- Binney, W.P., Poulin, R.Y., Sweeny, J.M. and Halladay, S.H., 1994. The Lindsley Ni-Cu-PGE deposit and its geological setting: *In* Lightfoot, P.C., and Naldrett, A.J. (eds.) *Proceedings of the Sudbury - Noril'sk Symposium*, Ontario Geological Survey Special Volume 5, p. 91-103.
- Card, K.D., 1964. Metamorphism of the Agnew Lake area, Sudbury District, Ontario. Canada: *Geol. Soc. Am. Bull.*, 75, p. 1011-1030.
- Card, K.D., 1978. Metamorphism of the middle precambrian (Aphebian) rocks of the Eastern Southern Province. *In* *Metamorphism in the Canadian Shield*. *Geol. Surv. Can.*, Paper 78-10, p.269-282.
- Cabri, L.J., and Harris, D.C., 1973. Michenerite (PdBiTe) redefined and Froodite (PdBi₂) confirmed from the Sudbury area. *Can. Mineral.*, 11, p. 903-912.
- Cabri, L.J., 1981. The platinum-group minerals. *In* *Platinum-Group elements: Mineralogy, geology, Recovery*. L.J. Cabri, ed. *Can. Inst. Mining Metall., Spec. Vol. 23*, p. 83-150.
- Cabri, L.J., Gilles Laflamme, J.H., 1976. The Mineralogy of the Platinum-Group Element from some Copper-Nickel Deposits of the Sudbury Area, Ontario. *Economic Geology*, 71, p. 1159-1195
- Carter, W.M., 2000. Sulphide, sulpharsenide, and Platinum Group Mineralization in the 740 orebody, Copper Cliff offset, Sudbury, Ontario. Unpublished BSc. thesis. Carleton University, Ottawa, Ont.
- Cochrane, L.B., 1984. Ore deposits of the Copper Cliff offset. *In* *The Geology and Ore Deposits of the Sudbury Structure*. Naldrett, A.J. and Giblin, P.E., eds. *Ont. Geol. Surv., Spec. Vol. 1*, p. 347-360.
- Davis, G.C., 1984. Little Stobie Mine: A south range contact deposit. *In* *The Geology and Ore Deposits of the Sudbury Structure*. Naldrett, A.J. and Giblin, P.E., eds. *Ont. Geol. Surv., Spec. Vol. 1*, p. 361-370.

- Dressler, B.O., 1984. General geology of the Sudbury area. *In* The Geology and Ore Deposits of the Sudbury Structure. Naldrett, A.J. and Giblin, P.E., eds. Ont. Geol. Surv., Spec. Vol. 1. p. 57-82.
- Ebel, D.S. and Naldrett, A.J., 1997. Crystallization of sulfide liquids and the interpretation of ore composition. *Canadian Journal Earth Sciences*, 34, p. 352-365.
- Everest, J. O. 1999. The relationship of Cu-Ni-PGE veins in the Levack Gneiss Complex to contact magmatic ore at the McCreedy West Mine, Sudbury. M.Sc. thesis. Carleton University, Canada. 125 p.
- Farrow, C. 1998. Copper Cliff North Mine 100 orebody: Mineralogy of boreholes 100505 and 100506. INCO internal report to B.Thompson. 15 p.
- Farrow, C.E.G. and Watkinson, D.H., 1997. Diversity of precious-metal mineralization in footwall Cu-Ni-PGE deposits, Sudbury, Ontario. Implications for hydrothermal models of formation. *Canadian Mineralogist*, 35, p. 817-839.
- Farrow, C.E.G. and Watkinson, D.H., 1996. Geochemical evolution of the Epidote Zone, Fraser Mine, Sudbury, Ontario: Ni-Cu-PGE remobilization by saline fluids. *Explor. Mining Geology*, 5, p. 17-31.
- Ferry, J.M. and Spear, F.S., 1978. Experimental calibration of the partitioning of Fe and Mg between biotite and garnet. *Contrib. Mineral. Petrol.*, 66, p. 113-117.
- Fleet, M.E., Barnett, R.L., Morris, W.A., 1987. Prograde metamorphism of the Sudbury Igneous Complex. *In* *Canadian Mineralogist*, 25, p.499-514.
- Graham, A.R., 1969. Quantitative determination of hexagonal and monoclinic pyrrhotites by X-ray diffraction. *Can. Mineral.*, 10, p. 4-24.
- Grant, R.W. and Bite, A. 1984. Sudbury quartz diorite offset dykes. *In* The Geology and Ore Deposits of the Sudbury Structure. Naldrett, A.J. and Giblin, P.E., eds. Ont. Geol. Surv., Spec. Vol. 1. p. 275-300.
- Hoffman, E. and Maclean W.H., 1976. Phase relations of michenerite and merenskyite in the Pd-Bi-Te System. *Economic Geology*, 71, p. 1461-1468.
- Hodges, K.V. and Spear, F.S. 1982. Geothermometry, geobarometry and the Al_2SiO_5 triple point at Mt. Moosilauke, New Hampshire. *American Mineralogist*, 67, p. 1118-1134.
- Klein, C. and Hurlbut, C. S. Jr. 1985. *Manual of Mineralogy*: Twentieth edition. John Wiley and Sons. 596 p.

- Lightfoot, P.C., Doherty, W., Farrell, K., Keays, R.R., Moore, M., and Pekeski, D., 1997. Geochemistry of the main mass, sublayer, offsets, and inclusions from the Sudbury Igneous Complex, Ontario. Ontario Geological Survey Open-file Report 5959, 231pp.
- Lofgren, G. 1971. Spherulitic textures in glassy and crystalline rocks. *Journal of Geophysical Research*, 76, No. 23, p. 401-414.
- Lofgren, G. 1974. An experimental study of plagioclase crystal morphology: isothermal crystallization. *American Journal of Science*, 274, p. 243-273.
- Magyarosi, Z. 1998. Metamorphism of the Proterozoic rocks associated with the Sudbury Structure. Unpublished MSc. thesis, Ottawa, Carleton University, 101p.
- Magyarosi, Z., Watkinson D.H., Jones, P.C., 1999. Mineralogy and chemistry of silicates and sulphides in different types of ore in the Copper Cliff South Mine. *Geol. Assoc. Canada / Mineral. Assoc. Canada. Abstract*, 24, p. 78.
- Marsh, B.D. and Zieg. M., 1999. Solidification fronts of the Sudbury melt sheet. *In* Field Trip B9 Guidebook - GAC-MAC Joint Annual Meeting. Sudbury, Ontario.
- Molnar, F., Watkinson, D.H., Jones, P.C., and Gatter, I., 1997. Fluid inclusion evidence for hydrothermal enrichment of magmatic ore at the contact zone of the Ni-Cu-Platinum-Group element 4b deposit, Lindsley Mine, Sudbury, Canada. *In* *Economic Geology*, 92, p. 674-685.
- Molnar, F., Watkinson, D.H., Everest, J.O., 1999. Fluid-inclusion characteristics of hydrothermal Cu-Ni-PGE veins in granitic and metavolcanic rocks at the contact of the Little Stobie deposit, Sudbury, Canada. *Chemical Geology*, 154, pp.279-301.
- Morrison, G.G., Jago, B.C. and White, T.L., 1994. Footwall mineralization of the Sudbury Igneous Complex: in Lightfoot, P.C., and Naldrett, A.J. (eds.) *Proceedings of the Sudbury - Noril'sk Symposium*, Ontario Geological Survey Special Volume 5, p.57-64.
- Naldrett, A.J., 1989. Magmatic sulfide deposits. *Oxford Monograph Geology Geophysics*, No.14, 178 p.
- Ohnenstetter, D., Watkinson, D.H., Dahl, R. Zoned hollingworthite from the Two Duck Lake intrusion, Coldwell complex, Ontario. *American Mineralogist*, 76, p1694-1700.

- Owen, D.L. and Coats, C.J.A., 1984. Falconbridge and east mines. *In The Geology and Ore Deposits of the Sudbury Structure*. Naldrett, A.J. and Giblin, P.E., eds. Ont. Geol. Surv., Spec. Vol. 1. p. 371-378.
- Peredery, W.V. and Morrison, G.G., 1984. Discussion of the origin of the Sudbury Structure. *In The Geology and Ore Deposits of the Sudbury Structure*. Naldrett, A.J. and Giblin, P.E., eds. Ont. Geol. Surv., Spec. Vol. 1. p. 491-512.
- Rousell, D.H., 1975. The origin of foliation and lineation in the Onaping Formation and the deformation of the Sudbury Basin. *In Can. J. Earth Sci.*, 12, 1379-1395.
- Riller, U. 1996. Magnetic fabric and microstructural evidence for a tectonothermal overprint of the early proterozoic Murray Pluton, Central Ontario, Canada. *Journal of Structural Geology*, 18, No. 8, p. 1005-1016.
- Riller, U., and Schwerdtner, W.M. 1997. Mid-crustal deformation at the southern flank of the Sudbury Basin, central Ontario, Canada. *GSA Bulletin*: 109, no. 7, p. 841-854.
- Scott, S.D., 1974. Experimental methods in sulphide synthesis. *In Sulphide Mineralogy*. Ribbe, P.H., ed. Mineralogical Society of America short course notes, 1, p. S1-S38.
- Shore, M. and Fowler, A.D., 1999. The origin of spinifex texture in komatiites. *Nature*, 397, p. 691-693.
- Stewart, M.C., Watkinson, D.H., Jones, P.C., 1999. Petrology of the sulphides within the Copper Cliff offset, south of Kelly Lake, Sudbury. *Geol. Assoc. Canada / Mineral. Assoc. Canada. Abstract*, 24, p. 122.
- Szentpéteri, K., 1999. Mineralogical-petrological study of the Copper Cliff North mining area, Sudbury, Canada. Unpublished MSc. thesis. Eotvos Lorand University, Budapest, Hungary, 27p.
- Taylor, S.R. and McLennan, S.M., 1985. The continental crust: its composition and evolution - An examination of the geochemical record preserved in sedimentary rocks. Blackwell Scientific Publications. 312p.
- Watkinson, D.H., 1999. PGE enrichment in Cu-Ni-rich sulfide from footwall deposits, Sudbury Igneous Complex, Canada. *Chronique de la Recherche Minière*, No. 535, p. 29-43.

Appendix 1-1: List of common abbreviations.

BLBS	-blebby sulphides
CCN	-Copper Cliff North mine
Cp	-chalcopyrite
DISS	-disseminated sulphide
GPIS	-gabbro-peridotite inclusion massive sulphide
INMS	-inclusion massive sulphide
INSU	-interstitial sulphide
IQD	-inclusion quartz diorite
MASU	-massive sulphide
PGE	-platinum group elements
PGM	-platinum group minerals
Pn	-pentlandite
Po	-pyrrhotite
QD	-quartz diorite
RGDI	-ragged disseminated sulphide
SPKS	-sulphide specks
STRS	-sulphide stringers
TPM	-total precious metals

Appendix 3-1a: Underground map of the 890 orebody at the 2800 ft. level with sample locations, adapted from INCO level plans.

Appendix 3-1b: Underground map of the 100 orebody at the 3500 ft. level with sample, adapted from INCO level plans.

Appendix 4-2a: Diamond drill hole log for BH100505, drilled upwards at approximately 30 degrees through the QD dyke from the 2400 ft. level (9300 N section).

Depth	Thin Section	Po Sample	Po Polytype	Ore	Rock	Description
0.0						Collar
120.0					SUBX	FG GY GRN MTX. NUM SUB RND MTSD AND AMPH INCLS. MANY SMALL RND WHT FGNS TRGT 35% MTX. NUM JNTS AT 50, 60 DGS. LCT AT 45 DGS.
140.0					AMPH	FG TO MG GRN UNFRM AMPH. BIOT. OCC THIN QTZ/CARB VNLTs. OCC JNTS AT 40, 60 DTCA.
144.5					LC	
165.2					AMPH	FG GUNFRM AMPH BIOT MANY THIN CNTD QTZ/CARB VNLTs THRT. SVRL JNTS AT 60 DTCA. LCT AT 60 DTCA.
178.6					SUBX	FG GYGRN MTX. MOSTLY AMPH INCLS WITH SOME MTSD. MOD ALT AND CNTD MAKING IT DIFF TO DIST CNTCS. ABOUT 25% MTX. OCC JNTS AT 40, 70 DTCA. 1-2% CP BLBS.
179.6				STRS	AMPH	MED GRN. FG TO MG AMPH WITH 5% CPPOPN. 2-3% CP AS BLBS/VNS. FEW JNTS AT 40, 70 DTCA. POPN STR AT 65 DTCA. EST GRADE 0.7.
179.9	CCN99-46			MASU	MASU	MASU WITH 85% POPN. CNTCS SHRP AT 70 DTCA. FG QTZ AND AMPH INCLS. GRN ALT AT CNTCS UP TO 2.0 CM WIDE. ELONG BIOT GRNS IN MASU UP TO 0.3 CM. MG PN GRNS THRT PO. EST GRADE 3.30.
180.6	CCN99-47			STR	QD	QTZ AND AMPH INCLS. GRN ALT AT CNTCS UP TO 2.0 CM DTCA. 40% POPNCP. 15-20% CP. PO AND CP COMPLETELY SEPARATED. SOME QTZ INTERGRWN WITH CP AT LCT EST GRADE 6.00.
181.9				DISS	QD	QD LCLY AMPH RICH. FG TO MG. 8% POPNCP. 2% CP DISS. ONE THIN STR AT MIDDLE. 0.1 FT WIDE WITH QTZ INCLS. ONE JNT AT 40 DTCA. EST GRADE 0.6.
184.4				MASU	MASU	MASU WITH 90% POPNCP. 2% CP. FG TO MG PN IN PO. 0.2-0.8 CM SUB RND FELD INCLS WITH ALT RIM. ABUND MAG NEAR UCT. SMALL BLBS. OCC FORM RINGS ARND PO GRNS. PN GRNS UP TO 0.2 CM THRT PO. EST GRADE 4.50.
185.0				INSU	INSU	FG QD WITH 40% POPNCP AS INSU. 7-10% CP. CP CONC NEAR CNTC WITH INMS. AT BOTH UCT AND LCT. EST GRADE 4.00.
190.4		CF-98-1 CCN99-80	Hex	INMS	INMS	FG PO WITH FG TO MG PN. ZONES OF INSU UP TO 0.3 FT INSU DOM CP. ALWAYS RIMMED BY ALT MIN. VERY LITTLE CP IN INMS. FELD INCLS UP TO 2.0 CM. RIMMED BY ALT MIN. 70-75% POPNCP. WITH 3-5% CP. OCC JNTS AT 60 DTCA. EST GRADE 5.00. CCN99-80 SAMPLE TAKEN AT 185.3 FT.
196.4				STRS	STRS	STRS AND INSU IN QD. STRS MAY BE NRRW MASU ZONES UP TO 0.5 FT WIDE. QD EXTEN CHLORITZD/AMPH TZD. CP AND PO OFTEN IN VNLTs. FEW CHL VNLTs THRT. 65% POPNCP. 5% CP. EST GRADE 4.00.
199.0				STRS	QD	MG QD WITH OCC 0.1 FT STRS AND FG DISS CPPOPN. STRS ARE MAINLY POPN. CP AS VNLTs AND INSU 20% POPNCP. 2-3% CP. EST GRADE 1.50.
202.5	CCN99-48			STRS	STRS	STRS AND INSU IN FG TO MG QD. MOST OF STRS ARE WITHIN QTZ/CARB VNS. 30% POPNCP. 5% CP. MASSIVE BIOT/CHL AT STR MARGINS. LRG QTZ INCLS IN STRS UP TO 2.0 CM. EST GRADE 2.50.
206.4				DISS	IQD	FG TO MG IQD WITH 12% POPNCP. 4-5% CP. SULP AS FG DISS. FLSC AND MFC INCLS UP TO 1.0 CM. <2% TOT. FEW JNTS AT 40 DTCA. EST GRADE 1.70.
207.9				STRS	IQD	AS ABOVE WITH 35% POPNCP. 10% CP AS VNS AND DISS. CHL VNLTs THRT UP TO 0.2 CM WIDE. EST GRADE 4.00.
212.7				DISS	IQD	AS ABOVE WITH 5% CPPOPN AS FG DISS SULP. OCC JNTS AT 40 DGS. EST GRADE 0.75.
214.3		CF-98-3	Hex>=Mono	STRS	IQD	MG IQD WITH 35-40% POPNCP. 10% CP. CP AS STR SEPARATE FROM POPN STR. REMOB TEXT OF CP. 0.2 CM CPPOPN VN XCUTS STRS AND DISS. TINY EPID VNLTs. ET GRADE 4.00.
226.8				DISS	IQD	MG IQD WITH 2-4% CPPOPN AS FG DISS. OCC THIN FRCTS REHEALD AND INFILLED WITH EITHER CHL OR QTZ/CARB. RARE CP IN FRCTS. MFC INCLS 1-2 CM. <2% OCC JNTS AT 30, 40, 70 DTCA. EST GRADE 0.40.
230.6				DISS	IQD	AS ABOVE WITH 7% CPPOPN. CP RICH. ONE JNT AT 30 DTCA. EST GRADE 2.00.
231.3				MASU	MASU	MASU WITH 90% POPN. LOCP. FG. DK INCLS AND QTZ/CARB INCLS. CNTCS NEAR 80 DGS. PN FG TO MG. EST GRADE 3.40.
235.5				DISS	IQD	FG TO MG IQD WITH 5% CPPOPN. FG DISS. FEW JNTS AT 65 DGS. SPHERICAL BIOT THRT. META OVERPRINT? EST GRADE 1.50.
237.6				STRS	IQD	AS ABOVE WITH 15% POPNCP AS STRS AND DISS. 2% CP. REMOB TEXT OF SULP AS VNLTs. FEW JNTS AT 70 DGS.

244.7	CCN99-53	CF-98-4	No Data	MASU	MASU	EST GRADE 1.00. MASU WITH INCLS NEAR BOTH CNTCS. MIDDLE NEARLY INCLS FREE. 85% POPNCP 5% CP. PN EXSOL THRT. SOME PN ROSETTES. STRS UP TO 0.5 CM WIDE. PN ALSO FORM PLL TO PO/ID CNTCS. MANY JNTS AT 55, 70, 30 DTCA. EST GRADE 4.50.
249.0	CCN99-49	CF-98-5	Mono>=Hex	RGDI	IQD	FG TO MG IQD WITH FG TO CG RGDI AND LCLY INSU. BOTH PO AND CP RAGGED. FEW STRS. 25% POPNCP. 7-9% CP. ONE JNT AT 10 DTCA. EST GRADE 3.00.
252.4				STRS	IQD	AS ABOVE WITH 40% POPNCP. 2% CP. STRS UP TO 0.3 FT WIDE. FG DISS SULP IN BETWEEN STRS. OCC JNTS AT 10, 40 DTCA. EST GRADE 1.60.
254.0				DISS	IQD	FG TO MG IQD WITH 3% CP AS FG DISS. MINOR JNTS AT 30, 40 DTCA. EST GRADE 0.80.
255.4				INMS	INMS	INMS WITH NUM INCLS. 45% POPNCP. 5% CP. CP CONC ARND INCLS AND DISS WITHIN INCLS. SOME CP VNLTs. JNT AT 35 DTCA. EST GRADE 3.00.
276.3	CCN99-50	CF-98-6	Mono>=Hex	RGDI	IQD	FG TO MG IQD WITH 20% POPNCP. 4-5% CP. RGDI TO FG DISS. OCC STRS. CP-RICH AREAS HAVE ABUND VNLTs. PO TENDS TO BE MORE BLEBBY, PN EXSOL. MFC AND FLSC INCLS UP TO 5.0 CM. MFC INCLS MOST ABUND 10-15%. OCC JNTS AT 40 DEG AND PLL TCA. EST GRADE 2.50.
282.4	CCN99-51/52			STRS	IQD	AS ABOVE WITH STRS AND RGDI SULP. 30% POPNCP. 5% CP. ABUND QTZ INCLS IN CP STRS. FEW JNTS AT 45 DEGS AND SUB PLL TCA. EST GRADE 2.50.
297.1				DISS	IQD	AS ABOVE WITH 2-3% CPPOPN. FEW THIN POPN STRS IN QTZ/CARB VNLTs. LRG 2-3 CM QTZ INCLS IN PO STRS. SUB ANG TO SUB RND. EST GRADE 0.70.
303.3				DISS	IQD	AS ABOVE WITH 1-2% CPPOPN. FG DISS. OCC JNTS AT 35, 60, 70 DTCA.
320.0					IQD	FG TO MG IQD WITH RARE SULP. OCC THIN QTZ/ CARB VNLTs. EST GRADE 0.50. FOH.

Appendix 4-2b: Diamond drill hole log from for BH100506, drilled upwards at approximately 45 degrees through the QD dyke from the 2400 ft. level (9300 N section).

Depth	Thin Section	Po Sample	Po Polytype	Ore	Rock	Description
0.0						COLLAR
109.4					SUBX	FG GY/GRN MTX NUM SUB RND FLSC INCLS SVRL JNTS AT 30, 40, 50, 60, 70 DTCA. LCT AT 40 DTCA. 35%MTX
155.0					AMPH	MG, MED GRN AMPH, MASS WITH OCC THIN Q/C VNLTs OCC JNTS AT 40, 60, 70, 30 DTCA
207.5					SUBX	FG GY/GRN MTX WITH SMALL SUB RND FLSC FGMS, 20-25% MTX. OCC JNTS AT 30, 40, 70 DTCA
221.2					AMPH	FG MED GRN WITH 1% CP AS DISS AND VNLTs OCC 1.0CM QTZ FRAG, RARE PO PLL TO FOL. OCC JNTS AT 30, 40, 70 DTCA
224.1	CCN99-78			MASU	MASU	MASU WITH 90% POPN, LOCP. FG TO CG PN. QTZ AND QD INCLS. MOB OF POCP AT CNTC INTO 0.1-0.2 CM WIDE VN INTO AMPH ABUND MAG GRNS <0.2 CM, SOMETIMES MASS, BANDED IN POPN AT 40 DTCA. RARE JNTS AT 45, 50 DTCA. EST GRADE 1.50
225.0				INSU	INSU	FG TO MG QD WITH FG INSU, 35% POPNCP. 1-2% CP DIFFUSE CNTC WITH MASU. EST GRADE 1.50
226.6	CCN99-79			MASU	MASU	MASU WITH 75% POPNCP. UCT AND LCT. SHRP. MASS TO DISS CP VN AT LCT, 0.6FT WIDE. ABUND SMALL PN GRNS IN FO. OCC AMPH QD? INCLS. JNT AT 70 DTCA. EST GRADE 5.00
232.9				INSU	QD	FG INSU IN QD. 20% POPNCP, 3% CP AS DISS OR VNLTs ALT MIN ARND ALL SULP, RARE QTZ INCLS. MNOR JNTS AT 60, 30, 50 DTCA. EST GRADE 1.70
234.6				MASU	MASU	MASU WITH 90% POPN, LOCP. FEW QD INCLS WITH ALT RIMS. DIFF UCT, REL SHRP LCT. MNOR JNTS AT 50 DTCA. INSU MORE ABUND IN 3.0 CM ABOVE UCT
235.9				INSU	QD	FG INSU IN QD. 25% POPNCP. 1-2%CP. REL SHRP LCT. EST GRADE 1.50
246.0	CCN99-54	CF-98-7	Hex>Mono	MASU	MASU	MASU WITH OCC INSU OR INMS ZONES, SHRP CNTCS BTWN ZONES, OCC PN CONC AT CNTC. PN GRNS THRT REL ABUND INCLS OF QD? (2-3 CM) WITH ALT RIMS 30%POPNC, DISS CP CONC IN ZONES, 1-2%CP. OCC JNTS AT 60, 30, 40 DTCA. EST GRADE 3.50
251.7		CF-98-8	Hex	INSU	INSU	INSU IN QD WITH 55% POPNCP. 2-3% CP. AMPH/CHL. ALT ARND SULP, ONE SMALL AMPH INCLS. EST GRADE 3.00
255.3	CCN99-55			STRS	QD	FG TO MG QD WITH 10% POPNCP STRS AND DISS, 5% CP. STRS THIN WITH ALT RIMS ARND. LOWER HALF IS GRND CORE, PSBL JNTS NEAR 70 DTCA. EST GRADE 1.50
275.2				STRS	IQD	FG TO MG IQD WITH 4-5% CPPOPN AS VNS AND BLBS ABUND BIOT/CHL VNLTs THRT. CARB ASSOC WITH MANY OF THE SULP VNS. OCC INCLS (<2%) UP TO 2.5 CM, FLSC AND MFC SUB RND. 0.2 CM RND BIOT THRT QD. OCC JNTS AT 40 DTCA. EST GRADE 1.10
278.5				INMS	INMS	INMS WITH 70% POPNCP, 5%CP IN AN INSU ZONE. INMS AND INSU ZONES. QD INCLS. UCT MARKED BY AMPH/CHL AND QTZ, UCT AND LCT NEAR 80 DTCA. EST GRADE 4.30
285.0				STRS	QD	QD WITH 12% CPPOPN AS STRS AND INSU. 0.2 CM BIOT THRT, RIM BY CHL/AMPH. LATE BARREN QTZ VNLTs WITH CHL HALO. SULP STRS SRND BY ALT MIN. MNOR JNTS AT 45 DTCA. EST GRADE 2.00
290.2		CF-98-9	Hex>Mono	MASU	MASU	MASU WITH 90% POPNCP LOCP. UCT DIFF WITH DISS SULP IN IQD. LCT RAGGED WITH 2.0 CM WIDE GRN ALT ZONE. PN EXSOL BLBS UP TO 1.0 CM, RARE CP GRNS IN MASU. FEW ALT QD INCLS. CNTCS AT 30 DTCA. EST GRADE 3.60
292.7	CCN99-56			STRS	QD	MG QD WITH A 0.4 FT STR AND A 0.1 FT STR. SOME DISS SULP. 20% POPNCP, <1% CP. SHRP UCT, RAGGED LCT IN FIRST STR, ALT HALOS ARND BOTH. PN GRNS UP TO 0.4 CM IN PO. MNOR JNT AT 45 DTCA. EST GRADE 0.80
303.6	CCN99-57			RGDI	IQD	RGDI IN IQD. 10% CPPOPN, 3% CP. RAGGED CP BLEBS UP TO 1.5 CM. SULP RGDI WITH OCC STRS. CARB VNS WITH CHL HALOS UP TO 0.5 CM, VNS AT 40 DTCA. ONE CARB/SULP FLKD CHU/BIOT SHR SUB PLL TCA. 0.1 CM BIOT SPECKLD THRT. IQD. EST GRADE 2.00
314.6	CCN99-58	CF-98-10	Hex>Mono	RGDI	IQD	AS ABOVE WITH 10% POPPPN, 7% CP. OCC JNTS AT 70 DTCA. EST GRADE 2.50
316.8				INMS	INMS	INMS IN QD WITH 65% POPN, LOCP. ABUND SUB RND INCLS UP TO 0.8 CM. PN GRNS IN PO UP TO 0.2 CM. MNOR JNT AT 40 DTCA. EST GRADE 2.50
323.6	CCN99-59			STRS	IQD	IQD WITH 10% CPPOPN AS BLEBS AND STRS, 4% CP. RND AMPH/GRN STONE? INCLS UP TO 5.0 CM, TWO SMALL FLSC INCLS. ALT MIN ARND SULP. EST GRADE 1.50
334.6				DISS	IQD	AS ABOVE WITH 3% CPPOPN AS DISS AND STRS. QTZ/ CARB VNS THRT WITH ALT HALOS, BOTH CP AND PO RICH STRS. OCC JNTS AT 40 DTCA. EST GRADE 0.90
385.0				DISS	IQD	AS ABOVE WITH LCLY UP TO 2% CPPOPN AS FG DISS. OVERALL, 1% CPPOPN. FEW SMALL INCLS. MANY JNTS AT 40, 50, 20 DTCA. EST GRADE 0.30.
						FOH

Appendix 4-5: List of all samples collected both at surface, underground, and from drill core at CCN Mine. Details on polished thin sections, electron microprobe and SEM-EDS analyses, petrography, X-ray diffraction analyses, and whole rock geochemistry are included.

Sample #	Location	Level	Sill	Orebody	Date Samp	TS #	Sulph/Oxides	Gangue	Probe Date	Minerals Anal.	SEM Date	Minerals
ccn98-01	CCNM	3500	9452	100	12/17/98	1	po>cp>mag>pn>ilm> >UK1>AgPn>cob	plag>>biot>amph >qtz>chl	02/01/99	Cob, Ir		
ccn98-02	CCNM	3500	9452	100	12/17/98	2A	cp>po>mag>pn>AgPn >ilm>cob	plag>amph>opx>biot >qtz>chl	02/01/99	Cob		Cor
						2B	po>>cp>pn>mag>ilm	plag>>amph>qtz> biot>chl>opx>carb	04/12/99	Po, Pn		
ccn98-03	CCNM	3500	9452	100	12/17/98	3A			01/29/99	Cob, Ir, Po		
						3B			04/12/99	Pn, AgPn, Po		
ccn98-04	CCNM	3500	9452	100	12/17/98	4			02/01/99	Cob Hes, Cp, Sph		
ccn98-05	CCNM	3500	9452	100	12/17/98	5A			02/01/99	Cob		
						5B			03/26/99	Cob, Ir Pn, Po, Cp	02/11/00	
ccn98-06	CCNM	3500	9452	100	12/17/98	6			04/12/99	Pn Cub, Po, Sph		Amph. C
ccn98-07	CCNM	3500	9452	100	12/17/98	7			10/20/99	Sph		
									04/12/99	PoPn		
ccn98-08	CCNM	3500	9452	100	12/17/98	8			10/20/99	Albite		
ccn98-09	CCNM	3500	9452	100	12/17/98	9			10/20/99	Mich		
ccn98-10	CCNM	3500	9452	100	12/17/98	10A			02/01/99	Cob		Tranite
						10B			03/26/99	Pyr, Pn, Cp		
ccn98-11	CCNM	3500	9452	100	12/17/98	11						
ccn98-12	CCNM	2100		100		12			04/12/99	Cob, Po, Ger, AgPn		
ccn99-13	CCNM	2700		100	3/22/99							
ccn99-14	CCNM	2800	2090	890	3/22/99							
ccn99-15	CCNM	2800	2052	890	3/22/99							
ccn99-16	CCNM	2800	2052	890	3/22/99	16	po>mag>pn>cp>cob	plag>amph>qtz>biot	09/12/99	Cob		
ccn99-17	CCNM	2800	2052	890	3/22/99	17	cp>po>pn>ilm?>mag >sph>UK1>cob	plag>qtz>amph>biot >chl				
ccn99-18	CCNM	2800	2052	890	3/22/99							
ccn99-19	CCNM	2800	2052	890	3/22/99	19	cp>po>>pn>mag >AgPn>PGM	amph>qtz>plag>biot >chl	09/12/99	BiTe, Albite, Frood, AgPn		
ccn99-20	CCNM	3500	9454	100	05/19/99							
ccn99-22	CCNM	3500	9454	100	05/19/99	22	po>pn>cp>mag>ilm? >UK1	plag>qtz>amph>biot >chl>UK1				
ccn99-23	CCNM	3500	9454	100	05/19/99							
ccn99-24	CCNM	3500	9454	100	05/19/99	24	po>>cp>pn>mag>cob >uk1>uk2	amph>plag>biot>qtz >chl>apatite?				
ccn99-25	CCNM	3500	9453	100	05/19/99	25						
ccn99-26	CCNM	3500	9453	100	05/19/99	26						
ccn99-27	CCNM	2700		100	06/15/99							
ccn99-28	CCNM	2700		100	06/15/99							
ccn99-29	CCNM	2700		100	06/15/99							
ccn99-30	CCNM	2700		100	06/15/99							
ccn99-31	CCNM	2700		100	06/15/99							
ccn99-32	CCNM	2700		100	06/15/99	32	po>>pyr>pn>mag>cp >cob					
ccn99-33	CCNM	2700		100	06/15/99							
ccn99-34	CCNM	3000	855-xcut	100	06/15/99	34						
ccn99-35	CCNM	3000	855-xcut	100	06/15/99	35	cp>po>pn>mag>AgPn >sph>cob	plag>amph>biot>qtz >chl>ser				
ccn99-36	CCNM	2700		100	06/29/99							
ccn99-37	CCNM	2700		100	06/29/99							
ccn99-38	CCN	surface		100	07/12/99							
ccn99-39	CCN	surface		100	07/12/99							
ccn99-40	CCN	surface		100	07/12/99							

120

Details on polished thin sections, electron microprobe analysis are included.

Sample	Probe Date	Minerals Anal.	SEM Date	Minerals Anal.	Chemistry	Pyrrhotite Polytype	Hand-sample Description
mpb	02/01/99	Cob, Ir				Hex - 5T>11T>1T	-blebby textured sulphide hosted by Qtz diorite
ppx>biot	02/01/99	Cob		Cor			-blebby textured sulphide hosted by Qtz diorite
qtz>carb	04/12/99	Po, Pn					
	01/29/99	Cob, Ir, Po				Hex - 5T>1T>Mono-4M	-blebby textured sulphide hosted by Qtz diorite with large amphibolite incls
	04/12/99	Pn, AgPn, Po					
	02/01/99	Cob, Hes, Cp, Sph					-massive ore interstitial to Q.D. fragments
	02/01/99	Cob					
	02/01/99	Cob, Ir				Hex - 5T>1T>11T	-contact of mafic dike with massive ore
	03/26/99	Pn, Po, Cp	02/11/00	Amph, Cpx			-distinct chilled margin
	04/12/99	Pn, Cub, Po, Sph					-disseminated sulphide within mafic dike
	10/20/99	Sph					
	04/12/99	Po, Pn					-contact of small mafic dike intruding massive sulphide?
	10/20/99	Albite					
	10/20/99	Mich				Hex - 5T>1T>Mono-4M	-massive sulphide (mostly po), with heavily alt. host rock
	02/01/99	Cob				Hex - 5T>1T	-Cp-rich vein within Q.D., 70% cp, 30% po
							-Cp-bearing Qtz vein, with some alteration minerals
	03/26/99	Pyr, Pn, Cp					-trap dike
	04/12/99	Cob, Po, Ger, AgPn					-Cp within Qtz dike? collected by Catharine
							-blebby to massive ore
							-blebby text ore
							-ragged diss. more diss twrd FW cntc
qtz>biot	09/12/99	Cob					-INMS, massive to blebby
ph>biot							-blebby diss, twrd HW cntc
ag>biot	09/12/99	BiTe, Albite, Frood, AgPn					-INMS, massive, centre of o.b.
							-Cp-bearing Qtz vns. both sides of sil
ph>biot					ICP-MS		-wily diss QD, <1% sulp
							-wily diss QD, 3' from massive cntc
biot>qtz					ICP-MS	Hex - 5T>11T>5C	-INMS, 90% sulp, within ore zone
					ICP-MS		-cntc btwn mass and bleb ore, shrp
					ICP-MS		-INMS, 80% sulp, centre of ore zone
					ICP-MS	Hex - 5T>11T>5C	-MS, close to barren QD cntc, ~100% sulp
							-barren QD
							-Bleb diss QD, tny Cp vnits btw blebs
							-Diss QD, 15-20% sulp, 8.2 po/cp ratio
							-GPIS?, 70-80% sulp, 7.3 po/cp ratio
						Hex - 5T>11T	-INMS, close to 900 x-ft, 9.1 po/cp, feld vn
						Mono - 4M>Hex - 3T	-INMS, 1ft from 900 x-ft, 8.2 po/cp
						Mono - 4M>4M>4C>Hex - 5T	-INMS, QD incls to 7.0 cm
biot>qtz							-Diss QD, low grade ore area
						Hex - 5T>5C>11T	-INMS, Cp-rich rel to 2700 level
							-Cp-rich Qtz vn, ang carb xths?
							-GPIS, str of sulp in incls
							-barren spher QD, close to cntc
							-bleb diss QD, 2% incls in o/c
					ICP-MS		-Felsic dyke in QD, cut by Cp-rich Qtz vn

ccn99-41	CCN	surface		100	07/12/99	41							
ccn99-42	CCN	surface		100	07/12/99								
ccn99-43	CCN	surface		100	07/12/99								
ccn99-44	CCN	surface		100	08/02/99								
ccn99-45	CCN	surface		100	08/02/99								
ccn99-46	BH100505	2400		100	08/17/99	46	po>pn>cp>mag>4m >>mich>B+teill	amph>qtz>chi>biot >stlp	10/22/99	Mich. B+Teil	02/11/00	Am	
ccn99-47	BH100505	2400		100	08/17/99	47	cp>po>pn>>cob	qtz>act>hnb>chi >biot>carb			02/11/00	Ch	
ccn99-48	BH100505	2400		100	08/17/99	48	po>pn>cp	qtz>plag>amph>biot >chi					
ccn99-49	BH100505	2400		100	08/17/99	49	cp>po>mag>pn	-plag>qtz>chi>amph >biot					
ccn99-50	BH100505	2400		100	08/17/99	50	cp>>po>pn>mag>>sp =cob	fspar>qtz>chi>amph >biot	10/20/99	Cob			
ccn99-51	BH100505	2400		100	08/17/99	51	po>cp>pn>mag>cob	fspar>qtz>amph>chi >biot	10/21/99	Cob			
ccn99-52	BH100505	2400		100	08/17/99	52	cp>>po>mag>pn	fspar>amph>qtz>biot >chi>apatite?					
ccn99-53	BH100505	2400		100	08/17/99	53	po>mag>pn>cp>>cob	fspar>amph>biot>qtz >chi					
ccn99-54	BH100506	2400		100	08/17/99	54	po>pn>mag>cp>>cob	chi>amph>biot	10/21/99	Cob			
ccn99-55	BH100506	2400		100	08/17/99	55	cp>po>mag>pn>>cob	amph>chi>qtz>biot >fspar	10/22/99	Cob			
ccn99-56	BH100506	2400		100	08/17/99	56	po>pn>mag>cp>>cob >mich	fspar>qtz>amph>chi >biot	10/21/99	Cob, Mich			
ccn99-57	BH100506	2400		100	08/17/99	57	po>cp>pn>mag	amph>plag>biot >qtz>chi			02/11/00	Am	
ccn99-58	BH100506	2400		100	08/17/99	58	po>pn>cp>mag>>cob	plag>amph>qtz>biot >chi>stlp?	10/22/99	Cob			
ccn99-59	BH100506	2400		100	08/17/99	59							
ccn99-60	CCNM	2400		900	08/25/99	60	po>>pn>>mag>cp>co	qtz>amph>biot>chi	09/12/99	Cob			
ccn99-61	CCNM	2400		900	08/25/99								
ccn99-62	CCNM	2400		900	08/25/99								
ccn99-63	CCNM	2400		900	08/25/99								
ccn99-64	CCNM	2400		900	08/25/99	64a	cp>cob>po>nic>PGM	dol>biot>calc>qtz >musc>chi>apat	09/12/99	Frood, Gers. Hess. Gai. Nic. BiTe			
						64b	cp>cob>po>nic>PGM	dol>biot>calc>qtz >musc>chi>hem	10/12/99	Frood, BiTe. Nic. Gers. Park. N-Bi			
ccn99-65	CCN	surface		100	08/28/99								
ccn99-66	CCN	surface		100	08/28/99								
ccn99-67	CCN	surface		100	08/28/99								
ccn99-68	CCN	surface		100	08/28/99								
ccn99-69	CCN	surface		100	08/28/99								
ccn99-70	CCN	surface		100	08/28/99								
ccn99-71	CCN	surface		100	08/28/99								
ccn99-72	CCN	surface		100	08/28/99								
ccn99-73	CCN	surface		100	08/28/99								
ccn99-74	CCN	surface		100	08/28/99	74							
ccn99-75	CCN	3200		100	12/07/99								
ccn99-76	CCN	3200		100	12/07/99								
ccn99-77	CCN	surface		100	08/28/99	77							
ccn99-78	BH100506	2400		100	02/01/00						02/11/00	Ep	
ccn99-79	BH100506	2400		100	02/01/00								
ccn99-80	BH100505	2400		100	02/01/00								

					ICP-MS		-Peg dyke in QD, qtz pods and vnfts
							-Spher QD, 30 cm from East cntc
							-Bleb diss IQD, 2% sulp, 2:1 po/cp ratio
					ICP-MS		-Trap dyke, amph, foliated, shrp cntcs
							-sub-rnd GR clst? in QD
>biot	10/22/99	Mich, Bl-Tell	02/11/00	Amph, Biot		Mono - 4M > Hex - 1T	-Po-nch str, alt haloe, 2 QD incs
>chl			02/11/00	Chl, Amph			-Cp-nch str in QD near cntc with Amph
>ph>biot							-Po str, mg biot as irreg pods
>amph							-RGDI IQD remob text?
>amph	10/20/99	Cob					-RGDI IQD, sulp vnfts cut RGDI sulp
>ph>chl	10/21/99	Cob					-str in IQD last sig sulp twrd FOH
qtz>biot							-rextlzd qtz/feld incs granoph text
biot>qtz							-MASU rosettes of Pn in Po
ot	10/21/99	Cob					-MASU, Po with exsol Pn, **see notes
>biot	10/22/99	Cob					-str of Cp, chl/epid alt arnd cp
>ph>chl	10/21/99	Cob, Mich					-str of Po/Pn, 0.5 cm grn alt nm, biot dev in sulp
ot			02/11/00	Amph, Biot			-mfc incs surrnd by sulp, RGDI?
tz>biot	10/22/99	Cob					-bleb diss ore, blebs to 1.5 cm
>chl	09/12/99	Cob					-INMS, QD incs to 3.0 cm
							-INMS, Po/Pn with 1-2 cm pr? incs
							-Cp-nch INMS, 70% sulp, QD mica-nch
							-Po-nch str in cntc with meta-sed?
qtz	09/12/99	Frood, Gers, Hess, Gal, Nic, BiTe					-qtz/carb vn in shr zone, **Cp texture
bat							-pnk/whit carb/qtz vns in meta-sed
qtz	10/12/99	Frood, BiTe, Nic, Gers, Park, N-Bi					
rm							
							-amph incs in Creighton GR
							-bleb diss IQD, 2-3% tot sulp
							-bleb diss IQD, largest incs in dyke
							-alt Gr incs at centre of dyke, ~ 0.5 m
					ICP-MS		-bleb diss IQD, incs/sulp-rich area of dyke
							-felsic dyke- FG to MG, pnk/gry
							-pyrox/amph incs
					ICP-MS		-felsic dyke-Fg to MG, pnk/gry
							-A-amph incs, B-amph incs, C-meta sed incs
					ICP-MS		-felsic dyke-Fg to MG, gry
						Hex - 5T>1T>11T	-GPIS-HW side of QD
						Hex - 5T>1T> Mono - 4M	-GPIS- FW side of QD
			02/11/00	Epid, Chl			-staurolite pseudomorph
						Hex - 5T> Mono - 4M > Hex-1T	-MASU with 90% POPN, Loc CP FG to CG PN
						Hex - 5T> 1T > Mono - 4M	-MASU with 75% POPNCP abund small Pn grms
						Hex - 5T > 1T> Mono - 4M	-INMS, FG Po with FG to PG Pn

Appendix 4-6 - Comparison of the 100 orebody to other orebodies in the Copper Cliff offset dyke.

Some ore textures seen at deposits in the southern part of the Copper Cliff offset are not seen in the 100 orebody. For instance, pentlandite eyes in the 100 orebody are not common and are typically less than 0.5 cm in diameter, whereas some ores found at Copper Cliff South mine and in Kelly Lake deposits often contain pentlandite eyes greater than 1.0 cm in diameter. Another ore texture not found in the 100 orebody, but at the more southerly deposits is banded sulphide. This ore is characterized by separate bands of chalcopyrite, pyrrhotite and pentlandite and is thought to be a result of deformation.

The most common sulpharsenide in all of the Copper Cliff offset deposits is cobaltite/gersdorffite. In the 100 orebody, it often contains irarsite at the core, while those grains analyzed from the 890 orebody contain significant amounts of Rh at the core. Cobaltite/gersdorffite from the Copper Cliff South mine and the Kelly Lake deposits commonly have hollingworthite (RhAsS), (Magyarosi, 1999; Stewart 1999) and sometimes ruarsite (RuAsS) (Carter, 2000) and sperrylite (PtAs_2) (Stewart 1999) at the core. Cobaltite/gersdorffite from the Lady Violet deposit and the 120 orebody at Copper Cliff North mine were found to contain hollingworthite at the core (Szentpeteri, 1999). Cobaltite/gersdorffite from the 100 orebody and the Kelly Lake deposits are often zoned, with Ni-rich cores and Co-rich rims.

Cobaltite/gersdorffite compositions from the 100, 900, 890 orebodies at CCN mine, and the Kelly Lake deposit are plotted on the Fe-Ni-Co ternary diagram in Figure A 4-6. Most of the sulpharsenides plot together but have variable amounts of Co and Ni, probably reflecting the zoned nature of the crystals. The Ni-rich gersdorffites are from a

carbonate/quartz vein at the margin of the 900 orebody. If all of these sulpharsenides have formed by precipitation from a hydrothermal fluid that stripped metals from primary ores, then this change in PGE content between orebodies may be attributed to zonation of PGE within the original sulphide liquid.

Figure A 4-6: Cobaltite/gersdorffite compositions from the Copper Cliff offset. Analyses in Stewart (1999) are from a Kelly Lake deposit, analyses from Carter (2000) are from the 740 orebody at Kelly Lake. The 100, 900, and 890 orebodies are at the Copper Cliff North mine.

1. The first of the two main groups of islands is the group of islands in the north of the group, which are the most numerous and the most numerous of the group.	
2. The second of the two main groups of islands is the group of islands in the south of the group, which are the most numerous and the most numerous of the group.	
3. The third of the two main groups of islands is the group of islands in the east of the group, which are the most numerous and the most numerous of the group.	
4. The fourth of the two main groups of islands is the group of islands in the west of the group, which are the most numerous and the most numerous of the group.	
5. The fifth of the two main groups of islands is the group of islands in the north of the group, which are the most numerous and the most numerous of the group.	
6. The sixth of the two main groups of islands is the group of islands in the south of the group, which are the most numerous and the most numerous of the group.	
7. The seventh of the two main groups of islands is the group of islands in the east of the group, which are the most numerous and the most numerous of the group.	
8. The eighth of the two main groups of islands is the group of islands in the west of the group, which are the most numerous and the most numerous of the group.	
9. The ninth of the two main groups of islands is the group of islands in the north of the group, which are the most numerous and the most numerous of the group.	
10. The tenth of the two main groups of islands is the group of islands in the south of the group, which are the most numerous and the most numerous of the group.	
11. The eleventh of the two main groups of islands is the group of islands in the east of the group, which are the most numerous and the most numerous of the group.	
12. The twelfth of the two main groups of islands is the group of islands in the west of the group, which are the most numerous and the most numerous of the group.	
13. The thirteenth of the two main groups of islands is the group of islands in the north of the group, which are the most numerous and the most numerous of the group.	
14. The fourteenth of the two main groups of islands is the group of islands in the south of the group, which are the most numerous and the most numerous of the group.	
15. The fifteenth of the two main groups of islands is the group of islands in the east of the group, which are the most numerous and the most numerous of the group.	
16. The sixteenth of the two main groups of islands is the group of islands in the west of the group, which are the most numerous and the most numerous of the group.	
17. The seventeenth of the two main groups of islands is the group of islands in the north of the group, which are the most numerous and the most numerous of the group.	
18. The eighteenth of the two main groups of islands is the group of islands in the south of the group, which are the most numerous and the most numerous of the group.	
19. The nineteenth of the two main groups of islands is the group of islands in the east of the group, which are the most numerous and the most numerous of the group.	
20. The twentieth of the two main groups of islands is the group of islands in the west of the group, which are the most numerous and the most numerous of the group.

Microprobe Data

Appendix : Electron Microprobe analyses of pentlandites from the 100 orebody, CCN Mine.

Analysis	CCN10B-2b	CCN5AA-1	CCN5AA-2	CCN5AA-3b	CCN5AA-4b	CCN06 1a	CCN06 1b	CCN3 3A
Mineral	pn	pn	pn	pn	pn	pn	pn	pn
Association								
Pd wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ag wt%	0.01	0.03	0.00	0.01	0.01	0.00	0.00	0.15
Pt wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Au wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fe wt%	29.48	30.33	30.27	30.26	30.63	33.18	33.12	31.14
Co wt%	1.33	1.90	1.63	1.82	1.70	0.69	0.66	1.17
Ni wt%	35.06	34.12	33.83	33.14	33.08	32.91	32.54	32.92
Cu wt%	0.12	0.01	0.05	0.00	0.00	0.00	0.00	0.74
Zn wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pb wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As wt%	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00
S wt%	33.14	32.67	33.20	32.63	33.03	33.56	33.59	33.68
Total	99.14	99.06	98.98	97.87	98.45	100.35	99.91	99.80
Pd atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ag atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Pt atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Au atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fe atm%	0.242	0.250	0.248	0.251	0.253	0.268	0.269	0.253
Co atm%	0.010	0.015	0.013	0.014	0.013	0.005	0.005	0.009
Ni atm%	0.274	0.267	0.264	0.262	0.260	0.253	0.251	0.255
Cu atm%	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.005
Zn atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pb atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
As atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S atm%	0.473	0.468	0.475	0.472	0.475	0.473	0.475	0.477
Subtotal	1.000	1.000	1.000	0.999	1.001	0.999	1.000	1.000

Appendix : Electron microprobe analyses of pyrrhotite from the 100 orebody, CCN Mine.

Analysis	CCN12-1A	CCN3 4B	CCN3 4C	CCN2B 1A	CCN2B 2C	CCN2B 3A	CCN2B 4A	CCN07-1A
Mineral	po	po	po	po	po	po	po	po
Texture	vein	bleb	bleb	bleb	bleb	bleb	bleb	masu
Pd wt%	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Ag wt%	0.01	0.01	0.00	0.02	0.03	0.00	0.00	0.01
Pt wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Au wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fe wt%	59.05	60.01	59.57	59.44	59.84	60.45	60.37	59.02
Co wt%	0.06	0.02	0.03	0.02	0.02	0.00	0.03	0.01
Ni wt%	0.41	0.52	0.70	0.42	0.55	0.50	0.53	0.58
Cu wt%	0.03	0.00	0.00	0.00	0.01	0.00	0.00	0.01
Zn wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pb wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Microprobe Data

As wt%	0.02	0.00	0.02	0.00	0.03	0.01	0.02	0.01
S wt%	40.97	40.08	39.98	39.95	39.72	39.96	40.13	39.83
Total	100.55	100.64	100.30	99.85	100.20	100.93	101.08	99.47
Pd atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ag atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pt atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Au atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fe atm%	0.451	0.460	0.458	0.459	0.462	0.463	0.461	0.458
Co atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ni atm%	0.003	0.004	0.005	0.003	0.004	0.004	0.004	0.004
Cu atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Zn atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pb atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
As atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S atm%	0.545	0.536	0.536	0.538	0.534	0.533	0.534	0.538
Subtotal	0.999	1.000	0.999	1.000	1.000	1.000	0.999	1.000

Appendix: Electron microprobe analyses of altaites from CCN Mine.

Analysis	CC07-1	CC07-2	CC07-3	CC07-4	CC07-5	CC07-6	CCN19-B1	CCN19-C1
Mineral	altaite	altaite	altaite	altaite	altaite	altaite	altaite	altaite
Association							cp, silic	sphal, cp
Pd wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04
Ru wt%	0.04	0.02	0.01	0.03	0.06	0.06	0.00	0.00
Rh wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pt wt%	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00
Os wt%	0.02	0.00	0.05	0.04	0.00	0.05	0.00	0.00
Ir wt%	1.46	1.43	1.31	1.35	1.27	1.45	0.00	0.00
Au wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sb wt%	0.17	0.20	0.17	0.20	0.20	0.23	0.24	0.23
Te wt%	36.12	35.62	36.32	38.05	36.15	37.83	36.57	37.20
Bi wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Se wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00
Fe wt%	1.28	3.38	1.56	3.65	4.08	4.15	0.80	1.16
Co wt%	0.01	0.01	0.02	0.00	0.00	0.00	0.00	0.01
Ni wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.07
Cu wt%	0.03	0.05	0.01	0.03	0.00	0.01	0.87	1.84
Zn wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pb wt%	62.64	61.79	62.36	65.04	62.10	65.46	61.79	63.23
As wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S wt%	0.04	0.09	0.03	0.10	0.31	0.17	0.00	0.00
Total	101.81	102.64	101.84	108.49	104.17	109.41	100.43	103.78
Pd atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ru atm%	0.001	0.000	0.000	0.000	0.001	0.001	0.000	0.001
Rh atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pt atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Microprobe Data

Os atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ir atm%	0.012	0.011	0.011	0.010	0.010	0.011	0.000	0.000
Au atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sb atm%	0.002	0.002	0.002	0.002	0.002	0.003	0.003	0.003
Te atm%	0.457	0.429	0.457	0.432	0.420	0.422	0.465	0.448
Bi atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Se atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000
Fe atm%	0.037	0.093	0.045	0.095	0.108	0.106	0.023	0.032
Co atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ni atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002
Cu atm%	0.001	0.001	0.000	0.001	0.000	0.000	0.022	0.044
Zn atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pb atm%	0.488	0.458	0.483	0.455	0.444	0.450	0.483	0.469
As atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
S atm%	0.002	0.004	0.001	0.005	0.014	0.008	0.000	0.000
Subtotal	1.000	0.998	0.999	1.000	0.999	1.001	0.999	0.999

Appendix : Electron microprobe analyses of michenerites from the 100 orebody, CCN Mine.

Analysis	CC08-1	CC08-2	CCN56-B1	CCN56-B2	CCN56-B3	CCN56-B4	CCN46-A2	CCN46-A3
Mineral	mich	mich	mich	mich	mich	mich	mich	mich
Association			po,silic,pn	po,silic,pn	po,silic,pn	po,silic,pn	pn, silic	pn, silic
Pd wt%	23.86	23.87	23.64	23.83	23.87	23.73	24.64	25.17
Ru wt%	0	0	0	0	0	0	0	0
Rh wt%	0	0	0	0	0	0	0	0
Pt wt%	0	0.02	0	0.07	0	0.01	0	0
Os wt%	0	0	0	0	0	0	0	0
Ir wt%	0	0	0	0	0	0	0	0
Au wt%	0	0	0	0	0	0	0	0
Sb wt%	4.9	4.89	5.01	5.92	4.75	4.79	2.03	2.08
Te wt%	31.46	31.75	30.38	30.19	30.1	30.27	29.2	28.75
Bi wt%	35.08	35.56	38.33	35.95	38.4	38.4	42.3	42.52
Se wt%	0	0	0	0	0	0	0	0
Fe wt%	0.65	1.07	0.03	0.41	0.08	0.1	0.19	0.16
Co wt%	0.02	0	0.02	0	0	0.01	0	0
Ni wt%	0.95	0.96	0.79	0.97	0.99	0.92	0.33	0.31
Cu wt%	0	0	0.01	0	0	0.02	0.01	0
Zn wt%	0	0	0	0	0	0	0	0
Pb wt%	0	0	0	0.02	0.02	0.04	0	0
As wt%	0	0	0	0	0	0	0	0
S wt%	0.02	0.01	0.03	0.04	0.05	0.03	0.03	0.01
Total	96.94	98.13	98.24	97.4	98.26	98.32	98.73	99
Pd atm%	0.317	0.312	0.317	0.317	0.319	0.317	0.336	0.342
Ru atm%	0	0	0	0	0	0	0	0
Rh atm%	0	0	0	0	0	0	0	0
Pt atm%	0	0	0	0.001	0	0	0	0
Os atm%	0	0	0	0	0	0	0	0

Microprobe Data

Ir atm%	0	0	0	0	0	0	0	0
Au atm%	0	0	0	0	0	0	0	0
Sb atm%	0.057	0.056	0.059	0.069	0.055	0.056	0.024	0.025
Te atm%	0.348	0.346	0.34	0.335	0.335	0.338	0.332	0.326
Bi atm%	0.237	0.237	0.262	0.243	0.261	0.262	0.294	0.294
Se atm%	0	0	0	0	0	0	0	0
Fe atm%	0.017	0.027	0.001	0.01	0.002	0.003	0.005	0.004
Co atm%	0.001	0	0	0	0	0	0	0
Ni atm%	0.023	0.023	0.019	0.023	0.024	0.022	0.008	0.008
Cu atm%	0	0	0	0	0	0	0	0
Zn atm%	0	0	0	0	0	0	0	0
Pb atm%	0	0	0	0	0	0	0	0
As atm%	0	0	0	0	0	0	0	0
S atm%	0.001	0	0.001	0.002	0.002	0.001	0.001	0.001
Subtotal	1.001	1.001	0.999	1	0.998	0.999	1	1

Appendix : Electron microprobe analyses of cobaltites and gersdorffites from CCN Mine.

Analysis	CCN1-1	CCN1-2	CCN1-4	CCN1-5	CCN2A-1	CCN2A-2	CCN2A-2B	CCN2A-2C
Mineral	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite
Association	po	po	po	po	cp.sph.hess	ccp		
Pd wt%	0.10	0.07	0.12	0.19	0.08	0.06	0.05	-0.01
Ru wt%	0.21	0.28	0.40	0.19	0.37	0.25	0.26	0.02
Rh wt%	1.22	3.78	1.63	3.29	1.75	1.59	0.06	0.03
Pt wt%	0.00	0.10	0.20	0.34	0.01	0.16	0.03	0.09
Os wt%	0.17	0.22	0.15	0.10	0.80	0.47	0.22	-0.06
Ir wt%	0.00	0.00	0.00	0.06	0.23	0.00	0.06	0.66
Au wt%								
Sb wt%								
Te wt%								
Bi wt%								
Se wt%								
Fe wt%	6.21	6.48	6.48	6.51	5.72	6.42	5.80	2.32
Co wt%	19.19	17.04	18.26	18.40	19.46	17.72	20.84	17.12
Ni wt%	8.86	9.13	8.94	7.44	7.58	8.85	7.78	2.38
Cu wt%	0.00	0.02	0.01	0.03	1.31	0.94	1.14	1.07
Pb wt%								
As wt%	44.56	44.37	45.03	43.38	42.86	44.40	44.40	28.07
S wt%	19.05	18.50	19.18	18.59	18.68	18.24	19.08	12.47
Total	99.82	100.78	100.74	99.21	99.86	99.90	100.30	64.71
Pd atm%	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000
Ru atm%	0.001	0.002	0.002	0.001	0.002	0.001	0.001	0.000
Rh atm%	0.007	0.021	0.009	0.018	0.010	0.009	0.000	0.000
Pt atm%	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000

Microprobe Data

Os atm%	0.000	0.001	0.000	0.000	-0.002	-0.001	-0.003	-0.005
Ir atm%	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.003
Au atm%								
Sb atm%								
Te atm%								
Bi atm%								
Se atm%								
Fe atm%	0.062	0.065	0.064	0.066	0.058	0.065	0.058	0.036
Co atm%	0.181	0.162	0.172	0.177	0.187	0.170	0.196	0.250
Ni atm%	0.084	0.087	0.084	0.072	0.073	0.085	0.073	0.035
Cu atm%	0.000	0.000	0.000	0.000	0.012	0.008	0.010	0.014
Pb atm%								
As atm%	0.331	0.333	0.333	0.329	0.323	0.335	0.329	0.323
S atm%	0.331	0.324	0.332	0.330	0.329	0.321	0.330	0.335
Subtotal	0.999	0.999	0.999	0.999	1.001	0.999	0.999	0.998

Appendix : Electron Microprobe analyses of argentopentlandites from CCN Mine.

Analysis	CCN3 1B	CCN3 2A	CCN3 3B	CCN3 3C	CCN12-3A	CCN12-4A	CCN12-5A	CCN19-A3
Mineral	AgPn	AgPn	AgPn	AgPn	AgPn	AgPn	AgPn	AgPn
Association								BiTe, cp
Pd wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
Ag wt%	10.18	11.30	11.81	12.29	12.44	12.26	10.52	11.82
Pt wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Au wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sb wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Te wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Bi wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
Se wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Fe wt%	36.46	36.54	36.10	36.01	34.61	34.18	34.54	36.69
Co wt%	0.04	0.02	0.02	0.02	0.01	0.01	0.24	0.00
Ni wt%	21.10	20.01	18.96	18.79	19.28	19.57	21.20	18.09
Cu wt%	0.57	0.39	0.84	0.98	0.33	0.15	0.45	0.45
Zn wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pb wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
As wt%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
S wt%	32.24	31.63	32.23	32.16	31.93	32.41	32.40	32.26
Total	100.59	99.89	99.96	100.25	98.60	98.58	99.37	99.47
Pd atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ag atm%	0.044	0.050	0.052	0.054	0.056	0.055	0.046	0.052
Pt atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Au atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sb atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Te atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Bi atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Se atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fe atm%	0.308	0.313	0.308	0.307	0.300	0.295	0.295	0.314
Co atm%	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000

Microprobe Data

[illegible]

Microprobe Data

0.000	0.000	0.000	0.000	0.000	0.000	Rh atm%
0.000	0.000	0.000	0.000	0.000	0.000	Pt atm%
0.000	0.000	0.000	0.000	0.000	0.000	Os atm%
0.002	0.002	0.003	0.003	0.003	0.003	Ir atm%
0.340	0.446	0.453	0.478	0.465	0.480	Au atm%
0.000	0.000	0.000	0.000	0.000	0.000	Sb atm%
0.002	0.000	0.000	0.000	0.002	0.007	Te atm%
0.101	0.076	0.070	0.019	0.044	0.004	Bi atm%
0.000	0.000	0.000	0.000	0.000	0.001	Se atm%
0.002	0.001	0.000	0.002	0.001	0.006	Fe atm%
0.101	0.008	0.000	0.006	0.001	0.002	Co atm%
0.000	0.000	0.000	0.000	0.000	0.000	Ni atm%
0.353	0.463	0.474	0.492	0.483	0.497	Cu atm%
0.000	0.000	0.000	0.000	0.000	0.000	Zn atm%
0.100	0.003	0.001	0.000	0.000	0.000	Pb atm%
1.001	0.999	1.001	1.000	0.999	1.000	As atm%
						S atm%
						Subtotal
						Appendix
						Analysis
						Mineral
						Association
CCN46-A4	CCN46-A7	CCN46-A9				Pd wt%
mich	mich	mich				Ru wt%
pn, silic	pn, silic	po, silic				Rh wt%
25.03	25.24	24.55				Pt wt%
0	0	0				Os wt%
0	0	0				Ir wt%
0	0.05	0				Au wt%
0	0	0				Sb wt%
0	0.1	0.01				Te wt%
0	0	0				Bi wt%
1.89	2.62	2.16				Se wt%
28.42	28.35	28.31				Fe wt%
43.25	41.12	41.86				Co wt%
0	0	0				Ni wt%
0.39	1.03	0.97				Cu wt%
0.01	0.01	0				Zn wt%
0.34	0.63	0.25				Pb wt%
0.03	0.03	0				As wt%
0	0	0				S wt%
0.01	0	0.05				Total
0	0	0				
0.01	0.03	0.04				
99.38	99.21	98.2				
0.339	0.335	0.333				Pd atm%
0	0	0				Ru atm%
0	0	0				Rh atm%
0	0	0				Pt atm%
0	0	0				Os atm%

Microprobe Data

0	0.001	0							Ir atm%
0	0	0							Au atm%
0.022	0.03	0.026							Sb atm%
0.321	0.313	0.32							Te atm%
0.298	0.277	0.289							Bi atm%
0	0	0							Se atm%
0.01	0.026	0.025							Fe atm%
0	0	0							Co atm%
0.008	0.015	0.006							Ni atm%
0.001	0.001	0							Cu atm%
0	0	0							Zn atm%
0	0	0							Pb atm%
0	0	0							As atm%
0	0.001	0.002							S atm%
0.999	0.999	1.001							Subtotal
CCN3A 2	CCN3A 3a	CCN3A 3b	CCN3A 3c	CCN3A 3c	CCN3A 4	CCN3A 4b	CCN3A 5	CCN3B-1A	
cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	
					po			ccp.pn	
0.08	0.07	0.07	0.08	0.24	0.08	0.04	0.10	0.11	
0.23	0.21	0.25	0.37	0.36	0.17	0.32	0.16	0.23	
0.15	0.13	3.07	6.22	5.97	0.89	1.88	0.76	0.55	
0.09	0.15	0.24	2.29	1.90	0.16	0.21	0.19	0.23	
0.30	0.06	0.15	0.78	0.50	0.28	0.75	0.01	0.31	
0.00	0.12	0.07	18.95	18.34	0.10	0.13	0.10	0.01	
7.26	5.91	6.72	3.91	3.89	7.49	7.09	7.14	6.75	
19.97	21.50	16.04	11.53	10.97	17.65	15.47	15.62	19.09	
8.35	7.57	10.19	4.81	4.90	9.74	10.98	11.92	9.46	
0.00	0.77	0.40	0.97	0.90	0.01	0.02	0.00	0.75	
44.46	44.48	44.20	37.25	36.95	44.59	44.35	45.53	44.30	
18.70	18.88	18.17	15.45	15.64	18.59	18.13	18.15	18.81	
99.62	100.26	100.41	104.38	102.25	99.93	99.77	99.84	101.08	
0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	
0.001	0.001	0.001	0.002	0.002	0.001	0.002	0.001	0.001	
0.001	0.001	0.017	0.039	0.038	0.005	0.010	0.004	0.003	
0.000	0.000	0.001	0.008	0.006	0.000	0.001	0.001	0.001	

Microprobe Data

0.001	-0.003	-0.001	-0.001	-0.002	0.001	0.002	0.000	-0.002
0.000	0.000	0.000	0.064	0.063	0.000	0.000	0.000	0.000
0.072	0.059	0.068	0.046	0.046	0.075	0.072	0.072	0.067
0.189	0.202	0.154	0.127	0.122	0.167	0.149	0.149	0.179
0.079	0.072	0.098	0.053	0.055	0.093	0.106	0.114	0.089
0.000	0.007	0.004	0.010	0.009	0.000	0.000	0.000	0.007
0.331	0.329	0.333	0.324	0.324	0.332	0.335	0.341	0.327
0.325	0.327	0.320	0.314	0.321	0.324	0.320	0.318	0.324
1.000	1.000	1.001	0.999	0.998	0.999	0.999	1.001	1.001

Appendix : Electron microprobe analyses of Froodites from CCN Min

CCN19-D2	Analysis	CCN19-J2	CCN64A-A	CCN64A-B1	CCN64A-C2	CCN64A-E1
AgPn	Association	pn	gers, BiTe	ers, hess, g	gal, gers	BiTe, gers
alt, silic, cp	Mineral	froodite	froodite	froodite	froodite	froodite
0.00	Ag wt%	0.00	0.00	0.00	0.00	0.00
12.33	Pd wt%	20.03	16.78	18.81	19.08	17.57
0.00	Ru wt%	0.00	0.00	0.00	0.00	0.00
0.00	Rh wt%	0.00	0.00	0.00	0.00	0.00
0.02	Pt wt%	0.01	0.00	0.04	0.00	0.00
0.03	Os wt%	0.00	0.00	0.00	0.00	0.00
0.00	Ir wt%	0.00	0.00	0.00	0.00	0.00
0.00	Au wt%	0.00	6.04	2.40	2.62	5.31
36.54	Sb wt%	0.00	0.01	0.00	0.01	0.00
0.00	Te wt%	0.15	0.03	0.27	0.22	0.09
17.67	Bi wt%	75.80	73.79	76.94	73.41	75.89
0.99	Se wt%	0.00	0.04	0.00	0.00	0.00
0.00	Fe wt%	1.95	0.1	0.05	0.34	0.07
0.00	Co wt%	0.02	0.02	0.09	0.21	0.03
0.00	Ni wt%	0.37	0.79	0.32	1.07	0.23
32.32	Cu wt%	2.10	0.03	0.00	0.02	0.01
99.91	Zn wt%	0.00	0.00	0.00	0.00	0.00
	Pb wt%	0.00	0.00	0.00	0.00	0.00
0.000	As wt%	0.00	0.00	0.00	0.00	0.00
0.055	S wt%	0.16	0.07	0.04	0.03	0.01
0.000	Total	101.31	97.70	99.64	97.60	99.96
0.000						
0.000	Ag atm%	0.004	0.000	0.004	0.002	0.005
0.000	Pd atm%	0.295	0.281	0.307	0.309	0.290
0.000	Ru atm%	0.000	0.000	0.000	0.000	0.000
0.000	Rh atm%	0.000	0.000	0.000	0.000	0.000
0.313	Pt atm%	0.000	0.000	0.000	0.000	0.000
0.000	Os atm%	0.000	0.000	0.000	0.000	0.000

Microprobe Data

0.144	Ir atm%	0.000	0.000	0.000	0.000	0.000
0.007	Au atm%	0.000	0.055	0.021	0.023	0.047
0.000	Sb atm%	0.000	0.000	0.000	0.000	0.000
0.000	Te atm%	0.002	0.000	0.004	0.003	0.001
0.000	Bi atm%	0.568	0.630	0.640	0.605	0.638
0.481	Se atm%	0.000	0.001	0.000	0.000	0.000
1.000	Fe atm%	0.055	0.003	0.002	0.010	0.002
	Co atm%	0.000	0.001	0.003	0.006	0.001
	Ni atm%	0.010	0.024	0.010	0.031	0.007
	Cu atm%	0.052	0.001	0.000	0.001	0.000
	Zn atm%	0.000	0.000	0.000	0.000	0.000
	Pb atm%	0.000	0.000	0.000	0.000	0.000
	As atm%	0.000	0.000	0.000	0.000	0.000
	S atm%	0.008	0.004	0.002	0.002	0.001
	Subtotal	1.000	1.000	1.000	0.999	0.999

Microprobe Data

[illegible]

Microprobe Data

0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39.50	39.37	38.96	39.18	39.18	39.18	39.61	39.28	39.81
100.52	100.31	99.06	100.07	100.07	100.07	100.48	99.89	100.01
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.467	0.468	0.467	0.468	0.468	0.468	0.466	0.467	0.462
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.003	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.530	0.530	0.530	0.529	0.529	0.529	0.531	0.530	0.535
1.000	1.001	1.000	1.000	1.000	1.000	0.999	0.999	0.999

Electron Microprobe analyses of bismuth tellurides from CCN Mine.

CCN56-B5	CCN46-A5	CCN46-A6	CCN46-A8	CCN46-A10	CCN19-A1	CCN19-A2	CCN19-J1	CCN19-K3
Bi Te cob, silic	Bi Te pn, silic	Bi Te po, silic	Bi Te pn, silic	Bi Te po, silic	BiTe AgPn, silic	BiTe silic	BiTe po, silic	BiTe alt, po
0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.72
0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.03
0.00	0.00	0.01	0.00	0.04	0.00	0.00	0.00	0.00
0.00	0.03	0.00	0.00	0.03	0.01	0.01	0.07	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.27	0.24	0.37	0.04	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.21	0.14	0.15	0.14	0.18	0.14	0.15	0.10	0.18
39.03	38.58	37.61	37.88	38.00	33.97	30.97	24.37	31.21
53.69	58.79	57.11	55.39	55.27	62.65	56.35	72.68	58.34
0.00	0.00	0.00	0.00	0.00	0.41	0.59	0.48	0.96
0.50	0.84	1.73	2.47	1.98	0.35	0.98	1.82	0.34
0.01	0.05	0.03	0.05	0.00	0.00	0.01	0.00	0.04
0.05	0.41	0.15	0.26	0.09	0.06	0.13	0.00	0.12
0.00	0.08	0.09	0.09	0.01	0.36	0.92	0.03	0.35
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.19	0.53	1.44	3.03	1.76	0.94	6.87	0.30	6.50
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.06	0.04	0.05	0.21	0.09	0.02	0.90	0.05	0.67
96.76	99.76	98.61	99.89	97.50	98.91	97.89	100.59	99.46
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.011
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Microprobe Data

0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.002	0.002	0.003	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.002
0.517	0.492	0.480	0.466	0.486	0.451	0.393	0.325	0.400
0.434	0.458	0.445	0.416	0.432	0.508	0.437	0.591	0.457
0.000	0.000	0.000	0.000	0.000	0.009	0.012	0.010	0.020
0.015	0.025	0.050	0.069	0.058	0.011	0.028	0.055	0.010
0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.001
0.001	0.011	0.004	0.007	0.002	0.002	0.004	0.000	0.003
0.000	0.002	0.002	0.002	0.000	0.010	0.024	0.001	0.009
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.026	0.004	0.011	0.023	0.014	0.008	0.054	0.002	0.051
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.003	0.002	0.002	0.010	0.005	0.001	0.046	0.003	0.034
0.999	0.999	0.999	0.999	1.000	1.002	1.000	1.000	0.998

Electron microprobe analyses of irarsite from the 100 orebody, CCN Mine.

[illegible]

Microprobe Data

0.082	0.135	0.120	0.100	0.116	0.059	0.120	0.127	0.069
0.037	0.030	0.038	0.042	0.046	0.056	0.029	0.042	0.042
0.127	0.061	0.069	0.084	0.070	0.116	0.059	0.047	0.113
0.060	0.027	0.023	0.033	0.022	0.041	0.023	0.024	0.050
0.002	0.004	0.004	0.004	0.003	0.002	0.022	0.036	0.006
0.341	0.331	0.325	0.314	0.324	0.322	0.324	0.329	0.326
0.314	0.313	0.326	0.346	0.326	0.331	0.307	0.298	0.338
0.996	0.986	0.989	0.989	0.990	0.992	0.985	0.989	0.991
CCN3B-1B	CCN3B-3	CCN3B-3B	CCN3B-4	CCN58-A1	CCN58-A2	CCN58-A3	CCN58-A4	CCN5A-1
cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	gersdorff
	ccp		sph.AgTe	cp	cp	cp	cp	ccp, BiTe
0.19	0.08	0.14	-0.03	0.11	0.12	0.11	0.15	-0.05
0.34	0.22	0.27	0.21	0.10	0.18	0.23	0.21	0.02
8.13	2.30	4.55	2.28	0.06	0.23	1.31	1.29	0.68
2.94	0.19	0.25	0.00	0.01	0.13	0.00	0.09	0.27
0.85	0.25	0.57	0.51	0.03	0.04	0.08	0.01	0.16
31.74	0.00	0.00	0.12	0.03	0.05	0.07	0.00	0.01
				0.00	0.00	0.00	0.00	
				0.03	0.03	0.02	0.00	
				0.01	0.00	0.00	0.00	
				0.00	0.00	0.00	0.00	
				0.00	0.00	0.00	0.00	
2.05	6.62	6.38	6.36	6.03	6.78	6.90	6.60	7.41
5.29	16.13	15.10	15.89	18.70	15.40	13.47	13.53	14.16
2.12	10.32	9.61	10.28	9.39	11.80	12.99	12.62	14.30
1.48	0.76	0.81	0.41	0.09	0.01	0.00	0.00	0.08
				0.00	0.00	0.00	0.00	
31.74	44.57	44.26	44.48	44.07	44.69	44.85	44.15	47.03
13.21	18.51	17.80	18.31	19.58	19.07	18.90	18.42	19.17
102.50	100.81	101.08	99.49	98.25	98.58	99.20	97.34	103.38
0.001	0.000	0.001	-0.001	0.001	0.001	0.001	0.001	-0.001
0.003	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.000
0.060	0.013	0.025	0.013	0.000	0.001	0.007	0.007	0.004
0.012	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001

Microprobe Data

0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.017	0.016	0.052	0.038	0.015	0.012	0.007	0.002	0.033
0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000
0.002	0.003	0.001	0.002	0.003	0.002	0.001	0.003	0.001
0.639	0.635	0.629	0.615	0.635	0.616	0.596	0.603	0.638
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.002	0.002	0.006	0.008	0.005	0.011	0.011	0.012	0.003
0.002	0.002	0.003	0.004	0.003	0.004	0.005	0.005	0.001
0.012	0.008	0.021	0.029	0.021	0.037	0.059	0.046	0.021
0.000	0.001	0.000	0.005	0.000	0.000	0.001	0.001	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000
0.003	0.001	0.001	0.001	0.001	0.001	0.002	0.006	0.000
1.001	1.000	1.000	0.999	1.000	0.999	1.000	1.001	0.998

Microprobe Data

CCN46-4B CCN46-5A CCN46-5C CCN09-1A CCN09-6A CCN09-6C CCN09-6D CCN46-1B CCN46-1C								
pn str-flames	pn str-flames	pn str-flames	pn str-blocky	pn str-blocky	pn str-blocky	pn str-blocky	pn str-blocky	pn str-blocky
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30.11	30.62	30.04	30.44	30.98	30.86	30.89	29.86	29.80
1 25	1 22	1 26	1 83	1 62	1 61	1 71	1 57	1 63
36.02	35.46	36.06	34.89	34.89	34.88	34.62	35.77	36.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
32.81	33.20	32.81	33.20	32.66	32.97	32.76	32.74	33.04
100.21	100.50	100.17	100.36	100.15	100.32	99.98	99.95	100.50
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.245	0.248	0.245	0.247	0.253	0.251	0.252	0.244	0.242
0.010	0.009	0.010	0.014	0.012	0.012	0.013	0.012	0.013
0.279	0.273	0.280	0.269	0.271	0.270	0.269	0.278	0.278
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.466	0.469	0.466	0.469	0.464	0.467	0.466	0.466	0.467
1.000	0.999	1.001	0.999	1.000	1.000	1.000	1.000	1.000
CCN46-2A CCN46-3A CCN46-3D CCN46-4A CCN46-5B								
po str	po str	po str	po str	po str				
0.00	0.00	0.00	0.00	0.00				
59.47	60.17	59.71	59.78	59.73				
0.00	0.01	0.00	0.00	0.02				
0.39	0.27	0.35	0.32	0.39				
0.00	0.00	0.00	0.00	0.00				

Microprobe Data

0.01	0.01	0.00	0.00	0.00	
39.60	39.89	39.60	39.52	39.66	
99.47	100.35	99.66	99.62	99.80	
0.000	0.000	0.000	0.000	0.000	
0.462	0.463	0.463	0.464	0.462	
0.000	0.000	0.000	0.000	0.000	
0.003	0.002	0.003	0.002	0.003	
0.000	0.000	0.000	0.000	0.000	
0.000	0.000	0.000	0.000	0.000	
0.535	0.535	0.535	0.534	0.535	
1.000	1.000	1.001	1.000	1.000	
</					

Microprobe Data

0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000
0.001	0.000	0.000	0.000	0.000	0.000
0.002	0.001	0.002	0.000	0.001	0.000
0.002	0.001	0.001	0.001	0.000	0.002
0.304	0.303	0.320	0.281	0.119	0.312
0.639	0.621	0.631	0.565	0.746	0.545
0.000	0.000	0.000	0.000	0.000	0.000
0.007	0.020	0.006	0.004	0.022	0.006
0.004	0.005	0.003	0.003	0.002	0.005
0.023	0.028	0.018	0.009	0.018	0.031
0.000	0.003	0.000	0.002	0.031	0.002
0.000	0.000	0.000	0.000	0.000	0.000
0.006	0.001	0.003	0.003	0.003	0.030
0.000	0.000	0.000	0.000	0.000	0.001
0.002	0.007	0.001	0.117	0.039	0.058
1.000	1.000	1.000	0.999	0.999	1.001

CCN50 B2	CCN50-C3	CCN50-C4
lrsite?	lrsite?	lrsite?
cob	cob	cob
0.18	0.01	0.03
0.51	0.80	0.73
2.85	6.63	6.21
2.81	4.51	4.35
0.72	1.53	1.37
6.72	9.66	9.27
0.00	0.00	0.00
0.00	0.01	0.01
0.00	0.00	0.03
0.00	0.00	0.00
0.00	0.00	0.00
7.03	4.96	5.09
12.73	12.56	12.74
9.58	5.95	6.08
0.08	1.54	1.61
0.00	0.00	0.00
0.00	0.00	0.00
41.78	38.72	38.57
17.66	17.12	17.28
103.37	105.53	104.74
0.001	0.000	0.000
0.003	0.005	0.004
0.016	0.039	0.037
0.008	0.014	0.014
0.002	0.005	0.004

Microprobe Data

0.020	0.031	0.029						
0.000	0.000	0.000						
0.000	0.000	0.000						
0.000	0.000	0.000						
0.000	0.000	0.000						
0.000	0.000	0.000						
0.074	0.054	0.055						
0.127	0.130	0.131						
0.096	0.062	0.063						
0.001	0.015	0.015						
0.000	0.000	0.000						
0.000	0.000	0.000						
0.327	0.314	0.312						
0.322	0.325	0.327						
0.999	0.999	0.995						
CCN5A-1B	CCN4-1	CCN4-1B	CCN53 A	CCN53 A2	CCN53 A3	CCN53 B1	CCN53 B2	CCN53 C1
gersdorff	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite
	ccp		po	po	po	po	po	po
0.00	0.13	0.09	0.05	0.10	0.05	0.05	0.10	0.06
0.00	0.15	0.22	0.00	0.00	0.00	0.00	0.00	0.00
1.53	0.03	0.07	0.19	0.62	0.35	0.65	0.00	0.05
0.73	0.00	0.13	0.00	0.03	0.00	0.00	0.00	0.00
0.00	0.87	0.97	0.00	0.00	0.00	0.00	0.00	0.02
0.10	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00
7.27	6.37	5.90	7.40	7.51	8.39	7.11	6.33	6.82
13.46	19.29	20.64	17.25	15.97	16.14	15.48	18.66	19.16
14.09	9.15	8.00	10.93	11.98	11.30	12.38	10.45	9.84
0.10	1.40	1.36	0.00	0.01	0.00	0.00	0.00	0.00
			0.00	0.00	0.00	0.00	0.00	0.00
46.94	44.81	44.50	45.26	45.17	44.74	45.10	44.39	44.85
18.20	18.88	18.89	19.33	19.35	19.34	19.25	19.59	19.53
102.74	101.09	100.78	100.48	100.88	100.38	100.15	99.52	100.34
0.000	0.001	0.001	0.000	0.000	0.001	0.000	0.001	0.000
0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
0.008	0.000	0.000	0.001	0.003	0.002	0.003	0.000	0.000
0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Microprobe Data

-0.001	-0.003	-0.003	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000	0.000	0.000
0.072	0.063	0.058	0.073	0.074	0.082	0.070	0.063	0.067
0.126	0.180	0.194	0.161	0.149	0.150	0.145	0.175	0.178
0.132	0.086	0.075	0.102	0.112	0.106	0.116	0.098	0.092
0.001	0.012	0.012	0.000	0.000	0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000	0.000	0.000
0.345	0.330	0.329	0.332	0.330	0.328	0.332	0.327	0.328
0.313	0.325	0.326	0.331	0.331	0.331	0.332	0.337	0.334
1.001	1.001	0.999	1.000	1.000	1.000	0.999	1.001	0.999

Appendix : Electron microprobe analyses of
niccolite from a quartz/carb vein
in the 900 orebody, CCN Mine

Analysis	CN64A-D2	CN64A-G2	CN64B-E1
Mineral	nic	nicc	nicc
Association	gers	gers	gers
Ag wt%	0.00	0.01	0.00
Pd wt%	0.00	0.00	0.03
Ru wt%	0.00	0.00	0.00
Rh wt%	0.00	0.00	0.00
Pt wt%	0.04	0.05	0.03
Os wt%	0.00	0.00	0.03
Ir wt%	0.00	0.00	0.00
Au wt%	0.00	0.00	0.00
Sb wt%	0.00	0.43	0.08
Te wt%	0.00	0.00	0.00
Bi wt%	0.00	0.00	0.00
Se wt%	0.00	0.00	0.00
Fe wt%	0.86	0.38	0.51
Co wt%	0.27	0.18	0.16
Ni wt%	42.56	43.02	43.68
Cu wt%	0.00	0.01	0.27
Zn wt%	0.00	0.00	0.00
Pb wt%	0.00	0.00	0.00
As wt%	54.93	54.94	55.20
S wt%	0.11	0.38	0.07
Total	98.77	99.40	100.06
Ag atm%	0.000	0.000	0.000
Pd atm%	0.000	0.000	0.000
Ru atm%	0.000	0.000	0.000
Rh atm%	0.000	0.000	0.000

Appendix - Electron m
quartz/carb

Analysis	CN64B-C2
Mineral	Parkerite
Association	gers
Ag wt%	0.54
Pd wt%	0.04
Ru wt%	0.00
Rh wt%	0.00
Pt wt%	0.04
Os wt%	0.00
Ir wt%	0.07
Au wt%	0.10
Sb wt%	0.13
Te wt%	0.03
Bi wt%	60.48
Se wt%	0.00
Fe wt%	0.62
Co wt%	0.22
Ni wt%	26.45
Cu wt%	0.00
Zn wt%	0.00
Pb wt%	0.00
As wt%	0.00
S wt%	9.16
Total	97.88
Ag atm%	0.005
Pd atm%	0.000
Ru atm%	0.000
Rh atm%	0.000
Pt atm%	0.000

Microprobe Data

Pt atm%	0.000	0.000	0.000	Os atm%	0.000
Os atm%	0.000	0.000	0.000	Ir atm%	0.000
Ir atm%	0.000	0.000	0.000	Au atm%	0.000
Au atm%	0.000	0.000	0.000	Sb atm%	0.001
Sb atm%	0.000	0.002	0.000	Te atm%	0.000
Te atm%	0.000	0.000	0.000	Bi atm%	0.276
Bi atm%	0.000	0.000	0.000	Se atm%	0.000
Se atm%	0.000	0.000	0.000	Fe atm%	0.011
Fe atm%	0.010	0.005	0.006	Co atm%	0.003
Co atm%	0.003	0.002	0.002	Ni atm%	0.430
Ni atm%	0.489	0.491	0.496	Cu atm%	0.000
Cu atm%	0.000	0.000	0.003	Zn atm%	0.000
Zn atm%	0.000	0.000	0.000	Pb atm%	0.000
Pb atm%	0.000	0.000	0.000	As atm%	0.000
As atm%	0.495	0.492	0.491	S atm%	0.273
S atm%	0.002	0.008	0.002	Subtotal	0.999
Subtotal	0.999	1.000	1.000		

Microprobe Data

CCN46-2B	CCN46-2C	CCN46-2D	CCN46-3B	CCN46-3C	CCN46-3E
pn	pn	pn	pn	pn	pn
str-blocky	str-blocky	str-blocky	str-blocky	str-blocky	str-blocky
0.00	0.00	0.00	0.00	0.00	0.00
30.62	30.73	30.90	30.14	30.33	30.45
1.72	1.61	1.67	1.68	1.58	1.50
35.03	35.24	34.96	35.78	35.58	35.78
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.01	0.02	0.01	0.00	0.02
32.80	32.78	32.79	32.80	33.15	32.83
100.17	100.37	100.34	100.41	100.64	100.58
0.000	0.000	0.000	0.000	0.000	0.000
0.250	0.250	0.252	0.245	0.246	0.247
0.013	0.012	0.013	0.013	0.012	0.012
0.272	0.273	0.271	0.277	0.274	0.277
0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000
0.466	0.465	0.465	0.465	0.468	0.464
1.001	1.000	1.001	1.000	1.000	1.000

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104
105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128
129	130	131	132	133	134	135	136
137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152
153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176
177	178	179	180	181	182	183	184
185	186	187	188	189	190	191	192
193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208
209	210	211	212	213	214	215	216
217	218	219	220	221	222	223	224
225	226	227	228	229	230	231	232
233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248
249	250	251	252	253	254	255	256
257	258	259	260	261	262	263	264
265	266	267	268	269	270	271	272
273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288
289	290	291	292	293	294	295	296
297	298	299	300	301	302	303	304
305	306	307	308	309	310	311	312
313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328
329	330	331	332	333	334	335	336
337	338	339	340	341	342	343	344
345	346	347	348	349	350	351	352
353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368
369	370	371	372	373	374	375	376
377	378	379	380	381	382	383	384
385	386	387	388	389	390	391	392
393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408
409	410	411	412	413	414	415	416
417	418	419	420	421	422	423	424
425	426	427	428	429	430	431	432
433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448
449	450	451	452	453	454	455	456
457	458	459	460	461	462	463	464
465	466	467	468	469	470	471	472
473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	

Microprobe Data

[illegible]

Microprobe Data

[illegible]

Microprobe Data

0.000	0.000	0.000	-0.002	-0.003	-0.003	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.072	0.067	0.082	0.065	0.074	0.075	0.082	0.081	0.079
0.151	0.180	0.161	0.185	0.145	0.134	0.168	0.156	0.133
0.111	0.089	0.104	0.086	0.108	0.120	0.092	0.102	0.123
0.000	0.000	0.000	0.004	0.006	0.005	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.332	0.328	0.327	0.328	0.335	0.336	0.328	0.329	0.336
0.330	0.336	0.326	0.330	0.325	0.322	0.330	0.329	0.324
1.001	1.002	1.001	0.998	1.000	0.999	1.000	0.998	0.999

Microprobe analyses of Parkerite from a vein in the 900 orebody, CCN Mine.

CN64B-C3 CN64B-E3 CN64B-G3
Parkerite Parkerite Parkerite
flood, gers flood, gersative-Bi, gers

0.63	0.64	0.42
0.04	0.02	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.07	0.00	0.00
0.00	0.00	0.00
0.18	0.00	0.00
0.14	0.11	0.10
0.19	0.29	2.11
0.03	0.00	0.00
60.80	60.72	59.65
0.00	0.00	0.00
0.51	0.34	0.11
0.19	0.08	0.05
26.45	26.66	26.36
0.00	0.11	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.07	0.06
9.29	9.80	9.85
98.52	98.84	98.71
0.006	0.006	0.004
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.000	0.000

Microprobe Data

0.000	0.000	0.000
0.001	0.000	0.000
0.001	0.001	0.000
0.001	0.002	0.016
0.000	0.000	0.000
0.276	0.272	0.268
0.000	0.000	0.000
0.009	0.006	0.002
0.003	0.001	0.001
0.428	0.425	0.421
0.000	0.002	0.000
0.000	0.000	0.000
0.000	0.000	0.000
0.000	0.001	0.001
0.275	0.286	0.288
1.000	1.002	1.001

Microprobe Data

1	2	3	4	5	6	7	8	9
1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1	1
3	1	1	1	1	1	1	1	1
4	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1
7	1	1	1	1	1	1	1	1
8	1	1	1	1	1	1	1	1
9	1	1	1	1	1	1	1	1
10	1	1	1	1	1	1	1	1
11	1	1	1	1	1	1	1	1
12	1	1	1	1	1	1	1	1
13	1	1	1	1	1	1	1	1
14	1	1	1	1	1	1	1	1
15	1	1	1	1	1	1	1	1
16	1	1	1	1	1	1	1	1
17	1	1	1	1	1	1	1	1
18	1	1	1	1	1	1	1	1
19	1	1	1	1	1	1	1	1
20	1	1	1	1	1	1	1	1
21	1	1	1	1	1	1	1	1
22	1	1	1	1	1	1	1	1
23	1	1	1	1	1	1	1	1
24	1	1	1	1	1	1	1	1
25	1	1	1	1	1	1	1	1
26	1	1	1	1	1	1	1	1
27	1	1	1	1	1	1	1	1
28	1	1	1	1	1	1	1	1
29	1	1	1	1	1	1	1	1
30	1	1	1	1	1	1	1	1
31	1	1	1	1	1	1	1	1
32	1	1	1	1	1	1	1	1
33	1	1	1	1	1	1	1	1
34	1	1	1	1	1	1	1	1
35	1	1	1	1	1	1	1	1
36	1	1	1	1	1	1	1	1
37	1	1	1	1	1	1	1	1
38	1	1	1	1	1	1	1	1
39	1	1	1	1	1	1	1	1
40	1	1	1	1	1	1	1	1
41	1	1	1	1	1	1	1	1
42	1	1	1	1	1	1	1	1
43	1	1	1	1	1	1	1	1
44	1	1	1	1	1	1	1	1
45	1	1	1	1	1	1	1	1
46	1	1	1	1	1	1	1	1
47	1	1	1	1	1	1	1	1
48	1	1	1	1	1	1	1	1
49	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1
51	1	1	1	1	1	1	1	1
52	1	1	1	1	1	1	1	1
53	1	1	1	1	1	1	1	1
54	1	1	1	1	1	1	1	1
55	1	1	1	1	1	1	1	1
56	1	1	1	1	1	1	1	1
57	1	1	1	1	1	1	1	1
58	1	1	1	1	1	1	1	1
59	1	1	1	1	1	1	1	1
60	1	1	1	1	1	1	1	1
61	1	1	1	1	1	1	1	1
62	1	1	1	1	1	1	1	1
63	1	1	1	1	1	1	1	1
64	1	1	1	1	1	1	1	1
65	1	1	1	1	1	1	1	1
66	1	1	1	1	1	1	1	1
67	1	1	1	1	1	1	1	1
68	1	1	1	1	1	1	1	1
69	1	1	1	1	1	1	1	1
70	1	1	1	1	1	1	1	1
71	1	1	1	1	1	1	1	1
72	1	1	1	1	1	1	1	1
73	1	1	1	1	1	1	1	1
74	1	1	1	1	1	1	1	1
75	1	1	1	1	1	1	1	1
76	1	1	1	1	1	1	1	1
77	1	1	1	1	1	1	1	1
78	1	1	1	1	1	1	1	1
79	1	1	1	1	1	1	1	1
80	1	1	1	1	1	1	1	1
81	1	1	1	1	1	1	1	1
82	1	1	1	1	1	1	1	1
83	1	1	1	1	1	1	1	1
84	1	1	1	1	1	1	1	1
85	1	1	1	1	1	1	1	1
86	1	1	1	1	1	1	1	1
87	1	1	1	1	1	1	1	1
88	1	1	1	1	1	1	1	1
89	1	1	1	1	1	1	1	1
90	1	1	1	1	1	1	1	1
91	1	1	1	1	1	1	1	1
92	1	1	1	1	1	1	1	1
93	1	1	1	1	1	1	1	1
94	1	1	1	1	1	1	1	1
95	1	1	1	1	1	1	1	1
96	1	1	1	1	1	1	1	1
97	1	1	1	1	1	1	1	1
98	1	1	1	1	1	1	1	1
99	1	1	1	1	1	1	1	1
100	1	1	1	1	1	1	1	1

Microprobe Data

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27
28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81
82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116	117
118	119	120	121	122	123	124	125	126
127	128	129	130	131	132	133	134	135
136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153
154	155	156	157	158	159	160	161	162
163	164	165	166	167	168	169	170	171
172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198
199	200	201	202	203	204	205	206	207
208	209	210	211	212	213	214	215	216
217	218	219	220	221	222	223	224	225
226	227	228	229	230	231	232	233	234
235	236	237	238	239	240	241	242	243
244	245	246	247	248	249	250	251	252
253	254	255	256	257	258	259	260	261
262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279
280	281	282	283	284	285	286	287	288
289	290	291	292	293	294	295	296	297
298	299	300	301	302	303	304	305	306
307	308	309	310	311	312	313	314	315
316	317	318	319	320	321	322	323	324
325	326	327	328	329	330	331	332	333
334	335	336	337	338	339	340	341	342
343	344	345	346	347	348	349	350	351
352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369
370	371	372	373	374	375	376	377	378
379	380	381	382	383	384	385	386	387
388	389	390	391	392	393	394	395	396
397	398	399	400	401	402	403	404	405
406	407	408	409	410	411	412	413	414
415	416	417	418	419	420	421	422	423
424	425	426	427	428	429	430	431	432
433	434	435	436	437	438	439	440	441
442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459
460	461	462	463	464	465	466	467	468
469	470	471	472	473	474	475	476	477
478	479	480	481	482	483	484	485	486
487	488	489	490	491</				

Microprobe Data

CCN54-E1	CCN54-E3	CCN54-F1	CCN60-A1	CCN60-A2	CCN60-A3	CCN60-B1	CCN60-B2	CCN60-B3
cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite
po	po	po	po	cob	cob	po, cp	cob	cob
0.03	0.04	0.08	0.06	0.32	0.41	0.09	0.34	0.60
0.04	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.52	0.13	0.09	0.31	2.83	0.09	1.69	5.23
0.06	0.20	0.09	0.16	0.14	0.34	0.13	0.19	0.33
0.07	0.21	0.06						
0.00	0.00	0.00	0.06	0.02	0.25	0.00	0.12	0.11
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.19	8.87	6.87	6.98	8.18	7.66	6.43	7.52	6.55
19.06	14.65	15.89	22.27	16.15	12.40	21.16	12.11	12.10
8.90	11.27	12.22	7.05	10.87	12.65	8.11	13.84	11.69
0.00	0.00	0.02	0.01	0.01	0.00	0.01	0.00	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
44.31	44.47	44.69	44.03	45.00	44.92	43.98	44.57	44.16
19.03	18.34	18.69	19.74	19.05	18.08	19.19	17.87	17.72
99.76	98.72	98.78	100.47	100.19	100.25	99.21	98.61	99.58
0.000	0.000	0.001	0.000	0.002	0.002	0.001	0.002	0.003
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.003	0.001	0.000	0.002	0.016	0.001	0.009	0.029
0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.001	0.001

Microprobe Data

[illegible]

Microprobe Data

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27
28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81
82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116	117
118	119	120	121	122	123	124	125	126
127	128	129	130	131	132	133	134	135
136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153
154	155	156	157	158	159	160	161	162
163	164	165	166	167	168	169	170	171
172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198
199	200	201	202	203	204	205	206	207
208	209	210	211	212	213	214	215	216
217	218	219	220	221	222	223	224	225
226	227	228	229	230	231	232	233	234
235	236	237	238	239	240	241	242	243
244	245	246	247	248	249	250	251	252
253	254	255	256	257	258	259	260	261
262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279
280	281	282	283	284	285	286	287	288
289	290	291	292	293	294	295	296	297
298	299	300	301	302	303	304	305	306
307	308	309	310	311	312	313	314	315
316	317	318	319	320	321	322	323	324
325	326	327	328	329	330	331	332	333
334	335	336	337	338	339	340	341	342
343	344	345	346	347	348	349	350	351
352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369
370	371	372	373	374	375	376	377	378
379	380	381	382	383	384	385	386	387
388	389	390	391	392	393	394	395	396
397	398	399	400	401	402	403	404	405
406	407	408	409	410	411	412	413	414
415	416	417	418	419	420	421	422	423
424	425	426	427	428	429	430	431	432
433	434	435	436	437	438	439	440	441
442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459
460	461	462	463	464	465	466	467	468
469	470	471	472	473	474	475	476	477
478	479	480	481	482	483	484	485	486
487	488	489	490	491</				

Microprobe Data

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380
381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410
411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430
431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470
471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500

Microprobe Data

[illegible]

Microprobe Data

CCN60-C1	CCN60-C2	CCN60-C3	CCN60-H1	CCN60-H2	CCN60-H3	CCN60-E1	CCN60-E2	CCN16-B1
cobaltite pn. po	cobaltite cob	cobaltite cob	cobaltite po. cp. pn	cobaltite cob	cobaltite cob	cobaltite po	cobaltite cob	cobaltite po
0.20	0.41	0.51	0.24	0.35	0.51	0.18	0.39	0.14
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.17	1.05	1.86	0.05	1.22	5.01	0.05	0.81	0.05
0.07	0.15	0.24	0.09	0.02	0.34	0.00	0.23	0.28
0.00	0.01	0.03	0.03	0.09	0.06	0.08	0.26	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.34
7.12	7.11	7.05	6.74	7.14	6.26	7.49	8.33	6.37
16.62	13.55	12.08	16.68	13.05	10.77	18.23	14.21	19.53
11.14	12.90	13.34	11.60	13.55	13.38	9.81	11.34	9.51
0.02	0.02	0.05	0.01	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
44.63	44.47	44.63	44.46	44.86	44.18	43.96	44.43	44.63
19.14	18.63	18.41	19.08	18.19	17.54	19.22	18.50	19.45
99.21	98.58	98.68	98.99	98.72	99.13	99.11	98.76	101.39
0.001	0.002	0.003	0.001	0.002	0.002	0.001	0.002	0.001
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.001	0.006	0.010	0.000	0.007	0.028	0.000	0.004	0.000
0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.001	0.001

Microprobe Data

[illegible]

Microprobe Data

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Microprobe Data

Depth (cm)	Temperature (°C)	pH	DO (mg/L)	Salinity (ppt)	Electrical Conductivity (µS/cm)	Redox Potential (mV)	Microbial Activity (nmol/L)
0	15.2	7.8	8.5	25.0	1500	100	1.2
1	14.8	7.9	8.2	25.0	1500	100	1.1
2	14.5	8.0	7.9	25.0	1500	100	1.0
3	14.2	8.1	7.6	25.0	1500	100	0.9
4	13.9	8.2	7.3	25.0	1500	100	0.8
5	13.6	8.3	7.0	25.0	1500	100	0.7
6	13.3	8.4	6.7	25.0	1500	100	0.6
7	13.0	8.5	6.4	25.0	1500	100	0.5
8	12.7	8.6	6.1	25.0	1500	100	0.4
9	12.4	8.7	5.8	25.0	1500	100	0.3
10	12.1	8.8	5.5	25.0	1500	100	0.2
11	11.8	8.9	5.2	25.0	1500	100	0.1
12	11.5	9.0	4.9	25.0	1500	100	0.0
13	11.2	9.1	4.6	25.0	1500	100	0.0
14	10.9	9.2	4.3	25.0	1500	100	0.0
15	10.6	9.3	4.0	25.0	1500	100	0.0
16	10.3	9.4	3.7	25.0	1500	100	0.0
17	10.0	9.5	3.4	25.0	1500	100	0.0
18	9.7	9.6	3.1	25.0	1500	100	0.0
19	9.4	9.7	2.8	25.0	1500	100	0.0
20	9.1	9.8	2.5	25.0	1500	100	0.0
21	8.8	9.9	2.2	25.0	1500	100	0.0
22	8.5	10.0	1.9	25.0	1500	100	0.0
23	8.2	10.1	1.6	25.0	1500	100	0.0
24	7.9	10.2	1.3	25.0	1500	100	0.0
25	7.6	10.3	1.0	25.0	1500	100	0.0
26	7.3	10.4	0.7	25.0	1500	100	0.0
27	7.0	10.5	0.4	25.0	1500	100	0.0
28	6.7	10.6	0.1	25.0	1500	100	0.0
29	6.4	10.7	0.0	25.0	1500	100	0.0
30	6.1	10.8	0.0	25.0	1500	100	0.0
31	5.8	10.9	0.0	25.0	1500	100	0.0
32	5.5	11.0	0.0	25.0	1500	100	0.0
33	5.2	11.1	0.0	25.0	1500	100	0.0
34	4.9	11.2	0.0	25.0	1500	100	0.0
35	4.6	11.3	0.0	25.0	1500	100	0.0
36	4.3	11.4	0.0	25.0	1500	100	0.0
37	4.0	11.5	0.0	25.0	1500	100	0.0
38	3.7	11.6	0.0	25.0	1500	100	0.0
39	3.4	11.7	0.0	25.0	1500	100	0.0
40	3.1	11.8	0.0	25.0	1500	100	0.0
41	2.8	11.9	0.0	25.0	1500	100	0.0
42	2.5	12.0	0.0	25.0	1500	100	0.0
43	2.2	12.1	0.0	25.0	1500	100	0.0
44	1.9	12.2	0.0	25.0	1500	100	0.0
45	1.6	12.3	0.0	25.0	1500	100	0.0
46	1.3	12.4	0.0	25.0	1500	100	0.0
47	1.0	12.5	0.0	25.0	1500	100	0.0
48	0.7	12.6	0.0	25.0	1500	100	0.0
49	0.4	12.7	0.0	25.0	1500	100	0.0
50	0.1	12.8	0.0	25.0	1500	100	0.0

Microprobe Data

[illegible]

Microprobe Data

[illegible]

Microprobe Data

CCN16-B2	CCN16-C1	CCN16-D1	CCN16-D2	CCN16-E1	CCN9-1	CCN9-1B	CCN12-1B	CCN12-1B
cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite
po	po	po	po	po	ccp		po	po
0.07	0.26	0.07	0.15	0.17	0.00	0.05	0.05	0.04
0.00	0.00	0.00	0.00	0.00	0.00	0.01		
0.95	0.03	0.04	0.20	0.01	0.00	0.42		
0.31	0.11	0.17	0.47	0.10	0.00	0.11	0.00	0.00
					0.36	0.22		
0.00	0.00	0.00	0.00	0.00	0.08	0.03		
0.00	0.00	0.00	0.00	0.00				
0.00	0.00	0.00	0.02	0.00				
0.00	0.00	0.00	0.00	0.00				
0.00	0.00	0.00	0.00	0.00				
1.26	1.38	1.32	1.34	1.21				
7.15	7.46	6.54	6.95	7.44	5.82	7.35	3.88	3.84
14.43	18.00	19.16	15.95	20.04	20.49	15.11	24.85	25.26
12.55	10.51	9.84	11.95	8.75	8.43	12.06	5.60	5.19
0.03	0.00	0.00	0.00	0.00	0.56	0.45	0.00	0.00
0.00	0.00	0.00	0.00	0.00				
44.58	44.40	43.96	45.27	44.42	44.78	45.56	47.33	44.56
18.79	19.43	19.30	18.89	19.44	18.80	17.86	20.45	20.34
100.39	101.66	100.41	101.23	101.58	99.32	99.32	102.18	99.23
0.001	0.001	0.000	0.001	0.001	0.000	0.001	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000		
0.005	0.000	0.000	0.001	0.000	0.000	0.002		
0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000

Microprobe Data

[illegible]

Microprobe Data

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96
97	98	99	100	101	102	103	104
105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128
129	130	131	132	133	134	135	136
137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152
153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176
177	178	179	180	181	182	183	184
185	186	187	188	189	190	191	192
193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208
209	210	211	212	213	214	215	216
217	218	219	220	221	222	223	224
225	226	227	228	229	230	231	232
233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248
249	250	251	252	253	254	255	256
257	258	259	260	261	262	263	264
265	266	267	268	269	270	271	272
273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288
289	290	291	292	293	294	295	296
297	298	299	300	301	302	303	304
305	306	307	308	309	310	311	312
313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328
329	330	331	332	333	334	335	336
337	338	339	340	341	342	343	344
345	346	347	348	349	350	351	352
353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368
369	370	371	372	373	374	375	376
377	378	379	380	381	382	383	384
385	386	387	388	389	390	391	392
393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408
409	410	411	412	413	414	415	416
417	418	419	420	421	422	423	424
425	426	427	428	429	430	431	432
433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448
449	450	451	452	453	454	455	456
457	458	459	460	461	462	463	464
465	466	467	468	469	470	471	472
473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	

Microprobe Data

[illegible]

Microprobe Data

[illegible]

Microprobe Data

Microprobe Data

[illegible]

Microprobe Data

[illegible]

Microprobe Data

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27
28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81
82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99
100	101	102	103	104	105	106	107	108
109	110	111	112	113	114	115	116	117
118	119	120	121	122	123	124	125	126
127	128	129	130	131	132	133	134	135
136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153
154	155	156	157	158	159	160	161	162
163	164	165	166	167	168	169	170	171
172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198
199	200	201	202	203	204	205	206	207
208	209	210	211	212	213	214	215	216
217	218	219	220	221	222	223	224	225
226	227	228	229	230	231	232	233	234
235	236	237	238	239	240	241	242	243
244	245	246	247	248	249	250	251	252
253	254	255	256	257	258	259	260	261
262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279
280	281	282	283	284	285	286	287	288
289	290	291	292	293	294	295	296	297
298	299	300	301	302	303	304	305	306
307	308	309	310	311	312	313	314	315
316	317	318	319	320	321	322	323	324
325	326	327	328	329	330	331	332	333
334	335	336	337	338	339	340	341	342
343	344	345	346	347	348	349	350	351
352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369
370	371	372	373	374	375	376	377	378
379	380	381	382	383	384	385	386	387
388	389	390	391	392	393	394	395	396
397	398	399	400	401	402	403	404	405
406	407	408	409	410	411	412	413	414
415	416	417	418	419	420	421	422	423
424	425	426	427	428	429	430	431	432
433	434	435	436	437	438	439	440	441
442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459
460	461	462	463	464	465	466	467	468
469	470	471	472	4				

Microprobe Data

[illegible]

Microprobe Data

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	8												

Microprobe Data

[illegible]

Microprobe Data

CCN50 B	CCN50 D1	CCN50-C	CCN50-C2	CCN51-A	CCN51-C1	CCN51-C2	CCN51-D	CCN56-A1
cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite
po	cp	cp	cp	po	pn	pn	pn	po
0.09	0.09	0.06	0.08	0.07	0.05	0.10	0.03	0.05
0.29	0.25	0.38	0.41	0.19	0.16	0.14	0.13	0.00
0.97	0.06	2.70	0.00	0.00	0.00	0.21	0.01	0.34
0.07	0.08	0.29	0.05	0.05	0.07	0.04	0.02	0.02
0.27	0.37	0.34	0.10	0.05	0.00	0.17	0.10	0.04
0.21	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.03	0.03	0.03	0.01	0.00	0.02	0.01
0.00	0.00	0.01	0.01	0.02	0.00	0.00	0.00	0.01
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.50	7.23	7.60	7.28	8.23	7.15	7.78	8.40	7.08
13.11	17.77	14.33	17.91	17.11	18.12	14.59	16.58	16.87
12.90	10.07	10.53	9.20	10.79	11.00	13.40	11.00	11.20
0.00	1.31	1.41	1.45	0.00	0.02	0.03	0.00	0.14
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
44.84	44.60	43.53	44.55	44.41	44.88	45.52	44.64	44.76
18.67	19.40	18.55	19.34	19.45	19.42	18.91	19.02	18.67
100.12	101.24	100.42	100.41	100.40	100.88	100.93	99.95	99.26
0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.001
0.002	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.000
0.005	0.000	0.015	0.000	0.000	0.000	0.001	0.000	0.002
0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000

Microprobe Data

[illegible]

Microprobe Data

																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															</
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	----

Microprobe Data

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49
50	51	52	53	54	55	56
57	58	59	60	61	62	63
64	65	66	67	68	69	70
71	72	73	74	75	76	77
78	79	80	81	82	83	84
85	86	87	88	89	90	91
92	93	94	95	96	97	98
99	100	101	102	103	104	105
106	107	108	109	110	111	112
113	114	115	116	117	118	119
120	121	122	123	124	125	126
127	128	129	130	131	132	133
134	135	136	137	138	139	140
141	142	143	144	145	146	147
148	149	150	151	152	153	154
155	156	157	158	159	160	161
162	163	164	165	166	167	168
169	170	171	172	173	174	175
176	177	178	179	180	181	182
183	184	185	186	187	188	189
190	191	192	193	194	195	196
197	198	199	200	201	202	203
204	205	206	207	208	209	210
211	212	213	214	215	216	217
218	219	220	221	222	223	224
225	226	227	228	229	230	231
232	233	234	235	236	237	238
239	240	241	242	243	244	245
246	247	248	249	250	251	252
253	254	255	256	257	258	259
260	261	262	263	264	265	266
267	268	269	270	271	272	273
274	275	276	277	278	279	280
281	282	283	284	285	286	287
288	289	290	291	292	293	294
295	296	297	298	299	300	301
302	303	304	305	306	307	308
309	310	311	312	313	314	315
316	317	318	319	320	321	322
323	324	325	326	327	328	329
330	331	332	333	334	335	336
337	338	339	340	341	342	343
344	345	346	347	348	349	350
351	352	353	354	355	356	357
358	359	360	361	362	363	364
365	366	367	368	369	370	371
372	373	374	375	376	377	378
379	380	381	382	383	384	385
386	387	388	389	390	391	392
393	394	395	396	397	398	399
400	401	402	403	404	405	406
407	408	409	410	411	412	413
414	415	416	417	418	419	420
421	422	423	424	425	426	427
428	429	430	431	432	433	434
435	436	437	438	439	440	441
442	443	444	445	446	447	448
449	450	451	452	453	454	455
456	457	458	459	460	461	462
463	464	465	466	467	468	469
470	471	472	473	474	475	476
477	478	479	480	481	482	

Microprobe Data

DATE	DESCRIPTION	AMOUNT	BALANCE
1901			
1902			
1903			
1904			
1905			
1906			
1907			
1908			
1909			
1910			
1911			
1912			
1913			
1914			
1915			
1916			
1917			
1918			
1919			
1920			
1921			
1922			
1923			
1924			
1925			
1926			
1927			
1928			
1929			
1930			
1931			
1932			
1933			
1934			
1935			
1936			
1937			
1938			
1939			
1940			
1941			
1942			
1943			
1944			
1945			
1946			
1947			
1948			
1949			
1950			
1951			
1952			
1953			
1954			
1955			
1956			
1957			
1958			
1959			
1960			
1961			
1962			
1963			
1964			
1965			
1966			
1967			
1968			
1969			
1970			
1971			
1972			
1973			
1974			
1975			
1976			
1977			
1978			
1979			
1980			
1981			
1982			
1983			
1984			
1985			
1986			
1987			
1988			
1989			
1990			
1991			
1992			
1993			
1994			
1995			
1996			
1997			
1998			
1999			
2000			
2001			
2002			
2003			
2004			
2005			
2006			
2007			
2008			
2009			
2010			
2011			
2012			
2013			
2014			
2015			
2016			
2017			
2018			
2019			
2020			
2021			
2022			
2023			
2024			
2025			
2026			
2027			
2028			
2029			
2030			
2031			
2032			
2033			
2034			
2035			
2036			
2037			
2038			
2039			
2040			
2041			
2042			
2043			
2044			
2045			
2046			
2047			
2048			
2049			
2050			
2051			
2052			
2053			
2054			
2055			
2056			

Microprobe Data

[illegible]

Microprobe Data

CCN56-A2	CCN56-C1	CCN56-C2	CCN56-C3	CCN56-C4	CCN56-C5
cobaltite	cobaltite	cobaltite	cobaltite	cobaltite	cobaltite
po	po	po	po	po	po
0.08	0.08	0.06	0.04	0.13	0.15
0.00	0.00	0.00	0.00	0.00	0.00
1.17	0.00	0.20	1.92	1.12	0.38
0.05	0.02	0.04	0.08	0.08	0.14
0.00	0.00	0.00	0.01	0.01	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.01	0.02	0.00	0.01	0.00
0.04	0.00	0.01	0.01	0.00	0.02
0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
7.20	6.24	7.96	6.04	7.10	11.10
14.41	21.71	17.30	20.87	20.67	19.52
12.37	7.50	9.91	6.42	6.81	6.28
0.03	0.00	0.02	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00
44.03	44.58	44.84	41.95	44.48	42.69
18.41	18.61	18.49	17.71	18.47	21.06
98.04	98.75	98.89	95.45	99.11	101.42
0.001	0.000	0.001	0.000	0.001	0.001
0.000	0.000	0.000	0.000	0.000	0.000
0.006	0.000	0.001	0.011	0.006	0.002
0.000	0.000	0.000	0.000	0.000	0.000

Microprobe Data

[illegible]

Microprobe Data

Probe	Depth (cm)	Temperature (°C)	Salinity (psu)	pH	Dissolved Oxygen (mg/L)	Electrical Conductivity (µS/cm)
1	0	15.2	35.2	8.1	4.5	150
1	10	14.8	35.1	8.2	4.2	145
1	20	14.5	35.0	8.3	4.0	140
1	30	14.2	34.9	8.4	3.8	135
1	40	14.0	34.8	8.5	3.6	130
1	50	13.8	34.7	8.6	3.4	125
1	60	13.5	34.6	8.7	3.2	120
1	70	13.2	34.5	8.8	3.0	115
1	80	13.0	34.4	8.9	2.8	110
1	90	12.8	34.3	9.0	2.6	105
1	100	12.5	34.2	9.1	2.4	100
2	0	15.1	35.1	8.0	4.6	152
2	10	14.7	35.0	8.1	4.3	147
2	20	14.4	34.9	8.2	4.1	142
2	30	14.1	34.8	8.3	3.9	137
2	40	13.9	34.7	8.4	3.7	132
2	50	13.7	34.6	8.5	3.5	127
2	60	13.4	34.5	8.6	3.3	122
2	70	13.1	34.4	8.7	3.1	117
2	80	12.9	34.3	8.8	2.9	112
2	90	12.7	34.2	8.9	2.7	107
2	100	12.4	34.1	9.0	2.5	102

INCO assay data

BHID	Rock	Ore	Length	Density	Cu %	Ni %	Co %	Pt %
864080	QTZ	BLBS	0.899994	0.086115	0.38	0	0	
988170	MTSD	BLBS	6.200073	0.090172	0.22	0.04	0.01	0
965670	QD	BLBS	9.300049	0.090172	0.03	0.03	0.01	0
955500	QD	BLBS	3.299988	0.088924	0.03	0.08	0.01	
922210	IQD	BLBS	6.300003	0.088924	0.19	0.1	0.01	
955500	QD	BLBS	14.29999	0.08986	0.02	0.02	0	
955190	QD	BLBS	9.600006	0.08986	0.04	0	0	0
965350	QD	BLBS	9.800049	0.08986	0.02	0.02	0	0
955200	QD	BLBS	15 3	0.090172	0.04	0.03	0	0
988180	QD	BLBS	9.099976	0.08986	0.04	0.04	0	0.009
988500	QD	BLBS	8.199951	0.08986	0.05	0.07	0	0
955280	QD	BLBS	5	0.090172	0.11	0.07	0.01	
980010	QD	BLBS	11.6001	0.090796	0.43	0.09	0.01	0.008
965740	QD	BLBS	18.3	0.090172	0.17	0.06	0.01	
922160	IQD	BLBS	10.39999	0.090172	0.34	0.04	0	
988790	QD	BLBS	5	0.090172	0.05	0.04	0.01	0
988620	QD	BLBS	15.2	0.08986	0.07	0.04	0	
955500	QD	BLBS	5.799988	0.090484	0.21	0.12	0.01	
955190	QD	BLBS	11.09999	0.091108	0.04	0.01	0	0.004
955200	QD	BLBS	4.699997	0.091108	0.02	0.02	0	0
955200	QD	BLBS	15	0.091108	0.03	0.02	0	0
980270	QD	BLBS	5	0.090484	0.4	0.07	0	0.003
980270	MTSD	BLBS	4.900024	0.090172	0.03	0.07	0	0
901900	QD	BLBS	9.400009	0.090796	0.13	0.05	0.01	
955500	QD	BLBS	9.200012	0.091108	0.1	0.06	0	
1019620	QD	BLBS	5.100006	0.090172	0.15	0.04	0	
955290	QD	BLBS	5	0.09142	0.1	0.04	0	
965940	QD	BLBS	13.5	0.090484	0.48	0.09	0	0.087
922220	QD	BLBS	5	0.091108	0.08	0.08	0.02	
1019620	QD	BLBS	5.000008	0.090484	0.33	0.07	0	
965670	QD	BLBS	10	0.090172	0.06	0.16	0.08	0.006
988510	QD	BLBS	5	0.08986	0.04	0.02	0	0
955290	IQD	BLBS	15	0.09142	0.08	0.05	0	
955190	QD	BLBS	8.199997	0.09142	0.05	0.03	0	0
988160	QD	BLBS	9.199951	0.090172	0.15	0.04	0.01	0
988640	QD	BLBS	5	0.090484	0.25	0.22	0.01	
955210	QD	BLBS	15.60001	0.09142	0.12	0.06	0	0.005
955340	QD	BLBS	5	0.091732	0.02	0.03	0	
955240	QD	BLBS	12.5	0.091732	0.02	0.02	0	
980570	QD	BLBS	4.699997	0.090172	0.06	0.04	0	0
955290	IQD	BLBS	10	0.09142	0.06	0.07	0.01	
922150	IQD	BLBS	11.5	0.091108	0.16	0.08	0.01	
955190	QD	BLBS	5.300003	0.091732	0.06	0.02	0	0
980590	QD	BLBS	5	0.08986	0.04	0.03	0	0.005
965370	QD	BLBS	7.599976	0.08986	0.05	0.01	0.01	0
955350	QD	BLBS	5	0.091108	0.11	0.12	0.01	
948830	QD	BLBS	12.2	0.091108	0.48	0.06	0	
864160	QD	BLBS	6.399994	0.091732	0.08	0.04	0	
901800	IQD	BLBS	5	0.092044	0.03	0.03	0	
988620	QD	BLBS	14.5	0.090172	0.13	0.08	0.01	

INCO assay data

955190	QD	BLBS	5	0.091732	0.1	0.05	0	0
901900	IQD	BLBS	6.900009	0.091732	0.13	0.05	0.01	
965670	QD	BLBS	14	0.090796	0.26	0.12	0.01	0.005
948800	QD	BLBS	5	0.091732	0.35	0.03	0	
955200	QD	BLBS	5.899994	0.092044	0.05	0.05	0	0
965350	QD	BLBS	9.599976	0.090484	0.1	0.09	0.01	0
1019650	QD	BLBS	11.59999	0.091732	0.91	0.21	0.01	
980470	QD	BLBS	8.5	0.090796	0.5	0.1	0.01	0
901910	QD	BLBS	3.099976	0.091732	0.22	0.11	0.01	
988350	QD	BLBS	5	0.09142	0.17	0.26	0.01	
988610	QD	BLBS	4.899994	0.090484	0.44	0.04	0	
988620	QD	BLBS	5	0.090796	0.28	0.13	0.01	
901900	IQD	BLBS	9.399994	0.091108	0.43	0.21	0.01	
1019640	QD	BLBS	5	0.090796	0.61	0.11	0.01	
922450	DSQD	BLBS	20	0.091108	0.34	0.24	0.01	
922490	QD	BLBS	5.100006	0.092044	0.16	0.07	0.01	
965670	QD	BLBS	11.59998	0.090796	0.29	0.17	0.01	0.009
988450	QD	BLBS	5	0.090484	0.09	0.08	0.01	
980280	QD	BLBS	7.400024	0.090796	0.57	0.15	0.01	0.011
988500	QD	BLBS	5	0.08986	0.03	0.1	0	0
965400	QD	BLBS	13	0.090796	0.4	0.17	0.01	
988440	QD	BLBS	5	0.090484	0.23	0.1	0.01	
955190	QD	BLBS	3.699997	0.092356	0.08	0.05	0	0
955240	QD	BLBS	19.1	0.09142	0.47	0.16	0.01	
955240	IQD	BLBS	5	0.092044	0.13	0.07	0.01	
988620	QD	BLBS	44.2	0.090796	0.22	0.13	0.01	
901900	IQD	BLBS	6.799988	0.092356	0.04	0.06	0.01	
922160	IQD	BLBS	5.899994	0.092044	0.25	0.11	0.01	
955200	QD	BLBS	13.10001	0.092044	0.13	0.08	0.01	0.003
965670	QD	BLBS	10	0.090796	0.17	0.16	0.01	0.006
922250	QD	BLBS	10.70001	0.092356	0.11	0.08	0.01	
980570	QD	BLBS	5	0.090484	0.25	0.12	0.01	0
922490	IQD	BLBS	13.29999	0.092356	0.15	0.06	0	
955240	IQD	BLBS	11.7	0.09142	0.44	0.21	0.01	
864140	IQD	BLBS	7.200012	0.092356	0.2	0.12	0	
819910	IQD	BLBS	13.5	0.091732	0.38	0.14	0.01	
955300	IQD	BLBS	10	0.092044	0.14	0.12	0.01	
988340	IQD	BLBS	5	0.090796	0.37	0.13	0.01	
948300	IQD	BLBS	10.10001	0.092356	0.36	0.06	0	
988340	QD	BLBS	10.09999	0.090484	0.21	0.14	0.01	
922150	IQD	BLBS	15	0.092356	0.15	0.13	0.01	
922250	QD	BLBS	8.099976	0.092356	0.14	0.1	0.01	
980460	QD	BLBS	9.5	0.090172	0.1	0.04	0	0
965370	IQD	BLBS	8.900024	0.090484	0.26	0.07	0.01	0.006
965390	QD	BLBS	10.7	0.09142	0.47	0.21	0.01	
922450	DSQD	BLBS	9	0.092044	0.39	0.11	0.01	
955280	QD	BLBS	5	0.092356	0.19	0.11	0.01	
901900	IQD	BLBS	6.199997	0.092668	0.1	0.08	0.01	
922160	IQD	BLBS	3.200012	0.092044	0.42	0.14	0.01	
955300	IQD	BLBS	5	0.092356	0.19	0.12	0.01	
988350	QD	BLBS	5	0.091732	0.38	0.31	0.01	
988480	QD	BLBS	5	0.090796	0.1	0.1	0.01	

INCO assay data

955300	IQD	BLBS	40	0.092668	0.11	0.08	0.01	
922490	DSQD	BLBS	10	0.092356	0.5	0.09	0	
955300	IQD	BLBS	25	0.092668	0.1	0.08	0.01	
955250	QD	BLBS	10.89999	0.09298	0.1	0.07	0	
980270	QD	BLBS	5	0.090484	0.45	0.14	0.01	0.004
922220	QD	BLBS	11.7	0.092668	0.18	0.1	0.01	
988340	QD	BLBS	13.10001	0.091108	0.62	0.24	0.01	
922240	IQD	BLBS	0.700012	0.091732	1.22	0.36	0.01	
988470	IQD	BLBS	5	0.090796	0.33	0.11	0.01	
948030	QD	BLBS	8.5	0.092668	0.28	0.09	0.01	
955300	IQD	BLBS	12.3	0.092356	0.25	0.16	0.01	
965390	QD	BLBS	13.3	0.09142	0.39	0.22	0.01	
965940	QD	BLBS	4.900024	0.090796	0.98	0.11	0.01	0.044
988500	AMPH	BLBS	1.699951	0.091108	0.74	0.13	0.01	0.022
955850	QD	BLBS	11.5	0.090796	0.49	0.2	0.01	0.007
922150	IQD	BLBS	13	0.092668	0.15	0.15	0.01	
980590	IQD	BLBS	5	0.090484	0.27	0.08	0.01	0.004
988180	QD	BLBS	7.599976	0.091108	0.41	0.17	0.01	0.003
922490	DSQD	BLBS	8.699997	0.092668	0.45	0.11	0.01	
980890	QD	BLBS	5	0.090796	0.51	0.07	0.01	0.005
988180	QD	BLBS	14.30005	0.091108	0.54	0.17	0.01	0.007
955200	QD	BLBS	6.700012	0.09298	0.13	0.12	0.01	0.003
988440	QD	BLBS	4.699997	0.090484	0.1	0.12	0.01	
901900	IQD	BLBS	4.5	0.09298	0.14	0.12	0.01	
922200	IQD	BLBS	3.400024	0.092668	0.44	0.12	0.01	
955290	IQD	BLBS	9.399994	0.09298	0.2	0.13	0.01	
922450	DSQD	BLBS	15.39999	0.092356	0.43	0.22	0.01	
988180	QD	BLBS	9.300049	0.091732	0.3	0.32	0.01	0.014
980270	QD	BLBS	16.5	0.091108	0.77	0.21	0.01	0.005
901810	IQD	BLBS	2	0.09298	0.27	0.14	0.01	
988620	QD	BLBS	2.5	0.09142	0.62	0.31	0.12	
988780	IQD	BLBS	4	0.090484	0.2	0.1	0.01	0
922490	IQD	BLBS	11.90002	0.093292	0.38	0.08	0	
988210	IQD	BLBS	5	0.090796	0.3	0.11	0.01	
922160	IQD	BLBS	13.40002	0.093292	0.15	0.15	0.01	
988150	QD	BLBS	15	0.091108	0.19	0.15	0.01	0
988610	QD	BLBS	10.7	0.09142	0.42	0.19	0.01	
819910	QD	BLBS	8.300003	0.093292	0.38	0.12	0.01	
922160	IQD	BLBS	11.10001	0.092668	0.47	0.19	0.01	
988350	QD	BLBS	5	0.091108	0.26	0.2	0.01	
980800	AMPH	BLBS	5.5	0.090484	0.35	0.06	0.01	0
988190	QD	BLBS	5	0.091108	0.33	0.15	0.01	
955270	QD	BLBS	5	0.093292	0.36	0.14	0.01	
955850	IQD	BLBS	12	0.091108	0.31	0.24	0.01	0.013
922160	IQD	BLBS	12.60001	0.09298	0.36	0.2	0.01	
965740	QD	BLBS	5	0.09142	0.69	0.33	0.01	
955850	QD	BLBS	10	0.092044	0.97	0.33	0.01	0.014
980020	QD	BLBS	5.699951	0.091108	0.74	0.09	0.01	0.003
988190	QD	BLBS	6.800003	0.090796	0.56	0.12	0.01	
948020	QD	BLBS	11.2	0.093292	0.67	0.07	0.01	0.005
955850	IQD	BLBS	10	0.09142	0.85	0.17	0.01	0.01
922150	IQD	BLBS	2.799988	0.093292	0.19	0.18	0.01	

INCO assay data

988460	QD	BLBS	5	0.09142	0.41	0.19	0.01	
922230	DSQD	BLBS	5.100006	0.093292	0.4	0.2	0.01	
901910	IQD	BLBS	2.600006	0.093292	0.32	0.19	0.01	
922480	DSQD	BLBS	5	0.093292	0.46	0.13	0.01	
901900	IQD	BLBS	4.899994	0.093916	0.11	0.12	0.01	
1019620	QD	BLBS	13.7	0.091732	0.94	0.24	0.01	
955260	QD	BLBS	5	0.093292	0.53	0.19	0.01	
988230	QD	BLBS	5	0.091108	0.47	0.13	0.01	
864070	IQD	BLBS	9.5	0.094228	0.16	0.14	0	
980270	QD	BLBS	9.900024	0.092356	1.03	0.47	0.02	0.024
988440	QD	BLBS	12	0.09142	0.48	0.16	0.01	
922450	DSQD	BLBS	15	0.093292	0.5	0.25	0.01	
955250	IQD	BLBS	7.099991	0.093292	0.46	0.18	0.02	
980270	QD	BLBS	11.59998	0.092668	0.72	0.38	0.01	0.009
988500	QD	BLBS	5.400024	0.090172	0.31	0.03	0	0
955850	IQD	BLBS	15	0.09142	0.74	0.26	0.01	0.013
988450	QD	BLBS	9.100006	0.09142	0.57	0.16	0.01	
988780	QD	BLBS	7.800049	0.09142	0.47	0.15	0.01	0
948830	IQD	BLBS	12.3	0.09298	1.03	0.12	0.01	
988150	QD	BLBS	7	0.091732	0.29	0.21	0.01	0
955270	QD	BLBS	10	0.094228	0.26	0.14	0.01	
922480	DSQD	BLBS	11.5	0.093604	0.8	0.17	0.01	
988110	AMPH	BLBS	5	0.090172	0.23	0.03	0.01	0
980870	QD	BLBS	5	0.09142	0.44	0.15	0.01	0
988180	QD	BLBS	7	0.092044	0.97	0.25	0.01	0.012
988640	QD	BLBS	5	0.091732	0.83	0.27	0.01	
965670	QD	BLBS	5	0.09142	0.43	0.27	0.01	0.009
988480	QD	BLBS	6.699997	0.092044	0.41	0.3	0.01	
965370	IQD	BLBS	8.900024	0.091732	0.44	0.24	0.01	0.014
955010	QD	BLBS	1.900024	0.093292	0.96	0.13	0.01	0.003
955850	IQD	BLBS	10.3	0.09142	0.88	0.21	0.01	0.02
988780	QD	BLBS	14.09998	0.091108	0.72	0.1	0.01	0.016
948820	QD	BLBS	9.800003	0.093916	0.76	0.15	0.01	
980280	IQD	BLBS	12.30005	0.09298	0.71	0.63	0.02	0.004
988190	QD	BLBS	9.199997	0.09142	1.07	0.16	0.01	
988200	IQD	BLBS	5	0.09142	0.7	0.16	0.01	
988460	QD	BLBS	5	0.091732	0.63	0.2	0.01	
988620	QD	BLBS	5	0.092044	0.43	0.32	0.01	
922450	DSQD	BLBS	20	0.093916	0.68	0.28	0.01	
988440	QD	BLBS	13.5	0.09142	0.57	0.21	0.02	
988150	QD	BLBS	6.5	0.092044	0.28	0.23	0.01	0.004
922140	IQD	BLBS	7.299988	0.09454	0.46	0.18	0.01	
955350	QD	BLBS	7.5	0.093604	0.85	0.17	0.01	
980970	AMPH	BLBS	5	0.090172	0.05	0.07	0.01	0
988470	QD	BLBS	5	0.092356	0.96	0.3	0.01	
988780	QD	BLBS	14.5	0.092044	0.66	0.2	0.01	0.009
988180	QD	BLBS	10	0.092356	0.62	0.27	0.01	0.018
922440	DSQD	BLBS	7.5	0.094228	0.6	0.28	0.01	
948810	QD	BLBS	4.5	0.093292	1.2	0.19	0.02	
955190	QD	BLBS	8.5	0.094852	0.3	0.3	0	0.017
965150	IQD	BLBS	8.5	0.092044	0.66	0.36	0.02	0.016
864010	QD	BLBS	7.600006	0.095476	0.48	0.08	0.01	

INCO assay data

980860	QD	BLBS	6.5	0.092356	0.51	0.25	0.02	0.004
955350	QD	BLBS	11.5	0.094228	1.12	0.2	0.01	
980790	AMPH	BLBS	5	0.090484	0.33	0.08	0.01	0
901910	IQD	BLBS	9.799988	0.09454	0.35	0.34	0.02	
922250	IQD	BLBS	3.100006	0.09454	0.49	0.34	0.02	
922200	QD	BLBS	7.200012	0.09454	0.82	0.23	0.01	
922440	STCT	BLBS	5	0.094852	0.33	0.38	0.02	
988190	QD	BLBS	10.5	0.092044	0.76	0.21	0.02	
988500	QD	BLBS	5	0.091732	1.3	0.16	0.01	0.015
864040	SUBX	BLBS	1.299999	0.097036	0.02	0	0	
988630	QD	BLBS	9.800018	0.092668	0.71	0.44	0.02	
965370	IQD	BLBS	8.5	0.092668	0.73	0.35	0.01	0.015
988440	QD	BLBS	9.600006	0.092668	0.57	0.36	0.03	
988200	QD	BLBS	1.599998	0.092356	0.24	0.33	0.02	
980580	QD	BLBS	13.39999	0.092668	1.02	0.24	0.02	0.019
988190	QD	BLBS	9.800018	0.092356	0.74	0.26	0.02	
980270	QD	BLBS	11.29999	0.09454	3.38	0.25	0.01	0.015
948300	IQD	BLBS	4.899994	0.095476	1.21	0.24	0.01	
955270	IQD	BLBS	8.5	0.0961	0.42	0.26	0.01	
988620	QD	BLBS	9.100006	0.093916	1.63	0.47	0.02	
1019640	QD	BLBS	13.8	0.093916	1.41	0.48	0.02	
980270	QD	BLBS	15.20007	0.094228	0.63	0.7	0.02	0.003
948820	QD	BLBS	8.199997	0.095164	0.95	0.28	0.02	
955510	AMPH	BLBS	0.800003	0.098284	0.02	0.01	0.01	
965150	IQD	BLBS	13.2	0.093604	1.27	0.54	0.02	0.029
988230	QD	BLBS	5	0.092668	0.65	0.27	0.02	
955350	QD	BLBS	14.60001	0.096412	0.37	0.35	0.02	
965150	IQD	BLBS	7.100006	0.093604	0.96	0.63	0.04	0.024
965150	QD	BLBS	5	0.093916	0.7	0.5	0.02	0.024
988620	QD	BLBS	5	0.094228	1.04	0.64	0.02	
980580	QD	BLBS	10.5	0.093292	0.69	0.36	0.02	0.01
988340	IQD	BLBS	11.1	0.093916	0.59	0.44	0.02	
965940	QD	BLBS	5.300049	0.093292	1.48	0.64	0.02	0.025
988210	IQD	BLBS	5	0.093292	0.56	0.36	0.02	
988640	QD	BLBS	10	0.094228	0.47	0.86	0.02	
948010	QD	BLBS	10.89999	0.095788	1.14	0.39	0.02	
965150	IQD	BLBS	10.5	0.093604	0.97	0.64	0.03	0.027
988160	QD	BLBS	5	0.090796	0.12	0.19	0.01	0
988630	QD	BLBS	6.299988	0.093916	0.8	0.64	0.02	
988640	QD	BLBS	10	0.094228	0.61	0.78	0.02	
955340	QD	BLBS	7.600006	0.0961	0.71	0.44	0.02	
948310	IQD	BLBS	5.5	0.097036	0.85	0.36	0.02	
1019660	QD	BLBS	8.300003	0.095476	1.24	0.89	0.03	
988630	QD	BLBS	16.79999	0.09454	0.81	0.74	0.03	
948770	QD	BLBS	11.10001	0.095788	1.35	0.38	0.03	
955350	QD	BLBS	10.10001	0.0961	1.01	0.4	0.03	
988640	QD	BLBS	13.20001	0.094852	0.61	0.92	0.03	
988620	QD	BLBS	11.2	0.095164	1.21	0.7	0.02	
988440	QD	BLBS	11.7	0.093916	0.69	0.43	0.03	
988340	IQD	BLBS	5.300003	0.094228	1.25	0.41	0.02	
965400	QD	BLBS	2.100006	0.096724	1.34	0.85	0.05	
955240	IQD	BLBS	5.699997	0.096724	1.39	0.4	0.02	

INCO assay data

922200	IQD	BLBS	4.599976	0.097348	0.51	0.48	0.02	
980870	QD	BLBS	7.900009	0.094228	0.9	0.43	0.02	0.005
988360	QD	BLBS	4.899994	0.093916	1.11	0.44	0.02	
988340	IQD	BLBS	12.6	0.09454	1.11	0.46	0.02	
988630	QD	BLBS	12	0.095164	0.7	0.85	0.03	
988640	QD	BLBS	15	0.093916	0.56	0.85	0.03	
948010	QD	BLBS	8.399994	0.097348	0.66	0.41	0.02	
922150	IQD	BLBS	6.300018	0.097036	0.66	0.5	0.03	
988450	QD	BLBS	7.400009	0.09454	0.8	0.49	0.03	
948030	QD	BLBS	6.800018	0.097348	1.6	0.36	0.02	
819880	GS	BLBS	3.200012	0.098284	0.69	0.1	0.01	
988240	IQD	BLBS	10.60001	0.093604	1.28	0.32	0.02	
922270	IQD	BLBS	3.599976	0.09766	1.54	0.32	0.02	
980570	QD	BLBS	8.800003	0.09454	0.42	0.59	0.03	0.009
955010	IQD	BLBS	7	0.09766	0.81	0.44	0.02	0.006
948830	IQD	BLBS	10	0.097348	0.77	0.55	0.03	
981000	QD	BLBS	5.299988	0.0961	3.79	0.38	0.02	0
988790	QD	BLBS	11.20007	0.094228	0.53	0.49	0.03	0.018
988100	QD	BLBS	2	0.093292	0.74	0.37	0.04	0.003
922150	IQD	BLBS	10.29999	0.098908	0.33	0.54	0.03	
980590	IQD	BLBS	7.5	0.094852	0.82	0.56	0.03	0.016
988110	IQD	BLBS	14.5	0.09454	1.09	0.45	0.03	0.005
980880	QD	BLBS	9.099991	0.094852	0.55	0.56	0.03	0.005
955270	IQD	BLBS	10	0.09922	0.45	0.5	0.03	
955250	IQD	BLBS	10	0.097972	0.85	0.48	0.03	
988450	IQD	BLBS	8.399994	0.095164	0.59	0.58	0.03	
980280	QD	BLBS	11.69995	0.0961	1.81	1.11	0.03	0.008
980990	QD	BLBS	10	0.0961	0.69	0.64	0.03	0.005
955020	QD	BLBS	8.700012	0.098908	1.56	0.51	0.03	0.008
980890	QD	BLBS	9.800003	0.094852	1.6	0.44	0.02	0.005
922490	DIQD	BLBS	9.799988	0.10078	0.22	0.54	0.03	
1019660	QD	BLBS	14.89999	0.097348	2.15	0.98	0.03	
948030	QD	BLBS	11.39999	0.09922	1.5	0.59	0.03	
948010	QD	BLBS	10.39999	0.099844	0.79	0.68	0.03	
955260	QD	BLBS	14.30002	0.099532	0.89	0.65	0.04	
922140	IQD	BLBS	4.399994	0.099844	0.85	0.59	0.03	
922480	DSQD	BLBS	6.899994	0.100468	0.91	0.52	0.02	
988220	IQD	BLBS	8.800003	0.09454	1.26	0.44	0.03	
819930	IQD	BLBS	11.39999	0.100468	1.14	0.56	0.03	
955290	IQD	BLBS	8.199997	0.100156	0.61	0.71	0.04	
955350	QD	BLBS	12.79999	0.100156	0.64	0.76	0.04	
922490	DIQD	BLBS	9.899994	0.10078	0.34	0.67	0.03	
980580	IQD	BLBS	10	0.096724	0.6	0.78	0.04	0.013
955290	IQD	BLBS	15.60001	0.100468	0.59	0.74	0.04	
988360	QD	BLBS	8	0.097036	0.72	0.78	0.04	
955360	QD	BLBS	9.399994	0.10078	0.63	0.83	0.04	
955350	QD	BLBS	10	0.101092	0.84	0.81	0.04	
948820	QD	BLBS	6.699997	0.101092	1.36	0.55	0.03	
955230	IQD	BLBS	13.29999	0.101092	0.82	0.88	0.04	
955230	IQD	BLBS	10.60001	0.101404	3.05	0.69	0.03	
980860	QD	BLBS	4	0.097972	1.07	0.82	0.04	0
955360	QD	BLBS	10	0.101716	0.37	0.85	0.04	

INCO assay data

955340	QD	BLBS	11.5	0.101716	0.58	0.88	0.04	
988360	QD	BLBS	15.3	0.098284	1.65	0.79	0.04	
955360	QD	BLBS	13.39999	0.101716	0.72	0.76	0.04	
980580	IQD	BLBS	7.100006	0.09766	0.68	0.86	0.04	0.015
955020	QD	BLBS	11.10001	0.102028	0.65	0.84	0.04	0.013
980590	IQD	BLBS	11.10001	0.097972	0.68	0.89	0.04	0.016
955280	IQD	BLBS	10	0.10234	0.91	0.88	0.04	
948020	QD	BLBS	5.100006	0.102652	1.75	0.62	0.03	0.016
948820	IQD	BLBS	6.199997	0.102652	0.37	0.69	0.04	
988350	QD	BLBS	9.600006	0.098596	1.01	0.96	0.04	
988350	QD	BLBS	11.10001	0.098596	0.76	0.97	0.04	
980280	QD	BLBS	6.400024	0.098596	2.22	1.49	0.04	0.087
955250	IQD	BLBS	10	0.102964	0.81	0.93	0.05	
948310	IQD	BLBS	8.899994	0.10546	1.67	0.82	0.04	
955350	QD	BLBS	11.29999	0.104212	0.68	1	0.04	
988230	IQD	BLBS	10.09999	0.09922	1.93	0.87	0.05	
988450	QD	BLBS	13.2	0.099532	0.92	1.06	0.05	
988480	QD	BLBS	11.5	0.09922	1.19	0.92	0.05	
988470	QD	BLBS	4.900009	0.099532	1.3	0.98	0.05	
948820	IQD	BLBS	7.5	0.103588	1.17	0.97	0.06	
980990	QD	BLBS	10	0.099844	0.58	1.05	0.05	0.006
949000	IQD	BLBS	3.400002	0.104836	2.15	0.86	0.04	
955280	IQD	BLBS	10.60001	0.102652	0.61	1.1	0.1	
980850	IQD	BLBS	14.69998	0.100156	0.95	1.1	0.06	0.006
948310	IQD	BLBS	10	0.107332	1.3	0.91	0.05	
955250	IQD	BLBS	10.10001	0.10546	0.49	1.12	0.05	
955240	IQD	BLBS	8.300003	0.1039	0.75	1.13	0.09	
988610	IQD	BLBS	3.199997	0.100156	1.32	1.34	0.05	
988470	QD	BLBS	7	0.10078	0.72	1.17	0.06	
955010	IQD	BLBS	7.5	0.105772	1.26	1.09	0.06	0.007
955240	IQD	BLBS	6.800003	0.106084	0.78	1.06	0.06	
980270	QD	BLBS	11.90002	0.101716	2.86	2.06	0.05	0
948830	IQD	BLBS	10.39999	0.106708	0.81	1.19	0.06	
988440	QD	BLBS	9.300003	0.102028	1.84	1.16	0.05	
980860	QD	BLBS	10	0.102028	1.79	1.16	0.06	0.013
955290	QD	BLBS	1.800003	0.107332	1.21	1.51	0.06	
988200	IQD	BLBS	7.800003	0.101404	0.96	1.17	0.06	
988200	IQD	BLBS	9	0.100156	1.72	1.01	0.05	
980870	IQD	BLBS	7.399994	0.101716	2.58	1.12	0.05	0.033
988460	IQD	BLBS	6.600006	0.102028	0.55	1.31	0.06	
980870	IQD	BLBS	7.199997	0.10234	1.19	1.27	0.06	0.008
988240	IQD	BLBS	9.299995	0.100156	1.17	1.07	0.05	
988210	IQD	BLBS	9	0.102028	1.74	1.16	0.06	
980280	QD	BLBS	11.79993	0.1039	1.56	2.85	0.06	0.016
980970	IQD	BLBS	9.899994	0.102652	1.32	1.27	0.06	0.007
955200	QD	BLBS	0.300003	0.107644	0.18	1.15	0.08	0.011
980860	QD	BLBS	11.8	0.10078	1.56	1.07	0.05	0.02
980870	IQD	BLBS	11.5	0.103276	2.41	1.22	0.06	0.009
980850	IQD	BLBS	8.100006	0.103588	1.81	1.33	0.06	0.013
955010	QD	BLBS	10.3	0.109204	0.78	1.21	0.06	0.027
980810	IQD	BLBS	10	0.097036	1.42	0.77	0.05	0.041
981000	IQD	BLBS	8	0.104212	1	1.41	0.07	0

INCO assay data

980870	IQD	BLBS	10.89999	0.1039	1.6	1.36	0.07	0.008
980860	QD	BLBS	10	0.1039	2.4	1.32	0.06	0.025
988110	IQD	BLBS	2.5	0.104524	1.95	1.41	0.07	0.008
980850	IQD	BLBS	12.60001	0.104524	1.8	1.4	0.07	0.012
980860	QD	BLBS	10	0.104524	2.17	1.35	0.06	0.01
980860	QD	BLBS	10	0.106708	4.97	1.26	0.06	0.009
980800	IQD	BLBS	6.299988	0.10702	1.72	1.65	0.08	0.012
948350	GC	BLBS	1.199951	0.113885	0.76	1.63	0.07	
980850	IQD	BLBS	12	0.105772	1.41	1.61	0.07	0.011
988440	QD	BLBS	8.699997	0.107644	0.75	1.81	0.09	
980870	IQD	BLBS	11.60001	0.107956	1.35	1.76	0.08	0.013
955010	IQD	BLBS	8	0.115133	0.43	1.97	0.1	0.007
980870	IQD	BLBS	11.5	0.108268	1.52	1.76	0.08	0.016
948620	IQD	BLBS	9.100006	0.116069	1.05	1.83	0.09	0.009
948350	QD	BLBS	11.40002	0.116069	3.36	1.85	0.09	
948500	IQD	BLBS	9.299988	0.116693	1.49	1.87	0.09	
980980	QD	BLBS	10	0.109516	1.04	1.95	0.09	0.008
948770	IQD	BLBS	16.39999	0.116069	0.67	2.03	0.11	
980980	QD	BLBS	10	0.111076	0.93	2.09	0.1	0.009
955260	QD	BLBS	12.39999	0.117629	0.8	2.15	0.1	
948500	IQD	BLBS	8.600037	0.118253	1.33	2.02	0.09	
980790	IQD	BLBS	11.5	0.1117	1.27	2.15	0.18	0.045
948790	IQD	BLBS	12.5	0.118253	1.18	2.22	0.11	
948970	IQD	BLBS	7.299988	0.117941	1.17	2.17	0.12	
988100	IQD	BLBS	13	0.112637	1.05	2.18	0.1	0.006
980800	QD	BLBS	11	0.113261	3.5	2.04	0.1	0.017
948500	IQD	BLBS	8.299988	0.120437	4.23	1.91	0.09	
980980	QD	BLBS	6.300003	0.112949	1.19	2.21	0.1	0.009
948500	IQD	BLBS	10.5	0.119501	1.22	2.15	0.1	
988110	IQD	BLBS	9.199997	0.112949	0.63	2.22	0.11	0.011
948770	IQD	BLBS	10.6	0.119813	0.96	2.04	0.11	
980980	QD	BLBS	10	0.113885	1.26	2.3	0.11	0.008
980980	QD	BLBS	8.699997	0.113573	1.28	2.25	0.11	0
988100	IQD	BLBS	10	0.113261	0.94	2.28	0.11	0
948350	IQD	BLBS	6.800049	0.120125	2.46	2.14	0.1	
948500	IQD	BLBS	10	0.121373	2.48	2.24	0.1	
948340	QD	BLBS	10	0.121373	0.92	2.22	0.1	
949000	IQD	BLBS	12.60001	0.120125	0.86	2.37	0.13	
980980	QD	BLBS	10	0.113261	1.18	2.24	0.1	0.014
988190	QD	BLBS	12	0.114821	1.83	2.3	0.11	
948340	QD	BLBS	7.600006	0.120749	1.9	2.25	0.11	
948500	IQD	BLBS	11.29999	0.121061	1.28	2.33	0.11	
980960	IQD	BLBS	10	0.114509	0.92	2.28	0.11	0.036
980780	IQD	BLBS	9.299988	0.113885	0.5	2.3	0.11	0.011
988100	IQD	BLBS	10	0.115133	0.84	2.41	0.11	0.005
948500	IQD	BLBS	10.59998	0.121997	1.36	2.37	0.11	
980800	QD	BLBS	11.89999	0.115757	1.89	2.35	0.11	0.008
980800	IQD	BLBS	12.40002	0.115757	1.36	2.42	0.11	0.01
948500	IQD	BLBS	7.099976	0.122309	1.29	2.42	0.11	
988190	QD	BLBS	12.5	0.115445	1.54	2.41	0.11	
980800	IQD	BLBS	11.79999	0.114821	1.55	2.34	0.11	0.008
948340	QD	BLBS	7.5	0.122621	1.18	2.35	0.11	

INCO assay data

948500	IQD	BLBS	10.59998	0.122933	1.74	2.37	0.11	
980800	IQD	BLBS	12	0.114509	1.51	2.38	0.12	0.009
948500	IQD	BLBS	6.400024	0.123869	2.47	2.39	0.11	
948350	QD	BLBS	11.40002	0.123869	1.37	2.31	0.1	
980960	IQD	BLBS	7.600006	0.116069	0.6	2.44	0.11	0.013
980980	QD	BLBS	10	0.116693	1.23	2.55	0.12	0
948500	IQD	BLBS	10	0.124181	1.63	2.48	0.11	
980800	IQD	BLBS	10.29999	0.115133	0.61	2.45	0.11	0.029
988190	QD	BLBS	12.89999	0.117941	1.4	2.63	0.12	
980800	QD	BLBS	12.70001	0.119189	1.96	2.68	0.12	0.004
980960	IQD	BLBS	10	0.117941	1.19	2.52	0.12	0.01
980800	QD	BLBS	9.899994	0.119501	1.25	2.72	0.13	0
980980	QD	BLBS	10	0.119189	1.03	2.71	0.12	0.005
980980	QD	BLBS	10	0.118877	0.7	2.73	0.12	0
948500	IQD	BLBS	11.10004	0.126677	1.23	2.75	0.13	
955010	IQD	BLBS	7.399994	0.127613	0.26	2.67	0.13	0.02
980800	IQD	BLBS	12.5	0.121373	1.12	2.89	0.13	0.015
864400	IQD	BLBY	5	0.093292	0.14	0.1	0.01	
889280	IQD	BLBY	3.199997	0.093916	0.38	0.24	0.01	
864280	IQD	BLBY	10	0.095476	0.38	0.32	0.01	
864280	IQD	BLBY	5.5	0.095476	0.36	0.4	0.02	
629300	IQD	DISS	9	0.086427	0.06	0.05	0	
618680	IQD	DISS	8.899994	0.087051	0.05	0.04	0	0
610840	IQD	DISS	5	0.088924	0.02	0.02	0.01	0
618680	IQD	DISS	13.3	0.088924	0.02	0.03	0.01	0
948050	QD	DISS	7.700012	0.08986	0.17	0.04	0	
965210	QD	DISS	3.5	0.08986	0.04	0.02	0	0
980460	IQD	DISS	11	0.08986	0.12	0.03	0	0
629300	IQD	DISS	6.300003	0.089548	0.07	0.04	0.01	
901960	IQD	DISS	2	0.089548	0.19	0.11	0.01	
965210	QD	DISS	7.600006	0.08986	0.03	0.02	0	0.002
610850	IQD	DISS	10	0.08986	0.14	0.05	0	0.004
955790	QD	DISS	12.8	0.090172	0.06	0.04	0.01	0
955820	QD	DISS	6.099998	0.090172	0.14	0.06	0.01	0.004
618680	IQD	DISS	10	0.090172	0.03	0.02	0.01	0
618680	IQD	DISS	10	0.090172	0.05	0.03	0.01	0
948050	QD	DISS	10	0.090484	0.07	0.02	0	
965240	QD	DISS	11.70001	0.08986	0.08	0.04	0	
948050	QD	DISS	10	0.090796	0.02	0.01	0	
955350	QD	DISS	15	0.090796	0.09	0.02	0	
965230	QD	DISS	8.199997	0.090172	0.25	0.07	0	0.006
618680	IQD	DISS	10	0.090172	0.07	0.05	0.01	0
610850	IQD	DISS	10	0.090172	0.16	0.07	0.01	0.005
594640	QD	DISS	8.900009	0.08986	0.27	0.24	0.01	0.011
980460	IQD	DISS	12	0.090172	0.1	0.05	0.01	0
629470	IQD	DISS	8	0.088924	0.2	0.25	0.01	0.004
965350	IQD	DISS	6.5	0.08986	0.01	0.02	0	0.006
610840	IQD	DISS	10	0.090172	0.22	0.1	0.01	0.005
948050	QD	DISS	8.299988	0.090796	0.18	0.03	0.01	
955820	STRT	DISS	9.800003	0.090484	0.17	0.09	0.01	0.004
948050	IQD	DISS	6.699982	0.090796	0.15	0.07	0.01	
955830	IQD	DISS	10.8	0.090172	0.1	0.07	0.01	0.002

INCO assay data

948060	QD	DISS	6.799988	0.091108	0.07	0.06	0.01	
955960	QD	DISS	4.799999	0.091108	0.08	0.08	0.01	0.003
955800	QD	DISS	1.199997	0.090484	0.34	0.15	0.01	0.002
955800	QD	DISS	10.4	0.090796	0.16	0.12	0.01	0
965210	QD	DISS	7.899994	0.08986	0.07	0.02	0	0
955810	QD	DISS	9.099998	0.091108	0.2	0.09	0.01	
642050	IQD	DISS	15	0.090172	0.25	0.15	0.01	0.005
948060	QD	DISS	8.600006	0.09142	0.13	0.06	0	
955790	QD	DISS	10	0.091108	0.05	0.06	0.02	0
642050	IQD	DISS	19.2	0.090796	0.1	0.07	0.01	0.007
662580	IQD	DISS	7.899994	0.09142	0.21	0.07	0.01	
594650	IQD	DISS	3.600006	0.090796	0.15	0.08	0.01	0.002
955970	IQD	DISS	10.1	0.091108	0.17	0.09	0.01	0.004
901600	QD	DISS	10	0.09142	0.15	0.03	0	
965350	IQD	DISS	5.900024	0.090172	0.12	0.04	0.01	0.002
965210	QD	DISS	7.100006	0.090172	0.05	0.04	0	0
901710	IQD	DISS	10	0.091732	0.02	0.02	0	
642050	IQD	DISS	6.899994	0.090796	0.11	0.07	0.01	0.003
889370	IQD	DISS	8.300018	0.09142	0.16	0.04	0	
618680	IQD	DISS	10	0.091108	0.17	0.1	0.01	0.015
618680	IQD	DISS	10	0.090796	0.17	0.12	0.01	0.008
901600	QD	DISS	11	0.09142	0.19	0.09	0	
610840	IQD	DISS	10	0.090796	0.25	0.15	0.01	0.017
618680	IQD	DISS	10	0.090484	0.21	0.17	0.01	0.019
955840	IQD	DISS	9.800003	0.090484	0.37	0.07	0.01	0.003
955830	QD	DISS	10.2	0.090172	0.21	0.1	0.01	0.007
864010	MTSD	DISS	1.099998	0.09142	0.1	0	0	
955820	QD	DISS	10.8	0.090484	0.17	0.11	0.01	0
965360	IQD	DISS	6.400024	0.090484	0.13	0.1	0.01	0.004
642050	IQD	DISS	20	0.091108	0.13	0.1	0.01	0.005
629300	IQD	DISS	12.7	0.090796	0.52	0.22	0.01	
955970	QD	DISS	1.800003	0.091732	0.21	0.08	0.01	0
965240	QD	DISS	12.79999	0.090484	0.38	0.13	0	
965220	QD	DISS	13.5	0.090484	0.14	0.08	0	0.003
955790	QD	DISS	10.1	0.092044	0.1	0.05	0.01	0.005
965240	QD	DISS	8.200012	0.090484	0.27	0.1	0	
955350	QD	DISS	13.5	0.09142	0.46	0.09	0	
955840	IQD	DISS	8.5	0.090172	0.27	0.08	0.01	0.007
618680	IQD	DISS	10	0.091108	0.19	0.16	0.01	0.021
955190	QD	DISS	3.200012	0.092044	0.34	0.06	0	0.006
629470	IQD	DISS	15	0.091108	0.15	0.15	0.01	0.003
610850	IQD	DISS	3.5	0.09142	0.32	0.11	0.01	0
980460	IQD	DISS	11.40002	0.090484	0.54	0.09	0.01	0.014
618680	IQD	DISS	10	0.091732	0.14	0.1	0.01	0.006
901710	IQD	DISS	10	0.092356	0.1	0.07	0	
955960	QD	DISS	9.700005	0.092044	0.16	0.1	0.01	0
955210	QD	DISS	5.5	0.092044	0.26	0.1	0	0.009
610840	IQD	DISS	7	0.091732	0.39	0.18	0.01	0.013
955840	IQD	DISS	8	0.090484	0.31	0.12	0.01	0.004
629470	IQD	DISS	10	0.09142	0.29	0.24	0.01	0.009
901600	QD	DISS	13.5	0.09298	0.11	0.07	0	
965360	IQD	DISS	11.09998	0.090796	0.18	0.17	0.01	0.003

INCO assay data

988610	QD	DISS	5	0.091108	0.68	0.11	0.01	
642050	IQD	DISS	5.300003	0.09142	0.29	0.17	0.01	0.005
901910	IQD	DISS	7.400024	0.091732	0.75	0.22	0.01	
965210	QD	DISS	9.800003	0.090484	0.16	0.11	0.01	0.003
662510	QD	DISS	15	0.092356	0.35	0.12	0.01	
594650	IQD	DISS	20.7	0.092356	0.29	0.17	0.01	0.012
955790	QD	DISS	5	0.092356	0.36	0.18	0.01	0.012
901650	IQD	DISS	10	0.092668	0.33	0.1	0.01	
955360	QD	DISS	15	0.092356	0.54	0.1	0.01	
965230	QD	DISS	5	0.090796	0.35	0.16	0.01	0.021
965360	QD	DISS	11.19995	0.091108	0.32	0.16	0.01	0.011
662420	QD	DISS	11.2	0.092668	0.41	0.16	0.01	0.011
629470	IQD	DISS	12	0.09142	0.31	0.3	0.01	0.007
662540	IQD	DISS	11.8	0.09142	0.51	0.42	0.02	0.008
618680	IQD	DISS	11.10001	0.091732	0.64	0.34	0.01	0.041
955840	IQD	DISS	6.699997	0.091108	0.6	0.25	0.01	0.009
965360	QD	DISS	6.900024	0.090172	0.06	0.03	0	0.003
955790	STRT	DISS	6	0.093292	0.08	0.06	0.01	0
965360	QD	DISS	10.90002	0.091732	0.36	0.3	0.01	0.012
965360	QD	DISS	9	0.090172	0.06	0.03	0	0.004
955980	IQD	DISS	10	0.09298	0.24	0.17	0.01	
948320	QD	DISS	5	0.093292	0.27	0.11	0.01	
948830	IQD	DISS	15	0.09298	0.3	0.12	0.01	
642070	IQD	DISS	2.599998	0.092356	0.53	0.15	0.01	0.009
662510	QD	DISS	13.39999	0.09298	0.57	0.16	0.01	
1019660	QD	DISS	15.39999	0.091108	0.77	0.16	0.01	
965240	QD	DISS	5.5	0.09142	0.44	0.25	0.01	
955960	QD	DISS	2.400002	0.092668	0.46	0.2	0.01	0.01
955840	IQD	DISS	6.100006	0.090796	0.43	0.17	0.01	0.009
965230	QD	DISS	9.800003	0.09142	0.55	0.2	0.01	0.008
955800	QD	DISS	4.800003	0.092668	0.61	0.23	0.01	0.005
594640	QD	DISS	17.2	0.092356	0.56	0.29	0.01	0.022
901720	IQD	DISS	8.200012	0.093604	0.12	0.11	0.01	
955980	QD	DISS	7.200012	0.092668	0.6	0.23	0.01	
662530	QD	DISS	7.800003	0.09298	0.36	0.21	0.02	0.01
642070	IQD	DISS	9.199997	0.092356	0.73	0.14	0.01	0.013
955830	QD	DISS	9.700005	0.091108	0.64	0.17	0.01	0.015
948590	QD	DISS	5	0.093292	0.45	0.12	0.01	0.007
955830	AMPH	DISS	5.699997	0.090484	0.21	0.11	0.01	0.008
594640	QD	DISS	10.7	0.092356	0.41	0.35	0.02	0.016
948050	QD	DISS	9.100006	0.093292	0.35	0.19	0.01	
988480	QD	DISS	5.800003	0.09142	0.28	0.2	0.01	
988480	QD	DISS	5	0.09142	0.42	0.18	0.01	
662510	QD	DISS	3.800003	0.093292	0.84	0.15	0.01	
889370	IQD	DISS	10.39999	0.09298	0.64	0.2	0.01	
948620	AMPH	DISS	6.299988	0.09454	0.14	0.02	0	0
901640	QD	DISS	5	0.092668	1.09	0.11	0.01	
948050	IQD	DISS	6.400024	0.092356	0.75	0.32	0.02	
864160	QD	DISS	3.399994	0.093292	0.32	0.22	0.01	
955790	QD	DISS	1.600006	0.092668	0.42	0.43	0.02	0.021
948830	IQD	DISS	12	0.093604	0.3	0.16	0.01	
955800	QD	DISS	4.099998	0.09298	0.78	0.31	0.01	0.029

INCO assay data

901640	QD	DISS	7.100006	0.087988	3.64	1.42	0.03	
889370	IQD	DISS	9.399994	0.09298	0.36	0.32	0.01	
955810	QD	DISS	7.900002	0.09298	0.89	0.29	0.01	
955840	IQD	DISS	4	0.091108	0.7	0.21	0.01	0.017
901920	QD	DISS	1.300018	0.093916	0.4	0.15	0.01	
948990	QD	DISS	5.199997	0.09298	1.3	0.23	0.01	
955180	QD	DISS	3.300003	0.093292	0.68	0.25	0	0.018
948060	QD	DISS	5.400024	0.093604	0.46	0.27	0.01	
948010	QD	DISS	15.20001	0.093604	0.65	0.16	0.01	
955360	QD	DISS	13.39999	0.093604	0.75	0.15	0.01	
955810	QD	DISS	10	0.093292	0.6	0.32	0.01	
980470	QD	DISS	5.5	0.091108	0.36	0.14	0.01	0.007
955210	QD	DISS	6.099991	0.093292	0.74	0.27	0.01	0.018
901640	QD	DISS	5	0.09298	1.43	0.12	0.01	
965240	QD	DISS	4.100006	0.092044	0.77	0.29	0.01	
662510	IQD	DISS	6.800003	0.093604	0.76	0.25	0.02	
965230	QD	DISS	10.8	0.091732	0.86	0.28	0.01	0.04
901790	IQD	DISS	5	0.093292	0.49	0.31	0.02	
955830	QD	DISS	2.300003	0.09142	0.85	0.25	0.01	0.021
955980	QD	DISS	5.399994	0.093916	0.56	0.36	0.01	
642070	IQD	DISS	10	0.093604	0.71	0.17	0.01	0.016
955980	STRT	DISS	2.5	0.093916	0.54	0.36	0.01	
901900	IQD	DISS	6.699997	0.094228	0.43	0.25	0.01	
662530	IQD	DISS	5.399994	0.094228	0.36	0.27	0.01	0.013
955960	QD	DISS	6.099998	0.093604	0.65	0.36	0.01	0.035
922200	QD	DISS	6.100006	0.094228	0.6	0.21	0.01	
629470	IQD	DISS	6.5	0.09298	0.45	0.53	0.02	0.016
955980	IQD	DISS	11.8	0.093916	0.67	0.41	0.01	
642070	STRT	DISS	1.899998	0.092356	2.18	0.28	0.02	0.015
901750	IQD	DISS	5	0.093604	1.14	0.16	0.01	
1019660	QD	DISS	12.5	0.092356	0.93	0.33	0.01	
955790	QD	DISS	4.699997	0.093292	1.19	0.38	0.02	0.036
955980	QD	DISS	5.599998	0.093604	0.63	0.4	0.02	
864010	SUBX	DISS	7.100006	0.093916	1.14	0.24	0.01	
662410	QD	DISS	3.699997	0.093916	0.48	0.35	0.02	0.016
955960	QD	DISS	8.099998	0.093604	0.85	0.39	0.02	0.026
948060	QD	DISS	9.799988	0.094228	0.65	0.35	0.01	
965210	QD	DISS	6	0.092044	0.44	0.31	0.01	0.01
955960	QD	DISS	8.900002	0.094228	0.91	0.41	0.01	0.028
955970	IQD	DISS	9.800003	0.094228	0.6	0.4	0.02	0.023
901640	QD	DISS	3.899994	0.094228	1.67	0.17	0.01	
955980	QD	DISS	4	0.093916	1.16	0.36	0.02	
948060	QD	DISS	9.399994	0.09454	0.86	0.38	0.01	
864080	IQD	DISS	6.799988	0.094852	0.44	0.34	0.01	
864070	IQD	DISS	5.899994	0.094852	0.58	0.3	0.01	
864140	QD	DISS	8.600006	0.09454	1.03	0.34	0.01	
922180	IQD	DISS	2.5	0.09454	0.85	0.26	0.01	
955220	QD	DISS	4.800003	0.09454	0.63	0.41	0.02	
955980	QD	DISS	5.099998	0.094852	0.97	0.36	0.01	
1019650	QD	DISS	9.799988	0.093292	1.88	0.25	0.01	
955820	QD	DISS	11.2	0.092668	0.84	0.44	0.02	0.01
662420	IQD	DISS	7.600006	0.095164	0.44	0.35	0.02	0.012

INCO assay data

864160	IQD	DISS	5.600006	0.095476	0.34	0.38	0.01	
955010	QD	DISS	10	0.094852	0.94	0.2	0.01	0.008
988610	QD	DISS	1.900009	0.093292	2.61	0.19	0.01	
901790	IQD	DISS	10	0.094852	0.98	0.35	0.02	
955220	QD	DISS	2.300003	0.094852	1.84	0.25	0.01	
965210	AMPH	DISS	4.499992	0.090484	0.1	0.04	0.01	0.002
955820	QD	DISS	8	0.09298	0.73	0.58	0.03	0.028
955790	QD	DISS	3.699997	0.094852	1.75	0.43	0.02	0.062
955820	QD	DISS	10.9	0.09298	0.94	0.46	0.02	0.01
955960	QD	DISS	6.099998	0.095164	0.96	0.49	0.02	0.036
948830	IQD	DISS	14.60001	0.095164	0.94	0.28	0.02	
662430	QD	DISS	3.5	0.095788	1.26	0.32	0.02	
629470	IQD	DISS	5	0.09454	1.01	0.74	0.03	0.014
901810	AMPH	DISS	0.699982	0.097348	0.45	0.16	0.01	
922170	IQD	DISS	6	0.095788	1.17	0.22	0.01	
922270	AMPH	DISS	4.199982	0.095164	1.94	0.21	0.02	
948820	IQD	DISS	10.60001	0.095476	1	0.23	0.02	
662430	IQD	DISS	14.39999	0.095788	0.73	0.4	0.03	
965360	QD	DISS	4.900024	0.093292	0.63	0.42	0.02	0.015
864150	QD	DISS	2.399994	0.096724	0.24	0.4	0	
662540	QD	DISS	15	0.0961	0.83	0.42	0.03	0.016
642060	IQD	DISS	3.800003	0.0961	1.36	0.37	0.02	
980270	QD	DISS	13.09998	0.093604	1.87	0.48	0.01	0.053
955840	IQD	DISS	9.800003	0.093604	0.91	0.62	0.02	0.013
948640	IQD	DISS	5.899994	0.095788	2.33	0.24	0.02	0.007
948300	QD	DISS	4.599991	0.096724	1.7	0.21	0.02	
901910	IQD	DISS	6.799988	0.097036	0.44	0.48	0.02	
642050	IQD	DISS	6.699997	0.095164	0.39	0.58	0.04	0.01
662440	IQD	DISS	7.800003	0.096724	0.59	0.51	0.03	
864250	QD	DISS	10.89999	0.097348	0.3	0.4	0.03	
594640	QD	DISS	4.5	0.095476	0.92	0.98	0.04	0.019
901750	IQD	DISS	5	0.096724	1.48	0.32	0.02	
988190	QD	DISS	5	0.09142	0.74	0.46	0.02	
864060	IQD	DISS	10.89996	0.097036	1.66	0.3	0.01	
864060	IQD	DISS	7.100006	0.098908	0.54	0.24	0	
948320	GS	DISS	5	0.09766	0.85	0.29	0.02	
819920	QD	DISS	10	0.09766	0.36	0.5	0.03	
819860	QD	DISS	10	0.096724	1.07	0.35	0.02	0.011
662450	IQD	DISS	5.599991	0.097348	1.36	0.48	0.03	
662530	IQD	DISS	10.3	0.097036	0.36	0.64	0.03	0.008
819920	QD	DISS	10	0.098284	0.56	0.42	0.03	
662440	IQD	DISS	8.299995	0.09766	0.61	0.54	0.03	
819920	QD	DISS	12.60001	0.096724	1.02	0.44	0.04	
988480	QD	DISS	5.699997	0.093916	1.13	0.37	0.02	
662530	IQD	DISS	7.199997	0.097348	1.05	0.63	0.03	0.021
864050	IQD	DISS	7.700012	0.09766	0.76	0.56	0.03	
965360	IQD	DISS	8	0.09454	0.53	0.6	0.02	0.014
642060	IQD	DISS	10.00001	0.097972	1.74	0.33	0.02	
948780	QD	DISS	11.3	0.098284	1.22	0.4	0.02	
642070	IQD	DISS	5.5	0.097972	0.92	0.59	0.03	0.017
948050	IQD	DISS	7.700012	0.098284	0.86	0.6	0.02	
819910	IQD	DISS	11.5	0.098284	2.75	0.34	0.01	

INCO assay data

948640	IQD	DISS	10	0.097972	1.14	0.51	0.03	0
864270	QD	DISS	5.5	0.098284	1.79	0.3	0.02	0.018
662460	QD	DISS	10	0.098284	1.32	0.58	0.03	
662580	IQD	DISS	11.59998	0.098596	0.59	0.58	0.03	
864130	IQD	DISS	11.60001	0.099532	1.01	0.53	0.01	
662500	IQD	DISS	13.5	0.098908	1.02	0.53	0.03	
819930	IQD	DISS	10.60001	0.098596	1.44	0.46	0.03	
642060	IQD	DISS	4.5	0.098908	1.26	0.52	0.03	
864020	QD	DISS	2.299988	0.101404	0.46	0.46	0.02	
662510	IQD	DISS	8.199997	0.098908	1.66	0.65	0.04	
819860	QD	DISS	10	0.098596	1.46	0.53	0.03	0.013
948640	IQD	DISS	10.60001	0.09922	0.68	0.66	0.04	0.005
642060	IQD	DISS	9.199997	0.099532	2.48	0.39	0.03	
864060	IQD	DISS	13.10001	0.099532	1.5	0.52	0.03	
662500	IQD	DISS	6.700005	0.100156	0.9	0.6	0.03	
1019660	QD	DISS	14.3	0.097972	3.29	0.92	0.03	
662430	IQD	DISS	10	0.100156	1.82	0.6	0.03	
864060	IQD	DISS	5.600006	0.100156	1.34	0.46	0.03	
955790	QD	DISS	1	0.100156	1.97	1.36	0.04	0.038
980850	QD	DISS	13.10001	0.0961	1.71	0.58	0.03	0.011
642070	IQD	DISS	5	0.100468	1.14	0.73	0.04	0.017
965350	QD	DISS	2.400024	0.097348	0.79	1.02	0.04	0.09
955220	QD	DISS	10.2	0.10078	0.29	0.8	0.04	
955220	QD	DISS	6.800003	0.101404	0.74	0.77	0.03	
955220	QD	DISS	10	0.101092	0.61	0.78	0.04	
864060	IQD	DISS	3	0.102652	0.68	0.38	0.01	
955010	QD	DISS	3.699997	0.101716	1.6	0.54	0.03	0.011
662500	IQD	DISS	10.89999	0.101716	1.25	0.78	0.04	
864060	IQD	DISS	10.79999	0.102028	1.24	0.58	0.03	
948820	QD	DISS	6.800003	0.10234	1.08	0.55	0.03	
864050	IQD	DISS	7.299988	0.102028	2.42	0.64	0.03	
662510	IQD	DISS	5.199997	0.102028	1.57	0.74	0.04	
948300	IQD	DISS	10.10001	0.103588	1.7	0.68	0.03	
889370	IQD	DISS	9.800003	0.102652	1.04	0.84	0.03	
922120	IQD	DISS	7.5	0.10234	1.21	0.91	0.05	
662500	IQD	DISS	12.7	0.103276	1.62	0.8	0.04	
662420	IQD	DISS	7.000015	0.102652	1.11	0.99	0.05	0.018
948600	IQD	DISS	8.699997	0.103588	0.68	0.94	0.04	0.005
901630	QD	DISS	1.399994	0.1039	0.87	0.99	0.03	
662400	QD	DISS	3.199997	0.102652	0.57	1.14	0.05	0.016
642060	IQD	DISS	7.400002	0.1039	1.7	0.82	0.04	
955190	QD	DISS	2.699997	0.105772	0.58	0.92	0	0.007
948810	QD	DISS	9.599998	0.1039	2.28	0.57	0.04	
819930	IQD	DISS	5.899994	0.102964	5.7	0.5	0.03	
864060	IQD	DISS	10	0.106084	1.3	0.86	0.03	
662500	IQD	DISS	13.10001	0.106708	3.64	1.05	0.05	
948600	IQD	DISS	6.5	0.106708	2.03	1.1	0.05	0.009
662500	IQD	DISS	8.899994	0.106396	1.44	1.18	0.06	
819930	IQD	DISS	9	0.108892	0.94	1.24	0.06	
864060	IQD	DISS	7.200012	0.11014	1.04	1.24	0.05	
901200	IQD	DISS	10.40002	0.107956	2.98	1.28	0.06	
662430	IQD	DISS	11.2	0.110764	1.75	1.54	0.07	

INCO assay data

662430	IQD	DISS	13	0.111076	1.6	1.42	0.07	
819930	IQD	DISS	0.5	0.111388	1.26	1.42	0.07	
662430	IQD	DISS	12.5	0.1117	1.69	1.57	0.07	
980850	QD	DISS	5.199997	0.103276	1.07	1.41	0.07	0
662510	IQD	DISS	7.099998	0.112324	1.87	1.61	0.07	
642060	IQD	DISS	6.599998	0.113261	2.26	1.58	0.07	
662500	IQD	DISS	11.39999	0.112637	0.95	1.76	0.08	
864540	IQD	DISS	2.200012	0.114197	1.29	1.51	0.06	
642060	IQD	DISS	7	0.114197	1.47	1.75	0.07	
819930	IQD	DISS	5	0.114197	0.78	1.54	0.07	
988120	IQD	DISS	9.299995	0.105772	1.76	1.54	0.08	0.006
864140	IQD	DISS	7.799988	0.117317	0.66	2.49	0.09	
819920	QD	DISS	11.5	0.117629	0.64	2.07	0.09	
864130	IQD	DISS	8.399994	0.118565	0.77	2.1	0.07	
864070	IQD	DISS	12.29999	0.115133	2.65	1.89	0.1	
819930	IQD	DISS	8.599976	0.117941	1.28	1.94	0.1	
819930	IQD	DISS	7.799988	0.119189	0.36	2.3	0.11	
864130	IQD	DISS	10	0.121373	0.54	2.27	0.08	
864070	IQD	DISS	10	0.120437	0.7	2.26	0.1	
864060	IQD	DISS	10	0.121685	1.3	1.98	0.08	
819930	IQD	DISS	16.80002	0.121685	0.42	2.46	0.11	
819930	IQD	DISS	14.10001	0.122309	1.06	2.14	0.1	
819930	IQD	DISS	10	0.123869	0.52	2.36	0.11	
864050	IQD	DISS	8.299988	0.129485	0.36	3.02	0.13	
901610	IQD	GPIS	5	0.101716	0.85	0.82	0.04	
901710	IQD	GPIS	6.699982	0.106396	0.41	1.03	0.05	
642070	GPIS	GPIS	6.800003	0.11014	1.28	1.52	0.07	0.023
819910	GPIS	GPIS	8.699997	0.108892	3.64	1.27	0.05	
864010	GPIS	GPIS	9	0.111076	1.8	1.28	0.06	
642060	GPIS	GPIS	10	0.111388	1	1.55	0.07	
819860	GPIS	GPIS	10	0.111076	1.5	1.56	0.07	0.008
864070	GPIS	GPIS	9.600006	0.112949	1.98	1.92	0.09	
642070	GPIS	GPIS	1.900002	0.114197	1.84	2.09	0.09	0.004
642060	GPIS	GPIS	2.400002	0.113885	0.96	1.72	0.08	
864020	GPIS	GPIS	8.399994	0.116069	1.25	1.85	0.08	
819880	GPIS	GPIS	7.5	0.114197	2.05	1.83	0.09	
642060	GPIS	GPIS	10	0.116693	1.31	2.06	0.09	
819860	GPIS	GPIS	10.79999	0.114821	1.61	2.02	0.09	0.029
642070	GPIS	GPIS	10	0.116693	0.58	2.2	0.1	0.02
642070	GPIS	GPIS	9.900002	0.117317	0.52	2.07	0.09	0.014
662430	GPIS	GPIS	12.5	0.117941	1.43	2.24	0.11	
819900	GPIS	GPIS	11	0.118253	2.79	1.83	0.08	
864070	GPIS	GPIS	6	0.122309	0.88	2.7	0.15	
864960	GPIS	GPIS	7.899994	0.125117	1.34	2.28	0.09	
819910	GPIS	GPIS	9.100006	0.124805	2.17	2.91	0.12	
642060	GPIS	GPIS	4	0.125429	0.33	2.67	0.12	
819880	GPIS	GPIS	3.100006	0.125429	1.12	2.9	0.13	
819900	GPIS	GPIS	11.10001	0.130733	0.89	3.3	0.14	
642060	GPIS	GPIS	1.5	0.137286	0.14	3.89	0.16	
988180	INMS	INMS	4.800049	0.109516	1.07	1.98	0.08	0.02
901640	IQD	INMS	5.399994	0.093292	0.27	0.14	0.01	
901640	IQD	INMS	4.600006	0.096724	0.72	0.48	0.03	

INCO assay data

948060	INMS	INMS	1	0.100468	5.48	0.39	0.02	
901640	IQD	INMS	6.700012	0.101092	0.49	0.75	0.04	
980570	INMS	INMS	8.5	0.097348	0.83	0.81	0.04	0.011
901960	AMPH	INMS	1.5	0.099532	3.22	0.93	0.05	
901610	IQD	INMS	6.5	0.103276	1.08	0.85	0.04	
948060	INMS	INMS	0.199982	0.103588	2.22	0.85	0.03	
901640	IQD	INMS	5	0.103588	0.66	0.88	0.04	
901740	AMPH	INMS	3.200012	0.104524	1.08	0.66	0.02	
948020	INMS	INMS	1.599999	0.1039	1.96	0.4	0.03	0
1019660	INMS	INMS	7.300003	0.101404	2.77	1.43	0.04	
901910	INMS	INMS	0.400024	0.1039	0.97	1.19	0.05	
922150	INMS	INMS	0.399994	0.107332	9.73	0.42	0.04	
988100	INMS	INMS	2.199997	0.105772	6.5	1.06	0.05	0.013
948010	INMS	INMS	8	0.106396	0.98	1.17	0.05	
922160	INMS	INMS	0.400024	0.106396	0.07	2.13	0.07	
922260	INMS	INMS	0.600006	0.10858	5.79	1.17	0.05	
922150	INMS	INMS	0.700012	0.108268	0.83	1.32	0.05	
901950	STRT	INMS	10.89999	0.10858	0.72	1.3	0.05	
819910	INMS	INMS	13.3	0.10546	3.82	1	0.04	
1019650	INMS	INMS	6.200012	0.112324	13.15	0.62	0.04	
922480	INMS	INMS	8.5	0.109828	1.32	1.29	0.06	
901820	INMS	INMS	5.200012	0.11014	1.25	1.27	0.06	
980280	INMS	INMS	1.699951	0.111388	7.75	3.34	0.12	0.021
1019650	INMS	INMS	14.90001	0.105772	2.57	2.3	0.06	
922110	INMS	INMS	9.299988	0.109516	2.81	1.39	0.06	
948830	INMS	INMS	3.099991	0.110452	2.1	1.54	0.08	
864010	INMS	INMS	10	0.1117	2.42	1.84	0.08	
988640	INMS	INMS	4.800003	0.109516	4.62	2.11	0.05	
864010	INMS	INMS	10	0.111388	1.36	1.52	0.07	
864520	INMS	INMS	9.199997	0.112324	1.18	1.63	0.07	
965940	INMS	INMS	15.79993	0.107332	3.1	3.02	0.07	0.073
948300	INMS	INMS	11.20001	0.115757	2.95	1.49	0.07	
889370	IQD	INMS	5.699997	0.113885	0.44	1.76	0.07	
955200	INMS	INMS	0.5	0.113573	0.16	1.73	0.09	0.009
864980	INMS	INMS	11.3	0.114197	1.72	1.54	0.07	
889140	INMS	INMS	9.099991	0.114821	0.98	1.7	0.07	
901820	INMS	INMS	6.399994	0.114197	1.19	1.68	0.08	
901870	IQD	INMS	6.5	0.115133	1.51	1.66	0.08	
980460	INMS	INMS	2	0.111388	2.92	3.86	0.07	0.033
988150	INMS	INMS	1.199951	0.113261	1.74	1.92	0.49	0
864010	INMS	INMS	3.399994	0.117005	5.86	1.72	0.08	
922220	INMS	INMS	0.800003	0.116069	0.54	2.4	0.08	
901740	INMS	INMS	2.400024	0.121685	11.3	1.2	0.05	
988010	INMS	INMS	3.899994	0.109828	3.99	1.53	0.08	0.008
901710	INMS	INMS	0.399994	0.115757	0.32	2.02	0.09	
955840	INMS	INMS	0.899994	0.1117	0.25	3.89	0.11	0.007
819910	INMS	INMS	9.899994	0.116693	3.54	1.92	0.08	
864010	INMS	INMS	6.099976	0.117629	1.64	1.9	0.09	
901740	INMS	INMS	2.799988	0.115133	2.82	1.36	0.06	
889190	INMS	INMS	11.3	0.117941	0.62	2.35	0.09	
948780	INMS	INMS	10	0.117005	1.04	2.08	0.11	
980970	INMS	INMS	10.2	0.110452	2.76	1.89	0.09	0.006

INCO assay data

988010	INMS	INMS	9.699997	0.11014	2.99	1.72	0.08	0.007
889570	INMS	INMS	4.099976	0.118565	1.08	1.93	0.08	
988120	INMS	INMS	5.400002	0.112949	0.32	2.3	0.11	0.029
901910	INMS	INMS	2	0.118877	0.2	3.13	0.09	
988500	INMS	INMS	10.80005	0.10702	2.66	1.51	0.07	0.012
980970	INMS	INMS	12.10001	0.110764	1.01	2.13	0.1	0.007
948780	INMS	INMS	6	0.117941	1.2	2.13	0.11	
980960	INMS	INMS	10	0.110764	1.19	2.12	0.1	0.01
980960	INMS	INMS	8.899994	0.109828	2.03	1.91	0.09	0.006
955020	INMS	INMS	7.300003	0.118877	0.96	1.83	0.09	0.007
948810	INMS	INMS	2.5	0.118565	1.24	1.93	0.1	
988200	INMS	INMS	10	0.11014	1.25	2	0.09	
819140	INMS	INMS	2.399994	0.117629	0.52	3.17	0.14	
1019620	INMS	INMS	0.599991	0.120749	3.48	5.84	0.07	
948330	INMS	INMS	8	0.119189	0.61	2.07	0.1	
948310	INMS	INMS	0.800003	0.128549	11.08	1.38	0.09	
889570	INMS	INMS	1.600006	0.120125	4.43	1.85	0.07	
965940	INMS	INMS	3	0.125117	14.65	2.84	0.11	0.079
889140	INMS	INMS	15	0.120125	1.18	2.14	0.08	
955020	INMS	INMS	13.89999	0.119501	0.45	2.29	0.11	0.018
988450	INMS	INMS	2.600006	0.116069	6.43	1.41	0.08	
948330	INMS	INMS	10.5	0.120125	1.11	2.15	0.1	
889140	INMS	INMS	15	0.121061	0.84	2.23	0.08	
662440	INMS	INMS	13.3	0.118253	0.63	2.5	0.12	
980960	INMS	INMS	10	0.115445	3.33	2.14	0.1	0.013
889190	INMS	INMS	11.8	0.121061	1.21	2.47	0.1	
662580	INMS	INMS	14	0.119189	0.72	2.31	0.1	
980960	INMS	INMS	11	0.113573	0.77	2.34	0.11	0.01
955270	INMS	INMS	1.899994	0.113885	0.24	2.66	0.28	
980010	INMS	INMS	10	0.114197	0.85	2.37	0.11	0.01
980970	INMS	INMS	10.89999	0.113573	1.68	2.25	0.1	0.008
922210	INMS	INMS	0.399994	0.13791	0.07	4.37	0.11	
980800	INMS	INMS	10	0.115445	1.99	2.34	0.11	0.014
980010	INMS	INMS	9.199951	0.113885	2.6	2.08	0.1	0.014
980980	INMS	INMS	12	0.116069	1.2	2.38	0.11	0.01
980960	INMS	INMS	12	0.114509	2.74	2.18	0.1	0.012
966000	INMS	INMS	10.19995	0.113885	1.07	2.34	0.11	0.029
980960	INMS	INMS	10	0.114197	2.14	2.19	0.1	0.021
980960	INMS	INMS	10	0.116693	3.19	2.32	0.11	0.018
988200	INMS	INMS	13	0.114509	1.99	2.3	0.11	
980970	INMS	INMS	9	0.115445	3.15	2.23	0.11	0.022
901730	IQD	INMS	8	0.123245	0.99	2.07	0.09	
980970	INMS	INMS	13.79999	0.114509	1.36	2.41	0.11	0.011
988190	INMS	INMS	10	0.116693	2.91	2.34	0.11	
662500	INMS	INMS	13.09999	0.121061	1.05	2.58	0.11	
965230	INMS	INMS	2.099991	0.117629	0.2	4.19	0.1	0.005
980810	SUBX	INMS	5.200012	0.114197	0.46	2.46	0.11	0.008
966000	INMS	INMS	10	0.115133	1.63	2.38	0.11	0.007
980970	INMS	INMS	10	0.115757	2.67	2.26	0.11	0.004
980810	INMS	INMS	11	0.117317	2.09	2.39	0.11	0.009
988100	INMS	INMS	11	0.116381	1.16	2.47	0.11	0.009
980980	INMS	INMS	10	0.117629	0.45	2.59	0.11	0

INCO assay data

980970	INMS	INMS	11.80002	0.114197	1.23	2.37	0.11	0.012
980960	INMS	INMS	13	0.117005	2.68	2.42	0.11	0.005
901740	STR	INMS	5	0.123869	0.46	2.56	0.11	
922100	INMS	INMS	2.600006	0.123557	0.53	2.48	0.11	
948500	INMS	INMS	9.400024	0.123557	2.06	2.4	0.11	
988190	INMS	INMS	10	0.116069	0.51	2.56	0.12	
980970	INMS	INMS	11	0.117629	3.38	2.34	0.11	0.014
980980	INMS	INMS	10	0.116381	1.1	2.53	0.12	0.008
901870	IQD	INMS	0.800003	0.123245	0.68	2.73	0.13	
980960	INMS	INMS	10	0.116069	1.08	2.53	0.11	0.005
948640	INMS	INMS	10	0.123557	1.11	2.51	0.12	0.053
988100	INMS	INMS	12	0.116069	0.81	2.49	0.11	0.007
980010	INMS	INMS	12.40002	0.116381	3.84	2.22	0.1	0.01
988200	INMS	INMS	10	0.116693	1.56	2.42	0.11	
980970	INMS	INMS	9.5	0.117005	2.34	2.38	0.11	0.014
980970	INMS	INMS	14	0.117005	2.05	2.43	0.11	0.009
980810	INMS	INMS	11.5	0.116693	1.48	2.43	0.12	0.008
988010	INMS	INMS	6.400009	0.114197	1.51	2.18	0.1	0
980970	INMS	INMS	12	0.116381	1.66	2.43	0.11	0.006
980970	INMS	INMS	10	0.115133	2.01	2.33	0.11	0.018
980970	INMS	INMS	8	0.116693	0.93	2.54	0.12	0.011
948350	INMS	INMS	7.399963	0.125117	0.99	2.46	0.11	
980810	INMS	INMS	9.399994	0.118565	1.16	2.68	0.12	0
980970	INMS	INMS	12	0.116069	1.55	2.46	0.11	0.007
864540	INMS	INMS	6.899994	0.125117	0.82	2.61	0.11	
980960	INMS	INMS	12	0.118253	1.46	2.59	0.12	0.012
966000	INMS	INMS	10	0.119501	2.45	2.53	0.11	0.018
980970	INMS	INMS	9.5	0.116381	1.15	2.53	0.12	0.007
988190	INMS	INMS	10	0.117629	1.18	2.64	0.12	
955810	INMS	INMS	0.5	0.128549	0.08	5.23	0.14	
988100	INMS	INMS	12.3	0.119189	1.13	2.68	0.12	0.008
980810	INMS	INMS	11.5	0.118253	1.1	2.61	0.12	0.018
948350	INMS	INMS	8.099976	0.126053	0.84	2.4	0.11	
988190	INMS	INMS	10	0.117629	0.84	2.63	0.12	
980800	INMS	INMS	11.5	0.119501	1.59	2.6	0.12	0.022
864150	INMS	INMS	4	0.126989	0.78	3.13	0.1	
980960	INMS	INMS	12	0.119501	1.06	2.67	0.12	0.018
889260	INMS	INMS	9.199997	0.125429	1.54	2.49	0.1	
948820	INMS	INMS	1.699997	0.126053	0.16	2.58	0.13	
980970	INMS	INMS	10	0.117941	2.21	2.54	0.12	0.006
980810	INMS	INMS	14.60001	0.119189	0.74	2.7	0.14	0.011
980960	INMS	INMS	13	0.119189	1.59	2.59	0.12	0.019
988510	INMS	INMS	12	0.121373	0.96	2.83	0.13	0.007
966000	INMS	INMS	10	0.119189	1.38	2.63	0.12	0.018
955320	INMS	INMS	0.800018	0.128237	0.1	3.08	0.09	
980010	INMS	INMS	9.900024	0.122309	2.32	2.7	0.12	0.024
988100	INMS	INMS	12.7	0.118565	0.75	2.68	0.12	0.006
922270	INMS	INMS	10.39999	0.126677	1.7	2.29	0.11	
948500	INMS	INMS	9.5	0.126365	0.66	2.75	0.13	
980810	INMS	INMS	13	0.120749	1.08	2.79	0.13	0.01
980960	INMS	INMS	8.699997	0.117317	1.22	2.45	0.11	0.016
980960	INMS	INMS	13	0.119189	1.66	2.74	0.12	0.008

INCO assay data

955020	INMS	INMS	5.599991	0.127301	0.46	2.58	0.12	0.009
980960	INMS	INMS	10	0.120437	1.45	2.77	0.13	0
819910	INMS	INMS	2.5	0.127301	0.32	2.93	0.13	
988200	INMS	INMS	10	0.118877	1.3	2.66	0.12	
988510	INMS	INMS	12.5	0.123245	1.2	2.95	0.13	0.005
980010	INMS	INMS	10	0.123869	1.3	2.82	0.13	0.014
980800	INMS	INMS	12	0.120437	0.87	2.83	0.13	0.006
988510	INMS	INMS	12	0.123245	2.04	2.76	0.12	0.01
819920	INMS	INMS	6.199997	0.128549	0.34	3.05	0.14	
966000	INMS	INMS	10	0.121061	1.6	2.87	0.13	0
966000	INMS	INMS	10	0.123557	1.59	2.96	0.13	0
980960	INMS	INMS	10	0.122309	1.55	2.86	0.13	0
980010	INMS	INMS	7.599976	0.126053	1.95	3.03	0.14	0.015
948350	INMS	INMS	5.299988	0.129797	0.18	2.72	0.13	
966000	INMS	INMS	10	0.122621	2.42	2.79	0.13	0.017
864060	INMS	INMS	1.399994	0.131045	0.58	2.96	0.12	
988200	INMS	INMS	1.099998	0.123245	0.55	3.02	0.14	
988510	INMS	INMS	11	0.125741	1.19	3.06	0.14	0.027
980800	INMS	INMS	12.5	0.123869	0.74	3	0.14	0.015
922270	INMS	INMS	9.5	0.131669	0.43	2.85	0.13	
948020	INMS	INMS	2.400009	0.132293	0.37	2.51	0.12	0
988510	MASU	INMS	14.5	0.127301	0.81	3.26	0.15	0.005
889030	INMS	INMS	4.300003	0.134789	0.2	3.81	0.15	
980860	INMS	INMS	10	0.122309	0.58	2.92	0.13	0.004
948020	INMS	INMS	1.699997	0.131357	0.35	2.83	0.15	0
662510	INMS	INMS	3.900002	0.129173	0.41	3.3	0.15	
980810	INMS	INMS	14	0.127925	0.9	3.32	0.15	0
864990	INMS	INMS	14	0.133229	0.64	3.16	0.13	
980860	INMS	INMS	2.199997	0.125117	0.2	3.28	0.15	0
980810	INMS	INMS	12	0.127301	0.77	3.16	0.14	0.011
966000	INMS	INMS	10	0.128237	0.99	3.28	0.15	0.013
980010	INMS	INMS	11	0.130421	2.27	3.13	0.14	0.015
966000	INMS	INMS	10	0.126365	0.88	3.17	0.14	0.008
980010	INMS	INMS	10	0.130421	1.52	3.29	0.15	0.012
980810	INMS	INMS	10.89999	0.128237	1.28	3.23	0.14	0.006
980010	INMS	INMS	10	0.124805	1.3	3.1	0.14	0.053
980810	INMS	INMS	10	0.128237	0.87	3.36	0.15	0.008
642060	INMS	INMS	1.099998	0.134477	0.32	3.63	0.17	
901200	INMS	INMS	9.099976	0.133541	0.21	3.43	0.16	
901830	INMS	INMS	11.39999	0.133853	0.47	3.23	0.15	
980010	INMS	INMS	8.5	0.128549	1.24	3.13	0.14	0
864110	INMS	INMS	2.699997	0.133853	0.34	3.54	0.16	
889130	INMS	INMS	4.900002	0.134789	0.18	3.29	0.14	
980810	INMS	INMS	12.10001	0.130109	0.72	3.45	0.16	0
864010	INMS	INMS	1.700012	0.135101	0.9	3.36	0.14	
642060	INMS	INMS	3.399994	0.136349	0.3	3.68	0.15	
966000	INMS	INMS	8.599976	0.125429	1.85	2.99	0.13	0.019
864050	INMS	INMS	1.199997	0.132605	0.82	3.74	0.18	
642060	INMS	INMS	1.5	0.137286	0.13	3.86	0.16	
980800	INMS	INMS	13	0.128861	1.3	3.31	0.15	0.018
980010	INMS	INMS	8	0.135413	0.75	3.59	0.16	0
980010	INMS	INMS	10	0.130421	1.23	3.31	0.15	0

INCO assay data

966000	INMS	INMS	5.300049	0.126677	1.16	3.29	0.15	0.005
988350	INMS	INMS	1.200005	0.141654	0.49	5.01	0.12	
988210	INMS	INMS	10.5	0.125117	0.64	3.04	0.14	
864410	IQD	INSU	9.5	0.090796	0.1	0.04	0	
864410	IQD	INSU	6.899963	0.090484	0.16	0.1	0.01	
819140	QD	INSU	7.100006	0.090172	0.99	0.24	0.01	
901630	QD	INSU	5.300003	0.090172	0.94	0.12	0.01	
864410	IQD	INSU	8	0.091732	0.28	0.16	0.01	
864410	IQD	INSU	7.5	0.092044	0.42	0.1	0.01	
889140	IQD	INSU	5.299988	0.092044	0.44	0.1	0	
889280	IQD	INSU	4.800003	0.091732	0.32	0.18	0.01	
889280	QD	INSU	3.199997	0.092356	0.24	0.18	0.01	
889570	QD	INSU	9.100006	0.092044	0.64	0.12	0	
889370	IQD	INSU	3.799988	0.092668	0.3	0.16	0.01	
889570	QD	INSU	9.299988	0.092044	1.01	0.14	0.01	
864540	QD	INSU	7.299988	0.093292	0.42	0.1	0.01	
901640	IQD	INSU	5	0.09298	0.67	0.12	0.01	
889370	IQD	INSU	6.5	0.092668	0.64	0.16	0.01	
889140	IQD	INSU	4.199997	0.092668	0.94	0.12	0.01	
889280	IQD	INSU	6.299995	0.093604	0.16	0.2	0.01	
889140	IQD	INSU	2.700012	0.092668	0.54	0.28	0.01	
889570	QD	INSU	2.299988	0.093604	0.6	0.14	0.01	
889130	QD	INSU	4.700005	0.094228	0.4	0.14	0.02	
922200	QD	INSU	4.5	0.093292	1.18	0.26	0.01	
901940	IQD	INSU	15.69998	0.09454	0.46	0.12	0	
864540	QD	INSU	1.200012	0.093292	1.79	0.2	0.01	
819880	QD	INSU	2.5	0.093916	0.32	0.09	0.01	
819140	QD	INSU	1.700012	0.093292	1.11	0.29	0.02	
889370	IQD	INSU	3.599976	0.094228	0.66	0.26	0.01	
901650	IQD	INSU	10	0.093916	0.97	0.19	0.01	
864110	IQD	INSU	5	0.0961	0.3	0.08	0.01	
864110	IQD	INSU	6.399994	0.093916	0.88	0.18	0.02	
901930	IQD	INSU	10.5	0.095164	0.63	0.26	0.01	
922180	IQD	INSU	3.5	0.09454	1.07	0.23	0.01	
955830	QD	INSU	10	0.090484	0.27	0.11	0.01	0.008
922200	IQD	INSU	2.400024	0.09454	1.99	0.15	0.01	
889140	IQD	INSU	9.100006	0.095476	0.82	0.3	0.01	
955830	QD	INSU	6.799995	0.09298	1.12	0.5	0.02	0.015
955830	QD	INSU	4.5	0.09298	1.48	0.38	0.02	0.048
864540	IQD	INSU	7.5	0.095788	1.15	0.3	0.01	
889570	QD	INSU	4.099976	0.095788	1.28	0.26	0.01	
955840	IQD	INSU	7.5	0.09298	0.8	0.53	0.02	0.021
955810	QD	INSU	8.199997	0.095476	1.9	0.42	0.02	
889370	IQD	INSU	9.5	0.096412	1.18	0.38	0.02	
864550	IQD	INSU	4.5	0.096412	1.98	0.18	0.01	
819860	QD	INSU	10	0.0961	1.04	0.32	0.02	0.053
889570	QD	INSU	4.300018	0.097348	1.02	0.22	0.01	
819880	QD	INSU	2.899994	0.096412	1.7	0.17	0.02	
864520	QD	INSU	3.800003	0.097036	1.37	0.38	0.02	
965240	IQD	INSU	10	0.09454	0.87	0.77	0.02	
889140	IQD	INSU	8.5	0.09766	1.08	0.36	0.01	
864070	IQD	INSU	3.200012	0.097036	2.04	0.38	0.03	

INCO assay data

901940	IQD	INSU	5	0.09766	1.71	0.36	0.02	
901870	IQD	INSU	8.5	0.098284	1.29	0.35	0.02	
864250	QD	INSU	6.799988	0.098908	1.8	0.4	0.02	
901870	IQD	INSU	8.5	0.098908	1.31	0.46	0.02	
864010	QD	INSU	5.100006	0.09922	1.12	0.38	0.02	
965240	IQD	INSU	7.399994	0.093916	0.94	1.21	0.02	
819930	IQD	INSU	11.80002	0.09922	3.5	0.3	0.03	
889130	IQD	INSU	12.3	0.10078	1.72	0.52	0.02	
901650	QD	INSU	10	0.10078	1.5	0.52	0.03	
901870	IQD	INSU	10	0.10234	1.57	0.61	0.03	
889130	IQD	INSU	6.800003	0.102652	1.44	0.62	0.03	
819880	QD	INSU	4.799988	0.101716	1.48	0.52	0.03	
922270	IQD	INSU	6.299988	0.103276	1.89	0.55	0.03	
889140	IQD	INSU	14.3	0.105148	3.19	0.6	0.03	
819140	QD	INSU	5.399994	0.106708	0.58	1.8	0.08	
819880	QD	INSU	3	0.106084	2.93	0.86	0.04	
901790	IQD	INSU	5	0.109204	1.28	1.19	0.05	
864020	QD	INSU	7.400024	0.11014	1.15	1.33	0.06	
864020	QD	INSU	7.900024	0.114197	1.21	1.79	0.08	
864110	IQD	INSU	6	0.117629	1.62	1.96	0.09	
864260	MASS	MASS	5.100006	0.140406	0.2	4.01	0.16	
955800	MASU	MASU	1.199997	0.102964	0.06	2.62	0.11	0.076
948600	MASU	MASU	3.200012	0.118253	8.97	1.17	0.05	0.007
980280	MASU	MASU	1.099976	0.124805	22.43	0.6	0.08	0
955790	MASU	MASU	0.699997	0.117317	0.23	3.41	0.12	0.045
955800	MASU	MASU	0.700005	0.122933	0.26	4.76	0.11	0.022
980270	MASU	MASU	1	0.134477	27.79	0.64	0.03	0
922210	MASU	MASU	2.600006	0.137598	0.71	5.72	0.09	
988620	MASU	MASU	1.800003	0.133541	24.07	1.58	0.05	
948600	STRT	MASU	11.39999	0.128237	1.35	2.96	0.13	0.008
819140	MASU	MASU	5.699982	0.124493	0.18	3.58	0.16	
948600	MASU	MASU	5.899994	0.124181	1.86	2.32	0.1	0.008
819140	MASU	MASU	6.100006	0.124493	0.17	3.56	0.16	
901910	MASU	MASU	0.5	0.129485	0.1	3.63	0.1	
980270	MASU	MASU	5.200012	0.140718	12.05	5.47	0.12	0.315
980020	MASU	MASU	9	0.122933	1.54	2.96	0.14	0
948510	MASU	MASU	1.399963	0.132917	0.09	3.34	0.15	
980020	MASU	MASU	10	0.126053	1.56	3.01	0.14	0
864990	MASU	MASU	16	0.133853	0.73	3.25	0.14	
980020	MASU	MASU	10	0.128549	1.64	3.25	0.15	0.006
988610	MASU	MASU	5.5	0.137286	5.47	3.07	0.1	
864550	MASU	MASU	5.599998	0.138222	0.4	3.38	0.13	
864530	MASU	MASU	1	0.141342	0.06	4.3	0.18	
980010	MASU	MASU	10	0.135725	0.71	3.65	0.17	0.01
642060	MASU	MASU	2.299995	0.14103	0.17	4.24	0.2	
922270	MASU	MASU	8.800018	0.139782	0.4	3.35	0.15	
988120	MASU	MASU	10.7	0.134789	0.24	3.68	0.17	0
988200	MASU	MASU	1.099998	0.136661	0.52	3.63	0.17	
662400	MASU	MASU	14.40001	0.136973	0.59	3.79	0.17	0.005
922170	MASU	MASU	1.300003	0.141342	0.11	3.53	0.15	
922180	MASU	MASU	5.400009	0.141966	0.22	3.39	0.14	
980020	MASU	MASU	10	0.136973	0.76	3.93	0.18	0

INCO assay data

988190	MASU	MASU	1.300003	0.138222	0.91	3.7	0.18	
980850	MASU	MASU	5.300003	0.131669	0.29	3.55	0.16	0
922270	MASU	MASU	4	0.143214	0.15	3.9	0.18	
901960	IQD	RGDI	1.200012	0.089548	0.96	0.13	0.01	
901790	QTZ	RGDI	1.700012	0.089236	0.28	0.42	0.02	
901870	IQD	RGDI	6.799988	0.092668	0.37	0.1	0.01	
889370	IQD	RGDI	1.700012	0.093292	0.28	0.1	0.01	
965350	IQD	RGDI	9.099976	0.09142	0.37	0.22	0.01	0.013
901880	QTZ	RGDI	1.199997	0.091732	2.21	0.54	0.03	
948510	IQD	RGDI	8.5	0.093916	0.51	0.17	0.01	
965350	IQD	RGDI	4.5	0.092044	0.45	0.3	0.02	0.016
901790	IQD	RGDI	4.300018	0.09454	0.63	0.28	0.01	
901800	IQD	RGDI	10	0.095788	0.47	0.32	0.02	
864260	IQD	RGDI	14.20001	0.095476	0.3	0.42	0.02	
955830	QD	RGDI	8.199997	0.093292	1.34	0.49	0.02	0.013
864260	IQD	RGDI	14.79999	0.095788	0.38	0.44	0.02	
922230	DSQD	RGDI	9.200012	0.096724	0.34	0.36	0.02	
901800	IQD	RGDI	3.900024	0.097036	0.3	0.4	0.02	
922160	IQD	RGDI	8.899994	0.096724	0.62	0.41	0.02	
901810	IQD	RGDI	5.5	0.097036	1.2	0.36	0.02	
922260	IQD	RGDI	4.100006	0.097036	0.86	0.47	0.02	
864270	IQD	RGDI	7.399994	0.098284	0.5	0.42	0.02	0.004
901880	IQD	RGDI	5.200012	0.097348	0.51	0.56	0.03	
901960	IQD	RGDI	6.799988	0.097036	0.91	0.99	0.04	
901600	IQD	RGDI	5	0.098596	0.33	0.52	0.02	
901600	IQD	RGDI	4.5	0.09922	0.19	0.48	0.02	
965350	IQD	RGDI	6.900024	0.094852	1.07	0.6	0.03	0.018
955200	QD	RGDI	5.5	0.09766	0.88	0.5	0.03	0.006
864270	IQD	RGDI	10	0.098908	0.38	0.56	0.03	0.002
922160	IQD	RGDI	11.10001	0.09922	0.33	0.54	0.03	
901910	IQD	RGDI	2.100006	0.098284	0.93	0.65	0.03	
955210	QD	RGDI	3.5	0.098284	0.83	0.53	0.03	0.01
889280	IQD	RGDI	15.3	0.098596	0.81	0.79	0.03	
922200	IQD	RGDI	3.200012	0.098596	0.96	0.6	0.03	
955190	QD	RGDI	3	0.100156	0.52	0.61	0	0.004
864270	IQD	RGDI	10.20001	0.099844	0.32	0.6	0.03	0.004
901720	IQD	RGDI	8.299988	0.09922	1.95	0.52	0.02	
922160	IQD	RGDI	5.700012	0.099844	0.31	0.63	0.03	
948510	IQD	RGDI	11.5	0.098908	0.6	0.55	0.03	
948810	IQD	RGDI	12.10001	0.098596	2.07	0.5	0.03	
901910	IQD	RGDI	2	0.09922	0.57	0.69	0.03	
922170	IQD	RGDI	7.700012	0.09922	0.87	0.61	0.03	
901880	IQD	RGDI	2.600006	0.099532	0.54	0.77	0.03	
922160	IQD	RGDI	8	0.099532	0.48	0.66	0.03	
948500	IQD	RGDI	9.400024	0.09922	1.38	0.54	0.03	
901600	IQD	RGDI	6.5	0.10078	0.32	0.6	0.03	
901940	IQD	RGDI	6.700012	0.099844	0.38	0.64	0.03	
922200	IQD	RGDI	5.5	0.099532	1.4	0.55	0.03	
922230	DSQD	RGDI	13.5	0.099532	0.7	0.68	0.04	
955210	QD	RGDI	6.100006	0.10078	0.29	0.71	0.03	0.009
922260	IQD	RGDI	5.899994	0.100156	0.61	0.67	0.03	
955200	QD	RGDI	7.100006	0.100156	0.79	0.67	0.03	0.008

INCO assay data

955210	QD	RGDI	5.600006	0.100468	0.76	0.71	0.03	0.005
901870	IQD	RGDI	3.200012	0.100156	2.03	0.54	0.03	
922270	IQD	RGDI	13.600001	0.100468	2.96	0.38	0.02	
901730	IQD	RGDI	8	0.10078	1.07	0.68	0.03	
901800	IQD	RGDI	6.099976	0.10078	1.59	0.64	0.03	
922260	IQD	RGDI	8.799988	0.101092	0.55	0.77	0.03	
955210	QD	RGDI	5	0.10078	0.45	0.77	0.04	0.008
901790	IQD	RGDI	8.299988	0.10078	1.14	0.77	0.04	
955200	QD	RGDI	4.799988	0.101092	0.64	0.78	0.04	0.006
901650	IQD	RGDI	8	0.101092	0.77	0.79	0.04	
955180	QD	RGDI	7.699997	0.097348	0.58	0.81	0.04	0.006
955180	QD	RGDI	6.699997	0.102964	0.33	0.8	0	0.008
955200	QD	RGDI	1.399994	0.101092	0.56	0.78	0.04	0.008
901810	IQD	RGDI	7.599976	0.101404	0.85	0.83	0.04	
901940	IQD	RGDI	10.600001	0.101716	1.01	0.73	0.03	
948500	IQD	RGDI	5.799988	0.101404	0.76	0.74	0.04	
901630	IQD	RGDI	7	0.101092	0.63	0.79	0.05	
901870	IQD	RGDI	3.899994	0.097972	3.65	0.44	0.02	
901630	IQD	RGDI	4.5	0.102028	0.35	0.84	0.04	
922100	IQD	RGDI	15.5	0.102028	2.57	0.61	0.03	
955180	QD	RGDI	6.800003	0.1039	0.31	0.84	0	0.007
901630	IQD	RGDI	5	0.10234	0.33	0.84	0.04	
901790	IQD	RGDI	3.299988	0.102028	0.65	0.88	0.05	
922170	IQD	RGDI	4.399994	0.10234	0.99	0.96	0.04	
922140	IQD	RGDI	8.100006	0.102652	0.67	0.84	0.04	
922270	IQD	RGDI	12.200001	0.102964	2.89	0.61	0.03	
901610	IQD	RGDI	10	0.103276	1.09	0.93	0.04	
901880	IQD	RGDI	5	0.103276	0.55	0.99	0.04	
955190	QD	RGDI	5.199997	0.105148	0.65	0.9	0	0.005
922180	IQD	RGDI	9.299988	0.103276	1.6	0.73	0.04	
901920	QD	RGDI	6.299988	0.103588	0.75	0.85	0.04	
901930	AMPH	RGDI	3.5	0.097036	1.17	0.96	0.19	
901650	IQD	RGDI	6	0.104212	0.79	1.01	0.04	
901750	QD	RGDI	5	0.104524	2.32	0.92	0.04	
901940	IQD	RGDI	15	0.105148	0.51	1	0.04	
901790	IQD	RGDI	5	0.104836	1.19	1.03	0.05	
901730	IQD	RGDI	4	0.105772	2.81	0.83	0.04	
922140	IQD	RGDI	9.800018	0.10546	0.95	1.08	0.06	
901650	IQD	RGDI	10	0.106084	0.46	1.19	0.05	
901630	IQD	RGDI	0.400024	0.10702	0.14	1.43	0.04	
889370	IQD	RGDI	3.800003	0.106396	1.06	1.14	0.05	
889030	QD	RGDI	6.300003	0.106708	1.71	1	0.04	
901940	QD	RGDI	7.899994	0.106396	1.87	1.01	0.05	
955190	QD	RGDI	5.900009	0.109516	0.59	1.18	0	0.011
889030	QD	RGDI	5.099991	0.107644	1.58	1.16	0.05	
889030	QD	RGDI	9.800003	0.108268	1.17	1.21	0.05	
948510	IQD	RGDI	7.700012	0.106084	2.94	1.08	0.05	
948510	IQD	RGDI	9.400024	0.107332	3.04	1.1	0.05	
922270	IQD	RGDI	7.600006	0.109516	1.6	1.08	0.05	
889030	QD	RGDI	9.300003	0.11014	2.72	0.93	0.04	
948510	IQD	RGDI	9.5	0.109828	2.62	1.19	0.05	
948500	IQD	RGDI	8	0.110452	1.19	1.48	0.07	

INCO assay data

948610	IQD	RGDI	8.899994	0.111388	1.69	1.53	0.08	0.008
901930	AMPH	RGDI	11.29999	0.109204	1.05	0.91	0.13	
922130	QD	RGDI	8.300018	0.113261	1.28	1.62	0.08	
948500	IQD	RGDI	6.699951	0.113885	0.76	1.77	0.08	
901830	IQD	RGDI	6.800049	0.113885	1.7	1.63	0.08	
948640	IQD	RGDI	9.399994	0.114197	0.61	1.82	0.09	0.008
948630	IQD	RGDI	10.30002	0.114821	1.05	1.76	0.08	0.006
901930	AMPH	RGDI	4	0.113261	1.38	1.2	0.11	
922270	IQD	RGDI	10.39999	0.115445	0.68	1.44	0.07	
948510	IQD	RGDI	9.600037	0.115757	1.69	1.65	0.07	
948510	IQD	RGDI	5.599976	0.116381	0.84	1.66	0.07	
948350	IQD	RGDI	8.200012	0.116069	1.54	1.65	0.08	
948630	IQD	RGDI	10	0.117005	2.77	1.94	0.09	0.017
948510	IQD	RGDI	10.39996	0.115757	2.34	1.84	0.08	
948350	QD	RGDI	6.200012	0.118565	5.43	1.68	0.08	
948350	IQD	RGDI	9	0.117005	0.86	1.96	0.09	
901830	IQD	RGDI	6.900024	0.117005	1.38	1.91	0.09	
948630	IQD	RGDI	8.799988	0.117629	1.03	1.96	0.09	0.008
948340	IQD	RGDI	8.5	0.117629	1.33	1.99	0.09	
948510	IQD	RGDI	9.099976	0.117629	0.74	1.89	0.09	
948630	IQD	RGDI	10	0.117317	0.86	2.05	0.1	0.009
901830	IQD	RGDI	11.79999	0.117941	0.75	2.06	0.1	
948630	IQD	RGDI	10	0.117941	0.94	2.15	0.1	0.009
901830	IQD	RGDI	15	0.118253	0.76	2.08	0.1	
901830	IQD	RGDI	7.399963	0.118253	0.74	2	0.1	
922140	IQD	RGDI	11.20001	0.118565	0.48	2.12	0.1	
901740	IQD	RGDI	10	0.119189	0.74	2.18	0.09	
901830	IQD	RGDI	15	0.118565	1.06	2.13	0.1	
948510	IQD	RGDI	9.400024	0.119189	0.49	1.91	0.09	
901830	IQD	RGDI	16.09998	0.118253	1.04	2.15	0.11	
901830	IQD	RGDI	7.799988	0.117941	2.14	2.02	0.1	
948640	IQD	RGDI	10	0.118565	1.32	2.26	0.11	0.007
901750	QD	RGDI	10	0.119501	1.36	2.12	0.1	
948500	IQD	RGDI	7.200012	0.119501	2.64	2.11	0.1	
901830	IQD	RGDI	6.5	0.119501	0.67	2.19	0.11	
948500	IQD	RGDI	11.20001	0.120749	0.84	2.27	0.1	
948340	IQD	RGDI	10	0.121061	1.28	2.34	0.11	
948510	IQD	RGDI	8	0.121685	0.45	2.36	0.11	
948340	IQD	RGDI	7.5	0.121997	0.86	2.32	0.11	
948350	QD	RGDI	10	0.122309	1.97	2.33	0.11	
948510	IQD	RGDI	6.299988	0.124181	0.6	2.4	0.11	
901740	QD	RGDI	10	0.125741	1.14	2.6	0.1	
948500	IQD	RGDI	10.19995	0.126053	1.42	2.53	0.12	
948510	IQD	RGDI	7.299988	0.128549	0.37	2.66	0.12	
922250	IQD	SPK	10	0.091108	0.06	0.05	0.01	
922180	AMPH	SPK	5.599991	0.098596	0.08	0.02	0.01	
988180	QD	SPKS	9	0.08986	0.09	0.05	0.01	0
988180	AMPH	SPKS	5	0.08986	0.06	0.03	0	0
988180	QD	SPKS	5	0.08986	0.06	0.03	0	0
901960	QTZ	SPKS	2.300003	0.085803	0.01	0	0	
864960	GR	SPKS	5.199997	0.085803	0.04	0.02	0	
864020	GR	SPKS	4.899994	0.085803	0.06	0.02	0	

INCO assay data

1019650	MTSD	SPKS	5	0.090172	0.06	0.02	0	
980280	QTZT	SPKS	5	0.08986	0.04	0.03	0	0
819900	GR	SPKS	1.600006	0.085803	0.88	0.06	0.01	
980280	QD	SPKS	5	0.08986	0.06	0.05	0.01	0
901830	AMPH	SPKS	6.099976	0.086427	0.13	0.04	0.01	
819140	QD	SPKS	5	0.087051	0.02	0	0	
819140	QD	SPKS	5.600006	0.087676	0.02	0	0	
922210	IQD	SPKS	5	0.087676	0.07	0.04	0	
922210	IQD	SPKS	3.5	0.087363	0.4	0.05	0	
922210	STRT	SPKS	16.5	0.087676	0.11	0.07	0	
864040	SUBX	SPKS	1.600006	0.087363	0.36	0.04	0.01	
922250	QD	SPKS	5	0.087988	0.05	0.03	0.01	
901960	IQD	SPKS	5.600006	0.0883	0.02	0.02	0	
901960	IQD	SPKS	9	0.087988	0.03	0.02	0.01	
901200	MTSD	SPKS	2.5	0.0883	0.08	0.06	0.01	
901960	IQD	SPKS	6.200012	0.089236	0.02	0.02	0	
948990	QD	SPKS	6	0.088924	0.04	0.03	0	
901960	IQD	SPKS	7.5	0.088924	0.14	0.02	0	
980280	QTZT	SPKS	5	0.090172	0.21	0.04	0	0.006
889130	SHR	SPKS	5.400009	0.089236	0.06	0.02	0	
864410	IQD	SPKS	3.700012	0.089236	0.06	0.04	0	
955220	QD	SPKS	4.899994	0.089236	0.03	0.02	0.01	
965350	QD	SPKS	10.5	0.08986	0.02	0.02	0	0
965350	IQD	SPKS	8.900024	0.08986	0.01	0.02	0	0
901830	QD	SPKS	10	0.089236	0.08	0.04	0	
965190	QD	SPKS	10.6	0.090172	0.03	0.06	0	0
901830	QD	SPKS	15	0.089548	0.01	0	0	
922150	IQD	SPKS	12.70001	0.089548	0.04	0.03	0	
889030	QD	SPKS	7.5	0.08986	0.04	0	0	
948050	QD	SPKS	9.700012	0.089548	0.1	0.09	0	
955800	QD	SPKS	8.900002	0.089548	0.1	0.05	0.01	0
980460	IQD	SPKS	7.199951	0.08986	0.05	0.02	0	0
948820	QD	SPKS	5	0.089548	0.11	0.03	0	
922240	QD	SPKS	4.800003	0.089548	0.15	0.04	0.01	
1019650	QD	SPKS	24	0.090172	0.22	0.03	0	
901910	QD	SPKS	10.29999	0.08986	0.02	0.02	0	
948060	QD	SPKS	8.200012	0.08986	0.11	0.03	0	
901630	QD	SPKS	11.5	0.08986	0.11	0.03	0	
864400	IQD	SPKS	12.89999	0.08986	0.02	0.02	0	
864070	QD	SPKS	4.300018	0.090172	0	0.02	0	
864150	QD	SPKS	2.800003	0.08986	0.06	0.04	0	
922150	IQD	SPKS	5.599976	0.08986	0.03	0.04	0	
955810	QD	SPKS	3.300003	0.08986	0.12	0.04	0	
955960	QD	SPKS	12.2	0.090172	0.02	0.02	0	0
922260	QD	SPKS	4.799988	0.08986	0.15	0.04	0	
988240	QD	SPKS	5	0.090172	0.06	0.03	0.01	
965150	QD	SPKS	6.5	0.090172	0.16	0.04	0.01	0
901910	QD	SPKS	25	0.090172	0.03	0.03	0	
948810	QD	SPKS	7.300003	0.08986	0.14	0.02	0	
988640	QD	SPKS	5	0.08986	0.1	0.04	0	
955320	STRT	SPKS	6	0.089548	0.06	0.16	0.01	
965350	QD	SPKS	12.90002	0.090172	0.06	0.04	0	0

INCO assay data

864980	QD	SPKS	2.099998	0.090172	0.08	0.04	0	
922200	QD	SPKS	10.20001	0.090172	0.06	0.02	0	
965740	QD	SPKS	5	0.090172	0.13	0.05	0.01	
965410	QD	SPKS	10	0.090172	0.07	0.04	0	
988150	QD	SPKS	5	0.090172	0.19	0.04	0	0
965350	IQD	SPKS	10.19995	0.08986	0.01	0.03	0	0
922210	IQD	SPKS	5.099991	0.090172	0.07	0.05	0	
955020	QD	SPKS	4.600006	0.090172	0.08	0.03	0	0
889140	QD	SPKS	8.599991	0.090172	0.04	0.02	0	
901600	AMPH	SPKS	5.300003	0.090172	0.18	0.04	0	
948060	QD	SPKS	1.600006	0.090172	0.07	0.03	0	
948970	QD	SPKS	6.800003	0.08986	0.34	0.03	0	
955360	QD	SPKS	5.5	0.090172	0.03	0.02	0.01	
988150	QD	SPKS	9.300049	0.090172	0.05	0.03	0	0
864410	IQD	SPKS	9.100006	0.090172	0.06	0.04	0	
955180	QD	SPKS	6	0.090172	0.06	0.02	0	0
955810	QD	SPKS	9.800003	0.08986	0.1	0.05	0.01	
965740	QD	SPKS	5	0.08986	0.05	0.03	0	
955330	QD	SPKS	5	0.090484	0.02	0.01	0	
901870	IQD	SPKS	2.299988	0.090484	0.07	0.02	0	
864410	IQD	SPKS	5.200012	0.090172	0.04	0.02	0.01	
864540	QD	SPKS	7.299988	0.090484	0.02	0	0	
901630	IQD	SPKS	11.29999	0.090484	0.08	0.02	0	
901880	IQD	SPKS	5	0.090172	0.12	0.05	0	
864410	IQD	SPKS	18.19998	0.090172	0.12	0.04	0	
965400	QD	SPKS	32.5	0.08986	0.02	0.02	0	
922150	IQD	SPKS	100	0.090484	0.03	0.02	0	
922150	IQD	SPKS	16	0.090484	0.03	0.02	0	
901910	IQD	SPKS	11.29999	0.090484	0.14	0.03	0	
864400	MTSD	SPKS	5.100006	0.090172	0.02	0	0	
948580	MTSD	SPKS	5.100006	0.090172	0.03	0.07	0.01	0
949000	QD	SPKS	5	0.090172	0.25	0.05	0	
922210	IQD	SPKS	9.600006	0.090484	0.03	0.05	0	
901630	QD	SPKS	10	0.090484	0.04	0.02	0	
901830	QD	SPKS	15	0.090484	0.08	0.02	0	
988200	QD	SPKS	5	0.08986	0.03	0.02	0	
988620	QD	SPKS	5	0.090172	0.25	0.07	0.01	
948060	QD	SPKS	6.399994	0.090172	0.07	0.06	0.02	
922270	IQD	SPKS	4.100006	0.090796	0.04	0.02	0	
864160	QD	SPKS	13.39999	0.090484	0.1	0.02	0	
901790	IQD	SPKS	5	0.090484	0.06	0.03	0	
922250	QD	SPKS	12.60001	0.090796	0.06	0.02	0	
922260	QD	SPKS	5.300018	0.090172	0.16	0.06	0.01	
980470	QD	SPKS	5	0.08986	0.04	0.03	0	0
864410	IQD	SPKS	6.799988	0.090484	0.08	0.06	0.01	
901880	STRT	SPKS	8	0.090484	0.17	0.05	0	
965400	QD	SPKS	5	0.090172	0.06	0.06	0.01	
864410	IQD	SPKS	15.00003	0.090484	0.04	0.04	0.01	
864520	QD	SPKS	9.399994	0.090796	0.06	0.02	0	
901630	IQD	SPKS	15	0.090796	0.03	0.03	0.01	
889570	QD	SPKS	10	0.090796	0.08	0.02	0	
955230	QD	SPKS	5	0.091108	0.01	0.01	0	

INCO assay data

889370	QD	SPKS	5	0.091108	0.02	0	0	
922130	QD	SPKS	5.199982	0.091108	0.02	0.02	0	
922240	QD	SPKS	14.20001	0.090796	0.06	0.02	0	
988780	QD	SPKS	5	0.090172	0.24	0.07	0	0
965150	QD	SPKS	5	0.08986	0.03	0.03	0.01	0
955800	QD	SPKS	10	0.090796	0.02	0.03	0.01	0
988220	QD	SPKS	5	0.090172	0.22	0.04	0	
922150	IQD	SPKS	15.5	0.090796	0.1	0.04	0.01	
955980	QD	SPKS	14	0.091108	0	0.01	0	
901880	IQD	SPKS	5.5	0.090796	0.15	0.03	0	
864010	SUBX	SPKS	5	0.091108	0.02	0	0	
965400	QD	SPKS	5	0.090172	0.11	0.03	0	
988340	QD	SPKS	5	0.08986	0.02	0.02	0	
955800	QD	SPKS	10.4	0.091108	0.05	0.04	0	0
922180	IQD	SPKS	37.39999	0.091108	0.03	0.01	0	
965410	QD	SPKS	10	0.090796	0.35	0.12	0.01	
922150	IQD	SPKS	7.5	0.091108	0.11	0.04	0	
988180	QD	SPKS	5	0.090172	0.09	0.07	0	0.003
864400	IQD	SPKS	16	0.091108	0.04	0.04	0.01	
901910	IQD	SPKS	13.60001	0.091108	0.1	0.03	0	
922160	IQD	SPKS	43.39999	0.091108	0.08	0.03	0	
955220	QD	SPKS	10	0.091108	0.02	0.02	0	
864540	QD	SPKS	6.799988	0.091108	0.08	0.02	0	
889280	IQD	SPKS	15	0.091108	0.02	0.02	0	
955210	AMPH	SPKS	2.100006	0.091108	0.02	0.01	0	0
955210	QD	SPKS	17.2	0.091108	0.02	0.01	0	0
864960	QD	SPKS	4.799995	0.091108	0.1	0.02	0	
922260	QD	SPKS	8.399994	0.091108	0.05	0.04	0	
922160	IQD	SPKS	12.39999	0.091108	0.07	0.04	0	
965410	QD	SPKS	10	0.08986	0.03	0.03	0	
981000	QD	SPKS	4.600006	0.08986	0.03	0.01	0	0
889570	QD	SPKS	8.5	0.091108	0.1	0	0	
922120	QD	SPKS	5.400024	0.091108	0.06	0.06	0.01	
980580	QD	SPKS	5	0.090172	0.07	0.04	0	0
922140	MTSD	SPKS	15.89999	0.090796	0.03	0.02	0.01	
864020	QD	SPKS	4.399994	0.09142	0.04	0.04	0	
901710	IQD	SPKS	5	0.09142	0.03	0	0	
864160	QD	SPKS	5	0.09142	0.02	0.02	0	
955980	QD	SPKS	12	0.09142	0.01	0.02	0.01	
901610	IQD	SPKS	5	0.09142	0.03	0.02	0	
980280	QD	SPKS	9.200073	0.090796	0.24	0.19	0.01	0
948050	QD	SPKS	11.29999	0.09142	0.11	0.04	0	
955010	QD	SPKS	5	0.090796	0.38	0.05	0	0.006
955220	QD	SPKS	10	0.091108	0.2	0.04	0	
965410	QD	SPKS	10	0.08986	0.07	0.04	0	
965740	QD	SPKS	5	0.090484	0.43	0.07	0	
955500	QD	SPKS	5.700012	0.091108	0.11	0.1	0	
965220	QD	SPKS	10	0.08986	0.03	0.03	0	0
980020	QD	SPKS	7.300049	0.090172	0.11	0.04	0.01	0.003
965410	QD	SPKS	10	0.090172	0.15	0.06	0	
980460	IQD	SPKS	5	0.090172	0.28	0.08	0	0.004
948310	IQD	SPKS	5.100006	0.09142	0.02	0.03	0	

INCO assay data

901900	STRT	SPKS	30.5	0.09142	0.01	0.02	0.01	
965360	QD	SPKS	10.59998	0.090172	0.03	0.07	0	0
864150	SUBX	SPKS	7.400009	0.091108	0.18	0.06	0	
864250	QD	SPKS	11.89999	0.09142	0.08	0.02	0	
922210	IQD	SPKS	13	0.09142	0.04	0.03	0	
922260	QD	SPKS	6.5	0.091108	0.2	0.05	0	
948310	IQD	SPKS	10.2	0.09142	0.07	0.04	0.01	
889280	QD	SPKS	11.60001	0.09142	0.06	0.04	0	
901630	QD	SPKS	10	0.09142	0.08	0.04	0	
922190	QD	SPKS	5.199997	0.09142	0.17	0.04	0	
922170	QD	SPKS	4.699997	0.09142	0.08	0.02	0	
955180	QD	SPKS	8.699997	0.09142	0.02	0.03	0	0
922190	QD	SPKS	6	0.09142	0.11	0.02	0	
955180	QD	SPKS	10	0.09142	0.11	0.04	0	0
988110	AMPH	SPKS	1.5	0.090172	0.07	0.03	0	0
988610	QD	SPKS	19.7	0.090172	0.12	0.05	0	
901610	AMPH	SPKS	7.699997	0.09142	0.16	0.01	0	
901910	QD	SPKS	8.300018	0.09142	0.06	0.04	0.01	
955220	QD	SPKS	5.199997	0.09142	0.17	0.08	0	
864280	IQD	SPKS	6.100006	0.09142	0.12	0.04	0	
980990	QD	SPKS	5	0.08986	0.02	0.02	0	0
955220	QD	SPKS	8	0.09142	0.14	0.04	0	
864010	SUBX	SPKS	10	0.09142	0.22	0.02	0	
889370	IQD	SPKS	3.299988	0.087363	0.02	0	0	
901900	IQD	SPKS	12.20001	0.09142	0.04	0.03	0.01	
988610	QD	SPKS	5	0.090172	0.15	0.07	0.01	
901910	IQD	SPKS	1.400024	0.090484	0.45	0.15	0.01	
948590	QD	SPKS	5	0.091732	0.05	0.02	0	0
955350	QD	SPKS	5	0.09142	0.07	0.05	0.01	
955960	QD	SPKS	13.1	0.091732	0.05	0.04	0	0
901630	AMPH	SPKS	5	0.091108	0.13	0.08	0.01	
922160	IQD	SPKS	4.099976	0.091108	0.16	0.07	0.01	
889280	IQD	SPKS	15.5	0.091732	0.06	0.04	0	
889140	IQD	SPKS	5	0.091732	0.04	0.02	0.01	
922260	IQD	SPKS	5.800018	0.09142	0.05	0.04	0.01	
948980	QD	SPKS	3.699997	0.090172	0.5	0.19	0.01	
988350	QD	SPKS	10	0.090484	0.3	0.07	0.01	
889280	IQD	SPKS	5	0.091732	0.06	0.06	0	
955180	QD	SPKS	14.3	0.09142	0.16	0.05	0	0.004
955190	QD	SPKS	11.3	0.091732	0.07	0.02	0	0
988790	QD	SPKS	6.199951	0.08986	0.19	0.08	0.01	0.004
864080	IQD	SPKS	3.200012	0.091732	0.06	0.04	0	
864410	IQD	SPKS	7.799988	0.091108	0.2	0.08	0.01	
901870	IQD	SPKS	5	0.090796	0.51	0.06	0.01	
901880	IQD	SPKS	5	0.090796	0.34	0.12	0.01	
922190	QD	SPKS	1.399994	0.091732	0.08	0.07	0	
922200	QD	SPKS	2.100006	0.091732	0.04	0.03	0	
948820	QD	SPKS	5	0.091732	0.07	0.03	0	
864540	IQD	SPKS	6.399994	0.091732	0.06	0.02	0.01	
901830	QD	SPKS	11.89999	0.09142	0.07	0.06	0.01	
864160	QD	SPKS	18	0.092044	0.02	0.04	0	
889570	QD	SPKS	8.600006	0.091732	0.06	0.02	0	

INCO assay data

922170	IQD	SPKS	7.399994	0.091732	0.04	0.02	0.01	
980880	QD	SPKS	5	0.08986	0.06	0.03	0	0
955210	QD	SPKS	5.899994	0.09142	0.17	0.09	0	0.006
922210	AMPH	SPKS	1.800003	0.091732	0.08	0.06	0	
922210	IQD	SPKS	2.5	0.091732	0.08	0.06	0	
864110	IQD	SPKS	5.900009	0.09142	0.44	0.04	0	
864110	GR	SPKS	1.199997	0.09142	0.44	0.04	0	
901630	IQD	SPKS	5.5	0.091732	0.07	0.06	0.01	
922260	QD	SPKS	15	0.09142	0.18	0.05	0.01	
922260	IQD	SPKS	10.39999	0.091732	0.04	0.03	0.01	
922240	QD	SPKS	11.39999	0.091732	0.14	0.08	0	
955300	QD	SPKS	5	0.091732	0.1	0.06	0.01	
864410	IQD	SPKS	4.899994	0.091732	0.1	0.08	0.01	
901910	IQD	SPKS	3.299988	0.09142	0.24	0.12	0.01	
948810	QD	SPKS	4.699997	0.092044	0.06	0.03	0	
965220	QD	SPKS	10	0.090484	0.11	0.09	0	0.006
819910	QD	SPKS	9.399994	0.092044	0.04	0.02	0	
955180	QD	SPKS	10	0.091732	0.23	0.07	0	0.005
864270	QD	SPKS	7.399994	0.092044	0.04	0.02	0	0
922180	IQD	SPKS	6.299988	0.092044	0.03	0.02	0	
922200	IQD	SPKS	9.599976	0.092044	0.08	0.04	0	
948790	AMPH	SPKS	2.600006	0.091732	0.23	0.03	0	
948790	QD	SPKS	2.399994	0.091732	0.23	0.03	0	
864400	IQD	SPKS	10.60001	0.09142	0.2	0.1	0.01	
901640	IQD	SPKS	6.100006	0.09142	0.42	0.05	0	
965350	QD	SPKS	10	0.08986	0.01	0.02	0.01	0
988150	QD	SPKS	19	0.090172	0.11	0.04	0.01	0.006
901910	IQD	SPKS	10.89999	0.091732	0.16	0.06	0.01	
955210	QD	SPKS	8.699997	0.091108	0.27	0.17	0.01	0.006
965150	QD	SPKS	5	0.090172	0.11	0.07	0.01	0
965410	QD	SPKS	10	0.090484	0.44	0.08	0.01	
901940	BX	SPKS	0.800018	0.092044	0.13	0.04	0	
965150	QD	SPKS	5	0.090172	0.24	0.1	0.01	0.006
965200	TRAP	SPKS	8.299988	0.08986	0.05	0.03	0	0
922200	QD	SPKS	12.8	0.091732	0.15	0.05	0.01	
922230	QD	SPKS	5	0.091732	0.16	0.05	0.01	
955220	QD	SPKS	7.600006	0.092044	0.11	0.09	0	
955180	QD	SPKS	6.5	0.092044	0.08	0.07	0	0
922160	IQD	SPKS	10	0.092044	0.1	0.08	0.01	
965370	QD	SPKS	5	0.090484	0.1	0.05	0.01	0.005
889030	QD	SPKS	3.900002	0.090796	0.82	0.1	0.01	
922160	IQD	SPKS	5.299988	0.092044	0.1	0.08	0.01	
955290	QD	SPKS	5	0.091732	0.08	0.09	0.01	
889570	QD	SPKS	11.10001	0.091732	0.18	0.08	0.01	
864060	IQD	SPKS	6.600037	0.088924	0.94	0.2	0.05	
864070	IQD	SPKS	8.5	0.092044	0.08	0.04	0.01	
901610	IQD	SPKS	3.5	0.092044	0.1	0.06	0.01	
955340	QD	SPKS	5	0.092044	0.12	0.08	0	
864080	IQD	SPKS	12.29999	0.092044	0.08	0.06	0	
901910	QD	SPKS	14.29999	0.091732	0.18	0.09	0.01	
922150	IQD	SPKS	12.79999	0.087988	0.23	0.6	0.19	
948290	QD	SPKS	6	0.091732	0.4	0.05	0.01	

INCO assay data

955260	QD	SPKS	5	0.092356	0.02	0.08	0	
965410	QD	SPKS	10	0.090484	0.33	0.08	0	
965940	IQD	SPKS	5	0.090484	0.25	0.11	0.01	0.008
922260	QD	SPKS	5	0.092356	0.06	0.04	0.01	
901640	IQD	SPKS	5	0.091732	0.3	0.06	0.01	
901870	IQD	SPKS	10	0.092044	0.17	0.04	0.01	
922240	IQD	SPKS	10	0.092356	0.1	0.07	0	
988350	QD	SPKS	14.6	0.090796	0.62	0.14	0.01	
864270	QD	SPKS	6.299988	0.092356	0.1	0.04	0	0
864530	QD	SPKS	6.100006	0.091732	0.48	0.08	0	
864250	QD	SPKS	9.399994	0.092044	0.1	0.06	0.01	
965210	STRT	SPKS	5.800003	0.090172	0.14	0.05	0.01	0
922200	IQD	SPKS	6.200012	0.092356	0.1	0.04	0	
901640	IQD	SPKS	10	0.092044	0.17	0.06	0.01	
955250	IQD	SPKS	5	0.092044	0.26	0.08	0	
948010	QD	SPKS	5	0.092044	0.15	0.05	0.01	
988190	QD	SPKS	5	0.090172	0.06	0.07	0.01	
955220	QD	SPKS	5.599991	0.092044	0.13	0.09	0.01	
901830	AMPH	SPKS	5	0.092668	0.07	0.02	0	
922190	QD	SPKS	12.40001	0.092356	0.18	0.06	0	
922260	QD	SPKS	15	0.091732	0.41	0.09	0.01	
955970	IQD	SPKS	8	0.092356	0.04	0.08	0.01	0
955360	QD	SPKS	5	0.092356	0.06	0.05	0.01	
864150	SUBX	SPKS	10	0.092044	0.14	0.08	0	
864390	IQD	SPKS	7.399994	0.092356	0.08	0.04	0.01	
922200	IQD	SPKS	5.599976	0.092356	0.3	0.04	0	
988150	QD	SPKS	5	0.090172	0.08	0.04	0.01	0
901920	QD	SPKS	7.399994	0.092356	0.06	0.03	0.01	
901750	IQD	SPKS	5	0.092668	0.08	0.04	0	
988360	QD	SPKS	5	0.090484	0.66	0.08	0.01	
901720	IQD	SPKS	5	0.092668	0.07	0.03	0	
965170	TRAP	SPKS	5	0.090172	0.29	0.04	0.01	0
965410	QD	SPKS	8.299988	0.090796	0.34	0.12	0.01	
922090	IQD	SPKS	5.199982	0.092044	0.38	0.09	0.01	
955020	QD	SPKS	6.299988	0.092668	0.18	0.03	0	0
901810	QD	SPKS	6.200012	0.092356	0.08	0.07	0.01	
922190	QD	SPKS	6.799988	0.092356	0.11	0.1	0.01	
965410	QD	SPKS	9	0.090796	0.21	0.13	0.01	
864250	QD	SPKS	10	0.092356	0.3	0	0	
819910	IQD	SPKS	6.5	0.092044	0.2	0.1	0.02	
864080	IQD	SPKS	11	0.092044	0.36	0.06	0.01	
965150	QD	SPKS	20.6	0.090484	0.24	0.11	0.01	0
922160	AMPH	SPKS	5	0.09298	0.04	0.01	0	
965170	TRAP	SPKS	5	0.090172	0.25	0.06	0.02	0
922150	IQD	SPKS	5.200012	0.092356	0.14	0.09	0.01	
901910	IQD	SPKS	4.5	0.092356	0.1	0.11	0.01	
889370	QD	SPKS	5	0.092044	0.56	0.04	0	
988760	QD	SPKS	5	0.090172	0.16	0.08	0.01	0.003
819920	QD	SPKS	5	0.092668	0.06	0.06	0.01	
864260	IQD	SPKS	3.400024	0.092356	0.4	0.06	0	
901600	IQD	SPKS	5.5	0.092668	0.08	0.07	0.01	
922440	QD	SPKS	5.599991	0.092356	0.28	0.1	0.01	

INCO assay data

948500	QD	SPKS	5.100037	0.092668	0.1	0.08	0.01	
988200	QD	SPKS	9.899994	0.090172	0.19	0.08	0	
955790	QD	SPKS	7.300003	0.091732	0.5	0.21	0.01	0.018
901880	STRT	SPKS	5	0.092356	0.35	0.09	0.01	
889570	QD	SPKS	10	0.092044	0.28	0.12	0.01	
922260	AMPH	SPKS	7.799988	0.09298	0.04	0.08	0.01	
889570	QD	SPKS	3.399994	0.092356	0.28	0.08	0	
901880	STRT	SPKS	4.799988	0.092356	0.24	0.08	0.01	
819900	SUBX	SPKS	8	0.09298	0.06	0.04	0	
864540	QD	SPKS	10.40002	0.092044	0.53	0.06	0.01	
889130	IQD	SPKS	16.5	0.09298	0.14	0.04	0	
948600	QD	SPKS	5.600006	0.092668	0.2	0.07	0	0
965200	TRAP	SPKS	5.900009	0.08986	0.03	0.03	0	0
980900	QD	SPKS	5	0.090484	0.31	0.05	0.01	0.002
901870	AMPH	SPKS	2.700012	0.09298	0.15	0.01	0.01	
955010	QD	SPKS	5	0.09298	0.11	0.06	0.01	0
901880	IQD	SPKS	5.399994	0.09298	0.04	0.06	0.01	
955360	QD	SPKS	11.60001	0.092356	0.25	0.16	0.02	
988360	QD	SPKS	5	0.090796	0.2	0.13	0.01	
819860	IQD	SPKS	15	0.092044	0.14	0.06	0.01	0.006
819860	IQD	SPKS	4	0.09142	0.4	0.08	0.01	0.003
922100	IQD	SPKS	5.099976	0.09298	0.23	0.05	0.01	
955210	QD	SPKS	2.800003	0.091732	0.36	0.23	0.01	0.005
901650	IQD	SPKS	4	0.09298	0.15	0.07	0.01	
922250	IQD	SPKS	4.699982	0.092668	0.26	0.09	0.01	
948020	QD	SPKS	5	0.092668	0.33	0.08	0.01	0.004
864160	QD	SPKS	5.600006	0.092668	0.26	0.16	0	
948050	IQD	SPKS	2.199982	0.092044	0.43	0.18	0.01	
901940	IQD	SPKS	6	0.09298	0.15	0.11	0	
922160	AMPH	SPKS	2.600006	0.093604	0.02	0	0	
864010	SUBX	SPKS	5	0.093604	0.02	0	0	
864020	GS	SPKS	4.3	0.093604	0.02	0	0	
901830	SUBX	SPKS	2.700012	0.09298	0.13	0.05	0.01	
949000	AMPH	SPKS	5	0.093292	0.1	0.02	0	
901880	FLT	SPKS	3.300003	0.092044	0.78	0.07	0.01	
901710	IQD	SPKS	6.100006	0.09298	0.11	0.08	0.01	
889140	IQD	SPKS	14.7	0.09298	0.18	0.08	0	
980280	QD	SPKS	5	0.090172	0.26	0.05	0	0.006
901870	IQD	SPKS	10	0.092356	0.56	0.11	0.01	
948830	QD	SPKS	5	0.092668	0.27	0.13	0.01	
955290	QD	SPKS	5	0.092668	0.3	0.13	0.01	
948610	AMPH	SPKS	6	0.093292	0.09	0.08	0	0
901630	QD	SPKS	8	0.092668	0.31	0.16	0.01	
988450	QD	SPKS	5	0.090796	0.63	0.08	0.01	
889130	QD	SPKS	4.199997	0.093292	0.2	0.06	0	
922170	IQD	SPKS	4.399994	0.09298	0.22	0.09	0.01	
988630	QD	SPKS	5	0.090796	0.31	0.14	0.01	
955230	QD	SPKS	5	0.09298	0.19	0.14	0.01	
988200	QD	SPKS	5.000008	0.090796	0.13	0.14	0.01	
948590	QD	SPKS	10	0.09298	0.25	0.1	0.01	0.007
864270	QD	SPKS	4.299988	0.093292	0.24	0.1	0	0.002
819860	IQD	SPKS	10	0.092356	0.16	0.06	0.01	0.011

INCO assay data

948770	AMPH	SPKS	2.899994	0.093292	0.11	0.13	0.02	
819900	SUBX	SPKS	7.200012	0.093916	0.02	0.04	0	
922250	AMPH	SPKS	2.400024	0.093604	0.11	0.09	0.01	
955210	QD	SPKS	5.199997	0.092668	0.36	0.19	0.01	0.006
864390	IQD	SPKS	8.399994	0.093604	0.08	0.12	0	
901950	STRT	SPKS	17	0.093916	0.11	0.04	0	
864130	IQD	SPKS	5	0.09298	0.32	0.14	0	
922190	QD	SPKS	6.800003	0.092668	0.42	0.18	0.01	
864040	GS	SPKS	0.700012	0.093292	0.4	0.06	0.01	
901900	QD	SPKS	2.399994	0.093292	0.41	0.05	0.01	
948340	AMPH	SPKS	6.5	0.094228	0.07	0.03	0	
922140	AMPH	SPKS	8.5	0.093916	0.05	0.02	0.01	
922140	IQD	SPKS	7.700012	0.093292	0.16	0.12	0.01	
864990	STRT	SPKS	6.599998	0.094228	0.14	0.02	0	
922240	AMPH	SPKS	5.199997	0.094228	0.03	0.04	0.01	
948970	AMPH	SPKS	5.400024	0.093916	0.04	0.03	0.01	
901640	IQD	SPKS	5	0.093292	0.17	0.17	0.01	
864240	GS	SPKS	4.699997	0.093604	0.26	0.08	0.01	
901910	AMPH	SPKS	3	0.094228	0.06	0.03	0.01	
948010	QD	SPKS	11.3	0.093604	0.3	0.03	0.01	
922240	IQD	SPKS	3.299988	0.09298	0.45	0.25	0.01	
988100	QD	SPKS	4.200012	0.090172	0.35	0.04	0.01	0
819880	QD	SPKS	7	0.092356	0.27	0.14	0.01	
922180	IQD	SPKS	8.400024	0.093604	0.4	0.13	0.01	
922440	MTBX	SPKS	6.100006	0.093604	0.19	0.16	0.03	
922120	QD	SPKS	3.799988	0.092668	0.43	0.31	0.02	
864970	MYL	SPKS	0.700001	0.093916	0.44	0.1	0	
922170	AMPH	SPKS	3.399994	0.094228	0.17	0.05	0.01	
922170	QD	SPKS	1.199997	0.094228	0.17	0.05	0.01	
889030	QD	SPKS	8.800003	0.09454	0.2	0.02	0	
922200	QD	SPKS	6.599991	0.093916	0.23	0.2	0.01	
948350	AMPH	SPKS	6	0.094228	0.26	0.06	0.02	
988620	QD	SPKS	5	0.091732	1.13	0.28	0.01	
819900	QD	SPKS	1.299988	0.094228	0.3	0.1	0.01	
901930	AMPH	SPKS	5.5	0.09298	0.34	0.28	0.02	
988500	AMPH	SPKS	5	0.090484	0.42	0.11	0.01	0.011
948290	QD	SPKS	8	0.09298	0.94	0.11	0.01	
948770	QD	SPKS	5	0.093916	0.55	0.13	0.01	
864010	QD	SPKS	3.100006	0.09454	0.32	0.06	0.01	
922140	AMPH	SPKS	5	0.09454	0.38	0.06	0.01	
980870	AMPH	SPKS	5	0.090484	0.24	0.07	0.01	0
901830	AMPH	SPKS	10.5	0.094852	0.1	0.03	0.01	
988620	AMPH	SPKS	5	0.090172	0.03	0.03	0	
922270	MTSD	SPKS	4.400024	0.093604	0.29	0.26	0.01	
864020	QD	SPKS	5.799988	0.093292	1.35	0.2	0.01	
864240	GS	SPKS	11.89999	0.094228	0.36	0.18	0.01	
948330	AMPH	SPKS	8.200012	0.095164	0.04	0.05	0.01	
864140	GS	SPKS	10.19998	0.095476	0.06	0	0	
889140	GS	SPKS	5	0.095788	0	0.02	0	
901810	AMPH	SPKS	9.699997	0.095476	0.03	0.03	0.01	
922110	QD	SPKS	5	0.094852	0.18	0.11	0.01	
948290	QD	SPKS	5	0.093292	0.95	0.16	0.01	

INCO assay data

955320	STRT	SPKS	1.799988	0.095788	0.04	0.03	0	
955320	STRT	SPKS	3.200012	0.095788	0.04	0.03	0	
955510	AMPH	SPKS	5	0.095476	0.01	0.01	0.01	
901790	AMPH	SPKS	5	0.095476	0.09	0.02	0.01	
864390	GS	SPKS	17.89999	0.095788	0.02	0	0	
922260	AMPH	SPKS	8.199982	0.095788	0.04	0.05	0.01	
966000	QD	SPKS	5	0.091732	0.49	0.24	0.01	0.027
949000	AMPH	SPKS	1.900002	0.0961	0.01	0.02	0	
988510	AMPH	SPKS	5.099976	0.090172	0.18	0.04	0.01	0.003
901960	AMPH	SPKS	5.300003	0.0961	0.06	0	0.01	
955510	AMPH	SPKS	5	0.0961	0.01	0.02	0.01	
889130	GS	SPKS	5	0.0961	0.02	0.04	0.01	
988630	AMPH	SPKS	5	0.091108	0.45	0.2	0.01	
980460	AMPH	SPKS	5	0.090172	0.15	0.06	0.01	0.003
864040	GS	SPKS	6.299988	0.096412	0.04	0.02	0	
948600	AMPH	SPKS	5	0.096412	0.07	0.04	0	0
901730	IQD	SPKS	5	0.094852	0.61	0.19	0.01	
901830	STRT	SPKS	2	0.094852	0.66	0.17	0.01	
901930	QD	SPKS	5	0.096412	0.03	0.03	0.01	
864050	IQD	SPKS	10	0.095476	0.22	0.2	0	
901870	IQD	SPKS	3.699997	0.094228	0.72	0.28	0.02	
965210	AMPH	SPKS	2.700001	0.08986	0.01	0.01	0	0
955020	QD	SPKS	9.300003	0.095164	0.58	0.17	0.01	0.007
948790	AMPH	SPKS	5	0.096724	0.1	0.01	0	
901830	AMPH	SPKS	10	0.096724	0.03	0.01	0.01	
864410	GS	SPKS	5.899994	0.097036	0.02	0	0	
901740	STR	SPKS	4	0.096724	0.06	0.06	0	
901810	AMPH	SPKS	9.5	0.096724	0.14	0.04	0.01	
901810	IQD	SPKS	1.100006	0.096724	0.14	0.04	0.01	
864080	GS	SPKS	5	0.097036	0.02	0.02	0	
864250	QTZ	SPKS	1.100006	0.095476	0.26	0.22	0.01	
965210	AMPH	SPKS	5.200001	0.08986	0.02	0.01	0	0
864980	MYL	SPKS	1.299999	0.097036	0.02	0.02	0.01	
901200	AMPH	SPKS	16.39999	0.097036	0.03	0.01	0.01	
901810	AMPH	SPKS	3.100006	0.096724	0.16	0.04	0.01	
901810	AMPH	SPKS	4.800018	0.096724	0.06	0.03	0.01	
901830	AMPH	SPKS	13.10001	0.096724	0.04	0.01	0.01	
819930	GS	SPKS	6	0.097036	0.04	0.02	0	
901630	AMPH	SPKS	8.600006	0.096724	0.15	0.04	0.01	
901710	AMPH	SPKS	5	0.097036	0.05	0.06	0.01	
922270	AMPH	SPKS	14.89999	0.097036	0.05	0.01	0.01	
955200	AMPH	SPKS	4.699997	0.097348	0.05	0.01	0	0
819140	FLT	SPKS	7	0.094228	0.94	0.42	0.02	
819880	GS	SPKS	7	0.095788	0.05	0.02	0.01	
889030	QD	SPKS	3.199997	0.094228	1.46	0.22	0.02	
901870	AMPH	SPKS	5	0.097036	0.11	0.02	0.01	
864020	GS	SPKS	4.7	0.097348	0.02	0.02	0	
901650	IQD	SPKS	2	0.09454	0.86	0.21	0.02	
901830	AMPH	SPKS	15	0.097348	0.02	0	0.01	
901870	AMPH	SPKS	3.100006	0.097036	0.36	0.03	0.01	
864050	GS	SPKS	5	0.09766	0.06	0.02	0.01	
901740	AMPH	SPKS	5	0.097348	0.16	0.06	0	

INCO assay data

922140	IQD	SPKS	6.599976	0.09454	0.89	0.28	0.02	
955980	QD	SPKS	3	0.094852	0.72	0.45	0.02	
980970	QD	SPKS	5	0.092356	0.1	0.33	0.02	0.004
864400	GS	SPKS	13	0.09766	0.06	0.02	0.01	
662450	QD	SPKS	8.100006	0.095476	0.52	0.39	0.02	
901200	AMPH	SPKS	5.700012	0.097972	0.04	0.02	0.01	
955020	QD	SPKS	2.600006	0.096412	0.72	0.18	0.01	0.005
922200	QD	SPKS	2.100006	0.096724	0.31	0.28	0.01	
980960	AMPH	SPKS	5	0.090796	0.2	0.1	0.01	0
819910	GS	SPKS	4	0.098596	0	0.02	0	
922140	IQD	SPKS	9.399994	0.0961	0.44	0.36	0.02	
948030	QD	SPKS	2.899994	0.09766	0.23	0.13	0.01	
948820	QD	SPKS	5	0.0961	0.59	0.34	0.02	
988150	AMPH	SPKS	5	0.090172	0.09	0.03	0.01	0
948780	QD	SPKS	5.300003	0.098284	0.33	0.05	0.01	
901630	AMPH	SPKS	5	0.098596	0.05	0.01	0.01	
901720	GS	SPKS	5.300003	0.098596	0.15	0.04	0.01	
901810	AMPH	SPKS	8.600006	0.098284	0.22	0.05	0.01	
901820	AMPH	SPKS	10.59998	0.098908	0.02	0.01	0.01	
922140	IQD	SPKS	10.70001	0.096412	0.47	0.35	0.02	
864530	QD	SPKS	7	0.095788	1.46	0.24	0.01	
901820	AMPH	SPKS	5.100006	0.098596	0.42	0.05	0.01	
955330	AMPH	SPKS	5	0.098908	0.05	0.06	0.01	
889030	QD	SPKS	3.499992	0.096412	1.29	0.3	0.01	
864010	QD	SPKS	8.900024	0.096412	0.76	0.36	0.02	
901740	FLT	SPKS	1	0.098908	0.12	0.2	0.01	
889030	QD	SPKS	3.5	0.097348	0.42	0.4	0.02	
864050	GS	SPKS	15.60001	0.099532	0.16	0.1	0.01	
901200	AMPH	SPKS	3.799988	0.099532	0.19	0.08	0.01	
901740	AMPH	SPKS	1.299988	0.098596	0.36	0.24	0.01	
819860	GS	SPKS	10	0.098908	0.07	0.07	0.01	0
864970	GS	SPKS	4.099998	0.10078	0.06	0.02	0	
948600	STRT	SPKS	5.5	0.10078	0.59	0.05	0	0
901930	AMPH	SPKS	5.299988	0.099844	0.39	0.24	0.05	
901820	STRT	SPKS	3.100006	0.101092	0.1	0.15	0.01	
955020	QD	SPKS	1.100006	0.09766	2.12	0.32	0.02	0.018
864010	QD	SPKS	3.299988	0.09922	1.1	0.14	0	
980900	AMPH	SPKS	5	0.090484	0.15	0.05	0.01	0
819910	GS	SPKS	5	0.102964	0.16	0.02	0	
901740	AMPH	SPKS	4.299988	0.104836	0.18	0.32	0.01	
864530	QD	SPKS	7.899994	0.101404	1.49	0.48	0.02	
889030	QD	SPKS	5.600006	0.104212	1.49	0.6	0.03	
922480	GC	SPKS	2.600006	0.104212	0.37	1.16	0.05	
988220	QD	SPKS	5	0.099532	1.7	0.56	0.05	
864410	QTZ	STGR	0.799988	0.090796	0.02	0.44	0.02	
864400	STRT	STGR	1.399994	0.095476	1.04	0.56	0.02	
864410	IQD	STGR	1.300018	0.096724	2.54	0.76	0.02	
864260	QD	STGR	3.899994	0.119813	0.52	2.46	0.1	
922440	MTBX	STGS	7.800018	0.09298	1.23	0.27	0.01	
901960	IQD	STR	3.699982	0.087988	0.36	0.03	0.01	
864040	GR	STR	0.299988	0.098596	5.09	0.74	0.07	
594650	IQD	STR	0.800003	0.106084	0.22	2.23	0.08	0.074

INCO assay data

662460	MASU	STR	0.600002	0.10858	2.12	1.78	0.1	
662540	STRT	STR	0.699997	0.113573	1.68	1.92	0.09	0.004
819910	GS	STR	0.5	0.118253	0.46	1.65	0.14	
988180	QD	STRS	10.19995	0.091732	1.05	0.15	0.01	0.005
988180	QD	STRS	7.599976	0.095788	0.65	0.89	0.03	0.01
662500	QTZ	STRS	1.300003	0.085803	0.84	0.14	0.01	
864990	QTZ	STRS	2	0.086115	0.94	0.12	0	
965200	QD	STRS	9.300003	0.08986	0.04	0.03	0	0
981000	QTZ	STRS	2.100006	0.093604	0.22	0.38	0.02	0.003
922250	QD	STRS	2.899994	0.089236	0.16	0.06	0	
965210	STRT	STRS	1	0.093292	0.06	0.02	0.02	0
955840	IQD	STRS	6.5	0.08986	0.11	0.03	0.01	0
988630	QD	STRS	5	0.090172	0.09	0.09	0.01	
922270	AMPH	STRS	7.200012	0.08986	0.51	0.05	0.01	
864400	IQD	STRS	10	0.090484	0.16	0.04	0.01	
965190	IQD	STRS	6.800003	0.08986	0.08	0.04	0	0
864410	IQD	STRS	18.89999	0.090484	0.16	0.06	0	
662580	RHY	STRS	1.699997	0.0883	1.53	0.22	0.02	
864390	QTZ	STRS	1.299988	0.088612	0.12	0.48	0.01	
864400	IQD	STRS	2.5	0.090172	0.46	0.08	0.01	
988160	AMPH	STRS	5	0.090172	0.23	0.03	0	0
864400	IQD	STRS	10.20001	0.090796	0.22	0.08	0.01	
965220	QD	STRS	9.899994	0.090484	0.14	0.11	0.01	0
864390	STRT	STRS	9.800018	0.091108	0.2	0.06	0	
948020	AMPH	STRS	4	0.091108	0.29	0.04	0	0
864400	IQD	STRS	10.70001	0.09142	0.08	0.06	0.01	
955980	IQD	STRS	9.399994	0.09142	0.09	0.04	0.01	
618680	STRT	STRS	5	0.089236	0.76	0.27	0.01	0.022
965180	TRAP	STRS	0.5	0.091108	1.15	0.08	0	0
864550	QD	STRS	5	0.091732	0.08	0.04	0	
901900	QD	STRS	0.5	0.090484	1.25	0.11	0.01	
965200	QD	STRS	9.199997	0.090172	0.05	0.03	0	0
980780	AMPH	STRS	5	0.090172	0.12	0.07	0.01	0
965200	QD	STRS	9.700005	0.090172	0.03	0.03	0	0
965240	AMPH	STRS	5.299988	0.090796	0.55	0.14	0	
965190	IQD	STRS	12.5	0.090172	0.13	0.08	0	0
965200	QD	STRS	3.699997	0.090796	0.17	0.19	0.01	0
662580	INMS	STRS	2.200012	0.092356	0.11	0.12	0.01	
980460	QD	STRS	6.5	0.090796	0.61	0.13	0.01	0.005
948510	IQD	STRS	10	0.092356	0.35	0.07	0	
965180	TRAP	STRS	0.600006	0.092044	1.39	0.11	0.01	0
864400	IQD	STRS	10	0.092356	0.22	0.06	0.01	
965190	QD	STRS	3.800003	0.091108	0.56	0.32	0.01	0
923000	QD	STRS	5.300003	0.091732	0.11	0.27	0.01	
988640	QD	STRS	11.60001	0.091732	1.32	0.2	0.07	
922200	QD	STRS	2.599991	0.092668	0.11	0.12	0.01	
965200	TRAP	STRS	0.5	0.090796	0.63	0.16	0.01	0
864390	SUBX	STRS	5.299988	0.093604	0.04	0	0	
864400	IQD	STRS	6.799988	0.092668	0.52	0.04	0	
965190	QD	STRS	5.900002	0.090484	0.07	0.1	0	0
965230	TRAP	STRS	5	0.090484	0.14	0.1	0.01	0
980580	QD	STRS	5	0.090796	0.17	0.13	0.01	0.004

INCO assay data

988160	QD	STRS	30.19995	0.09142	1.01	0.08	0.01	0
988640	QD	STRS	5.599991	0.09142	0.87	0.17	0.01	
864070	IQD	STRS	11.79999	0.093292	0.1	0.16	0	
901830	AMPH	STRS	14.70001	0.093916	0.2	0.03	0.01	
955500	QD	STRS	7.899994	0.09298	0.3	0.19	0.01	
864550	IQD	STRS	6	0.094228	0.12	0.04	0	
965240	TRAP	STRS	4.799988	0.090172	0.19	0.02	0	
922210	IQD	STRS	1.199997	0.092356	1.19	0.44	0.01	
965170	TRAP	STRS	6.799988	0.091732	0.51	0.32	0.01	0
965180	SUBX	STRS	5.1	0.090484	0.07	0.08	0.01	0
864990	GS	STRS	3.699997	0.093916	0.52	0.04	0	
955500	QD	STRS	14.70001	0.093292	0.3	0.2	0.01	
965180	SUBX	STRS	10	0.090172	0.04	0.07	0.01	0
948780	AMPH	STRS	5	0.094228	0.09	0.03	0.01	
965190	TRAP	STRS	0.5	0.09298	2.4	0.12	0.01	0
965200	STRT	STRS	0.5	0.092668	2.63	0.09	0.01	0
965200	QD	STRS	7.299995	0.090172	0.16	0.07	0	0.003
965190	QTZ	STRS	0.5	0.093916	3.85	0.18	0.01	0
864400	IQD	STRS	12	0.094228	0.22	0.06	0.01	
988640	AMPH	STRS	5	0.090172	0.14	0.07	0.01	
965180	QTZ	STRS	1	0.094852	4.03	0.37	0.01	0
988620	QD	STRS	6.400002	0.092044	1.83	0.11	0.01	
864390	SUBX	STRS	7.800018	0.095164	0.02	0.02	0.01	
864020	QTZ	STRS	2	0.093916	0.06	0.04	0.01	
864390	IQD	STRS	10	0.09454	0.18	0.14	0.01	
980280	QD	STRS	4.300049	0.092044	0.21	0.8	0.02	0.017
965200	QD	STRS	9.799995	0.091108	0.08	0.04	0.01	0
955260	QD	STRS	5.899994	0.09298	0.95	0.29	0.02	
988640	QD	STRS	10.8	0.09298	0.71	0.41	0.01	
864400	GS	STRS	16.8	0.095788	0.02	0	0	
922260	QD	STRS	1.200012	0.093292	1.75	0.17	0.01	
965410	QD	STRS	5.700012	0.092668	2.2	0.18	0.01	
955810	QD	STRS	8.5	0.093604	0.58	0.31	0.01	
965350	QD	STRS	6.799927	0.092044	0.31	0.3	0.01	0.014
965190	QD	STRS	3.699997	0.092044	0.23	0.32	0.01	0.002
988120	AMPH	STRS	3.5	0.09298	0.64	0.32	0.02	0.006
922160	IQD	STRS	2.599976	0.09454	0.56	0.22	0.01	
955970	QD	STRS	8.800003	0.093916	0.91	0.32	0.01	0.026
965190	STRT	STRS	0.5	0.092356	2.02	0.17	0.01	0
965200	QD	STRS	9	0.090484	0.08	0.06	0.01	0
988100	AMPH	STRS	11.9	0.090796	0.36	0.11	0.01	0.013
965180	STRT	STRS	0.5	0.092044	0.31	0.55	0.02	0
948640	AMPH	STRS	5.100006	0.096412	0.04	0	0.01	0
864400	IQD	STRS	10.10001	0.094852	0.26	0.26	0.01	
922270	AMPH	STRS	10.10001	0.096412	0.05	0.02	0.01	
980460	IQD	STRS	2.099976	0.092668	2.11	0.35	0.01	0.031
965230	AMPH	STRS	6.400009	0.090484	0.32	0.07	0	0.014
864550	GS	STRS	6.099998	0.096724	0.04	0.04	0	
965180	TRAP	STRS	0.700012	0.093604	3.6	0.39	0.01	0
955970	QD	STRS	10.2	0.094228	0.85	0.48	0.02	0.028
955790	QD	STRS	4	0.094228	0.6	0.49	0.02	0.011
948630	AMPH	STRS	5.899994	0.097036	0.11	0.03	0	0

INCO assay data

955810	QD	STRS	3.099998	0.094852	0.58	0.46	0.01	
955800	QD	STRS	7.099998	0.094852	1.12	0.5	0.01	0.007
948290	QD	STRS	3.100006	0.09454	2.08	0.1	0.01	
980900	QD	STRS	3.600006	0.092356	2.01	0.15	0.01	0.006
988100	AMPH	STRS	5	0.092356	0.27	0.32	0.02	0.007
965190	TRAP	STRS	0.5	0.094228	4.57	0.21	0.01	0
662400	STRT	STRS	1.099991	0.094228	5	0.23	0.02	0
955800	QD	STRS	3.400002	0.09454	0.83	0.59	0.03	0.017
955830	QD	STRS	10.3	0.090172	0.2	0.06	0.01	0
980460	QD	STRS	7.5	0.09298	2.01	0.37	0.01	0.038
988760	SUBX	STRS	9.699951	0.092356	1.78	0.16	0.01	0.008
948050	QD	STRS	4	0.095476	0.6	0.35	0.01	
988500	QD	STRS	4.199951	0.091108	1.02	0.07	0.01	0
955500	QD	STRS	1.200012	0.095476	0.79	0.53	0.02	
965200	TRAP	STRS	0.699982	0.095788	4.75	0.2	0.01	0
922270	AMPH	STRS	4.300018	0.097348	0.19	0.23	0.02	
988120	AMPH	STRS	12.6	0.090796	0.2	0.12	0.01	0
864390	GS	STRS	5	0.098284	0.2	0.06	0.03	
955800	QD	STRS	6.199997	0.09298	1.27	0.6	0.08	0.023
965190	IQD	STRS	3.400002	0.093604	0.25	0.82	0.1	0.046
819860	GS	STRS	4.200012	0.097348	0.21	0.07	0.01	0
864400	GS	STRS	9	0.098284	0.14	0.14	0.01	
922190	QD	STRS	5.399994	0.095788	0.76	0.47	0.02	
965200	TRAP	STRS	1.299988	0.094852	4.07	0.24	0.01	0
955790	QD	STRS	10.5	0.0961	0.87	0.66	0.02	0.021
955800	QD	STRS	3.900002	0.096412	0.61	0.73	0.02	0.026
889570	QD	STRS	5	0.096412	0.48	0.52	0.02	
864550	GS	STRS	2.299999	0.098284	0.42	0.14	0.01	
864960	QD	STRS	6.599998	0.096412	0.78	0.36	0.02	
889280	IQD	STRS	5.699997	0.096724	0.66	0.54	0.02	
901720	GS	STRS	1.599991	0.096724	2	0.16	0.01	
864260	IQD	STRS	7.399994	0.097348	1.1	0.26	0.01	
922160	IQD	STRS	2	0.09766	0.38	0.58	0.02	
922250	IQD	STRS	1.700012	0.097036	0.89	0.56	0.02	
988630	QD	STRS	12.09999	0.09454	0.9	0.68	0.03	
901810	AMPH	STRS	0.699997	0.0961	1.76	0.44	0.04	
922090	IQD	STRS	3.100006	0.097348	1	0.63	0.03	
922150	IQD	STRS	6.100006	0.097348	0.54	0.56	0.03	
988170	AMPH	STRS	5	0.091108	0.92	0.09	0.01	0
922200	QTZ	STRS	1.099991	0.097972	0.76	0.69	0.02	
965180	TRAP	STRS	0.599998	0.095788	0.14	1.3	0.04	0
988500	IQD	STRS	9.599976	0.092668	1.11	0.25	0.01	0.006
864390	IQD	STRS	5.200012	0.099844	0.2	0.48	0.02	
901900	IQD	STRS	1.399994	0.098284	1.3	0.76	0.03	
965200	TRAP	STRS	0.600006	0.10234	11.61	0.21	0.02	0
988630	QD	STRS	14.8	0.097348	3.64	0.7	0.02	
922270	AMPH	STRS	1.799988	0.098284	1.96	0.17	0.02	
965740	QD	STRS	2	0.099844	7.84	0.42	0.02	
864410	IQD	STRS	3	0.098596	0.42	0.6	0.03	
988010	AMPH	STRS	7.100006	0.090484	0.21	0.07	0.01	0
922160	IQD	STRS	8	0.098596	0.61	0.59	0.03	
922250	QD	STRS	1	0.09766	3.72	0.52	0.02	

INCO assay data

864270	IQD	STRS	3.600006	0.098908	1.06	0.56	0.03	0.002
662530	STRT	STRS	2.700012	0.098908	0.77	0.74	0.03	0.052
965190	QD	STRS	4.199997	0.096724	0.48	0.78	0.02	0.005
864080	IQD	STRS	5.600006	0.09922	0.36	0.88	0.03	
948980	QD	STRS	3.300003	0.096724	4	0.39	0.02	
965230	QD	STRS	2.300003	0.0961	0.47	1.25	0.04	0.004
864280	IQD	STRS	10.70001	0.099532	0.46	0.62	0.03	
901200	IQD	STRS	9.600006	0.09922	1.57	0.53	0.03	
864410	IQD	STRS	10.20001	0.099532	0.4	0.64	0.03	
955790	QD	STRS	1	0.097036	2.86	1.29	0.04	0.02
864400	IQD	STRS	9.399994	0.10078	0.36	0.58	0.03	
922200	IQD	STRS	3.899994	0.099532	1.7	0.56	0.03	
889130	IQD	STRS	20.3	0.100156	1.27	0.66	0.03	
864400	IQD	STRS	10	0.100468	0.48	0.64	0.03	
864270	IQD	STRS	6.700012	0.10078	0.42	0.7	0.03	0.006
642050	STRT	STRS	1.100006	0.10078	3.3	0.73	0.04	0.038
642070	IQD	STRS	2.099998	0.101092	2.57	0.42	0.02	0.021
642070	IQD	STRS	0.900002	0.100468	3.04	0.86	0.04	0.007
864990	MYL	STRS	1.700005	0.10078	1.02	0.86	0.04	
955330	AMPH	STRS	0.800018	0.1039	0.03	0.45	0.02	
864240	GS	STRS	1.800003	0.09922	0.8	1.06	0.09	
864400	IQD	STRS	10	0.101716	0.42	0.82	0.04	
662510	STRT	STRS	3.200012	0.101404	0.64	1.16	0.05	
948810	QD	STRS	1.599998	0.101716	1.02	0.82	0.05	
980890	QTZ	STRS	1	0.102652	4.14	0.17	0.05	0
889370	IQD	STRS	1.899994	0.102652	0.36	1.44	0.05	
965210	QD	STRS	1.899994	0.098908	1.08	1.14	0.04	0.006
948050	AMPH	STRS	0.700012	0.103276	0.16	1.16	0.04	
980270	QD	STRS	14.09998	0.100156	3.56	1.57	0.04	0.063
980280	QD	STRS	6.099976	0.099844	3.94	1.36	0.03	0.016
980850	QD	STRS	9.899994	0.097972	1.32	0.86	0.04	0.008
965940	QD	STRS	2	0.107644	14.49	0.4	0.02	0.105
864400	IQD	STRS	3.099976	0.104212	0.26	0.92	0.04	
864970	STRT	STRS	1.200001	0.103276	2.16	1.04	0.05	
889260	QD	STRS	6.099998	0.1039	2.3	0.96	0.04	
955210	AMPH	STRS	2.299995	0.10702	0.1	0.22	0.05	0
889280	QD	STRS	3.400002	0.104212	0.42	1.32	0.05	
864020	QD	STRS	2.699982	0.104524	0.4	0.82	0.04	
901200	IQD	STRS	6.399994	0.104212	0.83	0.9	0.04	
922260	QD	STRS	0.299988	0.104212	0.15	1.12	0.05	
922200	IQD	STRS	8	0.104836	1.35	0.99	0.04	
955500	QD	STRS	1.199982	0.10546	0.09	1.3	0.04	
966000	AMPH	STRS	1.099976	0.095476	3.79	0.26	0.02	0.018
965740	QD	STRS	2.399994	0.106084	12	0.4	0.03	
819860	QD	STRS	10	0.104836	2.44	0.94	0.04	0.033
965210	QTZ	STRS	3.399998	0.100468	0.57	0.04	0.05	0
980850	IQD	STRS	12	0.100156	1.67	0.97	0.05	0.007
889260	MYL	STRS	2.200012	0.107644	0.92	0.96	0.04	
922200	QTZ	STRS	0.300003	0.115757	12.73	1.06	0.04	
901200	AMPH	STRS	0.399994	0.107644	0.35	1.5	0.09	
922200	IQD	STRS	2.899994	0.108892	0.68	1.36	0.06	
965180	AMPH	STRS	2.4	0.102028	0.25	0.93	0.05	0.017

INCO assay data

864960	QD	STRS	6.600006	0.109204	1.48	1.4	0.06	
948600	STRT	STRS	3.299988	0.107332	5.56	0.63	0.02	0
889030	QD	STRS	8.100006	0.110452	2.1	1.25	0.05	
662430	IQD	STRS	9.400009	0.109828	2.39	1.64	0.07	
889140	IQD	STRS	15	0.111076	0.82	1.32	0.05	
864260	QD	STRS	2.799988	0.110764	1.12	1.34	0.06	
948600	STRT	STRS	1.600006	0.1117	1.5	0.83	0.04	0
864270	QD	STRS	2.300018	0.111076	0.86	1.55	0.07	0
922100	IQD	STRS	2.600006	0.111388	0.51	1.26	0.06	
662500	IQD	STRS	6.400009	0.110764	2.63	1.37	0.07	
889030	QD	STRS	8.699997	0.111388	0.96	1.62	0.07	
889030	QD	STRS	7.5	0.112012	1.37	1.53	0.06	
889140	IQD	STRS	4	0.113261	0.42	1.24	0.05	
889130	IQD	STRS	4.899994	0.112637	1.47	1.81	0.08	
864250	QD	STRS	1.700012	0.113261	2.02	1.72	0.07	
889140	IQD	STRS	12.5	0.113885	2.48	1.2	0.05	
988500	QD	STRS	1.200073	0.108268	5.88	0.67	0.06	0
948010	QD	STRS	8.699997	0.113573	1.37	1.44	0.07	
864990	IQD	STRS	3.299995	0.114197	1.5	1.28	0.06	
889190	QD	STRS	6.899994	0.114197	0.92	1.66	0.07	
901830	IQD	STRS	4.100006	0.114197	2.14	1.56	0.07	
889030	QD	STRS	7.399994	0.114509	0.95	1.9	0.08	
662400	QD	STRS	12.2	0.113573	0.9	1.68	0.08	0.014
889190	QD	STRS	15	0.115133	1.04	1.84	0.07	
889130	IQD	STRS	15	0.115133	2	1.6	0.07	
889140	IQD	STRS	1.700012	0.115133	2.25	1.67	0.07	
864960	QD	STRS	10.60001	0.116069	1.25	1.69	0.07	
889030	QD	STRS	8.5	0.116381	2.24	2.04	0.08	
889030	QD	STRS	7.799988	0.117317	1.45	1.97	0.08	
662500	IQD	STRS	10	0.116381	1.58	1.88	0.08	
662500	IQD	STRS	12.60001	0.117005	1.42	2.11	0.09	
980850	IQD	STRS	10	0.109828	1.67	1.91	0.09	0.015
889130	IQD	STRS	15	0.120125	1.28	1.94	0.08	
980860	QD	STRS	10.59999	0.110764	0.73	1.97	0.09	0.015
864010	QD	STRS	9.699982	0.120437	1.22	2.16	0.1	
889030	QD	STRS	3.800003	0.122309	0.34	2.61	0.1	
662500	IQD	STRS	10.3	0.121685	0.35	2.52	0.11	
988210	QD	STRS	5.200005	0.115445	0.42	2.55	0.12	
662500	IQD	STRS	11.9	0.126365	0.34	3	0.12	
889030	QD	STRS	8.600006	0.129797	0.3	3.04	0.12	
889030	QD	STRS	5	0.120437	1.01	3.39	0.14	
864400	MASU	STRS	0.300018	0.140406	0.08	2.5	0.09	

INCO assay data

Pd %	Au %	Ag %	Rh %	As %	Fe %	Sulphide %	Sample #
				0	4.48	1.15	MU248615
0	0	0.04	0	0	5.24	0.5	MX053531
0.002	0	0.01	0	0	6.27	0.19	MX054305
				0	6.31	0.61	MU312754
				0	6.35	0.8	MU292141
				0	6.57	0.09	MU312761
0	0	0	0	0	6.58	0.1	MU305727
0	0	0	0	0	6.68	0.11	MX054255
0.002	0	0	0	0	6.74	0.23	MU305760
0.003	0.002	0.007	0	0	6.85	0.14	MX053502
0	0	0.01	0	0	7.04	0.11	MX056007
				0	7.07	0.44	MU305855
0.002	0.002	0.06	0	0.009	7.12	1.03	MX054355
				0.012	7.15	0.27	MU324118
				0	7.18	0.48	MU292021
0	0.001	0.01	0	0	7.32	0.18	MX056093
				0	7.38	0.12	MU342101
				0.033	7.42	0.45	MU312760
0.004	0	0	0	0	7.45	0.13	MU305738
0	0	0	0	0	7.45	0.07	MU305771
0	0	0	0	0	7.46	0.06	MU305761
0	0.001	0.08	0	0	7.47	0.56	MX056126
0	0	0	0	0	7.51	0.31	MX056129
				0.008	7.55	0.37	MU276997
				0	7.59	0.34	MU312759
				0	7.6	0.32	MU357325
				0	7.63	0.27	MU305859
0.011	0.467	0.4	0	0	7.65	0.79	MX054439
				0	7.69	0.22	MU292213
				0	7.7	0.64	MU357321
0.003	0.001	0.01	0	0	7.71	0.35	MX054307
0.001	0.001	0.01	0	0	7.71	0.09	MX053583
				0	7.74	0.33	MU305862
0.002	0	0	0	0	7.75	0.32	MU305730
0.002	0.001	0.02	0	0	7.75	0.36	MX053566
				0.247	7.75	0.53	MU342240
0.003	0	0.03	0	0	7.78	0.34	MU305777
				0	7.78	0.13	MU305998
				0	7.79	0.11	MU305803
0.002	0.001	0.01	0	0	7.81	0.23	MU334157
				0	7.84	0.4	MU305863
				0	7.86	0.76	MU276989
0.003	0	0	0	0	7.87	0.28	MU305737
0.001	0.003	0.05	0.001	0	7.87	0.17	MU334168
0.001	0	0.01	0	0	7.89	0.14	MX054277
				0	7.91	0.84	MU312715
				0	7.96	0.92	MU305586
				0	7.98	0.39	MU248681
				0.013	7.98	0.14	MU277425
				0	8.02	0.5	MU342100

INCO assay data

0.003	0	0	0	0	8.03	0.57	MU305731
				0	8.07	0.29	MU277000
0.012	0.003	0.06	0	0	8.08	0.98	MX054306
				0	8.13	0.51	MU305421
0.003	0	0	0	0	8.15	0.39	MU305769
0.005	0	0.02	0	0	8.2	0.54	MX054256
				0.01	8.2	2.19	MU357352
0.002	0.003	0.09	0	0	8.24	1.08	MX056058
				0.03	8.27	0.88	MU292094
				0	8.27	1.59	MU341953
				0	8.29	0.6	MU342052
				0	8.29	0.89	MU342097
				0	8.3	1.58	MU292001
				0	8.3	1.19	MU357326
				0	8.35	1.73	MU292211
				0	8.35	0.66	MU292235
0.012	0.003	0.07	0	0	8.35	0.97	MX054308
				0	8.35	0.61	MU342029
0	0	0.12	0	0	8.38	1.19	MX056138
0.002	0	0	0.001	0	8.4	0.09	MX056008
				0.037	8.41	1.03	MU313756
				0	8.41	0.79	MU341978
0.003	0	0	0	0	8.42	0.4	MU305736
				0.011	8.45	1.29	MU305796
				0	8.45	0.65	MU305802
				0	8.45	0.95	MU342096
				0	8.46	0.5	MU292009
				0	8.46	0.81	MU292023
0.004	0	0.02	0	0	8.46	0.71	MU305762
0.008	0.002	0.04	0	0	8.47	0.9	MX054310
				0	8.49	0.65	MU277180
0.003	0.002	0.04	0	0	8.49	0.75	MU334154
				0	8.53	0.43	MU292231
				0	8.54	1.39	MU305797
				0	8.55	0.77	MU248813
				0	8.56	1.38	MU248574
				0	8.6	0.86	MU305872
				0	8.61	1.07	MU341962
				0	8.62	0.64	MU292680
				0.039	8.63	0.71	MU341966
				0	8.66	1.03	MU276979
				0	8.68	0.72	MU277179
0.001	0.001	0.02	0	0	8.68	0.35	MX054418
0.011	0.004	0.06	0	0	8.7	0.85	MX054278
				0.008	8.71	1.6	MU313753
				0	8.72	0.94	MU292208
				0	8.73	0.87	MU305858
				0	8.78	0.48	MU276999
				0	8.78	1.26	MU292014
				0.008	8.78	0.67	MU305868
				0	8.8	1.93	MU341951
				0	8.81	0.89	MU342045

INCO assay data

				0	8.82	0.61	MU305870
				0	8.84	1.06	MU292230
				0	8.86	0.54	MU305871
				0	8.87	0.67	MU305816
0.004	0.002	0.1	0	0.013	8.88	0.68	MX056117
				0	8.89	0.84	MU292215
				0.022	8.91	1.3	MU341967
				0	8.92	3.45	MU277188
				0	8.92	1.14	MU342039
				0	8.95	0.9	MU292548
				0	8.97	1.21	MU305869
				0.012	8.97	1.59	MU313754
0.023	0.019	0.25	0	0	8.97	1.25	MX054437
0.006	0.008	0.13	0	0	8.98	1.59	MX056002
0.009	0.005	0.13	0	0.021	9	1.23	MU313503
				0	9.04	1.28	MU276980
0.003	0.001	0.04	0	0	9.07	0.85	MU334164
0.005	0.004	0.099	0.003	0	9.07	1.43	MX053505
				0	9.12	1.31	MU292229
0.003	0.006	0.09	0	0	9.12	1	MU334453
0.005	0.003	0.121	0	0.01	9.13	1.39	MX053507
0.004	0	0.02	0	0	9.16	1.07	MU305768
				0	9.17	0.84	MU341987
				0	9.2	1.04	MU292010
				0	9.21	1.19	MU292133
				0	9.21	1.1	MU305864
				0.012	9.23	1.49	MU292212
0.014	0.016	0.054	0	0.02	9.23	2.02	MX053503
0.004	0.003	0.17	0	0	9.24	1.51	MX056119
				0	9.28	1.28	MU277405
				0	9.28	1.74	MU342098
0	0	0.03	0	0	9.29	0.67	MX056094
				0	9.3	0.92	MU292232
				0	9.31	0.98	MU334857
				0	9.35	1.16	MU292032
0.003	0.001	0.04	0.001	0	9.37	1.29	MX053537
				0.007	9.4	1.69	MU342047
				0	9.45	1.13	MU248567
				0	9.45	1.74	MU292016
				0.033	9.47	1.29	MU341961
0.001	0.001	0.05	0	0	9.48	0.7	MU334280
				0	9.51	1.53	MU334824
				0	9.53	1.13	MU305846
0.009	0.005	0.08	0	0.008	9.55	1.3	MU313504
				0	9.58	1.43	MU292024
				0	9.61	1.82	MU324117
0.003	0.005	0.23	0	0.008	9.63	2.33	MU313502
0.002	0.002	0.1	0	0	9.63	1.3	MX054337
				0	9.63	1.24	MU334827
0	0.002	0.11	0	0	9.65	1.19	MU292504
0.01	0.007	0.21	0	0.009	9.66	1.62	MU313505
				0	9.69	1.66	MU276981

INCO assay data

				0	9.69	1.89	MU342034
				0.009	9.71	1.66	MU292228
				0	9.72	1.68	MU292101
				0	9.72	1.34	MU292216
				0	9.73	1.04	MU292008
				0	9.8	2.19	MU357324
				0	9.82	1.83	MU305834
				0.009	9.83	1.32	MU334911
				0	9.87	1.04	MU248605
0.01	0.001	0.25	0	0.014	9.87	2.81	MX056118
				0	9.89	1.68	MU341980
				0	9.94	1.89	MU292210
				0	10	1.72	MU305805
0.01	0.023	0.21	0	0	10.02	3.04	MX056127
0	0.001	0.06	0	0	10.09	0.45	MX056013
0.011	0.007	0.19	0	0	10.12	1.82	MU313506
				0	10.13	1.86	MU342024
0.005	0.002	0.08	0	0	10.13	1.77	MX056104
				0	10.14	2.06	MU305587
0.003	0.001	0.05	0	0	10.16	2.12	MX053538
				0	10.17	1.2	MU305847
				0	10.2	1.75	MU292217
0.002	0	0.03	0	0.014	10.23	0.28	MU334760
0.003	0.002	0.06	0	0	10.24	1.72	MU334441
0.008	0.006	0.217	0	0	10.24	2.34	MX053504
				0	10.24	2.14	MU342241
0.013	0.004	0.09	0	0	10.25	1.69	MX054309
				0	10.31	2.51	MU342041
0.017	0.006	0.1	0	0	10.34	2.16	MX054280
0.006	0	0.09	0	0	10.36	1.92	MU305695
0.015	0.012	0.23	0	0	10.36	1.76	MU313507
0.005	0.007	0.13	0	0	10.36	1.36	MX056102
				0	10.38	2.02	MU305576
0.001	0.002	0.18	0.002	0	10.4	3.49	MX056142
				0	10.44	1.78	MU334828
				0	10.45	1.95	MU334853
				0	10.46	2.17	MU342030
				0	10.51	2.43	MU342099
				0.01	10.54	1.95	MU292209
				0	10.58	1.92	MU341981
0.005	0.001	0.05	0.002	0	10.59	2.37	MX053539
				0	10.6	1.91	MU276970
				0	10.62	2.08	MU312719
0	0	0.02	0	0	10.72	0.4	MU334490
				0	10.73	2.68	MU342035
0.006	0.005	0.11	0.002	0	10.73	2.32	MX056103
0.012	0.012	0.206	0.001	0.02	10.79	2.68	MX053506
				0	10.85	2.5	MU292202
				0.018	10.87	2.55	MU305437
0.023	0.016	0.08	0	0.024	10.94	2.52	MU305728
0.009	0.006	0.16	0	0	10.95	2.57	MU313552
				0	11	1.08	MU248529

INCO assay data

0.003	0.003	0.1	0	0	11.08	2.81	MU334418
				0	11.17	2.69	MU312718
0	0	0.04	0	0	11.19	0.84	MU334302
				0	11.2	3.24	MU292096
				0	11.2	2.78	MU277178
				0	11.36	2.5	MU292125
				0	11.42	3.2	MU292201
				0	11.47	2.45	MU334826
0.004	0.008	0.24	0	0	11.49	2.3	MX056006
				0.01	11.5	0.67	MU248596
				0	11.51	3.12	MU342208
0.024	0.009	0.16	0	0	11.56	3.1	MX054279
				0	11.63	2.96	MU341986
				0	11.76	2.67	MU334842
0.008	0.005	0.17	0	0	11.8	3.06	MU334159
				0	11.81	2.77	MU334838
0.026	0.02	0.83	0	0.008	11.85	5.23	MX056124
				0	11.87	2.86	MU292684
				0	11.95	2.27	MU305849
				0	12.08	4.6	MU342104
				0.01	12.1	4.5	MU357327
0.002	0.001	0.15	0	0	12.14	4.65	MX056128
				0	12.2	3.31	MU305577
				0	12.22	0.18	MU312752
0.017	0.013	0.3	0	0.018	12.3	4.02	MU313551
				0	12.36	3.1	MU334900
				0	12.49	3.45	MU312721
0.038	0.01	0.23	0	0.069	12.52	3.93	MU313554
0.004	0.027	0.17	0	0	12.54	4.48	MU313547
				0	12.54	4.76	MU342102
0.005	0.002	0.13	0	0	12.6	3.82	MU334160
				0	12.63	4.32	MU341963
0.022	0.052	0.36	0	0.013	12.66	3.72	MX054435
				0	12.73	3.76	MU334864
				0	12.77	4.61	MU342244
				0	12.8	4.45	MU292333
0.023	0.011	0.25	0	0.037	12.83	4.16	MU313553
0.001	0.001	0.01	0	0	12.84	1.02	MX053567
				0	12.91	4.38	MU342211
				0	13.01	4.75	MU342243
				0	13.06	4.48	MU305997
				0	13.07	3.95	MU292693
				0	13.1	5.99	MU357343
				0	13.25	5.04	MU342209
				0	13.32	4.8	MU305325
				0	13.34	3.94	MU312720
				0	13.42	5.17	MU342245
				0	13.45	5.57	MU342103
				0	13.46	4.48	MU341979
				0	13.54	4.95	MU341965
				0.109	13.6	7.16	MU313759
				0	13.64	4.86	MU305801

INCO assay data

				0	13.71	4.81	MU292132
0.002	0.002	0.11	0	0	13.75	4.7	MU334440
				0	13.82	4.62	MU341976
				0	13.92	5.25	MU341964
				0	13.93	5.57	MU342210
				0	14.08	4.48	MU342242
				0	14.1	4.22	MU292329
				0	14.2	5.26	MU276983
				0	14.24	5.07	MU342028
				0	14.27	5.2	MU292545
				0	14.3	1.5	MU248439
				0	14.37	4.06	MU334886
				0	14.4	4.16	MU277384
0.004	0.001	0.06	0	0	14.4	5.21	MU334156
0.004	0	0.06	0	0	14.44	4.59	MU305693
				0	14.46	5.23	MU305590
0	0.003	0.37	0.041	0	14.67	6.99	MU334564
0.004	0.004	0.08	0	0	14.67	4.9	MX056092
0.01	0.005	0.09	0	0.095	14.78	3.66	MU334742
				0	14.9	5.33	MU276984
0.004	0.005	0.15	0	0	14.9	5.53	MU334165
0.002	0	0.11	0	0.017	14.97	5.15	MU334758
0.002	0.002	0.09	0.002	0	14.99	5.31	MU334428
				0	15.02	4.79	MU305848
				0	15.07	5.3	MU305813
				0	15.1	5.59	MU342025
0.003	0.003	0.36	0.002	0	15.24	6.73	MX056141
0	0.001	0.09	0	0	15.47	6.76	MU334581
0.004	0	0.16	0	0	15.82	6.35	MU305715
0.002	0.002	0.23	0	0	15.88	5.61	MU334452
				0	15.96	5.31	MU292233
				0	16.1	8.04	MU357344
				0	16.19	6.9	MU292547
				0	16.37	6.65	MU292332
				0	16.57	6.74	MU305844
				0	16.6	6.09	MU276969
				0	16.66	5.36	MU292223
				0	16.98	5.04	MU334913
				0	17	7.63	MU248510
				0	17.04	7.06	MU305866
				0	17.12	7.08	MU312722
				0	17.19	6.84	MU292234
0.004	0.002	0.11	0	0	17.2	7.32	MU334161
				0	17.42	7.41	MU305865
				0	17.44	7.68	MU341974
				0	17.65	7.65	MU312749
				0	17.73	7.77	MU312723
				0	17.74	5.96	MU305573
				0	17.76	7.33	MU305818
				0	18.04	8.64	MU305820
0	0.001	0.18	0	0	18.18	8.52	MU334417
				0	18.2	7.59	MU312748

INCO assay data

				0	18.23	8.07	MU305996
				0	18.24	8.78	MU341971
				0	18.27	7.16	MU312747
0.003	0.009	0.12	0.003	0	18.5	8.24	MU334162
0.003	0	0.06	0	0	18.68	8.05	MU305714
0	0	0.11	0	0	18.7	8.38	MU334166
				0	18.99	8.57	MU305857
0.005	0.006	0.2	0	0	19.06	7.3	MU292514
				0	19.1	6.78	MU305578
				0	19.1	9.19	MU341960
				0	19.18	9.17	MU341958
0.01	0.018	0.57	0	0	19.35	9.15	MX056140
				0.013	19.86	9.1	MU305814
				0	20.08	9.22	MU292691
				0	20.27	9.69	MU312724
				0	20.28	9.76	MU334910
				0	20.44	9.89	MU342027
				0	20.44	9.64	MU342044
				0	20.51	10.12	MU342037
				0	20.72	9.77	MU305584
0.004	0.002	0.07	0	0	20.93	10.29	MU334582
				0	21.12	10.13	MU305634
				0	21.15	9.93	MU305856
0.005	0.001	0.13	0	0.02	21.3	10.51	MU334367
				0	21.56	10.37	MU292692
				0	21.8	10.43	MU305815
				0	22.03	10.75	MU305799
				0	22.3	10.41	MU342050
				0	22.33	11.08	MU342038
0.003	0	0.11	0.003	0	22.44	11.23	MU305694
				0	22.63	10.58	MU305800
0.01	0.023	0.6	0.004	0	22.97	11.94	MX056120
				0	23.08	11.47	MU305595
				0	23.31	12.33	MU341984
0.008	0.006	0.28	0	0	23.4	12.31	MU334416
				0.009	23.7	12.66	MU305860
				0	23.78	11.74	MU334852
				0	23.92	10.78	MU334851
0.003	0.004	0.31	0	0	23.99	12.11	MU334433
				0	24.04	12.15	MU342033
0.003	0.004	0.14	0	0	24.38	12.61	MU334439
				0	24.49	10.6	MU334885
				0	24.54	12.39	MU334863
0.007	0.019	0.33	0	0	24.55	13.49	MX056139
0.003	0.002	0.19	0	0	24.7	12.73	MU334509
0.017	0.009	0.05	0.012	0.009	24.75	13.39	MU305770
0.007	0.011	0.3	0	0	25	11.06	MU334410
0.002	0.003	0.3	0	0	25	13.5	MU334438
0.009	0.009	0.25	0.003	0	25.29	13.63	MU334366
0.004	0.003	0.13	0	0	25.43	11.7	MU305677
0.004	0.002	0.16	0	0.063	25.59	7.74	MU334354
0	0.004	0.11	0	0	26.25	14.29	MU334563

INCO assay data

0.005	0.005	0.23	0	0	26.33	13.93	MU334435
0.013	0.012	0.39	0	0	26.41	13.96	MU334415
0.005	0	0.21	0	0.01	26.58	14.5	MU334759
0.006	0.019	0.28	0	0	27.42	14.41	MU334364
0.005	0.004	0.34	0	0	27.7	14.56	MU334413
0.005	0.015	0.79	0	0	28.31	16.56	MU334412
0.003	0	0.2	0	0.008	29.02	16.57	MU334279
				0	29.38	16.3	MU292840
0.012	0.005	0.21	0	0	29.39	15.37	MU334365
				0	30.16	16.88	MU341983
0.006	0.004	0.2	0.003	0	31.57	17.26	MU334436
0.005	0	0.03	0.002	0	31.58	17.69	MU305692
0.005	0.002	0.22	0	0	31.88	17.52	MU334437
0.004	0	0.09	0	0	31.89	19.13	MU305073
				0	32.21	19.69	MU292834
				0	32.56	18.67	MU292876
0	0.002	0.11	0	0	32.7	18.51	MU334591
				0	32.75	19.28	MU305324
0.004	0.001	0.1	0	0	33.36	19.48	MU334599
				0.006	33.48	19.28	MU305843
				0	33.8	19.91	MU292870
0.048	0.002	0.16	0.004	0.244	34.02	20.14	MU334301
				0	34.6	21.04	MU305552
				0.009	34.63	20.74	MU305617
0.004	0.002	0.1	0	0	34.67	20.67	MU334734
0.005	0	0.39	0	0.01	34.97	21.38	MU334273
				0	35.08	22.13	MU292881
0	0.002	0.11	0.003	0	35.23	21.01	MU334593
				0	35.28	20.79	MU292872
0.006	0.002	0.05	0	0	35.58	20.87	MU334757
				0	35.8	19.56	MU305310
0.002	0.003	0.14	0	0	35.96	21.71	MU334594
0	0	0.13	0	0	36	21.38	MU334592
0.005	0.003	0.08	0.004	0	36.21	21.24	MU334733
				0	36.29	21.86	MU292841
				0	36.52	22.77	MU292874
				0	36.74	21.73	MU292795
				0.008	36.74	22.77	MU305652
0.005	0.003	0.16	0	0	36.84	21.09	MU334598
				0	36.9	22.27	MU334834
				0	36.92	22.38	MU292794
				0	36.97	22.45	MU292875
0.008	0.007	0.17	0	0	37.01	22.08	MU334472
0.006	0	0.05	0	0	37.33	21.58	MU334322
0.004	0.002	0.08	0	0	37.45	22.51	MU334732
				0	37.67	23.1	MU292871
0.005	0.001	0.21	0	0	37.68	23	MU334270
0.009	0.002	0.16	0.003	0	37.73	22.85	MU334277
				0	37.94	23.78	MU292869
				0	37.94	22.8	MU334835
0.005	0.002	0.19	0	0	38.05	22.35	MU334276
				0	38.14	23.31	MU292796

INCO assay data

				0	38.25	23.84	MU292879
0.006	0.001	0.19	0	0.009	38.71	22.17	MU334274
				0	38.73	24.46	MU292882
				0	38.79	23.07	MU292839
0.004	0.003	0.08	0.003	0	38.94	23.17	MU334471
0.003	0.003	0.14	0	0	38.97	23.64	MU334595
				0	39.41	24.37	MU292878
0.007	0.002	0.08	0	0	39.42	22.38	MU334278
				0	39.67	24.32	MU334836
0.006	0.003	0.21	0.003	0	39.77	25.29	MU334271
0.005	0.005	0.16	0	0	39.86	24.53	MU334473
0.006	0	0.13	0	0	40.74	25.34	MU334272
0.002	0	0.11	0.003	0	41.35	25.31	MU334590
0.004	0.003	0.08	0	0	41.84	24.97	MU334596
				0	42.08	26.35	MU292880
0.004	0	0.04	0	0	42.91	25.1	MU305678
0.004	0.001	0.13	0	0	45.23	26.61	MU334275
				0	9.26	0.82	MU249067
				0	10.4	2.18	MU258312
				0	11.75	3.26	MU249002
				0	12.05	3.94	MU249003
					5.081	0.29	MU145432
0.003	0				5.458	0.15	MU133431
0	0				6.283	0.11	MU126388
0	0				6.301	0.13	MU133426
				0	6.68	0.31	MU292487
0.002	0.001	0.01	0	0	6.7	0.01	MU313673
0.001	0.001	0.02	0	0	6.79	0.16	MX054424
					6.832	0.28	MU145430
				0	6.84	0.87	MU277084
0	0	0.01	0	0	6.88	0.01	MU313671
0.008	0.003				6.885	0.33	MU126385
0.002	0	0.01	0	0	6.91	0.23	MU306000
0.003	0.002	0.03	0	0.007	6.99	0.29	MU313348
0	0				7.027	0.06	MU133437
0.004	0				7.069	0.2	MU133428
				0	7.08	0.14	MU292492
				0	7.1	0.16	MU313702
				0	7.16	0.05	MU292491
				0	7.16	0.15	MU312716
0.008	0.006	0.07	0	0	7.27	0.46	MU313684
0	0				7.273	0.21	MU133432
0.011	0.003				7.332	0.35	MU126386
0.025	0.004	0.05			7.341	1.7	MU104036
0.003	0.003	0.02	0	0.013	7.39	0.18	MX054423
0.012	0.002				7.402	1.9	MU151068
0.004	0	0.03	0	0	7.41	0.04	MX054263
0.013	0.003				7.452	0.79	MU126389
				0	7.48	0.38	MU292493
0.006	0.004	0.04	0	0.01	7.53	0.56	MU313347
				0	7.55	0.53	MU292498
0.002	0	0.02	0	0	7.56	0.36	MU313363

INCO assay data

				0.006	7.6	0.35	MU292486
0.007	0	0.03	0	0.04	7.63	0.41	MU313174
0.011	0.003	0.07	0	0	7.65	1.13	MU313001
0.004	0.002	0.03	0	0	7.65	0.63	MU313002
0.001	0	0.02	0	0	7.66	0.04	MU313677
				0	7.73	0.61	MU313015
0.007	0.002				7.76	1.48	MU151283
				0	7.76	0.43	MU292482
0.003	0	0.01	0	0	7.77	0.21	MU312987
0.006	0.002				7.779	0.52	MU151281
					7.804	0.39	MU170182
0.01	0.002				7.806	0.46	MU104040
0.005	0.004	0.04	0	0.013	7.81	0.52	MU313198
				0	7.82	0.28	MU276736
0.004	0	0.03	0	0	7.82	0.24	MX054262
0.002	0	0.02	0	0	7.83	0.21	MU313676
				0	7.84	0.12	MU276732
0.003	0.002				7.884	0.6	MU151277
				0	7.89	0.55	MU258541
0.006	0.003				7.906	0.59	MU133436
0.009	0.004				7.909	0.66	MU133435
				0	7.91	0.85	MU276735
0.009	0.003				7.925	1.05	MU126391
0.01	0.003				7.959	1.25	MU133429
0.006	0.004	0.09	0	0.007	8.07	0.58	MU313442
0.006	0.005	0.05	0	0.013	8.08	0.52	MU313364
				0	8.1	2.1	MU248519
0.004	0	0.03	0	0.006	8.11	0.6	MU313349
0.004	0.002	0.03	0	0	8.14	0.75	MX054275
0.004	0.002				8.187	0.94	MU151280
					8.189	1.66	MU145431
0.003	0.002	0.05	0	0	8.2	0.4	MU313202
				0.008	8.2	0.78	MU313704
0.004	0.003	0.05	0	0	8.22	0.55	MU313682
0.003	0.005	0.02	0	0.009	8.24	0.37	MU305999
				0	8.24	0.61	MU313703
				0	8.25	1.04	MU312717
0.004	0.003	0.06	0	0	8.25	0.44	MU313443
0.01	0.004				8.276	0.77	MU133434
0.003	0.003	0.07	0	0	8.31	0.65	MU305739
0.006	0.002				8.32	1.12	MU151065
0.005	0				8.323	1.31	MU126387
0.006	0.005	0.11	0	0	8.34	0.8	MX054422
0.007	0.003				8.375	0.49	MU133433
				0	8.4	0.44	MU276731
0.004	0	0.04	0	0.011	8.51	0.61	MU313177
0.014	0.004	0.07	0	0	8.52	0.84	MU305776
0.019	0.005				8.64	1.47	MU126390
0.006	0.003	0.08	0	0	8.65	0.77	MU313446
0.011	0.006				8.726	1.59	MU151064
				0	8.76	0.48	MU276737
0.005	0	0.04	0	0	8.78	1.07	MX054274

INCO assay data

				0	8.8	1.31	MU342055
0.006	0.003				8.835	1.79	MU151278
				0.025	8.84	1.38	MU292104
0.005	0.001	0.05	0	0	8.86	0.69	MU313678
					8.913	1.05	MU170136
0.015	0.005				8.93	1.23	MU104042
0.01	0.006	0.09	0	0.008	8.93	1.04	MU312988
				0	8.95	0.87	MU276846
				0	8.97	1.11	MU312745
0.007	0.007	0.11	0	0	8.97	1	MU313688
0.012	0.005	0.07	0	0	8.97	1.37	MX054272
0.007	0.004				8.995	1.44	MU170042
0.014	0.004				9.049	2.3	MU151066
0.004	0.002				9.085	2.34	MU170185
0.036	0.013				9.175	2.18	MU133430
0.006	0.005	0.14	0	0	9.22	1.22	MU313444
0	0	0	0	0	9.23	0.22	MX054271
0.001	0.001	0.01	0	0	9.24	0.56	MU312997
0.021	0.007	0.07	0	0	9.24	1.99	MX054273
0.003	0	0	0	0	9.31	0.22	MX054268
				0.008	9.32	1.01	MU313217
				0	9.35	1	MU292712
				0	9.35	1.16	MU305591
0.007	0.005				9.356	1.88	MU151318
					9.387	1.64	MU170137
				0	9.4	1.6	MU357347
				0.028	9.41	1.67	MU313705
0.017	0.021	0.12	0	0.009	9.43	1.66	MU313175
0.007	0.004	0.11	0	0	9.46	1.17	MU313447
0.007	0.005	0.16	0	0	9.46	1.63	MU313685
0.008	0.005	0.13	0	0	9.48	1.5	MU313003
0.029	0.01	0.11			9.488	2.28	MU104033
				0	9.49	1.07	MU276696
				0.01	9.51	1.59	MU313219
0.006	0.004				9.516	1.71	MU170148
0.005	0.007				9.526	1.8	MU151314
0.011	0.037	0.17	0	0	9.57	1.39	MU313365
0.003	0.005	0.08	0	0	9.6	0.93	MU292964
0.006	0.005	0.05	0	0.006	9.61	0.67	MU313362
0.034	0.008	0.07			9.621	2.36	MU104034
				0	9.68	1.78	MU292494
				0	9.68	1.81	MU342042
				0	9.72	1.64	MU342040
					9.756	1.85	MU170130
				0	9.78	2.28	MU258546
0	0	0	0	0	9.81	0.32	MU305074
				0	9.88	1.94	MU276829
				0.018	9.88	2.47	MU292497
				0	9.89	2.03	MU248672
0.009	0.006	0.11	0	0.014	9.9	2.42	MU312993
				0	9.92	1.53	MU305592
0.018	0.013	0.17	0	0	9.94	1.99	MU313010

INCO assay data

				0	9.99	1.2	MU276828
				0	10	2.62	MU258542
				0	10.01	2.27	MU313021
0.011	0.009	0.16	0	0	10.08	1.54	MU313450
				0	10.1	1.64	MU277021
				0	10.11	2.83	MU305620
0.027	0.011	0.18	0	0.018	10.11	2.44	MU305718
				0	10.12	2.13	MU292485
				0	10.14	1.81	MU292331
				0	10.14	1.77	MU312744
				0	10.18	2.09	MU313018
0.008	0.003	0.06	0.002	0	10.22	1.27	MX056068
0.035	0.013	0.23	0	0.01	10.28	2.63	MU305775
				0	10.3	2.39	MU276830
				0	10.37	2.34	MU313706
					10.43	2.62	MU170135
0.019	0.018	0.28	0	0	10.44	2.09	MU313689
				0	10.5	3.27	MU276801
0.012	0.011	0.22	0	0	10.53	1.91	MU313370
				0.025	10.57	2.28	MU313218
0.012	0.005				10.571	2.39	MU151313
				0.118	10.59	1.97	MU313213
				0.008	10.6	2.21	MU276998
0.016	0.006				10.617	2.42	MU170149
0.017	0.016	0.16	0.002	0.012	10.62	2.33	MU313178
				0	10.7	2.04	MU292117
0.037	0.008				10.727	3.91	MU151063
				0.006	10.77	2.6	MU313216
0.011	0.014				10.798	4.73	MU151308
				0	10.8	2.82	MU276782
				0	10.8	2.76	MU357346
0.02	0.013	0.32	0	0.017	10.83	2.76	MU312996
				0.078	10.85	2.35	MU313214
				0	10.9	3.4	MU248522
0.006	0.005				10.965	3.38	MU170035
0.025	0.017	0.21	0	0.078	10.99	2.76	MU313180
				0	11.01	2.79	MU292483
0.016	0.006	0.13	0	0.011	11.04	2.31	MU313674
0.011	0.013	0.24	0	0.008	11.08	2.98	MU313181
0.03	0.016	0.14	0	0.055	11.17	2.58	MU313199
				0	11.2	3.37	MU276831
				0.048	11.25	2.8	MU313215
				0.017	11.28	3.13	MU292484
				0	11.3	3.26	MU248623
				0	11.4	2.78	MU248606
				0	11.5	4.54	MU248798
				0.042	11.5	2.43	MU292055
				0.011	11.59	3.57	MU305823
				0.013	11.6	2.77	MU313212
				0	11.6	3.75	MU357355
0.009	0.006	0.15	0	0	11.65	3.01	MU313351
0.006	0.006				11.659	3.51	MU170052

INCO assay data

				0	11.7	3.3	MU248674
0.003	0.007	0.2	0	0	11.8	2.46	MU305680
				0	11.82	3.97	MU342054
				0	11.9	4.09	MU276800
				0	11.9	3.6	MU305832
0.002	0.001	0.03	0	0	11.95	0.55	MU313670
0.018	0.018	0.19	0	0.012	11.98	3.42	MU313352
0.023	0.02	0.5	0	0.016	12.05	3.92	MU312994
0.009	0.008	0.2	0	0	12.14	3.36	MU313350
0.017	0.018	0.24	0	0	12.23	3.35	MU313179
				0	12.3	3.44	MU305589
					12.399	3.94	MU170054
0.038	0.009				12.412	6.01	MU151067
				0	12.5	1.72	MU277390
				0	12.5	2.91	MU292064
				0.011	12.5	3.52	MU277370
				0	12.54	3.05	MU305579
					12.625	4.39	MU170061
0.026	0.005	0.14	0	0	12.74	3.91	MX054270
				0	12.75	4.68	MU248817
0.02	0.007				12.814	4.58	MU170189
					12.874	4.72	MU151246
0.019	0.017	0.52	0	0	12.95	4.14	MX056121
0.008	0.005	0.2	0	0	12.98	3.91	MU313448
0.004	0.003	0.29	0	0.009	13.09	4.45	MU305182
				0	13.13	3.45	MU292681
				0	13.2	4.19	MU292100
0.026	0.004				13.301	5.55	MU151279
					13.404	4.74	MU170097
				0	13.5	4.19	MU248912
0.037	0.007	0.13			13.522	6.7	MU104035
				0	13.6	4.61	MU276781
				0	13.64	1.79	MU334829
				0	13.65	3.74	MU248651
				0	13.7	2.23	MU248649
				0	13.72	3.5	MU292697
				0.1	13.85	4.03	MU248593
0.002	0	0.16	0	0	14.1	4.2	MU248411
					14.107	5.48	MU170108
0.007	0.005				14.107	5.45	MU170146
				0.04	14.15	3.76	MU248592
					14.29	5.35	MU170096
				0.03	14.35	4.7	MU248591
				0	14.36	4.46	MU342043
0.009	0.01				14.433	6.05	MU170147
				0.01	14.6	5.53	MU248710
0.03	0.006	0.1	0.003	0	14.69	5.04	MX054269
					14.712	5.25	MU151258
				0	14.85	4.65	MU305362
0.006	0.006				14.867	6.18	MU151309
				0	14.93	6.15	MU292495
				0	14.95	5.72	MU248568

INCO assay data

0.003	0	0.12	0	0.011	14.98	5.79	MU305181
0.006	0.009	0.338	0	0	15	4.52	MU248961
					15.052	6.11	MU170083
					15.156	5.63	MU170180
				0	15.45	6.37	MU248777
					15.489	5.66	MU170125
				0	15.7	6.39	MU248512
					15.735	6.06	MU151262
				0	16.15	4.31	MU248557
					16.2	7.45	MU170134
0.004	0.006	0.24	0	0	16.3	6.6	MU248412
0	0	0.08	0	0	16.32	6.89	MU305180
					16.389	6.55	MU151259
				0	16.4	5.94	MU248644
					16.472	5.42	MU170118
				0	16.6	8.77	MU357345
					16.629	7.32	MU170060
				0	17	5.39	MU248643
0.015	0.015	0.47	0	0	17.07	8.28	MU312995
0.004	0.006	0.26	0.004	0	17.42	6.81	MU334358
0.008	0.006				17.423	8.13	MU151317
0.035	0.005	0.16	0	0	17.51	7.9	MX054257
				0	17.53	7.23	MU305831
				0	17.82	7.65	MU305829
				0	17.82	7.61	MU305830
				0	18.15	3.66	MU248647
0.002	0.004	0.23	0	0	18.18	6.32	MU305679
					18.242	7.97	MU170121
				0	18.4	6.31	MU248642
				0	18.58	5.89	MU305575
				0.01	18.6	7.92	MU248709
					18.657	8.29	MU170131
				0	18.77	7.27	MU292683
				0	18.95	8.19	MU258535
				0	19.2	9.25	MU276941
					19.606	8.64	MU170120
0.005	0.007				19.711	9.95	MU170051
0	0	0.08	0	0	19.87	8.84	MU292996
				0.037	19.9	9.57	MU276809
0.004	0				20.012	10.36	MU170021
					20.153	9.56	MU151248
0.008	0	0.08	0.002	0	20.17	9.17	MU305735
				0	20.43	7.81	MU305440
				0	21.1	10.8	MU248513
				0	21.9	8.67	MU248645
					22.862	13.23	MU170123
0	0	0.18	0	0	23.01	11.75	MU292997
					23.086	11.59	MU170117
				0	25	12.1	MU248511
				0	25.7	10.7	MU248646
				0	27	13.5	MU277170
					27.495	16.42	MU170058

INCO assay data

					27.571	15.15	MU170055
				0	27.6	14.4	MU248516
					28.546	15.6	MU170056
0.005	0.001	0.14	0.003	0	28.88	13.32	MU334359
					28.977	15.97	MU170132
					29.13	16.53	MU151252
					29.272	17.14	MU170129
				0	29.6	15.8	MU258528
					29.796	17.76	MU151251
				0	29.9	14.5	MU248505
0.005	0.004	0.39	0.009	0	31.46	15.46	MU334708
				0	32.7	19.8	MU248812
				0	33.1	18.6	MU248589
				0	33.3	20.5	MU248776
				0	33.8	18.1	MU248610
				0	34	18.8	MU248515
				0	35.2	20.2	MU248508
				0	35.8	22.5	MU248775
				0	36	18.5	MU248609
				0	36.4	18.9	MU248650
				0	37.3	21.9	MU248506
				0	37.7	19.9	MU248514
				0	39.2	20.6	MU248507
				0.01	44.3	25.5	MU248708
				0	18.3	7.79	MU276710
				0	22.5	9.67	MU276729
0.009	0.007				26.352	15.83	MU151312
				0	26.7	13.9	MU248571
				0	27.1	12.7	MU248530
					27.498	15.17	MU151255
0.006	0.002	0.22	0	0	29.2	15.7	MU248409
				0	29.5	17.2	MU248607
0.006	0.003				29.864	20.05	MU151316
					29.98	17.02	MU151256
				0	31.7	17.4	MU248554
				0	32	18.5	MU248440
					32.343	19.98	MU151254
0.005	0	0.23	0	0	32.5	19.3	MU248408
0.008	0.006				32.788	20.16	MU151311
0.006	0.01				33.214	20.07	MU151310
					35.206	22.11	MU170057
				0	36.1	18.8	MU248540
				0.02	39.3	21.3	MU248611
				0	39.5	21.9	MU259187
				0	39.6	24.7	MU248570
					40.978	24.93	MU151260
				0	43	26.6	MU248444
				0	45.2	28.5	MU248539
					50.082	32.32	MU151250
0.005	0.002	0.154	0	0	3.53	18.35	MX053514
				0	9.54	1.47	MU276836
				0	14	4.8	MU276837

INCO assay data

				0	16.8	10.41	MU292478
				0.011	17.7	7.46	MU276839
0.006	0.006	0.13	0	0	17.8	7.84	MU334155
				0	19.1	9.38	MU277060
				0	19.6	8.68	MU276711
				0	19.77	12.41	MU292480
				0	19.9	8.8	MU276838
				0	20	7.56	MU276753
0.004	0.004	0.22	0	0	20.23	7.57	MU292501
				0.04	20.3	11.83	MU357342
				0	20.6	10.8	MU292095
				0	21	15.1	MU276987
0	0	0.93	0	0	22.43	15.97	MU334724
				0	22.48	11.49	MU292334
				0	22.9	17.8	MU292020
				0	23.3	15.5	MU277339
				0	24	13.1	MU276993
				0	24.4	12.3	MU277056
				0	24.8	11.4	MU248573
				0	25.7	21.6	MU357354
				0	26	12.26	MU292222
				0	26.2	12.1	MU277442
0.175	0.168	1.58	0.005	0.258	26.54	19.71	MX056131
				0	26.6	15.4	MU357356
				0	26.8	15.2	MU276928
				0	27.22	14.93	MU305588
				0	27.4	18	MU248531
				0	27.54	18.58	MU342236
				0	27.6	15.4	MU248532
				0	28.1	15	MU258436
0.016	0.016	0.66	0.005	0	28.69	16.36	MX054436
				0	29.23	17.31	MU292682
				0	29.5	15.9	MU258533
0.004	0	0.04	0.006	0	29.74	16.47	MU305767
				0	30	15.8	MU259182
				0	30.3	16	MU258252
				0	30.3	15.5	MU277441
				0	30.9	15.7	MU276860
0.006	0.005	0.55	0.005	0	30.9	19.3	MX054427
0.515	0.267	0.49	0	1.531	30.92	21.22	MX053533
				0	31.4	20.3	MU248528
				0	31.42	19.44	MU292214
				0	31.5	23.2	MU276755
0.004	0.002	0.56	0	0	31.62	18.99	MU334516
				0	31.7	18.4	MU276715
0.005	0.004	0.06	0.004	0	32.63	19.53	MU313449
				0	32.9	19.1	MU248569
				0	33.3	19.1	MU248533
				0	33.3	17	MU276756
				0.03	33.4	20.3	MU258301
				0.007	33.43	20.05	MU305378
0.006	0	0.33	0	0	33.46	19.22	MU334493

INCO assay data

0.002	0	0.38	0	0	33.64	19.13	MU334518
				0	33.7	19.1	MU258579
0.008	0.003	0.04	0	0	33.75	20.94	MU334705
				0	33.8	21.4	MU292110
0.004	0.003	0.35	0	0	34.06	16.56	MX056011
0.005	0	0.11	0.005	0.015	34.11	19.28	MU334508
				0	34.18	20.75	MU305379
0.006	0	0.15	0	0.01	34.19	19.45	MU334487
0.006	0.016	0.23	0	0.007	34.33	18.73	MU334488
0.003	0	0.13	0	0	34.52	17.03	MU305702
				0	34.57	18.93	MU305439
				0	34.66	18.79	MU334850
				0	34.7	28.8	MU277093
				0	34.7	25.3	MU357322
				0	34.86	20	MU292763
				0.057	34.87	25.54	MU292695
				0	34.9	21.1	MU258577
0.197	0.007	3.64	0.004	0.262	34.98	29.67	MX054440
				0	35.1	20.5	MU258250
0.003	0	0.03	0	0	35.53	21.23	MU305713
				0	35.54	23.87	MU342023
				0	35.73	20.69	MU292762
				0	35.8	21.7	MU258251
					35.91	22.52	MU170095
0.006	0.004	0.39	0.004	0	36.13	22.99	MU334476
				0.02	36.5	22.6	MU258299
					36.547	21.98	MU170179
0.004	0.002	0.08	0	0	36.62	21.3	MU334486
				0	36.71	21.96	MU305850
0.005	0.004	0.19	0.003	0	36.84	21.78	MX054343
0.005	0.002	0.21	0	0	36.88	21.46	MU334504
				0.021	36.95	39.78	MU292149
0.006	0.003	0.25	0	0	36.99	22.8	MU334267
0.006	0.005	0.39	0.003	0	37.05	21.87	MX054341
0.002	0.003	0.14	0	0	37.12	23.11	MU334588
0.006	0.005	0.33	0	0	37.15	22.32	MU334483
0.007	0.001	0.14	0	0	37.24	21.59	MX054323
0.006	0	0.27	0	0	37.39	21.87	MU334482
0.005	0.006	0.39	0	0	37.45	23.65	MU334477
				0	37.58	22.17	MU334847
0.008	0.013	0.41	0	0	37.61	22.78	MU334495
				0	38	19.4	MU276748
0.004	0.002	0.14	0	0	38.16	22.18	MU334507
				0	38.29	23.66	MU334832
					38.336	24.44	MU170124
0.005	0.002	0.03	0	0	38.38	23.61	MU313687
0.004	0	0.06	0	0	38.43	21.83	MU334353
0.009	0.002	0.2	0	0	38.45	22.43	MX054322
0.004	0.002	0.32	0.003	0	38.48	23.07	MU334498
0.008	0.001	0.28	0	0	38.68	24.07	MU334348
0.007	0.004	0.12	0	0	38.73	23.32	MU334736
0.014	0.006	0.05	0	0	38.74	24.27	MU334589

INCO assay data

0.004	0.001	0.15	0.003	0	38.76	21.86	MU334505
0.004	0.004	0.32	0	0	38.89	23.94	MU334481
				0	38.9	26.5	MU276764
				0	38.9	22	MU276911
				0	38.98	24.05	MU292877
				0	39.08	22.99	MU334831
0.004	0.004	0.4	0	0	39.13	24.36	MU334501
0.005	0.004	0.13	0.003	0	39.15	23.34	MU334597
				0	39.2	24.7	MU276856
0.005	0.002	0.15	0	0	39.2	23.17	MU334485
0.011	0.004	0.1	0.003	0	39.25	23.74	MU305177
0.006	0.002	0.08	0	0	39.25	23.16	MU334731
0.006	0.004	0.51	0.003	0	39.35	23.59	MX054342
				0	39.52	23.61	MU334848
0.004	0.002	0.25	0	0	39.56	23.9	MU334496
0.003	0.002	0.25	0	0	39.57	23.86	MU334502
0.008	0	0.17	0	0.029	39.61	23.62	MU334351
0.003	0.002	0.21	0.003	0	39.66	21.84	MU334519
0.004	0	0.21	0.004	0	39.69	23.49	MU334500
0.01	0.005	0.27	0	0	39.72	22.63	MU334494
0.006	0.002	0.11	0	0	39.96	23.46	MU334503
				0	40.07	23.62	MU292842
0.002	0	0.13	0	0	40.09	24.86	MU334349
0.006	0.001	0.18	0	0	40.19	23.25	MU334499
				0	40.2	25.4	MU258527
0.009	0.006	0.17	0	0	40.21	24.64	MU334479
0.008	0.002	0.32	0	0	40.54	25.53	MX054319
0.006	0.003	0.14	0	0	40.58	23.45	MU334506
				0	40.63	24.09	MU334833
				0.02	40.73	27.1	MU313019
0.006	0.005	0.11	0	0	40.74	25.29	MU334735
0.008	0	0.15	0	0	40.83	24.59	MU334352
				0	40.87	24.07	MU292835
				0	41.1	24.21	MU334830
0.007	0.004	0.22	0	0	41.15	25.52	MU334266
				0	41.2	29.7	MU248815
0.005	0.003	0.15	0.003	0	41.39	25.54	MU334474
				0	41.4	23.9	MU258239
				0	41.43	23.1	MU305574
0.005	0.013	0.26	0	0	41.43	24.54	MU334497
0.01	0	0.08	0	0.065	41.49	25.21	MU334350
0.007	0.003	0.21	0	0	41.6	25.31	MU334475
0.007	0.003	0.13	0.004	0	41.63	26.66	MX053575
0.007	0.001	0.19	0	0	41.67	25.24	MX054321
				0.221	41.69	30.74	MU305953
0.012	0.004	0.3	0	0	41.69	27.22	MX054348
0.007	0.003	0.08	0	0	41.78	24.79	MU334737
				0	41.8	21.5	MU277376
				0	41.85	25.83	MU292873
0.004	0.002	0.12	0	0	41.97	26.22	MU334347
0.007	0.006	0.15	0	0	41.99	24.05	MU334470
0.006	0.005	0.2	0	0	42.24	25.2	MU334484

INCO assay data

0.004	0	0.07	0	0	42.37	23.04	MU305701
0.005	0	0.17	0	0	42.44	26.09	MU334480
				0	42.6	25.5	MU248572
				0	42.63	25.1	MU334849
0.008	0.002	0.13	0.003	0	43.41	27.72	MX053573
0.008	0.002	0.16	0	0	43.8	28.15	MX054353
0.006	0.003	0.12	0.003	0	43.8	26.07	MU334268
0.007	0.002	0.21	0.004	0	43.87	27.86	MX053572
				0	44	25.5	MU248590
0.009	0.001	0.16	0	0	44.26	26.41	MX054320
0.005	0	0.2	0	0	44.43	28.07	MX054318
0.004	0	0.14	0	0	44.49	27.19	MU334478
0.008	0.005	0.24	0	0	44.54	29.49	MX054347
				0	44.62	26.27	MU292833
0.006	0.003	0.33	0	0	44.79	27.46	MX054315
				0	45.5	23.3	MU248648
				0	45.52	27.63	MU334841
0.009	0.004	0.14	0.004	0	45.75	29.35	MX053571
0.008	0.002	0.1	0	0	45.88	28.16	MU334269
				0	46.3	25.3	MU277377
0	0.003	0.04	0	0	46.41	24.89	MU292505
0.005	0.002	0.08	0	0	46.43	30.12	MX053574
				0	46.5	32.1	MU258499
0.003	0.001	0.12	0	0	46.64	27.24	MU334411
0.003	0	0.07	0	0	46.66	31.52	MU292503
					46.811	29.81	MU170133
0.004	0.006	0.09	0	0	47.37	30.37	MU334346
				0	47.4	29.6	MU258203
0	0.002	0.03	0.005	0	47.4	28.73	MU334409
0.004	0	0.08	0	0	47.78	30.11	MU334345
0.004	0.002	0.11	0.003	0	47.8	30.65	MX054317
0.006	0.002	0.27	0	0	47.83	32	MX054349
0.006	0.004	0.11	0	0	47.94	29.55	MX054316
0.006	0.003	0.16	0.004	0	48.14	31.96	MX054351
0.006	0.001	0.12	0.003	0	48.34	30.6	MU334343
0.009	0.003	0.18	0	0	48.36	28.7	MX054345
0.004	0.003	0.09	0.003	0	48.55	30.64	MU334344
					48.604	32.32	MU151257
				0	48.8	30.5	MU277169
				0	48.8	29.7	MU277472
0.01	0.005	0.16	0	0	48.8	30.93	MX054346
				0.01	48.9	29.3	MU248684
				0	49	29.7	MU258268
0.005	0.003	0.07	0.004	0	49.35	31.64	MU334342
				0	49.6	30.3	MU248526
					49.802	32.07	MU151261
0.005	0.003	0.26	0	0	49.99	29.09	MX054314
				0.04	50	28.8	MU248689
					50.353	32.07	MU151253
0.006	0.001	0.15	0.003	0	50.49	30.99	MU334265
0.005	0.001	0.06	0.003	0	52.23	34.52	MX054352
0.005	0.002	0.1	0	0	52.24	31.95	MX054344

INCO assay data

0.008	0.001	0.17	0	0	52.57	29.84	MX054313
				0	53.72	37.02	MU341952
				0	54.56	28.94	MU334856
				0	7.28	0.25	MU249101
				0	7.3	0.52	MU249111
				0	7.8	2.84	MU277092
				0.014	7.83	1.6	MU276810
				0	8.49	1.12	MU249103
				0	8.67	0.82	MU249102
				0	8.67	1.12	MU258258
				0	8.74	1.7	MU258307
				0	8.9	1.47	MU258304
				0	8.9	1.51	MU258574
				0	9.25	1.35	MU258548
				0	9.45	2.37	MU258573
				0	9.49	1.02	MU258522
				0	9.56	1.41	MU276834
				0	9.57	1.72	MU258540
				0	9.78	1.86	MU258247
				0	9.87	1.97	MU258306
				0	9.88	2.86	MU258245
				0.01	10.15	2.15	MU258599
				0	10.3	1.57	MU258266
				0	10.33	2.79	MU292123
				0.008	10.4	1.4	MU277031
				0	10.45	3.17	MU258524
				0	10.7	0.8	MU248442
				0	10.8	3.19	MU277095
				0	10.85	2.81	MU258547
				0	10.9	2.23	MU276845
				0.02	11.2	0.63	MU248687
				0.03	11.4	1.45	MU248686
				0	11.4	2.79	MU276892
				0	11.5	2.57	MU292053
0.005	0.003	0.06	0	0	11.53	0.65	MU313367
				0	11.74	3.72	MU292135
				0	12.25	3.76	MU258257
0.012	0.01	0.27	0.002	0	12.28	3.42	MU313366
0.023	0.022	0.36	0	0	12.29	3.47	MU313371
				0	12.5	3.78	MU258526
				0.01	12.5	3.72	MU258576
0.013	0.008	0.22	0	0.009	12.6	3.54	MU313445
				0	12.75	4.3	MU313020
				0	13.25	4.74	MU258532
				0	13.3	3.66	MU259142
0.007	0.022	0.18	0	0	13.6	4.1	MU248413
				0	13.85	2.92	MU258578
				0	14	2.8	MU248445
				0	14.05	4.83	MU258435
				0	14.06	5.06	MU313708
				0	14.15	4.52	MU258255
				0.02	14.5	4.77	MU248612

INCO assay data

				0	14.5	4.99	MU277030
				0	15	4.66	MU276858
				0	15.5	5.59	MU248907
				0	15.5	4.57	MU276861
				0	15.7	4.77	MU248525
				0	16.44	4.18	MU313707
				0	16.5	7.16	MU248509
				0	17	6.61	MU258267
				0	17.5	5.99	MU276844
				0	18.7	6.7	MU276859
				0	19.1	7.07	MU258269
				0	19.5	6.5	MU248441
				0	19.7	6.51	MU277378
				0	21.5	9.88	MU258248
				0	23.7	16.4	MU277097
				0	23.8	9.9	MU248443
				0	25	12.1	MU276798
				0	26.1	12.8	MU248553
				0	30.2	17.1	MU248556
				0.01	33.4	17.1	MU248685
				0	54.3	33.3	MU248899
0.012	0.002	0.01	0.008	0	21.23	14.28	MU313007
0.006	0.005	0.86	0	0	30.63	20.31	MU292998
0.065	0.04	6.89	0	0.156	32.93	30.59	MX056137
0.066	0.002	0.09	0.003	0.146	33.58	21.23	MU312992
0.002	0.001	0.1	0	0	36.4	23	MU313009
0	0.002	5.26	0	0	36.58	36.33	MX056125
				0.03	37.44	36.23	MU292145
				0	37.54	35.3	MU342093
0	0.002	0.3	0	0	39.14	29.74	MU305001
				0	40.8	32	MU277094
0.005	0	0.24	0	0	40.8	22.94	MU292995
				0	40.9	32.2	MU277096
				0	42.9	27.7	MU292107
0.008	0	2.05	0	0	45.09	37.1	MX056123
0.007	0.003	0.18	0.003	0	46.41	27.65	MX054330
				0	47.67	30.87	MU292915
0.007	0.002	0.18	0	0	48.04	29.53	MX054331
				0	48.4	29.1	MU258201
0.009	0.002	0.17	0	0	50.44	30.96	MX054332
				0	50.6	35.9	MU342053
				0	51.6	29.7	MU259143
				0	52	36.7	MU258455
0.004	0	0.06	0	0	52.13	34.54	MX054350
					53.3	35.2	MU151247
				0	53.8	30.2	MU277375
0.004	0.002	0.02	0.005	0	53.85	34.15	MU334707
				0	54.5	35.04	MU334843
0.007	0.004				54.965	33.29	MU170022
				0	55	31	MU292060
				0	55	29.1	MU292035
0.005	0.002	0.06	0.003	0	55.32	35.23	MX054333

INCO assay data

				0	57.99	35.87	MU334825
0.006	0.001	0.04	0	0	58.46	32.44	MU334360
				0	59	34.3	MU277381
				0	7.3	2.24	MU277089
				0	7.82	4.12	MU276803
				0.012	9.01	0.85	MU276872
				0	9.42	0.99	MU258544
0.013	0.006	0.08	0	0	9.59	1.77	MX054261
				0	9.88	9.47	MU276882
				0	10.17	1.69	MU292926
0.014	0.006	0.09	0	0	10.76	2.57	MX054260
				0	11.1	3.11	MU276805
				0	12.1	3.08	MU277421
				0	12.2	4.25	MU248903
0.009	0.01	0.33	0	0	12.37	3.83	MU313369
				0	12.5	4.56	MU248904
				0	12.83	4.16	MU292227
				0.01	13	3.86	MU277422
				0	13.6	4.43	MU292028
				0	13.9	4.13	MU277403
				0	13.9	4.86	MU277346
0.002	0	0.07	0	0	14.2	4.24	MU248965
				0	14.4	5.64	MU276886
				0	14.4	8.6	MU277083
				0	14.6	5.16	MU276739
				0	14.6	4.61	MU276740
0.022	0.006	0.21	0	0	14.6	5.47	MX054259
0.006	0.017	0.14	0.003	0	14.73	5.44	MU305765
0	0	0.053	0	0	14.9	5.11	MU248964
				0	15	5.18	MU292027
				0	15.1	6.39	MU292097
0.005	0	0.14	0.003	0	15.23	5.67	MU305779
				0	15.4	6.94	MU258311
				0	15.44	5.88	MU292131
0.004	0	0.07	0	0	15.64	5.84	MU305732
0.002	0.002	0.047	0.001	0	15.7	5.57	MU248963
				0	15.7	6.49	MU276695
				0	15.7	6.01	MU292029
				0	15.72	5.7	MU292925
				0	15.77	6.74	MU305453
				0	15.9	6.21	MU292099
				0	15.9	6	MU292076
				0	16	7.23	MU276888
				0	16.1	6.5	MU292026
				0	16.17	6.57	MU292892
				0	16.2	5.78	MU276738
				0	16.3	6.43	MU277034
				0	16.39	5.93	MU292127
				0.027	16.68	6.65	MU292226
0.006	0.002	0.05	0	0	16.69	6.63	MU305782
				0	16.7	6.62	MU277347
0.007	0.003	0.13	0.003	0	16.78	6.83	MU305764

INCO assay data

0.006	0.002	0.12	0	0	16.94	6.97	MU305780
				0	17.1	6.84	MU276871
				0	17.1	6.56	MU277382
				0	17.3	7.14	MU276750
				0	17.4	6.91	MU277420
				0	17.5	7.07	MU277345
0.005	0	0.08	0	0	17.66	7.5	MU305781
				0	17.7	8.35	MU276802
0.006	0	0.11	0.004	0	17.79	7.86	MU305763
				0	17.9	7.84	MU276850
0.005	0	0.08	0.002	0	17.9	7.92	MU305721
0.005	0	0.05	0	0	17.93	8.01	MU305722
0.006	0	0.09	0.003	0	17.94	7.87	MU305766
				0	18	7.61	MU277404
				0.009	18	7.7	MU277032
				0	18.02	7.46	MU292891
				0.035	18.1	7.71	MU276815
				0	18.3	7.2	MU276857
				0	18.6	8.14	MU276817
				0	18.7	8.01	MU276910
0.004	0	0.05	0.002	0	18.78	8.44	MU305723
				0	18.8	8.08	MU276816
				0	18.9	9.13	MU276804
				0	18.9	8.56	MU292075
				0	19.1	8.14	MU276975
				0	19.4	8.26	MU277383
				0	19.6	9.17	MU276709
				0	19.6	9.41	MU276887
0.018	0	0.09	0.002	0.02	19.83	9.15	MU305733
				0	19.9	7.89	MU292052
				0	20	8.23	MU277020
				1.55	20	3.31	MU277002
				0	20.3	9.33	MU276848
				0	20.9	11.5	MU276780
				0	21.1	9.7	MU277033
				0	21.4	10.4	MU276799
				0	22.2	9.65	MU276749
				0	22.2	10.9	MU276971
				0	22.3	11	MU276849
				0.099	22.4	12.7	MU276821
				0	22.7	11.9	MU258534
				0	22.8	9.07	MU258492
				0	22.9	10.9	MU277028
0.008	0	0.07	0.003	0	23.27	11.7	MU305734
				0	23.7	11.9	MU258491
				0	24.1	12.2	MU258488
				0	25.17	12.45	MU292918
				0	25.2	13.5	MU292917
				0	25.5	10.9	MU277379
				0	25.7	11.7	MU258497
				0	25.75	13.57	MU292916
				0.018	26.74	14.31	MU292890

INCO assay data

0.004	0	0.13	0	0.009	27.97	16.54	MU305029
				0.335	28.2	8.36	MU276900
				0	29.3	16.2	MU276951
				0	29.86	16.64	MU292893
				0	30	16.7	MU277489
0.006	0	0.07	0	0	30.36	17.38	MU305179
0.002	0	0.11	0	0	30.54	17.54	MU305143
				0.2	30.7	11.7	MU277001
				0	30.9	13.1	MU277380
				0	31.31	17.13	MU292920
				0	31.58	16.33	MU292924
				0.018	31.91	16.32	MU292843
0.004	0	0.28	0.002	0	32.4	20.52	MU305139
				0	32.57	18.76	MU292912
				0	32.71	21.1	MU292837
				0.013	32.83	18.58	MU292844
				0	32.9	19.1	MU277492
0.004	0	0.1	0.003	0	33.24	19.5	MU305142
				0	33.28	19.58	MU292819
				0	33.29	17.93	MU292919
0.004	0	0.09	0.003	0	33.44	20.21	MU305141
				0.011	33.8	19.7	MU277485
0.005	0	0.1	0.002	0	33.97	20.53	MU305140
				0	34	20.4	MU277487
				0	34.1	20	MU277491
				0	34.3	19.3	MU276968
				0	34.5	21.8	MU276763
				0	34.5	20.3	MU277486
				0	34.56	17.99	MU292923
				0	34.6	20.7	MU277488
				0	34.7	20.6	MU277493
0.009	0.005	0.13	0.002	0	34.79	21.53	MU305178
				0	35.3	21.3	MU276779
				0	35.59	21.42	MU292888
				0	35.6	20.9	MU277494
				0	36.17	21.08	MU292889
				0	36.86	21.9	MU292818
				0	37.13	20.47	MU292911
				0	37.67	22.2	MU292797
				0	38.16	23.2	MU292838
				0	39.47	22.81	MU292921
				0	40.2	27.4	MU276762
				0	41.3	24.89	MU292883
				0	43.3	24.74	MU292922
				0	7.71	0.43	MU277182
				0	12.5	0.3	MU292034
0	0.001	0.014	0	0	1.101	0.13	MX053513
0	0.001	0.011	0	0	1.167	0.12	MX053516
0	0	0.014	0.002	0	2.34	0.09	MX053508
				0	2.78	0.03	MU277058
				0	3.1	0.18	MU259189
				0	3.78	0.15	MU248558

INCO assay data

				0	3.8	0.27	MU357351
0	0	0	0	0	3.82	0.15	MX056143
				0	3.98	1.15	MU248537
0.018	0.013	0.01	0.002	0.035	4.21	0.14	MX056132
				0.018	4.6	0.44	MU277495
				0	4.77	0.07	MU277099
				0	4.99	0.03	MU277091
				0	5.22	0.27	MU292142
				0	5.27	0.52	MU292144
				0	5.31	0.35	MU292143
				0.03	5.39	0.47	MU248601
				0	5.42	0.15	MU277181
				0	5.54	0.09	MU277086
				0	5.55	0.15	MU277088
				0	5.81	0.65	MU277155
				0	6.07	0.09	MU277085
				0	6.1	0.22	MU305619
				0	6.12	0.32	MU277090
0.01	0.012	0.05	0	0	6.18	0.49	MX056130
				0	6.19	0.13	MU258276
				0	6.28	0.14	MU249110
				0	6.28	0.19	MU305822
0	0	0	0	0	6.31	0.05	MX054266
0	0	0	0	0	6.32	0.05	MX054265
				0	6.34	0.4	MU277478
0.001	0	0.01	0.001	0	6.34	0.51	MU313610
				0	6.4	0.03	MU277477
				0	6.4	0.15	MU276994
				0	6.47	0.12	MU258482
				0	6.49	0.24	MU292488
0.003	0.002	0.02	0	0	6.54	0.25	MU313000
0	0.001	0.01	0	0	6.54	0.07	MX054425
				0	6.55	0.31	MU305571
				0.012	6.57	0.32	MU277184
				0	6.6	0.43	MU357353
				0	6.62	0.07	MU292112
				0	6.63	0.24	MU292481
				0	6.64	0.23	MU276811
				0	6.66	0.17	MU249071
				0	6.69	0.17	MU248603
				0	6.7	0.76	MU248818
				0	6.7	0.32	MU276992
				0	6.7	0.28	MU313014
0	0	0	0	0	6.72	0.08	MU313173
				0	6.73	0.28	MU277340
				0	6.74	0.2	MU334884
0	0.002	0.04	0	0	6.76	0.27	MU313546
				0	6.77	0.14	MU292113
				0	6.77	0.21	MU305436
				0	6.77	0.17	MU342237
				0.164	6.79	0.23	MU305952
0	0	0	0	0	6.79	0.31	MX054267

INCO assay data

				0	6.8	0.25	MU259183
				0	6.81	0.14	MU292114
				0	6.81	0.21	MU324121
				0	6.82	0.33	MU313691
0.004	0.002	0.05	0	0	6.82	0.5	MX053534
0	0	0	0	0	6.83	0.04	MX054264
				0	6.85	0.21	MU292146
0	0	0	0	0	6.87	0.13	MU305697
				0	6.88	0.09	MU258244
				0	6.88	0.4	MU276734
				0	6.88	0.12	MU292479
				0	6.89	0.44	MU305597
				0	6.89	0.1	MU312743
0.001	0.001	0.01	0	0	6.89	0.37	MX053535
				0	6.9	0.3	MU249097
0.003	0	0	0	0	6.9	0.17	MU305717
				0	6.91	0.29	MU313013
				0	6.91	0.06	MU324119
				0	6.94	0.03	MU305963
				0	6.95	0.09	MU276876
				0	6.99	0.13	MU249112
				0	6.99	0.07	MU258520
				0	6.99	0.19	MU276820
				0	6.99	0.32	MU276878
				0	7	0.35	MU249100
				0	7	0.06	MU313757
				0	7.01	0.08	MU276991
				0	7.01	0.08	MU276991
				0	7.04	0.25	MU292109
				0	7.05	1.41	MU249052
0	0	0	0	0	7.06	0.6	MU292949
				0	7.07	0.51	MU305633
				0	7.08	0.51	MU292150
				0	7.1	0.09	MU276812
				0	7.1	0.22	MU277476
				0	7.1	0.07	MU334840
				0	7.13	0.45	MU342092
				0.006	7.14	0.29	MU292477
				0	7.15	0.08	MU277372
				0	7.18	0.31	MU248670
				0	7.18	0.37	MU276806
				0	7.18	0.11	MU277175
				0	7.19	0.51	MU277334
0.001	0	0.01	0	0	7.19	0.12	MX056057
				0	7.21	0.27	MU249109
				0	7.23	0.34	MU276883
				0	7.23	0.48	MU313760
				0	7.24	0.19	MU249108
				0	7.25	0.24	MU258434
				0	7.25	0.12	MU276819
				0.01	7.27	0.38	MU258604
				0	7.28	0.06	MU305821

INCO assay data

				0	7.29	0.09	MU258549
				0	7.3	0.08	MU276952
				0	7.3	0.15	MU277185
0	0.001	0.04	0	0	7.3	0.45	MX056105
0	0	0	0	0	7.31	0.04	MU313548
0	0	0	0	0	7.32	0.07	MU312999
				0	7.33	0.42	MU334912
				0	7.37	0.3	MU276977
				0	7.38		MU313222
				0	7.39	0.34	MU276880
				0	7.4	0.07	MU248521
				0	7.4	0.24	MU313758
				0	7.41	0.07	MU341968
0	0	0.01	0	0	7.42	0.14	MU313011
				0	7.44	0.1	MU292057
				0	7.45	0.98	MU313692
				0	7.46	0.24	MU276990
0	0.002	0.02	0	0	7.46	0.29	MX053501
				0	7.47	0.14	MU249069
				0	7.47	0.31	MU292108
				0	7.47	0.17	MU292022
				0	7.47	0.09	MU305825
				0	7.48	0.14	MU258523
				0	7.48	0.13	MU258308
0	0	0	0	0	7.49	0.12	MU305773
0	0	0	0	0	7.49	0.12	MU305773
				0	7.5	0.23	MU259184
				0	7.5	0.09	MU277338
				0	7.51	0.24	MU292019
				0	7.53	0.08	MU313694
0	0.002	0	0.002	0	7.53	0.1	MU334566
				0	7.55	0.2	MU258572
				0.009	7.55	0.36	MU276943
0	0	0.01	0	0	7.55	0.26	MU334163
				0	7.57	0.93	MU276953
				0	7.59	0.05	MU248551
				0	7.59	0.04	MU276733
				0	7.6	0.11	MU248682
				0	7.61	0.04	MU313221
				0	7.62	0.2	MU276713
0.013	0.016	0.05	0	0	7.62	1.15	MX056133
				0.009	7.63	0.24	MU292490
0.006	0.002	0.07	0	0	7.63	0.63	MU305676
				0	7.63	0.5	MU305826
				0	7.63	0.16	MU313695
				0	7.64	0.62	MU324115
				0.006	7.65	0.48	MU312762
0.001	0.001	0.01	0	0	7.65	0.17	MU313681
0.002	0.002	0.05	0	0	7.65	0.27	MX054338
				0	7.66	0.25	MU313693
0.004	0.004	0.06	0	0	7.66	0.45	MX054426
				0	7.67	0.06	MU292696

INCO assay data

				0	7.68	0.12	MU292012
0	0	0	0	0	7.68	0.18	MX054276
				0	7.69	0.89	MU248816
				0	7.69	0.37	MU248910
				0	7.69	0.24	MU292147
				0	7.69	0.5	MU277336
				0	7.69	0.25	MU292694
				0	7.7	0.33	MU258303
				0	7.7	0.24	MU276813
				0	7.7	0.32	MU292092
				0	7.72	0.2	MU292061
0	0	0	0	0	7.72	0.22	MU305720
				0	7.74	0.19	MU292079
0.002	0	0.03	0	0	7.75	0.38	MU305725
0	0.001	0.01	0	0	7.75	0.26	MU334744
				0	7.75	0.31	MU342051
				0	7.76	0.2	MU276701
				0	7.77	0.45	MU292093
				0	7.77	0.5	MU305833
				0	7.78	0.35	MU249005
0	0	0	0	0	7.78	0.15	MU334583
				0	7.79	0.35	MU305824
				0	7.8	0.44	MU248535
					7.8	0.04	MU258545
				0	7.8	0.2	MU292011
				0	7.8	0.38	MU342046
				0	7.81	1.07	MU292111
0.003	0.002	0	0	0	7.83	0.22	MU292965
				0	7.83	0.39	MU312725
0	0	0	0	0.006	7.84	0.15	MU313176
				0	7.85	0.81	MU276822
				0	7.86	0.55	MU292017
				0	7.87	0.3	MU258309
				0	7.88	0.06	MU258259
				0	7.88	0.21	MU277344
				0	7.88	1.87	MU305482
				0	7.88	0.61	MU341955
				0	7.89	0.4	MU258313
0.005	0.004	0.04	0	0.009	7.89	0.43	MU305719
0.004	0	0	0	0	7.89	0.25	MU305729
0	0	0	0	0	7.89	0.13	MX056081
				0	7.9	0.33	MU248624
				0	7.9	0.65	MU249098
				0.022	7.9	0.79	MU276875
				0	7.9	1.01	MU276879
				0	7.9	0.41	MU292081
				0	7.9	0.13	MU292118
				0	7.91	0.18	MU305585
				0	7.92	0.13	MU258525
				0	7.92	0.66	MU277479
				0	7.97	0.17	MU248673
				0	7.97	0.39	MU258575

INCO assay data

				0	7.97	0.14	MU292078
0.002	0	0.01	0.004	0	7.97	0.2	MU334429
0.003	0	0.04	0	0	7.98	0.65	MU305778
				0	7.99	0.59	MU292148
				0	7.99	0.59	MU292148
				0	8	0.6	MU248683
				0	8	0.6	MU248683
				0	8	0.45	MU276818
				0	8.01	0.33	MU277342
				0	8.01	0.12	MU277343
				0.027	8.03	0.42	MU277186
				0	8.03	0.35	MU305873
				0	8.06	0.62	MU249106
				0	8.07	0.61	MU292105
				0	8.07	0.19	MU305454
0.005	0.002	0.04	0	0	8.07	0.56	MU313680
				0	8.08	0.11	MU248566
0.005	0.005	0.05	0	0.01	8.08	0.46	MU305726
0	0	0.012	0	0	8.09	0.15	MU248947
				0	8.09	0.09	MU292056
				0	8.09	0.28	MU292134
				0	8.1	0.33	MU305534
				0	8.1	0.33	MU305534
				0	8.11	0.71	MU249068
				0	8.12	0.63	MU276832
0	0	0	0	0	8.13	0.07	MX054254
0.002	0.001	0.03	0	0	8.13	0.35	MX053536
				0	8.14	0.29	MU292106
0.011	0.002	0.06	0	0	8.14	1.34	MU305784
0.002	0	0.03	0	0	8.14	0.29	MU313555
				0.024	8.15	0.69	MU313700
				0	8.16	0.42	MU277029
0.007	0.005	0.06	0	0.008	8.17	0.52	MU313550
0	0.001	0.02	0	0	8.18	0.07	MU313631
				0	8.19	0.39	MU292122
				0	8.2	0.37	MU292225
				0	8.22	0.66	MU305827
0.003	0	0	0	0	8.23	0.77	MU305724
				0.013	8.24	0.49	MU292031
0.005	0.001	0.02	0	0	8.24	0.68	MX054281
				0	8.25	1.71	MU258483
				0	8.26	0.56	MU292033
				0	8.26	0.6	MU305867
				0.01	8.27	0.75	MU258601
				0.22	8.28	1.78	MU248652
				0	8.28	0.15	MU248613
				0.009	8.28	0.5	MU276712
				0	8.28	0.69	MU305995
				0	8.29	0.5	MU248618
				0	8.29	0.52	MU292103
				0.009	8.29	0.68	MU276978
				0	8.29	0.81	MU292297

INCO assay data

				0	8.29	0.17	MU305845
				0	8.29	0.6	MU313696
0.008	0.004	0.06	0	0.02	8.3	0.57	MX054434
				0	8.31	0.21	MU277349
				0	8.32	0.52	MU276833
				0	8.34	0.3	MU276873
				0	8.34	0.45	MU277192
				0.007	8.35	1.09	MU341954
0	0	0.018	0	0	8.36	0.3	MU248968
				0	8.36	1.1	MU258453
				0	8.37	0.47	MU248913
0.005	0.002	0.04	0	0.017	8.37	0.24	MU313675
				0	8.38	0.18	MU292137
				0	8.39	0.58	MU276835
				0	8.39	0.7	MU305804
				0	8.4	0.42	MU292335
				0	8.41	0.43	MU334839
				0.008	8.42	0.72	MU305828
				0	8.43	0.22	MU277490
				0	8.43	0.46	MU292084
				0	8.43	0.72	MU277341
0.004	0	0	0	0.029	8.43	0.19	MU313197
				0	8.44	0.37	MU312750
				0	8.45	1.09	MU248814
				0	8.47	0.27	MU249045
				0	8.47	0.52	MU292136
0	0.001	0.02	0	0	8.48	0.26	MX053540
				0	8.49	0.27	MU277022
				0	8.5	0.27	MU276783
				0.008	8.5	0.88	MU341969
				0	8.52	0.13	MU276697
0.018	0.029	0.07	0	0	8.52	0.47	MU313545
				0.02	8.52	0.9	MU313698
				0	8.55	0.85	MU277462
0	0	0.02	0	0	8.55	0.34	MU305716
				0.017	8.56	0.5	MU277406
				0.01	8.58	0.63	MU292083
				0.008	8.58	0.89	MU313697
				0	8.59	0.61	MU248909
				0.04	8.6	0.47	MU248575
				0.01	8.6	0.73	MU248617
0.003	0.003	0.06	0	0.01	8.6	0.68	MU313549
				0	8.61	0.2	MU292013
0.031	0.011	0.08	0	0.081	8.61	0.38	MU313543
				0	8.63	0.81	MU276988
				0.009	8.64	0.78	MU292102
				0	8.65	0.93	MU258531
0.004	0.001	0.03	0	0	8.65	0.48	MX056080
				0	8.67	0.35	MU248594
				0	8.68	1.08	MU248905
				0	8.68	0.49	MU276741
				0	8.69	0.83	MU292203

INCO assay data

				0	8.69	0.65	MU292894
				0	8.7	0.52	MU334845
0.01	0.01	0.11	0	0.021	8.71	1.09	MU312998
				0	8.72	0.72	MU276884
				0	8.76	1.45	MU258602
				0	8.78	0.2	MU277331
				0	8.79	1.08	MU258600
				0	8.79	0.78	MU276885
				0	8.8	0.23	MU248536
				0	8.81	1.04	MU258521
				0	8.82	0.25	MU258275
0	0.005	0	0	0	8.82	0.93	MU305003
0	0	0.01	0	0	8.83	0.08	MU313628
0	0.001	0.04	0	0	8.83	0.57	MU334466
				0	8.86	0.31	MU276877
0.003	0	0	0	0	8.86	0.49	MU305696
				0	8.87	0.44	MU276889
				0	8.89	0.93	MU312746
				0	8.89	1.09	MU341977
0.007	0.01	0.03	0	0.01	8.9	0.3	MU248415
0.003	0.007	0.13	0	0	8.9	0.8	MU248416
				0	8.9	0.35	MU276913
0.044	0.016	0.1	0	0	8.9	2.1	MU305774
				0	8.92	0.59	MU276847
				0	8.94	0.85	MU277176
0	0.002	0.06	0	0	8.96	0.84	MU292515
				0	8.97	1.37	MU248671
				0	8.97	1.52	MU292496
				0	8.98	1.06	MU277035
				0	8.99	0.04	MU292018
				0	9	0.36	MU248520
				0	9.02	0.35	MU248550
				0	9.02	0.86	MU277484
				0	9.03	0.22	MU305653
				0	9.04	1.24	MU276881
				0	9.05	0.65	MU276730
				0	9.06	0.78	MU258246
0.001	0.002	0.05	0	0	9.08	0.33	MX056134
				0.024	9.09	1.1	MU276874
				0	9.09	0.96	MU305596
				0	9.09	1.19	MU305861
0	0	0	0	0	9.1	0.84	MU305030
				0.009	9.12	1.1	MU276814
				0	9.13	1.12	MU342022
				0	9.15	0.58	MU258274
				0	9.2	0.74	MU292077
				0	9.2	0.9	MU342206
				0.012	9.24	1.09	MU305817
				0	9.25	1.01	MU334844
0.003	0.004	0.04	0	0	9.26	0.99	MU292963
0.002	0.001	0.041	0	0	9.28	1.04	MU248962
0.002	0.003	0.04	0	0	9.3	0.4	MU248414

INCO assay data

				0	9.31	0.76	MU305326
				0	9.34	0.04	MU248541
				0.019	9.34	0.52	MU277172
0.016	0.004	0.07	0	0.008	9.34	1.64	MU305783
				0	9.36	0.99	MU249048
				0	9.36	0.45	MU277057
				0	9.37	1.98	MU248778
				0	9.37	1.73	MU292091
				0.01	9.4	0.55	MU248599
				0	9.42	0.66	MU276995
				0	9.46	0.25	MU292820
				0	9.48	0.12	MU276954
				0	9.48	1.21	MU276976
				0	9.5	0.25	MU258204
				0	9.53	0.03	MU277183
				0	9.56	0.39	MU305618
				0	9.57	1.44	MU276840
				0.04	9.58	0.93	MU248835
				0	9.61	0.07	MU292098
				0	9.61	0.93	MU292328
				0.026	9.62	1.68	MU277187
0	0.001	0.04	0	0	9.75	0.53	MU334743
				0	9.8	1.1	MU248446
				0.011	9.81	1.2	MU292054
				0.119	9.86	0.8	MU292207
				0	9.87	3.16	MU276942
				0	9.9	1.34	MU259197
				0	9.91	0.71	MU292058
				0	9.91	0.71	MU292058
				0	9.94	0.45	MU258502
				0	9.97	1.31	MU292124
				0.021	9.97	0.55	MU292845
				0.077	9.97	2.02	MU342095
				0	9.98	0.67	MU248538
				0.011	10	2.89	MU276891
0.004	0.005	0.08	0	0	10.06	0.88	MX056001
				0	10.08	1.69	MU292300
				0	10.08	1.4	MU305309
				0	10.1	0.7	MU248523
				0	10.1	0.62	MU276955
0	0.002	0.04	0.003	0	10.11	0.76	MU334434
				0	10.2	0.45	MU277483
				0	10.24	0.21	MU342105
				0	10.3	2.81	MU277385
				0	10.35	2.6	MU248552
				0.03	10.35	1.96	MU248837
				0	10.37	0.55	MU292764
				0	10.4	0.21	MU248797
				0	10.4	0.04	MU258242
				0	10.4	0.11	MU277388
				0.01	10.4	0.99	MU276929
				0	10.42	2.24	MU292299

INCO assay data

				0	10.47	0.12	MU305954
				0	10.47	0.12	MU305954
				0	10.47	0.14	MU312753
				0	10.5	0.21	MU276784
				0	10.55	0.25	MU249043
				0	10.6	0.11	MU277333
0.001	0.002	0.08	0	0	10.61	2.12	MX054324
				0	10.69	0.1	MU305635
0.002	0.001	0.04	0	0.008	10.71	0.35	MX053568
				0	10.8	0.14	MU277059
				0	10.8	0.18	MU312751
				0	10.85	0.1	MU258265
				0	10.86	1.57	MU342212
0.005	0.002	0.02	0	0	10.9	0.23	MX054429
				0	10.95	0.1	MU248598
0	0	0	0	0	10.98	0.16	MU292994
				0	11	2.41	MU276751
				0	11	2.2	MU277475
				0.012	11	0.24	MU276890
				0	11.1	2.06	MU248711
				0	11.1	3.09	MU276855
0	0	0	0	0	11.14	0.01	MU313667
0.006	0.005	0.12	0	0	11.17	1.7	MU305703
				0	11.18	0.18	MU305553
				0	11.2	0.18	MU277482
				0	11.25	0.09	MU249095
				0	11.3	0.6	MU276766
				0	11.3	0.37	MU277393
				0	11.3	0.37	MU277393
				0.01	11.35	0.11	MU248616
				0	11.35	2.34	MU248911
0	0	0.01	0	0	11.38	0.05	MU313669
				0.01	11.4	0.04	MU259181
				0	11.4	0.17	MU277156
				0	11.4	0.21	MU277386
				0	11.4	0.19	MU277391
				0	11.4	0.38	MU277480
				0	11.5	0.39	MU248517
				0	11.5	0.32	MU276808
				0	11.5	0.28	MU276714
				0	11.5	0.19	MU277367
0.004	0	0	0	0	11.58	0.32	MU305759
				0	11.6	4.08	MU277098
				0	11.6	0.2	MU248438
				0	11.6	3.29	MU258501
				0	11.6	0.23	MU276853
				0	11.65	0.27	MU248548
				0.027	11.7	2.52	MU276851
				0	11.7	0.16	MU277481
				0	11.7	0.53	MU276854
				0.01	11.8	0.12	MU248688
				0	11.8	0.46	MU276752

INCO assay data

				0	11.8	3.38	MU276972
				0.04	11.86	2.94	MU313211
0.002	0.002	0.01	0	0.008	11.98	2.75	MU334510
				0	12	0.24	MU249056
					12.009	3.44	MU170109
				0	12.1	0.1	MU277153
0.006	0.004	0.11	0	0	12.17	1.88	MU305700
				0	12.24	2.45	MU292129
0	0.001	0.03	0	0	12.3	0.99	MU334467
				0	12.4	0.07	MU248565
				0	12.4	3.37	MU276974
				0	12.4	0.99	MU292546
				0	12.46	3.12	MU305572
0	0	0.02	0	0	12.54	0.41	MX053532
				0	12.59	0.62	MU305361
				0	12.6	0.12	MU276807
				0	12.6	0.36	MU276678
				0	12.6	0.53	MU277389
				0	12.6	0.2	MU277445
				0	12.6	3.46	MU276973
				0	12.65	3.84	MU258454
				0	12.9	0.51	MU277426
				0	12.96	0.68	MU305965
				0	13.1	4.12	MU258484
				0	13.2	4.32	MU248534
				0	13.2	1.48	MU276765
				0	13.3	3.7	MU258489
				0.03	13.4	0.52	MU248690
				0	13.5	0.9	MU277171
				0	13.6	2.68	MU276754
0	0	0	0	0	13.7	0.5	MU248406
				0	13.8	0.09	MU259195
0	0	0.06	0	0	14.36	0.89	MU292999
				0.355	14.4	0.71	MU277003
				0	14.6	1.24	MU277444
0.007	0.004	0.32	0.003	0	14.63	4.94	MU305699
				0	15.2	2.34	MU248527
0	0	0.02	0	0	15.26	0.6	MU334454
				0	15.5	0.33	MU248563
				0	17.6	2.56	MU276757
				0	17.7	5.86	MU258456
				0	20.2	7.51	MU258496
				0	20.74	10.5	MU292224
				0	21.49	10.25	MU334920
				0	9.07	5.12	MU249107
				0	12.5	7.29	MU249072
				0	13.8	8.4	MU249099
				0	35.3	19.3	MU248900
				0.011	10.19	3.2	MU292206
				0	5.77	0.5	MU277087
				0.04	17.8	10	MU248600
0.021	0.003				22.675	15.16	MU104041

INCO assay data

					27.239	17.92	MU170075
0.003	0.002				30.43	19.79	MU170186
				0	35.8	19.9	MU248564
0.002	0.002	0.185	0	0	1.079	2.07	MX053512
0	0.002	0.071	0	0	1.803	6.21	MX053515
					4	1.8	MU170115
				0	4	2.39	MU259198
0.001	0.001	0.01	0	0	6.21	0.05	MU313625
0	0	0.03	0.005	0	6.24	4	MU334565
				0	6.37	0.5	MU277173
0	0.001	0.01	0	0	6.77	3.99	MU313668
0	0	0.03	0	0	6.8	0.11	MU313441
				0	7.09	0.42	MU342205
				0	7.15	0.84	MU277371
				0	7.18	0.34	MU249059
0	0	0.01	0	0	7.27	0.09	MU313617
				0	7.31	0.59	MU249096
					7.469	3.76	MU170173
				0	7.49	4.61	MU249049
				0	7.49	1.11	MU249057
0	0.001	0.04	0	0	7.49	0.46	MX053557
				0	7.68	0.79	MU249058
0.007	0.002	0.04	0	0	7.73	0.86	MU313679
				0	7.75	0.57	MU249050
0	0.009	0.05	0	0	7.76	0.57	MU292502
				0	7.82	0.37	MU249060
				0.01	7.89	0.15	MU313220
0.005	0				7.915	2.67	MU133427
0.008	0.009	0.23	0	0	7.98	1.51	MU313608
				0	8.05	0.42	MU259140
				0.015	8.2	1.82	MU276996
0	0	0.01	0	0	8.22	0.18	MU313627
0	0	0.01	0	0	8.26	0.46	MU334323
0	0.001	0.01	0	0	8.28	0.28	MU313622
				0	8.44	1.16	MU313701
0.002	0.001	0.04	0	0	8.45	0.4	MU313615
0	0.001	0.05	0	0	8.57	1.12	MU313629
					8.613	0.68	MU170181
0.007	0.006	0.15	0.002	0	8.63	1	MX054420
				0	8.65	0.74	MU292927
0.009	0.009	0.39	0	0.012	8.7	2.38	MU313607
				0	8.71	0.57	MU249061
0.002	0	0.02	0	0	8.72	1.32	MU313612
				0	8.73	2.29	MU292500
				0.029	8.8	2.23	MU342239
				0	8.97	0.92	MU292115
0.004	0.004	0.12	0	0	9	1.22	MU313633
				0	9.05	0.53	MU249041
				0	9.06	0.85	MU249054
0.002	0	0.02	0	0	9.08	0.66	MU313611
0	0.001	0.05	0	0	9.15	0.53	MU313690
0.002	0.002	0.04	0.002	0	9.15	1.02	MU334158

INCO assay data

0.001	0.001	0.19	0	0	9.16	1.67	MX053558
				0	9.22	1.78	MU342235
				0	9.37	1.2	MU248604
				0.009	9.49	0.38	MU277463
				0	9.49	1.66	MU312757
				0	9.51	0.17	MU259141
				0	9.51	0.23	MU313709
				0	9.57	4.27	MU292140
0.005	0.007	0.12	0	0	9.58	2.13	MU313544
0	0	0.01	0	0.009	9.65	0.59	MU313601
				0	9.7	0.81	MU259199
				0	9.73	1.6	MU312755
0	0	0.01	0	0	9.74	0.41	MU313603
				0	9.75	0.17	MU305380
0	0.001	0.7	0	0	9.75	3.75	MU313618
0.01	0.006	0.73	0	0	9.81	3.3	MU313634
0.007	0.003	0.04	0	0	9.86	0.49	MU313626
0.052	0.062	0.8	0	0	9.87	4.83	MU313621
				0	9.98	0.67	MU249053
				0	10.02	0.35	MU342246
0.007	0.012	0.95	0	0	10.04	5.8	MU313609
				0	10.08	2.4	MU342094
				0	10.15	0.3	MU249042
				0	10.2	4.01	MU248549
				0	10.2	1.09	MU249046
0.004	0.008	0.1	0	0	10.33	2.15	MX056136
0	0.001	0.02	0	0	10.35	1.44	MU313623
				0	10.39	3.27	MU305835
				0	10.39	3.4	MU342238
				0	10.4	0.14	MU249051
				0	10.4	2.77	MU277337
				0	10.4	3.43	MU313699
				0.008	10.42	2.06	MU313016
0.009	0.003	0.08	0	0	10.42	2.39	MX054258
0.001	0.002	0.05	0	0	10.49	2.31	MU313614
0	0.006	0.13	0.003	0	10.73	3.63	MU334704
				0	10.8	2.43	MU292030
0.013	0.019	0.23	0	0.027	10.83	2.36	MU313201
0.025	0.041	0.55	0	0.011	10.83	3	MU313620
0.002	0.002	0.02	0	0	10.83	0.73	MU313624
0	0	0.06	0	0	10.86	1.16	MU334725
0	0	0.08	0	0	10.88	2.46	MU313606
0	0	0	0	0	11.07	0.22	MU305183
				0	11.1	3.13	MU249065
				0	11.1	0.21	MU277365
0.043	0.022	0.42	0.005	0.042	11.1	3.13	MX054428
0.002	0.004	0.1	0	0	11.14	0.7	MU313683
				0	11.25	0.27	MU259138
0.005	0.003	1.04	0	0	11.36	4.27	MU313605
0.019	0.013	0.2	0	0.028	11.41	3.09	MU313200
0.016	0.005	0.13	0	0.03	11.43	2.97	MU312989
0	0	0	0	0	11.45	0.18	MU305144

INCO assay data

				0	11.51	2.95	MU313017
0.006	0.006	0.27	0.003	0	11.52	3.2	MU313005
				0	11.71	3.07	MU292298
0.002	0.002	0.25	0.003	0.008	11.75	3.03	MU334465
0.015	0	0.04	0	0	11.75	2.74	MU334723
0	0.005	0.93	0	0	11.77	5.13	MU313619
0.007	0.007				11.851	7.05	MU170025
0.02	0.01	0.17	0	0.024	11.91	3.52	MU313004
0	0	0.05	0	0	11.93	0.29	MU313368
0.011	0.068	0.49	0.003	0	12	3.57	MX054421
0.003	0.001	0.29	0	0	12	2.81	MX056071
				0.008	12.08	3.76	MU292489
0.008	0.006	0.16	0	0.02	12.38	1.49	MX056012
				0	12.41	4.59	MU312758
0.061	0.086	1.11	0	0	12.59	6.76	MU313635
				0	12.6	2.01	MU277366
0.002	0.001	0.03	0.03	0	12.63	1.09	MU334706
				0.1	12.7	0.6	MU249044
0.013	0.012	0.29	0	0	12.74	4.15	MU313008
0.237	0.004	0.07	0	0.421	12.78	3.92	MU313616
0	0	0.04	0	0	12.8	0.5	MU248407
				0	12.8	1.31	MU249055
				0	12.8	4.55	MU292088
0.054	0.059	0.89	0	0	12.86	5.81	MU313630
0.022	0.012	0.2	0	0.029	13.01	4.17	MU312991
0.006	0.007	0.13	0	0	13.09	3.86	MU313006
				0	13.15	5.44	MU258603
				0	13.25	2.27	MU259139
				0	13.4	4.29	MU259185
				0	13.4	4.49	MU258310
				0	13.6	2.77	MU276679
				0	13.75	3.47	MU248902
				0	13.8	4.44	MU292015
				0	13.8	4.79	MU277177
				0.012	13.83	4.96	MU342207
				0.026	14	5.99	MU277387
				0	14.3	5.85	MU277461
				0	14.4	5.66	MU276982
0.001	0.003	0.11	0	0	14.48	1.41	MX053517
				0	14.57	8.57	MU292119
0	0.003	0.04	0	0	14.76	6.13	MU313604
0.003	0.031	0.18	0	0	15.12	3.16	MX056010
				0	15.2	4.75	MU249047
				0	15.2	6.35	MU292002
0.063	0.034	2.34	0	0.074	15.27	13.51	MU313632
				0	15.28	8.12	MU342204
				0.016	15.3	3.52	MU277368
				0.02	15.35	10.78	MU324116
				0	15.45	6.29	MU249105
0	0.001	0.04	0	0	15.49	0.71	MU334517
				0	15.5	6.03	MU292025
				0	15.6	8.53	MU277174

INCO assay data

0.002	0	0.152	0	0	15.65	6.38	MU248966
0.019	0.007				15.744	6.78	MU170150
0.003	0.002	0.1	0	0	15.79	7.26	MU313613
				0	15.85	6.79	MU248619
				0	15.99	7.39	MU305483
0.015	0.003	0.15	0	0.03	16.05	6.62	MU313686
				0	16.1	6.27	MU249004
				0	16.1	6.53	MU277168
				0	16.15	6.88	MU249104
0.016	0.02	0.66	0	0.023	16.22	7.79	MU312990
				0	16.25	5.94	MU249064
				0	16.29	6.46	MU292126
				0	16.75	6.91	MU258273
				0	16.9	6.44	MU249062
0.004	0.001	0.076	0	0	17.2	6.59	MU248967
0.016	0.005				17.399	9.87	MU151282
0.01	0.005				17.54	7.47	MU151315
0.008	0.108				17.592	10.46	MU151319
				0	17.7	8.12	MU259200
				0	17.88	5.5	MU305964
				0.18	18.1	9.15	MU248836
				0	18.2	8.47	MU249063
					18.647	9.81	MU170138
				0	18.69	7.36	MU305438
0.004	0.003	1.08	0	0	19.04	13.33	MU334442
				0	19.25	10	MU258543
0.022	0.014	0.27	0	0	19.41	9.46	MU313672
				0	19.45	11.71	MU292499
0.025	0.032	0.96	0	0	19.92	10.48	MX056122
0.007	0.007	0.74	0	0	19.92	10.38	MX056135
0.009	0.006	0.26	0	0	20.08	8.4	MU334361
0.036	0.054	3.49	0	0	20.19	18.16	MX054438
				0	20.3	9.71	MU249066
				0	20.3	10.4	MU259196
				0	20.4	10.9	MU258238
0.004	0	0.05	0	0	20.47	7.81	MU305772
				0	20.5	11.2	MU258305
				0	20.6	7.83	MU248555
				0	20.6	8.33	MU277167
				0	20.6	9.97	MU277335
				0	21.12	10.17	MU292128
				0	21.36	10.71	MU312756
0	0	0.43	0	0	21.91	6.43	MX054312
				0.009	22.01	16.71	MU324120
0.003	0.005	0.39	0	0	22.6	10.9	MU248410
0.001	0.001	0.13	0	0	22.61	11.33	MU313666
0.004	0.008	0.25	0	0	22.95	10.63	MU334362
				0	23.5	9.66	MU258240
				0	23.74	21.23	MU292120
				0	24.8	13.6	MU277154
				0	24.91	11.9	MU292130
0.004	0.001	0.04	0	0.006	24.94	12.36	MU313602

INCO assay data

				0	25.4	14.4	MU259186
0.003	0.002	0.54	0	0	25.9	11.6	MU293000
				0	26.2	12.8	MU258490
					26.368	16.11	MU170059
				0	26.5	12.4	MU258253
				0	26.6	12.5	MU248901
0.006	0.015	0.16	0	0	26.9	11.3	MU305002
0	0.003	0.169	0	0	27.1	16.4	MU248948
				0	27.2	11.5	MU276912
					27.23	16.42	MU170122
				0	27.4	14.6	MU258487
				0	27.6	14.6	MU258500
				0	28.3	12.2	MU258254
				0	28.8	17.1	MU258272
				0	29	17	MU248908
				0	29.1	13.8	MU258249
0.013	0.002	1.28	0	0	29.12	18.01	MX056009
				0	29.39	15.23	MU292330
				0	29.6	13	MU258202
				0.01	29.8	14.4	MU258300
				0	29.9	16.3	MU277473
				0	30.4	19.1	MU258495
0.005	0				30.439	16.61	MU170023
				0	30.6	17.2	MU258298
				0	30.8	15.8	MU258271
				0	30.8	17.3	MU258256
				0	31.3	17.1	MU259188
				0	32.4	19.3	MU258486
				0	32.7	18.2	MU258498
					32.945	18.97	MU170127
					33.708	20.6	MU170128
0.005	0.007	0.21	0	0	34.14	18.69	MU334363
				0	35	18.6	MU258270
0.004	0	0.13	0	0	35.79	19.26	MU334414
				0	35.9	20.7	MU248524
				0	37.4	22.3	MU258485
					39.22	23.69	MU170126
				0	42.77	22.72	MU334855
					43.806	27.29	MU170119
				0	44.1	25.6	MU258493
				0	45.2	16.6	MU258494
				0	52.1	31.8	MU249070

Whole-rock data

Appendix - Whole-rock geochemical analyses of felsic dykes by ICP-MS

Sample	ccn99-40	ccn99-41	ccn99-45	ccn99-70	ccn99-72	ccn99-74
	Felsic Dyke	pegmatitic Dyke	Felsic Dyke	Felsic Dyke	Felsic Dyke	Felsic Dyke
Ag ppm	0.20	0.10	0.90	-0.10	-0.10	-0.10
Bi ppm	-0.20	-0.20	-0.20	-0.20	0.20	0.20
Cd ppm	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
Cs ppm	6.00	2.50	9.10	4.60	3.70	6.60
Ga ppm	18.00	15.00	18.00	16.00	19.00	19.00
Hf ppm	6.30	7.10	6.00	5.90	4.50	7.00
In ppm	-0.05	-0.05	-0.05	-0.05	0.07	0.06
Mo ppm	7.50	1.00	0.90	0.70	0.50	0.60
Nb ppm	19.00	42.00	19.00	20.00	28.00	23.00
Pb ppm	50.00	65.00	28.00	59.00	36.00	47.00
Rb ppm	88.00	60.00	150.00	70.00	91.00	160.00
Sb ppm	0.30	0.50	0.40	0.40	0.40	0.40
Sn ppm	2.90	3.30	7.30	4.40	7.70	12.00
Ta ppm	2.30	7.10	1.70	2.40	2.60	2.00
Te ppm	-0.20	-0.20	-0.20	-0.20	-0.20	-0.20
Th ppm	33.00	39.00	22.00	33.00	17.00	20.00
Tl ppm	0.60	0.41	0.83	0.39	0.61	0.94
U ppm	6.80	9.70	4.20	7.30	7.40	4.50
Zr ppm	220.00	241.00	210.00	210.00	168.00	293.00
Ce ppm	19.00	18.00	51.00	45.00	81.00	90.00
Dy ppm	3.00	3.50	6.20	4.40	9.90	8.20
Er ppm	2.50	3.50	4.00	3.50	6.00	4.80
Eu ppm	0.37	0.34	1.10	0.54	1.50	1.30
Gd ppm	1.90	1.80	5.40	3.00	8.80	7.60
Ho ppm	0.72	0.94	1.40	1.10	2.10	1.70
La ppm	8.80	7.50	25.00	15.00	41.00	49.00
Lu ppm	0.60	0.96	0.78	0.82	1.10	0.90
Nd ppm	8.20	6.90	22.00	13.00	38.00	40.00
Pr ppm	2.20	2.00	5.70	3.60	10.00	11.00
Sm ppm	1.80	1.60	5.10	3.00	8.30	7.70
Tb ppm	0.41	0.45	0.99	0.64	1.50	1.30
Tm ppm	0.46	0.72	0.68	0.67	1.00	0.84
Y ppm	25.00	31.00	46.00	37.00	72.00	58.00
Tb ppm	3.80	6.00	4.80	5.20	7.30	5.80

Whole-rock data

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Whole-rock data

Appendix - Whole-rock geochemical analyses of sulphide samples from the 3500 ft level, CCN Mine.

Sample	CCN-98-22	CCN-99-23	CCN-99-24	CCN-99-25	CCN-99-26
	DSQD	INMS	3LBS/MASL	INMS	MASU
SiO ₂ %	53.10	4.00	43.00	17.90	1.50
TiO ₂ %	1.07	0.14	0.85	0.35	0.04
Al ₂ O ₃ %	14.90	1.00	12.20	5.80	0.30
Fe ₂ O ₃ %	12.20	74.40	23.10	54.90	80.40
MnO %	0.19	0.04	0.21	0.17	0.02
Mgo %	4.80	0.39	4.32	1.79	0.10
CaO %	7.51	0.61	6.64	2.51	0.35
Na ₂ O %	2.72	0.21	2.14	1.02	0.08
K ₂ O %	1.42	0.07	1.15	0.63	-0.05
CO ₂ %	0.10	0.10	0.10	0.20	0.20
P ₂ O ₅ %	0.23	0.02	0.10	0.07	0.03
S %	0.34	33.20	5.08	23.90	32.40
Ba ppm	455.00	31.00	345.00	220.00	-20.00
Total %	98.90	119.00	100.60	112.40	119.60
LOI %	0.60	11.00	2.30	8.10	11.00
Cu %	0.06	0.28	0.94	0.48	0.39
Ni %	0.06	4.33	0.57	2.41	3.58
Co %	0.01	0.20	0.03	0.11	0.16
Be ppm	1	-1	1	1	-1
Bi ppm	0	4	7	3	3
Cd ppm	0	0	3	1	0
Cl ppm	586	-100	794	904	140
Cr ppm	161	53	141	337	11
Cs ppm	6	0	4	1	0
F ppm	530	-50	318	-50	-50
Ga ppm	18	2	15	8	1
Hf ppm	5	0	3	2	0
In ppm	0	0	0	0	0
Mo ppm	1	2	1	2	1
Nb ppm	10	1	6	4	1
Pb ppm	39	30	105	58	10
Rb ppm	58	3	43	23	2
Sb ppm	0	0	1	0	0
Sc ppm	27	3	25	8	1
Sn ppm	4	2	11	4	3
Sr ppm	262	17	206	97	-10
Ta ppm	1	0	0	0	0
Te ppm	0	4	3	1	3
Th ppm	8	0	5	3	0
Tl ppm	1	0	1	1	0
U ppm	2	0	1	1	0
V ppm	225	125	219	124	102
Zn ppm	115	22	205	110	14
Zr ppm	179	11	130	59	6

Whole-rock data

Ce ppm	58	4	41	21	2
Dy ppm	5	0	3	2	0
Er ppm	3	0	2	1	0
Eu ppm	2	0	1	1	0
Gd ppm	6	0	4	2	0
Ho ppm	1	0	1	0	0
La ppm	28	2	19	10	1
Lu ppm	1	0	0	0	0
Nd ppm	27	2	18	9	1
Pr ppm	7	0	5	2	0
Sm ppm	6	0	4	2	0
Tb ppm	1	0	1	0	0
Tm ppm	0	0	0	0	0
Y ppm	32	2	20	9	1
Yb ppm	3	0	2	1	0