## ASSESSMENT REPORT

## ON THE

# 2011 DIAMOND DRILLING PROGRAM 

KUTCHO PROPERTY
NORTH-CENTRAL BRITISH COLUMBIA

## LIARD MINING DISTRICT <br> 104I018, 019, 028, 029 <br> $58^{\circ} 12{ }^{\prime} \mathrm{N}: \mathbf{1 2 8}^{\circ} 22^{\prime} \mathrm{W}$

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854561, 858667 and 861767
July 2to August 24, 2011

## KUTCHO COPPER CORPORATION <br> OWNER AND OPERATOR

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## EXECUTIVE SUMMARY

The Kutcho Property is situated in the Cassiar Mountains of northern British Columbia, 100 km east of Dease Lake. Claim holdings total 12,048 hectares ( $120 \mathrm{~km}^{2}$ ) and cover the Lower Triassic Kutcho Formation which hosts volcanogenic massive sulphide (VMS) mineralization. Three elongate VMS sulphide deposits have been delineated. These form a linear, shallowly-plunging, west-northwesterly mineralized trend that is 3.6 kilometres long.
The Kutcho VMS deposits vary in depth. The Main deposit crops out on surface and extends to a depth of approximately 250 m below surface. The Esso deposit lies 2,250 metres to the west of Main deposit and extends from 400 m to 600 m below surface. The Kutcho Main Lens is overlain by felsic tuffs and part of an eroded gabbro sill further west, the Sumac and Esso lenses are overlain by the felsic tuffs, the gabbro sill, clastic sedimentary rocks and basalt tuffs, a regionally distributed limestone unit and a thick mudstone sequence.
The Main and Sumac deposits were both discovered through follow-up of stream sediment geochemistry anomalies. Further exploration showed that although the Main lens responded to ground and airborne EM surveys, neither of the deeper Sumac or Esso lens could be detected. Soil geochemistry surveys show similar results to the EM surveys.
An airborne electromagnetic (EM) survey was conducted in 2011 using Geotech Ltd.'s proprietary VTEM system which offered: significantly greater depth penetration (up to 750 m ) compared to the two previous airborne EM surveys on the property; the potential to see through conductive overburden higher in the stratigraphy; and the generation of precisely located drill-ready EM targets that do not require follow-up ground surveys.
The interpretation of the raw VTEM survey results by Condor Consulting Ltd. defined 19 Target Zones (EM anomalies) for follow-up. Ten targets were recommended for drill follow-up, and nine of these were drill-tested in 2011. Of the nine targets drill-tested, one yielded multiple thick drill intersections of polymetallic VMS mineralization. Five holes intersected lower-grade stratabound (syngenetic) pyrite horizons and six holes intersected significant horizons of graphitic mudstone which are interpreted as the source of the EM anomalies in those areas.
All geophysical targets drill-tested this year are new targets not previously delineated by earlier airborne or ground geophysical surveys. Nine VTEM targets were drill-tested in the 2011 exploration drill program. Specific conclusions following from this exploration program are:

- The VTEM survey successfully located one polymetallic massive sulphide lens plus two other horizons of stratabound disseminated exhalative pyrite in felsic volcanic rocks.
- The VTEM survey also detected strong anomalous responses over graphitic black mudstone units. The EM anomalies generated by the sulphides and the carbonaceous mudstones are sufficiently similar that it is not possible to discriminate between sulphidegenerated and graphite generated anomalies based on their geophysical responses alone.
- Drill programs testing EM anomalies on this property must be sufficiently well funded that there is capacity to test numerous geophysical targets, and must anticipate that only one target in three may be generated by bedrock sulphides.
- The Sumac massive sulphide deposit extends further south, further east and further up-dip than previously recognized during 38 years of exploration work on the deposit.
- In addition to the expected strong EM response over Main deposit, the VTEM system has been able to detect anomalous responses over the east end of Sumac deposit and along the up-dip edge of the Esso stratigraphic horizon. Respectively, these represent significantly deeper levels of penetration and higher levels of sensitivity than previous airborne EM systems used on this property.
- Graphitic mudstone horizons are common close to pyritic tuff horizons. These mudstone units may host significant exhalative (syngenetic) sulphides.


## TABLE OF CONTENTS

Page
Executive Summary ..... ii
1.0 Introduction .....  1
1.1 Property Description and Location ..... 1
1.2 Access, Physiography, \& Climate ..... 3
1.3 Exploration History ..... 4
1.4 2011 Exploration Program ..... 7
2.0 Geology ..... 7
2.1 Regional Geology ..... 7
2.2 Property Geology ..... 7
2.2.1 Stratigraphy ..... 7
2.2.2 Structure ..... 10
3.0 Mineralization and Alteration ..... 15
3.1 Deposit Type ..... 15
3.1.1 Main (Kutcho) Deposit. ..... 17
3.1.2 Sumac Deposit ..... 19
3.1.3 Esso Deposit ..... 15
3.1.4 Other Mineralization ..... 18
4.0 2011 Airborne Electromagnetic Survey ..... 15
5.0 2011 Exploration Drilling Program ..... 16
5.1 Introduction ..... 16
5.2 Description of Exploration Drilling Program. ..... 16
5.3 Drilling Program Results ..... 16
5.4 Drilling Program Interpretation ..... 16
5.5 Drilling Program Conclusions and Recommendations ..... 17
6.0 References ..... 22

## LIST OF FIGURES

Page
Figure 1.1 Property Location Plan ..... 2
Figure 1.2 Kutcho Property Claim Map ..... 3
Figure 2.1 Regional Geologic Setting of the Kutcho Property ..... 8
Figure 2.2 Cross-Section of King Salmon Allochthon in the Kutcho deposits area. .....  .8
Figure 2.3 Kutcho Property Geology Map. ..... 9
Figure 2.4 Reconstructed Stratigraphic Section ..... 10
Figure 3.1 Kutcho sulphide deposits, drillholes and topography ..... 11
Figure 3.2 The six types of volcanogenic massive sulphide deposits. ..... 12
Figure 3.3 North-south cross-section through Main deposit ..... 13
Figure 3.4 Internal stratigraphy and lithofacies of Main deposit ..... 14
Figure 3.5 Contoured Cu\% x Thickness long-section through Main deposit. ..... 14
Figure 5.1 Map of 2011 VTEM anomalies and drill targets ..... 18
LIST OF TABLES
Page
Table 3.1 Measured, Indicated and Inferred Resources for Kutcho Property ..... 11
Table 5.1 List of Priority VTEM Targets for Kutcho Area. ..... 19
Table 5.2 Proposed Drillhole Locations and Depths ..... 20
Table 5.3 Completed Drillholes and Results ..... 21
LIST OF APPENDICES
APPENDIX I List of Claims for Kutcho Property ..... 23
APPENDIX II Kutcho Property Resource Table. ..... 25
APPENDIX III Maxwell Models for VTEM Anomalies and Drill Targets. ..... 27
APPENDIX IV Kutcho 2011 Drillhole Locations and Lengths ..... 38
APPENDIX V Kutcho 2011 Drillhole Cross-Sections ..... 40
APPENDIX VI Core-logging Codes. ..... 52
APPENDIX VII Core Logs ..... 57
APPENDIX VIII Drillcore Sampling Procedures. ..... 384
APPENDIX IX Assay Results. ..... 387
APPENDIX X Assay Certificates ..... 388
APPENDIX XI Laboratory Accreditation and QA/QC Overview. ..... 575
APPENDIX XII Project QA/QC Program. ..... 583
APPENDIX XIII Pre-Feasibility Report. ..... 614
APPENDIX XIV Itemized Cost Statement. ..... 993
APPENDIX XV Certificate of Qualifications ..... 995

### 1.0 INTRODUCTION

The Kutcho Property lies in the Cassiar Mountains of north-central British Columbia, 100 km east of Dease Lake. Kutcho Copper Corporation (KCC) owns $100 \%$ of the Kutcho Property.
Exploration of the Kutcho Property through the late 1970's and early 1980's defined three elongate volcanogenic massive sulphide (VMS) deposits or lenses that form a linear, shallowlyplunging, west-northwesterly linear mineralized trend that is 3.6 kilometres long. The largest of the deposits, the Main lens, is a near-surface sulphide deposit. The adjacent sulphide lens to the west is the Sumac. The Esso deposit is furthest to the west and lies at a depth of 400 m to 600 m below surface.

### 1.1 Property Description and Location

The Kutcho Project area is situated 100 km east of the town of Dease Lake, and 330 km north of Smithers in northern B.C. (Fig 1.1). The property is located on NTS map sheet 104I/1. The geodetic coordinates for the center of the claim area are $58^{\circ} 12^{\prime} \mathrm{N}$ and $128^{\circ} 22^{\prime} \mathrm{W}$. The UTM coordinates for the centre of the Main deposit are approximately 537500 E and 6452000 N . The KCC claims cover an area of 17,186 hectares. Claims are shown in Figure 1.2 and listed in Appendix I.

Kutcho Copper Corporation owns the claims through two separate purchase agreements and through claim staking. One agreement is with Barrick Gold Inc. (a subsidiary of Barrick Gold Corporation) and AMI Resources Inc., who had $80 \%$ and $20 \%$ ownership, respectively, in all of the claims except the 16 SMRB claims and the 30 KC claims. Ownership of the SMRB and KC claims are covered in an agreement with Sumac Mines Inc., a subsidiary of Sumitomo Metal Mining Co. Ltd. Since 2008, Kutcho Copper has staked 29 additional claimblocks.

Following notice by Kutcho Copper that it has completed a feasibility study on the Kutcho Project, Barrick will have 120 days to elect to 'back-in' for a $50 \%$ interest by spending, within two years, three times Kutcho Copper's expenditures on the property. This applies only to that portion of the property on which Barrick previously held an interest.

Pursuant to the Sumac Agreement, Sumac is entitled to a royalty of 2\% of net smelter returns, on the portion of the Kutcho Project it sold to the Company, between the third anniversary and the sixth anniversary of the date of commencement of commercial production, and a royalty of $3 \%$ of net smelter returns after the sixth anniversary of the date of commencement of commercial production.

Barrick and AMI are collectively entitled to royalty of $2 \%$ of net smelter returns on the portion of the Kutcho Project they sold to the Company, which royalty is shared between Barrick and AMI on an 80/20 basis, respectively.

Kutcho Copper currently holds exploration permits for the project.
Kutcho Copper Corporation has formally entered the Kutcho project into the British Columbia Environmental Assessment process as a step toward obtain permitting for a mining operation. Initial consultations with all appropriate government agencies, both provincial and federal, have been held along with First Nations consultations and open houses. Water balance, weather, fish, archaeological and wildlife baseline studies have been completed.


Figure 1.1 Property Location Plan


Figure 1.2 Kutcho Property Claim Map

### 1.2 Access, Physiography and Climate

The Kutcho property is located approximately 100km east of Dease Lake, BC. Dease Lake is a community of about 650 people and has basic services such as an airstrip, medical clinic, school, restaurants, college extension campus, grocery store and hotels. The Dease Lake area offers a pool of potential project employees that would be supplemented with people from outside the region.
Dease Lake is reachable via a good all weather road, Highway 37 North, from Smithers ( 600 km to the south) and Watson Lake ( 250 km to the north). Dease Lake is 400 km from the port of Stewart. A marginal, seasonal road runs to the property but is only suitable for summer access with special equipment.
Access to the property is by fixed-wing aircraft and helicopter from Smithers or Dease Lake, landing at the $1,040 \mathrm{~m}$ gravel airstrip located at the junction of Kutcho and Andrea Creeks. The deposit area of the property is connected to the airstrip by a 10 km road. Currently this road has had culverts removed and is only passable to four-wheel drive trucks with good ground clearance.
Land access via the 125 km tote road to Dease Lake is available to 4 -wheel drive vehicles during late summer and early fall, but passage is somewhat dependent upon weather due to extensive muddy sections.
The property is located within the Cassiar Mountains, just to the north of the continental divide between the Arctic and Pacific watersheds. The area is moderately rugged with elevations ranging from 1,400 to 2,200 metres. Most of the area is alpine with treeline at approximately 1,500 metres.

Winters are cold and dry, while the summers are cool and moist. Average annual temperature is $1^{\circ} \mathrm{C}$. Average annual precipitation is 50 cm , approximately half of which occurs as snow. Snow cover can persist for nine months of the year, particularly on north-facing, shaded slopes. Dease Lake, the nearest government weather station, gets about 0.25 m of rain and over 2 m of snowfall annually.

### 1.3 Exploration History

Mineralization was first discovered on the Kutcho property in 1968 by an exploration joint venture operated by Imperial Oil Ltd. The discovery was made by prospecting follow-up of stream sediment geochemistry anomalies from samples collected during a regional drainage survey. Twenty claims were staked by W. Melnyk directly over the undiscovered Kutcho Main Lens sulphide deposit. These claims were allowed to lapse when the other partners in the joint venture declined to fund further exploration. Imperial Oil returned to the area in 1972, after the statutes of the joint venture agreement expired, in order to re-stake the area. However, Sumac Mines Ltd. (the Canadian exploration subsidiary of Sumitomo) had conducted their own regional stream sediment sampling program earlier that season and in response to anomalous samples, R. Britten staked 8 'two-post' claims along the anomalous stream, and an additional 8 claims (SMRB claims) along the geological strike direction resulting in the cruciform claim outline overlying the western part of the Kutcho Main Lens sulphide deposit and the whole of the Sumac deposit. Imperial Oil (later Esso Minerals Canada Ltd.) then staked a much larger area surrounding Sumac's claims.

Beginning in 1973, exploration work was carried out by both Sumac and Esso and early success prompted additional staking. Diamond drilling commenced in 1974 and by 1982 approximately 60,000 metres had been drilled by both companies, defining three sulphide lenses. Additionally, Esso had drilled a number of exploration targets in other areas of the property with moderate success. Environmental, metallurgical and engineering studies were begun by both groups in 1980. A partnership agreement on engineering and development work was signed by Esso and Sumac in 1983 but was retroactive to 1981, the year Sumac began work driving the adit in order to collect a 100 -tonne bulk sample. The agreement was a $50: 50$ joint venture for development work, and culminated in a pre-feasibility study by Wright Engineers Limited in 1985. The pre-feasibility study indicated an $11.3 \%$ internal rate of return (IRR) when using a copper price of US\$0.95. Given the risk factors involved and long-term price projections for copper below the 95 cent level, the companies put the project on hold pending further exploration results. Limited exploration on Esso's claims south of the main mineralized trend between 1985 and 1988 and the numerous earlier geophysical surveys suggested limited potential for additional shallow open-pit mineralization.

In 1989, Esso sold most of its mining assets to Homestake Canada Ltd. In 1990, Homestake optioned the Kutcho property to American Reserve Mining Corporation who funded a $\$ 1.1 \mathrm{M}$ exploration program (Homestake remained the operator) which included $7,031 \mathrm{~m}$ of drilling in 28 holes (Holbek et al, 1991) mostly in outlying target areas and thereby earned a $20 \%$ interest. Exploration was successful in confirming the presence of extensive areas of favourable geology and alteration indicative of hydrothermal activity, but failed to discover zones of potentially economic mineralization. For example, 10 km southwest of the Kutcho deposit, a narrow zone of cryptocrystalline massive pyrite with a strike length in excess of five kilometres was intersected in four widely spaced drill holes but was barren of base or precious metals. American Reserve carried out engineering studies but did no further exploration work and relinquished the option in 1993. They retained a $20 \%$ interest in Homestake's property.

The property was optioned to Teck-Cominco Metals Ltd. in 1992. Teck-Cominco carried out deep penetration EM geophysical surveys (UTEM) over the Esso zone with the goal of defining additional conductors along the Kutcho trend. Due to extensive cover of conductive argillaceous units in the hanging wall, the UTEM system was unable to detect the Esso deposit or other conductors at depth, consequently Teck-Cominco dropped the option.
Homestake was purchased by Barrick Gold Corp in 2003.
Extensions of the favourable Kutcho stratigraphy to the west have been staked and explored by various companies in the past. Shortly after the discovery of the Kutcho deposits, Noranda staked the Kutcho formation lying to the west of Kutcho Creek. Noranda conducted geophysical surveys,
and completed a small drill program of three drill holes in 1990. The claims were allowed to lapse and were re-staked in 1995 by Gary Belik. Mr. Belik carried out a detailed mapping program and optioned the claims to Atna Resources in 1997. Atna conducted a UTEM geophysical survey and an extensive drill program of nine holes. Results of Atna's work were mixed, and although no deposits were discovered, significant weak to moderately mineralized alteration zones were intersected. Structural complexity and lack of clear geophysical targets prevented additional work and the option was terminated.

Negotiations by Western Keltic Mines Inc. to purchase the property from Barrick and Sumitomo were initiated in 2003 and concluded in early 2004. Western Keltic carried out diamond drilling within the Kutcho and Esso deposits during 2004 to confirm historical results and to obtain material for metallurgical studies (Holbek and Wilson, 2005).

From July to September 2005, Western Keltic completed a 31-hole infill diamond drill program totalling $6,342 \mathrm{~m}$. In the deposits area, sixteen holes extended and delineated the updip and downdip limits of the Kutcho deposit and the underlying Footwall Zone. Four holes plus four branch holes located the western edge of the Esso deposit, and four holes discovered a higher grade core and the western limit to the Sumac Deposit. Regional exploration holes included one hole at the Jack target which confirmed a weakly mineralized horizon 5 km east of the Kutcho deposit, and one hole at the North Graben target that aided in the geological understanding of the rhyolite flow-dome complex.

In 2006, Western Keltic Mines Inc. completed an infill diamond drilling program on the Kutcho property from mid-September to the end of October. A total of 1,870 metres were drilled in 23 BTW diameter diamond drillholes at a total cost of approximately $\$ 1$ million.

In 2007, Western Keltic Mines focused on several aspects of pre-mine development, most of which had a field component. Logistical work involved expansion to a 45 -man camp. Baseline environmental studies encompassed acid rock drainage, air quality, archaeology, fisheries, groundwater hydrology and hydrogeology, meteorological data collection, terrain mapping, traditional use characterization, plus vegetation and wildlife inventories. Technical surveys concentrated on road design, layout and surveys; geotechnical foundation studies including seismic plus drill and test-pit examination of soil and rock depths, composition and stability; surveying of claims, mining lease and drill collar locations; and geological mapping of potential limestone horizons in Andrea Creek. Engineering studies focussed on mine and mill layout, pit stability and design, database verification and resource calculation, geohazards identification, metallurgical studies, and water balance calculations. Non-engineering work included development of safety, environmental and First Nations policies, operational protocols and project scheduling. Local area consultations included discussions toward impact benefits agreements and well as the signing of MOU's regarding ports, and with First Nations regarding project review participation and funding.
In 2008, Sherwood Copper Corporation purchased Western Keltic Mines Inc. and all assets and amalgamated these with Sherwood's wholly-owned subsidiary which was renamed Kutcho Copper Corporation.
Between May and August of 2008, Kutcho Copper Corporation completed a major diamond drill program entirely within the perimeter of the Main lens. 9,905 metres of drilling in 78 holes (plus three abandoned holes) provided core for assay and metallurgical processing. Based on these drill results, a new resource calculation was prepared (Appendix II).
In A total of ten thousand $(9,905)$ metres of HQ size core was drilled in 2008 by 669856 B.C. Ltd., doing business as SCS Diamond Drilling, 1270 Salish Road, Kamloops, BC, Canada, V2H 1 K 1 . The drill contractor was under the direct supervision of KCC personnel who were also responsible for supervising temporary employees and contractor geologists in core logging,
sample collection, sample preparation, QA/QC programs and preparation of sample shipments to various analytical facilities for either assay or metallurgical testing.
The principal objectives of the 2008 drill program were to:

- Infill gaps in previous resource drilling programs and enlarge the assay database;
- Better define and test higher grade trends for expansion within the Main Deposit;
- Demonstrate grade continuity in order to support a better resource classification;
- Provide material for extensive metallurgical testing that will relate to a revamped mine plan;
- Provide geotechnical information for mine design and for assessment of infrastructure locations; and
- Provide information to support project permitting activities and to develop a mine closure plan.

The 2008 drill program was designed principally to increase the assay sample density and to provide material for further metallurgical and environmental testing. The drill program in-filled on earlier work that had already defined the gross limits and overall geometry of the mineralized zone and as expected did not result in a material change to these limits or the geometry of the resource model, but it did better define higher grade trends within the deposit and provided more confidence in, and thus increased, the classification levels for this new mineral resource estimate.

In late 2008 Sherwood Copper Corporation merged with Capstone Mining Corporation, forming Capstone Mining Corporation.

Re-logging historic drillcore from the southern area of the claims was carried out in the spring of 2009 in preparation for a surface prospecting and mapping program over the same ground later in the season. In the area of these drillholes, 7 kilometres southwest of the three Kutcho VMS deposits, the southern limb of this anticline exposes part of the same favourable stratigraphy that hosts the VMS deposits on the north limb of the anticline. The early spring corelogging campaign was followed by a Soil Gas Hydrocarbon sampling program over the north-central section of the large contiguous claim block, including the known mineralized areas and their strike extensions. This soil sampling survey was followed by a property-wide, helicopter-supported program of mapping and prospecting.

Kutcho Copper Corporation completed a second diamond drill program in 2010. On July 3rd, 2010, a program of infill and step-out drilling commenced on Esso deposit which generated significant changes in the Mineral Resource Estimate of Esso deposit.

A total of eighteen thousand $(17,970)$ metres of HQ size core was drilled in 2010 by Driftwood Diamond Drilling Ltd., PO Box 2650, 2728 Pacific Street, Smithers, BC, Canada, V0J 2N0. The drill contractor was under the direct supervision of KCC personnel who were also responsible for supervising temporary employees and contractor geologists in core logging, sample collection, sample preparation, QA/QC programs and preparation of sample shipments to various analytical facilities for either assay or metallurgical testing.

The principal objectives of the 2010 drill program were to:

- Test selected undrilled perimeter areas to expand the size of the deposit
- Infill gaps in previous resource drilling programs and enlarge the assay database;
- Better define and test higher grade trends for expansion within Esso Deposit;
- Demonstrate grade continuity in order to support a better resource classification;
- Provide material for extensive metallurgical testing that will relate to a mine plan;
- Provide geotechnical information for mine design and for assessment of infrastructure locations; and
- Provide information to support project permitting activities and a mine closure plan.

The 2010 drill program was designed principally to increase the assay sample density and to provide material for further metallurgical and environmental testing. Most drillholes in-filled on earlier work that had already defined the gross limits and overall geometry of the mineralized zone and as expected did not result in a material change to these limits or the geometry of the resource model. The 2010 program better defines higher grade trends within the deposit, eliminates an internal gap in the resource model at the west end of Esso deposit and provides more confidence in, and thus increases, the classification levels of the new mineral resource estimate.

### 1.4 2011 Exploration Program

From April 8 to 19, an airborne electromagnetic (ABEM) survey was conducted over the Kutcho Property using Geotech Ltd.'s proprietary VTEM system (see separate Assessment Report). The VTEM system offered:

- significantly improved depth penetration (up to 750m) compared to the two previous airborne EM surveys on the property (Aerodat - 1974; Input Mark VI-1985), and the survey covered a larger area than either previous ABEM survey.
- a potential to see through the conductive overburden higher in the stratigraphy.
- generation of precisely located drill-ready EM targets that did not require follow-up ground surveys.
This geophysical program was followed by a drill program that tested nine high-priority VTEM targets. Results achieved at 8 of these VTEM targets are documented in this report.


### 2.0 GEOLOGY

### 2.1 Regional Geology

The Kutcho property lies within the King Salmon Allochthon (KSA), which consists of a faultbounded, narrow belt of Permo-Triassic island-arc volcanic rocks (Kutcho Formation) and younger, undated sedimentary rocks. These strata are sandwiched between two northerly-dipping thrust faults, the Nahlin fault to the north, and the King Salmon fault to the south (Fig. 2.1).
Kutcho Formation is thickest in the area where it hosts the volcanogenic massive sulphide deposits due in part to primary deposition, but also to stratigraphic repetition by folding and, possibly, thrusting. KSA is terminated to the east, near the eastern edge of the property, by the strike-slip Kutcho fault (Gabrielse, 1978) but KSA extends to the west for hundreds of kilometres. However, Kutcho Formation volcanic rocks thin to the west and are poorly exposed from a point 10 km west of Kutcho Creek all the way to Dease Lake.

KSA stratigraphy consists primarily of the Kutcho Formation, overlain by a regionally extensive limestone unit, which is overlain by a thick succession of fine clastic sediments, predominantly siltstone and mudstone. These are important units for clarifying the structural picture, major folds are clearly delineated by the outcrop trace of the limestone or by the contact between the volcanic and siltstone successions where the limestone is absent (Fig. 2.2). The limestone has historically been correlated with the Upper Triassic Sinwa Formation which has its type exposure on Sinwa Mountain 300 km to the west. By association, the black siltstone succession has been correlated with the Lower Jurassic Inklin Formation. However, stratigraphic relationships established in property-scale mapping at Kutcho program show that these regional stratigraphic correlations cannot be valid.

### 2.2 Property Geology

### 2.2.1 Stratigraphy

Stratigraphy of the Kutcho property has been described by Thorstad (1983), Bridge (1984) and Holbek (1985) and is only be briefly reviewed here. Figure 2.3 shows the property geology map,
and a generalized stratigraphic section is presented in Figure 2.4. Stratigraphy is best understood in the upper part of the Kutcho Formation where detailed drill information is available. The footwall stratigraphy, particularly away from the deposit area, is known only from surface mapping.


Figure 2.1 Regional Geologic Setting of the Kutcho Property


Figure 2.2 Schematic cross-section of the King Salmon Allochthon in the Kutcho deposits area


Figure 2.3 Simplified Kutcho Property Geology Map (with historical claim outline and surface projection of sulphide deposits)

The lowest rocks in the section include interlayered basalt, basaltic tuff and wacke, rhyolitic lapilli tuff and trondhjemite intrusive. Mafic rocks are fine to very fine grained, chloritic, and equigranular to weakly porphyritic. Lapilli tuffs are pale grey, siliceous and commonly contain very fine quartz phenocrysts and lenticular fragments from 0.5 to 3 cm in length. Textures can only be seen on weathered, lichen-free surfaces. Trondhjemite is described by Pearson and Panteleyev (1975) and Bridge (1983) as fine-grained, equigranular and plagioclase-rich. Weak but pervasive carbonate-chlorite-pyrite alteration of this unit is discernable.

Rocks overlying the basalt-lapilli tuff package have been termed the "ore-sequence" and consist of lapilli tuffs, crystal-lithic tuffs, quartz and quartz-feldspar crystal tuffs. Away from the deposit area, these units tend to be thin, interbedded, and variably but weakly altered. Fine quartz-crystal ash tuff with silica-rich laminations and rare thin zones of ferroan dolomite typically mark the distal exhalative zone. Sulphide zones occur at, or near to, the contact between footwall lapilli tuff and hangingwall quartz crystal tuff. Both lapilli fragments and phenocrysts are much coarser grained in the vicinity of the deposits, and become progressively finer grained to the south and west. Quartz-feldspar crystal tuff is quartz-rich near the deposits and to the south becomes more feldspar-rich.
A coarse breccia is developed within the quartz-feldspar crystal tuff immediately over the sulphide zones. Breccia fragments are typically sub-round, from 2 cm to 30 cm in size and are identical to crystal tuff matrix except for an increase in epidote from $2 \%$ to $10 \%$. This rock texture has been interpreted to be a debris flow of semi-consolidated crystal tuff shed from a flow-dome complex, and trapped in a graben or half-graben structure that hosts the sulphide lenses.
Rocks between the ore sequence and the overlying conglomerate unit are called the Tuff-Argillite Unit (TAU) and consist of gabbroic to basaltic intrusive sills and dikes, greywacke and argillite, and basalt tuffs and crystal tuffs. Gabbroic rocks are locally porphyritic with striking white euhedral plagioclase crystals ranging up to 2 cm long. In the area of the deposit the gabbroic units are more coarse-grained. Higher in the section and both to the east and west from the Kutcho
deposit this mafic unit becomes much finer grained and an intrusive origin is not so clearly identified. The amount of argillite increases in a westerly direction supporting the concept that this direction is towards the marine basin. The base of the TAU is interpreted to be a thrust fault and there are numerous other fault zones within the unit as noted in drillcore and in the adit.

Overlying the Tuff-Argillite Unit, and truncating it to the west, is the Pebble Conglomerate. This unit is a heterolithic, fragment-supported conglomerate composed of well-rounded to sub-rounded elongate rhyolite clasts, ranging in size from 1 cm to 38 cm long and derived from all of the underlying lithologies. The conglomerate is conformably overlain and transitional into the limestone, which in turn appears to be conformably overlain by a thick mudstone-siltstone sequence which incorporates minor lenses of limestone near its base.

Thorstad (1983) determined an Upper Triassic age for the Kutcho Formation on the basis of $\mathrm{Rb}-\mathrm{Sr}$ dating of volcanic rocks and regional stratigraphic correlation of sedimentary units. Subsequent UPb dating of five lithologies (Childe and Thompson, 1977 and Schiarizza, 2011b) constrains the age range of the volcanic strata to Early Triassic.

### 2.2.2 Structure

Rocks of the Kutcho Formation are characterized by planar foliation at a relatively constant strike direction of 270 to 290 degrees with northerly dips from 45 to 65 degrees. The dip of foliation decreases with structural depth. Foliation is part of the stress envelope associated with the regional thrust-faulting event that created the King Salmon Allocthon.

Folds are open to tight, asymmetrical, inclined and verging to the south. Folds plunge from 0 to 30 degrees west. Folds are most evident in well-bedded, competent units and fold data is heavily biased to the western property area, where these units predominate. The scale of the folds, combined with the large expanses of unfolded monoclonal strata, suggest that these are drag folds developed directly above and below the thrust fault planes (Figure 2.2).

Structures that critically affect stratigraphic interpretation are foliation-parallel thrust faults. These are difficult to detect in outcrop but can be inferred from foliation intensity, missing stratigraphy, contact geometry and topographic evidence. Faults of this type are considered to be present over the entire property.


Figure 2.4 Reconstructed Stratigraphic Section (10x Vertical Exaggeration)

### 3.0 MINERALIZATION AND ALTERATION

Three deposits comprise the Kutcho project. These form a west-plunging linear trend (Figures 2.3 and 3.1). From east to west the deposits are the Main, Sumac and Esso deposits (these deposits were previously termed Kutcho, Sumac West, and Esso West, respectively).


Figure 3.1 Kutcho sulphide deposits, drillholes and topography - looking south
Main deposit crops out on surface and extends to a depth of approximately 250 m below surface at its western tip, while the Esso deposit lies $2,250 \mathrm{~m}$ to the west of Main deposit and extends from 400 m to 600 m below surface. A combined mineral resources for the three deposits is summarized in Table 3.1.

| Kutcho Project - Mineral Resource Estimate at a 1.5\% Copper Cut-Off for All Deposits (1) |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Tonnes (000's) | Grade |  |  |  | Contained Metal |  |  |  |
| Class |  | Copper <br> (\%) | Zinc <br> (\%) | $\begin{aligned} & \text { Gold } \\ & (\mathrm{g} / \mathrm{t}) \end{aligned}$ | Silver $(\mathrm{g} / \mathrm{t})$ | Copper <br> (M Ib.) | Zinc <br> (M Ib.) | $\begin{aligned} & \text { Gold } \\ & \text { (K oz) } \end{aligned}$ | $\begin{aligned} & \text { Silver } \\ & \text { (K oz) } \end{aligned}$ |
| Measured (M) | 5,421 | 2.15 | 2.86 | 0.34 | 31.4 | 256.6 | 341.8 | 59 | 5,482 |
| Indicated (I) | 5,859 | 2.24 | 3.67 | 0.45 | 41.6 | 289.2 | 473.5 | 84 | 7,831 |
| M \& I | 11,280 | 2.19 | 3.28 | 0.39 | 36.7 | 545.8 | 815.3 | 143 | 13,313 |
| Inferred | 1,090 | 1.74 | 2.04 | 0.35 | 30.7 | 41.9 | 49.1 | 12 | 1,077 |

Table 3.1 Measured, Indicated and Inferred Mineral Resources for the Kutcho Property (Resource updated by KCC on February 15, 2011. Tabulated at a $1.5 \%$ copper cut-off for all three deposits.) A detailed resource tabulation is included as Appendix II.

### 3.1 DEPOSIT TyPE

Mineralization at the Kutcho project is part of the volcanogenic massive sulphide (VMS) family of deposits. These deposits are a major source of copper, zinc, lead, silver and gold around the world. Speculation about the origin of these deposits goes back to mid 1850's when various French and English scientists postulated chemical precipitation from seafloor volcanic activity (Stanton, 1991). In the early $19^{\text {th }}$ century, Japanese workers documented the sulphide textures preserved in the Kuroko deposits of Japan and the association of these deposits with rhyolite domes, developing the "submarine sinter theory". However, this work did not attract much attention and the Japanese genetic theories or models of ore formation of this deposit-type did not really gain international acceptance until their observations were translated and published by other workers in
the late 1950's. Discovery of the metalliferous Red Sea brine deposits in 1965 provided substantial impetus for the proponents of the "submarine exhalative" model. A certain amount of controversy between syngenetic and epigenetic theories continued through the 1970's, but with the advent of deep-sea submersibles and the filming of black and white "smokers" or hydrothermal vents in volcanic rift zones on the seafloor, scientific models could go to a new level of detail.

VMS deposits have been classified into six subtypes (Figure 3.2) depending upon the hostrocks, mineralization, and tectonic setting. Depending on the classification scheme used, Kutcho VMS deposits are Kuroko type or Felsic volcanic-Siliciclastic class. In this model, mineralization is related to felsic volcanism in island-arc or back-arc tectonic settings. A significant feature of VMS deposits from an exploration perspective is their tendency to occur in clusters. Larger VMS camps have up to 25 discrete deposits. Extensive mineralized districts, called volcanic belts, can extend over 200 km in length.

Features of Kutcho deposits suggest that they formed at or near the seafloor in a structurally controlled depression, such as a half-graben. The VMS deposits at Kutcho have some features that are not common to this class of deposits: the absence of lead and barite is likely due to the low potassium content of the volcanic hostrocks and the presence of abundant carbonate.


Figure 3.2 The six types of volcanogenic massive sulphide deposits (Galley et al., 2007)

Alteration associated with VMS deposits is well-documented and provides a valuable exploration tool. Since the volume of altered rock is 10 to 100 times greater than the actual sulphide deposit, alteration provides a larger exploration target. Extensive studies of the alteration around the Main deposit have been completed and the alteration is chemically well-zoned about the hydrothermal vent area. Applying this known zonation, geochemical analyses of drill core within the alteration zone provide vectors towards a hydrothermal vent area and, hopefully, new sulphide deposits.
Geophysical techniques such as electro-magnetic (EM) and gravity surveys are useful for locating conductors or possible sulphide concentrations. EM methods can be used in airborne and ground surveys but can also be used within drillholes to locate "off-hole" conductors, thereby effectively increasing the search area of a drillhole. Many airborne and ground geophysical surveys have been completed on the Kutcho property and most high-priority targets identified to date have been investigated.

### 3.1.1 Main (Kutcho) Deposit

Main deposit has an elliptical, lenticular shape with approximate dimensions of $1,500 \mathrm{~m}$ length, 300 m width (down-dip) and 30 m thickness ( 34 m maximum thickness). These dimensions roughly translate to 5000 ft length, 1000 ft width, and 100 ft thickness. The long axis of the deposit plunges west-northwest at 12 degrees towards azimuth 285 degrees. The deposit is stratabound and approximately conformable with stratigraphy (Figure 3.3).


Figure 3.3 North-south cross-section through Main deposit
There is a gentle warping of the deposit such that the dip of the deposit changes from east to west and from north to south. The shallowest dip, about $38^{\circ}$, occurs at the southeastern edge and becomes progressively steeper, to about $63^{\circ}$, at the northwestern edge. In general, the up-dip edge of the sulphide lens is thinner and pinches out, whereas the down-dip edge is thicker and interlayered with tuffaceous rock.

Sulphide mineralogy of the deposit is relatively simple and consists of pyrite, chalcopyrite, sphalerite and bornite, with minor chalcocite, tetrahedrite, diginite, galena, idiaite, hessite and
electrum. Gangue minerals include quartz, dolomite, ankerite, sericite, gypsum and anhydrite. Fluorite and barite have been observed but do not occur in significant amounts.
Interpretation of the shape of the sulphide zone, together with the observed volcanic and depositional textures of the enclosing rocks, suggests that sulphide mineralization was deposited in a structural depression, likely a half-graben. The internal stratigraphy of Main deposit was determined by detailed drillcore logging along a single longitudinal section of drill holes (Figure 3.4; Holbek and Heberlein, 1986). The deposit formed from three hydrothermal-depositional cycles that begin with barren pyrite which grades into a copper-rich middle and zinc-rich top. Depositional cycles are commonly separated by layers of exhalative quartz and/or carbonate and minor volcanic ash. However, post-depositional hydrothermal activity resulted in sulphide replacement mineralization which tends to blur metal gradation zones and boundaries of exhalative cycles. Additional features such as an irregular depositional surface and localized slumping of sulphide mineralization or chimney collapse, and late-stage (post depositional) hydrothermal activity also add complexities to the internal sulphide stratigraphy.


Figure 3.4 Vertical longsection through Main deposit showing internal stratigraphy and lithofacies.

Areas of late overprinting by remobilized copper minerals, and enrichment in precious metals, are interpreted as indicators of vent areas and occur along a linear trend on the down-dip side of the Main deposit with two "hot-spots" near each end of the deposit (Figure 3.5). However, no areas of 'classic' copper-rich footwall stringer mineralization have been encountered by drilling.


Figure 3.5 Vertical longsection along Main deposit showing contoured $\mathbf{C u} \%$ x Thickness. Black dots are drillhole pierce-points.

The upper contact of the sulphide mineralization is sharp with almost no sulphide minerals occurring in hangingwall rocks with the exception of scattered coarse crystals of porphyroblastic pyrite. However, sericite alteration of feldspar in the hangingwall strata is gradational from very weak at distances of up to 50 m above the sulphide contact to intense from 1 m to 10 m above the
sulphide lens. It is common for a shear zone to occur at the upper sulphide-schist contact; this shear zone varies from 20 cm to a maximum of 200 cm in thickness, and in many drillholes this hangingwall fault carries some grade. The base of the deposit consists of nearly barren massive pyrite with interstitial quartz. The contact between 'ore' and the footwall pyrite zone can be either gradational or sharp. Below the footwall pyrite zone is quartz-sericite schist with bands of generally barren, massive to semi-massive pyrite. The footwall pyrite content diminishes with depth away from the deposit, extending to a maximum depth of 200 m below the central part of the deposit. Although the footwall material appears to be of low competence in drillcore, it holds up very well in the adit.

### 3.1.2 Sumac Deposit

Sumac deposit has not previously received much attention due to its relatively low grades. It has been intersected in just 14 drillholes. A resource estimate is presented in Appendix II.

Sumac mineralization is massive to banded pyrite with varying amounts of chalcopyrite and sphalerite, but lacking bornite. The deposit is oval, 840 m long, 250 m wide and from 20 m to 32 m thick. Hangingwall alteration is similar to Main deposit; the footwall contains less pyritic banding, progressing much sooner into chlorite-altered lapilli tuff.

### 3.1.3 Esso Deposit

Esso deposit was discovered by following the trend in mineralization westward beyond the Main and Sumac areas. The deposit lies between 400 m and 520 m below surface. Like the others, Esso is an elongate lens with dimensions 640 m long, 150 m wide and up to 24 m thick. Mineralization in Esso lens is higher grade than both Main and Sumac deposits, but displays similar mineral zonation with copper-rich and zinc-rich layers or zones with highest grades concentrated in the central area of the larger lens. Hangingwall and footwall alteration is similar to Main lens and three-dimensional modeling indicates that these two deposits lie along the same stratigraphic horizon.

Drillholes are spaced approximately 30 m to 50 m along sections variably spaced 50 m to 60 m apart. The resource estimate summarized in Appendix II is based on 43 drill intersections.

### 3.1.4 Other Mineralization

Other zones of mineralization on the Kutcho Property include the Footwall zone, and the Jenn area. The Footwall zone occurs approximately 85 m stratigraphically below the footwall of Main deposit, and extends up-dip to surface in two locations. Footwall zone is 2 m to 5 m thick and relatively zinc-rich compared to Main lens. Didur (1979) calculated an inferred resource estimate using a polygonal method, of 230,000 tonnes grading $1.47 \% \mathrm{Cu}, 5.52 \% \mathrm{Zn}, 43.7 \mathrm{~g} / \mathrm{t} \mathrm{Ag}$ and $0.4 \mathrm{~g} / \mathrm{t}$ Au (historical resource; non-compliant with NI 43-101).

The Jenn claims at the eastern end of the property received a fair amount of exploration attention by Esso. Although significant alteration and some local mineralization were intersected, no resources have been defined in the Jenn area. Folding appears to limit the down-dip potential in this area but revisions to the structural interpretation are likely and detailed geophysical surveys may enhance the area's potential.
Exhalative mineralisation west of upper Kutcho Creek is hosted by strata that correlate closely with hangingwall units exposed at the deposits. The three separate areas of exposure of the Eveready prospect and the adjacent Belik showing consist of stratabound, crudely stratiform mineralization repeatedly exposed with predictable regularity on adjacent fold limbs.

### 4.0 2011 Airborne Electromagnetic Survey

From April 8 to 19 , an airborne electromagnetic (ABEM) survey was conducted over the Kutcho Property using Geotech Ltd.'s proprietary VTEM system. The VTEM system offered:

- significantly improved depth penetration (up to 750 m ) compared to the two previous ABEM surveys on the property (Aerodat - 1974; Input Mark VI - 1985)
- the VTEM survey covered a larger area than either previous ABEM survey.
- the potential to see through the conductive overburden.
- generation of precisely located drill-ready ABEM targets that did not require follow-up ground surveys.
The ABEM survey consisted of $1,649.4$ line-km (plus tie-lines) covering a $147.2 \mathrm{~km}^{2}$ area. The survey grid was oriented along flight lines with azimuth 004 degrees, perpendicular to the strike of the hostrock strata in the deposit area (Figure 4.1).


## $5.0 \quad 2011$ Exploration Drilling Program

### 5.1 Introduction

A diamond drill program was completed on Kutcho Property between July 2, and August 24, 2011. This program tested nine airborne electromagnetic anomalies detected by a VTEM geophysical survey completed in April, 2011.

### 5.2 Description of Exploration Drilling Program

Computer-based geophysical target analysis called Maxwell Modeling was completed over every high-priority VTEM geophysical target. Maxwell is a proprietary software package created by EMIT Electromagnetic Imaging Technology; more information on this processing is available at: http://www.electromag.com.au/maxwell.php.
Out of 19 higher-priority geophysical anomalies, ten targets were recommended for immediate drill follow-up (Table 5.2), and nine of these were drill-tested in 2011. One diamond drillhole was planned at each geophysical target, with an option to add additional drillholes depending on the results attained in the initial drillhole. In total, 19 drillholes, including two abandoned short holes, totalling 4,227 metres, were completed on nine geophysical targets.
Drillhole locations are shown in Figure 5.1, and summarized in Tables 5.1 and 5.2. The drillhole locations, depths and orientations were all designed based on the results of the Maxwell Modelling program. Strata throughout the Kutcho Property dips between $-45^{\circ} \mathrm{N}$ to $-60^{\circ} \mathrm{N}$ and averages $-50^{\circ} \mathrm{N}$. Most drillholes were planned with a dip of $-50^{\circ} \mathrm{S}$.

### 5.3 Drilling Program Results

Drilling results are summarized in Table 5.3. Individual Maxwell Models for each VTEM target, geological cross-sections for each drillhole, core logs and assay results are included as appendices.

### 5.4 Drilling Program Interpretation

The 2011 drilling program confirms that the VTEM geophysical system detected extensive polymetallic massive sulphides in an area beyond the southeast edge of the Sumac deposit (VTEM Target B). Six holes were completed at Target B; four of these intersected polymetallic massive sulphides. Although the sulphide lens at Target B is not completely drilled off, the decision was made to send the drill to continue testing the other high-priority VTEM targets. The airborne geophysical survey also detected uneconomic stratabound pyrite at VTEM Targets C and O . The remaining 6 high-priority VTEM targets (A, D, E, M, R, S) were all shown to be caused by heavy concentrations of graphite in recrystallized carbonaceous black mudstones.

### 5.5 Drilling Program Conclusions and Recommendations

All geophysical targets drill-tested this year are new targets not previously delineated by earlier airborne or ground geophysical surveys. Nine VTEM targets were drill-tested in the 2011 exploration drill program. Specific conclusions following from this exploration program are:

- The VTEM survey successfully located one polymetallic massive sulphide lens plus two other horizons of stratabound disseminated exhalative pyrite in felsic volcanic rocks.
- The VTEM survey also detected strong anomalous responses over graphitic black mudstone units. The EM anomalies generated by the sulphides and the carbonaceous mudstones are sufficiently similar that it is not possible to discriminate between sulphidegenerated and graphite generated anomalies based on their geophysical responses alone.
- Drill programs testing EM anomalies on this property must be sufficiently well funded that there is capacity to test numerous geophysical targets, and must anticipate that only one target in three may be generated by bedrock sulphides.
- The Sumac massive sulphide deposit extends further south, further east and further up-dip than previously recognized during 38 years of exploration work on the deposit.
- In addition to the expected strong EM response over Main deposit, the VTEM system has been able to detect anomalous responses over the east end of Sumac deposit and along the up-dip edge of the Esso stratigraphic horizon. Respectively, these represent significantly deeper levels of penetration and higher levels of sensitivity than previous airborne EM systems used on this property.
- Graphitic mudstone horizons are common close to pyritic tuff horizons. These mudstone units may host significant exhalative (syngenetic) sulphides.


Figure 5.1 VTEM conductors and prioritized targets on aeromagnetic base map

| TZ | Priority | Strike length | Conductors | General dip | Mag_correlation | Geology | Comments |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A | 1 | 1500 m. | Strong-weak DPR. | 45 degrees N. | Partial correlation with magnetic grain. | Rhyolite tuff | Near east end of survey. Possibly tested by drill hole E030,but conductor is stronger 350 m to W. |
| B | 1 | 300 m . | Strong DPR. | 45 degrees N . | Aligned with general E-W mag grain. | Rhyolite tuff. | Strong conductors on the eastern side of the Sumac deposit, which have not been drill tested. The strong conductivity suggests higher Cu grades. |
| C | 2 | 500 m . | Medium-weak DPR. | 45 degrees N. | Located in magnetically flat area, but parallel to magnetic grain | Rhyolite tuff. | Located adjacent to E end of Main deposit. Displaced SE, so may be footwall mineralization. Weak conductor on E end possibly tested by drill hole E013. |
| D | 2 | 700 m . | Medium - weak DPR. | 60 degrees N . | In area of flat magnetics, 200 m north of linear mag high. | Basalt tuffs and flows, near contact of gabbro sill. | Possibly same stratigraphic horizon as Main Zone. East end appears to be cut off by fault. Not drill tested. |
| E | 2 | 700 m . | Strong - weak SPR | 60 degrees N. | In local mag low, between two curvilinear mag highs. | Basalt tuffs and flows, near contact of gabbro sill. | Probably faulted equivalent of TZ D. W end (close to fault) possibly tested by drill hole E063, but conductivity improves to the east. |
| F | 3 | 900 m . | Mostly weak DPR, one medium DPR. | 45 degrees N. | Strongest portion of conductor correlates with small magnetic high. | Rhyolite tuff. | E end may be truncated by fault. Possibly tested by drill holes E017 (near best conductor and mag high) and by 90K22 (far W end with weak conductor). |
| G | 3 | 200 m . | One strong and one medium DPR in trend of weak DPR. | 45 degrees N. | Northern flank of weak magnetic high, oriented E-W. | Basalt tuffs and flows. | Locally better conductor within mostly weak hanging wall conductor. Probably tested by drill hole E011. |
| H | 2 | 500 m . | Medium DPR. | Steep N. | Correlates with weak mag high. | Rhyolite tuffs. | More conductive portion of 2200 m long conductor. Possibly tested by drill hole 90K01. |
| I | 3 | 800 m . | Strong-weak DPR and weak SPR. | Steep N. | Transects eminently magnetized probable intrusive. May be shallower than intrusive. | Basalt tuffs and flows. | Unusual conductor. Not drill tested. |
| J | 3 | 300 m . | Two strong DPR, one medium SPR. | Steep N. | Cuts across magnetic grain. | Basalt tuffs and flows. | Short strike-length, near edge of interpreted buried intrusive. Not drill tested. |
| K | 3 | 800 m (possibly truncated to the S ). | Mostly strongmedium DPR and SPR. | Steep N. | Close to the edge of a remanently magnetized probable intrusive. May be shallower than intrusive. | Contact between rhyolite tuff and basalt tuffs and flows. | On S edge of VTEM survey. Not drill tested. These strong conductors need to be explained. |
| L | 3 | 450 m . | Strong-weak SPR. | Steep. | Transects the edge of a remanently magnetized probable intrusive. May be shallower than intrusive. | Contact between rhyolite tuff and basalt tuffs and flows. | Similar to TZ K. Not drill tested. A nearby weak conductor extending into the remanently magnetized intrusive may have been tested by drill hole 90K18. |
| M | 2 | 1300 m . | Weak SPR and DPR and surficial. | Probably N, but weak and poorly defined. | Mag low, aligned with mag trends. | Fold axis - conglomerate, basalts tuffs, argillite, gabbro sill, basalt tuffs and flows and rhyolite tuff. | Possible plunge to W. Eastern part appears surficial. This part possibly tested by drill hole WKC01. |

Table 5.1 (Part 1 of 2): Listing of Prioritized VTEM Targets for Kutcho Area

| TZ | Priority | Strike length | Conductors | General dip | Mag_correlation | Geology | Comments |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| N | 2 | 900 m . | One medium SPR, nine weak DPR/SPR | Mostly steep N | Loose correlation with weak mag high. | Crosses contact between rhyolite tuff and basalt tuffs and flows, intruded by tonalite. | W part has different characteristics than E part. Strongest conductor on Line 1820. Not drill tested. |
| 0 | 3 | 1200 m. | Weak SPR. | Too weak to decipher. | Correlates with weak mag trend. | Limestone, near contact with rhyolite tuff. | Weak, but continuous conductor. Possibly tested at E end by drill hole E059. |
| P | 3 | 1000 m. | Weak DPR and surficial. | Flat-dip to N. | Mag low, but aligned with mag trends. | Rhyolite tuff, near contact with basalt tuffs and flows. | Weak conductor. Not drill tested. |
| Q | 3 | 1200 m. | Weak SPR | Too weak to decipher. | No obvious correlation. | Rhyolite tuff at east end, conglomerate at west end. | Very weak, possibly deeper conductors. Not drill tested. |
| R | 1 | 1100 m . | Strong SPR and DPR. | Flat-dip to N. | Central part directly correlates with local mag high. | Limestone and argilite with pyritic rhyolite tuff nearby. | Very conductive section of long strikelength conductor. Characteristics similar to Main lens. Not drill tested. |
| S | 1 | 1000 m. | Strong DPR and SPR. | Steep N. | Loose correlation with weak mag high. | Limestone and argilite with pyritic rhyolite tuff nearby. | Possibly folded equivalent of TZ R. Characteristics similar to Main lens. Not drilled tested.. |

Table 5.1 (Part 2 of 2): List of Prioritized VTEM Targets for Kutcho Area

| TZ | Hole <br> Name | Flight <br> line | $\mathbf{X}$ | $\mathbf{Y}$ | $\mathbf{Z}$ | Dip | $\mathbf{A z}$ | Length <br> $\mathbf{( m )}$ <br> Expected down- <br> hole depth to <br> conductor (m) <br> A TZA_1 | 3060 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 546790 | 6448670 | 1105 | 50 | 185 | 100 | 68 |  |  |  |
| B | TZB_1 | 1985 | 536260 | 6452210 | 1475 | 50 | 185 | 300 | 225 |
| C | TZC-1 | 2230 | 538665 | 6451590 | 1585 | 50 | 185 | 200 | 147 |
| D | TZD_1 | 2450 | 540875 | 6451600 | 1737 | 50 | 185 | 140 | 99 |
| E | TZE_1 | 2560 | 541955 | 6451060 | 1705 | 50 | 190 | 110 | 75 |
| M | TZM_1 | 1690 | 533300 | 6452200 | 1620 | 60 | 185 | 450 | 370 |
| O | TZO_1 | 1730 | 533460 | 6448750 | 1625 | 60 | 185 | 300 | 208 |
| P | TZP_1 | 1600 | 532235 | 6449770 | 1642 | 50 | 185 | 200 | 137 |
| R | TZR_1 | 1700 | 533150 | 6448420 | 1555 | 50 | 200 | 175 | 88 |
| S | TZS_1 | 1800 | 534098 | 6447820 | 1737 | 50 | 190 | 100 | 65 |

Table 5.2: Proposed Drillholes (TZ = Target Zone)

| Target and Hole ID |  |  |  |  | Header Information |  |  |  |  | Results |  |  |  | Sulphide Mineralization |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Target Name | $\begin{array}{c\|} \text { Hole } \\ \text { Number } \end{array}$ | Predicted Target Depth (m) | Actual Average <br> Target <br> Depth $(\mathrm{m})$ | Drillhole Depth EOH (m) | Easting | Northing | Elevation | Azmuth | Dip | Was Target tested | Explanation of Target | From | To | Py/Po (\%) | Cpy (\%) | Sph (\%) |
| A | 219 | 68 | 54 | 150 | 546,793 | 6,448,675 | 1,110 | 185 | -50 | Yes | Graphite (w pyrite) | 51.10 | 57.29 | 30 | 0 | 0 |
|  | 220 | 68 | 71 | 102 | 546,793 | 6,448,675 | 1,110 | 185 | -85 | Yes | Graphite (w pyrite) | 68.40 | 72.80 | 30 | 0 | 0 |
|  | 221 | 68 | 64 | 102 | 546,686 | 6,448,672 | 1,142 | 185 | -50 | Yes | Graphite (w pyrite) | 58.40 | 69.20 | 20 | 0 | 0 |
| B | 203 | 225 | 208 | 429 | 536,260 | 6,452,210 | 1,475 | 185 | -50 | Yes | Sulphides | 199.87 | 216.50 | 75 | 5 | 7 |
|  | 204 | 225 | 220 | 282 | 536,260 | 6.452,210 | 1,475 | 185 | -63 | Yes | Sulphides | 212.55 | 226.76 | 70 | 5.8 | 4.2 |
|  | 211 | 225 | 93 | 183 | 536,260 | 6.452,080 | 1.495 | 185 | -50 | Yes | Sulphides | 86.00 | 99.50 | 8 | 0 | 0 |
|  | 212 | 225 | 121 | 174 | 536,260 | 6,452,080 | 1,495 | 185 | -70 | Yes | Sulphides | 118.98 | 123.45 | 65 | 5 |  |
|  | 213 | 225 | 116 | 156 | 536,310 | 6,452,080 | 1,475 | 185 | -70 | Yes | Sulphides | 100.28 | 131.97 | 60 | 6 |  |
|  | 214 | 225 | 94 | 165 | 536,310 | 6,452,080 | 1,475 | 185 | -50 | Yes | Sulphides | 89.00 | 98.60 | 5 |  |  |
| C | 215 | 147 | 108 | 192 | 538,665 | 6,451,590 | 1,585 | 185 | -50 | Yes | Sulphides | 102.00 | 114.00 | 8 | tr |  |
| D | 205 | 99 | 104 | 165 | 540,875 | 6,451,600 | 1,737 | 185 | -50 | Yes | Graphite | 98.43 | 110.11 | 3 |  |  |
| E | 206 | 75 | 93 | 183 | 541,955 | 6,451,060 | 1,705 | 190 | -50 | Yes | Graphite | 43.43 | 49.19 | 2.5 |  |  |
| M | 207 | 368 | 215 | 483 | 533,300 | 6.452,200 | 1,620 | 185 | -60 | Yes | Graphite | 145.90 | 283.33 |  |  |  |
| 0 | 210 | 208 |  | 90 | 533,460 | 6,448,750 | 1,625 | 185 | -60 | No. Abe | ndoned hole. |  |  |  |  |  |
| 0 | 210A | 208 | 175 | 306 | 533,460 | 6.448,750 | 1,625 | 185 | -60 | Yes | Pynte | 147.74 | 202.30 | 6 |  |  |
| R | 209 | 88 | 78 | 330 | 533,150 | 6.448.420 | 1,555 | 200 | -50 | Yes | Graphite | 0.00 | 155.45 |  |  |  |
| S | 208 | 65 | 45 | 273 | 534,098 | 6,447,820 | 1,737 | 190 | -50 | Yes | Graphite | 0.00 | 88.89 | 1.5 |  |  |
|  | 216 |  |  | 117 |  |  |  |  |  | No. Aba | ndoned hole. |  |  |  |  |  |
| S | 216A |  |  | 345 |  |  |  | 190 | -55 | No. Ge | ology target. |  |  |  |  |  |

Table 5.3 Completed Drillholes and Results

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## APPENDIX I

LIST OF CLAIMS
FOR

## KUTCHO PROPERTY

| Tenure Number | Claim <br> Name | Owner | Tenure Type | Tenure Subtype | Map <br> No. | Area (ha) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 552782 |  | 218234 | Mineral | Claim | 104I | 306.9 |
| 552785 |  | 218234 | Mineral | Claim | 104I | 409.3 |
| 552792 |  | 218234 | Mineral | Claim | 104I | 153.5 |
| 552794 |  | 218234 | Mineral | Claim | 104I | 597.1 |
| 552796 |  | 218234 | Mineral | Claim | 104I | 494.8 |
| 552805 |  | 218234 | Mineral | Claim | 104I | 1,074.7 |
| 552809 |  | 218234 | Mineral | Claim | 104I | 136.4 |
| 552812 |  | 218234 | Mineral | Claim | 104I | 136.4 |
| 552814 |  | 218234 | Mineral | Claim | 104I | 357.9 |
| 552816 |  | 218234 | Mineral | Claim | 104I | 306.8 |
| 552820 |  | 218234 | Mineral | Claim | 104I | 340.9 |
| 552823 |  | 218234 | Mineral | Claim | 104I | 921.8 |
| 552911 | PASS 1 | 218234 | Mineral | Claim | 104I | 136.4 |
| 552913 | ADD1 | 218234 | Mineral | Claim | 104I | 17.0 |
| 552914 | ADD2 | 218234 | Mineral | Claim | 104I | 17.1 |
| 556552 | ADD3 | 218234 | Mineral | Claim | 104I | 374.9 |
| 556555 | ADD4 | 218234 | Mineral | Claim | 104I | 102.3 |
| 569607 |  | 218234 | Mineral | Lease | 104I | 1,090.0 |
| 585957 | MOTHER 1 | 218234 | Mineral | Claim | 104I | 426.6 |
| 585958 | MOTHER 2 | 218234 | Mineral | Claim | 104I | 409.6 |
| 585959 | MOTHER 3 | 218234 | Mineral | Claim | 104I | 375.3 |
| 586844 | ACCENT 1 | 218234 | Mineral | Claim | 104I | 426.5 |
| 586846 | ACCENT 2 | 218234 | Mineral | Claim | 104I | 273.0 |
| 586848 | SOUTH FORK 1 | 218234 | Mineral | Claim | 104I | 426.9 |
| 586849 | SOUTH FORK 2 | 218234 | Mineral | Claim | 104I | 426.9 |
| 586850 | SOUTH FORK 3 | 218234 | Mineral | Claim | 104I | 426.8 |
| 586851 | SOUTH FORK 4 | 218234 | Mineral | Claim | 104I | 426.9 |
| 586852 | TRONDHJEMITE 1 | 218234 | Mineral | Claim | 104I | 426.7 |
| 586854 | TRONDHJEMITE 2 | 218234 | Mineral | Claim | 104I | 426.7 |
| 586855 | TRONDHJEMITE 3 | 218234 | Mineral | Claim | 104I | 426.6 |
| 848105 | ACCENT 3 | 218234 | Mineral | Claim | 104I | 238.9 |
| 848106 | ACCENT 4 | 218234 | Mineral | Claim | 104I | 153.5 |
| 852142 | PYRAMID PEAK | 218234 | Mineral | Claim | 104I | 426.9 |
| 852162 | TUCHO 1 | 218234 | Mineral | Claim | 104I | 426.7 |
| 852163 | TUCHO 2 | 218234 | Mineral | Claim | 104I | 426.8 |
| 852164 | TUCHO 3 | 218234 | Mineral | Claim | 104I | 426.9 |
| 852165 | THE SPHINX | 218234 | Mineral | Claim | 104I | 427.0 |
| 852166 | NILE RIVER | 218234 | Mineral | Claim | 104I | 222.1 |
| 852167 | SOUTH ROAD | 218234 | Mineral | Claim | 104I | 187.6 |
| 852344 | FAR EAST 1 | 218234 | Mineral | Claim | 104I | 426.8 |
| 852345 | FAR EAST 3 | 218234 | Mineral | Claim | 104I | 85.3 |
| 852346 | FAR EAST 2 | 218234 | Mineral | Claim | 104I | 426.9 |
| 852347 | CAMPVIEW 1 | 218234 | Mineral | Claim | 104I | 307.0 |
| 852348 | CAMPVIEW 2 | 218234 | Mineral | Claim | 104I | 341.0 |
| 854561 | KUTCHO FAULT | 218234 | Mineral | Claim | 104I | 409.1 |
| 858667 | ACCENT 5 | 218234 | Mineral | Claim | 104I | 153.6 |
| 861767 | ACCENT 6 | 218234 | Mineral | Claim | 104I | 102.4 |

Table I-1. Claims held by Kutcho Copper Corporation on November 30, 2011

## APPENDIX II

## KUTCHO PROPERTY RESOURCE TABLE

Table II-1 Main Deposit Resource Summary

| Main Deposit - Mineral Resource Estimate at a 1.5\% Copper Cut-Off (1) |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Class | $\begin{gathered} \text { Tonnes } \\ \text { 000's } \end{gathered}$ | Grade |  |  |  | Contained Metal |  |  |  |
|  |  | Copper (\%) | $\begin{aligned} & \text { Zinc } \\ & (\%) \end{aligned}$ | Gold (g/t) | Silver (g/t) | $\begin{aligned} & \text { Copper } \\ & \text { (M Ib) } \end{aligned}$ | $\begin{gathered} \text { Zinc } \\ \text { (M lb) } \end{gathered}$ | Gold <br> (Koz) | Silver (Koz) |
| Measured (M) | 5,421 | 2.15 | 2.86 | 0.34 | 31.4 | 256.6 | 341.8 | 59 | 5,482 |
| Indicated (I) | 4,043 | 2.04 | 2.54 | 0.35 | 31.2 | 181.4 | 226 | 45 | 4,049 |
| M \& I | 9,464 | 2.1 | 2.72 | 0.34 | 31.3 | 438 | 567.8 | 104 | 9,531 |
| Inferred | 464 | 1.84 | 2.83 | 0.43 | 31.6 | 18.8 | 29 | 6 | 471 |

Table II-2 Esso Deposit Resource Summary

| Esso Deposit - Mineral Resource Estimate at a 1.5\% Copper Cut-Off (1) |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{gathered} \text { Tonnes } \\ \text { 000's } \end{gathered}$ | Grade |  |  |  | Contained Metal |  |  |  |
| Class |  | Copper (\%) | $\begin{aligned} & \text { Zinc } \\ & (\%) \end{aligned}$ | Gold (g/t) | Silver (g/t) | Copper <br> (M lb) | Zinc <br> (MIb) | Gold <br> (Koz) | Silver <br> (Koz) |
| Measured (M) | - | - | - | - | - |  | - | - |  |
| Indicated (I) | 1,816 | 2.69 | 6.18 | 0.66 | 64.8 | 107.8 | 247.5 | 39 | 3,782 |
| M \& I | 1,816 | 2.69 | 6.18 | 0.66 | 64.8 | 107.8 | 247.5 | 39 | 3,782 |
| Inferred | - | - | - | - | - | - | - | - | - |

Table 1I-3 Sumac Deposit Resource Summary

| Sumac Deposit - NI43-101 Mineral Resource Estimate at a $1.5 \%$ Copper Cut-Off ${ }_{(1)}$ |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $\begin{aligned} & \text { Tonnes } \\ & \text { (000's) } \end{aligned}$ | Grade |  |  |  | Contained Metal |  |  |  |
| Class |  | Copper (\%) | $\begin{aligned} & \text { Zinc } \\ & (\%) \end{aligned}$ | Gold (g/t) | Silver (g/t) | Copper <br> (M lb) | Zinc (MIb) | Gold (Koz) | Silver (Koz) |
| Measured (M) | - | - | - | - | - | - | - | - | - |
| Indicated (I) | - | - | - | - | - | - | - | - | - |
| M \& I | - | - | - | - | - | - | - | - | - |
| Inferred | 626 | 1.67 | 1.46 | 0.29 | 30.1 | 23.1 | 20.1 | 6 | 606 |

Table 1I-4 Kutcho Property Resource Summary
Kutcho Project - Mineral Resource Estimate at a 1.5\% Copper Cut-Off for All Deposits (1)

| Class | $\begin{aligned} & \text { Tonnes } \\ & \text { (000's) } \end{aligned}$ | Grade |  |  |  | Contained Metal |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Copper <br> (\%) | Zinc (\%) | $\begin{gathered} \text { Gold } \\ (\mathrm{g} / \mathrm{t}) \end{gathered}$ | $\begin{gathered} \text { Silver } \\ (\mathrm{g} / \mathrm{t}) \end{gathered}$ | Copper <br> (M lb) | Zinc <br> (MIb) | $\begin{gathered} \text { Gold } \\ \text { (Koz) } \end{gathered}$ | Silver (Koz) |
| Measured (M) | 5,421 | 2.15 | 2.86 | 0.34 | 31.4 | 256.6 | 341.8 | 59 | 5,482 |
| Indicated (I) | 5,859 | 2.24 | 3.67 | 0.45 | 41.6 | 289.2 | 473.5 | 84 | 7,831 |
| M \& I | 11,280 | 2.19 | 3.28 | 0.39 | 36.7 | 545.8 | 815.3 | 143 | 13,313 |
| Inferred | 1,090 | 1.74 | 2.04 | 0.35 | 30.7 | 41.9 | 49.1 | 12 | 1,077 |

(1) Numbers may not total due to rounding

Source: Capstone Mining Corp., Press Release 09-04, February 9, 2009: "Capstone Announces Robust Mineral Resource Update for High Grade Kutcho Copper Project". The technical information in this news release has been prepared in accordance with Canadian regulatory requirements set out in National Instrument 43-101 and reviewed by Stephen P. Quin, P. Geo., President \& COO for Capstone Mining Corporation and Mr. Garth Kirkham, P.Geo. of Kirkham Geosystems Ltd., the Independent Qualified Person under National Instrument 43-101 responsible for the resource estimate.

APPENDIX III

KUTCHO 2011 MAXWELL MODELS FOR VTEM ANOMALIES AND DRILL TARGETS


Figure III-1. Maxwell Model for VTEM Target A. Flight Line 3060


Figure III-2. Maxwell Model for VTEM Target B. Flight Line 1985


Figure III-3. Maxwell Model for VTEM Target C. Flight Line 2230


Figure III-4. Maxwell Model for VTEM Target D. Flight Line 2450


Figure III-5. Maxwell Model for VTEM Target E. Flight Line 2560


Figure III-6. Maxwell Model for VTEM Target M. Flight Line 1690


Figure III-7. Maxwell Model for VTEM Target O. Flight Line 1730


Figure III-8. Maxwell Model for VTEM Target P. Flight Line 1600


Figure III-9. Maxwell Model for VTEM Target R. Flight Line 1700


Figure III-10. Maxwell Model for VTEM Target S. Flight Line 1800

KUTCHO 2011 DRILLHOLE LOCATIONS AND LENGTHS

| Results and Recommendation from Kutcho Drilling in 2011 |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Target and Hole ID |  | Location Information |  |  |  |  |  |  |  |  |
| Target Name | Hole \# | Easting | Northing | Elevation | Azmuth | Dip | $\begin{aligned} & \mathrm{EOH} \\ & (\mathrm{~m}) \end{aligned}$ | Explanation of Target | $\qquad$ | Actual Average Target Depth (m) |
| A | 219 | 546,793 | 6,448,675 | 1,110 | 185 | -50 | 150 | Graphite (w pyrite) | 68 | 54 |
|  | 220 | 546,793 | 6,448,675 | 1,110 | 185 | -85 | 102 | Graphite (w pyrite) | 68 | 71 |
|  | 221 | 546,686 | 6,448,672 | 1,142 | 185 | -50 | 102 | Graphite (w pyrite) | 68 | 64 |
| B | 203 | 536,260 | 6,452,210 | 1,475 | 185 | -50 | 429 | Sulphides | 225 | 208 |
|  | 204 | 536,260 | 6,452,210 | 1,475 | 185 | -63 | 282 | Sulphides | 225 | 220 |
|  | 211 | 536,260 | 6,452,080 | 1,495 | 185 | -50 | 183 | Sulphides | 225 | 93 |
|  | 212 | 536,260 | 6,452,080 | 1,495 | 185 | -70 | 174 | Sulphides | 225 | 121 |
|  | 213 | 536,310 | 6,452,080 | 1,475 | 185 | -70 | 156 | Sulphides | 225 | 116 |
|  | 214 | 536,310 | 6,452,080 | 1,475 | 185 | -50 | 165 | Sulphides | 225 | 94 |
| C | 215 | 538,665 | 6,451,590 | 1,585 | 185 | -50 | 192 | Sulphides | 147 | 108 |
| D | 205 | 540,875 | 6,451,600 | 1,737 | 185 | -50 | 165 | Graphite | 99 | 104 |
| E | 206 | 541,955 | 6,451,060 | 1,705 | 190 | -50 | 183 | Graphite | 75 | 93 |
| M | 207 | 533,300 | 6,452,200 | 1,620 | 185 | -60 | 483 | Graphite | 368 | 215 |
| 0 | 210 | 533,460 | 6,448,750 | 1,625 | 185 | -60 | 90 | Abandoned Drillhole | 208 |  |
| 0 | 210A | 533,460 | 6,448,750 | 1,625 | 185 | -60 | 306 | Pyrite | 208 | 175 |
| R | 209 | 533,150 | 6,448,420 | 1,555 | 200 | -50 | 330 | Graphite | 88 | 78 |
| S | 208 | 534,098 | 6,447,820 | 1,737 | 190 | -50 | 273 | Graphite | 65 | 45 |
|  | 216 |  |  |  |  |  | 117 | Abandoned Drillhole |  |  |
| S | 216A |  |  |  | 190 | -55 | 345 | Geology Target |  |  |

Figure IV-1. Kutcho Property 2011 Drillhole Locations and Lengths

## APPENDIX V

KUTCHO 2011 DRILLHOLE CROSS-SECTIONS


Figure V-1. Cross-Section through Target A, Drillsite A-1


Figure V-2. Cross-Section through Target A, Drillsite A-2


Figure V-3. Cross-Section through Target B, Drillsites B-1 and B-2


Figure V-4. Cross-Section through Target B, Drillsite B-4


Figure V-5. Cross-Section through Target C, Drillsite C-1


Figure V-6. Cross-Section through Target D, Drillsite D-1


Figure V-7. Cross-Section through Target E, Drillsite E-1


Figure V-8. Cross-Section through Target M, Drillsite M-1


Figure V-9. Cross-Section through Target O, Drillsite O-1


Figure V-10. Cross-Section through Target R, Drillsite R-1


Figure V-11. Cross-Section through Target S, Drillsites S-1 and S-2

APPENDIX VI

KUTCHO CORE-LOGGING CODES

| CODE | NAME |
| :---: | :---: |
| UNDEFINED UNIT |  |
| UNKN | As Described |
| LITHOLOGY |  |
| ANDS | ANDESITE |
| DACT | DACITE |
| RHYL | RHYOLITE |
| ARGL | ARGILLITE |
| SILT | SILTSTONE |
| VSLT | VOLCANIC SILTSTONE |
| MDST | MUDSTONE |
| PMDS | MUDSTONE - PYRITIC |
| GMDS | MUDSTONE - GRAPHITIC |
| GYWK | GREYWACKE |
| TFWK | TUFFWACKE |
| CNGL | CONGLOMERATE |
| HNFS | HORNFELS |
| CHRT | CHERT |
| CARB | CARBONATE |
| DOLM | DOLOMITE |
| GBBR | GABBRO |
| GBBX | GABBRO - BRECCIA |
| GBBFL | Gabbro Flow |
| BSPF | Basalt Porphyry Flow |
| BSFL | Basalt flow (aphyric) |
| DIOR | DIORITE |
| DYKE | DYKE |
| BRECCIAS |  |
| QXBX | BRECCIA - QTZ |
| CBBX | BRECCIA - CARBONATE |
| LLTB | TUFF - LAPILLI - BRECCIA |
| MSBX | MASSIVE - SULPHIDES - BRECCIA |
| SXBX | BRECCIA - SULPHIDES |
| TFBX | TUFF - BRECCIA |
| QFTB | TUFF - QTZ - FSPAR - BRECCIA |
| QXTB | TUFF - QTZ - CRYSTAL - BRECCIA |
| PYBX | PYRITE BRECCIA |
| MPEB | MASSIVE PYRITE w EXHALITE BRECCIA |
| GBBX | GABBRO - BRECCIA |
| EXHALITES |  |
| CHRT | CHERT |
| CARB | CARBONATE |
| DOLM | DOLOMITE |
| EXHL | EXHALITE - undifferentiated |
| SEXL | Siliceous Exhalite |
| CBEX | EXHALITE - CARB |
| CQEX | EXHALITE - CARB - SILICA |
| QCEX | EXHALITE - SILICA - CARB |
| CBSX | CARBONATE EXHALITE w SULPHIDE ENRICHMENT |
| SESX | SILICA EXHALITE w SULPHIDE ENRICHMENT |


| QCSX | QUARTZ CARBONATE EXHALITE w SULPHIDE ENRICHMENT |
| :---: | :---: |
| CQSX | CARBONATE QUARTZ EXHALITE w SULPHIDE ENRICHMENT |
| CBSX | CARBONATE - SULPHIDES |
| VEINS |  |
| QZVN | VEIN - QTZ |
| VEIN | VEIN - undif |
| FAULT |  |
| FLTZ | FAULT |
| GOUG | GOUGE |
| OTHER |  |
| CASE | CASED |
| OVBD | OVERBURDEN |
| LOST | NO RECOVERY |
| MISN | MISSING |
| RUBL | RUBBLE |
| TUFF |  |
| ASHT | TUFF - ASH |
| ASLT | TUFF - ASH - LITHIC |
| TFBX | TUFF - BRECCIA |
| XATF | TUFF - CRYSTAL - ASH |
| XLTF | TUFF - CRYSTAL - LITHIC |
| XLAT | TUFF - CRYSTAL - LITHIC - ASH |
| FXTF | TUFF - FSPAR - CRYSTAL |
| FXAT | TUFF - FSPAR - CRYSTAL - ASH |
| FXLT | TUFF - FSPAR - CRYSTAL - LITHIC |
| FQXT | TUFF - FSPAR - QTZ - CRYSTAL |
| LLTF | TUFF - LAPILLI |
| LLAT | TUFF - LAPILLI - ASH |
| LLTB | TUFF - LAPILLI - BRECCIA |
| LLXT | TUFF - LAPILLI - CRYSTAL |
| LLFT | TUFF - LAPILLI - FSPAR |
| LATF | TUFF - LITHIC - ASH |
| LAFT | TUFF - LITHIC - ASH - FSPAR |
| LAXT | TUFF - LITHIC - ASH - CRYSTAL |
| LXTF | TUFF - LITHIC - CRYSTAL |
| LXAT | TUFF - LITHIC - CRYSTAL - ASH |
| QXTF | TUFF - QTZ - CRYSTAL |
| QXAT | TUFF - QTZ - CRYSTAL - ASH |
| QXLT | TUFF - QTZ - CRYSTAL - LITHIC |
| QFAT | TUFF - QTZ - FSPAR - ASH |
| QFXT | TUFF - QTZ - FSPAR - CRYSTAL |
| QFTB | TUFF - QTZ - FSPAR - BRECCIA |
| QXTB | TUFF - QTZ - CRYSTAL - BRECCIA |
| PATF | TUFF - PYRITIC ASH |
| PLTF | TUFF - PYRITIC LAPILLI |
| SULPHIDES |  |
| MSCP | Massive (or Semi-massive) Chalcopyrite |
| MSPY | Massive Pyrite - Fine-grained |
| MSSP | Massive (or Semi-massive) Sphalerite layers |
| MSBX | MASSIVE - SULPHIDES - BRECCIA |
| MSSX | MASSIVE - SULPHIDES |
| SMPY | SEMI-MASSIVE - PYRITE |


| SMSX | SEMI-MASSIVE - SULPHIDES |
| :--- | :--- |
| STRZ | STRINGER - SULPHIDES |
| SXBX | Sulphide Breccia |
| CBSX | CARBONATE - SULPHIDES |
| HMST | HANGINGWALL MIXED SULPHIDES \& TUFF |
| MXLM | MASSIVE SULPHIDES - LAMINATED |
| FMSX | Footwall mixed sulphides <br> $\pm$ tuff |
| DDSX | DENDRITIC SULPHIDES |
| CBSX | Carbonate Exhalite w sulphides |
| CBEX | Carbonate Exhalite |
| SEXL | Siliceous Exhalite |
| SESX | Siliceous Exhalite w sulphides |
| QCSX | Silica>Carbonate Exhalite |
| CQSX | Carbonate>Silica Exhalite |
| PYBX | Pyrite Breccia |
| PBLT | Pyrite-Banded Lapilli Tuff |
| LTPB | Lapilli Tuff - Pyrite-Banded |
| MPEB | Massive Pyrite + Exhalite Breccia |
| PYGR | Massive Pyrite - Granular |
| PMDS | MUDSTONE - PYRITIC |
| PATF | TUFF - PYRITIC ASH |
| PLTF | TUFF - PYRITIC LAPILLI |

Table VI-1. Kutcho Property Core-Logging Codes - Lithologies and Sulphides

| Geo-Metallurgical |  |  |  | for Kutcho Creek VMS Deposits |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| GeoMet Unit | Class or Location | GeoLog CODES | NAME | Description | Discussion |
| 1 | Semi-MX | HMST | Hangingwall mixed sulphides $\pm$ tuff $\pm$ exhalite | Cp-Bn-Py-Sp $\pm$ quartz veins. Wisps or blebs. Medium-grained. | Remobilized or late $\mathrm{Cp}-\mathrm{Bn}$ in lapilli tuff. May be interbedded w SEXL and/or CBEX |
| 2 | MX | MSSP | Massive (or Semi-massive) Sphalerite layers | Massive Sphalerite layers within banded massive pyrite | Near top of each SULPHIDE CYCLE. |
| 3 | MX | MSCP | Massive (or Semi-massive) Chalcopyrite | Cp wisps, chips or blebs. Chalcopyrite $>40 \%+$ Py. Minor Bn \& Sp. May occur as fine cpy mixed with fine massive pyrite - distinct geenish cast. | Superimposed on massive pyrite or exhalite |
| 4 | MX | MXLM | Fine laminated pyrite; Fine laminated sulphides; Banded polymetallic sulphides | Massive, fine- to very fine-grained sulphides. Pyrite is dominant. Laminations of Cp or Sp are common. Bn is rare and interstitial. Fine grained, banded, strongly laminated, $\mathrm{Py}-\mathrm{Sp},+\mathrm{Cp}( \pm \mathrm{Bn})$ |  |
| 5 | BX | SXBX | Sulphide Breccia | $\mathrm{Py}-\mathrm{Cp}-\mathrm{Bn}-\mathrm{Sp}$ BRECCIA. Medium grained. <br> Sulphide and/or lithic fragments. <br> Volcanic frags / Sulphide frags / Carb frags + matrix | Origin of Breccia: Transported Ore? <br> Collapsed Chimney? Pseudobreccia? <br> Slump? Churning by hydrothermal fluids? |
| 6 | DD | DDSX | Dendritic Sulphides | Recrystallized quartz $\pm$ carbonate with $\mathrm{Bn}+\mathrm{Cp}+\mathrm{Cc}$ fracture fillings | Superimposed on exhalite or massive pyrite |
| 7 | Exhalite | CHRT | Chert | Silica exhalite (chert); pale grey, translucent, usually thin-bedded | Can include Kutcho Middle Marker |
| 8 | Exhalite | SEXL | Siliceous Exhalite | Silica exhalite; white, granular (sacchariodal); may be silicified tuff | Can include Kutcho Middle Marker |
| 9 | Exhalite | SESX | Siliceous Exhalite w sulphides | Silica exhalite with pyrite, $\pm \mathrm{Bn} \pm \mathrm{Cp}$ fracture fillings |  |
| 10 | Exhalite | QCSX | Silica>Carbonate Exhalite | Silica+carbonate exhalite with pyrite, $\pm \mathrm{Bn} \pm \mathrm{Cp}$ fracture fillings |  |
| 11 | Exhalite | CBEX | Carbonate Exhalite | Carbonate exhalite; may be oolitic | Can include Kutcho Middle Marker |
| 12 | Exhalite | CBSX | Carbonate Exhalite w sulphides | Carbonate exhalite with pyrite, $\pm \mathrm{Bn} \pm \mathrm{Cp}$ fracture fillings |  |
| 13 | Exhalite | CQSX | Carbonate>Silica Exhalite | Carbonate+silica exhalite with pyrite, $\pm \mathrm{Bn} \pm \mathrm{Cp}$ fracture fillings |  |
| 14 | Basal Zone | FMSX | Footwall mixed sulphides $\pm$ tuff | $\mathrm{Cp}>\mathrm{Py}(>\mathrm{Sp}>\mathrm{Bn}$ ) as wisps or blebs in medium- to fine-grained pyrite | Always near the footwall |
| 15 | Basal Zone | MPEB | Massive Pyrite + Exhalite Breccia | Massive pyrite with carbonate-exhalite-clast breccia |  |
| 16 | Basal Zone | PYBX | Pyrite Breccia | Footwall pyrite breccia. Pyrite clasts in pyrite groundmass. | Always near the footwall |
| 17 | Basal Zone | MSPY | Massive Pyrite - Fine-grained | Massive Py; minor to accessory Cp or $\mathrm{Sp} \pm \mathrm{Bn}$. May be laminated. Ranges from medium-grained to fine-grained. | Basal |
| 18 | Basal Zone | PYGR | Massive Pyrite - Granular | Granular Massive Py; May be faintly laminated. <br> Basal zone of deposit is typically bright granular pyrite | Basal |
| 19 | Feeder Zone | PBLT | Pyrite-Banded Lapilli Tuff | Pyrite >25\% of rock <br> Footwall feeder zone; developed through unconsolidated ash | Below the footwall of the deposit |
| 20 | Feeder Zone | LTPB | Lapilli Tuff - Pyrite-Banded | Pyrite < $25 \%$ of rock, $>5 \%$ of rock Footwall feeder zone; developed through unconsolidated ash | Below the footwall of the deposit |

Table VI-2. Kutcho Property Geo-Metallurgical Core-Logging Codes for Sulphide Deposits

## APPENDIX VII

KUTCHO 2011 CORE LOGS

Casing/Overburden


Pale to medium green bedded tuffaceous siltstone. Tuffaceous interbeds become frequent below 12.50 m , and these are composed predominantly of feldspar crystal tuff. Unit is spotted throughout with small subhedral calcite crystals (syn-depositionsl precip.). Patchy silicification occurs between 8.43 m and 11.50 m . Bedding faintly developed at 60 to 66 TCA. $0.5 \%$ disseminated and blebby pyrite throughout. Lower contact at 45 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC | DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 ${ }^{\text {M3\% }}$ | From | To | Sample |

weak calcite spotting, weakly chloritic.

```
5.85 14.29 BD 63 VW
    Bedding at 60 to 66 TCA.
```


## $8.43 \quad 11.50 \mathrm{M} \mathrm{W}$

patchy silicification, weak calcite spotting, weakly chloritic.
$11.50 \quad 14.30 \mathrm{~W}$ W
weak calcite spotting, weakly chloritic.
$14.29 \quad 14.30$ CT 45

| Lower contact at 45 TCA. |  |  |
| :---: | :---: | :---: |
| From | To | Litho |
| $\mathbf{1 4 . 3 0}$ | $\mathbf{2 8 . 3 7}$ | TFBX |

14.3028 .37 TFBX

## Simple Geo

Mottled medium green, massive, strongly chlorite-epidote altered tuff breccia. Crystals include $5-7 \%$ grey blue rounded quartz, and weaky to intensely epidote altered patches and plagioclase (?) crystals; these impart the overall mottled appearance to the unit. Lithics occur to approximately $5 \%$ and are composed of altered patches and plagioclase (?) crystass; these impart the overall mottled appearance to the unit. Lithics occur to a.
chloritic volcanic derived siltstone, and lesser quartz crystal tuff. Trace disseminated pyrite. Lower contact at 80 TCA.


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 14.30 | 28.37 | TFBX |  |

Mottled medium green, massive, strongly chlorite-epidote altered tuff breccia. Crystals include $5-7 \%$ grey blue rounded quartz, and weaky to intensely epidote altered patches and plagioclase (?) crystals; these impart the overall mottled appearance to the unit. Lithics occur to approximately $5 \%$ and are composed of chloritic volcanic derived siltstone, and lesser quartz crystal tuff. Trace disseminated pyrite. Lower contact at 80 TCA

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 M3\% | From | To | Sample |
| $14.30 \begin{aligned} & \text { 28.36 } \\ & \text { massive }\end{aligned}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $\begin{array}{llllllll}14.30 & 28.37 & \mathrm{~S} & - & - & - & - & - \\ \text { strong chlorite-epidote atteration, moderate localized }\end{array}$ |  |  |  |  |  |  |  |  |  |  |  | $14.3028 .37 \text { 0.05 DIS }$ |  |  |  |  |  |  |  |  |  |  |
| strong chlorite-epidote alteration, moderate localized trace disseminated pyrite. hematite alteration. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |









| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: | :---: |
| 201.10 | 207.69 | MSBX |  |

Massive pyrite breccia. Characterized by $20 \%$ dark grey and much less milky white, siliceous clasts that are pitted, embayed and replaced by pyrite. Overall
texture is mottled. The milky white clasts are quartz and quartz-carbonate. The grey clasts appear to be silica. $70 \%$ pyrite overall, with chalcopyrite occuring as noted. Sharp lower contact at 85 TCA
203.44 m to $207.67 \mathrm{~m}: 4 \%$ cpy and trace bornite as splashes within the massive pyrite

207.68 207.69 CT 85 W
sharp lower contact at 85


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 207.69 | 210.57 | MSPY |  |

Bedded massive pyrite. Bedding at 85 TCA. Locally weakly brecciated, and this seems to be the locus of the only chalcopyrite mineralization within the interval. Somewhat gradational lower contact.
208.90 m to 209.35 m : $4 \%$ splashy chalcopyrite within $75 \%$ massive pyrite


210.57212 .63 BX M
massive sulphide breccia
$210.57 \quad 212.64 \quad$ M W
weak to moderate carbonate and silica alteration
associated with brecciation event.
210.7212.64 75 MS 7
$75 \%$ massive pyrite, $7 \%$ chalcopyrite and $2 \%$ bornite. The bornite occurs as coarse remobilized clots and partial striated crystals.


218.46218 .47 CT VW

| Lower contact gradational. |  |  |  |  |  |  |  | Sitho | Simple Geo |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | MSPY |  |  |  |  |  |  |  |

Very weakly bedded masisve pyrite. Bedding at 65 TCA. Overall, $65 \%$ pyrite with interstitial silica and lesser carbonate. Sericite parting on bedding and joint planes. Lower contact gradational.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | \|Min3 ${ }^{\text {M3\% }}$ | From | To |  | Sample |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 218.47219 .42 |  |  |  | $\begin{array}{ll}\text { I } & 134041\end{array}$ |

```
218.47 220.36 BD 65 VW
```

    bedding at 65 TCA.
    | 218.47 | $220.37 \mathrm{VW}-\quad-\mathrm{VW}-\quad-\quad-$ | $218.4 \mathrm{Z20.37}$ |
| :--- | :--- | :--- |
| Sericite parting on bedding and joint planes. | $65 \%$ prite |  |


| 219.42 | 219.42 | $\boldsymbol{I}$ | 134042 |
| :--- | :--- | :--- | :--- |
| 219.42 | 220.37 | I | 134043 |

220.36220 .37 CT VW


220.37 222.94 BD 70 VW

Bedding at 70 TCA
$220.3222 .95 \quad 9 \quad$ LB
8 -10\% pyrite as bands and dissminations (locally 55\% pyrite over 8 cm ).
220.90222 .95 S - - S - W moderate to strong sericite alteration, moderate Fe carbonate alteration.

### 222.94 222.95 CT 80 VW

Lower contact sharp at 80

| TCA. |  |  |  |
| :---: | :---: | :---: | :---: |
| From | To | Litho | Simple Geo |
| 222.95 | 229.68 | LTPB |  |

Light to medium grey, variably silicified and sericitized lapilli tuff with banded pyrite. Bedding at 80 TCA. Lapilli are composed of cloudy grey and cloudy white quartz/silica or sericitized softer lensoidal material with aspect ratios ranging from $4: 1$ to $8: 1$. Overall moderate to strong silicification and sericitization. $8-10 \%$ banded pyrite (locally $40 \%$ over 25 cm ). Blebby chalcopyite observed at 226.74 m . Sharp lower contact at 80 TCA.
223.95 m to 224.35 m : three separate gouge zones, $1-2 \mathrm{~cm}$ thick, noted.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 M2\% | Min3 M3\% | From | To | Sample |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 222.95 |  | 224.63 | I | I 134047 |

```
222.95 229.67 BD 80 M
    Bedding at }80\mathrm{ TCA.
```

| 222.95 | 229.68 | S | - | - | S | - |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| strong to moderate | - | - |  |  |  |  |
| silicification and sericitization. |  |  |  |  |  |  |


| 224.63 | 226.31 | $\boldsymbol{I}$ | 134048 |
| :--- | :--- | :--- | :--- | :--- |
| 226.31 | 227.99 | $\boldsymbol{I}$ | 134049 |



[^0]




271.10 275.24 BD 85 VW

Bedding at 85 TCA.
271.1975.25 12 LB

12\% banded and disseminated pyrite.
271.90275 .25 W - -W - - -
very weak chlorite-sericite

| 273.23 | 275.25 | $\boldsymbol{I}$ | 134080 |
| :--- | :--- | :--- | :--- | :--- |

275.24 275.25 CT VW

Gradational lower contact

Litho LLTF

Simple Geo
$275.25 \quad 282.00$
275.25 LLTF

Light green and pale green-grey (alteration dependent) bedded lapilli tuff. Bedding at 76 to 80 TCA. Straw yellow and wispy bedding parallel laminations of Fe
carbonate, coincident with elevated sericite alteration from 280.00 m to 281.45 m . Alteration is otherwise weak chlorite-sericite. Overall, $2 \%$ bedding parallel

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | $C C$ DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 ${ }^{\text {M3\% }}$ | From | To |  | Sample |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 275.25 | 275.25 | I | 134081 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 275.25 | 276.94 | I | 134082 |

### 275.25280 .00 W - W

 weak chlorite-sericite alteration.275.25 281.99 BD 78 W Bedding at 76 to 80 TCA.
$275.2882 .00 \quad 2 \quad$ LB
$2 \%$ bedding parallel lenses and bands of pyrite.

| 276.94 | 278.63 | $\boldsymbol{I}$ | 134083 |
| :--- | :--- | :--- | :--- | :--- |
| 278.63 | 280.32 | $\boldsymbol{I}$ | 134084 |



285.02288 .66 BD 70 VW
bedding at 70 TCA.
285.0288.67 12 LB
$12 \%$ banded and heavily disseminated pyrite.
286.12 288.67 S - - S - -
strongly sericitized with patchy silicification.

| 286.85 | 288.67 | $I$ | 134090 |
| :--- | :--- | :--- | :--- |

288.66288 .67 CT 80 VW

Lower contact at 80 TCA.

| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 288.67 | 297.63 | LLTF |  |

Medium green, weakly chlorite-sericite altered lapilli tuff. Essentially a "crowded" lapillituff, with $40 \%$ lapili; these are dominantly elongate and lensoidal cloudy

288.67 297.62 BD 78 VW

Bedding at 78 TCA.
288.67 297.63 W - - W - - 288.6297.63 2.5 DIS
weakly chlorite-sericite altered

| 290.91 | 293.15 | $\boldsymbol{I}$ | 134093 |
| :--- | :--- | :--- | :--- |
| 293.15 | 295.39 | $\boldsymbol{I}$ | 134094 |
| 295.39 | 297.63 | $\boldsymbol{I}$ | 134095 |



| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 304.60 | 308.44 | LLTF |  |

Light to medium green bedded lapilli tuff; crowded. With several less than 10 cm thick bands of PBLT occuring between 307.00 m and 308.44 m . Bedding at 66 to 72 TCA. Weak chlorite-sericite alteration overall. $4 \%$ banded pyrite. Sharp lower contact at 70 TCA


| Sharp lower contact at 70 <br> TCA. |  |  |  |
| :---: | :---: | :---: | :---: |
| From | To | Litho | Simple Geo |
| $\mathbf{3 0 8 . 4 4}$ | 313.82 | ASHT |  |

Turquoise blue to medium green, weakly bedded ash tuff. Bedding at 70 TCA. Weak chlorite and very weak sericite alteration. Pyrite occurs as occasional discreet bands associated with slightly more sericitic bands, which are less than 10 cm thick; also minor disseminations with $3 \%$ pyrite overall. Sharp lower contact at 75 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | $C C$ DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 M3\% | From | To |  | Sample |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 308.44 | 308.44 | $I$ | 134103 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 308.44 | 310.23 | I | 134104 |

308.44313 .81 BD 70 VW

## Bedding at 70 TCA.

308.44313 .82 W - - VW

Weak chlorite and very weak sericite alteration
308.4313 .824 LB

Pyrite occurs as occasional discreet bands associated with slightly more sericitic bands, which are less than 10cm thick; also minor disseminations with 3\% pyrite overall

| 310.23 | 312.02 | $\boldsymbol{I}$ | 134105 |
| :--- | :--- | :--- | :--- |
| 312.02 | 313.82 | $\boldsymbol{I}$ | 134106 |

313.81313 .82 CT 75 VW Sharp lower contact at 75 TCA

| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 313.82 | 320.37 | LTPB |  |

Light grey and green lapilli tuff with pyrite bands. Very sparse lapilli throughout, and this interval also includes interbedded weakly chlorite-epidote altered lapill tuff that is virtually devoid of sulphides. Bedding at 70 to 80 TCA. In the LTPB, alteration is moderate silicification and weak sericitization. Overall, $8 \%$ pyrite as disseminations and stratabound bands. Lower contact in 3 cm gouge

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 | M3\% | From | To | Sample |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 313.82 |  | 316.01 | $I$ | $\begin{array}{ll}\text { I } & 134107\end{array}$ |

313.82320 .36 BD 75 W
bedding at 70 to 80 TCA.
$\begin{array}{lllll}313.82 & 320.37 & \mathrm{M} & - & - \\ \text { moderate sericite alteration, patchy silicification. }\end{array}$
$313.8820 .37 \quad 8$ LB
$8 \%$ pyrite as disseminations and stratabound bands.

| 316.01 | 318.19 | $\boldsymbol{I}$ | 134108 |
| :--- | :--- | :--- | :--- |
| 318.19 | 318.19 | $\boldsymbol{I}$ | 134109 |
| 318.19 | 320.37 | $\boldsymbol{I}$ | 134110 |

320.36320 .37 CT

Lower contact in 3 cm

\section*{| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 320.37 | 328.18 | LLTF |  |}

Medium to dark green, moderately chloritic lapilli tuff; for the most part, a crowded lapilli tuff. Bedding at 70 to 80 TCA. Very sporadic and narrow (less than 8 cm thick) LTPB bands occur, and seem to indicate that the alteration system is waning with depth. Overall $2 \%$ pyrite. Lower contact in broken core

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | ${ }^{\text {AK }}$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 | M3\% | From | To | Sample |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | 320.37 |  |  |  |  |  |  |  |  |  |  |  | 7322.33 |  | $\begin{array}{ll}\text { I } & 134111\end{array}$ |

320.37 327.60 BD 75 W bedding at 70 to 80 TCA
$320.37 \quad 328.18$ M - - W moderately chloritic
320.3728 .182 LB
$2 \%$ pyrite

| 322.33 | 324.28 | $\boldsymbol{I}$ | 134112 |
| :--- | :--- | :--- | :--- |
| 324.28 | 326.23 | $\boldsymbol{I}$ | 134113 |
| 326.23 | 328.18 | $\boldsymbol{I}$ | 134114 |

327.60327 .70 FLT S 10 cm thick gouge zone


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 331.06 | 334.33 | LTPB |  |

Light grey lapilli tuff with pyrite bands. Original textures are obliterated by alteration, and faint lapilli are barely discernible. Moderately to intensely silicified with minor sericite partings. Three gouge and breccia zones occur from 332.27 m to 333.40 m . Bedding faint at $75 \mathrm{TCA} .12 \%$ banded and semi-massive pyrite. Gradational lower contact.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 | M3\% | From | To | Sample |
| $\begin{gathered} 331.06332 .27 \text { BD } 75 \quad \text { W } \\ \text { Beddina faint at } 75 \text { TCA } \end{gathered}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |


| 331.06 | 334.33 | S | - | - | W | - |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Moderately to intensely silicified | with minor sericite |  |  |  |  |  |
| partings. |  |  |  |  |  |  |

332.27333 .40 FLT S

Three gouge and breccia zones

| 332.70 | 332.70 | $I$ | 134118 |
| :--- | :--- | :--- | :--- | :--- |

333.40334 .32 BD 75

Bedding faint at 75 TCA
334.32334 .33 CT

Gradational lower contact.

## From To <br> $334.33 \quad 346.00$

Litho LLAT
331.0834.33 12 LB

12\% banded and semi-massive pyrite.

Light green, bedded lapilli ash tuff. Weak sericite, moderate chlorite alteration. Bedding crudely developed at 76 TCA. Relatively non-descript, except for the sporadic pyrite "blow-outs" with associated waning hydrothermal alteration noted in four less than 8 cm thick intervals down to 342.10 m . Outside of this,
approximately $1 \%$ disseminated pyrite overall. Gradational lower contact.

334.33345 .99 BD 76 VW Bedding crudely developed at 76 TCA.

| 334.33 | 346.00 | M | $-\quad-\mathrm{W}$ | $-\quad-$ |
| :--- | :--- | :--- | :--- | :--- | weak sericite, moderate chlorite alteration.

334.3346.00 1.5 DIS
$1.5 \%$ disseminated and stratabound pyrite.


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 359.38 | 363.77 | ASHT |  |

Pale grey pyritic ash tuff. Strongly sericite altered. Bedding at 70 TCA. Moderate Fe-carbonate as bedding parallel wisps. 8 to $10 \%$ fine grained stratabound pyrite. Fault gouge zone from 360.40 m to 362.05 m . Gradational lower contact.


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 369.22 | 386.59 | ASHT |  |

Light to medium grey, bedded and strongly altered ash tuff. Intense sericite and weak, patchy silicification down to 377 m , becoming more pervasively silicified with weak sericite alteration down to lower contact. Bedding at 70 to 74 TCA. Bedding/foliation locally kinked between 371.68 m and 374.41 m . Pyrite content is variable throughout, but overall occurs as stratabound bands, wisps and disseminations to $5 \%$. Lower contact gradational.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 | M3\% | From | To | Sample |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 369.22 |  | 371.70 | $I$ | $\begin{array}{ll}\text { I } & 134132\end{array}$ |

## $369.22 \quad 377.00$ S - - S - VW intense sericite and weak, patchy silicification, very weak Fe-carbonate alteration.

369.22386 .59 BD 72 VW Bedding at 70 to 74 TCA.
369.2286.59 5 LB
$5 \%$ pyrite as stratabound bands, wisps and disseminations

| 371.70 | 374.18 | $\boldsymbol{I}$ | 134133 |
| :--- | :--- | :--- | :--- |
| 374.18 | 374.18 | $\boldsymbol{I}$ | 134134 |
| 374.18 | 376.66 | $\boldsymbol{I}$ | 134135 |
| 376.66 | 379.14 | $\boldsymbol{I}$ | 134136 |

377.00386 .59 S - - W - VW pervasively silicified with weak sericite alteration; very weak Fe-carbonate alteration

| 379.14 | 381.62 | $\boldsymbol{I}$ | 134137 |
| :--- | :--- | :--- | :--- |
| 381.62 | 384.10 | $\boldsymbol{I}$ | 134138 |
| 384.10 | 386.59 | $\boldsymbol{I}$ | 134139 |

## From To Litho $\quad$ Simple Geo

$386.59 \quad 411.96$ LLTF
Medium green moderately chlorite-sericite altered bedded lapilli tuff. Generally a crowded lapilli tuff. Bedding at 68 to 72 TCA. There are sporadic intervals of
strong silicification and sericite alteration; these contain as much as $15 \%$ pyrite over 25 cm . Otherwise, the LLTF contains approximately $3 \%$ pyrite overall.
Gradational lower contact.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | $C C$ DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 ${ }^{\text {M3\% }}$ | From | To | Sample |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 386.59 |  | 386.59 | $I$ | 134140 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 386.59 | 387.59 | I | 134141 |

Medium green moderately chlorite-sericite altered bedded lapilli tuff. Generally a crowded lapillituff. Bedding at 68 to 72 TCA. There are sporadic intervals of strong silicification and sericite alteration; these contain as much as $15 \%$ pyrite over 25 cm . Otherwise, the LLTF contains approximately $3 \%$ pyrite overall. Gradational lower contact.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC | DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 | M3\% | From | To | Sample |
|  |  |  |  |  |  |  |  |  |  |  |  |  | $\begin{array}{lll} 386.5987 .70 & 1 & \text { DIS } \\ \text { 1\% disseminated pyrite. } \end{array}$ |  |  |  |  |  |  |  |  |  |  |  |  |

Bedding at 68 to 72 TCA
$\begin{array}{llll}387.70 & 388.43 & \text { S - } & \text { M - - }\end{array}$
well silicified, moderate sericite alteration
$388.43 \quad 393.12$ M - - M moderately chlorite-sericite altered
393.12393 .69 S - - S - moderately silicified, intense sericite alteration
$393.69 \quad 396.30 \mathrm{M}$ moderately chlorite-sericite altered
$396.30 \quad 398.03 \mathrm{M}$ patchy silicification and sericitization.
398.03405 .50 M - - M moderately chlorite-sericite altered
$387.7011 .96 \quad 3$ DIS
$3 \%$ pyrite overall with $10 \%$ stratabound pyrite in local LTPB intervals.

| 403.06 | 404.56 | $\boldsymbol{I}$ | 134143 |
| :--- | :--- | :--- | :--- |
| 404.56 | 405.56 | $\boldsymbol{I}$ | 134144 |

$405.50 \quad 408.07$ S - $\quad$ M well silicified, moderate sericite alteration

| 405.56 | 406.82 | $\boldsymbol{I}$ | 134145 |
| :--- | :--- | :--- | :--- |
| 406.82 | 406.82 | $\boldsymbol{I}$ | 134146 |
| 406.82 | 408.07 | $\boldsymbol{I}$ | 134147 |




Casing/Overburden


Pale to medium green bedded tuffaceous siltstone. Tuffaceous interbeds are composed predominantly of feldspar crystal tuff. Unit is spotted throughout with small subhedral calcite crystals. Patchy silicification below 9.40 m . Bedding faintly developed at 55 to 65 TCA. $0.5 \%$ disseminated and blebby pyrite throughout, trace pyrrhotite. Lower contact in broken core


Medium to dark green, pervasively chloritized, moderately epidotized, quartz crystal tuff breccia. Breccia fragments are the QXTF, which are epidotized down to 27.50 m . From 27.50 m to 31.06 m , breccia fragments are maroon coloured and hematized. Chloritized lithic fragments (ash tuff?) also occur very infrequently.

Very minor low angle carbonate veining evident. Trace pyrite. Gradational lower contact


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 13.33 | 31.06 | TFBX |  |

Medium to dark green, pervasively chloritized, moderately epidotized, quartz crystal tuff breccia. Breccia fragments are the QXTF, which are epidotized down to 27.50 m . From 27.50 m to 31.06 m , breccia fragments are maroon coloured and hematized. Chloritized lithic fragments (ash tuff?) also occur very infrequently. Very minor low angle carbonate veining evident. Trace pyrite. Gradational lower contact

$31.05 \quad 31.06$ CT VW



| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 82.06 | 101.45 | TFBX |  |

Medium green, mottled, massive quartz crystal tuff breccia, with characterisitc epidote altered QXTF fragments. Variably chlorite-epidote-hematite altered as noted. Riddled with thin (less than 1 cm thick) low to high angle carbonate veinlets. Trace pyrite. Lower contact approximated.
82.06 m to 95.70 m : Moderate to strong chloritization with moderate epidote overprint.
95.70 m to 101.45 m : Moderate chlorite alteration with epidote overprint. The epidote is in turn overprinted by weak to moderate hematite alteration


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 101.45 | 148.10 | LXTF |  |

Dark green, mottled, massive lithic crystal tuff. Essentially the QXTF with intense chlorite alteration amd moderate to strong epidote mottling. The epidote
appears to occurs as entire replacement of some pre-existing lithic gragments, and as alteration haloes of fine grained chloritized fragments (originally mafic
tuff?). Quartz crystals occur throughout with variable abundance. Trace pyrite overall. Lower contact drawn on basis of weakening alteration, and disappearance
of randomly oriented lithics in favour of more "layered " and lensoidal, infequent lapilli.
101.45 m to 115.47 m : Strong chlorite-epidote alteration; mottled appearance.
115.47 m to 119.96 m : Strong chlorite-hematite alteration, with hematite overprint of earlier epidote.
119.96 m to 120.30 m : strong chlorite and weak epidote alteration.
120.30 m to 121.93 m : Moderate chlorite with weak epidote-hematite alteration
121.93 m to 144.32 m : weak to moderate chlorite alteration, with weak to very weak epidote alteration, and intervals that are virtually devoid of alteration.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 | M3\% | From | To | Sample |

Strong chlorite-epidote alteration; mottled appearance.
101.45148 .09 NA massive
101.4548 .100 .05 DIS
trace disseminated pyrite.



## Lower contact sharp at 55

| TCA. |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Litho | Simple Geo |  |  |  |  |  |  |  |  |
| 172.29 | 185.40 | FQXT |  |  |  |  |  |  |  |  |  |

Medium green, bedded feldspar-quartz crystal tuff. Bedding at 55 TCA, and defined by alteranating crystal rich and ash rich beds. Moderately chloritic and weakly epidote altered to 178.30 m . Below this, significant hydrothermal alteration, as noted. Overall $3-4 \%$ stratabound pyrite throughout. Sharp lower contact at 65 TCA
172.29 m to 178.30 m : Moderately chloritic and weakly epidote altered.
174.70 m to 175.80 m : Chloritic breccia and gouge zone; low angle at upper contac
179.30 m to 185.40 m : Intensely altered and bleached FQXT, with alteration intensifying toward lower contact. Moderately to intensely sericitic throughout

Silicified and pyritic from 183.50 m to 183.75 m . Fluoromuscovite/pyrophyllite(?) alteration noted from 181.85 m to lower contact, and is intense from 183.88 m to 185.40 m ( $8-10 \%$ fluoromuscovite/pyrophyllite).

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | $C C$ DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 | M3\% | From | To | Sample |
| 172.29 | 4.7 | BD | 55 | VW |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Bedding at 55 TCA.

# Moderately chloritic and weakly epidote altered. 

$$
\text { bedding at } 55 \text { TCA }
$$




Light to dark grey intensely altered, foliated ash tuff. Hydrothermal alteration consists of moderate to locally strong silicification and weak sericitization to 193.60 m , and strong sericitization-weak silicification to 199.93 m (locally approaching paper schist). Foliation at 40 to 60 TCA to 195.90 m , and at 80 TCA to 199.93 m . Overall, $12 \%$ to $14 \%$ pyrite as laminations very heavy disseminations and semi-massive ( 193.29 m to 193.60 m ) and massive (196.88m to
bands. $0.5 \%$ chalcopyrite, mostly noted in a 1 cm stratabound band centered at 191.72 m , and as disseminations. Sharp lower contact at 75 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | $C C$ DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 ${ }^{\text {M3\% }}$ | From | To | Sample |  |  |
| 188.45 188.45 FOL 50 M Foliation at 40 to 60 TCA |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 188.45 |  | 188.45 | $I$ | 1134160 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 188.45 | 190.75 | I | 1134161 |

188.45 193.60 S VW - W - - W moderate to locally strong silicificication and weak sericitization; moderate Fe-carbonate as foliation parallel wisps
188.45 199.92 FOL 80 M

Foliation at 80 TCA.
$188.4599 .93 \quad 13 \quad$ LB $\quad 0.5$
12 to $14 \%$ pyrite as laminations very heavy disseminations
and semi-massive (193.29m to 193.60 m ) and massive
$(196.88 \mathrm{~m}$ to 197.04 m ) bands. $0.5 \%$ chalcopyrite. 196.88m to $197.04 m$ ) bands. $0.5 \%$ chalcopyrite.


|  |  |  |  |  |  |  |  |  |  |  |  | Simple Geo |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 202.10 |  | 212.55 |  | FXTF |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Intensely altered, medium grey and green, foliated feldspar crystal tuff. Feldspar crystals are sporadic and faintly discernable. Foliation at 70 to 80 TCA. Strong sericite-pyrophyllite(?) alteration, moderate wispy Fe-carbonate alteration to 211.00 m . Below this alteration is patchy silicification with weak sericitization. Bull milky quarz veins noted centered at 204.00 m ( 25 cm thick) and at 204.57 m ( 15 cm thick). Overall, $10 \%$ pyrite as heavy disseminations and semi-massive to massive bands. Sharp lower contact at 67 TCA. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| STRUCTURES |  |  |  |  | From |  |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| From | To | Struct | CA | Strain |  |  |  |  |  |  |  | From | To | PY\% | Style | Min | Min\% | Min2 |  | Min3 M3\% | From | To |  | pple |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 202.10 | 204.19 | I | 1134168 |
| 202.10211 .00 S - - S - W Strong sericite-pyrophyllite(?) alteration, moderate wispy Fe-carbonate alteration |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $202.10 \text { 212.54 FOL } 75 \quad \text { M }$ <br> Foliation at 70 to 80 TCA. $202.1012 .55 \quad 10 \text { LB }$ <br> $10 \%$ pyrite as heavy disseminations and semi-massive massive bands. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 204.19 | 206.28 | I | 1134169 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 206.28 | 208.37 | I | 1134170 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 208.37 | 208.37 | $I$ | 1134171 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 208.37 | 210.46 | I | 1134172 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 210.46 | 212.55 | I | 1134173 |
| 211.00212 .55 M - - W - patchy silicification with weak sericitization. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 212.54212 .55 CT 67 M Sharp lower contact at 67 TCA. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |





| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 217.86 | 223.55 | MSPY |  |

Massive pyrite. Bedded and locally brecciated with bedding at 70 to 76 TCA. Breccia infill is typically quartz-carbonate. Becoming more of a massive sulphide breccia over last meter to lower contact. Overall $70 \%$ massive pyrite and $2 \%-3 \%$ chalcopyrite as sporadic blebs, and as "sheen" suggests, very fine sulphide mud. Lower contact at 55 TCA.

| STRUCTURES |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA $\operatorname{Strain}$ | From | To |  | $C C$ DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2 }}$ \% | Min3 M3\% | From | To |  | pple |  |
| $\begin{aligned} & 217.86223 .54 \text { BD } 73 \mathrm{VW} \\ & \text { bedding at } 70 \text { to } 76 \text { TCA. } \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 217.86223 .55 VW VW - W weak quartz-carbonate-sericite |  |  |  |  |  |  |  |  |  |  | 217.8823.55 70 MS 2.5 <br> $70 \%$ massive pyrite and $2-3 \%$ chalcopyrite as sporadic blebs, and as "sheen" suggests, very fine sulphide mud |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 218.94 |  | 220.02 | I | 1134183 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 220.02 |  | 221.10 | I | 1134184 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 221.10 |  | 222.18 | I | 1134185 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 222.18 |  | 222.18 | I | 1134186 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 222.18 |  | 223.55 | I | 1134187 |

223.54223 .55 CT 55 VW

Lower contact at 55 TCA.


Breccia sulphides consisting of $30 \%$ pyrite and $70 \%$ largely white quartz-carbonate fragments and matrix. Sulphide and quartz-carbonate fragments are distinct
down to 225.15, and milled intervals of quartz-carbonate lithology also noted. Below this the interval appears more intact. $0.25 \%$ chalcopyrite also noted. Lower contact sharp at 75 TCA.

223.55226 .75 BD M sulphide breccia

| 223.55 | 226.76 | M | W | - | W | - | - |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |$\quad$| 223.5826 .76 |
| :--- |
| quartz-carbonate-sericite. |


| 224.62 | 225.69 | $\boldsymbol{I}$ | 1134189 |
| :--- | :--- | :--- | :--- |
| 225.69 | 226.76 | $\boldsymbol{I}$ | 1134190 |



236.22 243.69 FOL 70 M

Foliation at 68 to 72 TCA

> 236.22 243.70 S W - S - - W
> Intense silicification and sericitization. Weak Fecarbonate alteration as wisps, and weak pyrophyllite alteration.

### 236.2243.70 25 LB <br> 0.25

meani-massive to massive pyrite, $0.25 \%$ disseminated chalcopyrite.

| 238.09 | 239.96 | $\boldsymbol{I}$ | 1134197 |
| :--- | :--- | :--- | :--- | :--- |
| 239.96 | 241.43 | $\boldsymbol{I}$ | 1134198 |
| 241.43 | 243.70 | $\boldsymbol{I}$ | 1134199 |

243.69 243.70 CT 55 M

Sharp lower contact at 55

## From To

Medium to dark green, foliated/bedded lapilli tuff, wth foliation paralleling bedding at 60 to 70 TCA. Weak to moderate chlorite-seicite alteration. Upper 1.5 m slightly more altered, and also exhibits wispy foliation parallel Fe-carbonate alteration. Lapilli well flattened (aspect ratio of up to 15:1). $3 \%-4 \%$ stratabound pyrite, mostly as vestiges of the upper hydrothermally altered rocks. Sharp lower contact at 75 TCA

243.70 251.93 FOL 65 W
foliation paralleling bedding
foliation paralleling bedding at 60 to 70 TCA

[^1] hydrothermally altered rocks.

 Lower contact sharp and
irregular

| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 267.32 | 267.80 | QZVN |  |

Milky white, massive bull quartz vein. No significant alteartion, no visible sulphides. Sharp lower contact at 70 TCA


Medium to dark green moderately chloritic lapilli tuff. Weakly sericitic and pyrophyllitic(?). Bedding parallels foliation at 66 to 70 TCA. The upper 2 meters, to
Medium to dark green moderately chloritic lapilli tuff. Weakly sericitic and pyrophyllitic(?). Bedding parallels foliation at 66 to 70 TCA. The upper 2 meters, to
270.00 m may be a matic flow (large subhedral to anhedral plagioclase laths), and contains $4 \%-5 \%$ pyrite as $1 \mathrm{~mm}-4 \mathrm{~mm}$ aggregates. Below this, $0.25 \%$ pyrite as 270.00 m may be a mafic flow (large subhedral to anhedral plagioclase laths), and contains $4 \%-5 \%$ pyrite as $1 \mathrm{~mm}-4 \mathrm{~mm}$ aggregates. Below this, $0.25 \%$ pyrite as
sporadic aggregates. End of Hole.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 | M3\% | From | To | Sample |
| 267.8070.00 4.5 R |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Medium to dark green moderately chloritic lapilli tuff. Weakly sericitic and pyrophyllitic(?). Bedding parallels foliation at 66 to 70 TCA. The upper 2 meters, to 270.00 m may be a mafic flow (large subhedral to anhedral plagioclase laths), and contains $4 \%-5 \%$ pyrite as $1 \mathrm{~mm}-4 \mathrm{~mm}$ aggregates. Below this, $0.25 \%$ pyrite as sporadic aggregates. End of Hole.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 | M3\% | From | To | Sample |

267.80282 .00 BD 68 W $267.80 \quad 282.00$ M


Bedding parallels foliation moderately chloritic, weakly sericitic and
at 66 to 70 TCA pyrophyllitic(?).
270.0082 .000 .25 DIS
$0.25 \%$ disseminated pyrite.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 M3\% | From | To | Sample |
| 0.00 | 6.56 | NA |  |  | 0.00 | 6.56 | - | - - - | - | - | - | 0.00 | 6.56 | 0 | - |  |  |  |  |  |  |  |


|  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| From | To | Litho | Simple Geo |
| $\mathbf{6 . 5 6}$ | $\mathbf{1 2 . 0 0}$ | SILT |  |
| Charcoal grey, bedded siltstone to mudstone. Bedding at 70 to 74 TCA. Silicified to 9.15 m . No visible sulphides. Lower contact in blocky, broken core. |  |  |  |


| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 M3\% | From | To | Sample |
|  |  |  |  |  | 6.56 | 9.15 | M | - - - | - | - | - |  |  |  |  |  |  |  |  |  |  |  |  |

```
6.56 11.99 BD 72 VW
Bedding at 70 to 74 TCA.
```

$$
\begin{array}{ccc}
6.56 & 12.00 & 0 \\
\text { no visible sulphides. }
\end{array}
$$

$$
9.15 \quad 12.00 \quad-\quad-
$$

$11.99 \quad 12.00$ CT VW Lower contact in blocky,


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 12.00 | 35.93 | FXTF |  |

Dark to medium grey-green foliated feldspar-hornblende crystal tuff. Foliation at 70 TCA. Matrix is weakly to moderately chloritized. Riddled with randomly oriented carbonate veins filling fractures, joints and tension gashes. Feldspar crystals are cloudy grey to white and subhedral. Hornblende crystals are generally euhedral to subhedral and moderately to strongly chloritized; hornblende crystals become more altered downhole and exhibit very faint, hazy outlines. Crystals generally aligned parallel to foliation. Below 27.0 m , unit becomes bleached, very weakly epidotized, and crystals are very faint, but discernible. No visible generaily aligned paralel to 75 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 M3\% | From | To | Sample |

### 37.0035 .93 VW VW

...0
No visible sulphides
very weakly epidotized
$35.92 \quad 35.93$ CT 75 VW
Lower contact at 75 TCA.

## $35.93-48.69$

## Litho

MDS

## Simple Geo

Charcoal grey, massive to faintly bedded weakly to moderately graphitic mudstone with interbedded drab grey-green mudstone. Bedding at 85 TCA, and bes observed at graphitic mudstone-grey mudstone contact. Also, very rare and very small scale isoclinal folds (fold axes planar with bedding) noted. Interbedded tuffaceous sediment noted. One unusual example is at 37.90 m to 38.15 m , where medium grained feldspar crystal tuff contains angular and elongate fragments of the graphitic mudstone (may be a feldspar porphyry, and not a tuff). Mudstone is spotted with small white concretions (not calcite or silica). Sharp lower
contact at 80 TCA. Overall $1 \%$ streaky pyrite laminae
40.07 m to 40.82 m : drab grey-green mudstone.
45.00 m to 48.69 m : drab grey-green mudstone, locally tuffaceous; at the upper contact it appears to be gradational with the graphitic mudstone.


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 48.69 | 89.32 | FXTF |  |

Pale drab grey-green, foliated feldspar-hornblende crystal tuff, as per FXTF from 27.00 m to 35.93 m . The colour suggests weak to moderate epidote-sericite atteration. Foliation at 52 to 65 TCA. Plagioclase crystals are cloudy and attered (sericite). Hornblende crystals are very faint to moderately faint, variab chloritized and essentially "streaked out" parallel to foliation. Unit is overall quite uniform, but becomes increasingly chloritic from 74.14 m to 84.12 m , before grading back into epidote-sericite dominant. Low angle ( 12 TCA) milky to cloudy grey barren quartz vein noted from 67.25 m to 67.81 m . Very minor random carbonate veins filling joints and fractures. Trace pyrite noted on and around fractures. 20 cm chert band centered at 85.10 m contains $2-3 \%$ disseminated pyrite Lower contact sharp at 68 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 M3\% | From | To | Sample |
| 48.69 | 67.00 | FOL | 65 | VW |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

$$
69
$$

# $84.12 \quad 89.32 \mathrm{M}$ 

 Wmoderate sericite alteration and weak epidote alteration.
89.31 89.32 CT 68 VW
lower contact at 68 TCA.
From To Litho
Simple Geo
89.3294 .99 CHRT
at 48 to 54 TCA and chert is either bedded at 1 to 3 cm scale or is
Pale (drab) grey-green and charcoal-coloured bedded chert. Core is quite blocky. Bedding at 48
massive. $1 \%$ pyrite overall as $1-3 \mathrm{~mm}$ long stratabound streaks. Lower contact sharp at 72 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 | M3\% | From | To | Sam |

89.32 94.98 BD 51 VW
bedding at 48 to 54 TCA
$89.32 \quad 94.99 \quad-\quad-\quad-\quad W$
No alteration visible
$94.98 \quad 94.99$ CT 72 VW
sharp lower contact at 72
TCA
$89.3294 .99 \quad 1$ LB
\% pyrite overall as $1-3 \mathrm{~mm}$ long stratabound streaks.

| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 94.99 | 98.43 | FXAT |  |

Pale green-cream coloured well-foliated feldspar crystal ash tuff. Foliated at 58 to 64 TCA. Moderately to strongly sericitic, very weakly epidote altered. Feldspa crystals are locally discernible and are generally small and often broken. Minor interbedded chert, and a single, $<10 \mathrm{~cm}$ thick, lapilli tuff interbed noted. Fault gouge zone noted from 96.00 m to 96.30 m . $0.25 \%$ disseminated pyrite. Sharp lower contact at 72 TCA


| TCA. |  |  |  |
| :---: | :---: | :---: | :---: |
| From | To | Litho | Simple Geo |
| 98.43 | 100.78 | SILT |  |

Charcoal grey, very faintly bedded graphitic siltstone to mudstone. Bedding at 65 TCA. Silicified to $99.70 \mathrm{~m} .1 .5 \%$ pyrite as concretions, nodules, fracture coatings and laminations. Lower contact in broken core


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 100.78 | 101.46 | FXAT |  |

Light grey fine to medium grained feldspar crystal ash tuff. Feldspar crystals are cloudy grey-blue subhedral and 1-2mm in size, set in a fine tuffaceous, weakly sericite altered matrix. Trace pyrite. Lower contact in broken core


Light to medium grey lapilli tuff with pyite bands. Bedding parallels foliation at 70 TCA. Strongly silicified, weakly sericitized. Lapilli are rare, and are lensoidal. Overall, $15 \%$ pyrite as laminations, semi-massive bands up to 2 cm thick. $0.25 \%$ chalcopyrite. Sharp lower contact at 70 TCA

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 M2\% | Min3 M3\% | From | To |  | Sample |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 1011 | 1115 | $I$ | $\boldsymbol{I} \quad 1.34>05$ |

Light to medium grey lapilli tuff with pyite bands. Bedding parallels foliation at 70 TCA. Strongly silicified, weakly sericitized. Lapilli are rare, and are lensoidal Overall, $15 \%$ pyrite as laminations, semi-massive bands up to 2 cm thick. $0.25 \%$ chalcopyrite. Sharp lower contact at 70 TCA

112.91112 .92 CT 70 W sharp lower contact at 70

## From To Litho $\quad$ Simple Geo <br> 112.92117 .78 LLTF

Light to medium green, bedded lapilli tuff. Bedding at 70 TCA. Matrix is moderately sericitic. Lapilli are elongate lensoidal greenish-stained and siliceous, or charcoal grey soft, chloritic. Trace streaky pyrite along laminations. Sharp lower contact at 43 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 M3\% | From | To |  | pple |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 112.92 | 112.92 | $I$ | 134207 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 112.92 | 114.42 | I | 134208 |
| $112.92 \text { 117.77 BD } 70 \text { VW }$ Bedding at 70 TCA. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 112.92117 .78 M - - W |  |  |  |  |  |  |  |  |  |  |  | 112.9\$17.78 0.05 LB |  |  |  |  |  |  |  |  |  |  |  |  |
| Matrix is moderately sericitic. Trace streaky pyrite along laminations. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 114.42 | 115.42 | I | 134209 |

[^2]| From | To | $\square$ Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 117.78 | 118.63 | FXTF |  |

Light grey-green feldspar hornblende crystal tuff. Bedding at 68 TCA. Weak sericite-epidote alteration. Trace pyrite. Sharp lower contact at 65 TCA.


Very dark green, massive (except where flow-banded) medium grained gabbro. Moderate to strong epidote alteration, moderate chloritization. Plagioclase-
pyroxene-hornblende porphyritic. Plagioclase crystals are moderately to strongle sausseritized. Pyroxene crystals are moderately to completely chloritized, and hrade into the dominant massive varianterth cortitized. Ahe groundmass is moderately epidote altered. Flow banded/flow bedded inetrvals are common, and and breccia noted at from 155.40 m to 156.30 m . Trace pyrite overall. End of Hole.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain $\mid$ | From | To | INT\| | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 M3\% | From | To | Sample |
| 121.91 | 55.40 | NA |  | VW |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

massive 40 NA VW
banded/bedded intervals.

Wednesday, April 25, 2012


| From | To | Litho |
| :---: | :---: | :---: |
| 0.00 | 5.50 | OVBD |

Casing/Overburden

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 M3\% | From | To | Sample |
| 0.00 | 5.50 | NA |  |  | 0.00 | 5.50 | - | - - - | - | - | - | 0.00 | 5.50 | 0 | - |  |  |  |  |  |  |  |  |


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 5.50 | 25.13 | FXTF |  |

Medium charcoal grey, moderately to weakly foliated (parallels bedding?) coarse grained feldspar-hornblende crystal tuff. Foliation at 65 TCA approximately 23.00 m , and at 55 TCA to 25.13 m . Alteration is weak to moderate chlorite-weak epidote. Feldspar crystals are variable size, weakly epidote altered and anhedral to euhedral. Some very narrow ( 5 cm or less) intervals with randomly oriented plagioclase laths may indicate flows rather than tuff. Hornblende crystals are variable streaked parallel to foliation. Very minor carbonate filling joints and fractures. Trace very fine disseminated pyrite. Lower contact indistinct.


Light grey to grey-beige, fine grained, massive and fresh, moderately magnetic feldspar-hornblende porphyry. Composed of $15 \%$ subhedral to anhedral 1 mm
2 mm cream white plagioclase crystals and $5 \%-7 \%$ fresh euhedral to subhedral, $1 \mathrm{~mm}-3 \mathrm{~mm}$ hornblende crystals in a fine-grained to aphaniitc groundmass.
Brownish oxidation haloes, maximum thickness of 25 cm , noted associated with fractures in 4 locations. Very minor carbonate infilling rare low angle joints. No
visible sulphides. Upper contact indistinct, but chilled. Lower contact sharp and chilled, at 57 TCA.


$31.94 \quad 35.73$
LTho
Very pale green-grey foliated and strongly sericitized, weakly calcareous feldspar crystal tuff. Feldspar crystals are soft,pale grey-green and cloudy (highly altered). Lithology is practically a sericite schist. Interbedded graphitic mudstone ( $(2 \mathrm{~cm}$ thick bed centered at 34.60 m ) and minor chert noted. Foliated at 55 to 75 TCA. No visible sulphides to 33.4 m . Below this $1.5 \%$ streaky pyrrhotite. Sharp lower contact at 65 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 M3\% | From | To | Sample |
|  |  |  |  |  |  |  |  |  |  |  |  | $\begin{array}{r} 31.943 \\ 1.5 \% \text { stre } \end{array}$ | $35.70$ | $\begin{gathered} 0 \\ \text { oyrrhot } \end{gathered}$ | ite. |  |  |  | PO | 1.5 |  |  |
| $31.94 \quad 35.72$ BD 65 VW Bedding at 55 to 75 TCA |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| strongly sericitized, weakly calcareous |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | 35.70 | 35.73 | 0 |  |  |  |  | PO | 1.5 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | 1.5\% str | aky p | yrrhotit |  |  |  |  |  |  |  |  |
| 35.72 35.73 CT 65 VW |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sharp lower contact at 65TCA. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |


| TCA. |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Litho | Simple Geo |  |  |  |  |  |
| 35.73 | 36.60 | CARB |  |  |  |  |  |  |

Pale grey, medium grained bedded carbonate - not sure if this is a true limestone or a carbonate exhalite. Bedding at 55 TCA. Minor interbedded fine grained chloritic tuff. 0.5\% pyrite paralleling bedding. Sharp lower contact at 55 TCA.


| From | To | Litho | Simple Geo |
| :--- | :---: | :---: | :---: |

[^3]
## Simple Geo

Light grey-green, bedded, weakly sericitic lapilli tuff with sporadic sericitized and siliceous lapilli. Bedding at 55 TCA. $2 \%$ pyrrhotite, $0.25 \%$ pyrite along bedding planes. Sharp lower contact at 50 TCA


Wednesday, April 25, 2012


# From To Litho <br> 43.43 <br> GMDS 

Charcoal grey to near black, bedded, variably graphitic mudstone with minor interbedded tuffaceous sandstone. Bedding at 68 TCA. Strongly graphitic from 43.75 m to 47.00 m . Very minor, poorly devleloped carbonate lenses throughout. Over $2 \%-3 \%$ pyrite as discontinuous laminae. Lower contact sharp at 65 TCA.


| 49.18 | 49.19 | CT 65 VW |  |  |
| :---: | :---: | :---: | :---: | :---: |
| From | To |  | Litho | Simple Geo |
| $\mathbf{4 9 . 1 9}$ | $\mathbf{5 7 . 4 0}$ | LLTF |  |  |

Medium green, variably altered, bedded lapilli tuff. Bedding at 70 to 80 TCA between 49.19 m to 54.50 m , and at 65 TCA to 57.40 m . Quartz crystal tuff interbeds from 5400 m to variably altered, bedded lapilif tuff. Bedding at 70 to 80 TCA between 49.19 m to 54.50 m , and at 65 TCA to 57.40 m . Quartz crystal tuff interbeds from 54.00 m to 54.27 m . The lapilli tuff is chloritic and calcareous to 55.34 m with no visible sulphides, and a sharp lower contact. Below this, still a lapilli tuff, bu 65 TCA.

 Weakly bedded at 65 TCA. A single, 6 cm milky quartz vein noted. Disseminated pyrite and pyrrhotite occur to $0.1 \%$. Sharp lower contact at 65 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 M3\% | From | To |  | Sample |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 57.40 | 57.40 |  | $\begin{array}{ll}\text { I } & 134214\end{array}$ |

```
57.40 58.86 BD 65 VW
    Weak bedding at }65\mathrm{ TCA.
```



| 58.86 <br> 58.87 <br> sharp lower contact at 65 <br> TCA |  |  |
| :---: | :---: | :---: |
| From | To |  |
| $\mathbf{5 8 . 8 7}$ | $\mathbf{7 1 . 5 5}$ | Litho | $0.1 \%$ disseminated pyrite and pyrrhotite. $\qquad$都

Simple Geo

Light to medium grey, well bedded lapilli tuff with banded, disseminated and massive pyrite. Moderate to strong sericite alteration and patchy silicification to 65.92 m . Moderately to strongly silicified with weak sericitite alteration from 65.92 m to 68.25 m , and moderately sericitized with patchy silicification from 65.92 m to lower contact. Bedding is overprinted by alteration, but appears that bedding and foliation are parallel and at 65 to 75 TCA . Peculiar resinous looking (rusty to lower contact. Bedding is overprinted by alteration, but appears that bedding and foliation are paralle and at 65 to 75 TCA. Peculiar resinous looking (rusty
red garnet coloured) millimeter-thick laminations occur throughout and are iinvariable associated with pyrite bands. May be an iron carbonate replacement?
Overall, $10 \%-12 \%$ disseminated, laminated, banded and massive pyrite. Massive pyrite beds occur at the upper contact from 58.87 m to 58.97 m , and at 60.96 m to 61.08 m . Trace chalcopyrite. Sharp lower contact at 70 TCA.




Light grey-green massive fine quartz crystal tuff. The quartz crystals here are conspicuously smaller than in typical QXTF, occuring to $20 \%$ as 1 mm - 3 mm blue joint and fracture fillings. Sharp lower contact at 70 TCA.

$75.19 \quad 75.20$ CT 70
Sharp lower contact at 70
TCA. TCA.

| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 75.20 | 97.37 | LLTF |  |

Medium to light grey, relatively homogeneous lapilli tuff. Bedding at 72 to 80 TCA. Weakly sericitic down to 91.20 m , patchy silicification below this to the lower contact. Local intervals are crowded lapilli tuff. Unit is devoid of veining, and contains approximately $0.1 \%$ pyrite as scattered disseminations and concretions. Lower contact sharp at 40 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC D | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 M2\% $^{\text {a }}$ | Min3 | M3\% | From | To | Sample |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 75.20 97.36 BD 76 VW Bedding at 72 to 80 TCA. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| (1) $75.2097 .37 \quad 0.1$ DIS |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $\begin{aligned} & 91.20 \quad 97.37 \quad \mathrm{M} \end{aligned} \quad-\quad-\mathrm{W} \quad-\quad-\quad-\quad .$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 97.36 | 97.37 | CT | 40 | vw |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Lower contact sharp at 40
TCA.

| TCA. |  |  | Simple Geo |
| :---: | :---: | :---: | :---: |
| From | To | Litho | GBBR |
| 97.37 | 183.00 | GB |  |

Very dark green to charcoal, strong epidote-moderate to weak chlorite altered. Upper 3m are chilled to a fine grained plagioclase porphyritic phase. Minor carbonate and quartz veining. Trace pyrite overall. End of Hole.


| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 M3\% | From | To | Sample |
| 0.00 | 3.05 | NA |  |  | 0.00 | 3.05 | - | - - |  | - | - | 0.00 | 3.05 | 0 |  |  |  |  |  |  |  |  |


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 3.05 | 16.10 | LMST |  |

Medium grey, faintly bedded limestone. Bedding is at 25 to 45 TCA. The rock is completely shattered (down to 77.4 m with $40 \%$ to $50 \%$ recovery) and contact relationships obscured, but there is fault breccia and rusty gouge common from 5.0 m to 15.0 m , with fragments of soft tuffaceous material and rhyolite incorpororated into the limestone. The fault appears to be low angle, at 12 to 16 TCA. Trace pyrite. Lower contact in broken core.


Light to medium green-grey, crudely bedded heterolithic pebble conglomerate. Pebble compositions include rhyolite and/or chert, chloritic ash tuff, crystal tuff, and lapilli tuff. Bedding crudely developed at 20 to 30 TCA. Matrix is very calcareous and Fe-carbonate spotting is common throughout. Entire interval appears within a fault, or at least fault proximal. Recovery very poor ( $40 \%$ to $60 \%$ ). Trace pyrite. Lower contact in broken core.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 M2\% | Min3 ${ }^{\text {M }}$ 3\% | From | To | Sample |
| 16.10 | 40.06 | BD | 25 | S |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Light to medium green-grey, crudely bedded heterolithic pebble conglomerate. Pebble compositions include rhyolite and/or chert, chloritic ash tuff, crystal tuff, and lapilli tuff. Bedding crudely developed at 20 to 30 TCA. Matrix is very calcareous and Fe-carbonate spotting is common throughout. Entire interval appears within a fault, or at least fault proximal. Recovery very poor ( $40 \%$ to $60 \%$ ). Trace pyrite. Lower contact in broken core.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 M3\% | From | To | Sample |
| $16.10 \quad 40.07$ S - - - $\quad$ M <br> Matrix is very calcareous and Fe-carbonate spotting is common throughout. |  |  |  |  |  |  |  |  |  |  |  | $\begin{array}{r} 16.10 \\ \text { trace py } \end{array}$ | 40.07 | 0.05 | DIS |  |  |  |  |  |  |  |

$\begin{array}{llll}40.06 & 40.07 & \text { CT } \\ \text { Lower contact in }\end{array}$

| Lower contact in broken <br> core. |
| :--- |
| From |
| To |

Charcoal grey to near black variably graphitic mudstone to siltstone. Bedding is rarely evident, and ranges between 60 to 66 TCA. Core is very broken to
crushed (fault proximal). Moderately calcareous, in fact this may have been a carbonaceous limestone bed. Trace pyrite. Lower contact in spun core

$41.99 \quad 42.00 \quad$ CT $\quad M$

| Lower contact in spun core. |  |  |  |
| :--- | :---: | :---: | :---: |
| From | To | Litho | Simple Geo |

Pebble conglomerate as per 16.10 m to 40.07 m . Bedding at 45 TCA. Core rubbled and broken. No visible sulphides. Lower contact in broken core.


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 44.80 | 55.70 | LMST |  |

Mottled grey-white limestone. Essentially an annealed fault breccia to 52.90 m , with breccia fragments of the conglomerate and graphitic mudstone incorporated down to 49.65 m . Slightly competent below 52.90 m . Weak Fe-carbonate patches and staining. No visible sulphides. Lower contact in broken core

| STRUCTURES |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA $\operatorname{Strain}$ | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 |  | Min3 |  | From | To | Sample |
| $44.80 \quad 52.90 \quad$ FLT $\quad$ Sannealed fault breccia |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | 44.80 | 55.70 | W | M | - |  | - | 44.80 | 55.70 | 0 | - |  |  |  |  |  |  |  |  |  |
|  |  |  |  | Weak Fe-carbonate patches and staining. |  |  |  |  |  |  | no visible sulphides. |  |  |  |  |  |  |  |  |  |  |  |  |
| 52.90 | 55.69 | NA | M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | massive to in situ brecciated |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $\begin{aligned} & 55.69 \quad 55.70 \quad \text { CT } \\ & \text { Lower contact in broken } \end{aligned}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |


| From | To | Litho | Simple Geo |
| :--- | :---: | :---: | :---: |

$55.70 \quad 77.42$ CNGL
Charcoal grey to black moderately to strongly graphitic thin-bedded pebble conglomerate. Bedding at 32 to 40 TCA to 72.00 m and at 45 TCA at 77.42 m . Unit is heterolithic, with limestone (dominant), rhyolite/chert, and tuffaceous clasts incorporated. Matrix is moderately to strongly graphitic and strongly calcareous. No
visible sulphides visible sulphides. Lower contact demarcated by 1 cm thick band of fault gouge.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ |  | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 M3\% | From | To | Sample |
| 55.70 72.00 BD 36 W |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Bedding at 32 to 40 TCA. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  | 55.70 | . 42 |  | S |  |  |  | 55.70 | 7.42 | 0 | - |  |  |  |  |  |  |  |
| Matrix is moderately to strongly graphitic and strongly <br> No visible sulphides. calcareous. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 72.00 | 77.41 | BD | 45 | w |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Bedding at 45 TCA. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 77.41 77.42 CT M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Lower contact demarcated by 1 cm thick band of fault gouge. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 77.42 | 80.61 | LMST |  |

Dark to light grey brecciated limestone. Breccia clasts are limestone, and the breccia could be classified as a hydraulic breccia, annealed by randomly oriented, locally pitted and corroded calcite veins filling fractures. No visible sulphides. Lower contact in broken core.


Medium grey, massive plagioclase porphyritic mafic flow. Characterized by randomly oriented, euhedral, weakly to moderately sausseritized plagioclase laths up to 1 cm in length and intervals that are pyroxene-hornblende porphyritic as well. Overall less than $10 \%$ plagioclase crystals, they become very sparse and/or very faint over several intervals, but are present throughout. Weakly chloritic groundmass. Patchy zones of Fe-carbonate alteration noted, most pronounced from
91.65 m to 92.60 m . Trace pyrite. Weak chilling over 20 cm at lower contact. Lower contact sharp at 80 TCA.




| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC | DO | SR | ${ }^{\text {AK }}$ | SC |
| $\begin{gathered} 153.63 \text { 156.63 BD } 60 \text { VW } \\ \text { Bedding at } 60 \text { TCA } \end{gathered}$ |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

$153.6356 .64 \quad 0.5$ LB
no significant alteration $0.5 \%$ pyrite as disseminated aggregates and as wispy and
156.63156 .64 CT 45 VW discontinuous laminae.

Lower contact at 45 TCA

| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 156.64 | 167.55 | GMDS |  |

Charcoal grey to black moderately to intensely graphitic mudstone with minor interbedded pale grey-green mudstone. Bedding at 75 to 85 TCA. Fault gouge
zones noted at 163.20 m to $163.40 \mathrm{~m}, 164.11 \mathrm{~m}$ to 165.00 m and 166.45 m to 167.00 m . Milky quartz veins noted at 161.50 m to 161.60 m and at 164.10 m to
164.35 m (crushed in fault zone). Riddled with stratabound carbonate bands. Overall, $3 \%-4 \%$ pyrite as coarse aggregates, mostly associated with the carbonate
bands. Lower contact in broken core.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | \|Min3 ${ }^{\text {M3\% }}$ | From | To |  | Sample |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 156.64 | 158.14 | I | $\begin{array}{ll}\text { I } & 134229\end{array}$ |

156.64 163.20 BD 80 W
bedding at 75 to 85 TCA
Wednesday, April 25, 2012


### 173.15

To
16755173.15 MDS
silicified (or possibly cherty). Bedding at 60 TCA. $3 \%$ pyrite as nodules, wisps and disseminations. Lower contact in broken core

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 M3\% | From | To | Sample |

167.55 173.14 BD 60 VW
Bedding at 60 TCA.

# 167.55 173.15 M VW 

167.5\$73.15 3 NOD
$3 \%$ pyrite as nodules, wisps and disseminations
173.14 173.15 CT VW

Lower contact in broken

## From To Litho <br> $173.15 \quad 283.33$ GMDS

Thick, monotonous and homogeneous sequence of charcoal grey to black, massive to bedded graphitic mudstone. Bedding at 74 to 78 TCA to 177.30 m , and a 66 to 74 TCA to 186.20 m . Below this, the unit appears massive down to 247.00 m , bedded at 40 to 46 TCA down to 256.00 m , massive to 279.00 m and bedded at 70 TCA to the lower contact. Cut by numerous thin milky carbonate veins that record deformation, as small scale folds, within the unit. There is also an earlier limestone beds cur infrequently From 27350 m to lower contact graphite content wanes, and tuffaceous and crystal tuffaceous interbeds appear Overall, 257.86 m to 258.00 m : Quartz-carbonate vein with $7 \%$ coarse pyrite.

| STRUCTURES |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To Struct | CA Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 ${ }^{\text {M3\% }}$ | From | To |  | mple |  |
| 173.15 177.30 BD 76 W |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Bedding at 74 to 78 TCA. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 173.15 283.33 W W weakly calcareous. |  |  |  |  |  |  |  |  |  | 173.1883.33 4 DIS |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  | 4\% pyrit dissemin |  | ciated knots th |  |  | te vein | $s$, and as coar |  |  |  |  |  |  |
| 177.30 186.20 BD 70 W |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Bedding at 66 to 74 TCA. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| $186.20 \begin{gathered}247.00 ~ N A \\ \text { massive }\end{gathered}$ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 203.00 |  | 205.00 | I | 134238 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 208.00 |  | 210.00 | I | 134239 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 214.00 |  | 216.00 | I | 134240 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 231.00 |  | 233.00 | I | 134241 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 233.00 |  | 233.00 | I | 134242 |



# From To Litho <br> $321.10 \quad 332.78$ 

Medium green, fine to coarse garined greywacke with interbedded, and bedded, siltstone. Bedding at 80 TCA, but rare intervals are at 65 TCA. The greywacke ranges from very fine, relatively homogeneous sand to coarse beds dominated by feldpsar detritus, with less mafic detritis and angular to rounded siltstone, ash tuff and feldspar crystal tuff fragments. Matrix is weakly calcareous. Overall, weakly chloritic. $2 \%-3 \%$ blebby, stratabound and streaky and disseminated pyrrhotite, Trace pyrite associated with rare carbonate veins. Lower contact at 65 TCA.


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 340.62 | 431.26 | FXLT |  |

Light to medium green, weakly foliated feldspar crystal lithic tuff. Foliation at 35 to 45 TCA. The feldspar crystals occur to $20 \%$ to $25 \%$ and are 2 mm to 5 mm in size. Crystals vary from translucent to opaque, are green to grey in colour, and perfectly euhedral (laths) to subhedral. Amphibole and/or pyroxene crystals
occur very rarely. The matrix is green and white (sericite-feldsapr-chlorite) and weakly calcareous. Lithic fragments occur infrequently, and consist of lensoidal to
angular soft ash tuff, feldspar crytsal tuff and rhyolite/chert lapilli. Sporadic low to moderate angle carbonate veins noted.
356.75 m to 372.40 m . Mottled, weakly hematite altered, "milled" (weakly brecciated) looking FXLT
400.75 m to 405.70 m : "Disturbed" FXIT Not really
416.20 m to 420.40 m : A more lithic rich variant of the FXLT. Matrix over this interval is more calcareous. At 418.67 m to $418.79 \mathrm{~m}, 6 \mathrm{~cm}$ carbonate vein at 30 TCA.

Vein halo is calcareous over 25 cm of upper and lower contact
421.00 m to 427.00 m : bleaching and sericitization begins, increasing downhole.
427.00 m to 431.29 m : Well foliated and moderately to strongly sericitized FXLT(locally sericite schist). Pyrite content increases from trace above 427.00 m , to 2 -
$3 \%$ disseminated and foliation parallel streaks, and $1 \%$ pyrrhotite wisps over this interval.

431.25431 .26 CT 60
basal contact
Litho
Simple Geo

Light, drab green weakly foliated quartz crystal tuff. Weakly foliated at 53 TCA. Weakly sericitic. Abundant rounded grey-blue quartz crystals up to 8 mm in diameter to 432.00 m . Below this they are very sparse. Minor foliation parallel carbonate veining. $4 \%$ pyrrhotite as foliation-parallel bands. $0.25 \%$ pyrite as aggregates. Lower contact gradational.


| From | To | Litho | Simple GeO |
| :---: | :---: | :---: | :---: | :---: |
| $\mathbf{4 3 1 . 2 6}$ | $\mathbf{4 3 3 . 1 0}$ | QXTF |  |
| Light, drab green weakly foliated quartz crystal tuff. Weakly foliated at 53 TCA. Weakly sericitic. Abundant rounded grey-blue quartz crystals up to 8 mm in |  |  |  |

Light, drab green weakly foliated quartz crystal tuff. Weakly foliated at 53 TCA. Weakly sericitic. Abundant rounded grey-blue quartz crystals up to 8 mm in
diameter to 432.00 m . Below this they are very sparse. Minor foliation parallel carbonate veining. $4 \%$ pyrrhotite as foliation-parallel bands. $0.25 \%$ pyrite as aggregates. Lower contact gradational.

433.09433 .10 CT VW

## Gradational lower contac <br> $\longrightarrow$

$4 \%$ pyrrhotite as foliation-parallel bands. $0.25 \%$ pyrite as aggregates

Light to pale green, vey weakly foliated feldspar crystal lithic tuff. Very weakly foliated at 45 to 55 TCA. Weak sericite alteration. Unit is very similar to the FXLT from 340.62 m to 431.26 m . Lithic fragment types include chert/ rhyolite, ash tuff and silstone. Minor carbonate veining. $1 \%-2 \%$ disseminated pyrite and $2 \%$ disseminated pyrrhotite. End of Hole

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 M2\% | Min3 M3\% | From | To | Sample |
| 433.10483 .00 FOL 50 VW433.10 483.00 W VW - W - - Very weakly foliated at 45 Weak sericite alteration, very weakly calcareous. |  |  |  |  |  |  |  |  |  |  |  | 433.1083 .00 1.5 DIS PO 2 |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | 1-2\% dis | semin | nated p | pyrite a | and 2\% | dissem | minated pyrrh | otite. |  |  |  |


| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 | M3\% | From | To | Sample |
| 0.00 | 9.15 | NA |  |  | 0.00 | 9.15 | - | - - | - | - | - | 0.00 | 9.15 | 0 | - |  |  |  |  |  |  |  |  |


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 9.15 | 14.40 | GMDS |  |

Charcoal grey to black, bedded graphitic mudstone. Bedding at 50 to 56 TCA. Minor carbonate veining. $1 \%$ rusty stratabound carbonate. Sharp lower contact at 50 TCA


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 16.47 | 88.89 | GMDS |  |

Charcoal grey to black bedded graphitic mudstone. Thin to thick bedded, at 30 to 50 TCA down to 78.85 m , and at 65 to 75 TCA down to 88.89 m . Riddled with generally low angle carbonate veins, and these are only rarely deformed. Very sporadic limestone beds occur, with a maximum thickness of $25 \mathrm{~cm} .1 \%-2 \%$
pyrite overall, occuring dominantly as thin (maximum 1 mm thick) bedding pararlel wisps and laminae, and as disseminations. Sharp lower contact at 70 TCA


| Sharp lower contact at 70 <br> TCA. |  |  |  |
| :---: | :---: | :---: | :---: |
| From | To | Litho | Simple Geo |
| $\mathbf{8 8 . 8 9}$ | $\mathbf{9 3 . 3 0}$ | TFWK |  |

Greenish brown, massive, fine grained rather non-descript tuffwacke. Likely derived from fine grained feldspar crystal tuff. No visible sulphides. Gradational
lower contact.


| 93.29 <br> gradational lower contact. |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| From | To | Litho | Simple Geo |
| $\mathbf{9 3 . 3 0}$ | $\mathbf{9 6 . 1 0}$ | LLTF |  |

Medium green, bedded lapilli tuff. Bedding at 58 to 64 TCA. Very weak chlorite alteration. Trace disseminated pyrite. Sharp lower contact at 70 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 M3\% | From | To | Sample |
| 93.30 | 96.09 | BD |  | VW |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

# From To Lith <br> Litho 

Medium green, bedded lapilli tuff. Bedding at 58 to 64 TCA. Very weak chlorite alteration. Trace disseminated pyrite. Sharp lower contact at 70 TCA.


Medium to light drab green, fine grained tuffwacke with minor interbedded siltstone and lapilli tuff. The tuffwacke is as per 88.89 m to 93.30 m . Bedding (siltstone interbeds) at 60 to 66 TCA. The lapilli tuff is quite silicic(?) and typically contains bands of medium- to coarse-grained pyrite up to 6 mm thick (stratabound). $0.5 \%$ pyrite overall, largely as described in the lapilli tuff. Sharp lower contact at 66 TCA.


Medium to light grey, to turquoise green bedded lapilli tuff. Bedding at 60 to 64 TCA. Matrix is dominantly chlorite altered to 110.56 m and silicified with very
minor sericitization bo this to the lower contact Lapill are sparse and generally chloritic cown to 11300 m , and mostly soft and chloritic and more siliceous minor sericitization below this to the lower contact. Lapilir are sparse and generally chloritic down to 13.00 m , and mostly soft and chloritic and more siliceous grained bands, disseminated crystals in the chloritic lapilli tuff, and as fine to dusty disseminations and laminae in the silicified lapilli tuff. Lower contact at 70


124.19124 .20 CT 70 VW

Lower contact at 70 TCA


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 140.50 | 160.20 | GBBR |  |

Medium to dark green, massive mafic flow. Moderately chloritized and epidotized. Locally plagioclase porphyritic, with epidotized anhedral to rarely euhedral plagioclase crystals reaching up to 3 mm in size. Groundmass composed of chlorite-altered pyroxene, with fine felted mats of plagioclase crystals confirming that this is likely a flow. Moderate carbonate veining and "streaking" throughout; this gives the appearamce of a planar fabric to the flow, as the dominant orientation to the veining and streaks is 70 TCA. Overall, trace pyrite. Sharp lower contact at 67 TCA.


Pale green-buff, extremly siliceous/silicified lapilli tuff with sporadic faint lapilii. Bedded at 66 TCA. $3 \%$ fine disseminated pyrite. Lower contact at 80 TCA.


Fine to medium grained massive mafic flow as per 140.50 m to 160.20 m . Trace disseminated pyrite. Chilled over lower 2 metres to lower contact. Lower contact
is 1 cm of chloritic gouge


Wednesday, April 25, 2012

| $\begin{gathered} \text { From } \\ 161.64 \end{gathered}$ |  |  | 0 |  | Litho |  |  |  |  |  |  | Simple Geo | (Continued from previous page) |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 169 | .00 |  |  |  |  | GBBR |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  | SAMPLES |  |  |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 M2\% | Min3 M3\% | From | To | Sample |


| From | To |  | Litho |
| :---: | :---: | :---: | :---: |
| 169.00 | 206.28 | LLTF | Simple Geo |

Light grey to grey-yellow to near white, moderately to intensely altered lapilli tuff with minor altered ash tuff and feldspar crystal tuff interbeds. Alteration is
dominated by silicification with sericite partings occuring every several millimeters to every several centimeters. Beige coloured Fe-carbonate bands paralleling
foliation are common throughout. Lapilli are pale grey to white, lensoidal, siliceous and faint; they become less abundant downhole, below 188.00 m . Foliation at
58 to 62 TCA. $3 \%$ pyrite as fine disseminations and as foliation parallel bands. Lower contact at 67 TCA.
190.80 m to 191.10 m : annealed fault gouge zone; clay rich.

169.00190 .80 FOL 60 VW

Foliation at 58 to 62 TCA.
169.00206 .28 M - - M - M

Alteration is dominated by silicification with sericite partings occuring every several millimeters to every several centimeters. Beige coloured Fe-carbonate bands paralleling foliation are common throughout.
169.0006.28 3 LB
$3 \%$ pyrite as fine disseminations and as foliation parallel bands.

| 171.00 | 173.00 | $\boldsymbol{I}$ | 134262 |
| :--- | :--- | :--- | :--- |
| 173.00 | 175.00 | $\boldsymbol{I}$ | 134263 |
| 175.00 | 175.00 | $\boldsymbol{I}$ | 134264 |
| 175.00 | 177.00 | $\boldsymbol{I}$ | 134265 |
| 177.00 | 179.00 | $\boldsymbol{I}$ | 134266 |
| 179.00 | 181.00 | $\boldsymbol{I}$ | 134267 |
| 181.00 | 183.00 | $\boldsymbol{I}$ | 134268 |
| 183.00 | 185.00 | $\boldsymbol{I}$ | 134269 |
| 185.00 | 185.00 | $\boldsymbol{I}$ | 134270 |
| 185.00 | 186.50 | $\boldsymbol{I}$ | 134271 |


| From To <br> 169.00 206.28 |  |  |  |  | Litho |  |  |  |  |  |  | Simple Geo |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  | LLTF |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC |  | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 M3\% | From | To |  | Sample |  |
| 190.80191 .10 FLT S annealed fault gouge zone; clay rich. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 191.00 | 193.00 | I | 134274 |
| 191.10 206.27 FOL 60 VW Foliation at 58 to 62 TCA. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 193.00 | 193.00 | $I$ | 134275 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 193.00 | 195.00 | $I$ | 134276 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 195.00 | 199.00 | $I$ | 134277 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 199.00 | 199.00 | $I$ | 134278 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 199.00 | 201.00 | $I$ | 134279 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 201.00 | 203.00 | $I$ | 134280 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 203.00 | 205.00 | $I$ | 134281 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 205.00 | 206.28 | I | 134282 |
| 206.27 206.28 CT 67 VW Lower contact at 67 TCA. |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | om |  | 0 |  | Litho Simple Geo |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | . 28 | 213 | .71 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Mottled green and red, banded/foliated and brecciated ash tuff. Folation at 55 to 65 TCA. Moderately to intesely chloritized. Hematite and Fe-carbonate overprint accompanies brecciation of the tuff. Hematite occurs with dolomite in foliation parallel bands and as mattes and angular dark grey (may be extremely fine accompanies brecciation of the tuff. Hematite occurs with dolomite in foliation parallel bands and as mattes and angular dark grey (may be extremely fine extremely Fe-carbonate altered to lower contact, which is at 70 TCA.

206.28 209.00 FOL 60 M

Folation at 55 to 65 TCA.


## $212.74 \quad 213.71 \quad \mathrm{~S}$ <br> strong hematite-Fe carbonate alteration, weak chlorite alteration

213.70213 .71 CT 70 M

| lower contact at 70 TCA. |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Litho | Simple Geo |  |  |
| 213.71 | 221.45 | LLTF |  |  |  |

Light grey and greyish-yellow (alteration dependent) well foliated, variable silicified and sericitized, variably pyritic lapilli tuff with minor ash tuff interbeds. Foliation at 55 to 65 TCA, and roughly parallels bedding. Intense Fe-carbonate alteration persists down to 215.80 m . Overall $5 \%-6 \%$ pyrite as foliation parallel bands and heavy fine to medium grained disseminations. Slightly brecciated lower contact


[^4] Foliation at 55 to 65 TCA, and roughly parallels bedding. Intense Fe-carbonate alteration persists down to 215.80 m . Overall $5 \%-6 \%$ pyrite as foliation parallel bands and heavy fine to medium grained disseminations. Slightly brecciated lower contact.



Pale greyish-yellow foliated lapilli tuff with interbedded silicifified (welded?) ash tuff. Foliation is roughly parallel to bedding at 50 to 70 TCA. Variably silicified and
sericitized. Weak Fe-carbonatre alteration throughout. $2 \%$ very fine to fine disseminated pyrite overall. Lower contact sharp at 75 TCA.



Wednesday, April 25, 2012


Pale green-grey foliated lapilli tuff. Foliation at 60 TCA. Weak to moderate silicification and sericitization (sericite partings). $1 \%-2 \%$ pyrite as disseminations and

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 M3\% | From | To |  | Sample |  |
|  |  |  |  |  |  |  |  |  | - |  |  | $\begin{array}{lllll}256.64 & 258.73 & \boldsymbol{I} & 134315\end{array}$ |  |  |  |  |  |  |  | 256.64258 .73 |  |  |  |  |

256.64 264.99 FOL 60 W

Foliation at 60 TCA.

Wednesday, April 25, 2012

| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 256.64 | 265.00 | LLTF |  |

Pale green-grey foliated lapilli tuff. Foliation at 60 TCA. Weak to moderate silicification and sericitization (sericite partings). $1 \%-2 \%$ pyrite as disseminations and foliation parallel seams. Lower contact in broken core

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 ${ }^{\text {M2\% }}$ | Min3 M3\% | From | To | Sample |
| 256.64265 .00 W - -W - - - Weak to moderate silicification and sericitization |  |  |  |  |  |  |  |  |  |  |  | 256.6265.00 1.5 LB |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | $1-2 \%$ pyrite as disseminations and foliation parallel seams. |  |  |  |  |  |  |  |  |  |  |


| 258.73 | 260.82 | $\boldsymbol{I}$ | 134316 |
| :--- | :--- | :--- | :--- |
| 260.82 | 262.91 | $\boldsymbol{I}$ | 134317 |
| 262.91 | 262.91 | $\boldsymbol{I}$ | 134318 |
| 262.91 | 265.00 | $\boldsymbol{I}$ | 134319 |

264.99265 .00 CT W
Lower contact in broken

\section*{| From | To |  | Litho |
| :---: | :---: | :---: | :---: |}

Massive cream coloured rhyolite. Mottled burgundy and green appeance locally likey due to oxidixed and reduced iron impurities, respectively. Annealed fractures are sericite filled (also sericite partings on joints). 1\%-2\% dusty and fine grained disseminated pyrite. End of Hole.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 M3\% | From | To |  | Sample |  |

265.00283 .00 NA massive

VW265.00 283.00 VW

- Vw
fractures are sericite filled (also sericite partings on joints).
265.0a83.00 1.5 DIS
\%-2\% dusty and fine grained disseminated pyrite.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | AK | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 ${ }^{\text {M3\% }}$ | From | To | Sample |
| 0.00 | 12.19 | NA |  |  | 0.00 | 2.19 | - | - - - |  | - | - | 0.00 | 12.19 | 0 |  |  |  |  |  |  |  |  |  |


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 12.19 | 17.10 | GMDS |  |

Black intensely graphitic mudstone. Foliated at 80 TCA. Very minor carbonate veining. $0.25 \%$ pyrite along bedding planes. Lower contact in broken core. At 13.30 m to 13.50 m , pale green-grey bleached, massive amygdaloidal basalt with calcite filled amygdales.


| core. |  |  |  |
| :---: | :---: | :---: | :---: |
| From | To | Litho | Simple Geo |
| 17.10 | 18.00 | BSLT |  |

Very pale green-grey amygdaloidal plagioclase phyric basalt. Upper and lower contacts are calcarous over 25 cm . Amygdales are calcite. Plagioclase crystals are up to 3 mm in size, euhedral to anhedral and moderately epidotized. No visible sulphides. Lower contact in broken core


Intensely graphitic, very homogeneous black mudstone. Foliated at 60 to 70 TCA to 148.00 m , and at 70 to 80 TCA to 155.45 m . Riddled with foliation parallel carbonate seams and streaks, and pulled apart and deformed bands. $1 \%-2 \%$ pyrite as foliation parallel wisps, streaks and lamimae. Lower contact in broken core.
40.95 m to 41.10 m : graphitic gouge zone.
118.00 m to 119.50 m : fault zone.


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |
| 155.45 | 176.28 | ASHT |  |

Grey-beige and buff coloured fine grained massive to locally bedded ash tuff, with minor interbedded lapilli tuff near the upper contact and narrow crystal
Guffaceoous interbands throughout. The entire lithology has been largely Fe-carbonate replaced (weak reaction when powdered to HCI). Cut by numerous, thin
(maximum thickness 3 mm ) carbonate veins that are dominantly dolomite, with lesser calcite veins and even more rare quartz-carbonate veins. These veins are
(pseudo-bedding) $3 \%$ pyrite overall, dominantly as coarse crystals and agregates in dolomite veins and as very minor disseminations in the tuff Trace
chalcopyrite. Sharp lower contact at 68 TCA.
chalcopyrite. Sharp lower contact at 68 TCA
158.15 m to 158.55 m : fault gouge and grit.
168.10 m to 170.00 m : Fault brecciated ash tuff with dolomite veining more pervasive. Intense annealed breccia from 168.30 m to 168.60 m .

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 M3\% | From | To | Sample |
| 155.45 | 58.15 | NA |  | W |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



| From | To | Litho | Simple Geo |
| :--- | :---: | :---: | :---: |
| $\mathbf{1 7 6 . 2 8}$ | $\mathbf{1 8 8 . 3 1}$ | LLTF |  |
| $\begin{array}{l}\text { Medium grey, transitioning to a turquoise green, siliceous/silicified lapilli tuff with minor interbedded ash tuff within upper } 50 \mathrm{~cm} \text {. Bedding at } 60 \text { TCA. Sericite } \\ \text { partings occur to } 184.0 \mathrm{~m} \text {, and decrease in frequency with depth. Below this, the LLTF is silicified. Lapilli are typically cloudy-white-grey and siliceous } \\ \text { (chert/rhyolite?). } 4 \% \text { pyrite overall as unevenly spaced bedding parallel coarse bands. Sharp lower contact at } 64 \text { TCA, and chloritic wisps noted over basal }\end{array}$ |  |  |  | (chert/rhyolite?). $4 \%$ pyrite overall as unevenly spaced bedding parallel coarse bands. Sharp lower contact at 64 TCA, and chloritic wisps noted over basal 10 cm , consistent with the underlying lithology.



Medium green, fine grained, massive moderately chloritic mafic dyke. Lower contact appears chilled, and xenolith of lower unit noted. $10 \%$ coarse pyrite occurs within 5 cm of the upper contact. $2 \%-3 \%$ cpy occurs as irregular seams associated with dolomite in very narrow fractures, centered at 188.70 m . Overall $5 \%$ withinse pyrite. Sharp lower contact at 66 TCA.

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  |  | SAMPLES |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 | M3\% | From | To |  |

$188.31 \quad 188.96$
Medium green, fine grained, massive moderately chloritic mafic dyke. Lower contact appears chilled, and xenolith of lower unit noted. $10 \%$ coarse pyrite occurs .


| From | To | Litho | Simple Geo |
| :---: | :---: | :---: | :---: |

Turquoise green silicified/siliceous lapilli tuff as per 176.28 m to 188.31 m , but sericitization is virtually absent. Crude bedding at 55 to 65 TCA. Minor chlortic and pyritic interbedded ash tuff from 203.93 m to 204.25 m . Lapiiii are exclusvily lensoidal to egg-shaped, cloudy grey-white and practically $100 \%$ silica. Overall, $3 \%$ $4 \%$ pyrite as uneven bedding-parallel bands and seams, and as lesser disseminations. Sharp lower contact at 55 TCA.



Pale turquoise green silic/silicified lapilli tuff with minor ash tuff interbeds as per 188.96 m to 208.28 m . Weak sericite alteration as sporadic partings. Bedding at 48 to 56 TCA. Trace pyrite. Lower contact in broken core

| STRUCTURES |  |  |  |  | ALTERATION |  |  |  |  |  |  | MINERALIZATION |  |  |  |  |  |  |  |  | SAMPLES |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| From | To | Struct | CA | Strain | From | To | INT | CC DO | SR | $A K$ | SC | From | To | PY\% | Style | Min | Min\% | Min2 | M2\% | Min3 M3\% | From | To | Sample |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 208.71 |  | 211.13 | $I$ | I 134350 |

```
208.71 220.76 BD 51 VW
    Bedding at 48 to 56 TCA.
                208.71 220.77 W - - W
                Weak sericite alteartion as sporadic partings.
\begin{tabular}{llll}
211.13 & 213.54 & \(\boldsymbol{I}\) & 134351 \\
213.54 & 215.95 & \(\boldsymbol{I}\) & 134352 \\
215.95 & 218.36 & \(\boldsymbol{I}\) & 134353
\end{tabular}
 LTPB

Pale to medium grey, crudely bedded, locally in situ brecciated pyrite banded lapilli tuff with minor interbedded ash tuff. Upper contact demarcated by
gradational colour change from the turquoise green of the upper LLTF, to the grey colour of this LTPB. Also in situ brecciation not prominent in the upper LLTF.
Brecciation appears to occur within what may be siliceous bands, or very large lapilli that are larger than core diameter. Bedding parallels foliation at 52 to 62
wisps between 231 m to 252 m and 262.5 m to 294.26 m . Sulphide content is variable, with the highest concentration of \(7 \%\) to \(9 \%\) pyrite occuring between
239.20 m and 270.90 m . Elsewhere the average content is \(3 \%-4 \%\) pyrite. The purite occurs as heavily disseminated and aggregate pyrite, wispy fine to medium
grained banded pyrite and as semi-massive bands up to 3 cm thick. The pyrite occurs preferentially in silicified/siliceous bands as opposed to sericitic alteration.
Lower contact sharp at 45 TCA.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{5}{|c|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & \multicolumn{3}{|c|}{Sample} \\
\hline & & & & & & & & & & & & \multicolumn{11}{|r|}{\[
220.77
\]} & 220.77 & I & 134355 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 220.77 & 223.22 & I & 134356 \\
\hline
\end{tabular}
```

$220.77 \quad 228.00$ M - - M
moderate silicification and moderate sericitization

```
220.7239.20 3 LB
220.77 294.25 FOL 57 W Bedding parallels foliation at 52 to 62 TCA
\begin{tabular}{llll}
223.22 & 225.67 & \(\boldsymbol{I}\) & 134357 \\
225.67 & 228.12 & \(\boldsymbol{I}\) & 134358 \\
& & & \\
& & & \\
228.12 & 230.57 & \(\boldsymbol{I}\) & 134359 \\
230.57 & 233.02 & I & 134360
\end{tabular}



295.74295 .75 CT 30 VW
\begin{tabular}{c|c|c|c}
\multicolumn{5}{c|}{ Lower contact at 30 TCA } & \\
\hline From & To & Litho & Simple Geo \\
295.75 & 306.20 & LTPB &
\end{tabular}

Light grey lapilli tuff with pyrite bands, genearlly as per 220.77 m to 294.26 m , but with waning pyrite content. Foliation at 56 to 62 TCA. Moderately silicified weakly sericitized, moderate Fe-carbonate alteration as wisps paralleling foliation. Overall \(3 \%\) pyrite as bands, disseminations and fracture fills. Lower contact at 64 TCA.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{5}{|c|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 \({ }^{\text {M3\% }}\) & From & To & \multicolumn{3}{|c|}{Sample} \\
\hline & & & & & & & & & & & & \multicolumn{11}{|r|}{\[
295.75
\]} & 295.75 & \(I\) & 134392 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 295.75 & 298.01 & I & 134393 \\
\hline
\end{tabular}
295.75 306.19 FOL 58 VW

Foliation at 56 to 62 TCA.
295.75306 .20 M - - W - M Moderately silicified, weakly sericitized, moderate Fe carbonate alteration as wisps paralleling foliation.
295.7306.20 3 FF
\(3 \%\) pyrite as bands, disseminations and fracture fills.
\begin{tabular}{llll}
298.01 & 300.32 & \(\boldsymbol{I}\) & 134394 \\
300.32 & 302.63 & \(\boldsymbol{I}\) & 134395 \\
302.63 & 304.94 & \(\boldsymbol{I}\) & 134396 \\
304.94 & 306.20 & \(\boldsymbol{I}\) & 134397
\end{tabular}
306.19306 .20 CT 64 VW

Lower contact at 64 TCA.

307.95307 .96 CT 65 VW

Sharp lower contact at 65
\begin{tabular}{ccc|c|}
\hline From & To & Litho & Simple Geo \\
\hline 307.96 & 309.93 & LTPB & \\
\hline
\end{tabular}

Pale to light grey lapilli tiff with pyrite bands as per 295.75 m to 306.20 m . Almost looks like a rhyolite, but can discern rare lapilli. Generally massive and siliceous with very weak sericite as occasional partings. \(2 \%\) fracture-controlled pyrite. Lower contact bleached and at 53 TCA

309.92309 .93 CT 53 VW Lower contact bleached and at 53 TCA.

324.68324 .69 CT 51 VW

Lower contact sharp and
chilled at 51 TCA.
\begin{tabular}{|c|c|c|c|}
\hline \multicolumn{2}{c|}{ From } & To & Litho \\
\hline 324.69 & 330.00 & RHYL & Simple Geo \\
\hline
\end{tabular}

Waxy green, massive, aphanitic rhyolite. Pervasive carbonate veining with coarse epidite noted within 1.3 m of upper contact. Otherwise a featureless lithology \(1 \%-2 \%\) fine grained disseminated pyrite. End of Hole.



Pale grey, massive rhyolite. Faint feldspar(?) crystals occur sporadically. Minor sericite altered ash tuff interbeds noted. Core is extremely rubbly. \(0.1 \%\) disseminated pyrite. Lower contact in broken core.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & Sample \\
\hline \multicolumn{24}{|l|}{63.40 68.99 NA VW} \\
\hline \multicolumn{24}{|c|}{63.4069 .00 - - - - - 63.4069 .00 0.1 DIS} \\
\hline
\end{tabular}
\(68.99 \quad 69.00\) CT VW
Lower contact in broken
\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 69.00 & 73.22 & FXAT & \\
\hline
\end{tabular}

Medium charcoal grey, strongly foliated feldspar crystal ash tuff. Foliation at 45 to 55 TCA down to 72.80 m , steepening to 82 TCA to lower contact. Matrix is
moderately to strongly sericitic, with minor chlorite, and sporadic sericite schist bands occur infrequently. Feldspar crystals are white and stretched parallel to foliation. Very rare foliation parallel quartz veins (less than 2 cm thick) noted. Trace pyrite overall. Lower contact in broken core
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline STRUCTURES & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{10}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline \begin{tabular}{|c|c|c|l|l|l|}
\hline & \\
From & To & Struct & CA & Strain \\
\hline
\end{tabular} & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & & & Min3 & M3\% & From & To & Sample \\
\hline \multicolumn{21}{|l|}{\(69.00 \quad 72.80\) FOL 50 M} \\
\hline Foliation at 45 to 55 TCA. & \multicolumn{7}{|l|}{\(69.00 \quad 73.22 \mathrm{M}\) - - M - moderately sericitic, weak chlorite alteration.} & \multicolumn{4}{|l|}{69.0073 .220 .05 DIS trace disseminated pyrite.} & & & & & & & & & \\
\hline \[
\begin{gathered}
72.80 \quad 73.21 \text { FOL } 82 \mathrm{M} \\
\text { Foliation at } 82 \text { TCA. }
\end{gathered}
\] & & & & & & & & & & & & & & & & & & & & \\
\hline \[
\begin{aligned}
& 73.21 \quad 73.22 \quad \text { CT M } \\
& \text { Lower contact in broken }
\end{aligned}
\] core. & & & & & & & & & & & & & & & & & & & & \\
\hline
\end{tabular}

\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 75.10 & 85.00 & FQXT & \\
\hline
\end{tabular}

Medium charcoal grey feldspar quartz crystal tuff, with minor interflow rhyolite. Foliation at 35 TCA. The matrix is as per the FXAT at 69.00 m to 73.22 m . This FQXT is less intensely foliated, with less stretched plagioclase crystals, and with \(3 \%-4 \%\) rounded, 1 mm - 2 mm glassy grey quartz crystals. Rhyolite interflows noted between 80.05 m and 80.45 m . Trace disseminated pyrite. Lower contact in broken core.


Dark grey, aphanitic, plagioclase porphyritic rhyolite, with interbedded feldspar quartz crystal tuff. Core is highly broken over this interval, and recoveries are very poor (as low as \(25 \%\) ). Sericitic gouge adhering to some core, especially at lower contact, suggests this is a fault. \(0.1 \%\) fracture controlled pyrite. Lower contact in extremely rubbled core.

85.00 101.49 FLT S
fault gouge with moderate sericitic and clay gouge
(recovery as low as \(25 \%\) )
Wednesday, April 25, 2012
\(85.00 \quad 101.50\)
Dark grey, aphanitic, plagioclase porphyritic rhyolite, with interbedded feldspar quartz crystal tuff. Core is highly broken over this interval, and recoveries are very in extremely rubbled core.

\(101.49101 .50 \quad\) CT
Lower contact in extremely
\begin{tabular}{|c|c|c|c|}
\hline \multicolumn{8}{c|}{ rubbled core. } \\
\hline From & To & Litho & Simple Geo \\
\hline 101.50 & 105.00 & FXTF & \\
\hline
\end{tabular}

Light to medium grey feldspar crystal tuff. Foliated at 60 TCA, but less intense deformation than in previous FXTF. Weakly to moderately sericitic. \(1 \%-2 \%\) pyrite
filling fractures. Lower contact in broken core.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{10}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 & M3\% & From & To & Sample \\
\hline
\end{tabular}
\(101.50 \quad 104.99\) FOL 60 W
Foliated at 60 TCA
\(101.50 \quad 105.00 \mathrm{~W}-\quad-\quad \mathrm{W}\)
Weakly to moderately sericitic
101.5005.00 1.5 FF
\(1 \%-2 \%\) pyrite filling fractures.
104.99 105.00 CT W

Lower contact in broken
\begin{tabular}{cc|c|c}
\multicolumn{2}{c}{ core. } \\
\hline From & To & Litho & Simple Geo \\
105.00 & 106.68 & BSLT &
\end{tabular}

Massive bleached and hematized amygdaloidal basalt. Amygdales appear to be dolomite. Upper and lower contacts are intensely bleached to a beige-yellow. Core of the basalt is intensely hematized. No visible sulphides. Lower contact in broken core.


\begin{tabular}{|cc|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 110.78 & 111.73 & ASHT &
\end{tabular}

Bedded ash tuff. Pea soup coloured; appears to be due to incipient and ubiquitous dolomitization. Bedding at 45 TCA. No visible sulphides. Sharp lower contact at 70 TCA.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|l|}{\multirow[t]{2}{*}{}} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & & & & & & & & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 M3\% & From & To & Sample \\
\hline \multicolumn{23}{|l|}{110.78 111.72 BD 45 W} \\
\hline \multicolumn{23}{|c|}{Bedded at 45 TCA.} \\
\hline & & & & & 0.78 & . 73 & & S & & & - & 110.78 & 11.7 & & - & & & & & & & \\
\hline \multicolumn{12}{|c|}{incipient and ubiquitous dolomitization.} & \multicolumn{11}{|l|}{No visible sulphides.} \\
\hline \multicolumn{22}{|l|}{\multirow[t]{2}{*}{\begin{tabular}{l}
111.72111 .73 CT 70 W \\
Sharp lower contact at 70
\end{tabular}}} & \\
\hline & & & & & & & & & & & & & & & & & & & & & & \\
\hline
\end{tabular}
Sharp lower contact at 70
\begin{tabular}{|ccc|c|}
\hline From & To & Litho & Simple Geo \\
\hline 111.73 & 134.50 & RHYL &
\end{tabular}

Massive feldspar quartz porphyritic rhyolite as per 108.49 m to 110.78 m with interflow dolomitized ash tuff. Aphanitic, aphyric and cream-coloured rhyolite flows
noted from 118.4 m to the lower contact. Minor interflow feldspar-quartz and feldspar crystal tuff and dolomitized ash tuff noted between 114.50 m and 117.60 m,
and feldspar crystal tuff interbeds are noted from 121.89 m to 123.90 . Within these intervals, weakly sheared variant of the rhyolite also occurs. Sericite
alteration is weak, occuring as sporadic coatings and partings. Overall, \(0.25 \%\) disseminated and streaky pyrite. Lower contact sharp at 55 TCA.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 M3\% & From & To & Sample \\
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|}
\hline From & To & Struct & CA \\
Strain \\
\hline 111.73 & 134.49 & NA & W \\
\hline
\end{tabular}
massive
111.73134 .50 W - - W -
weak sericite alteration as partings weak sericite alteration as partings
134.49134 .50 CT 55 W

Lower contact sharp at 55
\begin{tabular}{c|c|c|c}
\multicolumn{2}{c|}{ TCA. } & & \\
\hline From & To & Litho & Simple Geo \\
134.50 & 147.74 & FXTF &
\end{tabular}

Medium charcoal grey, moderately sericitized well foliated feldspar crystal tuff with minor interbedded rhyolite and ash tuff. The rhyolite occurs as a crushed zone within the FXTF, probably a brittle response to shearing that induced a foliation in the FXTF. Foliated at 45 TCA. The ash tuff occurs as a single, intensely sericitized and pyritic bed at 144.0 to 144.40 m . \(3 \%\) pyrite overall, occuring almost entirely of discrete semi-massive bands up to 3 cm thick, and otherwise as very fine disseminations. Bleached over basal 75 cm to lower contact, which is sharp at 45 TCA.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{5}{|c|}{SAMPLES} \\
\hline From & To & Struct & & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2 \% }}\) & Min3 M3\% & From & To & \multicolumn{3}{|c|}{Sample} \\
\hline & & & & & & & & & & & & & & & & & & & & \multicolumn{2}{|r|}{134.50} & 136.71 & & \(\begin{array}{ll}\text { I } & 134408\end{array}\) \\
\hline
\end{tabular}
\begin{tabular}{cc|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 134.50 & 147.74 & FXTF & \\
\hline
\end{tabular}

Medium charcoal grey, moderately sericitized well foliated feldspar crystal tuff with minor interbedded rhyolite and ash tuff. The rhyolite occurs as a crushed zone within the FXTF, probably a brittle response to shearing that induced a foliation in the FXTF. Foliated at 45 TCA. The ash tuff occurs as a single, intensely sericitized and pyritic bed at 144.0 to 144.40 m . \(3 \%\) pyrite overall, occuring almost entirely of discrete semi-massive bands up to 3 cm thick, and otherwise as very fine disseminations. Bleached over basal 75 cm to lower contact, which is sharp at 45 TCA.

147.73 147.74 CT 45 M
lower contact sharp at 45
\begin{tabular}{|c|c|}
\multicolumn{2}{c|}{ TCA. } \\
\hline From & To \\
\hline 147.74 & 202.30
\end{tabular}

Mottled light and dark grey, massive locally flow banded and auto-brecciated, aphyric rhyolite flow, with minor interbedded dolomitized ash tuff and crystal tuff.
Sporadic quartz and quartz-carbonate veins and clots are common throughout. Fluoromuscovite noted at \(183.92 \mathrm{~m}, 184.03 \mathrm{~m}\) and 184.36 m . Flow-banding with
localized autobrecciation is more prominent than massive intervals down to 177.50 m . Below this, the rhyolite is more massive. \(5 \%-7 \%\) pyrite overall, dominamtly
as bedded semi-massive bands (maximum 10 cm thick) massive bands (maximum 2 cm thick) anastamosing fracture-controlled bands, and very fine
disseminations. Lower contact sharp at 57 TCA
180.00 m to 180.70 m : Clay rich breccia/gouge fault zone
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|l|}{\multirow[t]{2}{*}{STRUCTURES}} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{5}{|c|}{SAMPLES} \\
\hline From & & & & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & & Sample & \\
\hline & & & & & & & & & & & & & & & & & & & & & & 147.74 & 149.77 & I & \(\begin{array}{ll}\text { I } & 134415\end{array}\) \\
\hline
\end{tabular}

Mottled light and dark grey, massive locally flow banded and auto-brecciated, aphyric rhyolite flow, with minor interbedded dolomitized ash tuff and crystal tuft Sporadic quartz and quartz-carbonate veins and clots are common throughout. Fluoromuscovite noted at \(183.92 \mathrm{~m}, 184.03 \mathrm{~m}\) and 184.36 m . Flow-banding with localized autobrecciation is more prominent than massive intervals down to 177.50 m . Below this, the rhyolite is more massive. \(5 \%-7 \%\) pyrite overall, dominamtly as bedded semi-massive bands (maximum 10 cm thick) massive bands (maximum 2 cm thick) anastamosing fracture-controlled bands, and very fine disseminations. Lower contact sharp at 57 TCA
180.00 m to 180.70 m : Clay rich breccia/gouge fault zone

\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{\[
\begin{gathered}
\hline \text { From } \\
\hline 147.74
\end{gathered}
\]}} & & & & \multicolumn{7}{|l|}{} & Simple Geo & \multicolumn{13}{|c|}{\multirow[b]{2}{*}{(Continued from previous page)}} \\
\hline & & 202 & . 30 & & \multicolumn{7}{|c|}{RHYL} & & & & & & & & & & & & & & \\
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{8}{|c|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{5}{|c|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 M3\% & From & To & & Sample & \\
\hline \multicolumn{26}{|l|}{\(177.50 \underset{\text { massive }}{180.00 \text { NA }} \quad\) VW} \\
\hline & & & & & & & & & & & & & & & & & & & & & & 178.50 & 178.50 & \(I\) & 134432 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 178.50 & 180.80 & \(I\) & 134433 \\
\hline \multicolumn{26}{|l|}{\begin{tabular}{l}
180.00180 .70 FLT \\
Clay rich breccia/gouge fault zone
\end{tabular}} \\
\hline \multicolumn{26}{|l|}{180.70 202.29 NA massive} \\
\hline & & & & & & & & & & & & & & & & & & & & & & 180.80 & 182.80 & \(I\) & 134434 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 182.80 & 184.80 & \(I\) & 134435 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 184.80 & 186.80 & \(I\) & 134436 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 186.80 & 188.80 & \(I\) & 134437 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 188.80 & 190.80 & \(I\) & 134438 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 190.80 & 190.80 & \(I\) & 134439 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 190.80 & 192.80 & \(I\) & 134440 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 192.80 & 194.80 & \(I\) & 134441 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 194.80 & 196.50 & I & 134442 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 196.50 & 198.50 & \(I\) & 134443 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 198.50 & 201.00 & I & 134444 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 201.00 & 202.30 & \(I\) & 134445 \\
\hline \multicolumn{26}{|l|}{\begin{tabular}{l}
202.29 202.30 CT 57 \\
Lower contact at 57 TCA.
\end{tabular}} \\
\hline
\end{tabular}



Dolomitized and sericitized ash tuff. Dolomitized from 212.82 m to 213.53 m , and sericitized from 213.53 m to the lower contact. Foliated at 50 to 56 TCA. Trace disseminated pyrite. Sharp lower contact at 50 TCA.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{10}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 & M3\% & From & To & Sample \\
\hline \multicolumn{25}{|c|}{\[
\begin{aligned}
& 212.82213 .53 \mathrm{M}-\mathrm{M}-\cdots- \\
& \text { moderately dolomitized. }
\end{aligned}
\]} \\
\hline
\end{tabular}
212.82 214.29 FOL 53 VW

Foliated at 50 to 56 TCA.


Pale grey massive aphanitic rhyolite with minor dolomitized ash tuff and sericitized ash tuff interbeds within the upper contact from 215.70 m to 217.30 m .
Random hairline fractures are common throughout. Very weak sericite as partings on joint surfaces. Small faults with minor gouge noted at 232.15 m to
233.15 m , and at 245.38 m to 245.70 m . From 244.75 m to 246.42 m , slightly darker grey and weakly brecciated with \(2 \%-3 \%\) pyrite along fractures. Otherwise,
overall pyrite content is \(0.5 \%\) as disseminations. Lower contact sharp at 75 TCA.

246.42251 .11 FOL 45
\[
\text { Foliation at } 45 \text { TCA. }
\]
\begin{tabular}{cc|c|c|}
\hline From & To & Litho & Simple Geo \\
246.42 & 251.26 & ASHT &
\end{tabular}

Pale straw yellow, intensely sericitized ash tuff-essentially sericite schist with minor interflow rhyolite. Foliation at 45 TCA. Minor quartz veining noted. Trace disseminated pyrite. Lower contact in fault gouge.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{8}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC & DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 M3\% & From & To & Sample \\
\hline \multicolumn{5}{|l|}{} & \multicolumn{8}{|l|}{intensely sericitized} & \multicolumn{11}{|l|}{246.4251.26 0.05 DIS trace disseminated pyrite.} \\
\hline
\end{tabular}

\section*{\begin{tabular}{c}
251.11251 .26 FLT \\
\multicolumn{2}{c}{ Lower contact in fault }
\end{tabular} \\ > Lower contact in fault}
\begin{tabular}{|c|c|}
\hline \multicolumn{2}{c}{ gouge. } \\
\hline From & To \\
\hline 251.26 & 254.26
\end{tabular}

Litho Simple Geo

Brownish moderately dolomitized crudely bedded feldspar crystal tuff Bedding parallels foliation at 45 to 53 TCA Very weak hematite-chlorite alteration noted Fe-carbonate wisps parallel to foliation common. Trace disseminated pyrite. Slightly gradational lower contact.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 M2\% & Min3 M3\% & From & To & Sample \\
\hline
\end{tabular}
251.26 254.25 FOL 49 VW foliation at 45 to 53 TCA.

251.2854.26 0.05 DIS
254.25 254.26 CT VW

Slightly gradational lower

\begin{tabular}{|c|c|c|l|}
\hline From & To & Litho & Simple Geo \\
\hline 254.26 & 263.20 & BSLT & \\
\hline
\end{tabular}

Medium to dark green, massive chloritized basalt. Riddled with regularly spaced, regularly oriented Fe-carbonate laminations and wisps, exploiting joint planes and lending an overall "pseudo-fabric" to a massive rock type. Very weak epidote alteration. From 259.80 m to 260.35 m , intensely dolomitized and bleached basalt(?). Unit is also intensely bleached and shattered (the core) over basal meter. Trace disseminated pyrite overall. Lower contact in broken core.


\section*{Lower contact in broken}
\begin{tabular}{|cc|c|c|}
\multicolumn{2}{c}{ core. } & & \\
\hline From & To & Litho & Simple Geo \\
\hline 263.20 & 265.33 & DYKE &
\end{tabular}

Maroon coloured, massive hematite altered feldspar porphyry. Euhedral but rare plagioclase laths indicate intrusive. Groundmass is intensely hematized. Two sections of intensely bleached dyke (?) noted. Upper and lower contacts are drab grey-beige and bleached. No visible sulphides. Lower contact in broken core.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{8}{|c|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & & Strain & From & To & INT & CC DO & SR & AK & SC & & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & Sample \\
\hline \multicolumn{17}{|l|}{\(263.20 \underset{\text { massive }}{265.32 \mathrm{NA}} \mathrm{VW}\)} & & & & & & & & \\
\hline \multicolumn{5}{|l|}{\[
\begin{aligned}
& 265.32265 .33 \quad \text { CT } \quad \mathrm{M} \\
& \text { Lower contact in broken } \\
& \text { core. } \\
& \hline
\end{aligned}
\]} & & & & & & & & & & & & & & & & & & & & \\
\hline \multicolumn{5}{|c|}{From To} & \multicolumn{8}{|c|}{Litho} & \multicolumn{12}{|c|}{Simple Geo} \\
\hline \multicolumn{5}{|c|}{\(265.33 \quad 306.00\)} & \multicolumn{8}{|c|}{BSLT} & & & & & & & & & & & & \\
\hline \multicolumn{25}{|l|}{Medium green, massive fine grained chloritic basalt. Quite homogeneous with nothing to suggest that this is a tuff. In fact slightly coarser intervals exhibit euhedral to subhedral 1 mm to 1.5 mm plagioclase laths. Mottled appaerance due to ubiquitous patchy epidote alteration. Upper 60 cm is bleached somewhat banded and dolomitized. Entire unit is riddled with irregular but sporadic carbonate veins and patches, and very rare milky quartz veins. Very weak hematite, occuring on only very rare fractures. Trace disseminated pyrite. End of Hole} \\
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{8}{|c|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & & From & & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & Sample \\
\hline \multicolumn{3}{|l|}{265.33 306.00 NA massive} & \multicolumn{8}{|r|}{VW265.33 306.00 M moderately chloritized and epidotized.} & \multicolumn{2}{|l|}{-} & \multicolumn{4}{|l|}{265.3306.00 0.05 DIS race disseminated pyrite.} & & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{cc}
\hline From & To \\
\hline 0.00 & 6.52 \\
Overburden - cased.
\end{tabular}

Overburden - cased.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 \({ }^{\text {M3\% }}\) & From & To & Sample \\
\hline 0.00 & 6.52 & NA & & & 0.00 & 6.52 & - & - - - & - & - & - & 0.00 & 6.52 & 0 & - & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{ccc|c|}
\hline From & To & Litho & Simple Geo \\
6.52 & 90.00 & QXTF & TUFF \\
\hline
\end{tabular}

Quartz Crystal Tuff. Coarse grained. Locally quartz-crowded. Quartz crystals range up to 1 cm across. Strong chloritic alteration at top of hole with local bands of overprinted bleaching and hematization. Many distinctive, thin intercalated layers of coarse ash tuff \(15.27 \mathrm{~m}-16.05 \mathrm{~m}\). Hematitic alteration dominates below 16 m . Then weak epidote alteration is overprinted below 24 m . Rare thin \((<1.5 \mathrm{~cm})\) bull quartz veins at random angles. Moderate epidote alteration below 31 m ; strong epidote flooding below 34 m - core looks lime green. Rare dark green fine-grained lithic chips. Epidote alteration is strong enough to partially obscure quartz crystals (but the rock is all the same). Dark green fine-grained lithic clasts are more abundant below 55 m . Dark green groundmass is locally bleached to a pale yellow colour. Below 66 m lithic clasts and ash tuff intercalations are more abundant so it starts to look like an intercalated lithological contact. Below 66 m
irregular pinkish-white quartz veins are \(8 \%\) of rock
No significant pyrite noted until 73m
Oxidizing groundwater has percolated along a fracture at 12 m depth
Minor fault break at 50.5 m . Another at 52.8 m .
Below 66 m this is an intercalated unit of thin beds of quartz crystal tuff and coarse ash tuff (a gradational contact). Variably altered. Dark green lithic clasts
(lapilli) are more common.
Fault from 80.42 to 82.00 m . Wallrock is oxidized.
Fine pyrite as disseminations, wisps, seams, lamellae below 86.0 m . And unit is still mixed LLTF and QXTF - intercalated.
Pyrite content increases below 86 to locally reach \(10 \%\) of rock by 95 m . Occurs as seams and bands of fine pyrite


Chlorite
6.5286 .00 0.1 DIS
\(6.52 \quad 90.00\) BD 45
many intercalated ash tuff
beds
\begin{tabular}{ccc}
\begin{tabular}{cc}
16.05 & 24.00 \\
Hematite & W \\
24.00 & 31.00 \\
Epidote
\end{tabular} & W
\end{tabular}
16.0524 .00 W
\(4.00 \quad 31.00\) W
Epidote

\begin{tabular}{ccc|c}
\hline From & To & \(\square\) Litho & Simple Geo \\
99.50 & 108.00 & ASHT & \\
\hline
\end{tabular}

Bleached ash tuff with scattered lens-shaped lapilli. \(2 \%\) py overall. 20 cm of fault gouge from \(102.45-102.65 \mathrm{~m}\). 10 cm wide bull quartz vein at 102.10 m . Unit is overprinted by fine white carbonate knots. Is this clast-poor Lithic Lapilli Tuff?


\section*{From To \(\quad\) Litho \(\quad\) Simple Geo \\ 108.00115 .50 ASHT}

Fine ash tuff with rare scattered small lapilli (clast-poor LLTF?). Rock is meduim green, chloritic. \(1 \%\) py overall with an 8 mm band of fine pyrite at 108.51 m . 8 cm of fault gouge from \(113.12 \mathrm{~m}-113.20 \mathrm{~m}\).

\begin{tabular}{ccccc}
\hline From & To & Litho & Simple Geo \\
115.50 & 183.00 & LTPB &
\end{tabular}

Bleached, altered lapilli tuff. Pyritic. This may be the same lithology as surrounding strata but the lapilli stand out more clearly due to the bleaching. Repeating thin bands of this same alteration down to 118.50 m . Variably sericitized; variably silicified; variably pyritized. Abundance of lapilli clasts ranges from rare to clast
crowded ( \(>50 \%\) ). Rare, thin fine ash interbeds
Massive white bull quartz vein from 121.34 to 126.68 m with selvages and screens of pyritized, bedded-but-swirled, wallrock
Bedding is mostly planar but shows local weak crenulation proximal to the bull quartz vein.
Below 127.00 m rock resembles classic white LTPB with shotgun pyrite. Rare trace chalcopyrite along some pyritic lamellae/wisps. From \(134 \mathrm{~m}-136 \mathrm{~m}\) rock is
\(40 \%\) pyrite, but usually in the range of \(10 \%\) - \(15 \%\) pyrite.
信
veriably silicified 'crushed chert" appearance to 149 m where bleaching lessens and rock becomes weakly chloritized
From 136 m to 151 m pyrite averages \(6 \%\). Locally well preserved lens-shaped lapilli show the rock texture before silica flooding.
Bedding at 70 deg TCA at 150 m .
Silicified band from \(151 \mathrm{~m}-152 \mathrm{~m}\) with \(10 \%\) pyrite as seams and bands.
\(152 \mathrm{~m}-156.75 \mathrm{~m}\) dominantly moderately chloritic LLTF with local bleached \& silicified horizons/zones. 3\% pyrite
Silicified band from \(156.75 \mathrm{~m}-157.7 \mathrm{~m}\) with \(20 \%\) pyrite as seams and bands.
\(157.7 \mathrm{~m}-160.15 \mathrm{~m}\) dominantly moderately chloritic LLTF with local bleached and silicified horizons/zones. \(3 \%\) pyrite
\(160.15 \mathrm{~m}-173.0 \mathrm{~m}\) strongly silicified Lithic Lapilli Tuff - resembles crushed chert. \(12 \%\) py. Local moderately chloritic horizons
\(173.0 \mathrm{~m}-183.00 \mathrm{~m}\) Medium green moderately chloritic crowded lapilli tuff \(2.5 \%\) pyrite. Local silcified zones.

\begin{tabular}{llllllll}
115.80 & 183.00 & BD 70 & \begin{tabular}{l}
\(115.80 \quad 183.00\) \\
\end{tabular} \\
\begin{tabular}{l} 
Alternating zones of strong silica and chlorite \\
alteration. Variably pyritic
\end{tabular}
\end{tabular}
\(115.8083 .00 \quad 8\) LB
Alternating zones of \(10 \%\) and 3\% pyrite

\begin{tabular}{ccc}
\hline From & To & Litho \\
0.00 & 6.10 & OVBD
\end{tabular}

Simple Geo

Casing/Overburden


Massive medium to dark green, massive quartz crystal tuff. Variably chlorite-epidote altered as noted. Hematite alteration observed between 48.35 m to 64.70 m Massive medium to dark green, massive quartz crystal tuff. Variably chlorite-epidote altered as noted. Hematite alteration observed between 48.35 m to 64.70 m
only. This is typical QXTF, with \(12-14 \%\) overall rounded blue to grey quartz crystals, up to 6 mm in size set in a fine grained variably altered matrix. Rare chloritic and fine grained tuff fragments occur; this has been observed in several drillholes within the QXTF. Moderate quartz veining; these are typically thin, cloudy to
milky and low angle. Overall, trace pyrite, most notably occuring as aggregates with veins or at vein margins. Lower contact sharp at 45 TCA.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{10}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 & M3\% & From & To & Sample \\
\hline \multicolumn{25}{|c|}{\(13.60 \quad 16.50 \mathrm{M}\) moderate chlorite-epidote alteration} \\
\hline 13.60 & \[
\begin{array}{r}
87.29 \\
m
\end{array}
\] & NA
massive & & vw & & & & & & & &  & \[
\begin{aligned}
& 37.30 \\
& \text { te, mo } \\
& \text { at veir }
\end{aligned}
\] & \[
\begin{gathered}
0.05 \\
\text { sst nota } \\
7 \text { marg }
\end{gathered}
\] & WQV ably oc ins. & curin & as ag & gregat & es with & quart & & & & \\
\hline
\end{tabular}

 \(105.36 \quad 105.37\) CT VW
\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 105.37 & 117.10 & FXTF &
\end{tabular}

Medium to light grey, well foliated feldspar crystal tuff. Foliation at 40 to 50 TCA to 113.2 m and at 50 to 70 TCA to 115.5 m , and at 70 to 80 TCA to 117.1 m . Very rare siliceous feldspar crystal tuff lapilli noted. Moderate sericitization and very patchy silicification noted. Moderate Fe-carbonate alteration occurs as foliation parallel lamina and wisps. Apple green fluoromuscovite occurs sporadically. Overall, \(4 \%\) fine grained banded pyrite. Lower contact is a fault contact at 80 TCA

115.50 117.09 FOL 75 W foliated at 70 to 80 TCA
117.09117 .10 CT 80 S faut contact at 80 TCA
\(117.10 \quad 118.98\)
Litho
Intense fault gouge zone. Essentially a crushed, clay-sericite gouge zone probably of the upper FXTF, with sporadic milky white quartz veins interspersed. Aplle green fluoromuscovite/ pyrrophyylite commo. \(2 \%\) pyirte as fine aggregates and occasional coarse (remobilized aggregates) Trace chalcopyrite. Lower contact in broken core.

Lower contact in broken
\begin{tabular}{cccc}
\multicolumn{2}{c}{ core. } & \\
\hline From & To & & Litho \\
118.98 & 119.30 & MSBX
\end{tabular}

\section*{Simple Geo}

Massive sulphide breccia. Composed of \(5-6 \%\) splashy chalcopyrite and \(55 \%\) pyrite in an insitu breccia of silicified lapilli tuff (?) and sulphide fragments. Lower contact gradational.


Lower contact
\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 119.30 & 123.45 & MSPY & \\
\hline
\end{tabular}

Massive Bedded Pyrite with much less chalcopyrite. Bedded at 50TCA. Sulphides occur as very fine sulphide sand to sulphide mud. Locally interstital silica-very
minor carbonate occurs. Moderately pitted from 120.20 m to 122.87 m . Occasional splashes within the interstial silica-carbonate, and dominantly as sulphoide
mud mixed with pyrite. Overall, \(4-5 \%\) chacopyrite and \(75 \%\) pyrite. Sharp lower contact at 80 TCA.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{5}{|c|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & & Sample & \\
\hline & & & & & & & & & & & & & & & & & & & & & & 119.30 & 119.30 & I & 134458 \\
\hline & & & & & & & & & & & & & & & & & & & & & & 119.30 & 120.35 & I & 134459 \\
\hline
\end{tabular}

Massive Bedded Pyrite with much less chalcopyrite. Bedded at 50TCA. Sulphides occur as very fine sulphide sand to sulphide mud. Locally interstital silica-very minor carbonate occurs. Moderately pitted from 120.20 m to 122.87 m . Occasional splashes within the interstial silica-carbonate, and dominantly as sulphoide mud mixed with pyrite. Overall, \(4-5 \%\) chacopyrite and \(75 \%\) pyrite. Sharp lower contact at 80 TCA.

123.44123 .45 CT 80 VW Sharp lower contact at 80
\begin{tabular}{ccc|c|c|}
\hline \multicolumn{2}{c|}{ TCA. } & & Simple Geo \\
\hline From & To & Litho & Sit & \\
\hline 123.45 & \(\mathbf{1 2 5 . 7 2}\) & FXTF &
\end{tabular}

Light grey to grey-beige foliated feldspar crystal tuff. Foliation at 60 TCA. Plag crystals are generally milky to cloudy grey-white and moderately elongate parallel to foliation. Moderately sericitized with common Fe-carbonate wisps and laminae. Tuffaceous with some lapilli and lithic fragments occuring over basal 50 cm . 1 \(2 \%\) fine disseminated pyrite. Lower contact sharp at 60 TCA.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{10}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 & M3\% & From & To & \\
\hline
\end{tabular}
```

.45 125.71 FOL 60 W

```
    Foliation at 60 TCA.
123.45 125.72 M W - M - - W

Moderately sericitized with common Fe-carbonate wisps and laminae.
123.4525.72 1.5 DIS

1-2\% fine disseminated pyrite.
```

125.71 125.72 CT 60 W
Lower contact sharp at 60
TCA.

```

Medium to dark grey, foliated and silicified lapilli tuff with pyrite bands. Foliation at 48 to 60 TCA. Silicification is moderate, with variable and generally weak sericite alteration. Weak to moderate Fe-carbonate laminae occur from 137.00 m to 150.40 m . Alteration wanes towards lower contact, which is sharp at 58 TCA
\(12 \%\) pyrite as bands, laminations and heavy disseminations. Trace chalcopyrite (from one low angle fracture controlled band centered at 132.70 m .
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{10}{|c|}{MINERALIZATION} & \multicolumn{5}{|c|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT| & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 & M3\% & From & To & \multicolumn{3}{|c|}{Sample} \\
\hline & & & & & & & & & & & & & & & & & & & & & & \multicolumn{2}{|r|}{125.72} & 127.99 & \(I\) & \(\begin{array}{ll}\text { I } & 134466\end{array}\) \\
\hline
\end{tabular}

\section*{\(\begin{array}{ll}125.72 & 137.00 \mathrm{M}\end{array}\) \\ moderate silicification, very weak sericitization}
125.72 144.50 FOL 54 W Foliation at 48 to 60 TCA.

\subsection*{125.7250.40 12 LB}
\(12 \%\) pyrite as bands, laminations and heavy disseminations. Trace chalcopyrite.
\begin{tabular}{llll}
127.99 & 130.03 & \(\boldsymbol{I}\) & 134467 \\
130.03 & 130.03 & \(\boldsymbol{I}\) & 134468 \\
130.03 & 132.07 & \(\boldsymbol{I}\) & 134469 \\
132.07 & 134.11 & \(\boldsymbol{I}\) & 134470 \\
134.11 & 136.15 & I & 134471 \\
136.15 & 138.19 & I & 134472
\end{tabular}
\(137.00 \quad 150.40 \mathrm{M}\) - - VW - - W
moderate silicification, very weak sericitization weak
to moderate Fe-carbonate alteration.
\begin{tabular}{llll}
138.19 & 138.19 & \(\boldsymbol{I}\) & 134473 \\
138.19 & 140.23 & \(\boldsymbol{I}\) & 134474 \\
140.23 & 142.27 & \(\boldsymbol{I}\) & 134475 \\
142.27 & 144.31 & \(\boldsymbol{I}\) & 134476 \\
144.31 & 146.34 & \(\boldsymbol{I}\) & 134477 \\
& & & \\
& & & \\
& & &
\end{tabular}

Wednesday, April 25, 2012
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline & & & \(\bigcirc\) & & \multicolumn{7}{|c|}{Litho} & Simple Geo & \multicolumn{8}{|r|}{\multirow[b]{2}{*}{(Continued from previous page)}} & & & & \\
\hline \multicolumn{2}{|r|}{125.72} & \multicolumn{3}{|l|}{150.40} & \multicolumn{7}{|c|}{LTPB} & & & & & & & & & & & & & \\
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & Sample \\
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|c|}
\hline \multicolumn{4}{|c|}{ STRUCTURES } \\
\hline From & To & Struct & CA & \\
\hline 150.39 & 150.40 & CT & 58 \\
Lower contact sharp at
\end{tabular}
Lower contact sharp at 58
\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 150.40 & 174.00 & LLTF & \\
\hline
\end{tabular}

Medium green, moderately chloritized, weakly sericitized, bedded lapilli tuff. Bedding at 50 to 56 TCA. Lapilli are either lensoidal to egg-shaped, cloudy grey and
siliceous/silicified, or larger tan coloured, altered ash tuff. Remnant hydrothermal alteration (ie patches of LTPB) occur sporadically. Sericite alteration is weak to moderate, exhibited as frequent partings. Overall, \(3-4 \%\) pyrite as foliation parallel bands and laminations, and rarely as envelopes of lapilli.10\% chacopyrite over 10 cm from 164.90 m to 165.00 m , occuring as anastamosing bands within siliceous lapilli tuff. End of Hole.

\begin{tabular}{ccc}
\hline From & To & Litho \\
0.00 & 6.10 & OVBD \\
Casing/Overburden &
\end{tabular}

Simple Geo

Casing/Overburden
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & Sample \\
\hline 0.00 & 6.10 & NA & & & 0.00 & 6.10 & - & - - - & - & - & - & 0.00 & 6.10 & 0 & & & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 6.10 & 18.75 & QXTF & \\
\hline
\end{tabular}
lower contact. Composed of \(10 \%\)-12\% rounded to sub-rounded blue quartz crystals up to 5 mm in size set in a fine grained variably altered tuffaceous matrix. Weakly fractured, with minor groundwater oxidation over upper 12 meters. Trace pyrite. Lower contact sharp at 25 TCA.


Massive medium grained, plagioclase porphyritic mafic dyke. Groundmass is moderately chloritized, plagioclase are epidotized. No chill margins but veining at
the upper contact is clearly truncated. No visible sulphides. Lower contact sharp at 35 TCA.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 M3\% & From & To & Sample \\
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|c|}
\hline From & To & Struct & CA & Strain \\
\hline 18.75 & 19.08 NA & VW \\
& massive
\end{tabular}
\(18.7519 .09 \quad 0\)
No visible sulphides.
\begin{tabular}{ccc|c}
\hline From & To & Litho & Simple Geo \\
\hline 18.75 & 19.09 & DYKE & \\
\hline
\end{tabular}

Massive medium grained, plagioclase porphyritic mafic dyke. Groundmass is moderately chloritized, plagioclase are epidotized. No chill margins but veining at the upper contact is clearly truncated. No visible sulphides. Lower contact sharp at 35 TCA.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & Sample \\
\hline \multicolumn{5}{|l|}{\multirow[t]{2}{*}{19.0819 .09 CT 35 VW Lower contact sharp at 35 TCA.}} & & & & & & & & & & & & & & & & & & & \\
\hline & & & & & & & & & & & & & & & & & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 19.09 & 20.54 & QXTF & \\
\hline
\end{tabular}

Brick-red weakly hematized and epidotized massive quartz crystal tuff. No visible sulphides. Lower contact at 75 TCA
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 \({ }^{\text {M3\% }}\) & From & To & Sample \\
\hline \multirow[t]{4}{*}{19.09} & \multicolumn{4}{|l|}{\multirow[t]{2}{*}{20.53 NA VW
massive}} & & & & & & & & & & & & & & & & & & \\
\hline & & & & & & & & & & & & & & & & & & & & & & \\
\hline & & & & \multicolumn{2}{|r|}{19.09} & 20.54 & \multirow[t]{2}{*}{W} & \multirow[t]{2}{*}{tite alter} & \multirow[t]{2}{*}{ration} & \multicolumn{2}{|l|}{\multirow[t]{2}{*}{- -}} & \multicolumn{2}{|l|}{19.0920 .54} & 0 & \multirow[t]{2}{*}{-} & \multirow[t]{2}{*}{} & & & & & & \\
\hline & & & & & \multicolumn{2}{|l|}{weak epidote-hematite alteration} & & & & & & \multicolumn{3}{|l|}{No visible sulphides.} & & & & & & & & \\
\hline
\end{tabular}
\(20.53 \quad 20.54\) CT VW
\begin{tabular}{c|c|c|c}
\multicolumn{8}{l}{ Lower contact at 75 TCA. } & Simple Geo \\
\hline From & To & Litho & Simp
\end{tabular}
matic dyke as per 18.75 m to 19.09 m . Multipe dykes, with slivers of the OXTF occuring at 21.30 m to \(21.57 \mathrm{~m}, 22.15 \mathrm{~m}\) to 22.43 m and 23.20 m to
23.49 m . Plagioclase crystals are slightly larger (thicker dyke) and strongly epidotized. No visible sulphides. Lower contact slightly chilled at 65 TCA.




解 \(0.25 \%\) disseminated pyrite. From 94.49 m to 100.28 m , the QXTF is completely obliterated/disrupted by carbonate flooding (essentially a hydraulic breccia) tha
have a dominant orientation
Lower contact gradational.


Lower contact gradational.

\section*{From To \\ \(100.28 \quad 126.84\)}

Litho FXTF

Simple Geo

Strongly altered, foliated feldspar crystal tuff with minor interbedded ash tuff. Foliation at 45 to 55 TCA. Alteration is moderate to strong sericitization, patchy
silicification, moderate Fe-carbonate as foliation parallel laminae, and sporadic fluoromuscovite. Milky barren quartz vein occurs at 121.95 m to 122.70 m . From
silicification, moderate Fe-carbonate as foliation parallel laminae, and sporadic fluoromuscovite. Milky barren quartz vein occurs at 121.95 m to 122.70 m . Frate
123.00 m to 126.84 m , alteration consists additionally of a very soft grey, translucent slippery mineral that imparts an overall mottled texture. Overall pyrite
content is \(6 \%\) with pyrite occuring as irregular fine grained bands and as semi-massive bands up to 6 cm thick. Lower contact sharp at 48 TCA.
123.73 m to 126.84 m : Over this interval, unit is kinked and highly deformed. Chalcopyrite occurs as coarse rmobilized knots and fracture filles both within the

FXTF and in milky quartz veins that weave in and out of core axis. Coarse bornite blebs noted in one such vein from 125.06 m to 125.15 m . Overall, \(3-4 \%\)
chalcopyrite, \(0.1 \%\) bornite and \(3 \%\) pyrite.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{5}{|c|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & & pple & \\
\hline & & & & & & & & & & & & & & & & & & & & & & 100.28 & 102.50 & I & 134484 \\
\hline \multicolumn{26}{|c|}{100.2823.73 6 LB} \\
\hline
\end{tabular}

Strongly altered, foliated feldspar crystal tuff with minor interbedded ash tuff. Foliation at 45 to 55 TCA. Alteration is moderate to strong sericitization, patchy silicification, moderate Fe-carbonate as foliation parallel laminae, and sporadic fluoromuscovite. Milky barren quartz vein occurs at 121.95 m to 122.70 m . From 123.00 m to 126.84 m , alteration consists additionally of a very soft grey, translucent slippery mineral that imparts an overall mottled texture. Overall pyrite content is \(6 \%\) with pyrite occuring as irregular fine grained bands and as semi-massive bands up to 6 cm thick. Lower contact sharp at 48 TCA
123.73 m to 126.84 m : Over this interval, unit is kinked and highly deformed. Chalcopyrite occurs as coarse rmobilized knots and fracture filles both within the FXTF and in milky quartz veins that weave in and out of core axis. Coarse bornite blebs noted in one such vein from 125.06 m to 125.15 m . Overall, \(3-4 \%\) chalcopyrite, \(0.1 \%\) bornite and \(3 \%\) pyrite.


\begin{tabular}{ccc|c}
\hline From & To & \(\square\) Litho & Simple Geo \\
\hline 129.00 & 131.16 & MSPY & \\
\hline
\end{tabular}

Bedded massive pyrite. Bedding at 60 to 65 TCA. Overall, \(5 \%-6 \%\) chalcopyrite (mostly from a single cpy-rich band from 130.30 m to 130.45 m ) and \(70 \%\) pyrite Gradational lower contact.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{5}{|c|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 M2\% & Min3 M3\% & From & To & \multicolumn{3}{|c|}{Sample} \\
\hline & & & & & & & & & & & & & & & & & & & & \multicolumn{2}{|r|}{129.00} & 130.08 & I & I 134503 \\
\hline
\end{tabular}
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129.00 131.15 BD 63 VW
Bedding at 60 to 65 TCA
$129.00 \quad 131.16 \quad-\quad-$
no significant alteration

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129.0031.16 70 MS 5.5

5 -6\% chalcopyrite (mostly from a single cpy-rich band from 130.30 m to 130.45 m ) and \(70 \%\) pyrite.

\author{
\(\begin{array}{llll}130.08 & 131.16 & I & 134504\end{array}\)
}
131.15131 .16 CT VW
Gradational lower contact.

\section*{\begin{tabular}{c|c} 
From & To \\
\hline 131.16 & 131.97
\end{tabular}}

Litho
MSBX
Massive sulphide breccia, consisting of coarse remobilzed chalcopyrite and pyrite in a silica rich matrix spotted with dolomite crystals. 6 cm quartz vin with coarse pyrite and fluoromuscovite occurs centered at 131.32 m . The basal 22 cm of this unit is comprised of coarse networked chalcopyrite in a well foliated schistose tuffaceous lithology. The chalcopyrite overall occurs as anasatmosing and ragged clots, braids and splashes exploiting fractures. Overall, \(10 \%\) chalcopyrite and \(25 \%\) pyrite. Sharp lower contact at 80 TCA

131.96131 .97 CT 80 W

Sharp lower contact at 80
TCA.


Light turquoise green bedded lapilli tuff. Bedding at 50 to 56 TCA. Weak to sericite alteration, except where waning hydrothermal alteration results in more intense sericitization and pyritization. Overall, \(1 \%-2 \%\) pyrite, concentrated in the narrow LTPB bands. End of Hole.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{8}{|r|}{ALTERATION} & \multicolumn{10}{|c|}{MINERALIZATION} & \multicolumn{3}{|c|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC & DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 & & From & To & Sample \\
\hline \[
\begin{array}{r}
143.91 \\
b 6
\end{array}
\] & 53. & \[
\begin{aligned}
& 0 \quad \mathrm{BD} \\
& t 50 \text { to } 55
\end{aligned}
\] & \[
\begin{gathered}
53 \\
5 \mathrm{TC}
\end{gathered}
\] & \begin{tabular}{l}
VW1 \\
A.
\end{tabular} & overa & . 00 & W & - & - W & & & & \multicolumn{13}{|l|}{143.9153 .00 1.5 LB} \\
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 0.00 & 6.10 & OVBD & \\
\hline
\end{tabular}

Overburden - casing


Strongly altered, weakly pyritic Lapilli Tuff. Strong sericite and sparse fluoromuscovite alteration. \(5 \%\) pyrite overall as bands and blebs. Rock is coarse, clast-
rich lapilli tuff.
Bedding or foliation at 59 deg TCA at 96.5 m .
There are still many thin quartz-crystal-rich layers within this unit, so the QXTF / LLTF contact is complexly intercalated.

\begin{tabular}{ccc|c}
\hline From & To & \(\square\) Litho & Simple Geo \\
\hline 89.00 & 98.60 & LTPB & \\
\hline
\end{tabular}

Strongly altered, weakly pyritic Lapilli Tuff. Strong sericite and sparse fluoromuscovite alteration. \(5 \%\) pyrite overall as bands and blebs. Rock is coarse, clast rich lapilli tuff.
Bedding or foliation at 59 deg TCA at 96.5 m .
There are still many thin quartz-crystal-rich layers within this unit, so the QXTF / LLTF contact is complexly intercalated.


Fine ash tuff. Medium green. With rare dark lapilli and abundantly speckled with fine overprinted carbonate knots (some workers have logged this unit a feldspar crystal tuff, but the white grains are spaced equidistant - so no crystal sorting).

\begin{tabular}{ccc|c|}
\hline From & To & Litho & Simple Geo \\
\hline 107.60 & 114.00 & LTPB & \\
\hline
\end{tabular}

Pale, strongly silicified, moderately sericitized, weakly pyritized lapilli tuff. Resembles a silicieous exhalite unit, but we can still identify the original lithology Paper thin partings lined by sericite and lesser buff-orange ferro-dolomite. Some large lapilli clasts are evident. But there are bands within this unit that are so strongly silcified that they resemble chert. 0.5 to \(1 \%\) disseminated pyrite throughout.

\begin{tabular}{ccc|c|}
\hline From & To & Litho & Simple Geo \\
\hline 114.00 & 119.10 & ASHT &
\end{tabular}

Medium green fine ash tuff. Dotted with fine speckled dolomite knots.
Bedding at 58 deg TCA
Core becomes partially sericitized and crumbly towards base of unit.
No lapilli noted.



\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 0.00 & 24.00 & OVBD & \\
\hline
\end{tabular}

Overburden. 2 m of tumbled rubble recovered.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 \({ }^{\text {M3\% }}\) & From & To & Sample \\
\hline 0.00 & 24.00 & NA & & & 0.00 & 4.00 & - & - - - & - & - & - & 0.00 & 24.00 & 0 & - & & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{ccc|c|}
\hline From & To & Litho & Simple Geo \\
24.00 & 74.00 & LTPB & TUFF
\end{tabular}

Strongly altered lapillit tuff. Silicified and pyritized.
This is classic footwall rock to the Main deposit. This drillhole may have been collared too deep in the stratigraphy (too far south in the valley).
Weak fluoromuscovite alteration from 24 m to 30.5 m - this could be very intense sercite or mixed sericite-chlorite alteration (colour is not quite vibrant enough for fluoromica).
Coarse lapilli tuff with overprinted silica flooding, granular pyrite beds, bands and seams, and giant knots (up to 4 cm across) of pale-buff weathering ferro-
dolomite rhombs and aggregates of coarse rhombs.
Local semi-massive pyritic bands, up to 10 cm thick, but overall pyrite content averages \(5 \%\) to 37 m .
Bedding at 60 deg TCA grey to light grey to 85 m .
Over some sections, lapilli are absent or altered beyond recognition; other sections are strongly silicified and resemble crackled chert. All altered rocks have
overprinted bands of pyrite.
Foliation at 60 m 65 TCA.
Below 47 m rock begins to break up like Paper Schist; intensity increases with depth.
Trace blebs of bright chalcopyrite within a 15 cm -thick semi-massive pyrite bed at 45 m .
Another interval of palest sea-foam green sericite alteration from 54 m to 64 m , then back into white silicified core, breaking into thin discs
Faulted zone from 56.5 m to 63 m .
Fault at 68 m to 72 m ; major crush and gouge zone, with 2 m screen of semi-intact Paper Schist within.



Ash tuff. Fine to coarse - mainly thin-bedded fine ash tuff. Overprinted by strong and variable alteration: silica, sericite, chlorite, ferro-dolomite and pyrite
Approximate (gradational) upper and lower contacts.
Strongly bleached and palest grey to bone-coloured to 85 m , then progressively more chloritized until rock becomes dark green colour by 87 m . Strong chlorite
alteration persists to 103 m . Variable pyrite as wisps, disseminations, laminae and beds or bands of semi-massive pyrite up to 15 cm thick. Local coarse euhedral pyrite cubes overprinted as vell.
Below 92 m , scattered, coarse \((1 \mathrm{~cm})\) euhedral dolomite rhombs develop in the rock.


\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 102.00 & 114.00 & LTPB & \\
\hline
\end{tabular}

Lapili tuff. Strongly altered with overprinted silica, sericite and pyrite.
Ferro-dolomite present as coarse rhombs and as thin, fine, pale buff-peach laminae.
Bedding at 70 TCA at 111 m .
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{5}{|c|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 M2\% & Min3 M3\% & From & To & \multicolumn{3}{|c|}{Sample} \\
\hline & & & & & & & & & & & & & & & & & & & & \multicolumn{2}{|r|}{102.00} & 104.00 & & \(\begin{array}{ll}\text { I } & 135665\end{array}\) \\
\hline
\end{tabular}
\begin{tabular}{llll}
104.00 & 106.00 & \(\boldsymbol{I}\) & 135666 \\
106.00 & 108.00 & \(\boldsymbol{I}\) & 135667
\end{tabular}


\begin{tabular}{cc|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 157.73 & 192.00 & LTPB & TUFF \\
\hline
\end{tabular}

Lapilli tuff. Strongly bleached; weakly pyritic
Strongly silicified, weakly to moderately sericitized.
\(2.5 \%\) pyrite overall.
Bedding at 73 TCA at 174 m .
Trace chalcopyrite and sphalerite at 173.28 m
Trace chalcopyrite and sphalerite at 173.28 m .
Overprinted large cream-coloured dolomite rhombs or knots with blurred outlines developed below 170 m and reach \(15 \%\) to \(20 \%\) of rock by 192 m .


\begin{tabular}{ccc|c}
\hline From & To & Litho & Simple Geo \\
126.84 & 131.20 & ASHT & \\
\hline
\end{tabular}

Interbedded ash and limestone. Reworked fine felsic ash tuff and thin carbonate laminae. This is a finely intercalated transition unit which must be Late Triassic in age (same age as the limestone). Fine ash is pale lime green colour (weakly epidotized) - so fine it looks like greenish-yellow mud laminae. One intact 8 cm thick limestone bed. \(1 \%\) to \(1.5 \%\) fine pyrite as disseminations and thin laminae
Sharp upper and lower contacts.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & \begin{tabular}{l|l|} 
INT & \(C\) \\
\hline
\end{tabular} & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 M3\% & From & To & Sample \\
\hline 126.84 & 31.20 & 0 BD & 85 & & . 84 & 1.20 & W W & & - & - & & 126.84 & 31.20 & 1.5 & DIS & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{2}{|r|}{From} & & To & & \multicolumn{7}{|c|}{Litho} & \multicolumn{2}{|l|}{Simple Geo} & & & & & & & & & & & \\
\hline \multicolumn{2}{|r|}{131.20} & 132 & 2.31 & & \multicolumn{7}{|c|}{QXTF} & & & & & & & & & & & & & \\
\hline \multicolumn{25}{|l|}{Fine-grained quartz crystal tuff. Crystal-crowded. Pale grey-green. Bedding at 74 deg TCA.} \\
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{8}{|c|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{3}{|c|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & Sample \\
\hline 131.20 & 32.3 & 31 BD & 74 & & 1.20 & 31 & M & M & & M & & & 131.20 & 32.31 & 10 & & & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{cc|c|c}
\hline From & To & & Sitho \\
132.31 & 146.98 & ASLT & Simple Geo
\end{tabular}

Mixed fine ash tuff and lapilli tuff. Overall light to medium greyish green. A strongly bleached and sericitized interval from 143.5 m to 145.4 m
Distinctly pyrite-free with one thin pyrite lamina at 145.40 m
Bedding ranges from 62 to 80 deg TCA - averages 75 TCA
Rock is intermediate to felsic (?) composition lapilli tuff - possibly even an altered mafic ash \& lapilli tuff
Lapilli clasts vary from mafic to bull quartz.
Upper part of this unit has a strong reaction to acid - many thin carbonate laminae - indicating ash depositing in a basin that is also accumulating carbonate mud.

\begin{tabular}{ccc|c|}
\hline From & To & Litho & Simple Geo \\
146.98 & 179.42 & ASHT &
\end{tabular}

Mafic coarse ash tuff. Dark green to medium greenish grey colour. Moderately to strongly chloritic.
Bedding averages 76 deg TCA to 173.0 m
At 150.4 m there is 23 cm of interbedded chert and jasper.
Weak to moderate reaction to acid everywhere. This is not overprinted carbonate alteration; this is coarse mafic ash accumulating in a basin that is also
accumulating carbonate mud.
One thin bed of fine felsic lapilli tuff from 175.16 m to 176.41 m .
\(0.5 \%\) fine brigh disseminated to 177.

\begin{tabular}{ccc|c|c} 
\\
\hline From & To & Litho & Simple Geo \\
\(\mathbf{1 7 9 . 4 2}\) & \(\mathbf{1 8 6 . 4 1}\) & LLTF &
\end{tabular}

Pale green felsic lithic lapilli tuff. Clast-crowded. Heterolithic felsic clasts. Weak sericite alteration. No pyrite noted.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{8}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & & DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 M3\% & From & To & Sample \\
\hline 179.42 & 86.41 & BD & 76 & & 9.42 & 6.41 & W & - & - W & - & - & - & \multicolumn{3}{|l|}{179.4286 .410} & - & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 186.41 & 188.21 & VSLT & \\
\hline
\end{tabular}

Buff-brown tuffaceous siltstone. Thin bedded / finely bedded at 77 TCA. Scattered fine fragments. Sharp upper and lower contacts. No pyrite noted. Fine ferrodolomite alteration (?)


Light grey felsic lapilli tuff. Crowded clasts of heterolithic felsic debris. Similar to overlying unit 2 m up-section. Large rhyolite porphyry clasts. Bedding at 70 TCA. No pyrite noted. No reaction to acid
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 M2\% & Min3 M3\% & From & To & Sample \\
\hline 188.21 & 91.76 & BD & 70 & & 21 & 76 & W & & & W & & 188.2 & 1. & 60 & & & & & & & & \\
\hline
\end{tabular}

Wednesday, April 25, 2012
\begin{tabular}{cc|c|c}
\hline From & To & Litho & Simple Geo \\
\hline 191.76 & 210.00 & ASHT & \\
\hline
\end{tabular}

Coarse mafic ash tuff. Medium to dark grey. Bedding at 71 TCA. No pyrite noted. Fine scattered ferro-dolomite flecks overprinted throughout. Scattered bull quartz veins from 199 m to 202 m
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{10}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 & M3\% & From & To & Sample \\
\hline 191.76 & 210.00 & BD & 71 & & 1.76 & . 00 & W & W & - & - & - & 191.7 & 10.00 & 0 & - & & & & & & & & & \\
\hline
\end{tabular}


Mafic coarse ash tuff. Faintly medium-bedded. Bedding at 60 TCA. No pyrite noted. Fine overprinted buff ferro-dolomite flecks throughout. Scattered bull quartz veins 214 m to 218 m .


Felsic lithic lapilli tuff. Distinctly thin-bedded and well bedded. Clast-crowded; highly siliceous clasts only. Bedding at 50 TCA. No pyrite noted
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 M3\% & From & To & Sample \\
\hline 226.14 & 30.86 & BD & 50 & & 14 & 0.86 & W & - & - & W & & 226.1 & 30.86 & 0 & & & & & & & & \\
\hline
\end{tabular}


Thin-bedded, coarse mafic ash tuff. Medium green-grey. \(1.5 \%\) pyrite overall as wisps and thin lamellae. Bedding at 53 deg TCA. Moderate chlorite alteration throughout; a few local thin ash beds are calcite-flooded. Abrupt upper contact against narrow fault.
throughout; a few local thing
Bedding 56 deg at 259 m .

\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 260.47 & 264.40 & CHRT & \\
\hline
\end{tabular}

Thin chert beds with interbedded mafic ash tuff. Pyritic.
Thin-bedded throughout. Bedding at 52 deg TCA. Local gently folded beds.
Fault / crush zone from 261.25 m to 261.75 m .
Pyrite as thin lamellae averaging 3\%; locally bands up to \(5 \%\) pyrite.


\section*{From To Litho \(\quad\) Simple Geo \\ \(275.54 \quad 340.49\) RHYL}

Rhyolite flow. Strongly flow-banded; resembles bedded chert. Vari-coloured and vari-textured throughout. Weak sericite and pyrite throughout.
Bedding 48 TCA at \(275 \mathrm{~m} ; 48\) TCA at \(305 \mathrm{~m} ; 55\) TCA at 324 m . Pyrite \(1 \%\) to \(2 \%\); averaging \(1.5 \%\) overall. Pyrite occurs as disseminations; but not in
concentrations along thin sericite planes between flow-bands.
One 2 mm -thick laminae of grey sphalerite at 293.7 m .
Rock colour ranges from pure white to translucent to pale green to locally medium waxy green and rare faint pinkish tint.
Alteration is thic ash tuff at 317.7 m .
都
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 M3\% & From & To & Sample \\
\hline 275.54 & 05.00 & BD & 48 & & & & & & & & & & & & & & & & & & & & \\
\hline
\end{tabular}
\[
275.54340 .49 \mathrm{~W}-\mathrm{W} \text { W - S }
\]
305.00327 .00 BD 55
327.00332 .80 BD 52
332.80 335.25 FLTZ

Major fault zone.
Wednesday, April 25, 2012


\begin{tabular}{ccc|c}
\hline From & To & Litho & Simple Geo \\
51.10 & 57.29 & PMDS & PMDS \\
\hline
\end{tabular}

Graphitic Mudstone; pyritic mudstone. Black with many shiny graphitic partings. Highy contorted and buckled, but the pyrite is clearly interbedded and synsedimentary. Thin bedded. \(8 \%\) fine pyrite laminae throughout, with \(30 \%\) pyrite from 52.40 m to 55.00 m .



Feldspar-Quartz Crystal Tuff. 30\% fine feldspar and quartz grains in light grey ash. Crude bedding preserved at 55 TCA
Bull quartz vein with accessory ( \(4 \%\) ) coarse pyrite from 64.10 m to 65.35 m was not assayed due to coresaw problems with bull quartz.
Fault from 65.35 m to 65.74 m . 35 cm of clayey-gritty fault gouge recovered.

\begin{tabular}{lllllllllllllllll}
57.29 & 68.31 & BD & 55 & 57.29 & 68.31 & VW & - & - & - & - & 57.29 & 68.31 & 0.5 & DIS
\end{tabular}


Wednesday, April 25, 2012
\begin{tabular}{|ccc|c|}
\hline From & To & Litho & Simple Geo \\
\hline 70.01 & 75.08 & FXTF & \\
\hline
\end{tabular}

Crowded feldspr-quartz crystal tuff. Light green; crystal-crowded. 2\% pyrite as wisps and laminations. Bedding at 55 TCA.


Mafic ash tuff. Fine-grained. Dark green crudely thin-bedded. Granular appearance is not crystals, but due to overprinted knots of carbonate and then epidote alteration. 0.5 m of fine overprinted hematite alteration around 102 m .
Coarse white lapilli appear below 87.0 m - these are quartz clasts not alteration knots
Bedding at 52 TCA.
Below116m epidote flooding rises to \(30 \%\) of the rock volume, still as overprinted knots.
Bedding at 48 TCA at 132 m . Bedding at 55 TCA at 146 m .
Core is dark green.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 M3\% & From & To & Sample \\
\hline 80.80 & 150.00 & FOL & 52 & & \[
\begin{aligned}
& 0.801 \\
& \text { Chlori }
\end{aligned}
\] & carb & \begin{tabular}{l}
S \\
nate,
\end{tabular} & epidote &  & - &  & 80.80 & 50.00 & 0.2 & DIS & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 0.00 & 12.60 & OVBD & \\
\hline
\end{tabular}

Overburden - Casing
OVBD
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{7}{|r|}{MINERALIZATION} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & \\
\hline 00 & 12.60 & NA & & & 0.00 & 12.60 & - - & & & & & 0.00 & 12.60 & & & & & \\
\hline
\end{tabular}
\begin{tabular}{cc|c|c}
\hline From & To & Litho & Simple Geo \\
\hline 12.60 & 67.82 & QXTF &
\end{tabular}

Quartz Crystall Tuff. Not the classic hangingwall rock. Finer deep blue elongate quartz eyes and even smaller rounded clear quartz-eyes are scattered throughout this unit. Deep blue quartz eyes are almost opaline. Rock is about \(35 \%\) crystals.
Groundmass is thin bedded, moderately bedded fine to coarse ash tuff. Bedding at 45 TCA
Variably altered. Chloritic throughout, with epidote appearing below 26 m , and local bands of hematization.
Core is bleached to light grey below 53 m .
Very fine flat black crystals begin to appear below 57 m , concentration builds to depth but these are always minor ( \(<3 \%\) ) component of rock. Gives this pale
coloured rock a 'granitic' appearance. Looks like biotite, but I think these are mini-knots of hornblende aggregate.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{10}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct \(\mid\) & CA & Strain & From & To & INT & CC DO & SR & \(A K\) & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 & M3\% & From & To & Sample \\
\hline 12.60 & 67.82 & BD & 45 & & 2.60 & 7.82 & M & & & & & 12.60 & 67.82 & 0 & & & & & & & & & & \\
\hline
\end{tabular}


\begin{tabular}{ccc|c}
\hline From & To & Litho & Simple Geo \\
\hline 72.80 & 84.25 & FXTF & \\
\hline
\end{tabular}

Feldspar Crystal Tuff with lesser fine quartz crystals. Bleached and weakly pyritic to 78.15 m . Below this, rock is deep green. Gradational lower contact. Thin-bedded at 55 TCA
1.5\% pyrite and pyrrhotite as fine wisps and thin lamellae.

\begin{tabular}{|c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 84.25 & 93.50 & ASHT & \\
\hline
\end{tabular}

Fine ash tuff. Deep green. Fine minor epidote grains scattered throughout. Gradational and interbedded lower contact.
Bedding at 35 TCA
No pyrite noted.
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{8}{|r|}{ALTERATION} & \multicolumn{9}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC & DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 \({ }^{\text {M }}\) 3\% & From & To & Sample \\
\hline 84.25 & 93.50 & BD & 35 & & 4.25 & . 50 & S & & - - & & - & - & 84.25 & 3.50 & 0 & - & & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{ccc|c|}
\hline From & To & Litho & Simple Geo \\
\hline 93.50 & 102.00 & FXTF & \\
\hline
\end{tabular}

Feldspar Crystal tuff. Similar to overlying unit. Interbedded upper contact. Bedding at 38 TCA. No pyrite noted. EOH at 102.00 m
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{8}{|c|}{MINERALIZATION} & \multicolumn{3}{|r|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 \(\mathrm{M}^{2 \%}\) & Min3 M3\% & From & To & Sample \\
\hline 93.50 & 102.00 & BD & 38 & & \[
\begin{aligned}
& 93.50 \\
& \text { Stron }
\end{aligned}
\] & 2.00 & \[
\mathrm{S}
\] & inor epido & & & & 93.50 & 02.0 & 0 & - & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline & m & To & 0 & & \multicolumn{7}{|c|}{Litho} & Simple Geo & & & & & & & & & & \\
\hline & 00 & 24. & 50 & & \multicolumn{7}{|c|}{OVBD} & & & & & & & & & & & \\
\hline \multicolumn{23}{|c|}{Overburden - casing} \\
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & & \multicolumn{7}{|c|}{MINERALIZATION} & \multicolumn{3}{|c|}{SAMPLES} \\
\hline From & To & Struct & CA & Strain & From & To & INT & CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 \({ }^{\text {M2\% }}\) & Min3 M3\% & From & To & Sample \\
\hline 0.00 & 24.50 & NA & & & 0.00 & & & - - & - & - & - & 0.00 & 24.50 & 0 & & & & & & & & \\
\hline
\end{tabular}
\begin{tabular}{c|c|c|c|}
\hline From & To & Litho & Simple Geo \\
\hline 24.50 & 52.55 & QXTF & \\
\hline
\end{tabular}

Quartz Crystall Tuff. Not the classic hangingwall rock. Finer deep blue elongate quartz eyes and even smaller rounded clear quartz-eyes are scattered throughout this unit. Deep blue quartz eyes are almost opaline. Rock is about \(35 \%\) crystals.
Groundmass is thin bedded, moderately bedded, fine to coarse ash tuff. Bedding at 70 TCA.
Variably altered. Chloritic throughout, with epidote appearing below 26 m , and local bands of hematization
Core is bleached to light grey below 44 m
Very fine flat black crystals begin to appear below 35.5 m , concentration builds to depth, but these are always a minor ( \(<3 \%\) ) component of rock. Gives this pale
coloured rock a 'granitic' appearance. Looks like biotite, but I think these are mini-knots of hornblende aggregate.
No pyrite noted.


Coarse ash tuff. Thin-bedded. Granular. Bleached, pale grey rock.
Bedding at 77 TCA. No pyrite noted
Colour changes to medium to dark grey below 54.83 m Thin chert beds at 52.6 m . Thin black mudstone bed with minor pyrite laminae at 55.25 m . Another thin pyrtic mudstone bed at 55.70 m .
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|c|}
\hline \multicolumn{5}{|c|}{STRUCTURES} & \multicolumn{7}{|r|}{ALTERATION} & \multicolumn{10}{|c|}{MINERALIZATION} & \multicolumn{5}{|c|}{SAMPLES} \\
\hline & To & Struct & CA & & From & To & INT & T CC DO & SR & AK & SC & From & To & PY\% & Style & Min & Min\% & Min2 & M2\% & Min3 & M3\% & From & To & & Sample & \\
\hline 52.55 & 58.40 & BD & 77 & Strain & 52.55 & 58.40 & W & - W - & \multicolumn{2}{|l|}{- -} & - & \multicolumn{15}{|l|}{52.5558 .40 0 -} \\
\hline & & & & & & & & & & & & & & & & & & & & & & & 55.00 & 56.70 & I & 135795 \\
\hline & & & & & & & & & & & & & & & & & & & & & & & 56.70 & 58.40 & I & 135796 \\
\hline
\end{tabular}




\section*{APPENDIX VIII}

\section*{DRILLCORE SAMPLING PROCEDURES}

\section*{Core Processing Duties}

\section*{Assay Sampling}

All the quarter-cut cores are referred to as assay samples and bulk-density measurements need to be found for each sample. This is done by first making a sheet with shipment number, hole number beside; in brackets, and then a chart with W and D (wet and dry weights) in the first two columns, another two columns of W and D for possible overloads (the scale cannot measure anything over approximately 4000 g ), and last a number column for the sample number, and a note column for standards, blanks, and duplicate sample numbers.
With this sheet made you can then begin to measure the dry and wet mass of the samples. Be sure to zero the weight of the sample pan on the scale and the sieve in the water prior to measuring any of the assays. It is also important to change water regularly (cloudy water is denser than clean water which affects measurements), and also to make sure none of the metal hooks are rubbing against the hole in the wood, or the handles of the sive are touching any sides of the SG water bucket. All of these factors lead to inaccurate measurements.

Once all measurements are taken, all data needs to be recorded in the bulk density 89.90.91 document, located in the bulk density folder in KUTCHO GEOTECH folder on the DESKTOP. It is fairly straight-forward how to enter all data since there are many examples of the prior holes above. It is very important to copy and paste the VALUES column since it contains the formula that takes the wet and dry weights to compute the bulk density. All other information needed on that sheet, i.e. to and from, is found by getting the core loggers log (usually just copy and paste whatever hole log onto the computer by a USB stick). When accessing the log, hit OPEN, and then click on "export tables and sheets". Then when the save window pops up cancel saving all other documents such as headers, etc., until "Samples" (the last one) shows up. Save this because this is all the information you will need to copy/paste and export to the bulk density document.
*Important Note* It is easiest to get the core loggers information first, and then set up your sheet so you know which samples are standards, blanks, etc.

When all data has been entered in the computer, and all samples have been accurately measured, all sample bags should be sealed (trying to get as much air out as possible), and then be processed for shipments. There are rice bags which need to have both pending and return addresses on them. As well shipment needs to inked in with "WKM 080 (shipment \#), and as well which bag number of the shipment it is. Lastly on the top left corner of the bag in large print the first sample number needs to be written and then a dash to the last sample. For example: H033123-29. These bags should have around 7 samples, or however many suitable for easy lifting. They are not supposed to be heavy!

Lastly samples need to be consecutive order!!! If samples are out of order, or some samples are missing this needs to be recorded on the sample shipment form!!!!!
To tie off rice bags there are twist ties, security tags, and flagging tape. The first bag should be tied off last since you need to put the shipment form inside. The next paragraph explains the shipment form process, but it is important this form gets sealed in a bag as well and thrown in with the other samples in the first bag. Flagging tape is used to differentiate between shipment numbers, i.e. use different colours for different shipments. Lastly the first bag should always have an orange flagging tape bow along with the other colour chosen for that shipment. This makes it easy for the lab to distinguish the first bag.
Once shipment bags are ready to go, shipment forms need to be filled out. These are located in the sample shipment folder under assays. To start a new shipment form it is easiest to just open the previous shipment change the shipment number to the new one, then click "save as", and change the previous number to the new shipment number. Filling out the forms is fairly straight-forward. Number of samples is usually the difference between the first and last sample numbers plus one.

\section*{Metallurgy Sampling}

The MET samples are all the half cut core samples. These samples need to be completely dry before they are processed for shipments because they need to be purged with nitrogen gas to minimize any oxidation.
Unlike the assay samples no measurements are taken, but a sheet is necessary to jot down bucket number based on all of the buckets that have gone out, bucket number of the shipment, number of bags in bucket, and first and last sample. There are example sheets in the small yellow binder. These are all important in noting since a shipment form is made up for the MET samples too. To find the bucket number of the whole it is easiest to go under the folder sample shipments, then MET folder, and then click on the document labeled "METS". This gives you the last bucket number that went out for what shipment. This also provides the next shipment number.

To prepare buckets for shipments, a garbage bag is slid inside the bucket as a liner. Samples then need to be purged with oxygen prior to being put into the buckets. This is done by sealing the bag almost \(90 \%\) (there is a black mark on the sealer indicating where to line up the bag so it will leave just enough room for the hose to be inserted). Once the bag is sealed the nitrogen hose is inserted and turned on, inflating the bag with air. Squeeze this air out and repeat (i.e. flush the bag twice with nitrogen). Then seal the bag off trying once again to get as much air out as possible. You seal it off by sealing almost at a 45 degree angle to the first almost \(90 \%\) seal. This gives a more effective tight seal. It is important to make sure there are no holes in the bag, and if so you will need to double bag the sample so no oxygen can get in.

Try to fit as many samples as you can in the buckets \(4-5\) is great, but if the samples are large you may only be able to get 3 .

Once bucket is full, loosely tie off the garbage bag, insert nitrogen hose and purge the samples once again and immediately put on the lid. Use the hammer to make sure the lid is on tight.

On the top of lid write down the bucket number based on all buckets shipped out. Also on duct tape write down MET and then sample numbers in the bucket, bucket \(x\) of \(y\) (insert the proper numbers) and last WKM 080 (shipment \#). There is an example on the roof above the sealer. This label goes on the side of the bucket.
Lastly tie flagging tape on the buckets and be sure to put an orange one on the first one.
When the shipment is all ready, update the sample shipment form for METS, and as well the "METS" document which contains the numbers of all the buckets that have been already shipped.

\section*{Other Important Duties}

It is important to update the bulk densities of the rock that is not assayed sampled (i.e. non-mineralized zones), which are measurements the core loggers have collected. You should update this twice a week by just grabbing the core loggers notebook and updating quick. The document is located in the bulk density folder and labeled non-min bulk density.
It is also important to update shipment receipts. This is when a shipment is sent off, ALS CHEMEX sends a receipt with a work order number. VGM or RGW will update your hard-drive with these receipts so you can plug them into the tracking shipment document, located in the shipment receipts folder.
Being prepared is always nice when you have a lot of samples to process for shipments. Things such as writing labels for the tops of the MET samples (with Kutcho Copper's head office), writing return address on rice bags, getting lids ready for the met samples, setting up buckets with garbage bags, are all useful preparation jobs necessary for shipments.

\section*{APPENDIX IX}

\section*{ASSAY RESULTS}

Assay results are presented as an EXCEL table, with 50 columns and 3,343 rows.


















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[^0]:    Lower contact gradational.

[^1]:    243.7051.94 3.5 LB
    $3 \%-4 \%$ stratabound pyrite, mostly as vestiges of the upper

[^2]:    117.77117 .78 CT 43 VW Sharp lower contact at 43 TCA.

[^3]:    $36.60 \quad 37.8$
    LLTF

[^4]:    213.71215 .80 VS - - W - - VS
    weqk to moderate sericitization and silicification,
    intense Fe-carbonate alteration. Lapilli are typically elongate, lensoidal and siliceous.

