University of Alberta

Geochemical Characterization and Fluid History of the Tiger Zone; a Tertiary Distal Carbonate–Replacement Intrusion-Related Gold Deposit, Central Yukon.

by

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ABSTRACT

A paragenetic and geochemical study has resulted in the classification of the Tiger zone as a Tertiary-aged intrusion-related gold deposit. Gold-bearing mineralization occurs in two geochemically and temporally distinct assemblages. The first assemblage contains carbonate-replacement, arsenopyrite-hosted, lattice bound gold deposited from hot (~400 °C), CO_2-rich immiscible magmatic fluids derived from a local intrusive body at depths of ~5 km. The second gold-bearing event contains native gold in fractures associated with bismuth, antimony, silver and tungsten, and may have precipitated from depressurization and/or mixing with cooler, meteoric waters. Mixing of components from the host-rock limestone with Precambrian sediments are demonstrated by carbon, oxygen and strontium isotopes, whereas sulfur and metals originate from a local intrusion. Post-gold monazite aged 58.1 ± 0.9 Ma constrains the minimum age for Tiger zone mineralization. The waning of the magmatic system resulted in the influx of meteoric waters forming post-mineralization calcite veins.

Acknowledgments

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CHAPTER 1 – INTRODUCTION AND GEOLOGY OF THE TIGER ZONE

1.1 Introduction

Gold deposits have formed throughout geologic history from the Archean to Tertiary time and are found in most tectonic environments. Gold-bearing terranes and deposits include oceanic back-arc volcanogenic massive sulphide deposits (VMS) and sedimentary exhalative deposits (SEDEX), oceanic arc and continental arc porphyry and epithermal gold deposits, orogenic gold deposits within collisional zones, continental back-arc extensional epithermal, iron oxide copper gold (IOCG), Carlin-style gold, and continental intrusion related gold deposits (IRGD). Host-rocks in these environments are diverse and include sedimentary (VMS, SEDEX, Carlin-style, IRGD), igneous (VMS, porphyry, epithermal, orogenic, IRGD), and metamorphic (Orogenic, IRGD). As expected with such diversity in age, tectonic setting and host lithologies, there is debate on the source of gold and fluids within these mineralizaing systems. For example in the sediment-hosted Carlin-style deposits of Nevada, mineralization has been ascribed to leaching of metals from sedimentary sources by convecting connate (Large et al., 2011) and meteoric waters (Ilchik and Barton, 1997; Emsbo et al., 2003), epizonal intrusion related sources (Henry and Boden, 1998; Chakurian et al., 2003; Johnston and Ressel, 2004; Muntean et al., 2011), and deeply sourced metamorphic and/or magmatic fluids (Seedorff, 1991; Hofstra and Cline, 2000; Heinrich, 2005). The origin of orogenic gold deposits has also been highly debated; presently they are thought to have formed from devolatilization of felsic magmas or from metamorphic devolatilization at mid- to lower crustal levels (Ridley and Diamond, 2000; Groves et al., 2003). To complicate matters further, ore deposits such as the orogenic and IRGD, may be essentially indistinguishable in terms of tectonic setting, metal associations, mineralization style, wall-rock alteration, and fluid chemistry (Groves et al., 2003). In this case IRGDs are better distinguished by being more distal from cratonic margins, associated with tungsten and tin magmatic provinces, and generally occurring post-deformation (Lang and Baker, 2001; Groves et al., 2003). General geological characteristics, metal associations, and geochemical footprints are clearly not adequate to classify all deposit types where distinct genetic processes may be able to form seemingly identical ores.

The Yukon Territory has a rich history of mining and exploration dating back to the Klondike goldrush in the late 1890s. Currently there are three operating mines,

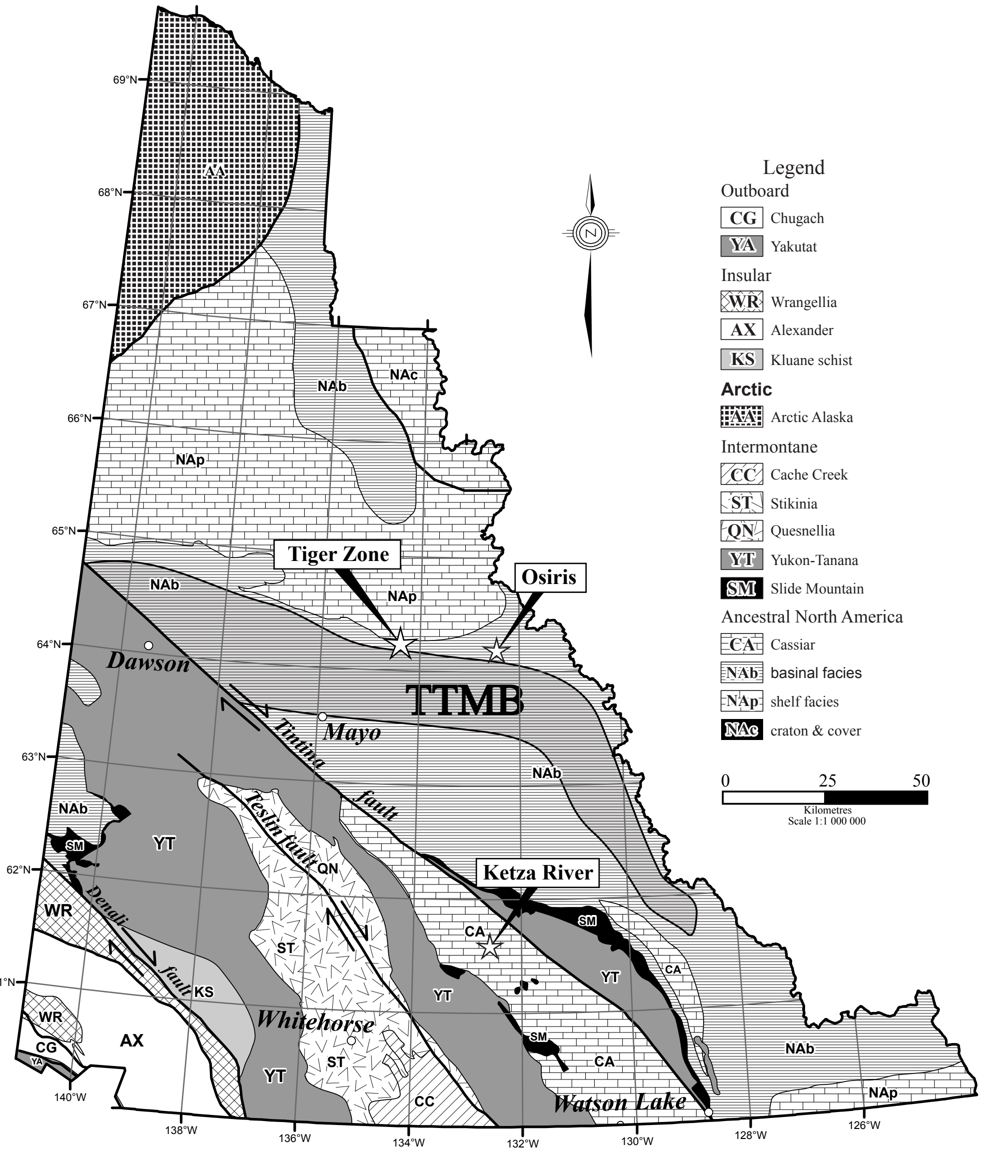


Figure 1. Terrane map of Yukon Territory highlighting the location of the Tiger zone, Osiris and Ketza River carbonate replacement-style deposits (*modified from* Colpron and Nelson, 2011). The shaded area within the Selwyn Basin (TTMB) highlights the location of the Tombstone-Tungsten Magmatic Belt.

and more money spent on exploration, more claims staked, and more claims in good standing than any previous year (MacFarlane, 2012). Gold deposits in the Yukon range from high (Saager and Bianconi, 1971) and low (Duke, 1990) sulphidation epithermal deposits, porphyry deposits (Godwin, 1976), IRGDs (Maloof et al., 2001), polymetallic vein deposits (Sinclair et al., 1980), IOCG deposits (Hunt et al., 2005) and orogenic deposits (Knight et al., 1999) that occur across the northern Cordilleran orogen. In 2010, Carlin-style gold mineralization was discovered within the Selwyn Basin of the Yukon as well (R. Carne, pers. commun., 2010) adding to the diversity of Yukon gold mineralizing systems.

The Tiger zone (Fig. 1) is located in central Yukon, north of the town of Mayo. The deposit is hosted in Paleozoic platform carbonates and is characterized by pervasive strata-bound carbonate-replacement gold mineralization, which manifests as a mineral assemblage of sulphide-carbonate-silicate as well as oxide mineralization. A felsic intrusion subcrops approximately 3 km southeast of the Tiger zone, and is associated with a more proximal zone of tungsten-bearing hornfels as well as pegmatitic and aplitic dikes. An inferred resource estimate for the deposit averages 289 400 ounces gold and the indicated resource is 509 000 ounces gold (Stroshein et al., 2011) making the Tiger zone an intriguing deposit geologically and economically. Only two other carbonate-hosted gold deposits are documented in the Yukon, the past-producing Ketza River oxide gold deposit in southeast Yukon and the Osiris showing 100 km east of the Tiger zone (Fig. 1). Stroshein, (1996) and Fonseca, (1998) have suggested that Ketza River may be an example of a gold-rich, base metal poor manto-type deposit which are oxidized, replacement deposits associated with porphyries, and form at high temperatures (>300˚C) from hydrothermal fluids derived from intrusive rocks, similar to examples in South America and Colorado (Mach and Thompson, 1998; Franchini et al., 2007; Kojima et al., 2009). In contrast, the Osiris deposit is considered analogous to the Carlin-type carbonate-hosted disseminated gold deposits of Nevada (R. Carne, pers. commun., 2010). Because the Tiger zone occurs in platform carbonates proximal to an intrusive body and within a low grade fold and thrust belt cratonward of the main orogenic hinterland, it provides the opportunity to study a gold deposit possibly related to an intrusion, Carlin-style mineralization, or a unique source without the complexities encountered in the more deformed orogenic terranes. Potential deposit analogies are described below.

Carlin-style deposits have host lithologies ranging from thin-bedded pyritic silty carbonates to calcareous shales and carbonaceous limestones with gold hosted in arsenic-rich pyrite overgrowths on earlier sulphides (Arehart, 1996; Cline et al., 2005). Orebody style ranges from fault controlled, to antiformal structural controlled, to reactive host-rock controlled, to controlled by zones of primary porosity. Although the source of gold and transport mechanisms are still debated, ore fluids are generally thought to be low salinity (2 to 3 wt. % NaCl eq.), low temperature (approximately 220 °C), low in CO_2 (<4 mol %) and CH_4 poor (<0.4 mol %) (Cline et al., 2005). Importantly, in Nevada these deposits occur in autochthonous rocks overthrust by correlative allochthonous strata near the margin of faulted and attenuated crystalline basement and is roughly analogous to the location and geology hosting the Tiger zone (Cook and Erdmer, 2005; Colpron, 2007). The deep seated basement faults are suggested to be an important localization factor of ore fluids (Crafford and Grauch, 2002; Grauch et al., 2003; Emsbo et al., 2006).

Intrusion related gold deposits form a distinct class of mineral occurrences first described in the Tintina Gold Province (TGP) of the northern Cordillera of Alaska and the Yukon (Thompson et al., 1999; Lang and Baker, 2001; Hart, 2007), but they have also been suggested to occur elsewhere e.g. Mokrsko (Czech Republic), Salave (Spain), Vasilkovskoe (Kazakstan), Timbarra and Kidson (Australia) and Kori Kollo (Bolivia) (Thompson et al., 1999 and references therein). These gold-bearing systems are commonly, but not exclusively, characterized by sheeted quartz vein systems that are associated with 1) metaluminous, subalkalic felsic to intermediate intrusions, 2) carbonic hydrothermal fluids, 3) a metal assemblage of Bi, W, As, Mo, Te ± Sb ± Au and base metal poor, 4) a reduced ore assemblage of arsenopyrite, pyrrhotite and pyrite and a lack of magnetite, 5) being aerially restricted and having weak hydrothermal alteration halos, 6) a tectonic setting well inboard of convergent plate boundaries, and 7) within magmatic W and Sn provinces (Lang and Baker, 2001). In the northern North American Cordillera these deposits predominantly occur in a belt within the TGP named the Tombstone-Tungsten magmatic belt (TTMB. Fig. 1), southwest of the Tiger zone. The Middle Cretaceous (97 to 90 Ma) TTMB comprises the Tombstone, Mayo and Tungsten intrusive suites (Hart et al., 2004) all of which intrude autochthonous rocks inboard of the accreted allochthonous terranes (Mair et al., 2006b). A volumetrically minor intrusive occurrence, the McQuesten suite with ages of 66.8 to 64.0 Ma, overlap the western TTMB and have not been considered prospective for gold thus far (Murphy, 1997). Examples of Middle Cretaceous IRGDs include Alaska's Fort Knox deposit and the Yukon's Eagle Gold deposit, located at Dublin Gulch, ~50 km southwest of the Tiger zone (Maloof et al., 2001; Stephens et al., 2004; Hart, 2007).

Mineral deposits are typically investigated using first-order field relationships, paragenetic studies, and a plethora of analytical techniques in order to genetically classify them as well as to infer conditions under which the mineralization occurred. This study combines a detailed paragenetic framework coupled with mineralogical data, carbon, oxygen, and sulphur stable isotope compositions, radiogenic strontium isotope compositions, U-Pb age constraints and fluid inclusion microthermometry. The goal of this study is therefore, to geochemically classify the mineralization of the Tiger zone, assess its potential link to the nearby intrusive body, and develop a genetic model in which source of fluids and metals, and depositional processes may be inferred.

1.2 Regional Geology and Tectonic Setting

Early mapping describing the geology of the Tiger zone area involved 1:250 000 scale reconnaissance work by the Geological Survey of Canada (Green, 1972; Blusson, 1978). The Tiger zone is situated in the Jurassic-Cretaceous fold and thrust belt of the northern North American Cordillera comprising autochthonous rocks of the Selwyn Basin and the Mackenzie Platform (Fig. 1) (Abbott et al., 1986).

As described by Gabrielse (1967), the Selwyn Basin is a passive margin succession (shelf, slope and basinal strata) that accumulated on the western border of ancient North America from the Neoproterozoic to Jurassic. Adjacent to the study area, the northwestern Selwyn Basin (Fig. 2) comprises the Hyland Group, Gull Lake Formation, Rabbitkettle Formation, Road River Group, Earn Group and the Keno Hill Quartzite (Fig. 3). Most of the northwestern Selwyn Basin consists of slope to basin facies coarse quartz sandstone, shale and carbonates (Gordey and Anderson, 1993; Murphy, 1997). Sedimentation changed in the Early to Middle Devonian when rifting initiated within the western continental margin of North America forming the Slide Mountain Ocean. This isolated the now parautochthonous Yukon Tanana Terrane (Mair et al., 2006b) from the autochthonous Selwyn Basin (Mortensen, 1992). During this time in the Selwyn Basin the Earn Group was deposited in a series of fault bounded basins developed within a now restricted deep marine setting that formed complex internal stratigraphy (Gordey et al., 1991). This subsidence and subsequent rifting in the Selwyn Basin resulted in episodic volcanism and correlative shale-hosted Pb-Zn deposits (Gordey and Anderson, 1993; Murphy, 1997). Overlying the Earn Group in the northwestern Selwyn Basin are isolated occurrences of Mississippian Keno Hill Quartzite.

Platform carbonates and sediments of the Mackenzie Platform were deposited during the Proterozoic and Paleozoic roughly northeast of the time equivalent Selwyn Basin. Underlying most of the Mackenzie platform are the Proterozoic

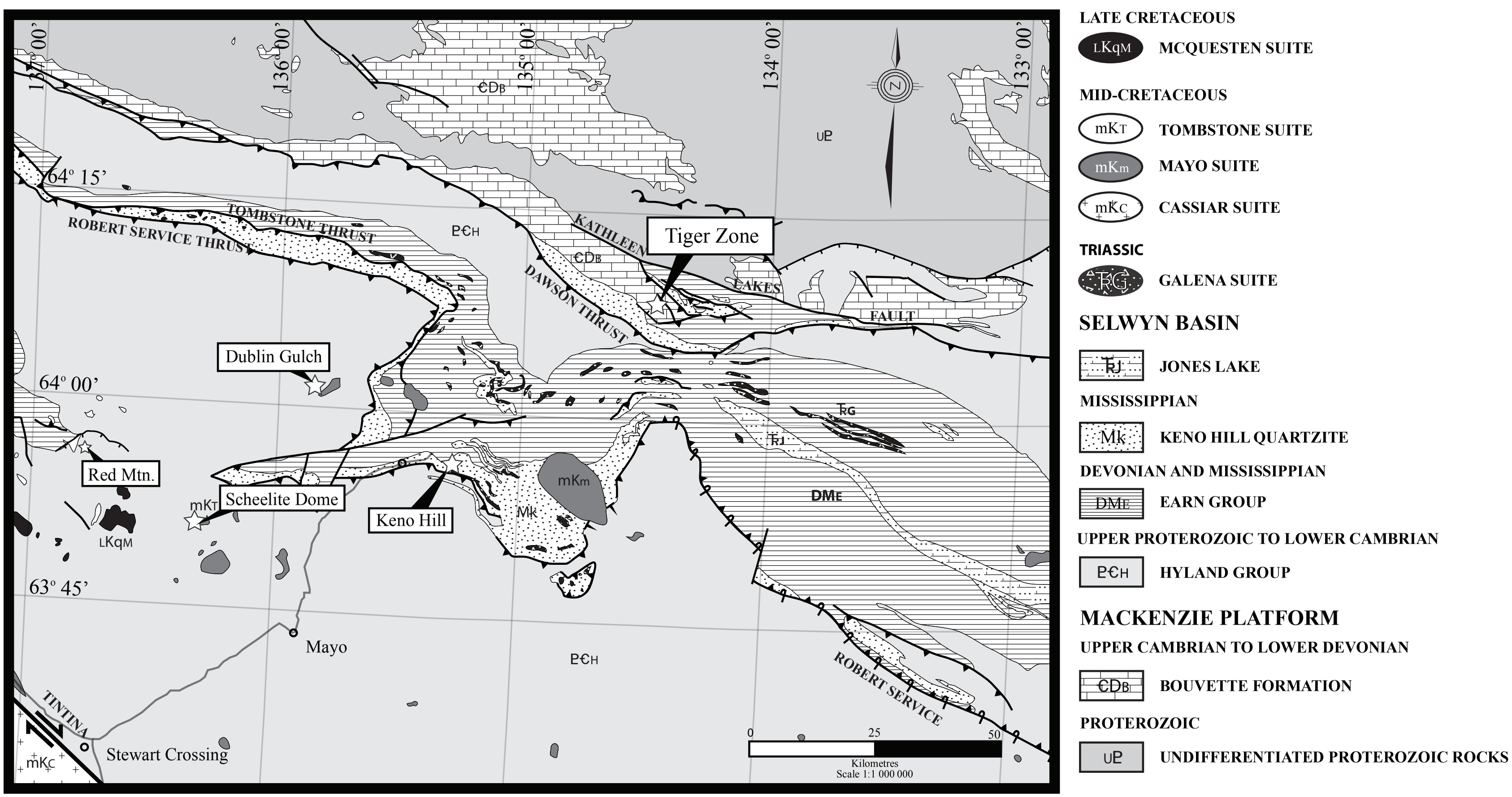


Figure 2. Regional geology of the northwest Selwyn Basin showing the Tiger zone and its location in relation to Cretaceous intrusive rocks and other deposits of the Selwyn Basin (*modified from* Gordey and Makepeace, 2001). Note the Selwyn Basin occurs south of the Dawson Thrust.

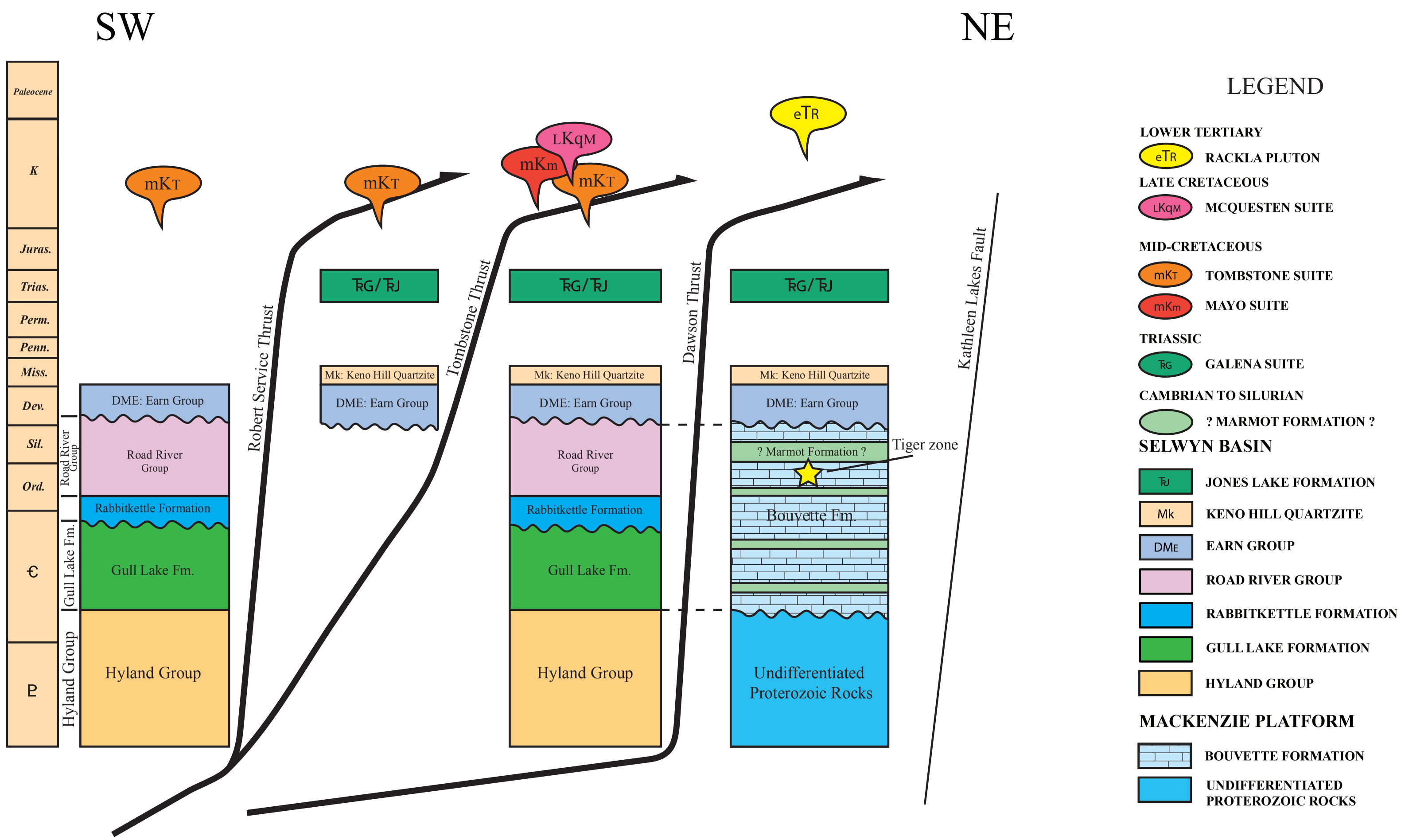


Figure 3. Generalized regional stratigraphy surrounding the Tiger zone as well as the Selwyn Basin, categorized by specific thrust-sheet packages (*modified from* Murphy, 1997). See text for explanation of Marmot Formation.

Wernecke Supergroup, Pinguicula Supergroup, Mackenzie Mountains Supergroup and the Windermere Supergroup (Mair et al., 2006b). Paleozoic shelf carbonates in the immediate study area consist of the Bouvette Formation, which is broadly described as a Cambrian to Devonian sedimentary package consisting of platformal limestones and dolostones (Morrow, 1999).

Deformation of these basinal and platformal rocks commenced during the Late Triassic when extensive northeasterly-directed compression imbricated and folded the strata (Murphy, 1997). The majority of deformation however, occurred southwest of the Selwyn Basin and Mackenzie Platform within the parautochthonous Yukon Tanana Terrane as it converged with North America (Mair et al., 2006b). The Early Jurassic to Early Cretaceous compression produced the majority of the thrust faults in the Selwyn Basin and Mackenzie Platform foreland (Abbott et al., 1986). The largest displacements occur along the Roberts Service Thrust and the Tombstone Thrust with little documented displacement along the Dawson Thrust (Mair et al., 2006b). The Dawson Thrust, which broadly separates Selwyn Basin rocks to the southwest (hangingwall), from Mackenzie Platform rocks to the northeast (footwall; Murphy, 1997), occurs ~7 km from the Tiger zone (Fig. 2). Uplift and extension is documented in the Yukon Tanana Terrane uplands of Alaska (Hudson, 1994), however similar geologic interpretations have not been made for the Selwyn Basin and Mackenzie Platform which is reflected by the relative lack of Middle Cretaceous plutonism therein (Mair et al., 2006b). Following the major episode of crustal thickening and deformation, dextral strike-slip motion initiated on the Tintina Fault around 85 Ma, due to the newly established northward-directed subduction of the Kula plate (Engebretson et al., 1985).

Intrusive rocks of the western Selwyn Basin in proximity to the study area are restricted to the Middle Cretaceous 95 to 92 Ma Mayo suite (Hart et al., 2004) and the 92 to 90 Ma Tombstone suite as well as the Late Cretaceous to Early Tertiary 66.8 to 64.0 Ma McQuesten suite (Murphy, 1997). The Mayo suite rocks are composed dominantly of metaluminous, coarse-grained leucocratic quartz monzonites, granodiorites and biotite granites (Murphy, 1997). These intrusions have initial strontium isotopic values ($^{87}Sr/^{86}Sr$) of 0.710 to 0.730 and belong to the ilmenite-series of intrusions (Hart, 2004). Mineral occurrences associated with Mayo suite intrusive rocks include the Dublin Gulch deposits, Scheelite Dome deposits and Clear Creek deposits (Fig. 2; Murphy, 1997; Hart et al., 2004; Mair et al., 2006a).

The Keno Hill district Ag-Pb-Zn vein deposits are also in close proximity to these intrusions yet a genetic link between the two has not been clearly demonstrated (Lynch et al., 1990). Tombstone intrusive rocks range in composition from metaluminous monzonite, to granodiorite, to syenite (Murphy, 1997). These intrusions commonly are magnetite bearing, display high initial $^{87}Sr/^{86}Sr$ values of 0.710 and are well known for their Au-Cu-Bi skarn occurrences throughout the Yukon such as Brewery Creek and Marn and Horne (Brown and Nesbitt, 1987; Murphy, 1997; Baker and Lang, 2001; Lang and Baker, 2001; Hart, 2007). McQuesten Suite intrusions (Fig. 2) comprise peraluminous biotite-muscovite granite and quartz monzonite compositions and have very few associated mineral occurrences (Murphy, 1997).

1.3 Local Geology and Field Relationships

The Tiger zone is hosted by the Bouvette Formation, which consists of bedded limestones intercalated with locally extensive basalts and tuffs, all of which dip gently to the northeast (Fig. 4). The Bouvette Formation locally consists of lime mudstone to skeletal wackestone with minor skeletal floatstone and rudstone. Primary fossil assemblages include crinoid ossicles, tabulate and rugose corals, bryzoans, and stromatoporoids. The occurrence of the tabulate corals *Favosites favosus*, *Halysites catenularia*, and *Syringopora flexuosa* suggest the limestone hosting the Tiger zone is Silurian in age (Moore et al., 1952), and agrees with mapping by Abbott, (1990) who classified the local stratigraphy as being Ordovician to Silurian in age. Way-up indicators are rare but suggest the rocks young to the northeast. There is also a northeastward shallowing of the depositional environment from basal terrigenous mudstone to the southwest and carbonate turbidites to upper ramp or lagoonal facies to the northeast (E.C. Turner, pers. commun., 2010).

Goodfellow et al. (1995) and Leslie (2009) have described the occurrence of Cambrian to Devonian volcanic rocks of the Marmot Formation in eastern Yukon and western Northwest Territories within the Mackenzie Mountains and Misty Creek Embayment. The host-rock volcanics within the Tiger zone may belong to the Marmot Formation given their estimated age of roughly Ordovician to Silurian, however, no published work has described the volcanic units regionally proximal to the Tiger zone and thus, this inferred association remains speculative.

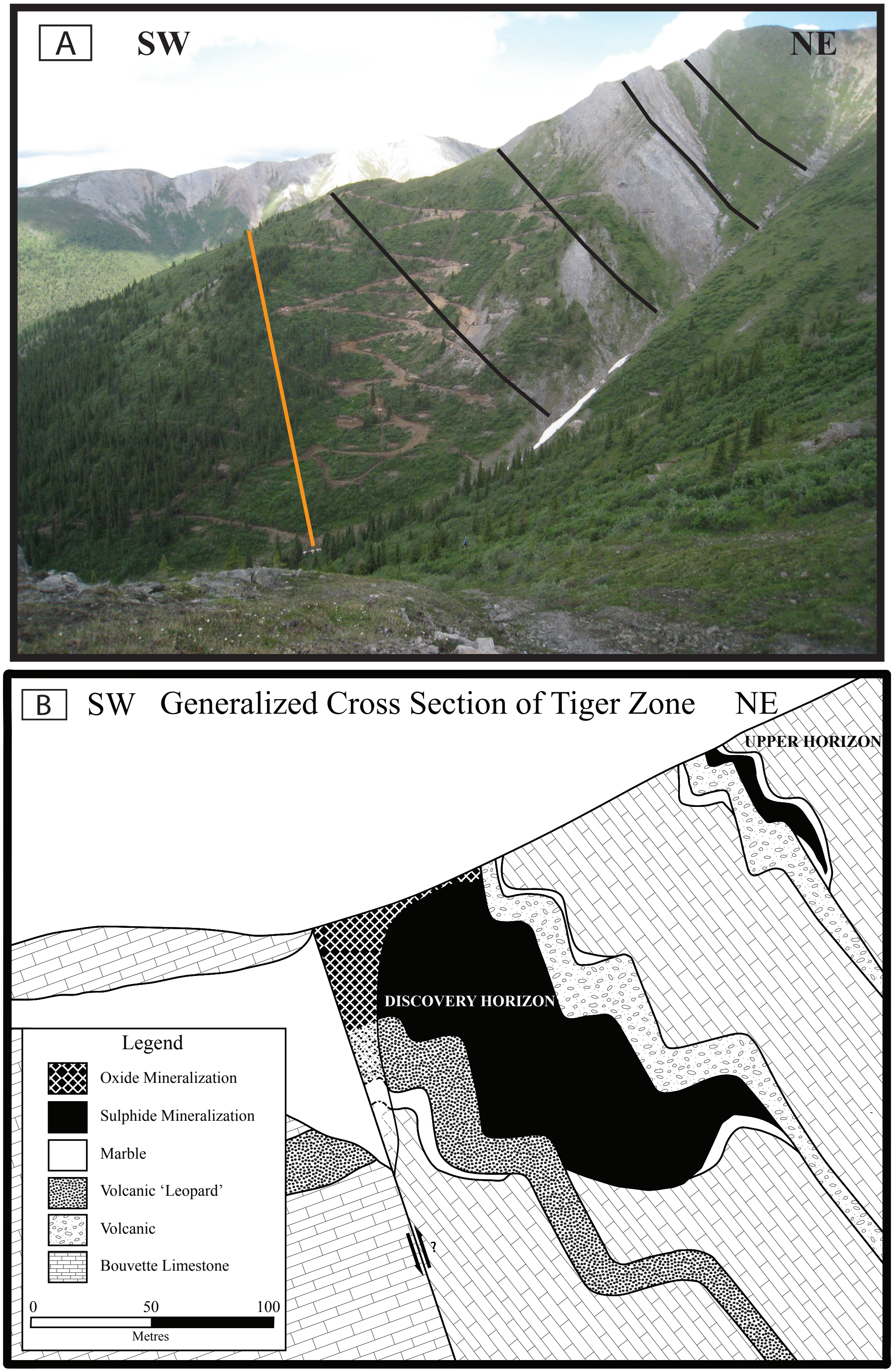


Figure 4. (A) Tiger zone drill valley highlighting the stratigraphy in black and the Tiger zone fault in orange and (B) typified cross-section of the Tiger zone displaying the Discovery Horizon and the Upper Horizon. Local structural complexities are not displayed (*modified from* section line 10+000 in Dumala, 2011)

A small, two-mica, granitic intrusion, the Rackla pluton, intrudes Bouvette Fm. stratigraphy 3 km east-southeast of the Tiger zone. A U-Pb zircon age of 62.9 ± 0.5 Ma (2σ) was determined for a large intrusive sill of the Rackla pluton (V. Bennett, pers. commun., 2010). Additionally, small aplitic and pegmatitic dikes ~1km east of the Tiger zone yielded $^{40}Ar/^{39}Ar$ muscovite ages of 62.3 ± 0.7 Ma, 62.4 ± 1.8 Ma and 59.1 ± 2 Ma (Kingston et al., 2010).

Tiger zone mineralization is primarily hosted in a carbonate stratigraphic package, the Discovery Horizon, which is bounded to the top (NE) and bottom (SW) by volcanic units (Fig. 4). The intercalated volcanic-carbonate package is truncated to the southwest by a northwest trending high-angle fault named the Tiger zone fault (Fig. 4).

Sulphide mineralization also occurs in the Upper Horizon, adjacent to a volcanic unit stratigraphically above the main Discovery Horizon (Fig. 4). In a carbonate package stratigraphically equivalent but structurally down-dropped and east of the Discovery Horizon, is a pyrite-rich gold-poor horizon called the Lower Horizon.

The prominent high-angle Tiger zone fault that bounds the Tiger zone to the southwest is characterized by a thick sequence of white marble in the immediate footwall and a distinctive volcaniclastic unit informally termed the ‘Leopard unit’ in the hangingwall basal to the Discovery Horizon (Fig. 4). The Leopard unit is distinctive from other volcanic rocks due to its high calcite content (>50 %). Between the Leopard unit and the Discovery Horizon, a ~50 cm thick magnetite bearing white marble is locally in sharp contact with the Discovery Horizon.

In addition to the Tiger zone, regional exploration on the Rau property (ATAC Resources Ltd.) has resulted in discovery of several polymetallic quartz veins ± gold, scheelite-bearing tremolite skarn, pyrrhotite ± scheelite ± chalcopyrite-bearing actinolite-diopside-garnet skarn and wolframite ± tantalite occurrences. Three scheelite-tremolite-actinolite skarn showings occur between the Tiger zone and the Rackla pluton within the Bouvette Formation. The most strongly altered skarn occurrences are associated with southwest striking quartz-muscovite-pegmatitic dikes. Geochemical anomalies for these skarns include elevated tungsten, gold and rare copper (Dumala, 2011).

CHAPTER 2 – ANALYTICAL TECHNIQUES AND DATA COLLECTION

Rock samples were collected from core boxes at the Tiger zone drill camp. Drill-hole coordinates can be found in Dumala (2011) and Stroshien (2011). Other non drill-core sample locations are presented in Appendix A.

2.1 Petrography, Electron Probe and Cathodoluminescence

Hand sample and thin section petrography was conducted on core from the Tiger zone to constrain a first order paragenesis, which is fully described in the results section herein. Over 600 samples were described at the macro scale and about 100 thin sections were prepared and subsequently analyzed using optical microscopy at the University of Alberta. Cathodoluminescence (CL) was extensively used in order to determine carbonate mineral petrography and paragenesis where optical techniques and EPMA were insufficient. A CL microscope, maintained in the U-Pb geochronology laboratory at the University of Alberta, was used to identify carbonate mineral compositional zoning and crosscutting relationships. The CL microscope consisted of a cathode ray tube connected to an enclosed thin section sample holder. This apparatus was operated in a dark room at the University of Alberta in order to properly capture digital images.

Electron probe micro analyser (EPMA) techniques including wavelength dispersive spectrometry (WDS), electron dispersive spectrometry (EDS), X-Ray elemental maps, and backscattered electron (BSE) imaging were completed using a Cameca SX100 EPMA equipped with five wavelength dispersive spectrometers at the University of Alberta's Electron Microprobe Laboratory. These techniques were used to analyze for major elements and compositional zoning in sulphide and carbonate minerals. The EPMA beam was operated at an accelerating voltage of 20 kV, probe current of 20 nA and had a beam diameter of 1 μm.

2.2 X-Ray Diffraction

X-Ray Diffraction (XRD) was utilized to determine the mineralogy of unknown monomineralic phases as well as unknown mineral assemblages in whole-rock powders. Samples were crushed and powdered using agate mortar and pestle or in a tungsten shatterbox to obtain a relatively homogenous powder. Samples with simple mineralogy were analyzed on a quartz plate whereas polymineralic samples utilized a top-press sample holder to obtain more accurate results. Analysis was performed by Diane Caird at the University of Alberta using a Rigaku Geigerflex Powder Diffractometer equipped with a cobalt cathode ray tube, a graphite monochromator and a scintillation detector.

2.3 Whole-Rock Major and Trace Elements

Limestone as well as unaltered and altered volcanic rocks were analyzed for major element oxides and trace elements through Activation Laboratories of Ancaster, Ontario by the method 4E Research which uses instrumental neutron activation (INAA) for trace element analysis, and total digestion-inductively coupled plasma (ICP) for major element analysis of rock powders fused in lithium metaborate/tetraborate. These analyses constrain the background chemical composition of the unaltered host-rocks as well as the altered composition of these rocks post hydrothermal mineralization.

Samples of the Rackla pluton were analyzed for major element lithogeochemistry and ferrous iron by Australian Laboratory Services (ALS) Minerals, in Vancouver, British Columbia, using the methods ME-XRF06 and Fe-VOL05, respectively. The method ME-XRF06 fuses the sample into a lithium borate disc which is subsequently analyzed by X-Ray Fluorescence Spectroscopy (XRF). The method Fe-VOL05 digests the sample in H_2SO_4-HF acid and utilized titration to analyze for FeO. These analyses allow for the Rackla pluton to be characterized geochemically and compared to other intrusive suites in the Yukon.

2.4 Microthermometry

Fluid inclusion thick-sections were prepared by Vancouver Geotech and Vancouver Petrographics. The sections were doubly polished 100-150 micron thick wafers which were separated from glass slides using acetone after petrographic examination. Based on criteria of Rodder (1984), fluid inclusions were categorized as primary, pseudosecondary or secondary and also categorized by their phase assemblage at room temperature (Lw = liquid water, Lc = carbonic liquid, Vw = water vapour, Sh = solid halite, So = solid opaque, nS = multiple solids). Fluid inclusion assemblages (FIA) refer to all phase assemblages of primary inclusions within a wafer that appear coeval and for which microthermometric data was collected during the same runs. All microthermometry was performed on a Linkam THMSG600 heating/freezing stage mounted on an Olympus BX50 microscope equipped with a 40x SLCPlan long-working distance fluorite objective lens, 2X image magnifier and a video camera and printer. The heating/freezing stage has a working range of -196 to 600 ºC. Calibration at -56.6 ºC (pure CO_2), 0 ºC and 374.1 ºC using synthetic fluid inclusion standards from SynFlinc was completed before and after microthermometry. Accuracy below 0 ºC is ± 0.2 ºC and above 0 ºC accuracy is ± 2 ºC. Reported salinities have been calculated using equations from Bodnar (1993) for ice melting and Sterner et al. (1988) for halite dissolution temperatures. Salinities are reported in weight percent NaCl equivalent (wt. % NaCl eq.).

2.5 Carbon and Oxygen Isotopes

Carbon and oxygen stable isotope analyses were completed on host-rock limestone, calcite and dolomite samples at the Isotope Science Lab, Department of Physics and Astronomy, University of Calgary by Mr. Steve Taylor. Hand-picked 20-30 mg mineral separates from core samples were ground to <50 µm using agate mortar and pestle. This powder was digested with anhydrous phosphoric acid at 25 ºC followed by the collection of CO_2 and then analyzed by a VG 903 stable isotope ratio mass spectrometer for $^{13}C/^{12}C$ and $^{18}O/^{16}O$ ratios. Internal lab standards were run at the beginning and end of sample sets of 20 and are used to normalize the data and correct for instrumental drift. Additionally, these standards are calibrated against international reference materials and reported relative to Peedee Belemnite (PDB) for $\delta^{13}C$ and Standard Mean Ocean Water (SMOW) for $\delta^{18}O$. The sample analyses are precise to 0.4 ‰ (2σ) for $\delta^{13}C$ and $\delta^{18}O$.

Whole-rock Rackla pluton and Tiger zone quartz samples were also analyzed for oxygen isotopes at the University of Alberta's Stable Isotope Laboratory by Dr. K. Muehlenbachs and Olga Levner. These samples were hand-picked and separated after completion of optical petrography and a paragenesis study, and ground to a powder using a tungsten shatterbox. Oxygen isotopes were measured based on methodology of Clayton and Mayeda (1963), using bromine pentafluoride to liberate O_2 gas and subsequently combine with carbon to create CO_2 gas. This CO_2 gas was analyzed by a Finnigan Mat 252 mass spectrometer equipped with multiport and continuous flow inlets located at the Department of Chemistry, University of Alberta. Analyses are precise to 0.4 ‰ (2σ) and reported relative to Vienna Standard Mean Ocean Water (VSMOW).

2.6 Sulphur Isotopes

Sulphur isotope analysis was conducted on pure sulphide mineral separates hand-picked and analyzed at the Isotope Science Laboratory, Department of Physics and Astronomy, University of Calgary by Steve Taylor. The sulphur isotope ratio $^{34}S/^{32}S$ of pure sulphides were analyzed by the method described by Glesemann et al. (1994) by Continuous Flow-Isotope Ratio Mass Spectrometry (CF-EA-IRMS) using a Carlo Erba NA 1500 elemental analyzer interfaced to a VG PRISM II mass spectrometer. Pure sulphide mineral samples were homogenized and placed into high-purity tin cups subjected to a high-temperature (EA) combustion reactor at 1020 ºC. SO_2 gas was liberated and subsequently transmitted to the ion source of the mass spectrometer. Raw data are normalized to Vienna Cannon Diablo Triolite (VCDT) by comparison to internal lab standards. The accuracy of $\delta^{34}S$ for the data reported is 0.6 ‰ (2σ).

2.7 U-Pb Dating

Laser ablation multicollector inductively coupled plasma mass spectrometry (LA-MC-ICPMS) was utilized to determine a U-Pb crystallization age of monazite identified in the Tiger zone. Analyses were conducted at the Radiogenic Isotope Facility (RIF) in the Department of Earth and Atmospheric Sciences, University of Alberta using a NuPlasma MC-ICP-MS and the UP213 laser ablation system by the methods described by Simonetti et al. (2006). Reference material monazite from Madagascar, analyzed by ID-TIMS (Heaman et al., unpublished data), was used to normalize to unknown monzite data from the Tiger zone. The laser spot size for both unknown and reference monazite was 10 microns in diameter. The monazite crystals occur in a single thin section and were analyzed by EPMA prior to U-Pb dating. BSE images, WDS analysis and U, Th, Si, P, La and Ce elemental maps were collected for the 4 monazite grains to establish zones of physical and chemical homogeneity for quicker spot selection and subsequent analysis. The raw data from the isotopic analysis were manipulated using the Isoplot software (v. 2.0) of Ludwig, 2003 by Dr. Andy Dufrane, University of Alberta. Careful petrographic examination, BSE imaging, and WDS mapping of the monazites together with the Isoplot data reduction allowed for the aquisition of a robust ^{206}Pb-^{238}U monazite crystallization age.

2.8 Strontium Isotopes

Carbonate host-rock, Tiger zone carbonates, and whole-rock Rackla pluton samples were prepared for analysis in a class 100 cleanroom in the RIF, University of Alberta following the methods described in Buzon et al. (2007). After sample preparation and chromatographic treatment the samples were aspirated into an ICP torch using a desolvating nebulizing system (DSN-100). Isotopes $^{87}Sr/^{86}Sr$, $^{87}Rb/^{86}Sr$, and total Sr (ppm) and Rb (ppm) were subsequently analyzed using a NuPlasma MC-ICP-MS. Accuracy and precision was verified by analysis of the standard reference material NIST SRM 987. Internal precision of individual isotopic measurements vary from 0.00001 to 0.00003 (2σ level).

CHAPTER 3 - RESULTS

3.1 Petrography and Paragenesis (EPMA, XRD, CL)

A paragenetic summary is presented in Figure 5 and detailed descriptions are described herein. Appendix B contains extensive EPMA data for Tiger zone minerals.

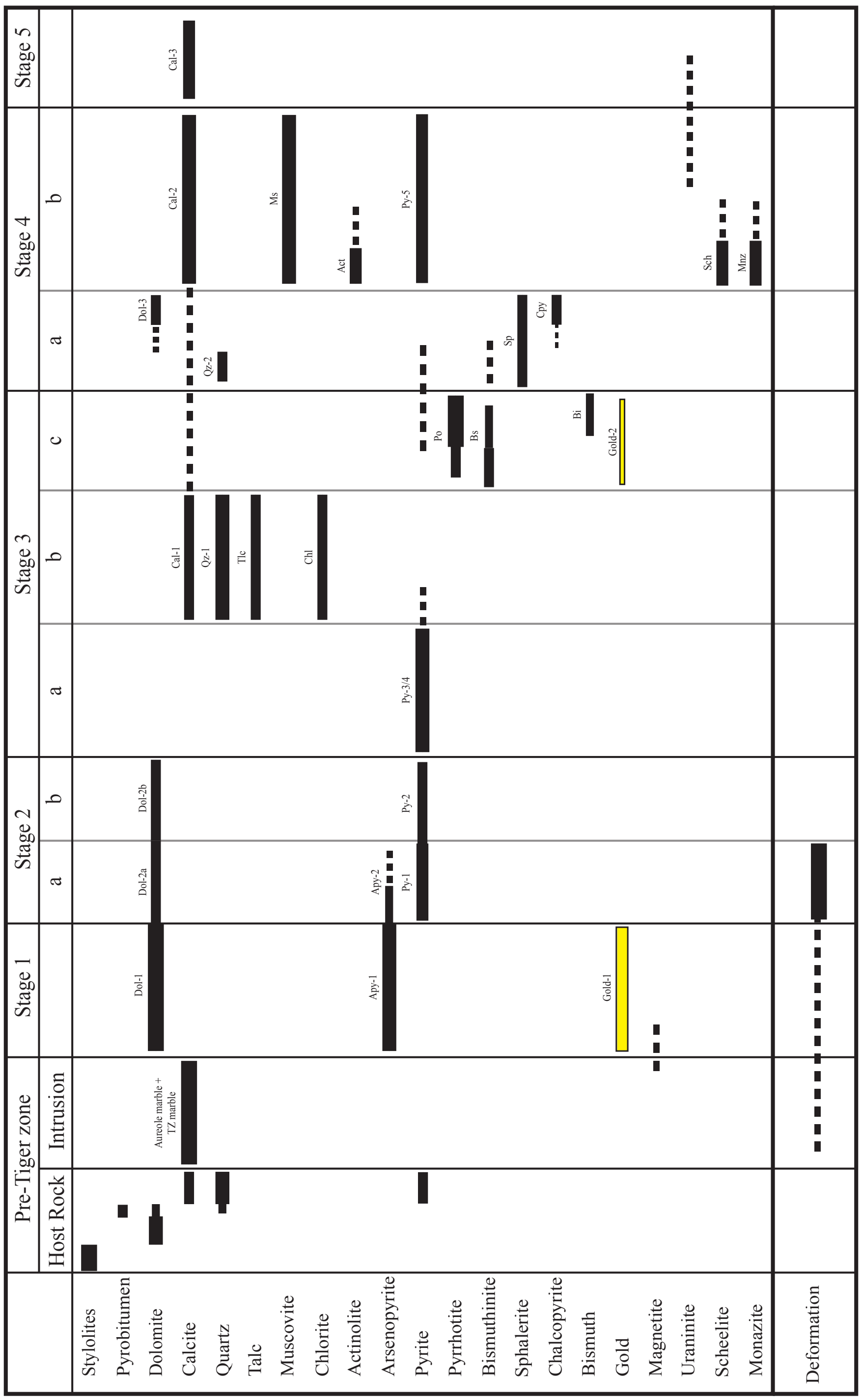


Figure 5. Paragenetic sequence of the Tiger zone. Solid lines refer to observed mineral phases and widths correspond to estimated relative abundances. Dashed lines refer to uncertainty in the paragenetic sequence.

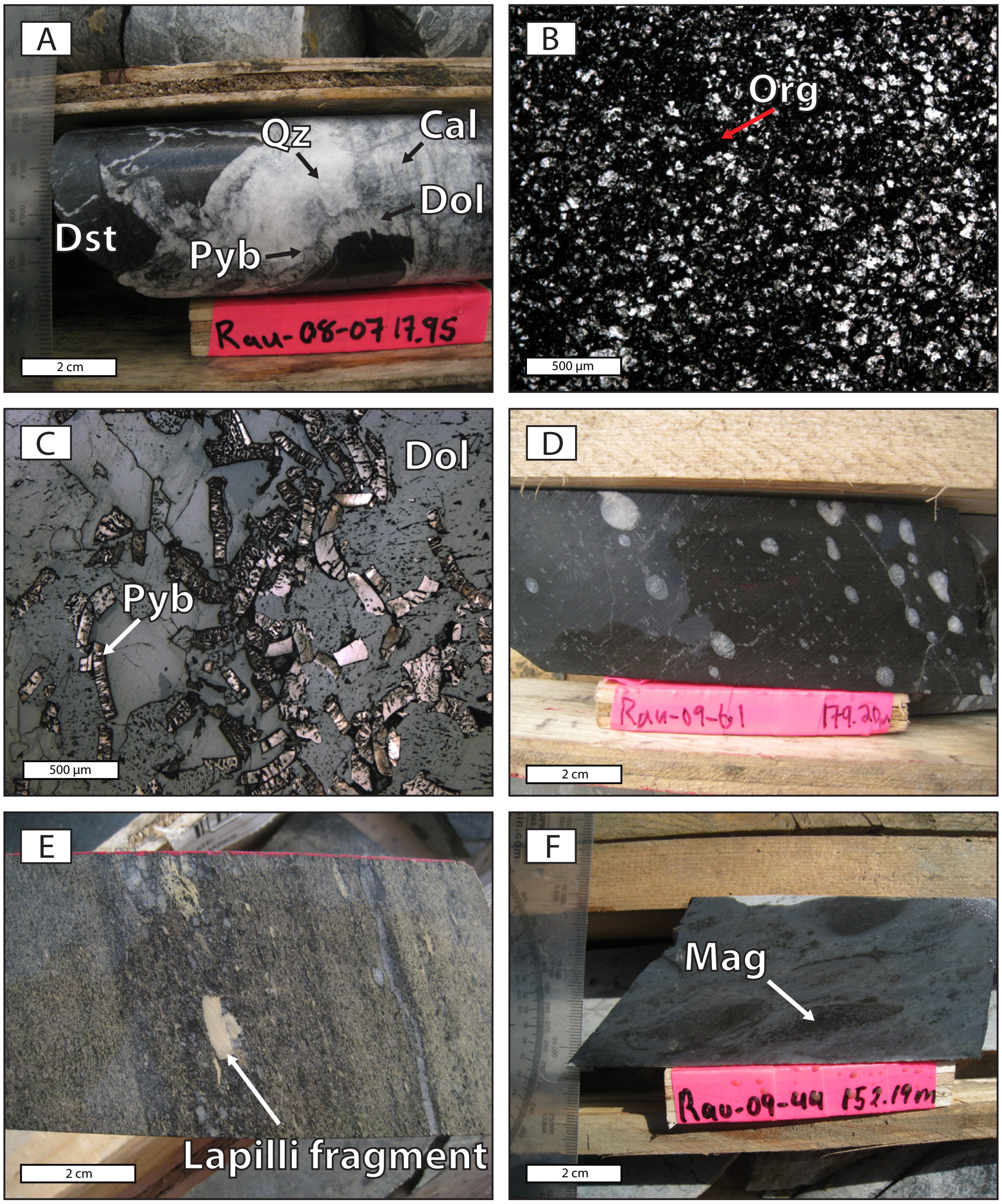


Figure 6. Host-rock carbonate and volcanic rock pictures including (A) brecciated host-rock dolostone, (B) plane polarized light (PPL) image of dolostone with carbonaceous matter, (C) reflected light image showing pyrobitumen, (D) amygdaloidal basalt, (E) volcanic tuff and, and (F) magnetite pebble conglomerate.

Host-Rock

The carbonate host-rocks of the Bouvette Formation range from lime-mudstones and dolo-mudstones (Fig. 6a) to crinoidal packstones and coral rudstones. These carbonates are commonly recrystallized to form coarse dolomite and/or dolomite replacement textures. They are generally devoid of sedimentary structures due to bioturbation and/or overprinting dolomitization. Dolomitization occurs randomly throughout the unit and is found away from the mineralized areas, which suggests it is unrelated to mineralization.

The host carbonates are dark grey in colour and organic material comprises 10 to 50 % of the rock (Fig. 6b). Extensive single-seam stylolite formation sub-parallel with bedding also occurs in these host-rocks. These carbonates are brecciated (Fig. 6a) within the deposit, and regionally around the Tiger zone. The most common breccia type is a mosaic breccia in which angular to subangular carbonate clasts are slightly rotated and separated from one another by up to a few centimetres. The breccia fractures exhibit polyphase cementation beginning with a 'dog tooth' dolomite spar that crystallizes on limestone clasts (Fig. 6a). This dolomite spar forms euhedral crystals up to 1 cm long and commonly rimmed by a thin veneer of sub-millimetre sized tabular pyrobitumen (Fig. 6a, 6c). The remaining void space is filled by an assemblage of anhedral quartz and calcite with minor anhedral fine-grained pyrite.

Volcanic horizons within the Tiger zone host-rocks range from flows to tuffs to epiclastic rocks. These units typically have sharp contacts with host-rock carbonates, contain very small amounts of limestone interlayers and are 10-30 m thick. One of the most identifiable textures amongst these rocks is a black amygdaloidal basalt (Fig. 6d) that contains calcite filled amygdules. Ash beds of lapilli tuff occur locally within the volcanic units where graded bedding and lapilli fragments are visible (Fig. 6e). Additionally, magnetite-bearing pebble to cobble conglomeritic volcanic rocks occur with locally high concentrations of magnetite ~20 % in centimetre-scale intervals (Fig. 6f). The volcanics are commonly fine-grained and layered (Fig. 7a). The layering may be a primary volcanic origin but is more likely a deformational feature.

Rackla Pluton

The modal mineralogy of the Rackla pluton consists of 10 to 50 % quartz, 30 to 60 % K-feldspar and 10 to 60 % plagioclase feldspar and therefore, has compositions ranging from granite to quartz monzonite to granodiorite (Fig. 7b). The grain size is generally coarse-grained with crystals commonly 0.5-1 cm in diameter but some plagioclase megacrysts are up to 3-4 cm long. The most common texture consists of centimetre-scale blocky to interlocking equant grains of quartz and feldspar however, metre-scale portions may be granophyric to pegmatitic with graphic quartz present. Plagioclase in relatively 'fresh' drill-core has a chalky appearance whereas more altered portions of the rock contain abundant sericite and chlorite replacing feldspars and may appear green (Fig. 7b). Primary mica

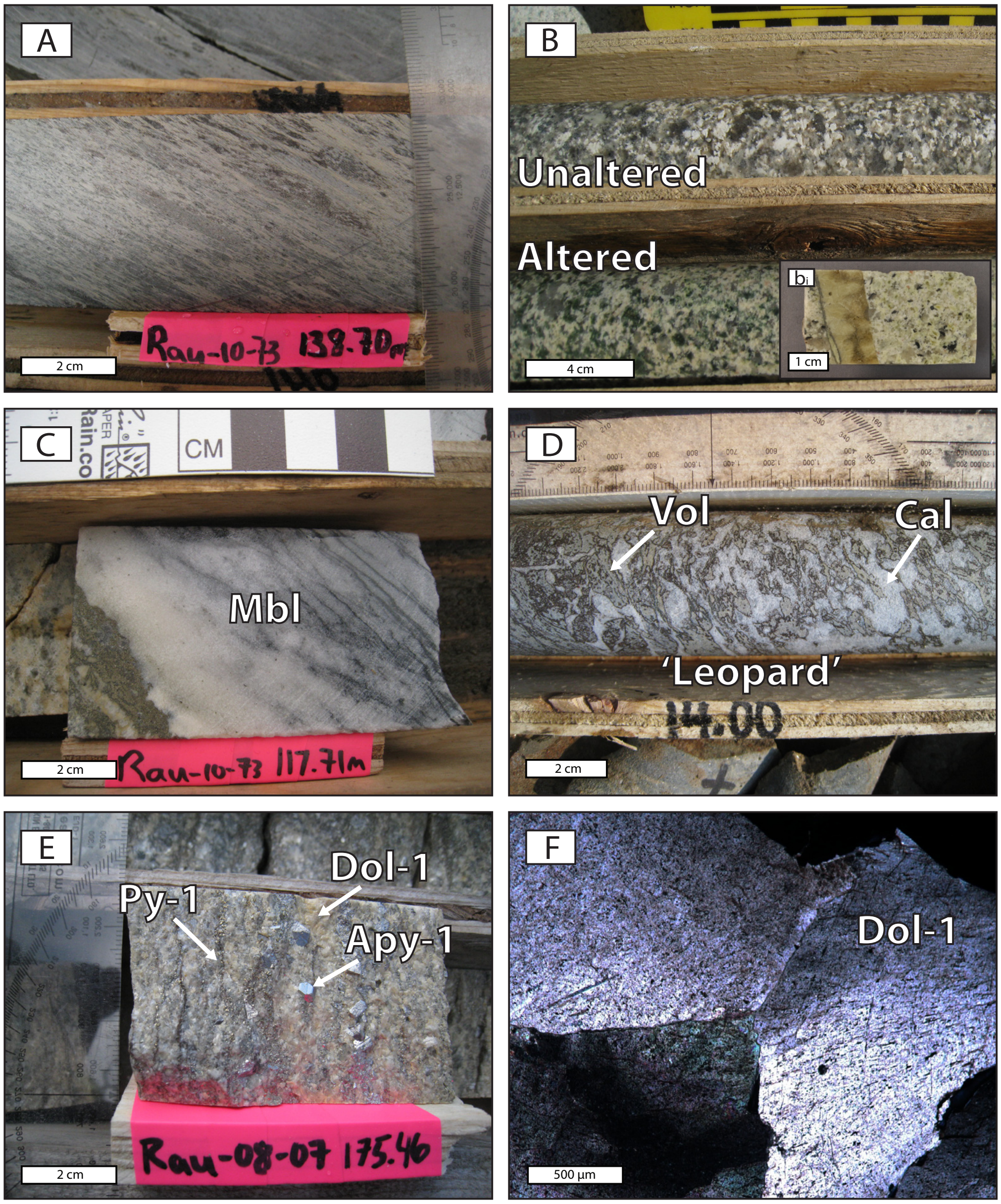


Figure 7. Host-rock and Stage 1 mineralization including (A) fine-grained, strained and sericitized volcanic, (B) felsic intrusive rocks from the Rackla Pluton, (bi) inset of intrusion-hosted vein, (C) massive marble being crosscut by Tiger zone mineralization, (D) calcite influx within volcanic unit, (E) classic Tiger zone pink Dol-1 with disseminated Apy-1 and foliated Py-1, and (F) cross polarized light image of Dol-1 saddle morphology and triple point texture.

components are minor (<5 %) and are typically biotite, muscovite and Cr-bearing muscovite. Minor fine-grained euhedral pyrite, arsenopyrite and sphalerite occur disseminated throughout the intrusive rock with higher sulphide concentrations occurring proximal to crosscutting calcite and dolomite veins (Fig. 7bi). A contact metamorphic aureole of marble surrounds the intrusive rocks and can be traced in drill-core for ~150 m. At the margins of the intrusion is a centimetre to metre-scale actinolite skarn. This unit is dark green in colour and has a fibrous texture due to the presence of actinolite and contains minor sulphides such as pyrite and pyrrhotite. Beyond this aureole is unaltered limestone similar to that of the host-rock described above.

The host-rock limestone has been metamorphosed to a marble regionally and in the Tiger zone (Fig. 7c). The marble is very fine-grained, sucrosic and not very competent. Marble commonly occurs at the boundary between volcanic horizons and limestone rocks above and within the Discovery Horizon proximal to the Tiger zone fault (Fig. 4). The thickness of this marble can reach ~100 meters in the footwall of the Tiger Zone fault, however 1-4 m intersections are more common throughout the deposit. The contacts between the marbles and limestones are mostly gradational on the centimetre-scale. Similarly, the contacts of the marbles and the volcanic horizons are also gradational; the volcanic rocks can contain up to 50 % calcite. The volcanic unit basal to the Discovery Horizon contains over 50 % calcite for depths of a few metres to hundreds of metres and is informally called the leopard unit as it has a ‘leopard’ texture of alternating calcite and biotite (Fig. 7d). This basal unit also contains variable amounts of disseminated, euhedral magnetite at the contact with the basal volcanic package.

Tiger Zone Mineralization

Stage 1: Dolomite-1 + Arsenopyrite-1 + Gold-1

Stage 1 of the paragenetic sequence involves the pervasive replacement of host-rock carbonate within the Discovery Horizon by dolomite 1 (Dol-1) + arsenopyrite 2 (Apy-2) + gold-1 (Au-1). This mineralization massively overprints the marble (Fig. 7c) or crosscuts it as rare, discrete, centimetre-scale veins. Dolomite 1 occurs as 2-4 mm, equant to elongate, pale pink to white crystals (Fig. 7e, 7f) that commonly exhibit saddle morphology (curved crystal faces and sweeping extinction) in cross polarized transmitted light. These crystals have angular crystal boundaries and have triple-point grain textures (Fig. 7f). Both pink and white Dol-1 have a mottled texture and luminesce dark-red and black under cathodic light (Fig. 8a). This mottled texture is also visible in BSE images (Fig. 8b) as light (Fe-rich) and dark (Mg-rich) shades of grey for both pink and white dolomite. The similar compositions, CL-active species, identical BSE response and the indistinguishable nature of the pink and white dolomite phases under the microscope suggest a broadly coeval origin.

Euhedral Apy-1 is disseminated throughout Dol-1 (Fig. 7e). Importantly, Apy-

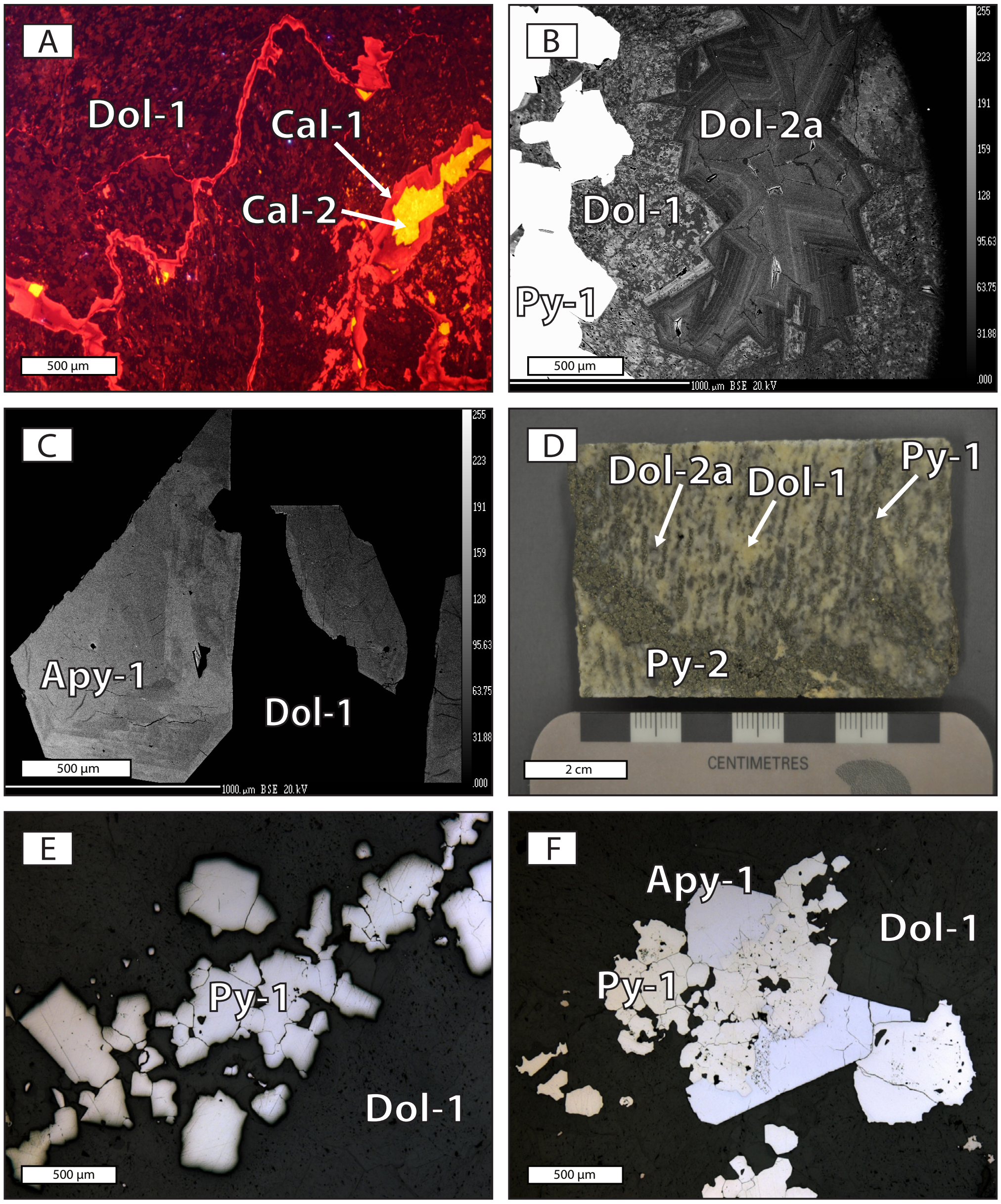


Figure 8. Stage 1 and Stage 2 mineralization including (A) CL image showing Dol-1, Cal-1 and Cal-2 and their crosscutting relationships, (B) BSE image showing mottled and zoned textures for Dol-1 and Dol-2, (C) BSE image of euhedral Apy-1 and Dol-1, (D) relationships between Dol-1, Dol-2a with Py-1 and Py-2, (E) cross polarized light image of foliation producing Py-1 within Dol-1, and (F) cross polarized light image of Py-1 crosscutting Apy-1.

1 grains have angular crystal boundaries and no reaction rim with Dol-1 and, thus, both these phases are considered to be coeval in the paragenetic sequence. Thin, <0.01 mm sub-parallel fractures are restricted to Apy-1 grains but are not observed to extend into the adjacent and inferred coeval Dol-1. Back-scattered electron imaging of Apy-1 crystals reveal faint euhedral zoning (Fig. 8c) in which the lighter zones are characterized by higher levels of As as determined by EDS analyses.

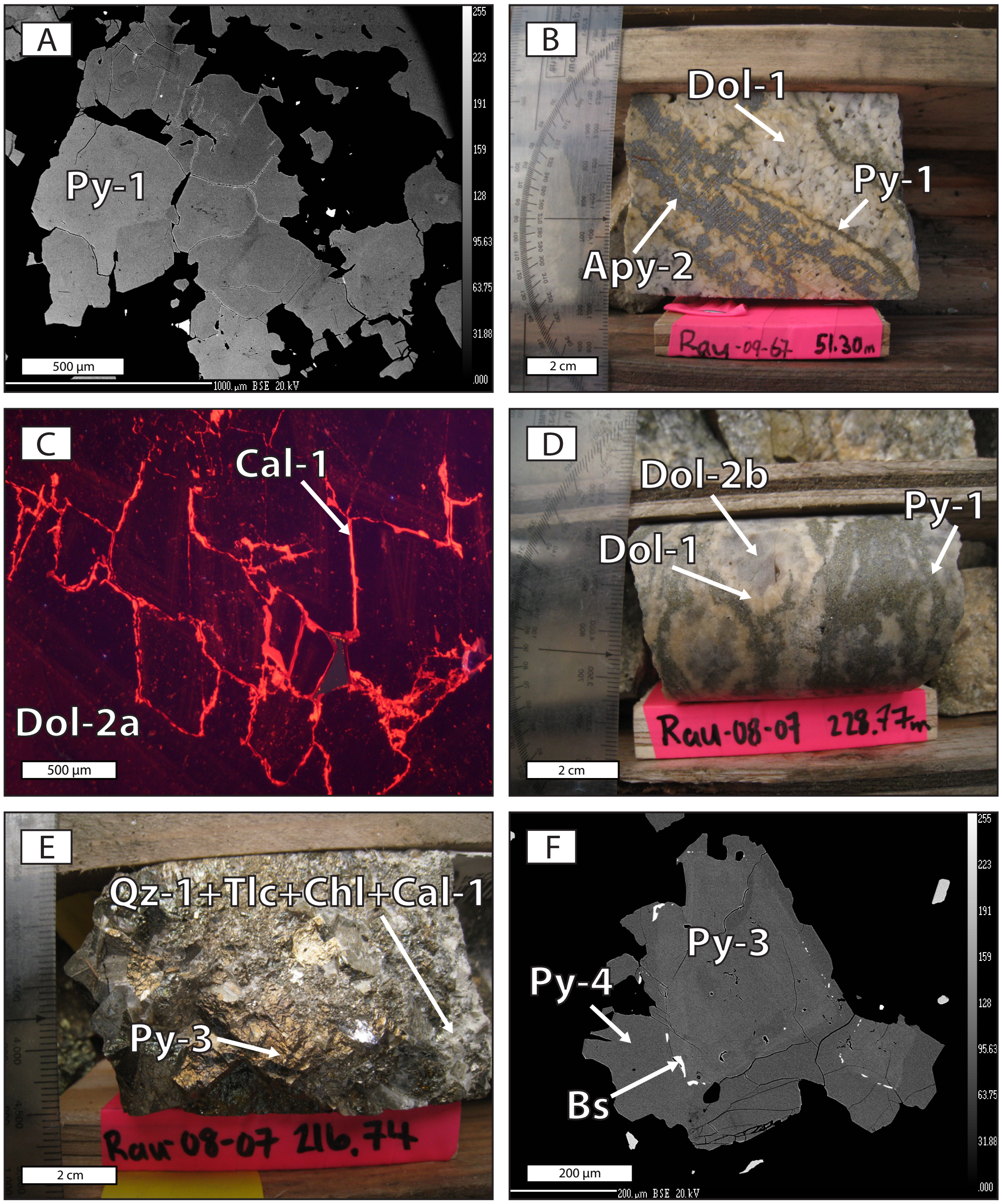


Figure 9. Stage 2 and Stage 3 mineralization including (A) BSE image of non-zoned Py-1, (B) foliation producing Py-1 and Apy-2 within white Dol-1, (C) CL image of Dol-2a with interstitial Cal-1 on grain boundaries, (D) non-foliated Dol-2b, Dol-1 and Py-1, (E) Py-3 with crosscutting Qz-1, Tlc, Chl and Cal-1, and (F) BSE image showing growth zoning in Py-3 and Py-4 with a layer of Bs between them.

Stage 2: (a) Pyrite-1 + Arsenopyrite-2 + Dolomite-2a, (b) Dolomite-2b + Pyrite-2

Stage 2a mineralization is characterized by an assemblage of fine-grained pyrite (Py-1), coarse-grained arsenopyrite (Apy-2) and dolomite (Dol-2a) that have grown in parallel tabular arrays and define a prominent foliation (Fig. 8d). Pyrite-1 occurs as 0.1-0.5 mm equant, subhedral to-cubic crystals that have grown both interstitially within Dol-1 (Fig. 8e) and overprint Dol-1 and Apy-1 (Fig. 8f). Grain boundaries of Py-1, Dol-1 and Apy-1 are sharp (Fig. 8e, 8f), have no reaction rim or dissolution textures and are inferred to be in textural equilibrium.

These pyrite crystals have a weak preferred orientation and commonly have grain boundary area reduction or triple-point textures. Back-scattered electron imaging of Py-1 grains reveals that they are broadly homogeneous (Fig. 9a), although weak zoning is rarely observed. Wavelength dispersive spectrometry analysis of the brighter BSE zones of Py-1 grains demonstrates that As-rich portions of crystals have concentrations of approximately 2000 ppm As (10σ), and less commonly, can contain up to 1 wt. % As.

Arsenopyrite-2 consists of undeformed coarse-grained (0.5 cm) crystals that occur in tabular arrays parallel to Py-1 and within Dol-1 (Fig. 9b). Although Apy-2 crosscuts Dol-1 the euhedral nature of the crystals and lack of any reaction rim suggests Apy-2 is in textural equilibrium with Dol-1. Aside from the tabular array of crystals, Apy-2 is identical to Apy-1 however, is much less abundant than Apy-1.

Dolomite-2a forms 1 mm to 1 cm equant blocky, light grey crystals (Fig. 8b) with angular crystal boundaries. The abundance of angular crystal faces, absence of both saddle morphology textures and sweeping extinction (under polarized light) and fewer fluid inclusions, distinguishes Dol-2a from Dol-1. Weak undulose extinction and birdseye textures are much more common in Dol. Although no internal deformation or crystal elongation is observed besides some twinning, Dol-2a occurs in elongate mineral clusters sub-parallel to Py-1 (Fig. 8b, 8d). Alternating dark and light banding (Fig. 8b) is visible in BSE imaging; the darker zones are Mg-rich and the lighter zones are more Fe-rich. Dolomite-2a has a dark-red to black luminescence (Fig. 9c) similar to Dol-1 but is texturally, and therefore, temporally distinct.

Stage 2b mineralization is characterized by an assemblage of fine-grained pyrite (Py-2) and dolomite (Dol-2b) that postdates or crosscuts the foliation. Pyrite-2 occurs as 0.1-0.5 mm, equant, and subhedral crystals that form irregular crystal masses oblique to Py-1 (Fig. 8d). Pyrite 2 pervasively overprints Stage 1-2a mineral assemblages with no preferred orientation. Pyrite-2 does not show well-defined zoning in BSE imaging however, brighter zones also have higher As contents.

Dolomite-2b forms 1 mm to 1 cm equant, blocky and light grey crystals with

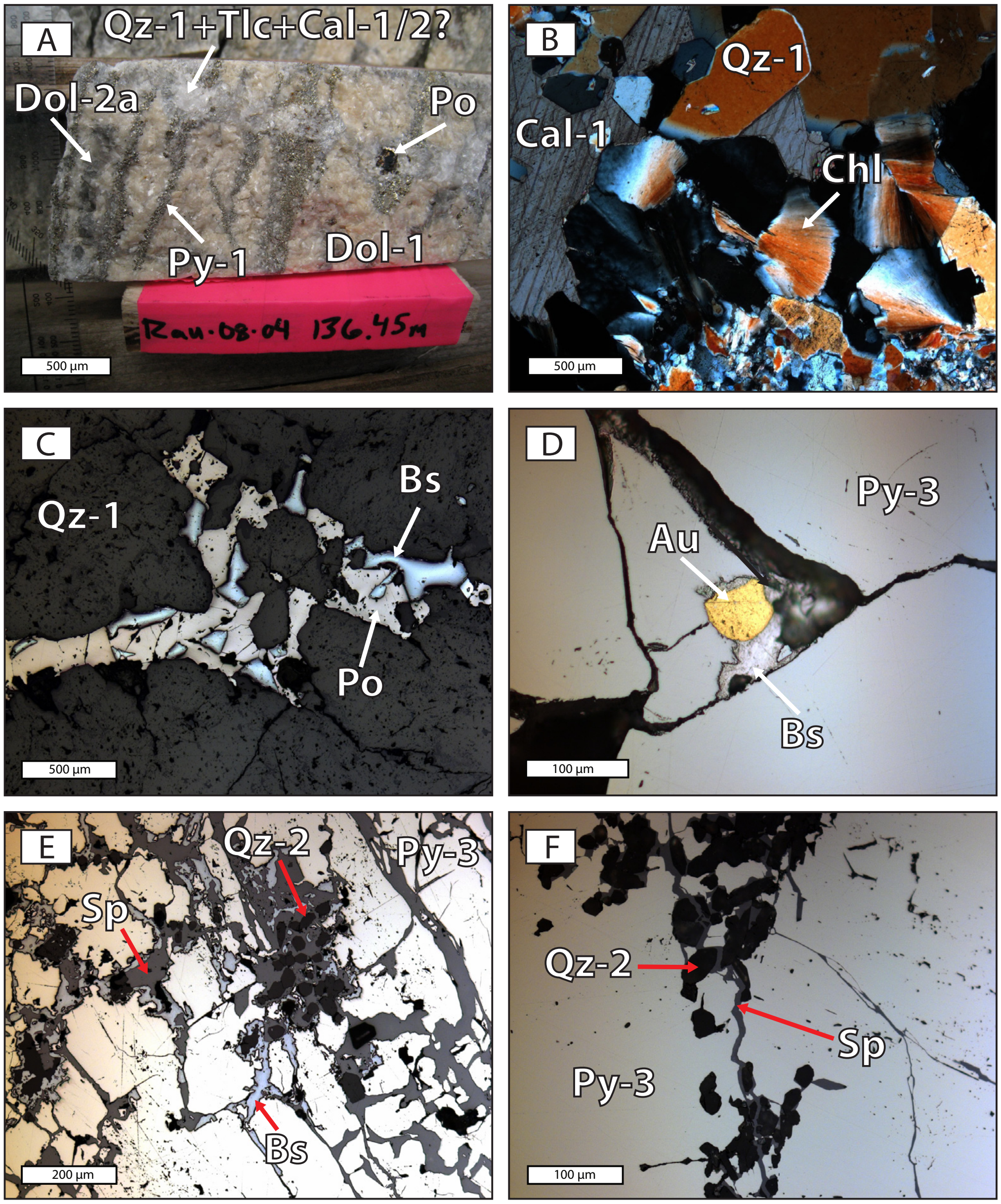


Figure 10. Stage 3 and Stage 4 mineralization including (A) Qz-1+Tlc+Cal assemblage crosscutting Dol-1, Dol-2a and Py-1, (B) cross polarized light image of Cal-1, Qz-1 and fans of Chl, (C) reflected light image of Bs and Po occupying fractures in Qz-1, (D) reflected light image of Bs and Au co-existing within fractures in Py-3, (E) reflected light image of Bs, Sp and Qz-2 within fractures of Py-3, and (F) reflected light image of Sp crosscutting Qz-2 within fractures of Py-3.

angular grain boundaries. This dolomite appears almost identical to Dol-2a, however Dol-2b does not have a preferred alignment parallel to the foliation (Fig. 9d). Back scattered electron imaging of Dol-2b reveals more uniform growth zoning similar to Dol-2a (Fig. 8b). EDS analysis indicates that darker zones in Dol-2b have higher Mg concentrations and lighter zones correspond to higher relative Fe contents. Cathodoluminescence colours for zoned Dol-2b range from dark-red to black and are identical to the CL colours and textures of Dol-2a.

Stage 3: (a) Pyrite-3, (b) Quartz-1+ Talc + Chlorite + Calcite-1, (c) Bismuthite + Gold-2 + Bismuth + Pyrrhotite + Pyrite-4

Stage 3a mineralization is characterized by coarse-grained (>1cm), brassy, euhedral to subhedral pyrite (Py-3) that overprints Stage 1-2 mineralization (Fig. 9e). Pyrite-3 is commonly associated with, but pre-dates quartz (Qz-1). Back-scattered electron imaging shows weak, sub-angular zoning within the Py-3 phase (Fig. 9f). Brighter BSE zones are determined by WDS to have higher As values ranging from 1000 to 10000 ppm.

Stage-3b mineralization comprises variable amounts of Qz-1, talc (Tlc), chlorite (Chl) and calcite (Cal-1) replacing and occurring in brittle fractures crosscutting Py-3 (Fig. 9e) and overprinting Stage 1-2 mineral assemblages (Fig. 10a). Quartz-1 is the major constituent of Stage 3b generally occurring as anhedral accumulations (Fig. 10b) replacing Stages 1-2 minerals or more rarely as euhedral crystals. Chlorite occurs as small 0.1-0.5 mm, radiating, acicular needles within Qz-1 (Fig. 10b). XRD analysis has identified talc in this stage, however it has not been identified in thin section. The Chl, and Qz-1 share sharp, angular grain boundaries (Fig. 10b) and are considered to be coeval. Calcite-1 is characterized by centimetre-scale blocky and subhedral crystals occurring as a minor phase within quartz (Fig. 10b) or as centimetre-scale veins crosscutting Py-3. Calcite-1 also crosscuts Dol-1, 2a and 2b as it precipitates along grain boundaries (Fig. 8a, 9c)

Stage 3c mineralization consists of bismuthinite (Bs), native gold (Au-2), native bismuth (Bi) and pyrrhotite (Po) within fractures of Stage 3b Qz-1 and Stage 3a Py-3. Bismuthinite occurs as anhedral crystals within fractures of Stage 1-2 sulphides, Py-3 and Qz-1 (Fig. 10c) and has been observed in a few drill holes to occur in large centimetre-scale accumulations. Back-scattered electron imaging has revealed rare bismuthinite rimming Py-3 crystals which in turn are rimmed by a later anhedral pyrite (Py-4) (Fig. 9f). Native gold occurs as anhedral fracture fills within Stage 1-2 sulphide fractures and within Py-3 fractures. When native gold is present, it is adjacent to Bs in fractures and suggests coeval precipitation (Fig. 10d). Analysis of Bs by WDS indicates the grains have elevated Sb between 4000 and 9000 ppm and anomalous As up to 17 wt. %. Where observed, native bismuth is 'speckled' within Bs as small <0.1 mm anhedral crystals and also as fracture coatings of other sulphide phases. Similarly, Po commonly occurs within close

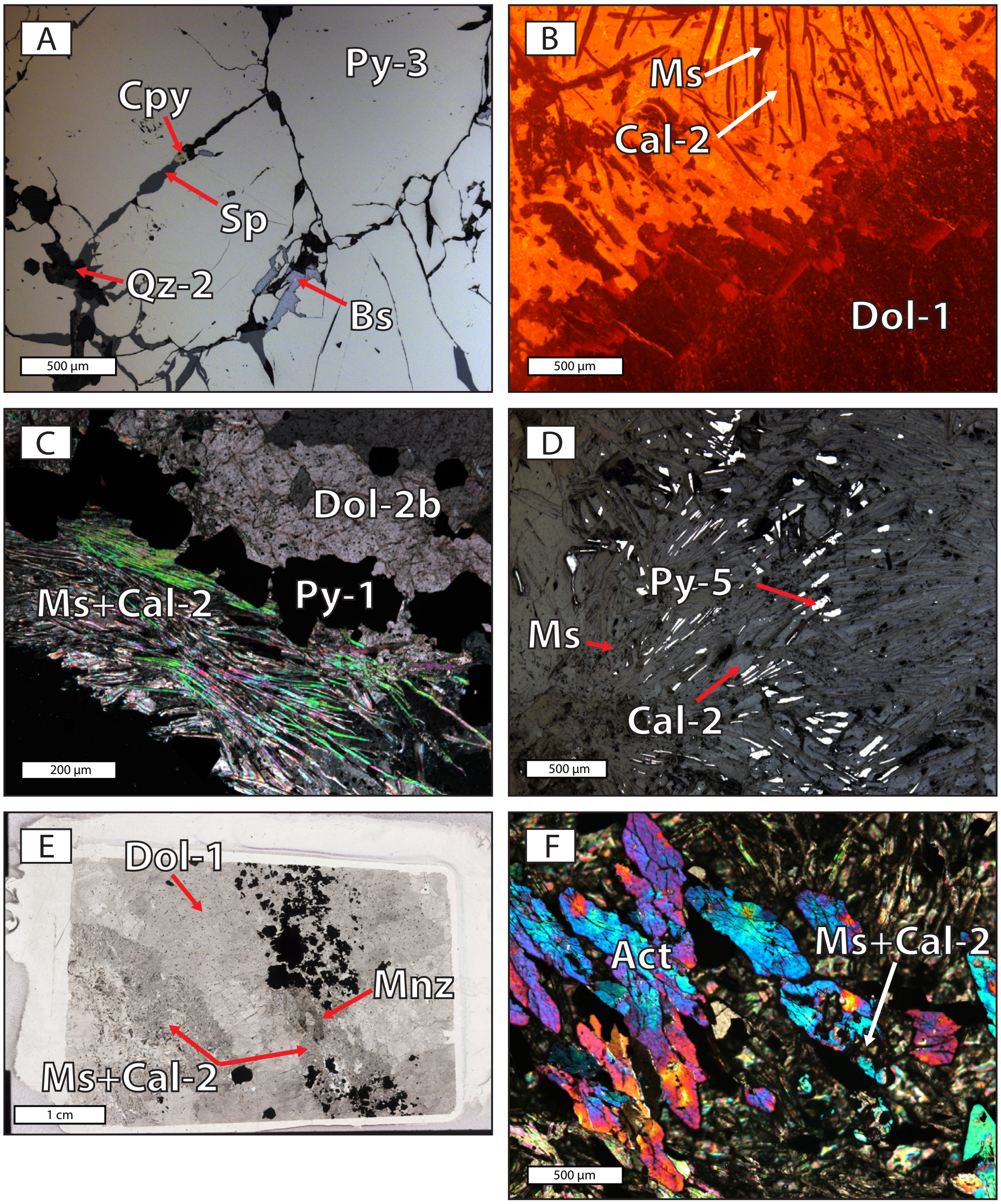


Figure 11. Stage 4 mineralization including (A) reflected light image of Bs, Sp Qz-2 and Cpy occupying fractures in Py-3, (B) CL image of Ms and Cal-2 co-existing and overprinting Dol-1, (C) cross polarized light image of Ms and Cal-2 crosscutting Dol-2b, (D) reflected light image of Ms intergrown with Cal-2 and Py-5, (E) thin section of Mnz within Cal-2 and Ms assemblage , and (F) cross polarized light image of Act crosscut by the assemblage of Ms and Cal-2.

proximity to Bs as anhedral masses with no apparent crosscutting relationship. However, native bismuth and Po are observed to crosscut Bs in fractures suggesting a coeval to slightly epigenetic relationship of Po to Bs+Au-2 mineralization.

Stage 4: (a) Quartz-2 + Sphalerite + Chalcopyrite + Dolomite-3, (b) Monazite + Actinolite + Scheelite + Muscovite + Calcite-2 + Pyrite-5 + Uraninite)
Stage 4a mineralization is characterized by fracture filling and replacement by quartz (Qz-2), sphalerite (Sp), chalcopyrite (Cpy) and dolomite (Dol-3). This mineral assemblage is commonly observed in bismuthinite-bismuth veinlets within Py-3 (Fig. 10e). Quartz-2 occurs as small, 0.1 mm, euhedral crystals along fractures in Py-3 (Fig. 10e, 10f) which may have Bs rimming the fractures, thus suggesting Qz-2 postdates Bs growth or minor Bs occurs in this stage. These euhedral quartz crystals are associated with anhedral Sp that also occupies these Py-3 fractures, but are also occasionally crosscut by Sp veinlets (Fig. 10f). When Bs and Sp occupy a fracture the Bs is usually rimming the Py-3 crystals whereas the Sp is commonly central to the fracture (Fig. 10e). Rare anhedral crystals of Cpy occur within fractures of Sp (Fig. 11a) suggesting Cpy is coeval to slightly epigenetic to the Sp. In rare, large centimetre-scale calcite-3 (Cal-3, below) veins Sp has been observed to occur as millimetre-scale euhedral zoned crystals rimming fractures in-filled by the calcite. Associated with this phase is a euhedral to anhedral dolomite (Dol-3) that commonly occurs with euhedral Sp and is observed to crosscut and offset fractures filled with Sp.

Stage 4b mineralization consists of monazite (Mnz), actinolite (Act), scheelite (Sch), muscovite (Ms), calcite (Cal-2), uraninite (Urn) and pyrite (Py-5). The main constituent of this phase is Cal-2 and Ms. Calcite-2 occurs as subhedral crystals that range from 0.01 mm to 1 cm in diameter and are intergrown with muscovite (Fig. 11b, 11c). Muscovite forms both parallel, acicular crystals 0.5 mm long (Fig. 11c) and irregular radiating aggregates. Muscovite and Cal-2 commonly form along rheologic boundaries such as between Dol-1 or 2 and sulphides (Fig. 11c). Pyrite (Py-5) is a minor constituent of this phase and occurs interstitial to the Ms and Cal-2 as small 0.01 mm anhedral crystals (Fig. 11d). Crosscutting relationships of Py-4 and Py-5 are not observed and, therefore, their relationship is unknown. Stage 4b mineral phases destructively overprint Stage 1-3 mineral assemblages. Calcite-2 has bright red and orange luminescence under cathodic light (Fig. 11b) and is very distinct from Cal-1 and Stage 1-2 dolomites (Fig. 9c). Calcite-2 also occurs along grain boundaries Dol-1, 2a and 2b and appears to infill void space postdating Cal-1 determined by CL (Fig. 8a).

Monazite, Act and Sch are all present within the Ms-Cal-2 assemblage but are not observed in contact with one another, thus, the relative crosscutting relationships are unclear. Monazite, which is observed to form only within Ms-Cal-2 aggregates, occurs as large 0.5-2 mm euhedral crystals (Fig. 11e). Small fractures in Mnz grains are occupied by Ms or Cal-2 crystals and locally small urananite grains (Fig. 11e) suggesting monazite pre-dates these minerals. Actinolite is associated with the Ms-Cal-2 assemblage in dense mineral clusters (Fig. 11f). No obvious temporal relationship is observed between Act grains suggesting coeval growth with the Ms-Cal-2 assemblage. Scheelite is an extremely minor component of Stage 4b. It occurs as 1 cm diameter subhedral crystals that have fractures in-filled with Ms and Cal-2. Stage 4b minerals were not found in association with Stage 4a minerals, thus the two stages may be coeval.

Stage 5: Calcite-3

Calcite-3 occupies centimetre-scale brittle fractures that crosscut Stages 1-4. Veins will occasionally contain outer margins of euhedral Sp while the later Cal-3 occupies the majority of the vein centres. Calcite-3 is coarse-grained with crystals often up to 1 cm in diameter.

3.2 Whole-Rock Analysis

The data for whole-rock analysis of limestone, variably altered volcanic rocks and the Rackla pluton are presented in Table 1 and Appendix C. Volcanic rocks have been plotted on a total alkali versus silica graph and normalized to totals without water (Fig. 12). The data have a large scatter ranging from 35 to 57 wt. % SiO_2 and 0 to 8 wt. % $Na_2O + K_2O$. The leopard volcanics, which are inundated with calcite, have the lowest values of between 35 and 40 wt. % SiO_2. Rackla pluton samples have been classified for alumina saturation using major element oxides. All samples have Al_2O_3 molar proportions that exceed combined $CaO + K_2O + Na_2O$ molar proportions (Table. 1), indicating the pluton is weakly peraluminous. Additionally Rackla pluton samples have ferric/ferrous iron values below 0.5 at 70 wt. % SiO_2 (Fig. 13), and are therefore classified as ilmenite-series or reduced affinity using the classification of Ishihara, (2000).

Table 1. Whole-rock major element oxide data for the Rackla pluton. Molar proportions of Al_2O_3/CaO+Na_2O_3+K_2O are reported under row A/CNK.

		I074541	I074543	I074544	I074545	I074546	I074548	I074549	I074550	I074551	I074552	I074553	I074554	I074555
Recvd Wt.	kg	0.14	0.14	0.14	0.12	0.14	0.10	0.08	0.06	0.14	0.02	0.12	0.08	0.12
SiO_2	%	71.07	73.83	73.21	72.31	74.24	73.35	74.30	73.82	56.19	69.32	71.85	71.59	62.44
Al_2O_3	%	12.99	13.23	13.01	12.77	13.11	13.10	13.17	13.29	9.86	13.32	13.24	13.36	9.31
Fe_2O_3tot	%	1.42	1.52	1.48	2.01	1.33	1.85	1.67	1.95	13.92	4.43	2.32	1.69	12.11
FeO	%	1.23	1.29	1.16	1.67	1.16	1.55	1.41	1.54	12.05	n/a	1.68	1.28	8.61
CaO	%	2.30	1.74	1.74	1.14	1.63	1.73	1.82	1.65	1.02	0.82	1.25	2.21	0.66
MgO	%	0.58	0.24	0.23	0.21	0.20	0.21	0.24	0.23	0.71	0.52	0.36	0.31	0.98
Na_2O	%	2.32	2.37	1.61	0.60	2.39	2.21	2.85	2.56	0.19	0.13	0.38	0.22	0.15
K2O	%	5.67	5.42	6.17	7.10	5.36	5.67	4.65	5.12	5.31	6.38	6.24	5.69	4.26
Cr_2O_3	%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
TiO_2	%	0.20	0.21	0.20	0.15	0.16	0.19	0.19	0.21	0.13	0.17	0.19	0.19	0.12
MnO	%	0.04	0.04	0.09	0.21	0.05	0.06	0.02	0.06	1.78	0.44	0.14	0.11	1.19
P_2O_5	%	0.07	0.08	0.07	0.05	0.06	0.07	0.07	0.07	0.06	0.08	0.07	0.07	0.04
SrO	%	0.03	0.03	0.02	0.01	0.02	0.02	0.03	0.03	<0.01	0.01	0.01	<0.01	<0.01
BaO	%	0.07	0.06	0.07	0.07	0.06	0.07	0.05	0.06	0.05	0.05	0.06	0.05	0.02
LOI	%	1.85	1.20	2.09	2.59	1.22	1.41	0.77	0.88	9.39	3.97	3.39	4.25	6.81
Total	%	98.62	99.97	99.99	99.23	99.84	99.95	99.84	99.94	98.61	99.63	99.50	99.74	98.10
A/CNK		0.92	1.02	1.04	1.19	1.03	1.01	1.01	1.04	1.25	1.55	1.37	1.27	1.54

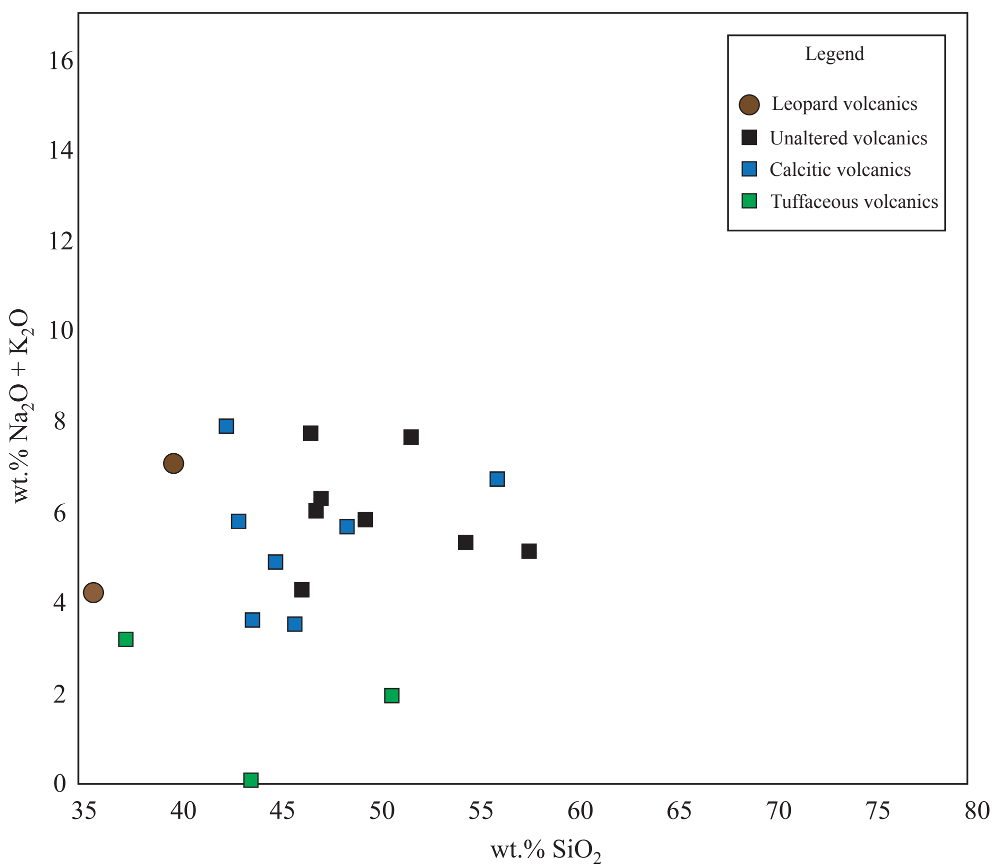


Figure 12. Tiger zone host-rock volcanics including two leopard-volcanic samples plotted on an alkali vs. silica diagram. Volcanic rocks are divided into relatively unaltered samples, altered calcitic volcanic rocks, and altered tuffaceous volcanic rocks.

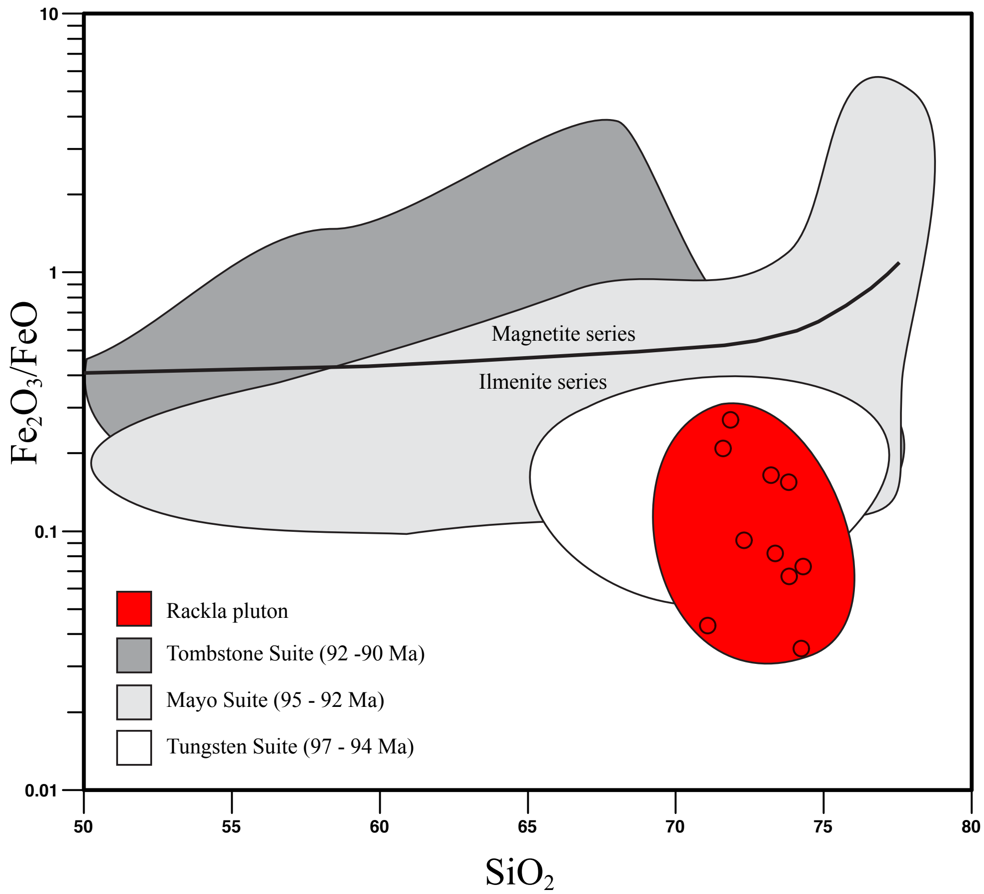


Figure 13. Classification of the Rackla pluton as reduced/ilmenite-series, in comparison with other nearby intrusive suites from Hart et al. (2004). Dividing line between ilmenite and magnetite series based on values from Ishihara (2000).

3.3 Microthermometry

Microthermometric analyses were carried out on primary, pseudosecondary and secondary FIAs in Dol-1, Dol-2b, Qz-1, Sp, and from Rackla pluton magmatic quartz and crosscutting veins, thus spanning most of the paragenetic sequence. None of the mineral phases had clear discernable growth zones (excluding sphalerite) and therefore criteria for fluid inclusions of primary origin were based on host minerals that had a consistent CL signature and by fluid inclusions that had a random orientation throughout the wafer. Inclusions that appeared necked and had very irregular shapes were not analyzed due to potential post-entrapment modifications. Below, FIAs are described with respect to their paragenesis with supporting images in Figure 14 and 15, and microthermometric data are summarized in Table 2 and Figure 16. All microthermometric data are presented in Appendix D.

Rackla Pluton

The primary inclusions in single quartz crystals were very rare and mostly occurred as individual inclusions or small clusters and usually were smaller than 15 μm.

A primary FIA consisting of Lw+Lc occurred with phase proportions of Lw = 0.9 and Lc = 0.1. Carbonic vapour bubbles (Vc) nucleated within the Lc phase followed by the formation of solid CO_2 during cooling. During the heating run, melting temperatures of the Lc phase occurred at -56.6 ºC and carbonic liquid and vapour homogenization occurred at 28 ºC into the Lc phase. The average aqueous ice melting temperatures in this FIA is -28 ºC and final ice melting temperatures are -11 ºC. Calculated salinites from ice melting had an average of 15 wt. % NaCl eq., however, due to the presence of CO_2, clathrate should have formed but was not observed, thus, reported salinities are overestimated. Some inclusions had total homogenization temperatures of 341 ºC, but some inclusions decrepitated at higher temperatures (370 ºC).

One inclusion consisting of Lw+Lc+Sh occurred with a phase proportion of Lw = 0.85, Lc = 0.1 and Sh = 0.05, and appears to be of primary origin using the criteria listed above (Fig. 14a). Upon cooling, a Vc phase nucleated within the Lc phase. This Vc homogenized into the Lc phase (via vapour disappearance) at 26 ºC. After freezing of the liquid CO_2 at approximately -100 ºC, subsequent melting of the Lc phase occurred at -56.7 ºC. The average aqueous ice melting temperatures in this FIA is -22 ºC. Decrepitation of the inclusion (Td) occurred at a temperature of 350 ºC, at which time the halite had not dissolved. Therefore, based on a minimum halite melting temperatures of 350 ºC, the calculated salinity is >40 wt. % NaCl eq.

Apparently primary aqueous (Lw+Vw) FIAs also occurred in quartz and had average phase proportions of Lw = 0.95 and Vw = 0.05. After freezing of the aqueous phase, the first ice melting temperatures have an average temperature of -22 ºC and final ice melting occurred at -8 ºC which corresponds to a calculated salinity of 12 wt. % NaCl eq. The homogenization temperatures have an average value of 227 ºC (Table 2).

Halite saturated primary aqueous FIAs (Lw+Vw+Sh) rarely occurred and have average phase proportions of Lw = 0.85, Vw = 0.1 and Sh = 0.05. First ice melting

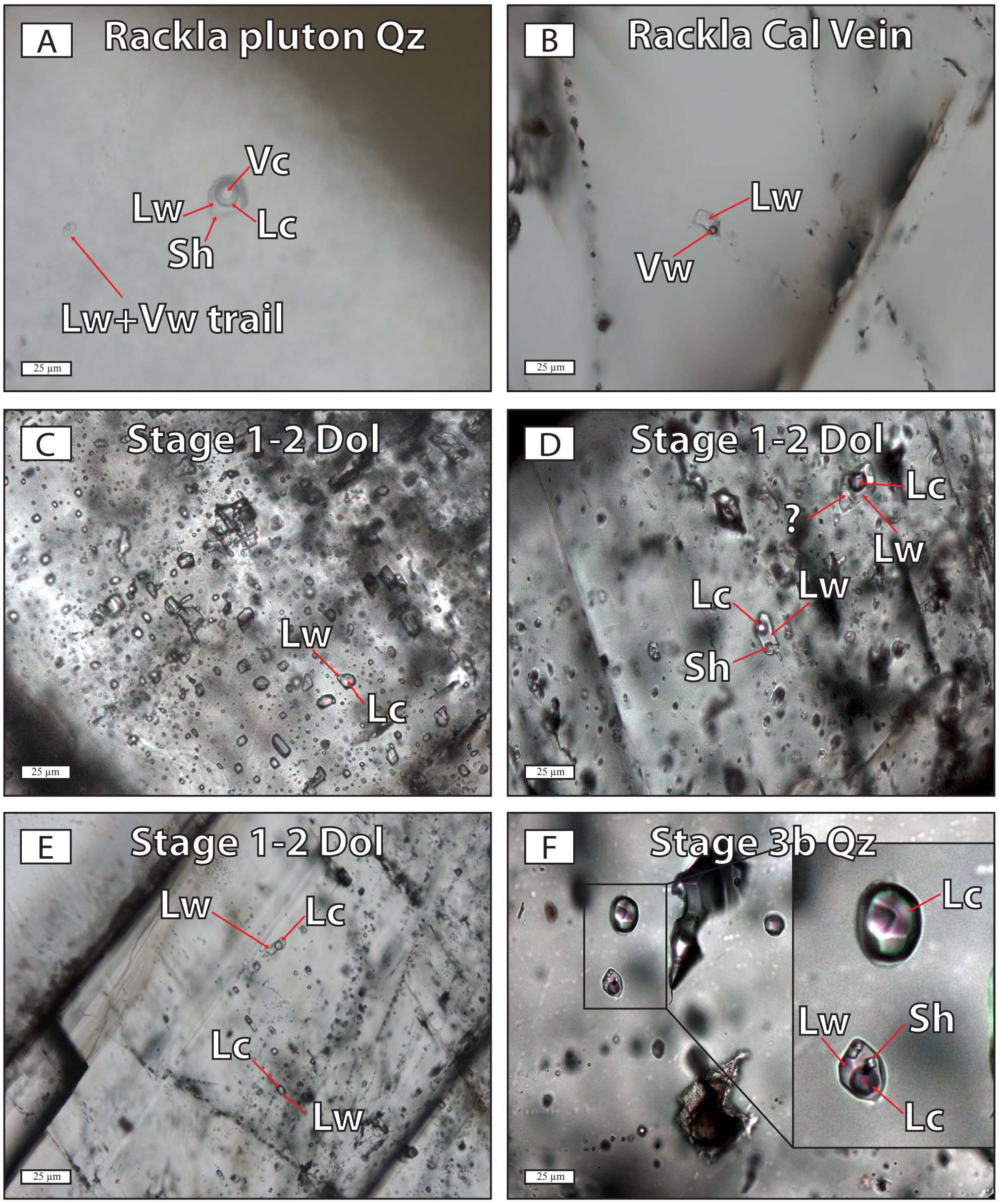


Figure 14. Fluid inclusions hosted in the Rackla pluton, Dol-1, Dol-2b and Qz-1 including (A) primary carbonic-aqueous brine inclusions in magmatic quartz and water and water vapour inclusions in secondary trails, (B) primary water and water vapour inclusions in intrusion-hosted calcite veins, (C) abundant primary carbonic-aqueous liquid inclusions in dolomite, (D) carbonic-aqueous brines with halite and carbonic multisolid brine inclusions in dolomite, (E) primary aqueous carbonic inclusions in dolomite, and (F) co-existing primary carbonic-aqueous and aqueous-carbonic brine inclusions in quartz.

occurred at -33 ºC. Halite dissolution occurred at 152 ºC before total homogenization of the inclusions at 284 ºC. Calculated salinity based on halite dissolution temperatures is approximately 29 wt. % NaCl eq.

Secondary trails of Lw+Vw inclusions were common; these crosscut the quartz grains and have phase proportions of Lw = 0.95 and Vw = 0.05. First ice melting temperatures have an average of -30 ºC and final ice melting temperatures have

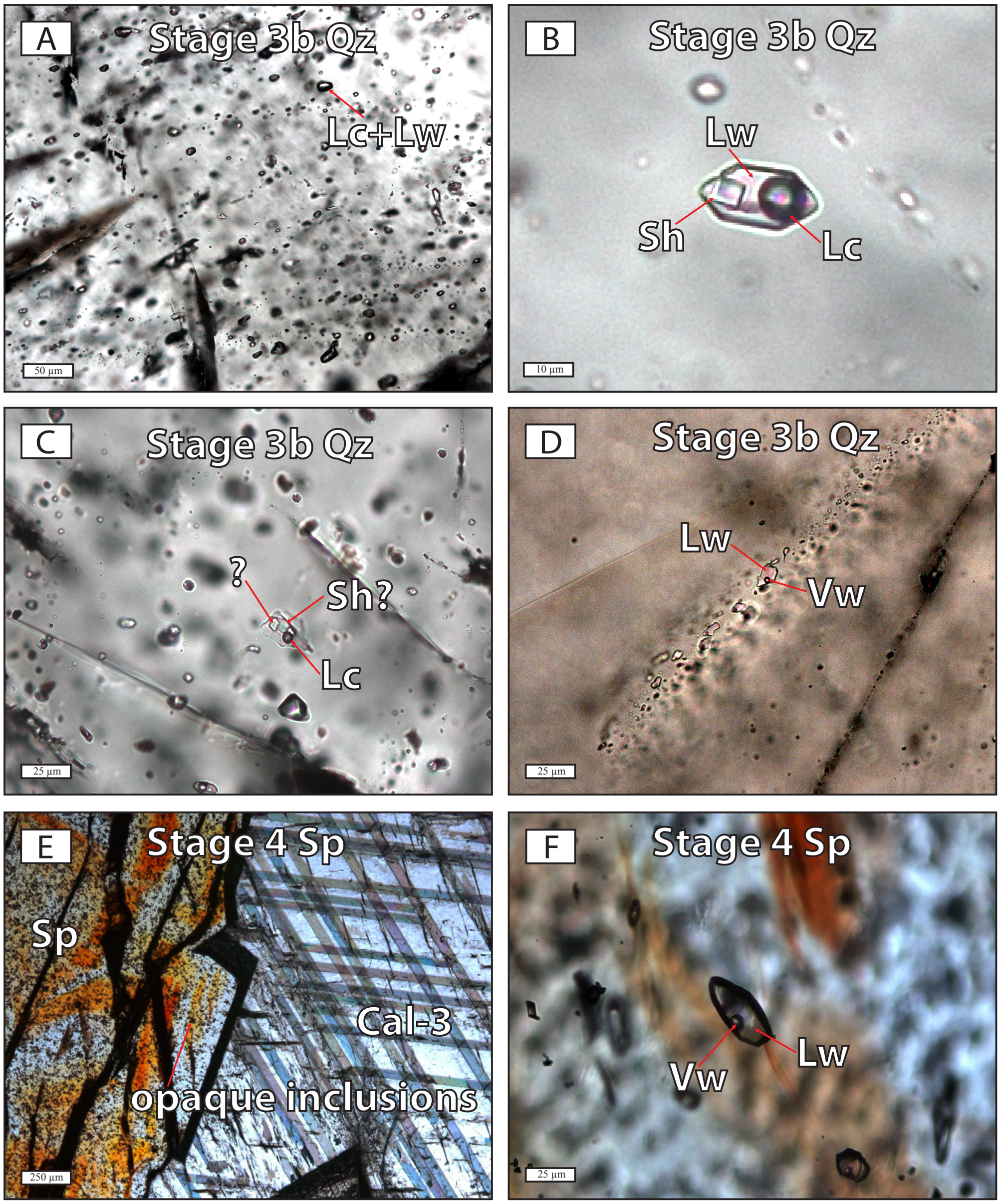


Figure 15. Fluid inclusion images for Qz-1 and Stage 4 sphalerite including (A) abundant primary carbonic-aqueous fluid inclusions in quartz, (B) negative crystal shape of primary aqueous-carbonic brine in quartz, (C) multisolid carbonic-aqueous brine possibly containing halite and an unknown solid in quartz, (D) secondary trail of water and water vapour in quartz, (E) sphalerite and Cal-3 in a vein, dark areas in sphalerite are opaque inclusions, and (F) water and water vapour inclusions in secondary trails in sphalerite.

an average of -11 ºC that correspond to a calculated salinity of 15 wt. % NaCl eq. Total homogenization temperatures have an average of 259 ºC.

Late calcite veining

Late calcite veins crosscut the Rackla pluton (Fig. 7bi) and contain rare primary fluid Lw+Vw inclusions (Fig. 14b). These inclusions have phase proportions of Lw = 0.95 and they did not appear to be necked or in trails. First ice melting temperatures have an average of -28 ºC. Final ice melting temperatures average -12 ºC that

Table 2. Summary of microthermometric data. Shaded rows correspond to FIA's and all measurements are recorded in °C. Abbreviations are P = p primary, PS = pseudosecondary, S = secondary, T_MCO_2 = final ice melting of CO_2, T_HCO_2 = homogenization temperature of the CO_2 phase, T_{FM} = temperature of first aqueous ice melting, T_M = final melting of aqueous ice, T_M*halite* = dissolution temperature of halite, T_D = decrepitation temperature, T_H = total homogenization temperature, LVS = volumetric proportions of liquid, vapour and solid, and INT = intrusion. Total number (n) of inclusions measured are listed for FIA's and inclusion types, however, some individual inclusions do not have all microthermometric data recorded and thus, data in this table do not correspond to the exact number of listed measured inclusions, see appendix for a full data table.

n=	FIA	Phase	Stage	Type	P PS S	T_MCO_2			T_HCO_2			T_{FM}	T_M	T_M*halite*	wt % NaCl	T_D	T_H	L	V	S
						MIN	MAX	**AVG**	MIN	MAX	**AVG**									
8	33	RP-Qz	INT	Lw+Vw+Sh	P							-33		152	**29**		**284**	0.85	0.10	0.05
11	35	RP-Qz	INT	Lw+Vw	P							-22	-8		**12**		**227**	0.95	0.05	0.00
1	34	RP-Qz	INT	Lw+Lc+Sh	P			**-56.7**			**26**	-22		>350	**>40**	350		0.85	0.10	0.05
11	36	RP-Qz	INT	Lw+Lc	P			**-56.6**			**28**	-28	-11		**15**	370	**341**	0.90	0.10	0.00
7	33	RP-Qz	INT	Lw+Vw	S							-30	-11		**15**		**259**	0.95	0.05	0.00
5	32	RP-Cal	INT	Lw+Vw	P							-28	-12		**16**		**290**	0.95	0.05	0.00
10	1	Dol-1	Stage 1	Lw+Lc	P	-56.6	-56.2	**-56.4**	28	29	**29**	-39				365	**406**	0.56	0.44	0.00
1	1	Dol-1	Stage 1	Lw+Lc+Sh	P			**-56.3**			**28**			380	**45**			0.50	0.49	0.01
6	19	Dol-1	Stage 1	Lc+Lw	P	-56.8	-56.6	**-56.7**	15	22	**17**					266		0.32	0.68	0.00
2	19	Dol-1	Stage 1	Lw+Lc	P	-56.6	-56.3	**-56.5**	20	28	**24**	-35	-23		**24**			0.55	0.45	0.00
9	19	Dol-1	Stage 1	Lw+Lc+Sh	P	-65.0	-56.4	**-57.9**	24	28	**27**	-35	-23		**24**			0.66	0.29	0.05
3	19	Dol-1	Stage 1	Lw+Lc+Sh+So	P	-65.0	-56.4	**-59.8**	22	30	**26**	-30	-8		**12**			0.78	0.17	0.05
3	20	Dol-1	Stage 1	Lw+Lc	P			**-57.0**										0.70	0.30	0.00
13	20	Dol-1	Stage 1	Lw+Lc+Sh	P	-60.0	-57.0	**-59.0**				-35	-22		**24**			0.67	0.28	0.05
1	21	Dol-1	Stage 1	Lw+Lc	P											290		0.70	0.30	0.00
6	21	Dol-1	Stage 1	Lw+Lc+Sh	P							-33	-22	171	**31**	340		0.63	0.28	0.08
1	22	Dol-1	Stage 1	Lc+Lw	P			**-56.4**			**23**							0.20	0.80	0.00
3	22	Dol-1	Stage 1	Lw+Lc	P													0.90	0.10	0.00
6	22	Dol-1	Stage 1	Lw+Lc+Sh	P			**-56.4**			**30**	-36		226	**33**			0.66	0.25	0.06
2	22	Dol-1	Stage 1	Lw+Lc+Sh+So	P			**-56.4**			**30**	-35		250	**35**			0.65	0.30	0.05
9	23	Dol-1	Stage 1	Lw+Lc	P			**-56.4**	28	30	**29**	-38	-15		**9**			0.73	0.27	0.05
7	23	Dol-1	Stage 1	Lw+Lc+Sh	P			**-56.4**			**29**							0.69	0.23	0.09
6	30	Dol-1	Stage 1	Lc+Lw	P	-57.4	-56.6	**-57.2**	10	15	**13**					280		0.20	0.80	0.00
11	31	Dol-1	Stage 1	Lc+Lw	P	-56.7	-56.6	**-56.6**	17	22	**20**					328		0.20	0.80	0.00
4	31	Dol-1	Stage 1	Lw+Lc	P	-56.7	-56.6	**-56.6**	18	19	**26**							0.70	0.30	0.00
2	31	Dol-1	Stage 1	Lw+Lc+Sh+So	P	-56.6								213	**33**			0.85	0.10	0.05
9	24	Dol-2b	Stage-2b	Lc+Lw	P	-56.9	-56.5	**-56.6**	4	17	**10**					285		0.11	0.89	0.00
1	24	Dol-2b	Stage-2b	Lw+Lc+Sh	P			**-56.6**			**27**	-35	-15		**19**	280		0.69	0.30	0.01
14	25	Dol-2b	Stage-2b	Lc+Lw	P	-56.6	-56.4	**-56.6**	10	26	**18**	-23	-11		**14**	256		0.26	0.74	0.00
3	25	Dol-2b	Stage-2b	Lw+Lc+Sh	P			**-56.6**	23	29	**25**	-35		283	**37**			0.75	0.20	0.05
11	26	Dol-2b	Stage-2b	Lc+Lw	P	-57.0	-56.6	**-56.6**	3	16	**12**					241		0.20	0.80	0.00
4	26	Dol-2b	Stage-2b	Lw+Lc	P			**-56.6**	12	27	**21**	-35	-15		**19**			0.70	0.30	0.00
5	26	Dol-2b	Stage-2b	Lw+Lc+Sh	P			**-56.6**	22	27	**24**	-35	-20	212	**30**	290		0.60	0.30	0.10

Table 2. Cont.

n=	FIA	Phase	Stage	Type	P PS S	T_MCO_2 MIN	T_MCO_2 MAX	T_MCO_2 **AVG**	T_HCO_2 MIN	T_HCO_2 MAX	T_HCO_2 **AVG**	T_{FM}	T_M	T_M*halite*	wt % NaCl	T_D	T_H	L	V	S
1	2	Qz-1	Stage 3b	Lw+Vw	Unk							-35					**268**	0.95	0.05	0.00
1	3	Qz-1	Stage 3b	Lw+Lc+Sh	P			**-60.0**			**3**	-10		163	**30**	230		0.50	0.45	0.05
2	4	Qz-1	Stage 3b	Lc+Lw	P			**-57.7**			**25**	-11						0.20	0.80	0.00
2	4	Qz-1	Stage 3b	Lw+Lc	P			**-57.0**	23	25	**24**	-23					**350**	0.80	0.20	0.00
3	4	Qz-1	Stage 3b	Lw+Lc+Sh	P	-57.8	-56.8	**-57.4**			**22**	-26					**278**	0.83	0.16	0.01
5	4	Qz-1	Stage 3b	Lw+Lc+Sh+So	P			**-56.8**	17	20	**19**					400	**410**	0.73	0.26	0.01
11	5	Qz-1	Stage 3b	Lc+Lw	P			**-57.1**	12	14	**12**					300		0.20	0.80	0.00
9	6	Qz-1	Stage 3b	Lc+Lw	P	-57.1	-56.8	**-56.8**	10	19	**15**	-25				300		0.20	0.80	0.00
2	6	Qz-1	Stage 3b	Lw+Lc+Sh+So	P			**-56.4**			**28**	-30		355	**43**	360		0.65	0.30	0.05
3	7	Qz-1	Stage 3b	Lc+Lw	P	-61.6	-61.1	**-61.3**	2	6	**3**	-30				343		0.20	0.80	0.00
2	7	Qz-1	Stage 3b	Lw+Lc+Sh	P	-63.0	-61.5	**-62.3**			**2**	-25		154	**30**	356		0.70	0.20	0.10
21	8	Qz-1	Stage 3b	Lc+Lw	PS	-57.6	-57.4	**-57.6**	13	20	**17**	-20	-12		**16**			0.20	0.80	0.00
44	9	Qz-1	Stage 3b	Lc+Lw	P	-57.2	-56.6	**-56.8**	7	15	**10**							0.20	0.80	0.00
9	10	Qz-1	Stage 3b	Lc+Lw	P			**-57.2**	6	7	**7**							0.20	0.80	0.00
3	10	Qz-1	Stage 3b	Lw+Lc	P			**-57.0**	9	20	**14**	-32						0.78	0.22	0.00
2	10	Qz-1	Stage 3b	Lw+Lc+Sh	P			**-58.2**			**17**	-26						0.94	0.05	0.01
1	10	Qz-1	Stage 3b	Lw+Lc+Sh+So	P			**-57.6**			**8**	-30	-3					0.19	0.80	0.01
1	11	Qz-1	Stage 3b	Lc+Lw	PS			**-61.2**			**-1**							0.20	0.80	0.00
22	11	Qz-1	Stage 3b	Lw+Lc+Sh	PS	-68.0	-56.8	**-58.5**	3	12	**9**	-35		165	**30**			0.80	0.18	0.02
11	12	Qz-1	Stage 3b	Lc+Lw	P	-57.0	-56.6	**-56.8**	8	27	**23**	-20				300		0.51	0.49	0.00
1	12	Qz-1	Stage 3b	Lw+Lc+nS	P							-35		210	**32**		**200**	0.80	0.10	0.10
5	12	Qz-1	Stage 3b	Lw+Lc+Sh	P							-37	-19	226	**31**	300	**277**	0.70	0.18	0.12
8	12	Qz-1	Stage 3b	Lw+Lc+Sh+So	P							-36	-20	206	**29**	300		0.69	0.23	0.09
17	13	Qz-1	Stage 3b	Lc+Lw	P	-56.8	-56.2	**-56.7**	17	24	**20**							0.24	0.76	0.00
1	13	Qz-1	Stage 3b	Lc+Lw+Sh	P			**-56.6**			**27**							0.65	0.30	0.05
4	13	Qz-1	Stage 3b	Lw+Lc	P	-56.8	-56.6	**-56.7**	27	29	**28**							0.70	0.30	0.00
4	13	Qz-1	Stage 3b	Lw+Lc+Sh	P	-56.8	-56.2	**-56.4**	16	28	**22**	-32						0.83	0.12	0.05
5	14	Qz-1	Stage 3b	Lc+Lw	P	-57.4	-56.7	**-57.2**	20	24	**22**							0.26	0.74	0.00
14	14	Qz-1	Stage 3b	Lw+Lc+Sh	P	-57.4	-56.6	**-57.0**	23	25	**24**	-35	-24	241	**34**		**250**	0.76	0.15	0.09
10	14	Qz-1	Stage 3b	Lw+Lc+Sh+So	P			**-56.6**			**25**	-30	-21	239	**33**			0.78	0.16	0.06
1	15	Qz-1	Stage 3b	Lw+Vw+nS	Unk							-25	-7	209	**32**	209				
3	16	Qz-1	Stage 3b	Lc+Lw	PS				10	13	**12**							0.20	0.80	0.00
7	16	Qz-1	Stage 3b	Lw+Lc+Sh	P			**-56.4**	17	21	**19**	-36						0.62	0.23	0.15
4	17	Qz-1	Stage 3b	Lw+Vw+nS	Unk							24	28		**27**			0.75	0.05	0.20
11	18	Qz-1	Stage 3b	Lc+Lw	P	-57.7	-56.9	**-57.3**	12	20	**15**					350		0.30	0.70	0.00
1	18	Qz-1	Stage 3b	Lw+Lc	P			**-56.6**			**17**					350		0.50	0.50	0.00
8	18	Qz-1	Stage 3b	Lw+Lc+Sh+So	P	-57.1	-56.4	**-56.6**	11	22	**18**	-32	-15	237	**34**	359		0.71	0.24	0.05
20	27	Sp	Stage 4a	Lw+Vw	S								-4		**7**		**151**	0.02	0.98	0.00
1	28	Sp	Stage 4a	Lw+Vw	S							-13	-1		**1**		**153**	0.02	0.98	0.00
10	29	Sp	Stage 4a	Lw+Vw	S							-10	-3		**5**		**150**	0.02	0.98	0.00

correspond to calculated salinities that have an average value of 16 wt. % NaCl eq. Total homogenization values have an average of 290 ºC.

Tiger Zone

Dol-1

Dolomite 1 contains abundant fluid inclusions. Many of the inclusions appeared to be of primary origin. Most inclusions, however, were very small (<10 µm) and due to the opaque nature of the dolomite it was difficult to observe phase transitions.

The most abundant inclusion type in Dol-1 were aqueous carbonic inclusions (Lc+Lw) and had phase proportions of Lc = 0.8 and Lw = 0.2 (Fig. 14c). These inclusions had dark rims on their perimeter making the thin Lw portion very difficult to see and thus, microthermometric data from these inclusions are rare. Upon cooling, these inclusions nucleated a Vc phase, which homogenized into the Lc phase between temperatures of 13 and 23 ºC. During the heating run, melting temperatures of CO_2 were mostly within error of -56.6 ºC with some values of -57.2 ºC, which may indicate the presence of another phase such as CH_4 or N_2 (Roedder, 1984). Aqueous ice melting was not observable and thus, no ice melting temperatures were recorded. Decrepitation temperatures have an average of 300 ºC.

A less abundant, primary FIA was observed consisting of Lw+Lc+Sh+So inclusions with Lc+Lw inclusions. These halite-bearing inclusions had degrees of fill of Lw = 0.8, Lc = 0.15, Sh = 0.05 and So = trace (Fig. 14d). The So occurred as a very small black speck attached to halite cubes, but was not always visible in all inclusions; it may have been present in most inclusions but hidden by the opaque rims of inclusions. Upon cooling, a Vc phase nucleated in the Lc phase followed by the formation of solid CO_2 at low temperatures. In the heating runs, melting temperatures for the solid CO_2 range from -65.0 to -56.6 ºC and the Vc phase homogenized to the Lc phase at 26 to 30 ºC. First melting temperature of aqueous ice had a range of -36 to -30 ºC. Halite dissolution occurred at a range of temperatures of 171 to 380 ºC corresponding with calculated salinities of 31 to 45 wt. % NaCl eq. Total homogenization temperatures were not recorded due to fluid inclusion decrepitation however, decrepitation temperatures have an average of 317 ºC.

A rare primary inclusion population occurred as a phase assemblage of Lw+Lc

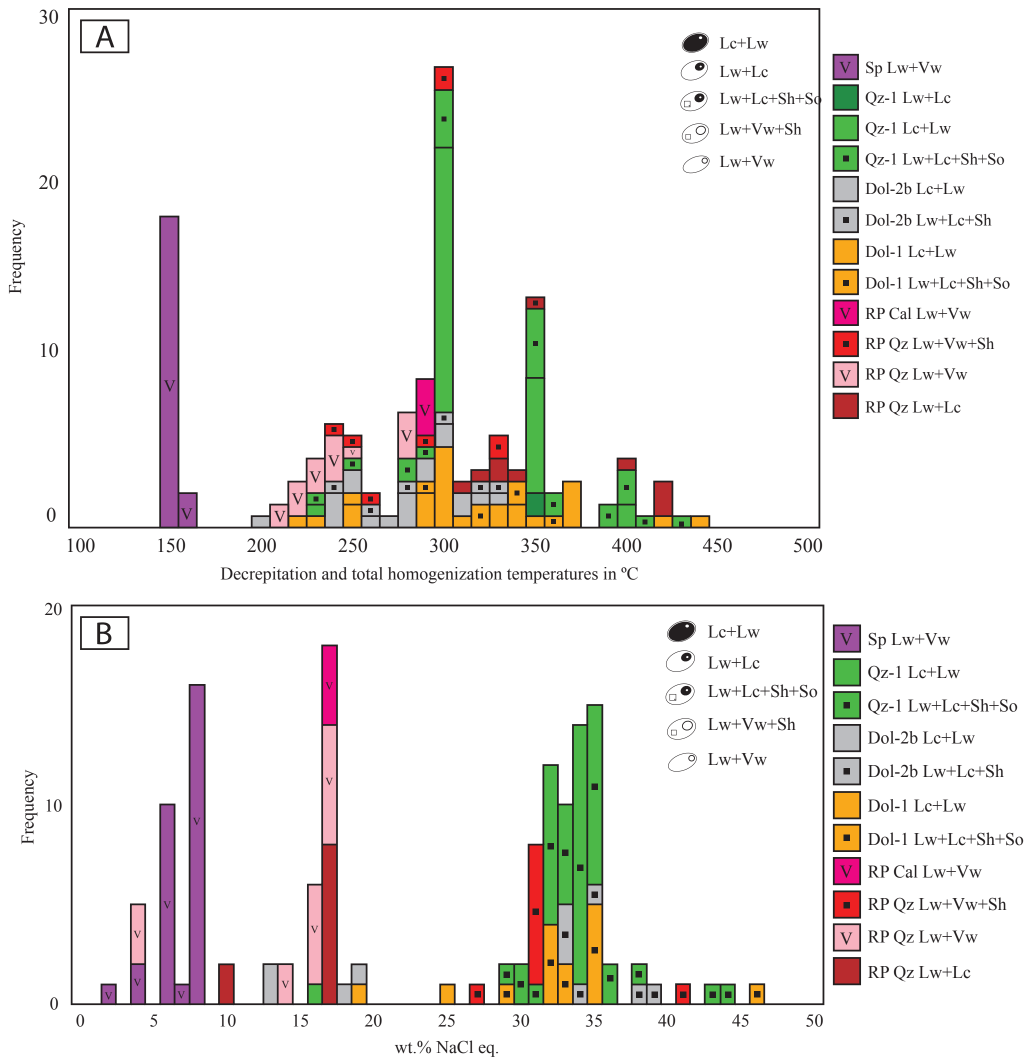


Figure 16. Fluid inclusion summary data including (a) decrepitation and homogenization temperatures, and (b) salinity data reported as wt. % NaCl eq.

(Fig. 14e). These inclusions occurred adjacent to the Lc+Lw and Lw+Lc+Sh+So and appeared to be part of the same FIA. Phase proportions for these inclusions are Lw = 0.7 and Lc = 0.3. Upon cooling, a Vc phase nucleated in the Lc phase followed by the formation of solid CO_2 at low temperatures. In the heating runs, melting temperatures for the solid CO_2 range from -56.7 to -56.6 ºC and the Vc phase homogenized to the Lc phase at 24 to 29 ºC. The temperature of first aqueous ice melting had a range of -39 to -35 ºC. These inclusions have calculated salinity values of 9 to 24 wt. % NaCl eq. based on final ice melting temperatures of -23 and -15 ºC. Because no clathrate was observed, no clathrate melting temperature was obtained and thus, calculated salinities are overestimated. Total homogenization temperatures have an average of 406 ºC and decrepitation temperatures had a range between 290 and 365 ºC.

Rare Lw+Lc+nS inclusions occurred and contained solid halite as well as an acicular mineral with a green hue in PL (anhydrite?) (Fig. 14d). These inclusions were observed adjacent to FIAs of Lc+Lw, Lw+Lc+Sh+So, and Lw+Lc yet it is unclear if these inclusions are primary or altered by post-entrapment processes, and thus were not measured by microthermometry.

Secondary trails of <2 µm Lw+Vw inclusions crosscut Dol-1 primary FIAs, however the small size of the inclusions within the trails did not allow for microthermometric measurements.

Dol-2b

Dol-2b had fewer inclusions than Dol-1, but the host minerals were less opaque allowing for easier data collection. The FIAs in Dol-2b are very similar to FIAs in Dol-1in that they contain primary Lc+Lw, Lw+Lc+Sh+So and lesser Lw+Lc fluid inclusions, all of which have similar microthermometric data to Dol-1.

The most common fluid inclusion type was the Lc+Lw that had phase proportions of Lc = 0.8 and Lw = 0.2 (Fig. 14c). These inclusions had dark rims on their perimeter making the Lw portion difficult to see and thus, microthermometric data are rare. Carbonic vapour bubbles nucleated in the Lc phase during cooling, and during subsequent heating homogenized by vapour disappearance at 12 to 18 ºC. Melting temperatures of frozen Lc were all within error of -56.6 ºC, indicative of a pure CO_2 phase. First ice melting occurred at -23 ºC and final ice melting occurred at -11 ºC which was calculated to correspond with 14 wt. % NaCl eq. Due to the lack of any observable clathrate, the calculated salinities from aqueous ice melting are overestimates. Decrepitation temperatures have an average of 270 ºC.

Primary Lw+Lc+Sh+So fluid inclusions were less common yet rarely they occurred in same FIA with Lc+Lw inclusions. These inclusions had degrees of fill of Lw = 0.69, Lc = 0.3, Sh = 0.01 and So = trace (Fig. 14d). The So occurred as a very small black speck attached to halite cubes, however, similar to the inclusions in Dol 1 the So was not always observed. The Lc nucleated a Vc upon cooling, which homogenized during heating into the Lc phase at 24 to 27 ºC by vapour disappearance. Melting temperatures for the Lc phase have an average of -56.6 ºC. First aqueous ice melting temperatures have an average of -35 ºC and halite dissolution occurred at temperatures of 212 to 283 ºC, thus, the calculated salinities for these inclusions range from 30 to 37 wt. % NaCl eq. Decrepitation temperatures have an average of 288 ºC.

A rare primary inclusion population occurred as a phase assemblage of Lw+Lc with phase proportions of Lw = 0.7 and Lc = 0.3. These inclusions are found with Lc+Lw and Lw+Lc+Sh+So inclusions and are thus, considered to part of the same FIA. Upon cooling, a Vc nucleated in the Lc phase followed by the formation of solid CO_2 at low temperatures. In the heating runs, melting temperatures for the solid CO_2 have a range from -57.0 to -56.4 ºC and the Vc phase homogenized to the Lc phase at 21 ºC. First melting of aqueous ice had an average of -35 ºC and final ice melting occurred at -15 ºC and thus, have a maximum salinity of 19 wt. % NaCl eq. Total homogenization and decrepitation temperatures were not recorded.

Secondary trails of <2 µm Lw+Vw inclusions crosscut Dol-2b primary FIAs, however their small size did not allow for microthermometric measurements.

Qz-1

Fluid inclusion assemblages in Qz-1 are comparable to the FIAs hosted in Dol-1 and Dol-2b and have similar microthermometric data (Fig. 14f).

The most dominant primary inclusion type was the Lc+Lw assemblage (Fig. 15a) with phase proportions of Lc = 0.8 and Lw = 0.2. A single fluid inclusion contained a small halite cube, Sh = 0.05, however only carbonic phase measurements were obtained. Upon cooling, nucleation of a Vc occurred within the Lc phase, which upon heating homogenized at -1 to 25 ºC into the Lc phase. Melting temperatures of solid Lc range from -61.3 to -56.6 ºC. First aqueous ice melting temperatures had a range between -30 and -11 ºC, and final ice melting temperatures, although rare, have an average of -12 ºC, for a calculated salinity of 16 wt. % NaCl eq. Decrepitation temperatures have a range from 300 to 350 ºC. No total homogenization temperatures were recorded.

Primary Lw+Lc+Sh+So inclusions were found with Lc+Lw inclusions in the same FIA (Fig. 14f). These inclusions have phase proportions of Lw = 0.8, Lc = 0.15, Sh = 0.05 and So = trace. Most of these inclusions resemble the inclusion in Figure 15b, having negative crystal shapes and clear optics. A small black speck

(So) attached to the halite cubes was not always visible. During cooling, a Vc nucleated in the Lc phase which, upon heating homogenized into the Lc phase at 2 to 28 ºC. Melting temperatures of the solid carbon phase had a range of -62.3 to -56.4 ºC. First ice melting temperatures had a range from -37 to -10 ºC however, the average temperature was -30 ºC. Halite melting temperatures had a range of 154 to 355 ºC corresponding with salinities that range from 29 to 43 wt. % NaCl eq. Decrepitation of inclusions occurred during heating runs and range from 230 to 400 ºC and total homogenization temperatures of a small number of inclusions that did not decrepitate range from 250 to 410 ºC.

Primary Lw+Lc inclusions are very rare and have phase proportions of Lw = 0.7 and Lc = 0.3. When they are observed, they occur with Lc+Lw and Lw+Lc+Sh+So inclusions and are considered to be part of the same FIA. Cooling results in Vc nucleation in the Lc phase which upon heating homogenizes at 14 to 28 ºC by vapour disappearance. Melting temperatures of solid Lc range between -57.0 and -56.6 ºC. First aqueous ice melting temperatures had a range of -32 to -23 ºC. Final ice melting and clathrate melting were not observable and therefore, no salinities are reported. One temperature of decrepitation was recorded at 350 ºC.

Multisolid Lw+Lc+nS inclusions also occurred in the quartz (Fig. 15c) it is not known if they are primary, pseudosecondary or secondary inclusions. These inclusions had a range of 5 to 30 µm and were often necked and had irregular shapes. Solid phases present include two cubic minerals, and occasional rhombic and acicular phases (Fig. 15c)

Secondary trails of Lw+Vw inclusions occurred crosscutting primary phases in Qz-1 (Fig. 15d). These inclusions had phase proportions of Lw = 0.95 and Vw = 0.05 but were generally too small (<10 µm) to observe accurate phase transitions.

Sphalerite

Sphalerite of Stage 4a contains abundant growth zones and fluid inclusions, however, most of these inclusions appeared opaque (Fig. 15e). Secondary Lw+Vw fluid inclusions were present (Fig. 15f), are 10-30 µm long and occur in planar trails cutting across growth zones. Phase proportions were Lw = 0.95 and Vw = 0.05. First ice melting temperatures have a range of -13 to -10 ºC and final ice melting temperatures have a range of -4 to -1 ºC corresponding to calculated salinities of 1 to 7 wt. % NaCl eq. Total homogenization temperatures had a range from 150 to 153 ºC.

3.4 Carbon, Oxygen, Sulphur and Strontium Isotopes

80 carbonate, 2 quartz and 2 whole-rock samples were analyzed for $\delta^{13}C$ and/or $\delta^{18}O$ based on the paragenetic classification in Figure 5. These data are presented in Table 3 and Figure 17. Arsenopyrite, pyrite, pyrrhotite, bismuthinite and sphalerite mineral separates were analyzed for $\delta^{34}S$. Samples from each stage of the paragenetic sequence as well as from the Rackla pluton were analyzed and the data are presented in Tables 4 and Figure 18. Total strontium concentration and strontium isotope ($^{87}Sr/^{86}Sr$) values were obtained from 25 carbonate samples and 1 whole-rock sample from the Rackla pluton. Samples were selected based on their distribution throughout the deposit as well as based on the paragenesis presented in Figure 5. All quartz and carbonate samples were analyzed for $\delta^{18}O$ and carbonates were additionally analyzed for $\delta^{13}C$ which contributed to the sample selection process for the strontium work. The data are presented in Table 5 and Figures 19 and 20.

Host-Rock

Host-rock $\delta^{13}C$ and $\delta^{18}O$ values range from -3.8 to 3.2 ‰ and 16.2 to 22.3 ‰ respectively. Tiger zone marble has $\delta^{13}C$ values of -3.8 to 2 ‰ and $\delta^{18}O$ values of 13.4 to 18.9 ‰. Calcite within the leopard unit has a range in $\delta^{13}C$ values from -3.9 to -0.6 ‰ and $\delta^{18}O$ values that range from 14.4 to 18.9 ‰.

Limestone, marble and leopard-calcite were also analyzed for $^{87}Sr/^{86}Sr$ and have values ranging from 0.7086 to 0.7264. The lowest ratios of 0.7086 to 0.7093 correspond to unaltered host-rock reflecting normal marine $^{87}Sr/^{86}Sr$ values for the Ordovician to Silurian (Veizer et al., 1999). However, most of these data values are much higher than normal marine $^{87}Sr/^{86}Sr$.

Rackla Pluton

Two whole-rock samples from the Rackla pluton have $\delta^{18}O$ values of 11.2 and 11.7 ‰. A single whole-rock sample from the Rackla pluton has a measured $^{87}Sr/^{86}Sr$ value of 0.7618 and a calculated initial $^{87}Sr/^{86}Sr$ value of 0.7089 at an age of 62.9 Ma.

Table 3. All $\delta^{13}C$ and $\delta^{18}O$ data for analyzed samples including sample ID, mineralogy, and paragenetic stage. Sample IDs with asterisks (*) correspond to samples that have also been analyzed for $^{87}Sr/^{86}Sr$ analysis. Abbreviations are Cal = calcite, Lst = limestone, Dol = dolomite, Mbl = marble, Lep = leopard marble, Qz = quartz, RP = Rackla pluton, WR = whole-rock, RP -cal = Rackla pluton hosted calcite vein, and Int = intrusion.

Sample ID	Phase	Stage	$\delta^{13}C_{PDB}$ ‰	$\delta^{18}O_{SMOW}$ ‰
08-07 61.45*	Limestone	Host Rock	-3.8	18.3
08-07 17.95	Limestone	Host Rock	-0.8	18.6
10-73 275.50*	Limestone	Host Rock	-2.8	19.1
ER-13	Limestone	Host Rock	-0.6	16.2
08-07 17.95*	Limestone	Host Rock	-1.1	16.9
08-07 41.50*	Limestone	Host Rock	-3.6	17.7
08-07 18.73*	Limestone	Host Rock	-1.4	18.3
08-07 17.95	Limestone	Host Rock	-1.2	19.1
ER-3	Limestone	Host Rock	-0.5	20.1
ER-1	Limestone	Host Rock	1.1	20.7
08-07 9.22	Limestone	Host Rock	-0.8	20.9
ER-9*	Limestone	Host Rock	0.7	22.1
ER-7*	Limestone	Host Rock	3.2	22.3
Sc10-05 245.5	RP-WR	Int	n/a	11.2
Sc10-05 221.0*	RP-WR	Int	n/a	11.6
Sc10-05 212.00	RP-Mbl	Int	-6.5	12.9
Sc10-05 216.40	RP-Mbl	Int	-1.5	18.1
Sc10-05 256.30	RP-Cal	Int	-1.7	-5.2
Sc10-05 260.70*	RP-Cal	Int	-4.2	17.0
Sc10-05 268.70	RP-Cal	Int	-1.4	20.4
10-89 103.31*	Mbl	Host Rock	-3.8	13.4
10-76 133.80*	Mbl	Host Rock	-3.0	15.7
10-77 122.15	Mbl	Host Rock	-0.6	20.1
10-77 117.71	Mbl	Host Rock	-1.4	20.2
08-05 159.35*	Mbl	Host Rock	2.0	22.0
08-04 174.38	Mbl	Host Rock	1.4	22.9
08-04 174-38	Mbl	Host Rock	1.3	23.1
08-04 174.38*	Mbl	Host Rock	1.2	23.1
08-07 238.16	Lep-Cal	Host Rock	-3.7	14.4
10-73 408.00	Lep-Cal	Host Rock	-3.9	14.6

Sample ID	Phase	Stage	$\delta^{13}C_{PDB}$ ‰	$\delta^{18}O_{SMOW}$ ‰
08-04 181.65	Lep-Cal	Host Rock	-0.6	18.9
10-87 109.60	Dol-1	Stage 1	-6.5	12.5
09-66 55.70	Dol-1	Stage 1	-6.0	16.4
08-07 172.74	Dol-1	Stage 1	-6.1	17.3
08-04 136.45*	Dol-1	Stage 1	-7.3	17.4
08-07 227.64	Dol-1	Stage 1	-7.3	17.6
08-04 145.59	Dol-1	Stage 1	-7.5	17.7
08-07 199.67	Dol-1	Stage 1	-7.4	17.7
08-04 136.45	Dol-1	Stage 1	-7.1	17.8
08-07 199.33*	Dol-1	Stage 1	-3.3	17.8
08-07 175.46	Dol-1	Stage 1	-7.4	18.1
08-07 217.77	Dol-1	Stage 1	-7.2	18.3
08-07 199.33	Dol-1	Stage 1	-0.6	18.4
08-06 45.82	Dol-1	Stage 1	-5.2	19.6
09-51 74.52*	Dol-1	Stage 1	-6.7	17.5
09-67 51.30	Dol-1	Stage 1	-7.1	17.8
09-59	Dol-1	Stage 1	-6.5	17.9
10-75 176.65*	Dol-1	Stage 1	-7.8	16.3
10-73 219.50	Dol-1	Stage 1	-6.8	17.6
10-75 212.35	Dol-1	Stage 1	-7.2	17.7
08-04 162.30	Dol-1	Stage 1	-7.0	17.8
09-18 261.50*	Dol-1	Stage 1	-6.4	17.8
10-77 121.60*	Dol-1	Stage 1	-6.8	17.8
08-07 194.93	Dol-1	Stage 1	-7.3	18.0
08-04 122.36	Dol-1	Stage 1	-7.1	18.2
09-66 67.05	Dol-1	Stage 1	-7.1	18.2
10-89 257.00	Dol-1	Stage 1	-6.2	19.3
08-07 227.64	Dol-2a	Stage 2a	-8.4	15.4
08-04 122.36	Dol-2a	Stage 2a	-8.1	16.2
08-04 136.45	Dol-2a	Stage 2a	-7.1	17.5

Table 3. Cont.

Sample ID	Phase	Stage	$\delta^{13}C_{PDB}$ ‰	$\delta^{18}O_{SMOW}$ ‰
10-75 212.35	Dol-2b	Stage 2b	-8.2	15.9
09-66 55.70	Dol-2b	Stage 2b	-6.4	17.6
10-89 104.10	Dol-2b	Stage 2b	-7.3	17.9
10-75 176.65	Dol-2b	Stage 2b	-7.0	18.0
10-73 199.90*	Dol-2b	Stage 2b	-7.0	18.3
08-07 212.89	Qz-1	Stage 3b	n/a	16.9
08-07 176.67	Qz-1	Stage 3b	n/a	17.0
08-04 136.45*	Cal-2	Stage 4b	-7.0	11.8
08-05 77.30	Cal-2	Stage 4b	-7.8	14.7
08-06 38.60*	Cal-2	Stage 4b	-6.4	15.6
08-07 199.67	Cal-2	Stage 4b	-6.6	15.7
08-04 113.96	Cal-2	Stage 4b	5.1	16.4
08-07 199.33*	Cal-2	Stage 4b	-6.6	16.4
08-07 115.20	Cal-2	Stage 4b	-4.4	14.8
08-07 199.33	Cal-2	Stage 4b	-6.7	15.5
08-07 211.04	Cal-2	Stage 4b	-6.9	15.8
08-07 119.33	Cal-2	Stage 4b	-6.7	16.0
08-07 115.20	Cal-2	Stage 4b	-7.1	16.3
09-18 250.25*	Cal-3	Stage 5	1.0	-1.3
10-89 123.30	Cal-3	Stage 5	-4.4	2.7
10-89 123.30	Cal-3	Stage 5	-2.8	3.4
10-99 475.00*	Cal-3	Stage 5	-2.7	4.0
09-18 256.74*	Cal-3	Stage 5	-2.9	16.0

Two samples of marble from the contact aureole of the intrusion, have $\delta^{13}C$ values of -6.5 to -1.5 ‰, and have $\delta^{18}O$ values of 12.9 and 18.2 ‰. The marble sample with the lower values is located immediately adjacent to the Rackla pluton while the marble with higher values is ~4 m from the intrusion.

Calcite veins crosscutting the Rackla pluton have $\delta^{13}C$ values of -4.2 to -1.4 ‰, $\delta^{18}O$ values of -5.2 to 20.4 ‰ and a $^{87}Sr/^{86}Sr$ value of 0.7293.

Arsenopyrite and sphalerite separates from the Rackla pluton have $\delta^{34}S$ values that range from 6.0 to 6.6 ‰.

Tiger Zone Mineralization

Stage 1

Dol-1 ranges in $\delta^{13}C$ values from -7.8 to -5.2 ‰, and ranges in $\delta^{18}O$ values from 12.5 to 19.3 ‰. The $^{87}Sr/^{86}Sr$ values of Dol-1 range from 0.7183 to 0.7244.

Apy-1 from has $\delta^{34}S$ values ranging from 7.3 to 9.2 ‰.

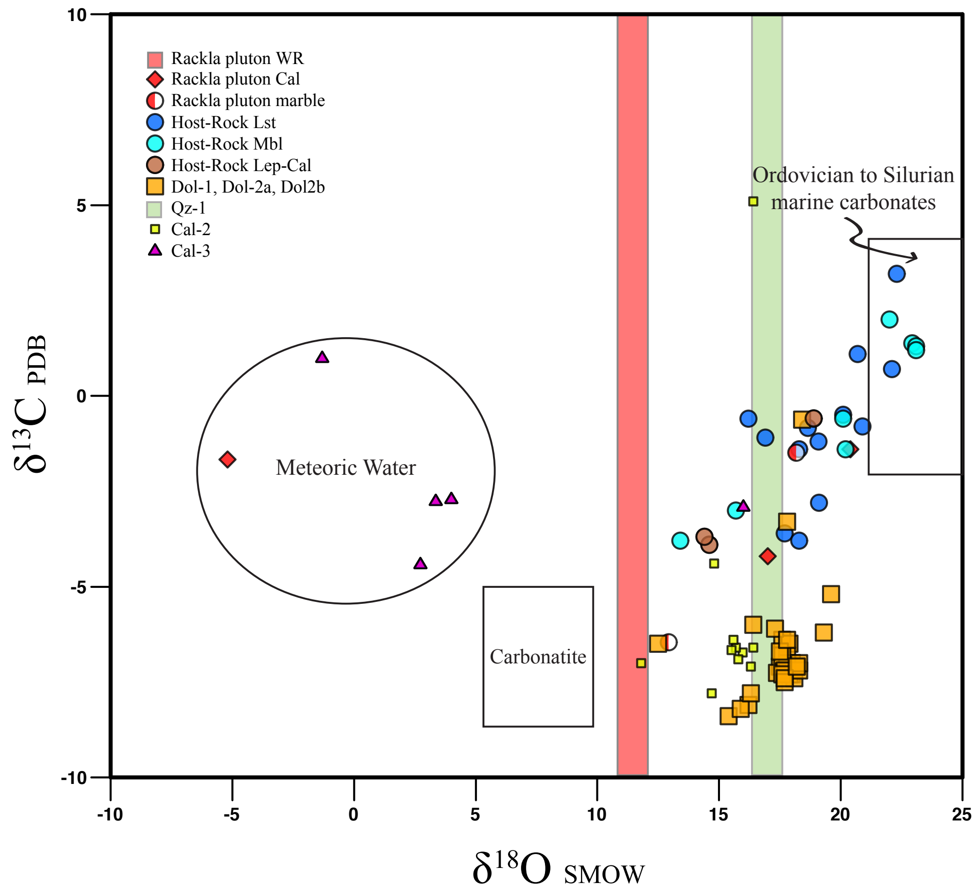


Figure 17. Stable isotope $^{13}C/^{12}C$ and $^{18}O/^{16}O$ data reported in delta notation in per mille relative to PDB and SMOW respectively for host-rock limestones, marbles, hydrothermal dolomite and calcite as well as data for Rackla pluton marble, calcite veins and whole-rock values. Rackla pluton whole-rock data and Tiger zone Qz-1 data do not have associated carbon isotope values and are plotted as bars. Ordovician to Silurian marine carbonates box is derived from Veizer et al. (1999), carbonatite box is from Valley (1986).

Stage 2

Dol-2a has a range of $\delta^{13}C$ and $\delta^{18}O$ values of -8.4 to -7.1 ‰ and 15.4 to 17.5 ‰ respectively. Dol-2a has a $^{87}Sr/^{86}Sr$ value of 0.7252, similar to values from Dol-1. The $\delta^{13}C$ values of Dol-2b range from -8.2 to -6.4 ‰ and the $\delta^{18}O$ values from 15.9 to 18.3 ‰.

Py-1 has $\delta^{34}S$ values ranging from 5.0 to 8.6 ‰ and Py-2 ranges in $\delta^{34}S$ from 1.7 to 8.4 ‰.

Stage 3

Qz-1 has $\delta^{18}O$ values ranging from 16.9 to 17.0 ‰.

Py-3 has $\delta^{34}S$ values between 3.5 and 9.6 ‰. This phase of pyrite is the only sulphide phase sampled that has a bimodal distribution of $\delta^{34}S$ values (Fig. 18).

Table4. All $\delta^{34}S$ data for Tiger zone and Rackla pluton samples. Mineralogical abbreviations are Apy = arsenopyrite, Py = pyrite, Po = pyrrhotite, Bs = bismuthinite and Sp = sphalerite.

Sample ID	Phase	Stage	$\delta^{34}S_{CDT}$ ‰	Sample ID	Phase	Stage	$\delta^{34}S_{CDT}$ ‰
09-66 67.40	Apy-1	Stage 1	**7.3**	08-04 116.74	Apy-1	Stage 1	**9.0**
08-04 162.30	Apy-1	Stage 1	**7.4**	08-07 174.62	Apy-1	Stage 1	**9.0**
09-66 67.05	Apy-1	Stage 1	**7.6**	08-04 113.24	Apy-1	Stage 1	**9.2**
09-66 69.90	Apy-1	Stage 1	**7.7**	10-75 176.65	Py-1	Stage 2a	**5.0**
08-04 168.26 b	Apy-1	Stage 1	**7.8**	08-05 102.80	Py-1	Stage 2a	**6.5**
08-07 227.64	Apy-1	Stage 1	**7.9**	08-07 199.67	Py-1	Stage 2a	**6.6**
08-04 163.64 a	Apy-1	Stage 1	**7.9**	09-66 5570	Py-1	Stage 2a	**7.0**
10-77 121.60 a	Apy-1	Stage 1	**7.9**	09-67 12.40	Py-1	Stage 2a	**7.2**
09-67 51.30	Apy-1	Stage 1	**8.0**	08-04 160.51	Py-1	Stage 2a	**7.2**
10-75 132.90	Apy-1	Stage 1	**8.0**	09-67 51.30	Py-1	Stage 2a	**7.4**
08-05 102.80	Apy-1	Stage 1	**8.0**	09-66 67.40	Py-1	Stage 2a	**7.5**
08-04 168.26 a	Apy-1	Stage 1	**8.2**	09-66 69.90	Py-1	Stage 2a	**7.6**
08-05 77.30 b	Apy-1	Stage 1	**8.3**	08-07 199.33	Py-1	Stage 2a	**7.8**
10-77 121.60 b	Apy-1	Stage 1	**8.3**	08-07 214.30	Py-1	Stage 2a	**7.8**
10-77 121.0	Apy-1	Stage 1	**8.4**	10-77 121.60	Py-1	Stage 2a	**8.0**
08-04 122.36	Apy-1	Stage 1	**8.4**	10-87 109.60	Py-1	Stage 2a	**8.0**
08-04 163.64 b	Apy-1	Stage 1	**8.5**	08-09 116.76	Py-1	Stage 2a	**8.0**
08-06 24.95	Apy-1	Stage 1	**8.6**	09-66 67.05	Py-1	Stage 2a	**8.1**
08-05 77.30 a	Apy-1	Stage 1	**8.6**	08-06 45.82	Py-1	Stage 2a	**8.5**
08-09 116.74	Apy-1	Stage 1	**8.7**	08-05 77.30	Py-1	Stage 2a	**8.5**
09-59 37.90	Apy-1	Stage 1	**8.7**	10-77 121.0	Py-1	Stage 2a	**8.6**
08-07 174.13	Apy-1	Stage 1	**8.7**	10-87 113.40	Py-1	Stage 2a	**8.8**
08-04 111.66	Apy-1	Stage 1	**8.8**	10-89 268.45	Py-2	Stage 2b	**1.7**
08-07 174.55	Apy-1	Stage 1	**8.9**	10-89 251.88	Py-2	Stage 2b	**7.2**
08-07 174.13	Apy-1	Stage 1	**8.9**	08-09 156.24	Py-2	Stage 2b	**7.4**
08-07 175.80	Apy-1	Stage 1	**8.9**	08-04 162.30	Py-2	Stage 2b	**7.5**
08-07 176.67	Apy-1	Stage 1	**8.9**	08-04 156.24	Py-2	Stage 2b	**7.7**
10-87 113.40 a	Apy-1	Stage 1	**8.9**	08-07 227.47	Py-2	Stage 2b	**7.8**
10-87 113.40 b	Apy-1	Stage 1	**8.9**	08-04 166.16	Py-2	Stage 2b	**8.4**

Pyrrhotite and bismuthinite from Stage 3c have $\delta^{34}S$ values ranging from 3.4 to 8.6 ‰.

Stage 4

Cal-2 has a similar range of carbon and oxygen isotope compositions to Dol-1, Dol-2a and Dol-2b. $\delta^{13}C$ values range from -7.8 to 5.1 ‰ and have an average value of -5.6 ‰. $\delta^{18}O$ values range from 11.8 to 16.4 ‰ and $^{87}Sr/^{86}Sr$ values from 0.7189 to 0.7282, similar to values from Dol-1.

Sphalerite from Stage 4a has $\delta^{34}S$ values ranging from -1.2 to 5.2 ‰.

Table 4. Cont.

Sample ID	Phase	Stage	$\delta^{34}S_{CDT}$ ‰	Sample ID	Phase	Stage	$\delta^{34}S_{CDT}$ ‰
08-07 216.74	Py-3	Stage 3a	**3.4**	08-04 111.66	Py-3	Stage 3a	**8.8**
09-18 238.10 a	Py-3	Stage 3a	**3.5**	10-73 177.40	Py-3	Stage 3a	**8.9**
10-75 201.0	Py-3	Stage 3a	**3.5**	09-18 250.25	Py-3	Stage 3a	**9.0**
10-87 266.90	Py-3	Stage 3a	**3.6**	09-18 263.70	Py-3	Stage 3a	**9.6**
08-18 238.10 c	Py-3	Stage 3a	**4.0**	09-18 232.00	Bs	Stage 3c	**3.4**
09-18 238.10 b	Py-3	Stage 3a	**4.3**	10-89 247.20	Po	Stage 3c	**3.5**
09-18 232.00	Py-3	Stage 3a	**4.3**	08-04 111.66	Bs	Stage 3c	**4.5**
08-06 75.68	Py-3	Stage 3a	**4.9**	10-87 268.10 a	Po	Stage 3c	**4.9**
08-07 209.05 a	Py-3	Stage 3a	**5.1**	10-73 177.40	Po	Stage 3c	**4.9**
08-07 216.74	Py-3	Stage 3a	**5.4**	09-59 30.05	Po	Stage 3c	**5.1**
09-59 30.05	Py-3	Stage 3a	**6.1**	10-87 268.10 b	Po	Stage 3c	**5.9**
08-07 209.05 b	Py-3	Stage 3a	**6.6**	08-06 38.60	Po	Stage 3c	**6.2**
08-07 209.30	Py-3	Stage 3a	**7.0**	08-05 71.55	Po	Stage 3c	**8.6**
09-59 110.30	Py-3	Stage 3a	**7.4**	09-18 256.24	Sp	Stage 4a	**-1.2**
09-18 257.70	Py-3	Stage 3a	**7.5**	09-18 257.70	Sp	Stage 4a	**4.1**
09-18 256.24	Py-3	Stage 3a	**7.6**	09-18 250.0	Sp	Stage 4a	**4.6**
10-75 132.90	Py-3	Stage 3a	**7.9**	Sc10-05 268.70 a	Sp	Stage 4a	**5.1**
10-89 112.85	Py-3	Stage 3a	**8.3**	Sc10-05 268.70 b	Sp	Stage 4a	**5.2**
08-05 71.55	Py-3	Stage 3a	**8.4**	Sc10-05 268.70 a	Apy	Int	**6.0**
09-18 250.00	Py-3	Stage 3a	**8.4**	Sc10-05 268.70 b	Apy	Int	**6.3**
09-51 74.52	Py-3	Stage 3a	**8.5**	Sc10-05 268.70 a	Py	Int	**6.4**
09-18 269.55	Py-3	Stage 3a	**8.6**	Sc10-05 268.70 b	Py	Int	**6.6**

Stage 5

Cal-3 veins have $\delta^{13}C$ values ranging from -4.4 to 1.0 ‰, and have $\delta^{18}O$ values from -1.3 to 16.0 ‰. These late calcite veins, and the calcite veins cutting the Rackla pluton, are the only samples that have $\delta^{18}O$ values lower than those of the Rackla pluton. Additionally, these calcites also have the only $\delta^{18}O$ values below 0 ‰. Cal-3 has $^{87}Sr/^{86}Sr$ values that range from 0.7170 to 0.7189.

3.5 U-Pb Age Determination

Four monazite crystals from Stage 4b were chosen for U-Pb dating. The data and images are presented in Figure 21, 22 and Table 6. These monazites were characterized using BSE imaging, WDS analysis and elemental mapping; this allowed for the selection of spots for analyses that were free of mineral inclusions and fractures, areas of post-crystallization dissolution, areas with low U and fractured areas. The monazites generally have high U concentrations between 2000 and 14000 ppm. From 48 individual spots analyzed from 4 monazite grains, 8 analyses were rejected before the age was interpreted; six were rejected due to low ^{206}Pb counts (<40000 cps) and two were rejected due to abnormally high common-Pb (^{204}Pb >400 cps). The six rejections due to low ^{206}Pb counts were from samples 1K, 1L, 1M, 1N, 1O and 1P which had a spot size of 10 µm as opposed to the 20

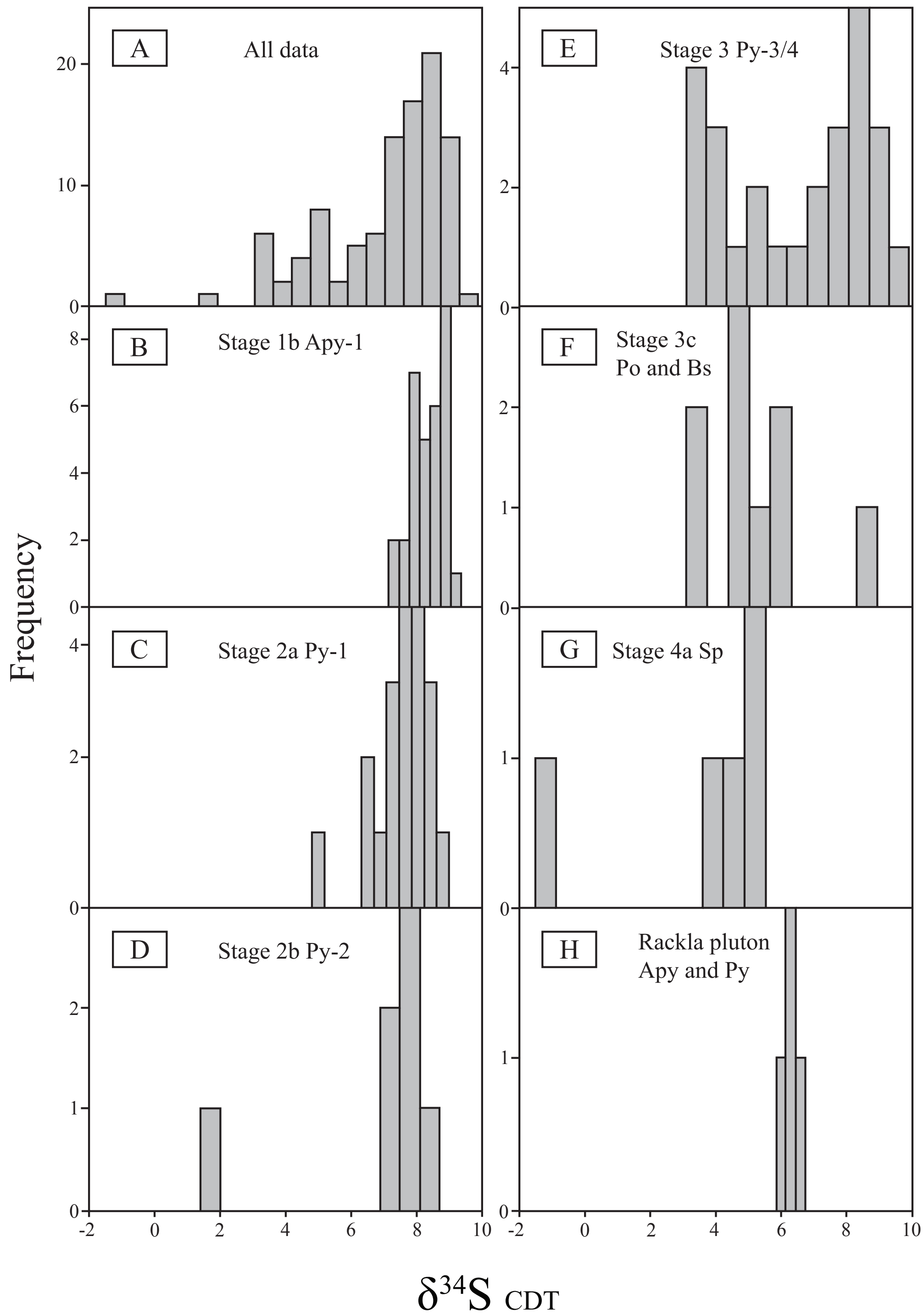


Figure 18. Stable sulphur isotope data ($\delta^{34}S$ CDT) for Tiger zone sulphides including (A) all data plotted, (B) Stage 1b Apy-1, (C) Stage 2a Py-1, (D) Stage 2b Py-2, (E) Stage 3 Py-3/4, (F) Stage 3c Po and Bs, (G) Stage 4a Sp and (H) Rackla pluton Apy and Py.

Table5. Strontium isotopic data for Tiger zone and Rackla pluton samples. All samples have also been analyzed for $^{13}C/^{12}C$ and $^{18}O/^{16}O$ values. The $^{87}Sr/^{86}Sr$ i ratio is the initial ratio at time of emplacement.

Sample ID	Type	Stage	Rb (ppm)	Sr (ppm)	$^{87}Rb/^{87}Sr$	$^{87}Sr/^{86}Sr$	$^{87}Sr/^{86}Sr$ i	2 SE
ER-7	Lst	Host Rock		271.4		**0.70858**		0.000028
ER-9	Lst	Host Rock		295.4		**0.70924**		0.000022
08-07 18.73	Lst	Host Rock		51.28		**0.71318**		0.000039
08-07 17.95	Lst	Host Rock		53.14		**0.71347**		0.000020
08-07 61.45	Lst	Host Rock		49.11		**0.71694**		0.000023
10-73 275.50	Lst	Host Rock		69.68		**0.72050**		0.000024
08-07 41.50	Lst	Host Rock		23.86		**0.72642**		0.000038
Sc10-05 221.0	RP-WR	Int	395.2	19.43	59.16	**0.76182**	**0.70899**	0.000031
Sc10-05 260.70	RP-Cal	Int		3.343		**0.72926**		0.000143
08-04 174.38	Mbl	Host Rock		110.3		**0.70933**		0.000022
10-76 133.80	Mbl	Host Rock		408.9		**0.71205**		0.000038
10-89 103.31	Mbl	Host Rock		138.4		**0.71626**		0.000020
08-05 159.35	Mbl-Cal	Host Rock		151.5		**0.71104**		0.000022
08-07 199.33	Dol-1	Stage 1		61.90		**0.71834**		0.000024
09-51 74.52	Dol-1	Stage 1		87.29		**0.72039**		0.000024
10-75 176.65	Dol-1	Stage 1		123.5		**0.72182**		0.000025
09-18 261.50	Dol-1	Stage 1		104.0		**0.72185**		0.000046
08-04 136.45	Dol-1	Stage 1		113.0		**0.72349**		0.000033
10-77 121.60	Dol-1	Stage 1		105.3		**0.72439**		0.000044
10-73 199.90	Dol-2a	Stage 2a		133.9		**0.72520**		0.000017
08-06 38.60	Cal-2	Stage 4b		73.50		**0.71890**		0.000021
08-04 136.45	Cal-2	Stage 4b		75.69		**0.71954**		0.000032
08-07 199.33	Cal-2	Stage 4b		36.65		**0.72821**		0.000031
09-18 256.24	Cal-3	Stage 5		326.7		**0.71701**		0.000023
09-18 250.25	Cal-3	Stage 5		42.93		**0.71837**		0.000040
10-99 475.00	Cal-3	Stage 5		36.17		**0.71889**		0.000021

μm spot size from all other analyses. The two rejected for high common-Pb were 3A and 3G. Annotated photomicrographs, BSE images and WDS-U maps and more comprehensive isotopic data for Tiger zone monazites are available in Appendix E.

Correcting for common-Pb in most cases increases the accuracy of the desired age calculation; however, when common-Pb is corrected for there are inherent errors that propagate into the overall age calculation. Therefore, in the case of a host mineral containing very low common-Pb, applying a common-Pb correction can yield a less precise age when common-Pb can't be accounted for, such as when using an ICP. The monazites from the Tiger zone contained very low amounts of common-Pb. Using IsoPlot (Ludwig, 2003) the monazite crystallization age was interpreted at 58.1 ± 0.9 Ma (2σ) and is plotted as a weighted mean of the $^{206}Pb/^{238}U$ age (Fig. 21).

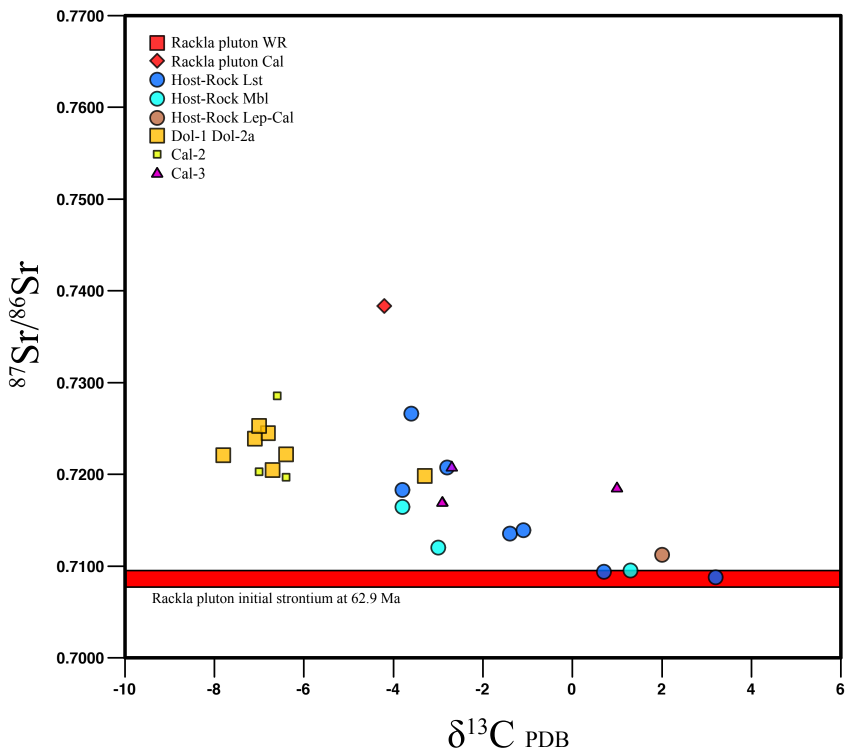


Figure 19. Strontium isotope data ($^{87}Sr/^{86}Sr$) plotted against $\delta^{13}C$ showing increasing strontium ($^{87}Sr/^{86}Sr$) values with decreasing $\delta^{13}C$ values. Rackla pluton whole-rock data is plotted as a bar because no $\delta^{13}C$ data is available for that sample.

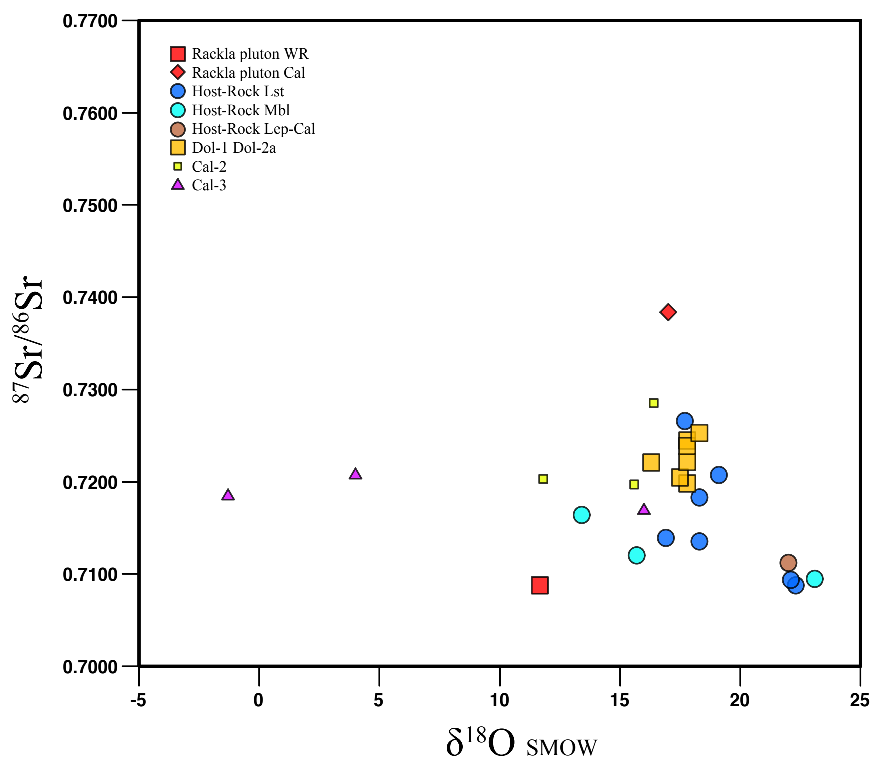


Figure 20. Strontium isotope data ($^{87}Sr/^{86}Sr$) plotted against $\delta^{18}O$ showing increasing strontium ($^{87}Sr/^{86}Sr$) values with decreasing $\delta^{18}O$ values. The Rackla pluton whole-rock sample has been back calculated to initial $^{87}Sr/^{86}Sr$ isotopic composition at an age of 62.9 Ma.

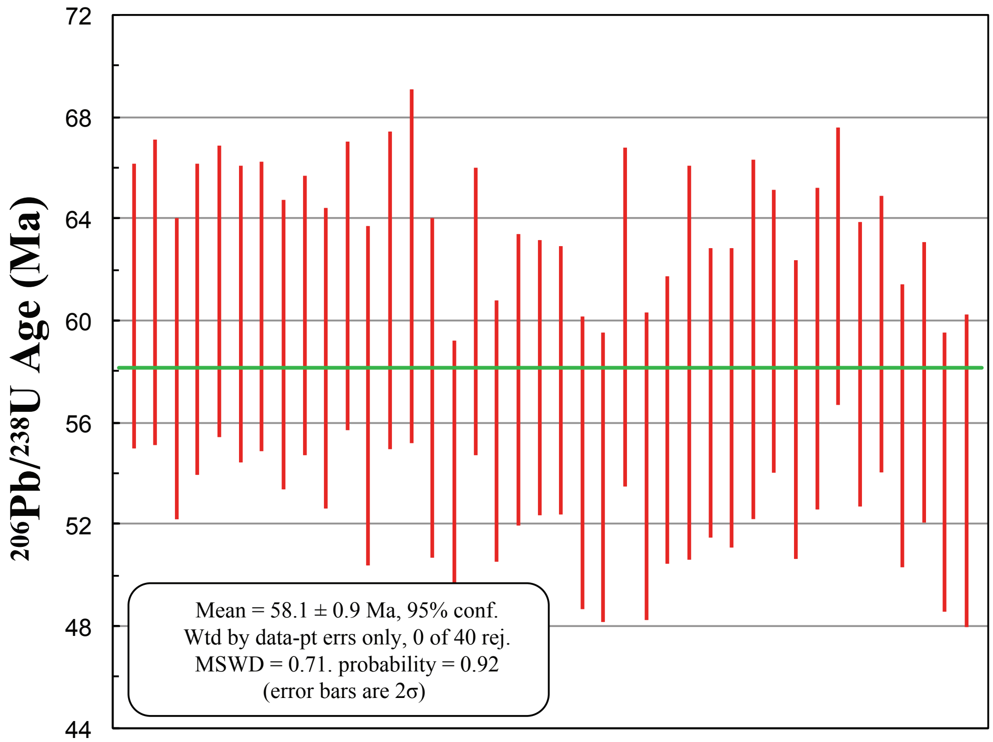


Figure 21. Weighted mean $^{206}Pb/^{238}U$ age displaying non common-Pb corrected results from LA-MC-ICP-MS for Tiger zone monazite from thin section.

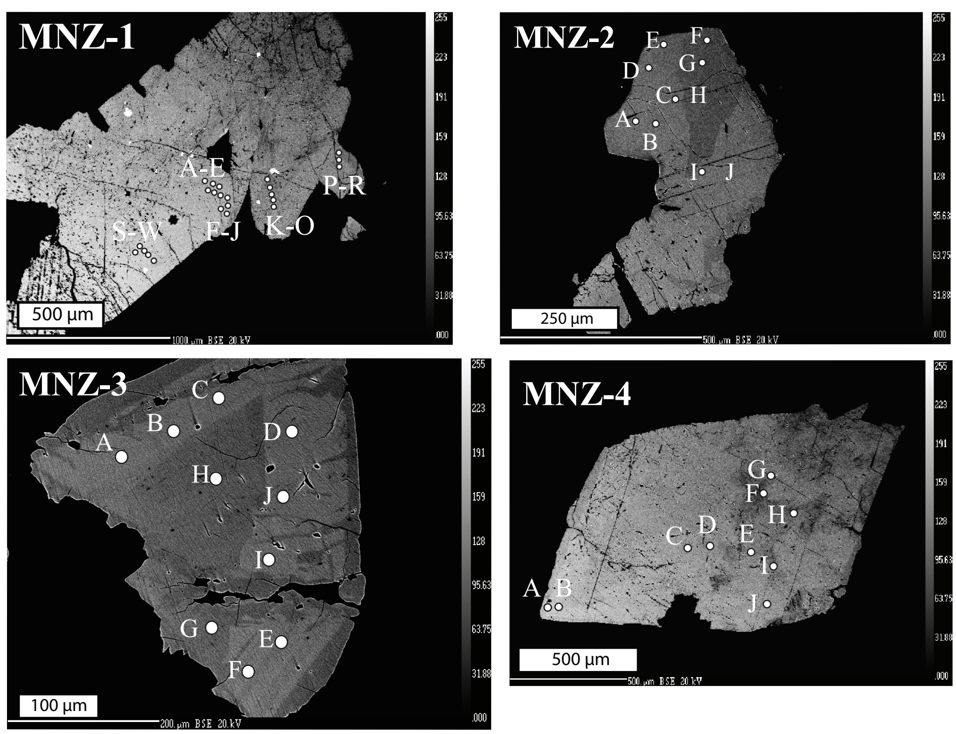


Figure 22. BSE images of monazite grains analyzed by U-Pb LA-ICP-MS for geochronology with annotated spot locations.

Table 6. U-Pb LA-ICP-MS data for individual spot analysis used for age calculation.

Spot ID	^{206}Pb (cps)	^{204}Pb (cps)	^{238}U/^{206}Pb	2 σ	^{207}Pb/^{206}Pb	2 σ	^{206}Pb*/^{238}U age (Ma)	2 σ
MNZ-1F	132237	145	105.956	9.799	0.046	0.001	61	6
MNZ-1G	125441	141	104.962	10.374	0.048	0.001	61	6
MNZ-1H	103135	120	110.449	11.271	0.045	0.001	58	6
MNZ-1I	94059	142	106.878	10.895	0.046	0.001	60	6
MNZ-1J	108596	113	104.952	9.907	0.046	0.001	61	6
MNZ-1Q	83498	120	106.492	10.334	0.046	0.001	60	6
MNZ-1R	89971	119	105.951	10.025	0.045	0.001	61	6
MNZ-1S	58444	147	108.693	10.487	0.045	0.001	59	6
MNZ-1T	48651	126	106.553	9.784	0.045	0.002	60	6
MNZ-1U	63607	130	109.619	11.133	0.043	0.002	59	6
MNZ-1V	54611	120	104.520	9.726	0.042	0.001	61	6
MNZ-1W	43687	107	112.520	13.176	0.040	0.002	57	7
MNZ-2A	113934	201	104.875	10.772	0.045	0.001	61	6
MNZ-2B	93490	163	103.280	11.578	0.044	0.002	62	7
MNZ-2C	84979	131	111.870	13.121	0.043	0.001	57	7
MNZ-2D	99099	128	119.441	12.196	0.044	0.002	54	5
MNZ-2E	101240	114	106.321	10.037	0.044	0.001	60	6
MNZ-2F	68292	155	115.292	10.711	0.044	0.001	56	5
MNZ-2G	51150	139	111.260	11.138	0.041	0.002	58	6
MNZ-2H	43415	144	111.116	10.430	0.041	0.003	58	5
MNZ-2I	100255	143	111.324	10.202	0.043	0.001	58	5
MNZ-2J	74823	163	117.935	12.526	0.042	0.002	54	6
MNZ-3B	90921	235	119.169	12.662	0.045	0.001	54	6
MNZ-3C	78636	208	106.677	11.872	0.045	0.001	60	7
MNZ-3D	83473	210	118.269	13.198	0.045	0.001	54	6
MNZ-3E	80443	200	114.405	11.601	0.044	0.003	56	6
MNZ-3F	85785	176	109.998	14.661	0.046	0.001	58	8
MNZ-3H	51017	168	112.281	11.260	0.044	0.002	57	6
MNZ-3I	93295	175	118.758	12.094	0.046	0.001	54	5
MNZ-3J	75885	144	118.612	13.540	0.045	0.001	54	6
MNZ-4A	117523	110	112.621	11.705	0.046	0.001	57	6
MNZ-4B	58059	107	108.265	12.962	0.045	0.001	59	7
MNZ-4C	96360	135	107.682	10.095	0.046	0.001	60	6
MNZ-4D	100430	133	113.553	11.859	0.046	0.001	57	6
MNZ-4E	107490	152	108.946	11.784	0.046	0.001	59	6
MNZ-4F	119453	148	103.220	9.117	0.048	0.001	62	5
MNZ-4G	111772	129	110.075	10.616	0.046	0.001	58	6
MNZ-4H	122861	123	107.921	9.877	0.046	0.001	59	5
MNZ-4I	91562	121	114.861	11.485	0.046	0.001	56	6
MNZ-4J	82493	118	111.489	10.685	0.046	0.001	58	5

CHAPTER 4 - DISCUSSION

4.1 Nature of the Host-rock Carbonates and Volcanics

The limestone host-rock within the study area has been preferentially replaced by the gold-bearing mineralization of the Tiger zone, thus the nature and the geochemistry of these rocks are critical to the genesis of the deposit. The Silurian to Ordovician Bouvette Formation limestones have $\delta^{13}C$ values that range from -3.8 to 3.2 ‰ and $\delta^{18}O$ values that range from 16.2 to 22.3 ‰; these values are positively correlated (Fig. 17) with an r^2 of 0.61. The limestones, with isotopically higher $\delta^{13}C$ values of 3.2 ‰ and $\delta^{18}O$ of 22.3 ‰, have compositions within the range of Silurian to Ordovician normal marine carbonates (Veizer et al., 1999). These samples also have the lowest values of $^{87}Sr/^{86}Sr$ at 0.7086 (Fig. 19, 20) which are comparable to normal marine $^{87}Sr/^{86}Sr$ in Silurian to Ordovician carbonates, between approximately 0.7070 and 0.7090 (Veizer et al., 1999). The initial $^{87}Sr/^{86}Sr$ of carbonate minerals is expected to be the same as present day $^{87}Sr/^{86}Sr$ because the large atomic radius of Rb does not readily fit into carbonate minerals. The presence of Rb-bearing silicate minerals in the whole-rock limestone samples cannot be ruled out and could result in more elevated ^{87}Sr through time. As the $\delta^{13}C$ and $\delta^{18}O$ values of the limestones decrease, the $^{87}Sr/^{86}Sr$ values increase up to 0.7264 (Fig. 19, 20). Because the host-carbonates deviate away from normal marine $\delta^{13}C$, $\delta^{18}O$ and $^{87}Sr/^{86}Sr$ values, their isotopic compositions are likely to be related to mineralization and is discussed below.

The volcanic host-rocks vary widely in silica and alkali composition indicating they are likely all very altered from their original composition (Fig. 12). Volcanic rocks proximal to Tiger zone mineralization, are calcified, have abundant sericite, and may be strained whereas volcanic rocks distal to the Tiger zone mineralization do not exhibit these features and volcanic textures may be visible (Fig. 6). The less altered volcanic rocks seem to have bulk rock silica compositions similar to the Ordovician Marmot volcanics within the Misty Creek Embayment (Leslie, 2009). However, detailed geochemical analysis and geochronology is required to assess this speculation.

4.2 Rackla Pluton and Marble Development

The Rackla pluton is one of two known intrusive occurrences proximal (~3 km) to the Tiger zone consisting of weakly peraluminous (Table 1), highly fractionated granitoids including local zones of pegmatite. An age for the intrusion of 62.9 ± 0.5 Ma (2σ) has been determined by U-Pb LA-ICP-MS of zircon grains by V.Bennett, (pers. commun., 2010). A zone of tungsten-bearing hornfels that occurs distal from the Rackla pluton and about 1 km from the Tiger zone is associated with aplitic and pegmatitic dikes which have $^{40}Ar/^{39}Ar$ muscovite ages of 62.3 ± 0.7 Ma, 62.4 ± 1.8 Ma and 59.1 ± 2.0 Ma (Kingston et al., 2010) which, with the exception of one sample, are within error of the Rackla pluton age. Additionally, Kingston et al. (2010) determined the Pb isotope composition of feldspars in these dikes and found high values for $^{206}Pb/^{204}Pb$ from 19.768 to 19.945 and $^{207}Pb/^{204}Pb$ from 15.676 to 15.767. These values are distinctly different from the Tombstone and McQuesten suite feldspars which have $^{206}Pb/^{204}Pb$ values that range from 19.00 to 19.40 and $^{207}Pb/^{204}Pb$ values that range from 15.65 to 15.70 (Kingston et al., 2010). The Tertiary age and Pb isotopic signature of the Rackla pluton suggests it is distinct from the well-known mid to late-Cretaceous TTMB intrusions and although it has a similar age, may also be different than the McQuesten plutonic suite rocks.

The whole-rock Rackla pluton samples have $\delta^{18}O$ values of 11.2 and 11.7 ‰ and a $^{87}Sr/^{86}Sr$ value for the intrusion is 0.7618. Using the age of 62.9 Ma, the initial $^{87}Sr/^{86}Sr$ value for the Rackla pluton is calculated to be 0.7089 and is preferred because it represent the strontium isotopic composition at the time of mineralization. Because the isotopic compositions of the host-rocks form a trend from normal marine $\delta^{18}O$ and $^{87}Sr/^{86}Sr$ values towards lower $\delta^{18}O$ values and more elevated $^{87}Sr/^{86}Sr$ values, it is suggested that the unaltered limestone host-rocks and an unidentified unit with high $^{87}Sr/^{86}Sr$ values define two isotopically distinct reservoirs, and the altered limestone host-rocks have compositions generated by mixing between these two end-members (Fig. 17); this process is discussed further below. Sulphur isotope compositions of magmatic sphalerite and arsenopyrite within the Rackla pluton have positive $\delta^{34}S$ values of 6.0 to 6.6 ‰ and contrasts with the intrusions of the Tombstone plutonic suite that typically have negative $\delta^{34}S$ values (Marsh et al., 2003; Mair et al., 2006a) due to their incorporation of biogenic sulphide from the metasediments of the Selwyn Basin (e.g. Boyle et al., 1970).

Numerous plutonic suites in the northern Cordillera, including the TTMB, have additionally been classified based on their age, spatial distribution, redox state of magmas, and associated metallogenic signature (Hart et al., 2004). Plutonic suites are broadly classified into magnetite and ilmenite-series, or oxidized and reduced based on the initial classification of Ishihara (1977), and subsequent development of the concept (e.g. Ishihara et al., 2000; Ishihara, 2004). Reduced intrusions commonly contain ilmenite, pyrrhotite and tungsten minerals, have low magnetic responses (<3 x 10^{-3} SI units) and ferric/ferrous iron ratios below 0.5 at 70 wt. % SiO_2. In the Yukon, there is an association of IRGDs with reduced intrusions (Thompson et al., 1999; Hart et al., 2004; Hart et al., 2007) and, Hart (2007) has suggested that these systems are the most prospective for gold mineralization. The Rackla pluton has ferric/ferrous ratios below 0.5 (Fig. 13), low magnetic responses (Dumala, 2011), and associated tungsten mineralization (Kingston et al., 2010) thus, it is interpreted to be part of the group of gold-prospective, reduced, ilmenite-series intrusions.

Marble Development

Two types of marble occur in the study area, one in the Rackla pluton thermal aureole, and the second within the Tiger zone. The Tiger zone marble is localized along rheologic boundaries and proximal to faults, and as such it is unlikely that it formed simply by contact metamorphism. More likely the Tiger zone marble is a product of fracture controlled, local fluid-mediated metasomatism. Collectively, the marbles have a trend in isotopic composition (Fig. 17, 19, 20); one end member has isotopic compositions similar to some of the host limestones. The Rackla pluton aureole marble and leopard unit calcite plot away from this end member; the Rackla pluton aureole marble sample has the lowest $\delta^{13}C$ and $\delta^{18}O$ values of -6.5 ‰ and 12.9 ‰, respectively. $^{87}Sr/^{86}Sr$ values for the Tiger zone marble range from 0.7093 to 0.7163, and like the limestones the $^{87}Sr/^{86}Sr$ values deviate from Ordovician to Silurian normal marine carbonates and are correlated with the $\delta^{13}C$ and $\delta^{18}O$ values (Fig. 19, 20). Organic-rich sediments have negative $\delta^{13}C$ isotope compositions which, if mobilized, may be incorperated into circulating fluids and ultimately into the isotopic composition of the altered host-rocks. Sediments rich in organic matter occur proximal to the Tiger zone and are a likely source for the observed trend in $\delta^{13}C$ isotope compositions. The elevated $^{87}Sr/^{86}Sr$ isotopic compositions in the marbles may have originated in Precambrian sediments high in $^{87}Sr/^{86}Sr$ (e.g. Driver et al., 2000) that occurr regionally surrounding the Tiger zone.

Evolution of the Magmatic Hydrothermal System in the Rackla Pluton

Fluid inclusion assemblages hosted in magmatic quartz in the Rackla pluton include Lw+Lc, Lw+Lc+Sh. Lw+Vw, Lw+Vw+Sh and trail-hosted Lw+Vw. These inclusions appear primary however, the low homogenization temperatures suggest they are likely not primary to the magmatic quartz. No unequivocal unmixing assemblages were observed. The first melting temperatures for aqueous ice in all the FIAs range between -33 and -22 ºC and may indicate the presence of some divalent ions in addition to NaCl in the fluids (Crawford, 1981). Salinity data from FIAs have a bimodal distribution as halite-bearing inclusions range from 27 to 40 wt. % NaCl eq. with a mode at 30 wt. % NaCl eq. No clathrate was observed in the non halite-bearing aqueous-carbonic inclusions so the calculated salinity values are overestimated (e.g. Diamond, 1994) but have salinities that are less than 17 wt. % NaCl eq. Total homogenization temperatures range from 200 to 300 ºC for the non-carbonic inclusions, including the trail-hosted Lw+Vw inclusions, while the carbonic inclusions have higher homogenization temperatures from 300 to 420 ºC. Although all inclusions are interpreted to be secondary in origin it is clear that the higher temperature, CO_2-bearing inclusions predate the cooler, trail-hosted, aqueous inclusions; the cooler aqueous inclusions thus, may represent the ingress of meteoric fluids into a previously magmatic environment during the collapse of the magmatic-hydrothermal system. This is supported by isotopic and microthermometric data from the late calcite veins that cross-cut the pluton. These veins contain primary aqueous fluid inclusions with salinities of 16 wt. % NaCl eq. and homogenization temperatures of 280 ºC and are comparable to the non-carbonic inclusions hosted in the quartz in the Rackla pluton. Furthermore, one of the calcite vein samples has a negative $\delta^{18}O$ value (Fig. 17, Table 3) which requires a component of surface waters and is likely meteoric in origin. Two other vein calcites have $\delta^{13}C$ and $\delta^{18}O$ values similar to the limestone host-rocks. A $^{87}Sr/^{86}Sr$ value of 0.7293, for the calcite vein with negative $\delta^{18}O$, is much higher than other limestone host-rocks and marbles, and is interpreted to be meteoric in origin. The elevated $^{87}Sr/^{86}Sr$ values, variable $\delta^{13}C$ and $\delta^{18}O$ values, and fluid inclusions homogenization temperatures therefore suggest that these veins (and the secondary inclusions in the plutonic quartz) are derived from mixed magmatic-meteoric hydrothermal circulation, or are derived from just meteoric water which has variably equilibrated with an elevated $^{87}Sr/^{86}Sr$ reservoir.

4.3 Evolution of the Tiger Zone Mineralization: Stage 1, 2 and 3

Early gold-bearing mineralization within the Tiger zone occurs as lattice bound, arsenopyrite-hosted gold, associated with replacive dolomite and pyrite. Lattice bound gold in arsenopyrite was identified by dynamic secondary ion mass spectrometry (D-SIMS); the data are presented in a technical report by Stroshein et al. (2011). A unique feature regarding the first gold-bearing event, and the Tiger zone, is the abundance and pervasive nature of the replacement dolomite. Many samples of Dol-1, Dol-2a and Dol-2b have abundant twinning and, may have undergone plastic deformation. Additionally, the presence of fractures within Apy-1 surrounded by non-fractured Dol-1 suggests plastic deformation may have occurred in Dol-1 while the rheologically stiffer Apy-1 underwent brittle deformation.
The second gold-bearing mineralization is inherently different. Here, free gold is hosted in fractures, associated with bismuthinite and has also been demonstrated to occur with silver as electrum grains (Stroshein et al., 2011).

The foliation parallel growth of Py-1, Dol-2a and Apy-2, which may post-date the first gold-bearing event, suggest that, at the property scale, the rocks have been deformed in a ductile manner. The mechanisms and degree of deformation in these dolomites are beyond the scope of this study but, dolomite deformation may have occurred in a ductile manner at low temperatures (~380 ºC) by accommodation through dislocation glide and mechanical twinning (Turner et al., 1954; Davis et al., 2008). If deformation initiated during Dol-1 and Apy-1 mineralization, then the strain environment may have been responsible for localization of early Tiger zone mineralizing fluids. Although these fluids caused pervasive replacement of the carbonate host-rocks, the highest gold grades occur along the rheologic boundaries on the margins of the volcanic packages and the host-carbonates (Dumala, 2011), either because of higher fluid flow or more reactive rocks in the vicinity.

The gangue minerals associated with both gold mineralizing events, specifically Dol-1, Dol-2a, Dol-2b, Qz-1 and Cal-2, have low $\delta^{13}C$ and $\delta^{18}O$ values compared to the host limestones (Fig. 17). Additionally, the $^{87}Sr/^{86}Sr$ values for Dol-1, Dol-2a and Cal-2 have a narrow range (from 0.7183 to 0.7282), and are generally more enriched in ^{87}Sr than the host limestones. Using equation 16.14 in Faure and Mensing (2005) a theoretical two component mixing line is modelled using strontium data (Fig. 23) representing an unaltered limestone endmember and an endmember high in $^{87}Sr/^{86}Sr$ compositions. The calculated Rackla pluton initial

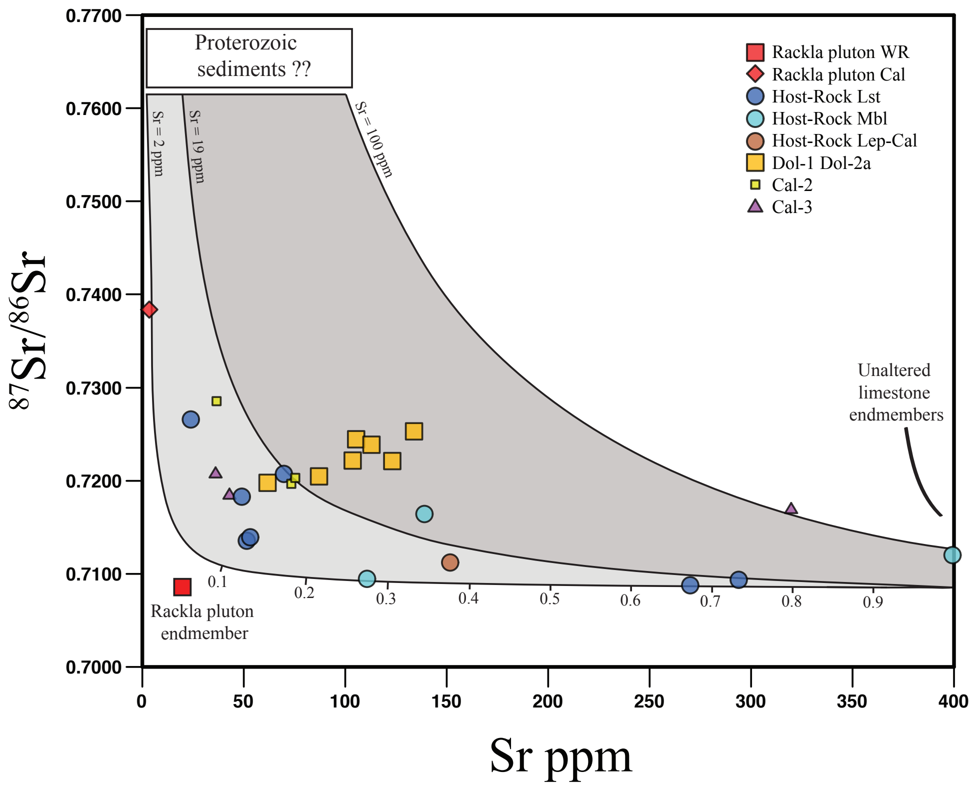


Figure 23. Theoretical mixing zone of a two compnent system with end members reflecting an unidentified isotopic reservoir with values of $^{87}Sr/^{86}Sr$ = 0.7618 and Sr = 2 ppm, 19 ppm and 100 ppm and unaltered limestone values of $^{87}Sr/^{86}Sr$ = 0.7086 and 0.7120 and Sr = 400 ppm derived from data in Table 1 and 5. Mixing lines are calculated from equation 16.14 in Faure and Mensing (2005). Annotated tick marks denote the weight ratio degree of mixing of the two components. As for 0.1 mixing, 10 % of the unidentified component has mixed with 90 % of an unaltered limestone component.

$^{87}Sr/^{86}Sr$ isotope composition is 0.7089 and strontium concentration is 19.4 ppm. It is therefore, unlikely that a strontium isotopic component from the Rackla pluton mixed with a strontium isotopic component of the unaltered limestones to obtain the present day trend in Figure 23. To obtain this isotopic trend, a high $^{87}Sr/^{86}Sr$ isotopic endmember would be required to mix with unaltered limestone $^{87}Sr/^{86}Sr$ isotopic compositions. Such high $^{87}Sr/^{86}Sr$ values exist in Precambrian sediments of southern Yukon and northern British Columbia (Driver et al., 2000). High $^{87}Sr/^{86}Sr$ isotopic compositions may also occur within the Precambrian sediments regionally surrounding the Tiger zone however, isotopic values for these rocks have not been obtained.

The majority of marbles and Tiger zone carbonates fall within the modelled mixing zone, and only 10 to 30 % mixing of the high $^{87}Sr/^{86}Sr$ isotopic signature is needed to produce the values within the Tiger zone carbonates and the altered host-rock limestones and marbles (Fig. 23).

Detailed modeling of the fluid inclusion data could not be carried out because decrepitation during heating runs, and the lack of clathrate data from CO_2-bearing inclusions (Diamond, 1994) prevented the aquisition of complete microthermometric measurements. Furthermore there are presently no equations of state that adequately describe CO_2-bearing halite-saturated brines.

Apparently primary FIAs of Lc+Lw and Lw+Lc+Sh+So in Dol-1, Dol-2b and Qz-1 have salinities less than 16 wt. % NaCl eq. and between 30 and 35 wt. % NaCl eq. respectively. Decrepitation temperatures in Dol-1 and Qz-1 for these FIAs range between 230 and 440 ºC, and a small number of total homogenization temperatures for Lw+Lc+Sh+So inclusions are recorded at 350 to 411 ºC. The vast majority of fluid inclusions in Dol-1, Dol-2b and Qz-1, associated with gold-bearing mineralization, are the aqueous-carbonic inclusions (Lc+Lw). However, the FIAs with Lc+Lw and Lw+Lc+Sh+So do occur in random 3D orientation in in zones that have a homogenous cathodoluminescence, which may suggest the inclusions are coeval and represent varying degrees of fluid immiscibility. It is possible, therefore, that the parental fluid to this unmixing assemblage was a high-temperature (>400 ºC), low to moderate salinity (<15 wt. % NaCl eq.) carbonic-aqueous liquid. This type of parental fluid is common in deep (>5 km) IRGDs and is commonly overprinted by fluid inclusion assemblages representing unmixing; these unmixing assemblages are associated with gold mineralization in IRGDs (Baker, 2002). The Tiger zone contains hot (~400 ºC) CO_2-rich fluids, that resemble deeper IRGD assemblages (Baker, 2002), however, it does not have an early parental fluid that is later cross-cut by unmixing assemblages. In fact, Dol-1, Dol-2b and Qz-1 all have the same CO_2-rich aqueous and lesser coeval CO_2-bearing brine assemblages, which suggests that if the Tiger zone is a deep distal IRGD it does not show the typical evolution of fluids described in Baker (2002). Additionally, rare Lw+Lc fluid inclusions occur within unmixing FIAs with Lc+Lw and Lw+Lc+Sh+So; these inclusions should not occur in unmixing assemblages and actually resemble the postulated Tiger zone parental fluid. If the Lw+Lc inclusions are the parental fluid to the Lc+Lw and Lw+Lc+Sh+So inclusions, then cross-cutting relationships are expected yet not observed, therefore, the nature and origin of the Lw+Lc inclusions remains unclear. If the FIAs have been trapped at depth, in dolomite that may have deformed in a ductile manner, it is possible that some of these apparently primary arrays may have been modified after trapping. It should be noted however, that the fluids inclusions in quartz, a more robust mineral, have similar assemblages and have comparable microthermometric data.

Benning and Seward (1996) have shown gold can be transported in near neutral pH, H_2S-bearing fluids by bisulphide complexing. Additionally, gold, arsenic and sulphur are more likely to partition into the vapour phase during fluid immiscibility (Heinrich et al., 1999). It is possible therefore, that the CO_2-rich inclusions in the Tiger zone are analagous to the vapour inclusions described in Heinrich et al. (1999), and may have been the main phase that transported gold, arsenic and sulphur, as observed in the first gold-bearing event. The presence of liquid CO_2 however, suggests high pressures existed at the time of trapping allowing a denser CO_2 fluid to be trapped as the 'vapour phase'. The high CO_2 contents of this fluid may theoretically be buffered by the limestone host-rocks thus retaining a neutral pH (Phillips and Evans, 2004), and allowing the fluid to transport these metals from their source. During the Stage 1 gold-bearing event, the persistence of the high-temperature fluids and lack of a secondary lower temperature FIA suggests that cooling and mixing with a dilute colder fluid is not the likely gold precipitating mechanism. More likely, the CO_2-rich Lc+Lw phase transported gold, arsenic and sulphur to the Tiger zone where sulphidation with host-rock iron precipitated the gold-bearing arsenopyrite at the contact with host rock volcanic units that have higher iron contents than the limestones (Appendix C).

The Stage 1 sulphide mineralization of Apy-1, Py-1, and Py-2 have narrow ranges of $\delta^{34}S$ values around 8 ‰, whereas later sulphide mineralization of Po, Bs and Sp have lower $\delta^{34}S$ values around 4 to 5 ‰. Only Py-3/4 has a bimodal sulphur isotopic distribution reflecting two stages of pyrite growth which were not resolved at the scale of the sampling (Fig. 9f, 18). Assuming a single fluid phase, the decrease in $\delta^{34}S$ later in the paragenesis cannot be due to cooling of the hydrothermal system because the $\delta^{34}S$ values should increase with lower temperatures (Rye and Ohmoto, 1974). More likely, mixing of Rackla pluton primary $\delta^{34}S$ values (~6 ‰) with sedimentary sulphates (>10 ‰ Claypool et al., 1980; Cecile et al., 1983) could produce $\delta^{34}S$ values of ~ 8 ‰ as in the early sulphides, and mixing with biogenic sediments (<0 ‰) could produce the values of <6 ‰ seen in the later sulphide phases. Furthermore, the proximity of Selwyn basin meta-sediments and local barite occurrences (discussed in Dumala, 2011), validates the likelihood that local country rocks contain variable sulphur isotopic compositions, which may be reflected in the range of $\delta^{34}S$ values in the Tiger zone sulphides.

4.4 Meteoric Input and Collapse of the Hydrothermal System: Stage 4 and 5

The second gold-bearing event is distinct due to the lack of arsenopyrite and dolomite, and abundance of pyrite, pyrrhotite and bismuthinite within brittle fractures of sulphides and an association with Stage 4 base metal mineralization. Abundant muscovite, calcite (Cal-2) and minor actinolite, scheelite and monazite post-date the base metal mineralization and represent the last phase of Tiger zone mineralization. Calcite veining, Cal-3, is present throughout the deposit and is commonly associated with, but post-dates, sphalerite. The $\delta^{13}C$ and $\delta^{18}O$ values for this calcite are similar to the isotopic values of the late calcite veins cutting the Rackla pluton (Fig. 17), however, the $^{87}Sr/^{86}Sr$ values for this calcite are lower the Rackla pluton calcite veins. The low $\delta^{18}O$ values in Cal-3 are diagnostic of a meteoric water component which overprint the mineralization and are likely the same late calcite veins observed in the Rackla pluton however, the lower $^{87}Sr/^{86}Sr$ values in the Cal-3 veins are likely due to less water rock interaction with the high ^{87}Sr Rackla pluton, or less magmatic strontium in the system at this time.

Secondary fluid inclusion trails in sphalerite associated with Cal-3 veins may represent the Cal-3 forming fluid. These fluids have salinities ranging from 3 to 8 wt. % NaCl eq., are not CO_2-bearing and have lower homogenization temperatures of 150 to 153 ºC; thus, they are distinct from the primary FIA's in the Tiger zone. The aqueous nature of the fluid, low salinity, relatively low homogenization temperatures and low $\delta^{18}O$ values suggest this fluid has a distinct meteoric component that overprints Tiger zone mineralization and represents the collapse of the magmatic-hydrothermal system.

Isotopic and fluid inclusion data are not specifically available for the second gold-bearing event, however, it is clear that from Qz-1 to Cal-3 the mineralization temperature decreased from approximately 400 to 150 ºC. The higher temperatures of the main Tiger zone mineralization may have allowed base metals, complexed by Cl ligands, to be transported in the less abundant unmixed Lw+Lc+Sh+So inclusions (Heinrich et al., 1999) without significant deposition. The paragenetically late temperature decrease suggests that possible dilution and cooling of the magmatic fluids with the meteoric fluids may have allowed for the precipitation of base metals from solution. The solid opaque mineral within halite-bearing brine inclusions may be one of these base metal phases. Because the second gold-bearing event also occurs in this time interval, cooling and mixing may have affected gold solubility as well. The second gold-bearing event occurs as native gold ± bismuthinite ± electrum in brittle fractures in sulphide grains and thus, likely precipitated from the fluid by a different mechanism than the first gold-bearing event. Also, the nature of the fracture-hosted gold indicates brittle deformation may be more pervasive in the second gold-bearing event suggesting a lower pressure or temperature environment. Therefore, this second gold-bearing event, may have resulted from bisulphide complexing in the CO_2-rich Lc+Lw fluids, which were destabalized through depressurizing, cooling, and/or mixing with meteoric water. The incomplete nature of the microthermometric data means this hypothesis cannot be tested here.

4.5 Age of the Tiger Zone Mineralization and Links to the Rackla Pluton

Similar types of fluid inclusions with comparable chemistries and homogenization temperatures occur within both the Tiger zone mineralization and within the Rackla pluton. Also, the oxygen and sulphur isotopic signatures of the Tiger zone carbonates are likely produced by mixing of the unaltered Tiger zone limestone isotopic reservoir with the isotopic compositions within the Rackla pluton. However, the high $^{87}Sr/^{86}Sr$ and low $\delta^{13}C$ isotopic composition of the Tiger zone carbonates indicate a third undiscovered isotopic reservoir is mixing with both the Rackla pluton and host-rock limestone isotopic signature. Additionally, both the Rackla pluton and the Tiger zone have a late meteoric overprint with comparable fluid inclusion chemistries and oxygen isotopic values.

Lead isotopes in undifferentiated pyrite and pyrrhotite within Tiger zone mineralization were analyzed by Kingston et al. (2010). The $^{207}Pb/^{204}Pb$ values range from 15.596 to 15.940 and $^{206}Pb/^{204}Pb$ ratios from 19.105 to 21.046. They compared their data with values obtained for Rackla pluton associated dikes and McQuesten and Tombstone suite intrusions. Although there is significant scatter in their dataset, Kingston et al.'s results indicate that the Pb isotope compositions of Tiger zone sulphides more closely resemble that of the Rackla pluton than the Tombstone or McQuesten intrusions.

Late in the Tiger zone paragenesis, in Stage 4, monazite grains occur; this assemblage represents the waning stages of the Tiger zone mineralization before or during the meteoric influx. I obtained a U-Pb crystallization age of 58.1 ± 0.9 Ma

(2σ) for the monazites, which is within analytical uncertainty of a $^{40}Ar/^{39}Ar$ muscovite age reported for pegmatitic and aplitic dikes (Kingston et al., 2010), but is younger than the 62.9 ± 0.5 Ma (2σ) zircon age for the Rackla pluton (V. Bennett, pers. commun. 2010). The proximity of the Tiger zone to the Rackla pluton, their reduced chemistries, fluid chemistries and corresponding ages indicates they are temporally, and most likely genetically related. Because the monazite age gives a minimum age for its crystallization, and post-dates the gold mineralization events, this suggests that both gold bearing event occurred prior to 58.1 ± 0.9 Ma and due to textural relationships (Fig. 6), likely no older than 62.9 ± 0.5 Ma. The Tiger zone is thus, the first occurrence of gold-bearing mineralization associated with Tertiary plutonism in central Yukon.

4.6 Genetic Model

The nature and style of mineralization as well as age relationships, suggest that the Tiger zone is a deep (~5 km) Au deposit related to a reduced intrusion. Early magmatic fluids from the Rackla pluton, or a related source at depth, circulated through the Tiger zone variably interacting with the host carbonates (Fig. 24a) and resulted in the subsequent deposition of hydrothermal dolomite, gold-bearing arsenopyrite and pyrite (Fig. 24b). These fluids were largely structurally focused, possibly during an early ductile deformation regime, and localized along rheologic boundaries, resulting in local marble development and increased gold grades at lithological contacts. The early arsenopyrite-hosted gold-bearing event formed from a high temperature (~400 ºC), immiscible, CO_2-bearing fluid sourced from the Rackla pluton, and probably reacted with iron in the host-rocks during mineralization. The second gold-bearing event contains fracture-hosted free gold, electrum and bismuthinite and may have formed from depressurization, cooling and possibly mixing with a meteoric fluid prompting mineralization at shallower depths and lower pressures. A small amount of base metals and low-temperature calcite veining occurs late in the paragenesis and documents the influx of meteoric water and the collapse of the magmatic-hydrothermal system (Fig. 24c).

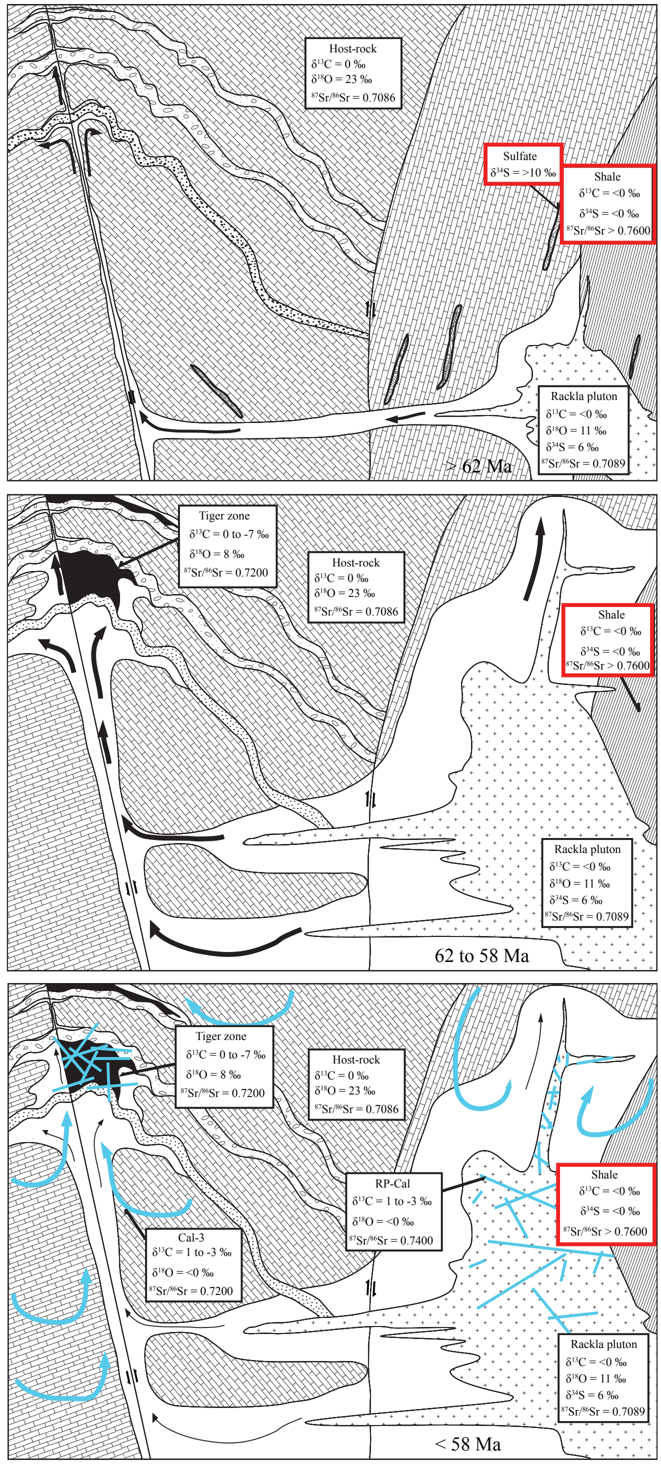
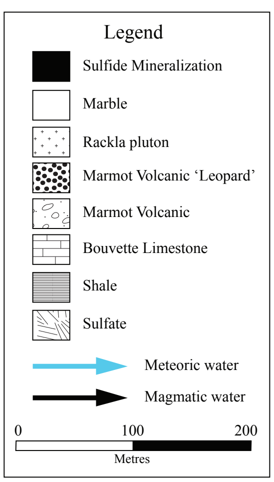


Figure 24. Genetic diagram of Tiger zone mineralization with approximate isotopic values overlaid including (a) early intruding pluton assimilating supra-crustal sources and forming early marble, (b) emplacement and continued formation of marble horizons, subsequent gold mineralization, and (c) relaxation of the magmatic-hydrothermal system and influx of meteoric waters. Based from cross section A – A' from Abbott (1990). Modeled initial strontium isotopic compositions are reported for the Rackla pluton. Thicker red boxes indicate inferred isotopic values not measured in this study.



CHAPTER 5 – CONCLUSIONS

The Tiger zone gold mineralization is unique in that it represents a poorly studied class of Au mineralized carbonate-replacement deposits and is the product of a highly fractionated, reduced, CO_2-rich magmatic system. Based on geochemistry, fluid inclusion analysis and age constraints, the Tiger zone mineralization is determined to be genetically related to the Rackla pluton and represents a ~60 Ma distal IRGD. Two gold-bearing events are associated with immiscible CO_2-rich aqueous fluids and lesser amounts of CO_2-bearing brines. The fluid associated with the first gold-bearing event was at least 400 ºC at the time of mineralization, and initially the deposit probably formed at depths of approximately 5 km. Gold from Stage 1 was precipitated due to sulfidation reactions with host-rock iron. This magmatic fluid is interpreted to persist throughout most of the gold-bearing paragenesis of the Tiger zone, however, the second gold-bearing event may be a result of depressurization and fluid mixing between magmatic and meteoric waters. The Tiger zone has many characteristics that resemble IRGDs in the northern Cordillera including having reduced affinities for both mineralization and host intrusion, peraluminous and fractionated host intrusions, unequivocal magmatic source for fluids and metals, abundant CO_2-rich fluids, and metal associations of arsenic, bismuth and tungsten. Features of the Tiger zone that make it unique with respect to Yukon IRGDs include mineralization hosted in platformal carbonate rocks in the footwall of the Dawson Thrust, widespread replacive dolomite mineralization, moderate sulphide content (>5 %), and intrusion emplacement ~25 m.y. after initiation of Cordilleran dextral transpression. Perhaps the most significant distinction is the 58.1 ± 0.9 Ma age for Tiger zone mineralization, indicating significant Tertiary intrusion-related gold resources potentially occur elsewhere in Yukon. Exploration therefore should not be restricted to the 90-100 Ma Tombstone-Tungsten magmatic belt or spatially to the Selwyn Basin. Additionally, the Rackla pluton has similar ages, composition and spatial proximity to the poorly studied McQuesten suite intrusions, indicating a potential genetic link and an ignored prospective target for gold mineralization.

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APPENDIX A
non drill-core sample locations

non drill-core sample locations. NAD 83 zone 8

Sample ID	Rock type	easting	northing
ER-20	VOL	528027	7119385
ER-19	VOL	528020	7119406
ER-18	LST	528029	7119411
ER-17	VOL	528032	7119425
ER-16	LST	528063	7119432
ER-1	LST	528147	7119552
ER-3	LST	528173	7119578
ER-2	VOL	528163	7119584
ER-4	VOL	528220	7119619
ER-5	LST	528245	7119673
ER-6	VOL	528261	7119692
ER-7	LST	528291	7119722
ER-8	VOL	528294	7119763
ER-10	VOL	528325	7119828
ER-14	VOL	528359	7119889

APPENDIX B

EPMA data

Sulphide data

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-07 216.74 Bi	18.63	0.04		0.04					6818			80.12						99.89
08-07 216.74 Bi	18.00	0.04		0.04					7010			79.00						98.23
08-07 216.74 Bi	18.32	0.04		0.05					9188			78.64						98.59
08-07 216.74 Bi	18.17	0.04		0.04		592			6787			79.05						98.43
08-07 216.74 Bi	18.21	0.04		0.05					5779			79.38						98.70
08-07 216.74 Bi		0.05		0.06					2674			99.46						99.59
08-07 216.74 Bi	18.15	0.05		0.05					7301			79.95						99.64
08-07 216.74 Bi	18.51	0.06		0.04					5835			79.22						99.15
08-04 166.16 Apy	19.17	0.08		0.08		1029			44612			75.01						99.42
08-07 216.74 Bi	18.39	0.08							7129			78.68						98.45
08-07 226.33 ?		0.10		0.05					2989			98.44						98.62
08-04 166.16 Apy	18.81	0.11		0.09		954			46030			74.49						98.69
08-04 166.16 Apy	18.81	0.13		0.07		1009			44346			74.85						98.87
SC-10 Sp 13	32.59	0.14	66.11															98.62
SC-10 Py 30	32.42	0.14	67.29															99.72
08-04 115.75 Fracture		0.18					2753			1002878		0.45						100.79
SC-10 Py 29	32.39	0.20	67.34															99.71
08-07 216.74 Bi	0.07	0.20		0.07					2340			97.80						98.23
SC-10 Sp 14	32.69	0.21	65.88															98.61
08-07 216.74 Bi	0.09	0.23		0.06					2910			100.46						100.86
SC-10 Py 17	32.52	0.29	66.64															99.16
SC-10 Py 16	32.50	0.29	66.33															99.13
SC-10 Po 20	32.07	0.32	66.05															98.48
SC-10 Sp 12	32.63	0.32	65.86															98.59
08-04 166.16 Apy	18.92	0.34				993			44083			75.61						99.96
08-04 115.75 Fracture	0.05	0.37								1051		98.29						98.81
08-04 156.21 fracture	18.28	0.41				1050			12133			79.21						99.71
08-04 166.16 Apy	18.94	0.42		0.09		1147			46177			73.63						98.32
08-04 122.36 ? 112		0.44		0.09			33420			1018320		0.37						105.24
08-07 216.74 ?	0.08	0.44		0.06					3111			100.34						100.97
SC-10 Py 15	32.62	0.44	66.14															99.20
08-04 156.21 fracture	18.23	0.53				980			15027			77.34						98.17
08-04 166.16 Apy	18.56	0.53		0.11		1401			45969			74.71						99.11
08-04 122.36 ? 109	0.07	0.57		0.10					1445			100.32						101.11
08-07 216.74 ?	0.27	0.62		0.06					3367			99.48						100.56
08-04 166.16 Apy	19.45	0.71		0.22		710			46985			73.20	205					98.91
08-04 156.21 fracture	18.36	0.71		0.07		814			12717			78.56						99.50
08-04 115.75 Fracture	0.10	0.71					1240			1000873		0.40						101.44
08-07 199.97 Fracture		0.73							5465			97.99						99.15
08-04 115.75 Fracture	0.04	0.74							7584			98.06						99.76
08-07 199.97 Fracture	0.07	0.76										97.34	263					98.28
08-07 199.97 Fracture	0.04	0.81		0.07					6834			98.24						99.85

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-07 199.97 Fracture	2.59	0.96							3465			95.54						99.58
08-04 122.36 ? 91	0.07	0.97		0.17					3350			97.09						98.62
08-04 166.16 Apy	19.00	1.03		0.27		1107			47816			74.13						99.82
08-04 115.75 Fracture	0.06	1.13							8182			99.83						101.82
08-04 122.36 ? 92		1.16		0.12					3940			100.32						102.01
08-04 162.87 Py	19.58	1.19		0.06		509			91408			67.85						98.31
08-04 156.21 fracture	18.18	1.33				1156			12096			77.11						98.47
08-04 166.16 Apy	19.36	1.45		0.19		947			46979			74.81						101.11
08-07 226.33 As	0.22	1.54		0.11					4553			99.77						101.82
10-77 121.60 fracture	0.15	1.57		0.20								97.04						98.84
08-04 166.16 Py	18.88	1.63				1024			45977			73.61						99.43
08-04 115.75 Fracture	0.07	1.71							8028			99.25						101.80
08-04 156.21 fracture	19.01	1.87				926			11598			75.99						98.57
08-04 162.87 Py	20.46	2.08		0.52		801			80188			69.29						100.91
08-04 162.87 Apy	20.34	2.21		1.52		931			78905			69.52						102.01
08-04 156.21 fracture	19.80	2.79		0.07		891			13115			78.98						103.64
08-04 156.21 fracture	20.10	3.93				1790			15270			78.46						104.76
SC-10 As 11	21.66	33.91		42.33	322				1541									98.17
SC-10 As 10	21.53	33.94		42.65														98.10
08-07 175.80 As	21.87	34.06		42.67														98.56
08-04 166.16 Apy	21.25	34.09		42.04														98.07
08-07 175.80 As	21.17	34.14		42.78	318													98.60
08-04 122.36 As 102	21.36	34.16		42.43	342													98.30
08-04 122.36 As 106	21.46	34.26		42.41														98.42
08-04 166.16 Apy	21.04	34.33		42.11														98.11
08-04 122.36 As 95	21.43	34.35		42.37														98.38
08-07 175.80 As	20.64	34.35		42.94														98.38
08-04 122.36 As 104	22.35	34.35		41.76														98.66
08-04 122.36 As 89	20.88	34.39		43.39														98.66
08-04 122.36 As 101	21.56	34.40		42.68														98.89
08-07 175.80 As	21.24	34.44		42.26														98.21
08-04 122.36 As 105	21.98	34.45		41.93														98.72
08-07 175.80 As	21.40	34.47		42.22														98.44
08-04 122.36 As 103	22.06	34.50		42.06														98.66
08-04 122.36 As 94	21.45	34.53		42.41	313													98.49
SC-10 As 23	21.37	34.54		42.76														98.66
SC-10 As 24	21.38	34.56		42.93	501													99.06
SC-10 As 36	21.28	34.57		42.51	324													98.79
08-04 122.36 As 100	22.06	34.58		41.77														98.58
08-04 122.36 As 113	21.40	34.59		42.92														99.03
SC-10 As 35	21.68	34.62		42.30	360													98.71
08-07 226.33 As	20.76	34.62		42.60														98.33
10-77 121.60 Apy	21.77	34.63		41.24														98.25
SC-10 As 22	21.46	34.63		42.95														99.34

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-04 166.16 Apy	20.98	34.65		41.97														98.20
10-77 121.60 Apy	21.80	34.65		41.06	324													98.23
10-77 121.60 Apy	21.51	34.65		41.45														98.25
SC-10 As 18	21.13	34.66		43.40	380													99.51
10-77 121.60 Apy	21.32	34.67		41.61														98.22
08-04 122.36 As 93	21.42	34.67		42.27														98.30
10-77 121.60 Apy	21.46	34.67		41.76														98.52
08-04 122.36 As 85	21.64	34.69		42.63														98.74
08-04 122.36 As 114	21.59	34.70		42.95														99.28
08-07 217.77 Fracture	20.59	34.70		43.28														99.19
SC-10 As 25	21.82	34.72		42.53	353													99.42
08-07 174.62 As	21.20	34.73		41.52														98.02
10-87 113.40 Apy	21.95	34.74		41.39														98.59
10-77 121.60 Apy	22.11	34.74		41.05	357													98.40
08-04 166.16 Apy	21.33	34.75		42.03														98.59
SC-10 As 33	21.20	34.77		42.86														99.17
08-04 122.36 As 80	21.43	34.78		42.51														98.84
08-04 166.16 Apy	21.06	34.79		42.52														98.88
08-04 166.16 Apy	22.00	34.80		41.02														98.52
08-04 122.36 As 67	22.36	34.80		41.49														98.92
10-87 113.40 Apy	21.65	34.81		41.77														98.81
08-04 122.36 As 82	21.87	34.86		42.27	327													99.15
10-87 113.40 Apy	20.89	34.88		42.32	378													98.63
SC-10 As 26	21.65	34.88		42.36	387				2882									99.37
10-87 113.40 Apy	21.14	34.89		42.18														98.60
SC-10 As 32	22.14	34.90		42.05	335													99.26
08-04 122.36 As 77	21.12	34.90		43.33														99.60
08-07 174.62 As	21.09	34.91		41.62														98.21
08-04 166.16 Apy	21.79	34.92		41.51														98.88
08-04 122.36 As 81	21.25	34.93		42.75														99.05
08-04 166.16 Apy	21.82	34.93		41.12														98.40
08-04 166.16 Apy	20.90	34.93		42.90														99.32
08-07 174.62 As	21.20	34.93		41.99														98.33
08-04 166.16 Apy	20.88	34.94		43.06														99.39
08-04 122.36 As 76	21.73	34.95		42.47	373													99.39
08-04 166.16 Apy	21.57	34.96		41.89	313													98.94
08-04 166.16 Apy	22.04	34.96		40.79	389													98.40
08-04 122.36 As 88	21.62	34.96		42.17														98.71
08-07 176.67 As	21.28	34.98		42.54	320													99.21
08-07 176.67 As	21.21	35.00		42.45														99.34
08-04 115.75 Fracture	21.01	35.01		42.46														99.06
08-04 162.87 Apy	21.61	35.02		41.64														98.90
10-77 121.60 Apy	21.39	35.02		41.83														98.80
10-77 121.60 Apy	21.83	35.03		40.99														98.57

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
10-87 113.40 Apy	20.97	35.05		42.71	373													99.42
08-04 166.16 Apy	21.83	35.05		41.65														99.28
08-04 122.36 As 83	21.75	35.06		42.01														98.78
08-07 176.67 As	21.36	35.07		42.45														99.26
10-87 113.40 Apy	21.92	35.08		41.11														98.78
08-07 175.80 As	21.37	35.09		41.38														98.49
08-04 162.87 Apy	21.56	35.10		41.83														99.05
08-04 166.16 Apy	22.17	35.10		40.94														98.80
08-07 176.67 As	21.14	35.11		42.80														99.44
08-07 175.80 As	21.32	35.11		42.14														99.05
08-07 226.33 As	21.12	35.12		42.41	314													99.30
08-07 217.77 Py	20.46	35.13		43.25	314													99.39
08-04 162.87 Py	21.28	35.13		42.24	343													99.15
10-87 113.40 Apy	21.83	35.14		41.41														98.92
08-04 162.87 Apy	22.04	35.16		41.32														98.98
10-87 113.40 Apy	21.66	35.16		41.84														99.06
08-07 226.33 As	20.71	35.16		43.39														99.84
08-07 174.62 As	20.74	35.16		42.60	390													99.16
10-87 113.40 Apy	20.90	35.17		43.05														99.71
08-07 217.77 Py	20.69	35.17		42.77	378													99.18
SC-10 As 28	23.13	35.17		40.26	2565													98.85
08-04 162.87 Py	21.51	35.17		42.05	398													99.27
08-07 174.62 As	21.19	35.18		42.37														99.38
08-07 174.62 As	21.96	35.18		40.76	314													98.57
10-77 121.60 Apy	21.14	35.18		42.91														99.78
08-04 162.87 Py	21.27	35.18		42.21														99.17
08-07 226.33 As	22.05	35.18		41.21														99.01
08-07 176.67 As	21.70	35.19		41.84														99.17
10-77 121.60 Apy	21.77	35.19		41.68														99.23
08-04 162.87 Py	21.82	35.19		41.19	352													98.69
08-07 176.67 As	21.56	35.19		41.70														98.83
08-07 175.80 As	21.87	35.21		41.66										542				99.23
08-07 226.33 As	20.41	35.21		43.03														99.22
10-87 113.40 Apy	21.31	35.21		41.87	437													98.94
08-04 122.36 As 84	22.46	35.22		41.29														99.25
08-07 176.67 As	21.41	35.22		42.39														99.60
10-87 113.40 Apy	21.51	35.22		41.81														99.25
08-07 176.67 As	21.10	35.22		42.58														99.41
08-07 174.62 As	20.72	35.23		42.96														99.55
08-07 226.33 As	21.92	35.23		40.46	343													98.25
08-04 166.16 Apy	21.96	35.23		41.43														99.26
08-07 175.80 As	21.62	35.23		41.97														99.25
08-07 175.80 As	21.30	35.23		42.67														99.80
08-07 175.80 As	21.54	35.24		42.13														99.22

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-07 175.80 As	21.83	35.25		41.75														99.34
10-87 113.40 Apy	21.69	35.26		41.76														99.27
08-07 174.62 As	20.91	35.26		42.17														98.86
08-07 175.80 As	22.07	35.27		41.84														99.52
08-07 176.67 As	21.65	35.27		41.70														98.95
08-07 226.33 As	21.02	35.29		42.52														99.38
08-07 176.67 As	21.36	35.30		42.19														99.39
08-07 226.33 As	22.04	35.30		41.22										649				99.20
08-04 166.16 Apy	21.61	35.30		41.86	404													99.49
08-07 175.80 As	20.85	35.30		42.53														99.21
08-07 174.62 As	20.82	35.30		42.66														98.98
08-07 175.80 Po	21.33	35.30		42.44														99.44
08-07 176.67 As	21.98	35.30		42.35														100.08
08-04 122.36 As 79	22.96	35.31		41.26														99.59
10-77 121.60 Apy	21.99	35.31		41.71														99.65
08-07 174.62 As	21.39	35.31		41.33														98.56
08-07 176.67 As	21.84	35.32		41.90														99.49
SC-10 As 31	22.96	35.33		40.63	1138													99.25
08-07 175.80 As	22.18	35.33		41.19														99.22
08-07 175.80 As	21.85	35.33		41.98														99.63
10-77 121.60 Apy	22.31	35.34		40.84														99.02
08-07 175.80 As	21.42	35.34		42.34	404													99.67
10-87 113.40 Apy	21.35	35.35		42.64														99.83
08-04 166.16 Apy	21.43	35.36		42.45	423													99.70
08-07 176.67 As	21.87	35.36		41.60	428													99.41
08-04 166.16 Apy	21.51	35.36		42.18	409													99.63
08-07 174.62 As	21.87	35.37		41.37														99.16
08-07 176.67 As	21.68	35.38		42.03	382													99.56
08-07 176.67 As	21.95	35.38		41.54														99.20
08-04 166.16 Apy	21.52	35.38		42.36														99.72
08-07 175.80 As	21.99	35.39		41.77														99.78
08-07 176.67 As	21.21	35.39		41.27														98.46
08-07 175.80 As	21.72	35.41		41.98														99.65
08-04 162.87 Apy	22.26	35.41		40.69	343													98.90
08-07 217.77 Py	20.98	35.41		42.71														99.60
08-07 176.67 As	21.92	35.42		42.07														99.77
08-07 176.67 As	21.88	35.42		41.99														99.83
08-07 174.62 As	20.99	35.43		42.22														98.99
08-04 166.16 Apy	22.66	35.44		40.39														98.99
08-07 174.62 As	21.56	35.44		41.27														98.50
08-07 175.80 As	21.67	35.44		41.83														99.36
08-07 174.62 As	21.75	35.44		41.69	353													99.39
08-07 175.80 As	21.89	35.45		41.91														99.77
10-77 121.60 Apy	22.14	35.47		41.19														99.38

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-07 174.62 As	21.66	35.47		41.55	330													99.15
08-07 176.67 As	21.54	35.48		42.20	507													99.78
08-07 226.33 As	21.63	35.48		41.24	421													98.94
10-87 113.40 Apy	21.13	35.48		42.65														99.80
08-07 174.62 As	21.89	35.49		41.95														99.81
08-04 162.87 Apy	22.27	35.49		40.99														99.33
08-04 166.16 Apy	22.37	35.49		40.88	341													99.36
SC-10 As 27	23.84	35.51		39.61	950				2547									99.43
08-07 175.80 As	22.83	35.51		40.61														99.49
08-07 176.67 As	21.80	35.51		41.63														99.46
08-07 176.67 As	21.59	35.52		42.19	326													99.95
08-07 175.80 As	21.63	35.53		42.00														99.75
08-07 175.80 As	22.95	35.55		40.18														99.22
08-07 176.67 As	21.99	35.55		41.28	368													99.37
08-07 176.67 As	21.87	35.55		41.73	379													99.61
08-07 174.62 As	22.13	35.56		41.00														99.14
08-07 175.80 As	22.43	35.56		41.04														99.66
08-07 175.80 As	21.37	35.56		42.78														99.85
10-77 121.60 Apy	22.32	35.57		41.42	396													99.83
10-77 121.60 Apy	21.53	35.57		41.97														99.67
08-07 175.80 As	22.06	35.57		41.42														99.52
10-87 113.40 Apy	21.80	35.58		41.59	340													99.40
08-07 174.62 As	22.60	35.58		40.03	311													98.82
08-07 175.80 As	21.86	35.59		41.25														99.24
08-07 176.67 As	21.88	35.59		41.46														99.46
10-87 113.40 Apy	21.79	35.60		41.81														99.93
08-04 162.87 Py	22.73	35.60		40.07														98.99
08-07 175.80 As	22.03	35.61		41.32														99.13
08-07 175.80 As	22.11	35.61		41.75														99.95
08-07 175.80 As	22.72	35.61		40.39	372													99.12
08-07 176.67 As	21.91	35.61		41.41														99.53
08-07 176.67 As	21.70	35.61		42.06														99.86
08-04 162.87 Py	23.03	35.61		39.91														99.13
08-07 174.62 As	21.72	35.62		41.79														99.57
08-07 175.80 As	22.01	35.62		41.41														99.39
08-04 122.36 As 73	21.41	35.62		42.17														99.36
08-07 174.62 As	21.91	35.63		41.14														99.08
10-77 121.60 Apy	22.44	35.63		40.96														99.55
10-77 121.60 Apy	22.52	35.63		41.03	345													99.86
10-87 113.40 Apy	21.46	35.63		42.21														99.75
08-07 175.80 As	22.17	35.64		41.32	321													99.63
08-07 226.33 As	22.09	35.64		40.90	390													99.30
08-07 174.62 As	21.91	35.64		40.97														99.08
10-77 121.60 Apy	22.26	35.66		41.18														99.72

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-07 176.67 As	22.11	35.69		41.45														99.87
08-07 175.80 As	21.96	35.69		41.10	354													99.22
08-07 174.62 As	22.17	35.71		40.90														99.29
10-87 113.40 Apy	22.37	35.72		41.04														99.82
08-07 175.80 As	23.00	35.74		40.22														99.62
08-07 226.33 As	22.09	35.74		40.82														99.41
08-07 175.80 As	22.69	35.74		40.59														99.34
10-77 121.60 Apy	22.60	35.75		40.55	338													99.45
08-04 122.36 As 72	22.14	35.76		42.15														100.35
08-07 175.80 As	23.03	35.76		40.44														99.85
08-04 166.16 Apy	22.63	35.76		40.95														99.95
08-07 176.67 As	22.39	35.76		41.06	324									907				99.84
08-07 174.62 As	22.62	35.77		40.45														99.48
08-07 175.80 As	22.79	35.78		40.13														99.36
10-87 113.40 Apy	22.75	35.81		40.73														99.83
08-07 175.80 As	22.17	35.82		41.21														99.65
08-07 176.67 As	23.03	35.85		40.28														99.87
08-07 174.62 As	21.75	35.86		40.77														99.03
08-07 175.80 As	22.24	35.87		40.91														99.45
08-07 175.80 As	22.95	35.88		40.02	334													99.36
08-07 174.62 As	22.71	35.90		40.09														99.26
08-07 175.80 As	22.73	35.91		40.55	379													99.65
08-07 217.77 fracture	29.43	36.57		38.42														104.88
08-04 166.16 Py	51.12	43.28		4.35														99.90
08-04 166.16 Py	51.45	44.63		1.66	362													99.08
08-04 166.16 Py	51.55	44.81		1.68	393													99.23
08-07 216.74 Py	51.85	44.92		0.30		390												98.57
08-04 115.75 Py	52.31	44.98		0.26	403													98.87
08-07 226.33 Py	52.33	44.99		0.17	420													98.78
SC-10 Py 6	52.15	44.99		1.53	322													99.02
08-07 226.33 Py	51.61	45.00		1.16						1491								98.98
08-07 174.62 Py	52.20	45.03		0.09	361													98.66
10-87 113.40 Apy	52.38	45.05		0.06	524													98.78
08-07 174.62 Py	51.82	45.08		0.21	319													98.32
SC-10 Py 9	52.93	45.09			355	5126		3713										99.40
SC-10 Py 3	53.09	45.09		0.17	338													98.87
SC-10 Py 5	52.62	45.10		1.04														99.14
08-07 226.33 Py	51.40	45.11		1.49														98.99
08-07 174.62 Po	52.20	45.13		0.11	326													98.60
SC-10 Py 7	52.31	45.16		1.30														99.19
08-07 217.77 Py	51.08	45.16		1.00														98.70
08-07 174.62 Py	51.98	45.17		0.05	337													98.44
08-07 226.33 Py	52.13	45.19		1.60														100.05
08-07 226.33 Py	51.79	45.19		1.52		475												99.76

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-04 122.36 Py 63	52.92	45.26		1.01	392													99.46
SC-10 Py 2	53.23	45.27		0.32	363													99.12
SC-10 Py 8	52.81	45.28		1.02														99.36
08-04 166.16 Py	50.96	45.33		2.21														99.80
09-44 192.02 Py 44	52.89	45.40			370													98.64
08-04 122.36 Py 62	53.21	45.41		0.09														99.27
09-44 192.02 Py 48	53.39	45.41																99.50
08-07 174.62 Py	51.95	45.44		0.32	314													98.93
08-04 166.16 Py	51.79	45.46		1.70														100.11
08-07 226.33 Py	51.75	45.48		1.36	528	441												99.85
08-04 162.87 Py	50.81	45.48		1.06	336													98.63
09-44 192.02 Py 58	53.53	45.51		0.11	417													99.44
08-07 226.33 Py	52.09	45.51		1.08														100.07
08-04 122.36 Py 61	53.46	45.51		0.27	472													99.41
08-07 174.62 Py	51.98	45.54		0.34	340													99.07
SC-10 Py 1	52.32	45.54		1.37														99.78
08-07 199.97 Py	51.97	45.55											292					98.76
08-07 216.74 Py	51.42	45.55		0.53	436	427												98.63
09-44 192.02 Py 49	53.25	45.55																99.10
08-04 162.87 Py	50.87	45.57		1.54	370													99.34
09-44 192.02 Py 53	53.42	45.57			482													99.62
09-44 192.02 Py 56	53.35	45.59																99.34
08-07 217.77 Py	53.08	45.59		0.10														100.06
09-44 192.02 Py 54	53.75	45.60		0.05														99.77
09-44 192.02 Py 55	53.51	45.60		0.05	357													99.58
08-04 122.36 Py 64	53.64	45.60		0.38														100.13
SC-10 Po 21	53.03	45.61		0.28														99.34
08-04 166.16 Py	51.70	45.62		1.48	332													100.08
08-07 174.62 Py	51.36	45.64		1.05	342													99.19
08-07 216.74 Py	52.33	45.68		0.43														99.79
09-44 192.02 Py 38	53.15	45.68		0.15	369													99.41
09-44 192.02 Py 39	53.08	45.68		0.06														99.26
09-44 192.02 Py 57	53.51	45.68											175					99.85
09-44 192.02 Py 59	53.34	45.69		0.09														99.57
08-07 174.62 Py	51.76	45.70		0.92														99.65
09-44 192.02 Py 60	53.45	45.71		0.22														99.83
09-44 192.02 Py 43	52.76	45.72																98.93
08-07 217.77 fracture	52.90	45.72		0.08	523													100.27
09-44 192.02 Py 37	53.30	45.72		0.11														99.61
08-07 174.62 Py	52.11	45.73		0.31	407													99.50
08-07 226.33 Py	52.80	45.73		0.45	432	432												100.05
08-07 226.33 Py	52.64	45.77		0.20		374												100.04
08-07 175.80 Py	52.19	45.78		1.06	387													100.20
08-07 226.33 Py	52.00	45.78		1.15														99.97

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-07 217.77 Py	52.81	45.79			380													99.96
08-07 217.77 Py	51.95	45.80		0.17														99.30
08-07 226.33 Py	52.93	45.80		0.11	401													100.03
10-77 121.60 Py	51.63	45.81		0.93	363													99.80
08-07 199.97 Py	52.10	45.81		0.16														99.51
08-07 216.74 Py	52.45	45.82		0.48														99.84
08-07 199.97 Py	51.90	45.82		0.36	395													99.57
08-04 162.87 Py	51.35	45.83		1.19														99.60
08-07 174.62 Py	52.15	45.84		0.62	429													99.85
10-87 113.40 Py	52.14	45.84		0.77														100.18
10-87 113.40 Apy	52.21	45.84		0.66														100.07
08-07 217.77 fracture	51.52	45.85		0.75														99.50
08-04 122.36 Py 66	53.43	45.85		0.39														100.21
08-04 156.21 Py	51.66	45.85		0.36	324													99.22
08-07 226.33 Py	52.54	45.85		0.27														99.94
08-07 226.33 Py	51.55	45.86		1.19		538												99.91
08-04 156.21 Py	53.05	45.86		0.05									466					100.49
08-04 122.36 Py 69	53.25	45.87		0.73	334	413												100.33
08-04 156.21 Py	51.53	45.87		0.29														99.12
08-04 156.21 Py	51.86	45.88		0.24														99.31
08-07 216.74 Py	52.66	45.88		0.26	414													100.20
10-77 121.60 Py	52.28	45.88		0.06														99.67
10-87 113.40 Apy	51.63	45.89		1.57	448													100.43
08-07 216.74 Py	52.21	45.89		0.55														99.72
08-07 199.97	51.94	45.89		0.29	444													99.45
08-07 216.74 Py	52.45	45.90		0.20	340													99.41
08-04 156.21 Py	51.76	45.91		0.27	492													99.22
08-07 216.74 Py	52.42	45.92		0.48														99.96
08-07 226.33 Py	52.08	45.92		1.13	313													100.37
08-07 176.67 Py	52.90	45.93		0.75	351													100.86
08-07 217.77 Py	51.48	45.93		1.11	447													99.91
08-07 199.97 Py	51.95	45.95		0.40														99.65
08-04 122.36 Py 87	52.91	45.95		0.22														99.33
08-04 122.36 Py 65	53.67	45.95		0.07														100.05
08-04 166.16 Py	52.63	45.97		0.14														100.07
08-04 122.36 Py 119	53.12	45.97		0.68														100.13
08-04 122.36 Py 86	52.96	45.98		0.57	398													100.14
08-07 216.74 Py	52.76	45.99		0.34														100.27
08-04 156.21 Py	51.83	45.99		0.28														99.38
08-04 156.21 Py	52.03	46.00		0.31														99.77
08-04 162.87 Py	51.76	46.00		1.00														100.05
08-04 115.75 Fracture	55.30	46.01		0.08	331		435						176	312				103.27
08-07 226.33 Py	52.88	46.01		0.18														100.27
08-04 122.36 Py 68	53.44	46.01		0.18	314													100.14

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-07 226.33 Py	52.65	46.25		0.21	306													100.35
08-07 176.67 Py	53.18	46.25		0.86	362													101.52
10-77 121.60 Py	52.11	46.25		1.31														101.09
08-07 174.62 Py	52.65	46.26		0.54	501													100.69
08-07 216.74 Py	53.05	46.26		0.37	353	390												100.70
08-07 216.74 Py	52.40	46.26		0.32														100.34
08-04 115.75 Py	52.16	46.27		0.96	371													100.79
08-07 226.33 Py	53.09	46.27		0.24														100.65
08-07 175.80 Py	52.65	46.28		0.75														100.81
08-07 175.80 Py	52.79	46.28		0.86														100.87
08-04 156.21 Py	52.36	46.28		0.29														100.13
08-07 176.67 Py	52.62	46.29		0.68	340													100.83
08-07 217.77 fracture	52.39	46.29		0.28														100.27
08-07 226.33 Py	53.11	46.29		0.06	491													100.78
08-07 175.80 Py	52.83	46.29		0.73	341													100.91
08-07 216.74 Py	52.68	46.29		0.10														100.29
08-07 174.62 Zn	52.52	46.30		0.09														100.30
09-51 74.52 Py 4	53.02	46.30		0.27	326											5709		99.82
08-04 115.75 Fracture	52.74	46.30		0.16	369													100.91
10-77 121.60 Py	52.15	46.31		1.04	414													100.63
10-77 121.60 Py	52.30	46.31		1.20														100.99
10-87 113.40 Apy	51.78	46.31		1.21														100.49
08-04 162.87 Py	52.54	46.32		0.07	374													100.33
08-07 176.67 Py	52.69	46.32		0.82														100.90
08-07 217.77 fracture	52.73	46.33		0.24	354													100.85
08-07 226.33 Py	52.68	46.33		0.33														100.61
08-07 217.77 fracture	52.20	46.33		0.08	312													100.07
08-07 175.80 Py	52.98	46.34		0.65	319													101.22
08-04 156.21 Py	52.09	46.34		0.25	407													100.09
08-07 216.74 Py	52.26	46.34		0.44	318													100.23
08-07 216.74 Py	52.38	46.35		0.22	439													100.12
10-77 121.60 Py	52.14	46.35		1.00														100.76
08-07 216.74 Py	53.30	46.36		0.05														100.83
08-07 226.33 Py	53.23	46.37		0.42														101.14
08-07 217.77 bright	51.34	46.37		0.88	329													100.04
08-07 176.67 Py	52.88	46.37		0.76														101.23
10-77 121.60 fracture	52.86	46.37		0.09	415													100.65
10-87 113.40 Py	52.27	46.37		0.63	316													100.66
10-77 121.60 Py	52.46	46.37		0.63	425													100.76
08-07 174.62 Py	52.13	46.37		0.86														100.62
08-07 217.77 Py	50.80	46.38		0.14														98.66
08-04 156.21 Py	52.19	46.38		0.16														100.14
08-07 217.77 fracture	51.96	46.38		0.31	453													99.93
08-07 226.33 Py	51.60	46.38		1.74														100.67

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-07 175.80 Py	52.34	46.39		1.53														101.36
10-87 113.40 Py	52.72	46.39		0.12	325													100.51
08-07 176.67 Py	52.82	46.39		0.85	406													101.27
08-07 217.77 fracture	52.11	46.39		0.24														100.16
10-87 113.40 Apy	51.68	46.39		0.95	389													100.31
08-04 115.75 Py	52.24	46.39		0.98	420													100.90
08-07 216.74 Py	52.22	46.39		0.55		381												100.25
08-07 175.80 Py	52.49	46.40		0.82														100.93
08-07 174.62 Py	52.59	46.40		0.24	482													100.30
08-07 199.97	52.18	46.40		0.41														100.37
08-07 175.80 Py	52.63	46.40		0.74	306													100.95
08-07 226.33 Py	53.02	46.40		0.04	324	406												100.53
10-77 121.60 Py	52.98	46.41			330													100.72
08-07 226.33 Py	52.74	46.41		0.11														100.55
08-04 156.21 Py	52.83	46.42		0.35	415													100.84
08-07 175.80 Py	52.52	46.42		1.24	380													101.13
08-04 156.21 Py	52.48	46.42		0.32														100.61
08-04 156.21 Py	52.23	46.43		0.32														100.35
08-04 156.21 Py	52.49	46.44		0.32														100.59
08-07 174.62 Py	52.20	46.45		1.04														100.76
08-07 199.97 Fracture	52.43	46.45		0.37	384													100.61
08-07 176.67 Py	52.79	46.45		0.84														101.26
08-07 174.62 Py	52.63	46.46		0.57														100.79
08-07 216.74 Py	52.59	46.46		0.31	310													100.65
08-04 162.87 Py	52.61	46.46		0.08	313													100.51
08-07 176.67 Py	52.84	46.48		0.86														101.36
08-07 216.74 Py	52.72	46.48		0.48	448	385												101.17
08-04 156.21 Py	51.92	46.48		0.57														100.23
08-04 115.75 Py	52.46	46.50		0.65														100.98
08-04 115.75 Fracture	52.65	46.50		0.10														100.55
10-87 113.40 Apy	52.88	46.50		0.07	349													100.94
08-07 226.33 Py	53.17	46.50		0.06	405	629												100.92
08-07 217.77 fracture	52.18	46.50		0.07														100.01
08-07 199.97 Fracture	52.38	46.51		0.09														100.35
10-87 113.40 Apy	52.66	46.52		0.25	418													100.75
08-04 115.75 Py	52.32	46.52		0.86	361													100.92
08-07 199.97	52.50	46.52		0.62														100.93
08-07 216.74 Py	52.34	46.52		0.42	500	500												100.70
08-04 156.21 Py	51.93	46.52		0.41	348													100.25
08-04 115.75 Py	52.96	46.53		0.06														100.82
08-07 199.97	52.43	46.53		0.55	329													100.87
10-77 121.60 Py	52.81	46.54		0.12	331													100.80
08-07 174.62 Py	52.83	46.55		0.24														100.72
08-07 199.97 Py	52.12	46.55											309					100.05

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-07 216.74 Py	53.03	46.55		0.38														101.32
08-07 216.74 Py	52.91	46.56		0.25	352													100.96
08-04 115.75 Py	52.72	46.57		0.15														100.84
08-07 199.97 Fracture	52.03	46.57		0.49	423													100.43
10-87 113.40 Apy	52.97	46.57		0.12	406													101.04
08-07 175.80 Py	53.31	46.57		0.44														101.50
08-07 199.97 Py	51.93	46.58		0.73														100.62
08-04 156.21 Py	52.07	46.58		0.45														100.55
08-07 199.97 Py	52.48	46.59		0.11														100.60
08-07 216.74 Py	53.27	46.59		0.34														101.45
08-07 174.62 Zn	52.86	46.59		0.24														101.13
08-04 122.36 Py 75	52.76	46.60		0.39	399													100.12
10-87 113.40 Apy	52.59	46.61		0.08	415													100.72
08-07 199.97 Py	52.49	46.61		0.10														100.55
08-07 226.33 Py	52.65	46.61		0.82	474	423												101.21
08-07 175.80 Py	53.09	46.61		0.37	438													101.28
08-07 174.62 Zn	52.72	46.62		0.22	411													100.73
08-04 156.21 Py	52.10	46.62		0.52														100.64
08-04 122.36 Py 74	53.38	46.62		0.28														100.61
08-07 176.67 Py	52.95	46.64		0.80														101.48
08-07 176.67 Py	52.62	46.64		0.80														101.10
08-07 226.33 Py	52.96	46.66		0.06														100.75
08-07 174.62 Zn	52.95	46.66		0.19														101.17
08-07 199.97 Py	52.17	46.67		0.15	396													100.26
08-04 156.21 Py	52.43	46.68		0.27	341													100.79
08-07 175.80 Py	53.27	46.68		0.44														101.38
08-07 176.67 Py	53.49	46.68		0.04														101.42
08-04 115.75 Fracture	52.89	46.68		0.13														101.02
08-07 176.67 Py	52.82	46.69		0.75	326													101.40
08-07 199.97	52.43	46.69		0.27	326													100.84
08-07 176.67 Py	52.61	46.69		0.77	372													101.49
08-07 174.62 Py	52.37	46.70		0.41														100.73
08-07 176.67 Py	52.73	46.71		0.84														101.45
08-04 115.75 Py	52.98	46.72		0.08	417													101.20
09-51 74.52 Py 5	53.24	46.73		0.25	387											6694		100.76
08-04 156.21 Py	52.16	46.73		0.29														100.63
08-07 176.67 Py	52.64	46.73		0.76														101.21
08-07 216.74 Py	52.86	46.74		0.33		476												101.19
08-07 176.67 Py	52.83	46.74		0.77	321													101.37
08-04 156.21 Py	52.75	46.74		0.39														101.12
08-07 226.33 Py	52.94	46.75		0.17	498													101.13
08-04 156.21 Py	52.63	46.75		0.21														100.93
08-07 199.97 Py	52.79	46.77		0.22														101.10
08-07 176.67 Py	53.53	46.77		0.13														101.58

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
08-04 115.75 Py	52.74	46.78		0.06	491													100.92
08-07 175.80 Py	52.88	46.81		0.96														101.79
08-07 199.97 Py	52.42	46.81		0.08	361													100.60
09-51 74.52 Py 7	53.30	46.83		0.13	424											6742		100.85
08-07 216.74 Py	52.83	46.83		0.18														101.10
08-07 216.74 Py	52.73	46.86		0.36														101.01
08-07 199.97 Py	51.63	46.87		0.37	346								317					100.29
09-51 74.52 Py 6	53.18	46.87			359											6337		100.22
08-04 166.16 Py	52.96	46.90		0.11	461													101.26
09-51 74.52 Py 16	52.60	46.95		0.28	396											6769		100.35
09-51 74.52 Py 9	52.88	46.95		0.19	316											7526		100.52
09-51 74.52 Py 8	53.39	46.95		0.13												7134		101.05
09-51 74.52 Py 15	52.60	46.97		0.23	405											7272		100.16
09-51 74.52 Py 10	52.81	46.97		0.14												6358		100.29
09-51 74.52 Py 11	52.91	47.02		0.24												7130		100.73
09-51 74.52 Py 13	52.77	47.02		0.27												7561		100.54
08-04 115.75 bright	53.16	47.04		0.14														101.59
08-07 174.62 Py	53.03	47.04		0.05														101.37
09-51 74.52 Py 18	53.24	47.06														6166		100.59
09-51 74.52 Py 12	52.89	47.07		0.32	341											7087		100.86
08-07 217.77 bright	52.72	47.08		0.10														101.22
09-51 74.52 Py 19	53.31	47.08														6981		100.94
08-04 156.21 Py	52.69	47.10		0.19														101.40
08-07 217.77 bright	52.42	47.12		0.81														101.50
08-04 115.75 bright	52.68	47.15		0.15														101.34
09-51 74.52 Py 22	52.53	47.16			336											6409		99.95
09-51 74.52 Py 17	52.92	47.17		0.29	377											6609		100.83
09-51 74.52 Py 14	53.03	47.33		0.25	495											6515		100.80
08-04 122.36 Py 71	53.36	47.36		0.14	397													101.27
08-04 122.36 Py 70	52.76	47.49		0.35	402													101.19
09-51 74.52 Py 21	53.33	47.52			394											7106		101.07
08-07 175.80 Po	39.35	58.32		0.06	394													98.61
10-73 408 Py 124	39.12	58.37			1394									2510				98.06
10-73 408 Py 144	39.32	58.37			1407									2456				98.62
10-73 408 Py 135	38.94	58.37			1419									2042				98.20
10-73 408 Py 134	38.89	58.39			1406									2364				98.19
10-73 408 Py 121	39.28	58.45			1491									2612				98.52
08-07 226.33 ?	38.67	58.50			492													98.07
08-07 175.80 Po	39.24	58.50		0.03	374													98.63
08-07 175.80 Po	39.01	58.51		0.07														98.25
08-07 176.67 Po	39.41	58.56			451													99.10
10-73 408 Py 126	39.33	58.56			1464									2334				98.67
08-07 175.80 Po	39.01	58.58		0.05	334													98.39
10-73 408 Py 122	39.28	58.59			1357									2485				98.90

Comment	S wt.%	Fe wt.%	Zn wt.%	As wt.%	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi wt.%	Mg	Ni	W	Hg	Te	Total
10-73 408 Py 120	39.32	58.61			1209									2651				98.63
10-73 408 Py 125	39.04	58.61			1343									2485				98.52
10-73 408 Py 133	38.72	58.63			1295									2525				98.12
08-07 175.80 Po	38.93	58.64		0.05	358													98.53
08-07 174.62 Po	38.90	58.68		0.04	472													98.54
08-07 175.80 Po	39.41	58.71		0.05														99.01
08-07 226.33 ?	38.57	58.73		0.03	386													98.32
08-04 115.75 Po	38.47	58.74			447													98.37
08-07 174.62 Po	38.59	58.80		0.04														98.32
08-07 175.80 Po	39.01	58.82			416													98.57
08-07 226.33 ?	38.58	58.82			349													98.37
08-07 174.62 Po	39.09	58.88																98.99
08-04 115.75 Po	38.34	58.88																98.43
08-07 226.33 ?	38.67	58.90		0.03		385												98.62
08-07 174.62 Po	39.05	58.96		0.03	511													98.95
08-07 175.80 Po	38.96	58.98		0.06														98.95
08-04 115.75 Po	38.76	59.02			485													98.80
08-07 175.80 Po	39.23	59.05			413													99.24
08-07 175.80 Po	39.12	59.13		0.06														99.34
08-04 115.75 Apy	37.65	59.13																98.01
08-07 175.80 Po	38.31	59.14		0.04	356													98.24
08-04 115.75 Po	37.61	59.27		0.05	405													98.01
08-04 122.36 Po 116	38.98	59.31		0.06														98.83
08-04 122.36 Po 115	38.95	59.33			451													98.71
08-07 175.80 Po	38.62	59.47		0.04	355													99.17
08-07 175.80 Po	38.66	59.55																99.03
08-07 174.62 Po	38.52	59.55			371													99.12
08-07 175.80 Po	39.01	59.66		0.04	351													99.67
Au										998270		4333 ppm						100.01

Sulphide data detection limits 3 sigma (ppm)

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-07 216.74 Bi	429	399	556	355	378	471	594	1131	1117	1887	1928	2710	213	392	1221	2122	573
08-07 216.74 Bi	445	405	561	349	375	464	579	1083	1132	2095	1901	2686	208	388	1240	2095	566
08-07 216.74 Bi	408	401	542	339	370	461	591	1062	1081	1757	1861	2623	203	382	1217	1965	570
08-07 216.74 Bi	397	389	546	345	369	460	568	1105	1090	1894	1793	2587	201	381	1197	2013	568
08-07 216.74 Bi	388	393	542	345	370	466	586	1127	1146	1743	1821	2630	205	380	1196	2072	575
08-07 216.74 Bi	363	407	563	369	383	472	628	1167	1185	1995	1784	2541	228	393	1225	2207	589
08-07 216.74 Bi	406	409	543	344	367	461	597	1071	1073	1835	1870	2587	204	372	1197	1955	567
08-07 216.74 Bi	430	406	565	357	380	469	595	1083	1152	1568	1832	2679	214	393	1243	2063	563
08-04 166.16 Apy	410	401	563	554	384	473	587	1072	1060	950		2569	191	394			
08-07 216.74 Bi	425	404	550	352	379	472	582	1129	1145	1862	1858	2683	206	391	1217	1879	580
08-07 226.33 ?	420	430	571	383	388	488	639	1167	1184	1961	1842	2665	239	400	1271	2083	598
08-04 166.16 Apy	437	401	564	564	381	475	559	1085	1112	934		2593	191	397			
08-04 166.16 Apy	439	403	559	562	378	471	583	1068	1156	1011		2662	189	390			
SC-10 Sp 13	511	304	530	669	272	389	441	859	849	1872		2060	214	265		3330	417
SC-10 Py 30	489	301	530	668	268	387	463	795	820	1887		2097	212	262		3406	416
08-04 115.75 Fracture	489	412	639	563	387	464	705	1268	1212	1538		3264	176	388			
SC-10 Py 29	513	294	533	640	266	386	441	836	796	2091		2083	216	262		3410	411
08-07 216.74 Bi	385	420	569	358	388	491	641	1162	1173	1944	1826	2707	227	401	1242	2137	604
SC-10 Sp 14	530	296	529	638	271	391	441	825	816	2124		2054	210	257		3369	407
08-07 216.74 Bi	370	423	573	375	388	483	636	1180	1181	1854	1824	2768	228	403	1261	2155	611
SC-10 Py 17	519	302	531	634	265	382	452	838	826	2061		2098	212	265		3318	411
SC-10 Py 16	501	309	524	665	271	385	455	815	825	1742		2071	214	262		3384	417
SC-10 Po 20	488	303	529	640	260	390	453	828	832	1946		2141	208	262		3316	424
SC-10 Sp 12	491	307	525	668	258	384	458	871	802	2170		2135	215	258		3310	418
08-04 166.16 Apy	409	411	564	575	377	472	586	1075	1139	941		2662	190	392			
08-04 115.75 Fracture	390	425	583	614	392	482	640	1167	1197	1013		2630	211	400			
08-04 156.21 fracture	443	393	562	570	379	467	606	1144	1127	954		2627	195	394			
08-04 166.16 Apy	394	414	571	547	383	473	584	1092	1121	939		2624	187	389			
08-04 122.36 ? 112	487	419	627	557	375	462	701	1267	1179	2726	4822	3454	183	392	1328		604
08-07 216.74 ?	378	418	563	371	379	473	616	1143	1183	1939	1824	2620	230	392	1238	2103	605
SC-10 Py 15	481	305	523	622	261	387	444	842	812	1991		2200	210	262		3310	420
08-04 156.21 fracture	415	394	545	586	367	451	581	1133	1106	979		2668	202	380			
08-04 166.16 Apy	399	406	555	561	379	467	605	1126	1117	965		2587	192	388			
08-04 122.36 ? 109	326	427	565	649	388	484	621	1158	1187	1989	2793	2752	222	407	1308	3439	605
08-07 216.74 ?	378	423	564	383	390	477	614	1159	1192	1926	1856	2671	236	396	1247	2176	601
08-04 166.16 Apy	424	412	553	563	379	474	602	1129	1114	981		2692	190	390			
08-04 156.21 fracture	408	420	558	574	385	475	571	1108	1127	1023		2598	201	389			
08-04 115.75 Fracture	414	421		566	381	462	704	1238	1141	1537		3364	174	389			
08-07 199.97 Fracture	405	426	577	638	389	488	636	1186	1194	1076		2732	209	399			
08-04 115.75 Fracture	374	423	568	611	390	481	621	1131	1155	1005		2675	212	400			
08-07 199.97 Fracture	369	426	572	613	389	483	624	1173	1172	1051		2671	206	404			
08-07 199.97 Fracture	408	421	565	612	387	484	631	1153	1130	1044		2698	208	400			
08-04 122.36 ? 111	379	434	570	666	385	488	612	1158	1205	2060	2953	2765	230	405	1322	3546	596

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-07 199.97 Fracture	371	416	576	620	388	480	636	1166	1215	981		2671	203	395			
08-04 122.36 ? 91	356	428	561	636	380	478	614	1120	1194	2015	2757	2790	220	405	1309	3459	596
08-04 166.16 Apy	400	412	558	568	379	469	567	1093	1092	984		2627	199	391			
08-04 115.75 Fracture	375	421	566	639	392	480	616	1184	1196	1051		2757	209	402			
08-04 122.36 ? 92	396	439	563	650	389	476	645	1209	1238	2051	2866	2741	225	403	1321	3412	598
08-04 162.87 Py	431	405	569	565	377	470	583	1093	1107	1035		2584	190	384			
08-04 156.21 fracture	430	407	555	563	377	462	610	1142	1142	1026		2649	190	386			
08-04 166.16 Apy	405	408	566	575	378	470	589	1064	1117	963		2670	199	390			
08-07 226.33 As	367	410	560	371	383	473	608	1132	1185	2072	1819	2765	231	388	1239	2007	598
10-77 121.60 fracture	386	417	545	627	375	462	620	1204	1180	1036		2609	214	380			
08-04 166.16 Py	414	395	562	562	380	475	571	1054	1127	986		2631	192	390			
08-04 115.75 Fracture	385	425	575	636	393	478	632	1187	1197	1023		2580	209	401			
08-04 156.21 fracture	442	413	556	567	380	469	578	1108	1108	977		2646	191	379			
08-04 162.87 Py	431	411	565	565	382	480	584	1046	1080	947		2508	206	390			
08-04 162.87 Apy	441	404	548	549	383	474	584	1092	1159	980		2570	272	394			
08-04 156.21 fracture	469	405	566	526	378	480	630	1097	1130	1031		2679	185	393			
08-04 156.21 fracture	427	392	562	541	378	469	564	1138	1124	964		2623	193	386			
SC-10 As 11	420	369	445	575	311	385	440	848	843	2099		2120		316	1038	2955	421
SC-10 As 10	445	366	462	583	312	382	447	861	832	1941		2050		316	1070	3064	415
08-07 175.80 As	515	357	452	340	309	390	462	821	884	1913	1692	2244		320	997	1740	641
08-04 166.16 Apy	423	359	458	565	312	382	459	828	807	978		2066		315			
08-07 175.80 As	426	354	453	353	307	383	466	828	848	2113	1689	1984		318	1032	1878	410
08-04 122.36 As 102	498	368	462	578	313	390	442	823	812	2058		1934		329	1058	3019	447
08-04 122.36 As 106	443	376	454	555	316	388	433	795	853	2069		2031		326	1074	3013	414
08-04 166.16 Apy	425	360	451	574	316	387	440	831	852	892		2031		316			
08-04 122.36 As 95	422	368	452	565	315	383	458	806	816	1969		2143		312	1047	3034	412
08-07 175.80 As	475	355	458	349	315	390	452	825	840	2083	1923	1981		314	1013	2166	406
08-04 122.36 As 104	456	370	449	572	318	384	456	841	825	2021		2133		320	1049	3014	414
08-04 122.36 As 89	433	360	454	570	312	385	456	833	855	2154		2097		321	1092	3025	415
08-04 122.36 As 101	472	366	458	572	315	386	429	794	830	2013		2070		323	1078	3040	409
08-07 175.80 As	406	353	437	340	315	375	433	779	793	2034	1884	1940		309	1009	2085	401
08-04 122.36 As 105	408	362	460	571	318	387	431	829	817	2060		1992		327	1051	2931	418
08-07 175.80 As	459	355	448	348	314	386	432	818	807	2095	1913	1975		313	1020	1820	408
08-04 122.36 As 103	494	364	442	587	311	386	441	844	823	2106		2024		323	1077	3079	416
08-04 122.36 As 94	487	356	451	571	308	391	453	843	820	2028		2150		322	1078	3039	414
SC-10 As 23	451	373	451	577	311	382	455	840	807	2008		2082		327	1078	3085	417
SC-10 As 24	469	368	447	568	323	388	445	808	858	2094		2161		317	1089	3053	409
SC-10 As 36	414	359	454	551	312	387	466	827	798	1945		1981		327	1074	2999	407
08-04 122.36 As 100	506	374	457	567	314	383	461	836	830	2123		2004		320	1058	3012	406
08-04 122.36 As 113	414	373	453	552	317	382	429	814	840	2063		2115		323	1064	3030	409
SC-10 As 35	470	372	456	552	314	395	453	838	850	1948		2105		324	1058	3014	412
08-07 226.33 As	463	355	455	358	317	387	440	789	783	1878	1792	2154		323	1040	2050	414
10-77 121.60 Apy	454	361	448	561	314	389	476	803	815	938		2000		321			
SC-10 As 22	434	372	462	566	319	392	458	837	799	1813		2011		320	1088	3064	420
SC-10 As 34	486	374	455	575	318	392	454	831	808	2152		2003		329	1064	3027	411

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-04 166.16 Apy	485	358	464	576	320	384	439	823	807	913		2045		320			
10-77 121.60 Apy	427	361	458	559	311	390	449	806	801	965		1992		319			
10-77 121.60 Apy	464	355	454	569	312	381	434	846	795	1013		1970		324			
SC-10 As 18	512	357	463	567	319	388	430	836	828	2049		2002		319	1072	3048	414
10-77 121.60 Apy	438	361	452	557	313	384	447	799	800	965		2032		328			
08-04 122.36 As 93	464	369	460	569	308	380	453	891	807	2153		2121		325	1048	3030	405
10-77 121.60 Apy	413	352	456	557	317	392	442	835	793	1008		2040		319			
08-04 122.36 As 85	442	363	458	564	317	383	475	803	841	2168		2080		321	1083	3083	413
08-04 122.36 As 114	460	369	448	572	313	386	439	836	812	1971		2040		321	1084	3001	442
08-07 217.77 Fracture	447	355	456	569	316	377	454	796	815	981		2113		324			
SC-10 As 25	460	360	456	557	307	391	447	828	807	2071		2026		318	1080	3036	413
08-07 174.62 As	470	360	457	354	317	395	431	819	795	2016	1906	2094		319	1016	1775	406
10-87 113.40 Apy	453	354	455	534	314	386	463	841	753	1060		2052		323			
10-77 121.60 Apy	457	364	464	549	313	386	449	842	775	1000		2057		319			
08-04 166.16 Apy	497	370	457	556	317	378	452	823	859	999		2046		312			
SC-10 As 33	443	366	457	573	323	376	433	867	817	1964		1999		325	1078	3014	415
08-04 122.36 As 80	477	368	450	578	317	382	451	858	803	2078		2141		327	1065	3009	420
08-04 166.16 Apy	475	363	466	569	318	381	446	817	856	1000		2084		318			
08-04 166.16 Apy	441	362	455	550	316	387	443	815	812	1010		1998		316			
08-04 122.36 As 67	426	371	444	567	310	379	434	824	816	2072		2074		325	1077	3057	406
10-87 113.40 Apy	439	341	459	553	319	386	436	849	796	994		2162		318			
08-04 122.36 As 82	463	366	448	576	312	391	454	822	833	2089		2046		325	1064	2965	417
10-87 113.40 Apy	401	371	451	545	310	380	461	834	817	1031		1988		322			
SC-10 As 26	427	371	460	561	311	391	454	821	843	1812		2221		324	1079	3008	415
10-87 113.40 Apy	438	365	459	551	315	388	454	832	801	1045		2121		320			
SC-10 As 32	432	367	459	551	317	388	440	836	850	2075		1961		326	1071	3002	405
08-04 122.36 As 77	465	364	453	563	316	396	456	856	817	2161		2092		318	1062	2984	413
08-07 174.62 As	466	361	447	342	306	378	439	828	790	1723	1849	1975		311	999	1717	401
08-04 166.16 Apy	447	358	449	542	316	387	451	801	832	980		1895		316			
08-04 122.36 As 81	516	367	456	566	313	387	450	845	845	2034		2111		325	1082	3023	409
08-04 166.16 Apy	479	355	459	571	315	388	441	832	815	948		2142		321			
08-04 166.16 Apy	446	369	456	568	317	394	449	821	843	990		2052		315			
08-07 174.62 As	447	364	456	355	313	387	447	840	833	1884	1756	2143		323	1013	2285	411
08-04 166.16 Apy	428	356	454	569	317	390	434	835	805	1003		2000		320			
08-04 122.36 As 76	470	370	443	568	308	379	453	796	840	2197		2166		322	1079	3022	414
08-04 166.16 Apy	448	355	448	568	311	387	421	786	825	1035		2044		315			
08-04 166.16 Apy	438	368	458	550	315	384	434	809	814	933		2106		315			
08-04 122.36 As 88	440	373	453	569	317	386	459	835	784	1988		2039		322	1062	3096	415
08-07 176.67 As	449	348	440	346	305	387	434	817	803	1788	1804	1874		317	989	2036	405
08-07 176.67 As	463	361	448	352	312	380	441	801	802	1805	1752	1865		315	1006	1954	409
08-04 115.75 Fracture	452	358	458	579	315	386	456	838	814	977		2073		322			
08-04 162.87 Apy	491	350	455	552	313	385	448	824	787	966		2063		316			
10-77 121.60 Apy	447	364	448	572	316	385	434	825	821	1027		2007		316			
10-77 121.60 Apy	428	354	468	566	315	384	446	804	808	982		1948		316			
10-87 113.40 Apy	468	366	456	560	313	385	439	824	842	968		2145		322			

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
10-87 113.40 Apy	465	346	452	561	316	389	434	801	816	966		1981		316			
08-04 166.16 Apy	455	352	452	545	315	391	447	815	836	1007		1860		316			
08-04 122.36 As 83	509	368	458	583	314	387	438	825	852	1809		2183		328	1084	3077	415
08-07 176.67 As	461	358	445	350	318	380	451	845	800	1942	1850	2071		312	1012	2050	411
10-87 113.40 Apy	458	353	451	556	314	385	436	843	798	957		1890		316			
08-07 175.80 As	421	351	444	348	308	376	419	801	789	1889	1876	1867		306	994	2037	403
08-04 162.87 Apy	430	357	467	574	308	389	451	836	788	1046		2007		322			
08-04 166.16 Apy	454	367	452	586	316	381	450	832	820	968		2065		313			
08-07 176.67 As	477	354	441	346	309	381	448	836	795	2016	1870	1979		315	996	2146	402
08-07 175.80 As	453	356	451	351	318	384	459	849	814	1663	1775	2018		319	991	2088	400
08-07 226.33 As	455	367	457	354	311	385	442	781	800	1874	1761	2040		314	1005	1714	418
08-07 217.77 Py	491	348	457	575	312	388	456	824	828	1008		1931		325			
08-04 162.87 Py	410	363	451	575	312	387	445	854	796	1070		2192		320			
10-87 113.40 Apy	479	367	457	562	320	384	433	798	803	986		2071		321			
08-04 162.87 Apy	407	361	462	575	324	384	456	837	783	992		2174		314			
10-87 113.40 Apy	414	356	461	562	315	383	462	852	793	1063		2054		321			
08-07 226.33 As	426	344	445	342	315	383	440	797	817	1974	1827	1863		316	984	1882	394
08-07 174.62 As	496	349	444	345	302	378	431	789	807	1899	1896	1873		310	987	1727	400
10-87 113.40 Apy	442	363	463	575	315	382	446	812	822	998		2122		314			
08-07 217.77 Py	433	365	453	565	309	380	440	846	798	1059		2037		317			
SC-10 As 28	450	368	457	579	313	387	456	817	826	1962		2069		333	1070	3038	414
08-04 162.87 Py	417	359	461	555	308	383	454	828	831	932		2023		318			
08-07 174.62 As	439	355	452	350	319	387	451	776	819	1790	1712	2038		320	1024	1986	409
08-07 174.62 As	487	354	457	348	312	388	431	826	812	1805	1784	2117		321	1022	1808	411
10-77 121.60 Apy	429	376	452	569	317	384	451	782	808	1056		1927		322			
08-04 162.87 Py	445	347	447	564	313	387	473	835	839	1052		2048		315			
08-07 226.33 As	457	360	453	350	321	388	440	825	841	1795	1913	1956		320	1005	1954	413
08-07 176.67 As	434	343	442	347	311	367	446	787	792	1693	1876	2028		310	1015	1891	393
10-77 121.60 Apy	446	356	460	546	312	386	432	828	809	927		2019		317			
08-04 162.87 Py	507	349	453	549	311	384	434	826	809	992		2138		328			
08-07 176.67 As	458	368	457	357	312	385	454	804	839	1860	1918	2027		309	1020	2001	413
08-07 175.80 As	457	343	444	342	307	379	428	832	801	1798	1739	1955		304	985	2074	400
08-07 226.33 As	423	346	446	348	315	383	431	827	768	2024	1776	1968		315	978	1929	406
10-87 113.40 Apy	414	351	461	555	315	388	444	844	778	1003		2086		315			
08-04 122.36 As 84	[illegible]	374	451	578	313	386	445	835	800	1061		2113		325	1087	3026	404

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-07 175.80 As	433	342	439	342	308	373	435	834	780	1886	1853	1969		311	994	1798	401
10-87 113.40 Apy	395	363	458	564	316	392	443	782	788	974		2063		317			
08-07 174.62 As	425	366	463	352	313	385	453	805	819	2038	1761	2042		318	1029	1945	407
08-07 175.80 As	449	362	447	341	308	378	429	819	795	1959	1798	1965		313	988	2087	402
08-07 176.67 As	467	352	456	353	317	387	436	798	784	2074	1850	2135		313	1017	1852	408
08-07 226.33 As	429	335	439	347	302	378	440	798	803	1952	1800	1960		318	1007	1916	399
08-07 176.67 As	422	353	441	348	307	377	428	808	813	1864	1838	1982		304	967	1795	400
08-07 226.33 As	441	364	455	353	319	387	438	840	811	1924	1795	2113		316	1029	1940	407
08-04 166.16 Apy	475	353	462	573	310	388	439	783		1070		2045		317			
08-07 175.80 As	425	350	458	353	315	390	463	851	832	2005	1922	1959		319	1034	1859	405
08-07 174.62 As	439	357	462	352	318	385	435	845	843	2379	1791	2048		323	1023	1877	420
08-07 175.80 Po	409	359	461	356	317	392	452	860	818	1887	1876	2177		317	1027	1917	406
08-07 176.67 As	505	353	455	355	315	386	425	846	815	1982	1801	2096		321	1016	1998	411
08-04 122.36 As 79	436	368	454	559	317	382	454	806	804	1925		2022		324	1065	3054	410
10-77 121.60 Apy	482	351	456	560	313	394	451	826	829	920		1962		321			
08-07 174.62 As	445	358	453	354	310	389	462	807	797	1847	1839	2038		321	1036	1850	418
08-07 176.67 As	448	339	449	343	308	377	433	811	771	1986	1675	1987		314	981	1887	403
SC-10 As 31	462	363	456	552	315	388	454	811	806	1743		2113		323	1070	3019	414
08-07 175.80 As	442	342	447	338	311	376	431	804	818	1935	1924	1964		311	999	1910	394
08-07 175.80 As	441	365	465	356	319	388	449	822	825	1861	1947	2055		325	1027	1971	408
10-77 121.60 Apy	418	347	456	562	318	383	453	819	833	980		2044		321			
08-07 175.80 As	448	354	447	341	301	371	432	783	781	1911	1866	1865		306	1005	1995	407
10-87 113.40 Apy	429	356	458	553	322	390	465	806	830	1011		2063		322			
08-04 166.16 Apy	472	355	456	549	310	382	475	826	813	1090		2146		323			
08-07 176.67 As	499	353	458	358	315	390	454	828	822	1854	1854	1920		318	1040	2111	411
08-04 166.16 Apy	442	365	455	567	312	387	435	799	813	998		2056		319			
08-07 174.62 As	481	343	438	343	306	383	439	828	806	1952	1783	1932		305	997	1899	395
08-07 176.67 As	421	353	450	350	309	388	431	816	803	1878	1660	2125		320	1024	2010	408
08-07 176.67 As	472	355	464	354	316	382	449	802	836	2264	1920	2015		311	1018	2063	408
08-04 166.16 Apy	416	365	455	550	314	387	442	830	803	1033		2041		322			
08-07 175.80 As	422	369	454	357	319	392	433	814	817	1932	1749	2044		317	1020	1935	411
08-07 176.67 As	433	347	452	339	312	382	422	780	822	1871	1702	1891		310	1001	1920	408
08-07 175.80 As	391	359	449	352	318	385	440	805	807	2015	1859	1982		318	1013	1875	405
08-04 162.87 Apy	488	353	455	557	309	390	450	824	795	989		2010		309			
08-07 217.77 Py	450	364	465	574	317	387	455	814	838	981		2012		325			
08-07 176.67 As	417	345	455	346	308	380	423	805	1013	2182	1739	1997		311	1000	2048	401
08-07 176.67 As	415	340	448	350	304	381	440	824	799	1736	1717	2053		307	1002	1792	403
08-07 174.62 As	435	357	465	352	323	393	446	817	805	1914	1904	1926		316	1011	2134	413
08-04 166.16 Apy	451	356	460	564	317	384	451	810	825	1001		2135		317			
08-07 174.62 As	469	341	448	348	313	388	459	825	818	1806	1866	2184		313	1034	2151	410
08-07 175.80 As	464	351	465	348	319	386	436	786	792	1854	1776	2116		321	1014	1919	407
08-07 174.62 As	459	348	452	347	302	378	431	815	816	1880	1661	1970		315	995	1999	401
08-07 175.80 As	488	350	461	350	319	387	442	793	1000	1920	1822	2058		323	1041	1795	405
10-77 121.60 Apy	442	346	457	563	317	383	461	797	775	952		2041		319			
08-07 226.33 As	408	350	445	345	311	377	429	800	809	1909	1794	2019		311	994	1836	404

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-07 174.62 As	405	370	455	346	308	379	454	836	804	1809	1879	1948		333	1033	2327	409
08-07 176.67 As	443	359	461	344	308	388	447	803	821	1662	1711	2066		319	1007	1863	396
08-07 226.33 As	457	345	441	346	306	382	425	821	789	1916	1731	1864		314	993	2037	403
10-87 113.40 Apy	421	356	461	573	314	383	454	798	832	1013		1952		319			
08-07 174.62 As	450	360	466	352	316	391	460	814	797	1617	1770	2073		320	1022	2060	409
08-04 162.87 Apy	429	368	460	562	314	383	453	851	806	1000		2077		319			
08-04 166.16 Apy	457	364	457	559	310	385	444	835	827	1069		1990		314			
SC-10 As 27	485	361	455	557	314	389	458	809	831	2212		2104		324	1098	3053	428
08-07 175.80 As	437	344	450	348	305	374	440	798	811	1790	1789	2020		317	1016	1847	406
08-07 176.67 As	485	366	451	349	305	388	438	841	837	1976	1756	1987		317	1040	1786	411
08-07 176.67 As	435	360	452	344	308	390	426	826	827	1966	1843	2016		316	1009	2001	408
08-07 175.80 As	428	366	448	348	316	387	456	833	805	1997	1838	1912		321	1020	1907	415
08-07 175.80 As	482	356	456	348	315	387	437	800	785	2056	1891	2039		314	994	1924	403
08-07 176.67 As	423	356	448	343	302	373	436	791	801	1869	1891	1923		305	969	1821	407
08-07 176.67 As	447	337	449	343	304	381	430	818	783	1960	1781	2033		308	1002	1905	391
08-07 174.62 As	463	363	448	348	314	376	435	841	801	1938	1749	1952		314	1041	2012	404
08-07 175.80 As	434	356	454	346	315	386	442	836	818	1915	1707	2046		314	1026	2011	408
08-07 175.80 As	424	359	461	354	320	394	451	855	834	1884	1958	2022		323	1037	2231	428
10-77 121.60 Apy	413	366	449	552	316	389	453	824	818	1011		2083		317			
10-77 121.60 Apy	447	362	455	552	314	387	457	807	814	960		2108		316			
08-07 175.80 As	436	359	459	353	314	377	444	855	836	1803	1824	2054		316	1010	1882	412
10-87 113.40 Apy	424	356	450	576	320	390	448	833	821	999		2161		319			
08-07 174.62 As	452	347	460	337	309	381	442	772	775	2086	1808	2051		316	1011	1729	394
08-07 175.80 As	474	376	459	357	319	397	451	790	775	1934	1830	2175		326	1029	1917	412
08-07 176.67 As	489	356	462	356	318	387	439	849	799	1989	1897	2114		326	1031	2022	416
10-87 113.40 Apy	464	352	465	556	315	383	455	839	801	1015		1957		319			
08-04 162.87 Py	466	366	453	571	316	391	444	776	794	1070		1934		316			
08-07 175.80 As	474	353	459	355	327	391	451	815	824	2027	1896	2037		314	1030	1882	417
08-07 175.80 As	412	366	452	352	313	391	459	842	851	1920	1949	1956		323	1023	1746	404
08-07 175.80 As	451	361	463	349	316	390	437	861	805	2087	1833	2099		319	1010	1875	411
08-07 176.67 As	471	343	450	347	305	377	440	843	796	1637	1857	2041		312	975	1931	394
08-07 176.67 As	499	360	460	352	321	389	460	866	815	2013	1668	2081		324	1019	1765	410
08-04 162.87 Py	445	364	455	554	311	393	451	818	820	977		2006		310			
08-07 174.62 As	473	351	455	350	317	386	455	872	773	2125	1872	2071		322	1024	1860	403
08-07 175.80 As	468	354	444	343	308	379	441	794	786	1901	1717	2136		309	984	1984	400
08-04 122.36 As 73	473	368	465	572	313	388	461	820	816	2168		2015		333	1066	3089	411
08-07 174.62 As	492	363	461	344	319	392	448	825	815	2198	1813	2020		322	1032	2026	405
10-77 121.60 Apy	489	347	461	552	318	387	459	822	806	918		1974		318			
10-77 121.60 Apy	409	366	456	557	315	382	447	812	812	993		2041		321			
10-87 113.40 Apy	411	352	461	552	322	386	448	830	828	1008		2159		325			
08-07 175.80 As	378	351	435	344	308	377	424	772	806	1878	1746	1903		313	998	1924	396
08-07 226.33 As	478	349	451	349	314	389	436	798	833	2006	1834	1976		323	1016	1926	417
08-07 174.62 As	517	357	449	353	323	389	454	840	808	1863	1831	2019		315	1012	1931	404
10-77 121.60 Apy	453	364	455	552	319	391	451	825	813	908		2052		323			
10-87 113.40 Apy	459	362	456	541	318	385	434	838	842	965		1990		316			

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-07 176.67 As	435	370	454	351	315	390	446	843	783	2080	1808	1989		318	1029	1968	407
08-07 175.80 As	435	373	452	352	313	390	458	836	811	2021	1859	2192		318	1030	2003	414
08-07 174.62 As	446	357	453	343	317	390	448	835	834	2059	1763	1929		325	1022	1866	408
10-87 113.40 Apy	456	354	454	565	320	386	430	829	788	964		1995		317			
08-07 175.80 As	388	354	447	351	315	386	432	809	810	2118	1795	1737		316	1010	2141	411
08-07 226.33 As	462	368	453	343	311	379	449	800	805	1968	1702	2063		314	999	1706	392
08-07 175.80 As	452	353	463	351	328	388	465	836	1.#INF	2033	1822	1976		322	1036	1959	404
10-77 121.60 Apy	437	361	455	552	314	387	444	805	822	1047		2170		317			
08-04 122.36 As 72	444	378	452	575	310	389	460	834	783	1988		2047		322	1072	3032	409
08-07 175.80 As	458	350	448	354	312	395	462	816	822	1817	1737	1847		316	1027	2063	406
08-04 166.16 Apy	455	360	457	560	311	384	455	808	806	1014		1891		316			
08-07 176.67 As	450	363	456	347	318	389	438	821	849	1800	1859	2181		315	1031	2084	408
08-07 174.62 As	451	365	458	351	314	395	436	840	808	1835	1695	1997		323	1016	2064	410
08-07 175.80 As	467	361	457	350	323	394	471	830	813	1628	1800	2028		327	1025	1618	408
10-87 113.40 Apy	451	358	459	563	316	385	464	820	809	1017		1980		317			
08-07 175.80 As	446	358	462	353	315	386	441	873	810	2046	1874	2085		321	1032	1914	405
08-07 176.67 As	494	360	461	348	317	390	451	790	826	1817	1756	2038		320	1036	2076	407
08-07 174.62 As	456	352	462	351	313	391	460	807	807	1971	1965	1834		318	1032	1941	409
08-07 175.80 As	465	369	460	357	314	390	465	866	831	1891	1900	2054		323	1024	1969	411
08-07 175.80 As	443	363	441	344	308	375	437	795	800	1912	1676	1938		318	990	1878	403
08-07 174.62 As	441	357	454	340	307	388	429	820	798	2041	1735	2062		311	981	1848	401
08-07 175.80 As	496	370	460	349	317	385	448	827	835	1863	1877	2067		320	1030	2221	412
08-07 217.77 fracture	514	364	461	548	319	390	453	786	831	965		2102		325			
08-04 166.16 Py	476	344	451	483	309	375	425	803	788	921		2244	283	305			
08-04 166.16 Py	535	364	458	485	309	384	441	784	799	876		2272	195	308			
08-04 166.16 Py	535	366	464	477	311	387	430	812	800	833		2277	205	310			
08-07 216.74 Py	457	355	458	290	313	371	418	796	749	1427	1857	2165	161	305	963	1608	385
08-04 115.75 Py	475	361	456	466	314	380	408	823	777	827		2302	160	311			
08-07 226.33 Py	478	366	441	288	298	374	424	773	763	1521	1893	2201	164	307	992	1637	379
SC-10 Py 6	507	379	455	483	314	382	405	777	832	1569		2314	202	315	1066	2802	387
08-07 226.33 Py	492	361	449	292	307	366	418	802	794	1357	1954	2188	193	298	970	1680	390
08-07 174.62 Py	457	364	449	284	308	372	415	796	748	1524	1977	2178	159	306	976	1641	388
10-87 113.40 Apy	506	366	463	474	308	388	440	801	782	839		2378	149	314			
08-07 174.62 Py	481	351	459	303	313	363	427	821	768	1761	2003	2274	173	312	1000	1651	398
SC-10 Py 9	513	374	462	503	314	395	425	787	780	1546		2306	157	315	1025	2792	398
SC-10 Py 3	531	377	452	481	311	385	416	799	804	1652		2241	153	312	1066	2816	396
SC-10 Py 5	491	381	454	482	316	372	426	799	796	1704		2374	184	317	1048	2791	395
08-07 226.33 Py	480	351	451	286	304	372	423	802	773	1805	1997	2290	204	302	990	1644	378
08-07 174.62 Po	499	357	445	288	306	366	414	821	775	1703	2044	2244	158	300	976	1696	380
SC-10 Py 7	499	364	458	487	311	376	425	791	777	1585		2351	195	310	1057	2829	395
08-07 217.77 Py	505	362	457	491	316	390	411	811	754	829		2216	184	306			
08-07 174.62 Py	512	359	442	281	304	368	438	799	783	1652	1903	2248	159	306	984	1607	390
08-07 226.33 Py	483	347	451	301	310	376	435	827	793	1817	1854	2103	208	301	985	1592	379
08-07 226.33 Py	503	359	455	294	312	375	415	784	759	1597	1967	2268	210	310	1018	1523	390
SC-10 Py 4	549	366	458	499	313	382	443	828	796	1738		2257	188	312	1060	2796	399

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-04 122.36 Py 63	492	379	457	485	313	382	433	833	788	1820		2235	185	313	1068	2850	393
SC-10 Py 2	501	383	468	496	312	390	425	793	813	1746		2333	165	310	1049	2771	385
SC-10 Py 8	495	371	460	477	315	378	443	821	794	1887		2258	189	315	1041	2805	396
08-04 166.16 Py	526	354	471	481	322	383	435	839	775	869		2270	213	305			
09-44 192.02 Py 44	497	365	455	474	312	390	422	832	761	1817		2287	157	316	1082	2672	389
08-04 122.36 Py 62	486	374	450	480	314	378	419	834	799	1687		2222	155	308	1045	2808	387
09-44 192.02 Py 48	487	378	466	488	310	376	428	830	784	1645		2151	151	314	1037	2774	389
08-07 174.62 Py	498	364	452	286	309	372	417	820	794	1618	1882	2244	167	305	971	1652	380
08-04 166.16 Py	472	350	453	462	316	371	403	819	828	859		2254	197	305			
08-07 226.33 Py	510	372	455	305	295	377	445	788	802	1736	1914	2181	206	318	1005	1697	393
08-04 162.87 Py	507	344	460	462	305	381	430	767	796	876		2352	185	310			
09-44 192.02 Py 58	542	371	459	484	307	380	412	840	826	1620		2322	154	309	1070	2839	392
08-07 226.33 Py	533	355	449	286	308	383	427	786	728	1432	1956	2200	192	310	968	1622	381
08-04 122.36 Py 61	482	373	461	498	304	375	420	812	848	1722		2372	163	313	1074	2807	398
08-07 174.62 Py	483	359	444	290	305	371	418	805	798	1615	1879	2177	167	306	964	1764	377
SC-10 Py 1	519	378	458	480	318	382	414	772	808	1477		2182	197	315	1059	2802	388
08-07 199.97 Py	501	357	459	475	315	379	423	789	832	918		2442	155	314			
08-07 216.74 Py	501	361	466	295	307	376	431	827	817	1686	1997	2400	176	309	1009	1795	392
09-44 192.02 Py 49	505	372	460	477	319	385	436	828	808	1664		2303	158	319	1050	2856	395
08-04 162.87 Py	511	364	476	471	313	380	432	798	739	820		2267	196	314			
09-44 192.02 Py 53	509	379	463	471	307	375	437	789	796	1593		2321	152	311	1022	2796	389
09-44 192.02 Py 56	515	376	454	493	313	369	429	802	784	1768		2343	158	324	1051	2820	386
08-07 217.77 Py	479	356	461	496	315	377	442	839	770	808		2328	162	305			
09-44 192.02 Py 54	502	366	461	473	315	376	413	815	803	1802		2276	152	322	1039	2897	389
09-44 192.02 Py 55	546	356	464	464	320	381	422	809	843	1566		2232	157	324	1072	2843	393
08-04 122.36 Py 64	478	374	456	488	313	387	428	798	853	1561		2197	166	302	1037	2832	393
SC-10 Po 21	499	386	471	492	321	376	422	835	839	1594		2303	165	309	1090	2813	387
08-04 166.16 Py	484	367	455	474	312	386	410	843	754	775		2293	192	316			
08-07 174.62 Py	537	371	457	295	312	383	426	780	762	1654	1957	2366	197	316	1001	1824	392
08-07 216.74 Py	500	351	458	294	318	386	410	810	744	1468	2118	2262	178	311	1001	1645	395
09-44 192.02 Py 38	535	375	458	481	313	390	420	835	824	1696		2221	162	314	1042	2826	383
09-44 192.02 Py 39	520	369	451	478	311	372	424	807	830	1700		2286	162	316	1021	2834	378
09-44 192.02 Py 57	517	380	453	495	315	377	430	807	805	1593		2315	155	316	1036	2798	384
09-44 192.02 Py 59	480	364	455	476	315	381	416	825	814	1625		2354	158	316	1055	2836	394
08-07 174.62 Py	492	363	455	289	307	374	419	756	791	1581	1932	2273	190	304	964	1496	383
09-44 192.02 Py 60	487	372	458	492	317	388	418	822	831	1709		2336	163	319	1046	2778	397
09-44 192.02 Py 43	456	377	468	475	314	375	413	805	819	1636		2189	154	312	1016	2796	387
08-07 217.77 fracture	454	355	460	476	306	381	412	850	748	797		2255	155	312			
09-44 192.02 Py 37	499	363	452	492	315	376	425	816	803	1701		2230	160	311	1048	2873	387
08-07 174.62 Py	487	362	451	289	305	374	416	812	743	1633	1926	2336	165	299	956	1653	382
08-07 226.33 Py	516	357	468	288	314	379	410	834	788	1809	2023	2177	176	308	996	1775	389
08-07 226.33 Py	465	350	450	293	308	367	411	800	773	1581	1885	2188	161	308	965	1698	382
08-07 175.80 Py	525	364	462	302	308	376	419	779	762	1502	1913	2337	198	313	992	1498	391
08-07 226.33 Py	541	353	462	290	312	378	421	820	783	1660	2010	2333	194	306	1008	1681	386
08-07 174.62 Py	470	354	441	287	309	378	411	743	787	1672	1889	2251	183	308	996	1585	379

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-07 217.77 Py	498	376	464	508	313	381	435	840	805	930		2352	158	309			
08-07 217.77 Py	521	364	459	482	318	383	433	833	731	792		2326	159	308			
08-07 226.33 Py	507	356	464	297	313	384	436	781	771	1596	1958	2316	161	312	1004	1702	385
10-77 121.60 Py	473	375	451	476	313	381	425	845	793	777		2235	178	310			
08-07 199.97 Py	507	360	459	481	320	378	413	807	839	903		2124	156	311			
08-07 216.74 Py	477	376	461	297	315	381	427	779	826	1773	1982	2494	180	307	1009	1647	380
08-07 199.97 Py	524	358	458	502	311	387	443	807	742	817		2140	169	312			
08-04 162.87 Py	513	348	467	483	315	377	433	811	804	861		2224	184	311			
08-07 174.62 Py	531	356	440	290	302	371	411	832	761	1551	1911	2340	181	305	962	1634	382
10-87 113.40 Py	502	359	462	480	319	383	418	783	786	796		2227	175	307			
10-87 113.40 Apy	523	369	454	484	322	384	424	822	798	822		2246	174	310			
08-07 217.77 fracture	465	351	462	498	316	385	420	825	750	862		2281	178	310			
08-04 122.36 Py 66	505	390	455	486	314	381	435	867	797	1625		2266	172	308	1039	2771	393
08-04 156.21 Py	475	367	475	481	316	382	432	798	763	837		2304	161	316			
08-07 226.33 Py	492	361	454	294	313	380	442	804	818	1458	2062	2263	168	312	998	1704	395
08-07 226.33 Py	493	347	443	294	306	366	419	793	750	1488	1945	2225	194	305	965	1617	384
08-04 156.21 Py	512	358	459	436	313	376	466	772	855	878		2330	135	317			
08-04 122.36 Py 69	495	384	462	482	315	375	427	802	839	1627		2197	177	322	1070	2747	402
08-04 156.21 Py	511	365	463	471	319	383	408	806	757	824		2336	160	314			
08-04 156.21 Py	517	368	468	477	313	374	433	813	779	840		2400	157	310			
08-07 216.74 Py	526	355	462	298	308	383	413	833	768	1546	1951	2327	173	309	992	1617	395
10-77 121.60 Py	515	368	462	471	330	379	418	846	764	848		2220	154	307			
10-87 113.40 Apy	501	354	455	488	306	383	430	807	758	824		2297	198	311			
08-07 216.74 Py	538	352	466	296	313	381	430	825	783	1658	1994	2309	182	316	1009	1681	390
08-07 199.97	497	359	477	505	311	390	415	815	766	753		2369	161	319			
08-07 216.74 Py	536	343	459	289	313	380	449	816	785	1614	2084	2486	170	310	993	2011	397
08-04 156.21 Py	509	363	463	466	306	381	435	814	769	871		2424	163	314			
08-07 216.74 Py	469	357	459	303	316	381	420	833	784	1421	2031	2232	180	308	1023	1749	390
08-07 226.33 Py	500	338	456	299	305	379	419	792	778	1710	1977	2154	190	301	991	1511	382
08-07 176.67 Py	516	366	452	295	309	372	417	790	792	1584	1903	2193	189	306	1006	1676	391
08-07 217.77 Py	526	365	455	469	309	381	427	772	822	797		2266	186	315			
08-07 199.97 Py	490	372	460	474	314	376	427	785	775	789		2378	168	311			
08-04 122.36 Py 87	478	370	449	482	311	379	432	822	793	1898		2466	165	312	1045	2777	386
08-04 122.36 Py 65	480	374	455	489	313	380	421	818	804	1758		2383	153	315	1047	2766	404
08-04 166.16 Py	515	359	462	490	318	387	419	850	774	866		2300	152	311			
08-04 122.36 Py 119	492	379	471	472	313	386	443	824	808	1612		2376	177	318	1045	2862	395
08-04 122.36 Py 86	539	359	458	472	311	382	417	809	797	1556		2267	181	312	1031	2851	389
08-07 216.74 Py	515	354	463	299	314	385	422	803	774	1733	1879	2371	173	308	1008	1713	389
08-04 156.21 Py	489	360	466	480	316	382	422	801	777	804		2348	168	312			
08-04 156.21 Py	457	373	462	472	322	386	438	789	769	889		2303	160	308			
08-04 162.87 Py	515	367	460	483	314	381	426	778	796	821		2334	183	314			
08-04 115.75 Fracture	484	360	454	477	311	386	424	803	815	803		2259	152	299			
08-07 226.33 Py	466	366	457	293	321	378	428	839	799	1639	1901	2231	167	312	980	1842	389
08-04 122.36 Py 68	506	367	474	472	309	378	410	787	787	1651		2265	160	310	1073	2909	400
08-04 162.87 Py	507	355	454	464	320	375	439	783	773	821		2255	184	312			

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-04 162.87 Py	491	371	463	482	321	374	444	812	763	790		2347	202	302			
08-04 162.87 Py	530	356	454	455	311	373	417	783	794	787		2241	189	303			
09-51 74.52 Py 2	491	367	453	484	313	385	411	840	795	1666		2258	162	309	1066	2785	401
08-04 162.87 Py	499	359	463	481	309	393	422	843	803	872		2330	183	310			
08-04 166.16 Py	490	363	460	474	308	382	430	808	776	777		2367	181	300			
08-07 174.62 Py	529	356	463	290	318	371	408	833	760	1577	1956	2217	170	309	1006	1921	387
08-07 216.74 Py	504	361	459	299	307	383	434	797	771	1699	1998	2238	174	313	998	1852	396
10-77 121.60 Py	498	362	462	481	320	390	417	851	801	819		2224	186	319			
08-07 174.62 Py	505	363	461	296	315	383	429	819	770	1616	1940	2234	199	314	1008	1679	395
08-07 216.74 Py	494	365	452	315	317	378	443	794	782	1625	1984	2381	181	298	989	1897	389
10-87 113.40 Apy	506	363	458	485	313	375	436	832	771	821		2204	191	304			
08-07 216.74 Py	504	359	466	296	315	375	427	767	805	1591	1947	2141	164	310	996	1663	381
08-04 156.21 Py	496	370	468	476	307	379	433	837	761	868		2334	158	311			
08-07 176.67 Py	474	347	440	291	303	369	412	808	770	1531	1856	2237	177	309	988	1876	378
08-07 217.77 Py	507	364	458	502	308	383	428	800	820	868		2115	178	310			
10-87 113.40 Apy	495	360	469	470	308	376	405	808	781	860		2299	170	311			
08-07 216.74 Py	511	349	445	297	307	381	434	822	812	1647	1969	2257	174	309	1003	1712	382
08-07 174.62 Zn	532	358	455	294	304	373	423	852	794	1640	1905	2148	173	307	967	1640	389
08-04 162.87 Py	541	366	451	480	312	381	428	810	792	846		2148	195	309			
10-77 121.60 Py	545	353	459	471	310	388	442	818	786	810		2370	187	308			
10-77 121.60 Py	524	353	454	480	307	371	429	802	808	831		2297	159	306			
08-07 175.80 Py	489	358	452	290	313	373	427	817	809	1698	1977	2256	171	313	1003	1734	391
08-07 216.74 Py	507	358	470	296	313	380	418	822	784	1509	1992	2377	171	310	1006	1675	382
08-07 175.80 Py	490	359	455	294	310	376	432	775	737	1715	1932	2366	182	309	992	1539	388
08-07 199.97 Py	522	357	460	484	307	380	407	820	785	799		2350	151	312			
10-77 121.60 Py	506	362	464	464	306	379	417	778	792	821		2237	181	313			
10-77 121.60 Py	516	351	456	480	312	378	416	831	817	808		2280	162	308			
08-04 122.36 Py 118	538	365	466	510	312	381	445	820	825	1609		2383	166	318	1048	2848	386
09-51 74.52 Py 3	565	355	452	479	315	384	434	802	744	1715		2292	167	314	1035	2805	398
08-07 217.77 Py	504	370	461	464	316	378	428	798	801	874		2254	157	308			
10-87 113.40 Py	513	352	453	464	315	375	445	818	775	821		2263	164	311			
08-07 226.33 Py	508	346	451	290	307	374	441	777	804	1430	1951	2173	172	303	954	1719	378
08-07 216.74 Py	482	374	461	304	303	376	409	791	742	1560	1925	2268	164	311	1015	1627	382
08-07 176.67 Py	487	366	462	291	315	388	422	775	786	1479	1948	2279	162	311	977	1609	394
08-07 226.33 Py	496	362	445	285	309	377	418	786	754	1596	1882	2232	197	310	980	1687	385
08-07 174.62 Zn	501	359	451	292	314	371	406	857	780	1579	1950	2256	165	304	961	1505	386
08-07 175.80 Py	541	362	449	296	310	377	408	819	808	1775	1861	2195	183	315	998	1769	381
08-07 176.67 Py	492	343	441	294	308	369	414	804	788	1643	1851	2240	185	298	978	1776	376
08-07 175.80 Py	505	365	450	301	313	380	415	764	759	1505	1914	2308	189	306	991	1838	396
08-04 156.21 Py	513	356	466	485	318	387	417	784	781	814		2363	170	314			
10-87 113.40 Apy	492	369	459	467	316	386	437	812	756	842		2253	157	307			
10-77 121.60 Py	508	356	455	453	302	382	455	840	770	878		2303	184	306			
08-07 216.74 Py	498	372	463	300	309	383	438	818	784	1666	2058	2384	190	314	998	1709	392
08-07 226.33 Py	531	359	465	296	310	389	417	782	779	1588	1924	2160	171	308	996	1664	386
08-07 217.77 Fracture	498	352	466	514	307	385	435	832	832	808		2174	166	314			

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-07 226.33 Py	528	357	452	292	301	376	414	798	769	1533	2019	2308	163	304	983	1723	384
08-07 176.67 Py	465	349	449	296	301	373	422	786	744	1458	1939	2233	190	301	977	1600	391
10-77 121.60 Py	494	365	457	472	315	381	427	837	793	782		2266	190	310			
08-07 174.62 Py	501	357	446	299	301	376	426	812	767	1623	1903	2267	181	308	975	1598	377
08-07 216.74 Py	517	361	464	289	310	380	413	831	792	1798	1953	2273	175	317	998	1808	385
08-07 216.74 Py	510	367	465	308	311	383	431	819	783	1745	1954	2182	173	308	994	1666	378
08-04 115.75 Py	560	345	458	475	315	367	437	807	818	772		2219	181	314			
08-07 226.33 Py	485	380	460	296	313	386	426	779	842	1680	1955	2288	167	314	1010	1655	396
08-07 175.80 Py	496	365	458	300	311	380	428	820	763	1617	1956	2259	188	315	1006	1577	382
08-07 175.80 Py	531	360	454	297	316	382	442	819	799	1680	2074	2278	187	309	1004	1827	384
08-04 156.21 Py	497	357	470	456	311	379	426	808	822	928		2236	160	316			
08-07 176.67 Py	475	373	455	295	310	375	403	782	777	1653	1957	2190	184	310	1003	1781	392
08-07 217.77 fracture	484	357	465	474	314	391	431	796	798	861		2300	159	311			
08-07 226.33 Py	497	348	462	295	309	383	446	757	803	1517	2031	2199	168	313	1011	1694	377
08-07 175.80 Py	524	350	443	293	301	373	413	811	778	1635	1976	2187	183	305	968	1730	374
08-07 216.74 Py	483	356	465	298	313	388	434	778	780	1544	1971	2367	165	314	1005	1748	381
08-07 174.62 Zn	498	346	443	285	308	370	427	766	784	1561	1889	2168	159	306	993	1514	383
09-51 74.52 Py 4	511	381	460	490	311	376	427	778	820	1682		2322	164	324	1051	2798	386
08-04 115.75 Fracture	495	351	466	460	314	387	423	799	765	837		2220	156	314			
10-77 121.60 Py	524	359	462	474	306	376	425	819	798	862		2400	186	319			
10-77 121.60 Py	505	351	456	482	316	387	426	805	765	833		2337	187	308			
10-87 113.40 Apy	485	361	459	480	314	375	428	817	793	808		2321	192	308			
08-04 162.87 Py	472	357	458	471	310	379	408	776	800	814		2245	152	317			
08-07 176.67 Py	491	348	457	288	308	376	431	815	775	1649	1888	2183	186	306	973	1811	379
08-07 217.77 fracture	477	363	453	482	309	384	425	804	770	876		2207	160	309			
08-07 226.33 Py	481	347	446	298	307	373	411	835	774	1618	1932	2268	169	308	945	1731	380
08-07 217.77 fracture	490	373	466	473	310	381	424	800	809	877		2223	149	314			
08-07 175.80 Py	498	362	449	293	314	380	418	814	821	1677	1894	2216	183	308	985	1522	390
08-04 156.21 Py	512	351	464	477	307	383	406	818	768	871		2349	160	305			
08-07 216.74 Py	498	356	457	290	303	380	415	764	776	1842	1938	2229	173	303	982	1550	381
08-07 216.74 Py	480	356	454	289	299	382	409	736	754	1545	2019	2238	164	303	992	1884	373
10-77 121.60 Py	494	357	451	477	319	388	435	791	791	852		2345	179	305			
08-07 216.74 Py	506	363	448	298	316	385	425	814	813	1649	2008	2351	168	306	998	1668	393
08-07 226.33 Py	504	370	463	299	320	384	437	759	771	1704	1909	2327	175	312	983	1817	389
08-07 217.77 bright	520	343	463	480	315	379	424	807	752	842		2253	176	305			
08-07 176.67 Py	475	341	451	285	307	370	414	803	757	1717	1819	2103	187	303	972	1715	374
10-77 121.60 fracture	529	353	467	496	308	376	416	812	775	831		2352	153	304			
10-87 113.40 Py	542	350	461	461	313	381	416	809	769	857		2274	163	310			
10-77 121.60 Py	503	351	455	480	311	388	424	773	787	777		2235	176	308			
08-07 174.62 Py	496	353	449	289	308	380	417	737	778	1528	1868	2176	184	302	973	1743	380
08-07 217.77 Py	470	348	459	510	311	388	411	797	792	839		2227	165	307			
08-04 156.21 Py	471	370	457	460	313	380	438	759	812	874		2271	155	315			
08-07 217.77 fracture	521	364	454	477	308	385	433	808	786	867		2372	165	306			
08-07 226.33 Py	476	359	455	302	312	377	441	776	828	1417	1988	2289	216	318	1017	1860	381
08-07 175.80 Py	509	356	449	306	314	383	406	783	806	1712	1912	2196	197	309	1010	1817	388

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-07 175.80 Py	481	354	465	297	324	383	428	801	782	1731	1939	2424	208	310	1008	1694	389
10-87 113.40 Py	497	340	456	462	316	384	425	781	769	858		2208	156	309			
08-07 176.67 Py	498	346	448	289	298	377	416	769	772	1421	1912	2224	186	304	970	1654	382
08-07 217.77 fracture	504	356	454	488	308	376	418	815	772	775		2345	160	310			
10-87 113.40 Apy	476	353	457	481	313	380	432	767	766	865		2273	188	312			
08-04 115.75 Py	519	359	472	474	314	376	427	825	818	848		2213	183	310			
08-07 216.74 Py	521	355	455	288	313	368	417	796	781	1711	2020	2298	177	303	989	1572	382
08-07 175.80 Py	555	368	451	296	324	384	431	815	777	1684	1929	2358	188	305	991	1809	393
08-07 174.62 Py	518	355	464	301	305	386	429	808	758	1728	1977	2131	168	310	1002	1994	395
08-07 199.97	466	356	458	477	309	395	438	805	756	849		2237	163	313			
08-07 175.80 Py	423	364	440	293	305	373	408	782	811	1533	1930	2141	176	305	981	1618	382
08-07 226.33 Py	498	355	457	291	302	371	424	793	783	1652	1976	2346	166	301	985	1844	381
10-77 121.60 Py	491	366	459	510	310	377	422	800	772	806		2210	154	317			
08-07 226.33 Py	492	359	447	287	311	378	426	845	773	1639	1912	2242	160	299	990	1591	378
08-04 156.21 Py	512	353	456	464	310	388	443	818	781	857		2356	164	315			
08-07 175.80 Py	506	367	463	301	321	393	429	808	766	1783	2050	2266	201	315	1004	1798	393
08-04 156.21 Py	457	364	462	490	314	383	451	791	813	845		2350	165	310			
08-04 156.21 Py	508	356	462	482	312	382	422	792	765	785		2326	164	315			
08-04 156.21 Py	503	358	452	481	313	384	411	773	775	853		2363	163	313			
08-07 174.62 Py	518	375	463	296	317	396	436	787	771	1483	1874	2287	196	315	1008	1774	392
08-07 199.97 Fracture	440	349	459	500	315	380	436	791	789	831		2316	162	312			
08-07 176.67 Py	482	359	455	297	319	377	424	786	774	1766	1864	2326	189	315	986	1730	388
08-07 174.62 Py	518	358	452	301	316	383	412	848	791	1503	1927	2238	181	316	1004	1748	390
08-07 216.74 Py	482	347	450	289	302	371	407	767	755	1685	1970	2197	171	305	967	1584	380
08-04 162.87 Py	496	365	461	468	308	379	459	824	772	823		2371	153	309			
08-07 176.67 Py	532	361	457	288	314	375	412	773	800	1790	1975	2258	189	311	1007	1660	387
08-07 216.74 Py	520	350	447	288	308	375	410	765	779	1490	1848	2215	174	301	978	1483	379
08-04 156.21 Py	487	354	460	469	315	378	437	848	781	903		2250	173	316			
08-04 115.75 Py	570	362	461	474	318	385	437	821	773	774		2219	176	311			
08-04 115.75 Fracture	470	347	450	479	308	393	437	807	800	805		2390	159	311			
10-87 113.40 Apy	503	365	465	475	313	382	423	800	772	837		2162	156	317			
08-07 226.33 Py	498	365	440	296	300	362	427	790	787	1683	1884	2416	162	297	991	1569	379
08-07 217.77 fracture	480	350	461	498	319	380	433	801	802	838		2365	159	305			
08-07 199.97 Fracture	508	368	457	462	315	388	426	798	821	857		2321	154	312			
10-87 113.40 Apy	510	362	460	468	308	383	430	814	779	843		2343	158	311			
08-04 115.75 Py	554	359	463	470	316	387	429	788	824	825		2280	179	310			
08-07 199.97	514	364	458	460	319	387	423	798	775	842		2318	171	309			
08-07 216.74 Py	501	353	447	289	302	371	433	780	770	1624	2052	2241	173	302	984	1618	376
08-04 156.21 Py	499	366	459	469	314	378	404	788	753	773		2392	163	305			
08-04 115.75 Py	544	366	454	476	315	383	422	817		888		2414	157	311			
08-07 199.97	503	361	463	456	315	387	425	782	813	804		2369	173	311			
10-77 121.60 Py	459	359	461	474	308	382	417	807	811	826		2273	158	302			
08-07 174.62 Py	464	353	441	288	309	371	446	769	754	1791	1958	2225	164	311	968	1888	393
08-07 199.97 Py	541	350	457	498	317	392	431	808	801	803		2210	155	310			
10-87 113.40 Apy	503	358	458	484	318	376	426	823	804	874		2340	190	307			

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-07 216.74 Py	535	362	458	299	315	383	413	804	760	1638	1914	2275	176	306	993	1606	387
08-07 216.74 Py	483	358	450	296	306	370	405	793	761	1636	1916	2165	173	300	980	1603	380
08-04 115.75 Py	518	380	461	462	313	380	428	856	778	859		2191	161	305			
08-07 199.97 Fracture	462	359	468	455	308	386	435	779	797	811		2313	172	313			
10-87 113.40 Apy	515	356	470	469	313	391	428	802	794	829		2223	155	312			
08-07 175.80 Py	479	356	457	305	318	388	441	868	774	1628	2015	2119	180	317	990	1732	397
08-07 199.97 Py	481	362	460	501	315	380	434	834	764	823		2295	172	307			
08-04 156.21 Py	514	366	468	470	317	386	435	774	768	832		2231	168	309			
08-07 199.97 Py	502	365	465	496	310	379	410	768	809	798		2267	156	307			
08-07 216.74 Py	464	361	468	289	312	384	413	818	800	1734	2016	2184	174	310	1022	1757	388
08-07 174.62 Zn	516	356	462	297	311	372	412	778	741	1715	1919	2164	171	303	971	1607	374
08-04 122.36 Py 75	501	377	459	496	310	382	426	818	800	1694		2348	167	317	1050	2864	392
10-87 113.40 Apy	506	364	468	466	311	390	433	794	787	803		2210	153	308			
08-07 199.97 Py	463	368	466	467	314	384	417	831	820	853		2246	156	305			
08-07 226.33 Py	506	352	450	286	304	370	412	815	759	1621	1910	2334	189	302	980	1817	386
08-07 175.80 Py	525	360	448	288	303	369	417	822	750	1344	2004	2088	174	300	986	1850	393
08-07 174.62 Zn	487	356	452	297	304	373	408	814	779	1700	1867	2265	164	306	999	1635	383
08-04 156.21 Py	524	360	470	479	318	385	428	830	775	802		2232	171	310			
08-04 122.36 Py 74	456	378	461	498	315	381	422	793	790	1785		2365	168	318	1077	2827	390
08-07 176.67 Py	468	361	468	301	312	381	431	807	780	1719	1926	2281	189	310	1003	1754	387
08-07 176.67 Py	527	365	457	299	314	400	448	834	791	1695	2004	2272	189	323	1001	1727	381
08-07 226.33 Py	515	356	467	301	315	385	441	771	815	1555	1979	2383	164	313	1040	1787	390
08-07 174.62 Zn	521	355	457	287	310	372	412	756	782	1503	1894	2148	163	296	980	1535	390
08-07 199.97 Py	453	362	456	485	317	392	429	815	801	841		2343	158	313			
08-04 156.21 Py	470	357	460	464	311	388	422	792	748	803		2174	162	313			
08-07 175.80 Py	500	366	461	306	313	386	436	833	804	1530	2058	2358	180	310	989	1759	401
08-07 176.67 Py	481	343	464	295	320	389	448	808	810	1668	1972	2305	160	319	994	1646	393
08-04 115.75 Fracture	521	357	462	462	313	389	436	837	771	816		2306	159	311			
08-07 176.67 Py	512	360	457	299	313	389	408	813	800	1788	1913	2251	191	307	997	1831	399
08-07 199.97	520	363	458	464	314	382	408	794	764	862		2215	161	312			
08-07 176.67 Py	523	354	455	302	308	388	436	795	776	1595	1919	2096	192	309	991	1550	385
08-07 174.62 Py	482	359	459	299	312	372	418	825	811	1408	1884	2261	178	304	991	1839	388
08-07 176.67 Py	526	366	476	306	311	389	431	779	812	1544	2006	2261	189	313	994	1862	380
08-04 115.75 Py	509	370	455	480	310	379	428	795	772	851		2163	156	311			
09-51 74.52 Py 5	518	368	454	468	307	386	427	779	777	1582		2272	162	316	1050	2786	387
08-04 156.21 Py	484	358	454	485	321	374	422	781	778	850		2213	164	306			
08-07 176.67 Py	522	366	460	293	322	386	421	797	797	1711	2045	2265	187	317	1017	1849	398
08-07 216.74 Py	527	351	453	293	308	375	424	812	756	1685	1931	2155	172	309	973	1534	377
08-07 176.67 Py	490	363	469	289	310	384	441	822	799	1572	2092	2314	191	313	999	1889	388
08-04 156.21 Py	485	364	459	458	319	390	417	818	765	833		2354	165	319			
08-07 226.33 Py	540	360	456	299	301	386	431	808	804	1563	1899	2326	166	312	1017	1722	393
08-04 156.21 Py	493	363	460	484	322	377	419	820	819	821		2348	160	317			
08-07 199.97 Py	470	366	465	471	316	374	426	792	799	869		2212	165	314			
08-07 176.67 Py	509	351	445	291	308	375	418	774	779	1479	1998	2273	166	304	989	1592	381
08-07 199.97 Fracture	471	360	457	480	312	385	405	761	757	862		2157	156	316			

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
08-04 115.75 Py	498	352	456	492	307	387	417	803	767	801		2371	158	306			
08-07 175.80 Py	518	357	464	297	316	382	423	861	753	1685	1911	2221	195	313	988	1913	393
08-07 199.97 Py	519	362	463	489	302	380	420	815	789	800		2414	156	305			
09-51 74.52 Py 7	509	373	462	495	309	382	429	797	803	1670		2303	159	321	1043	2784	388
08-07 216.74 Py	479	353	450	288	315	375	439	809	757	1578	2001	2243	162	313	979	1679	384
08-07 216.74 Py	475	354	446	290	305	374	413	788	774	1741	1921	2262	171	304	961	1668	383
08-07 199.97 Py	475	370	470	442	314	389	442	770	779	881		2251	151	315			
09-51 74.52 Py 6	515	367	457	497	313	385	430	820	813	1744		2323	159	307	1063	2836	400
08-04 166.16 Py	494	368	461	492	311	389	427	792	825	843		2302	158	317			
09-51 74.52 Py 16	524	377	459	488	308	387	445	810	787	1759		2338	161	309	1038	2832	396
09-51 74.52 Py 9	535	374	453	499	313	379	417	786	831	1589		2307	168	307	1052	2824	395
09-51 74.52 Py 8	497	372	463	464	313	383	434	818	795	1661		2293	159	316	1046	2777	426
09-51 74.52 Py 15	545	372	458	475	312	384	425	788	793	1802		2353	164	317	1044	2863	400
09-51 74.52 Py 10	530	359	463	482	320	381	435	812	798	1653		2396	163	321	1064	2814	389
09-51 74.52 Py 11	540	363	453	479	312	387	419	802	792	1623		2431	162	313	1038	2716	393
09-51 74.52 Py 13	490	379	449	499	321	379	438	805	786	1815		2264	164	313	1064	2871	389
08-04 115.75 bright	518	358	464	489	313	383	415	778	794	799		2433	156	306			
08-07 174.62 Py	499	358	463	291	315	375	435	791	784	1636	2048	2251	168	312	1011	1691	389
09-51 74.52 Py 18	490	380	454	492	310	383	450	811	806	1741		2332	155	318	1076	2822	390
09-51 74.52 Py 12	540	381	457	501	316	387	409	788	774	1461		2307	170	312	1072	2827	399
08-07 217.77 bright	508	363	462	485	315	389	432	757	795	890		2348	158	308			
09-51 74.52 Py 19	501	379	456	490	317	382	421	849	792	1568		2325	158	318	1062	2810	393
08-04 156.21 Py	477	364	466	476	317	380	416	783	837	828		2326	161	301			
08-07 217.77 bright	470	373	454	478	318	383	422	849	800	923		2339	181	310			
08-04 115.75 bright	489	377	462	464	316	384	433	762	804	825		2267	159	313			
09-51 74.52 Py 22	506	379	465	502	310	390	407	833	799	1763		2209	159	306	1051	2853	430
09-51 74.52 Py 17	510	379	467	464	309	380	434	806	779	1543		2279	161	322	1026	2794	396
09-51 74.52 Py 14	506	373	459	469	310	378	433	841	794	1653		2326	168	320	1084	2872	387
08-04 122.36 Py 71	502	364	461	484	309	387	431	847	822	1625		2436	159	316	1079	2870	411
08-04 122.36 Py 70	493	378	467	488	312	387	436	783	787	1586		2256	170	309	1052	2766	398
09-51 74.52 Py 21	511	362	462	501	311	387	436	824	842	1717		2301	156	306	1046	2824	444
08-07 175.80 Po	457	384	452	314	326	380	413	810	770	1762	1916	2077	178	323	1013	1926	393
10-73 408 Py 124	520	382	478	516	319	397	412	804	805	1700		2128	168	327	1106	2916	396
10-73 408 Py 144	427	395	464	518	321	390	428	815	821	1511		1951	172	319	1075	2826	395
10-73 408 Py 135	458	396	470	531	319	399	424	814	821	1890		2045	170	326	1083	2867	391
10-73 408 Py 134	490	392	465	527	327	392	434	800	793	1684		1927	170	326	1103	2852	397
10-73 408 Py 121	481	386	471	529	322	391	444	796	837	1914		2079	172	317	1104	2808	397
08-07 226.33 ?	488	385	470	326	324	387	427	775	787	1767	1968	1915	176	315	1010	1969	410
08-07 175.80 Po	520	382	463	321	317	380	424	803	765	1552	1965	1984	185	322	1038	1823	386
08-07 175.80 Po	474	374	475	320	329	388	439	795	816	1728	1912	1914	183	321	1020	1661	509
08-07 176.67 Po	476	359	467	321	313	388	428	804	768	1776	1872	1894	175	313	1013	1691	402
10-73 408 Py 126	494	392	473	525	319	407	422	829	814	1590		2016	172	326	1089	2878	391
08-07 175.80 Po	461	384	462	317	322	394	451	816	828	1710	1888	2111	180	324	1009	1710	499
10-73 408 Py 122	486	393	459	519	321	399	422	769	783	1628		1956	169	325	1115	2816	392
08-07 176.67 Po	477	375	462	312	323	392	428	791	812	1814	1859	1993	177	321	1023	1773	390

Comment	S	Fe	Zn	As	Co	Cu	Ag	Sn	Sb	Au	Pb	Bi	Mg	Ni	W	Hg	Te
10-73 408 Py 120	460	389	464	537	327	408	430	801	789	1732		2118	173	320	1081	2934	397
10-73 408 Py 125	441	386	470	528	323	394	427	828	820	1667		2016	171	325	1087	2876	385
10-73 408 Py 133	522	379	472	533	324	404	428	791	808	1700		2017	169	327	1092	2850	379
08-07 175.80 Po	486	385	471	315	326	394	425	824	784	1805	1813	2071	179	319	983	1637	381
08-07 174.62 Po	427	375	456	312	316	383	420	796	804	1727	1790	1934	174	308	1021	1539	386
08-07 175.80 Po	475	382	468	312	326	388	433	832	796	1760	1912	2003	179	313	999	1687	392
08-07 226.33 ?	459	368	479	320	321	390	424	796	797	1543	1871	2047	179	317	1024	1657	394
08-04 115.75 Po	467	382	470	512	322	390	431	819	791	859		1972	173	313			
08-07 174.62 Po	452	371	450	307	326	382	421	795	758	1820	1889	1909	166	309	994	1671	379
08-07 175.80 Po	455	372	470	327	322	390	431	795	781	1637	1901	1972	185	321	1022	1788	429
08-07 226.33 ?	434	375	470	322	325	392	420	804	806	1660	1952	2004	173	319	1031	1785	388
08-07 174.62 Po	471	377	467	322	324	394	408	805	784	1599	1880	1934	178	317	1013	1760	393
08-04 115.75 Po	443	369	468	527	328	375	421	802	774	913		2073	164	316			
08-07 226.33 ?	507	377	479	318	330	384	435	797	740	1603	1877	2074	178	325	1027	1767	393
08-07 174.62 Po	434	365	455	315	315	377	420	801	760	1754	1848	1915	176	308	974	1729	391
08-07 175.80 Po	472	378	477	315	329	381	435	791	794	1806	1820	2066	185	323	1041	1712	397
08-04 115.75 Po	463	378	473	512	320	393	440	794	799	877		2131	171	317			
08-07 175.80 Po	481	382	461	327	322	387	424	819	800	1846	1967	1893	182	319	1025	1706	392
08-07 175.80 Po	486	382	479	320	326	400	434	809	771	1674	1877	2014	181	323	1045	1812	394
08-04 115.75 Apy	477	382	474	522	332	391	430	794	756	913		1997	168	324			
08-07 175.80 Po	441	373	487	317	333	391	432	829	795	1690	1997	1998	182	323	1018	1786	492
08-04 115.75 Po	507	375	465	496	321	395	437	772	799	926		2066	168	320			
08-04 122.36 Po 116	473	382	477	513	330	388	425	810	795	1850		1971	172	319	1091	2890	395
08-04 122.36 Po 115	456	390	467	523	322	386	430	838	799	1697		2102	177	322	1114	2816	395
08-07 175.80 Po	443	378	468	323	323	384	406	815	792	1678	1869	2041	183	306	1006	1715	393
08-07 175.80 Po	491	374	476	339	326	383	429	820	777	1705	1907	1902	182	320	1029	1783	394
08-07 174.62 Po	436	364	458	319	314	386	410	851	790	1742	1738	1945	177	310	998	1788	385
08-07 175.80 Po	477	390	467	324	328	405	426	809	800	1569	2003	1886	185	323	1060	1490	396
Au	462	402	626	542	381	461	716	1228	1161	1484		3316	174	383			

non-sulphide data

Comment	Mg wt.%	Al wt.%	Ca wt.%	Mn	Fe wt.%	S wt.%	Ba	Sr	Na	Si wt.%	K	Ti	Total
08-04 136.45 Cal			35.72	2490	0.27								50.70
08-04 156.24 Dol yellow			38.42		0.05			583					53.98
08-04 156.24 Dol yellow			38.63		0.06			683					54.22
08-04 156.24 Dol yellow		0.10	38.44		0.09			753					54.22
08-04 156.24 Dol yellow			38.80		0.08			972					54.57
08-04 122.36 Aufrac		0.03			29.09	30.82							99.12
08-04 181.65 bt?		18.49	13.09		0.06				7308	21.03			99.31
08-04 181.65 bt?		18.60	13.27		0.10				6352	21.01	136		99.67
08-04 181.65 bt?		18.37	12.92		0.11				9279	21.27	181	439	99.72
08-07 176.67 Qz										46.62			99.74
08-04 111.66 Qtz										46.58			99.78
08-04 181.65 bt?		18.77	13.47		0.11				5620	20.88	149		99.95
08-07 176.67 Qz			0.02						281	46.70	314		100.07
08-04 111.66 mus										46.81			100.18
08-07 176.67 Qz										46.83			100.20
08-04 111.66 Qtz										46.91			100.33
08-07 176.67 Qz										46.87			100.34
08-04 111.66 Qtz										46.96			100.47
08-07 176.67 Qz										46.96			100.51
08-04 136.45 mus		0.02	0.02						31	46.93			100.55
08-07 113.96 Qz										47.10			100.78
08-07 176.67 Qz										47.11			100.80
08-07 176.67 Qz										47.32			101.19
08-07 113.96 Qz										47.29			101.21
08-07 113.96 Qz										47.30			101.23
08-07 176.67 Qz DT										47.30			101.23
08-04 181.65 bt?	0.02	16.85	16.12		0.21				2759	18.54	403	297	94.88
08-04 136.45 DOL frac	0.05		38.85	1150	0.13								54.77
08-04 136.45 DOL frac	0.06		38.99	1967	0.08								55.05
08-04 136.45 DOL frac	0.06		39.21	1594	0.11								55.38
08-04 136.45 DOL frac	0.07		39.18	1059	0.12			439					55.23
08-04 122.36 Cal	0.08		30.88	2389	0.19								43.91
08-04 122.36 DOL frac	0.09		35.30	1667	0.35								50.30
08-04 136.45 DOL frac	0.09		38.94	2072	0.12								55.09
08-04 181.65 bt?	0.09	18.53	11.67		0.37		466		3509	21.00	11763	345	98.87
08-04 122.36 DOL frac	0.09		35.02	2177	0.23								49.74
08-04 136.45 DOL frac	0.09		38.95	2059	0.14			442					55.13
08-04 122.36 DOL frac	0.09		35.43	3086	0.14								50.32
08-04 122.36 DOL frac	0.10		35.08	2060	0.30								49.95
08-04 122.36 Cal	0.10		31.14	2766	0.09			589					44.30
08-04 122.36 DOL frac	0.10		35.37	1826	0.21			421					50.23
08-04 122.36 Cal	0.11		31.38	3338	0.18								44.84

Comment	Mg wt.%	Al wt.%	Ca wt.%	Mn	Fe wt.%	S wt.%	Ba	Sr	Na	Si wt.%	K	Ti	Total
08-04 122.36 DOL frac	0.13		35.16	2574	0.21								50.04
08-07 17.95 CalDT	0.13		39.19										55.15
08-04 122.36 Cal	0.14		31.08	2940	0.12								44.31
08-04 136.45 DOL	0.14		37.76	4270	0.06	0.03							53.77
08-04 136.45 Cal	0.15		36.67	3399	0.07			393					52.12
08-04 136.45 Cal	0.16		36.03	2079	0.15								51.15
08-07 17.95 Cal	0.16		39.33		0.18			404					55.67
08-04 122.36 DOL frac	0.17		34.91	1990	0.48			470					50.10
08-04 136.45 Cal	0.17		36.39	2225	0.06								51.60
08-07 17.95 CalDT	0.18		39.37		0.05			463					55.49
08-04 136.45 DOL	0.18		37.87	3195	0.21								53.97
08-07 17.95 Cal	0.18		39.05		0.19			522					55.30
08-07 17.95 CalDT	0.18		39.26	663									55.44
08-04 122.36 Cal	0.19		31.23	5138	0.12								44.89
08-07 17.95 Cal	0.19		36.25		0.04								51.17
08-07 17.95 CalDT	0.20		39.54	623				411					55.83
08-07 17.95 Cal	0.20		39.42		0.19								55.78
08-04 122.36 DOL frac	0.20		34.41	2337	0.65			588					49.74
08-04 136.45 DOL	0.21		37.94	3014	0.15								53.98
08-04 136.45 Cal	0.21		37.82	2078	0.16								53.78
08-07 17.95 Cal	0.22		38.91		0.18			435					55.10
08-07 17.95 Cal	0.22		36.85		0.05								52.04
08-04 136.45 Cal	0.24		32.22	2765	0.08			542					46.01
08-04 136.45 Cal	0.24		36.37	2190	0.08								51.69
08-04 122.36 Cal	0.25		30.37	5028	0.10								43.72
08-04 181.65 bt?	0.25	18.31	10.49		0.82		763		3641	21.07	21372	1054	99.17
08-04 136.45 Cal	0.26		32.79	2275	0.18			399					46.88
08-04 136.45 Cal	0.26		35.96	2290	0.10								51.15
08-04 136.45 Cal	0.28		35.19	1911	0.08								50.10
08-07 17.95 CalDT	0.28		38.88	577	0.04								55.06
08-07 17.95 Cal	0.29		36.86		0.05								52.15
08-04 136.45 DOL frac	0.29		38.35	2975	0.20			578					54.86
08-07 17.95 CalDT	0.30		38.57	494	0.05								54.63
08-04 111.66 Qtz frac	0.32		39.29	3775	0.12								56.18
08-07 17.95 Cal	0.34		36.39	524	0.06								51.66
08-07 17.95 Cal	0.36		36.93	514									52.42
08-07 17.95 Cal	0.37		36.40										51.67
08-04 111.66 Qtz frac	0.37		39.93	3591	0.13				198	0.01			57.16
08-04 136.45 Cal	0.37		36.90	2076	0.09								52.66
08-07 17.95 Cal	0.39		36.36	495				464					51.68
08-07 17.95 CalDT	0.41		39.09	613	0.05			427					55.57
08-07 17.95 Cal	0.41		38.90		0.05								55.26
08-07 17.95 CalDT	0.42		39.35	556	0.05								55.90
08-04 136.45 DOL frac	0.49		38.02	3346	0.20			406					54.74
08-07 17.95 Cal	0.51		39.18		0.05			432					55.82

Comment	Mg wt.%	Al wt.%	Ca wt.%	Mn	Fe wt.%	S wt.%	Ba	Sr	Na	Si wt.%	K	Ti	Total
08-07 17.95 CalDT	0.53		38.98	549	0.06								55.58
08-07 17.95 Cal	0.54		39.25	517									55.92
08-07 17.95 CalDT	0.54		39.15		0.06								55.81
08-04 136.45 Cal	0.54		36.74	3147	0.11			530					52.94
08-07 17.95 Cal	0.56		39.07	722				500					55.82
08-07 17.95 Cal	0.58		38.49		0.04								54.99
08-04 136.45 Cal	0.66		34.05	2344	0.08			508					49.20
08-07 17.95 CalDT	0.67		38.91		0.05								55.69
08-04 136.45 Cal	0.70		34.61	2332	0.11			408					50.08
08-04 136.45 Cal	0.71		36.40	2182	0.07								52.49
08-04 136.45 Cal	0.77		34.85	6748	0.19			424					51.21
08-04 136.45 Cal	0.78		35.38	2372	0.11			592					51.27
08-04 136.45 Cal	0.80		35.41	4419	0.11								51.62
08-04 136.45 Cal	0.83		36.36	3247	0.17			419					52.97
08-04 111.66 Qtz frac	0.97		38.61	3366	0.23								56.39
08-04 181.65 bt	4.49	9.44	0.06		16.26		3256		417	17.24	74745	11687	94.60
08-04 181.65 bt	4.77	9.14	0.09		18.48		2277		486	16.34	74440	12005	95.34
08-04 181.65 bt	4.79	9.16	0.20		18.24		2870		432	16.13	74500	12795	95.02
08-04 181.65 bt	4.91	9.25	0.02		17.98		3659		352	16.32	74589	13041	95.36
08-04 181.65 bt	4.92	8.57	0.03		18.24		2726		484	16.57	74677	13664	95.03
08-04 181.65 bt	4.95	8.56			18.11		3594		335	16.63	73984	13539	94.94
08-04 181.65 bt	4.96	8.59	0.05		18.03		2862		470	17.06	72180	13975	95.70
08-04 181.65 bt	4.99	9.15	0.21		17.70		1673		559	16.31	74825	12915	95.05
08-04 181.65 bt	5.07	8.35	0.10		18.31		2333		386	16.57	72230	13525	94.65
08-04 181.65 bt	5.07	8.73		510	18.48		2884		621	16.58	73457	9991	95.16
08-04 181.65 bt	5.10	8.68	0.03		17.57		2059		484	16.80	73074	14000	94.88
08-04 181.65 bt	5.27	8.82	0.17	480	17.11		1809		490	16.70	73820	14325	95.02
08-04 181.65 bt	5.40	8.42	0.07	513	17.98		2947		499	16.93	74355	7601	95.01
08-04 181.65 bt	5.51	8.60	0.03	584	16.81		1068		440	17.10	73724	15303	95.33
08-04 156.24 Dol clean	8.68	0.03	20.61	15200	7.92			424					55.47
08-04 122.36 DOL	9.02	0.02	18.72	8140	5.66								49.51
08-04 122.36 DOL	9.03		18.35	6444	4.96								47.89
08-04 122.36 DOL	9.13		18.00	6907	3.72								46.07
08-04 122.36 DOL	9.26		18.37	6100	4.72								47.97
08-04 122.36 DOL	9.29		18.62	6959	5.25			456					49.10
08-04 122.36 DOL	9.30		18.37	5938	4.27								47.47
08-04 122.36 DOL	9.40		18.78	7169	5.21								49.53
08-04 122.36 DOL	9.48		17.02	4713	2.00								42.76
08-04 122.36 DOL	9.57		18.43	6368	3.60			516					47.22
08-04 122.36 DOL	9.60		18.72	7474	4.70								49.13
08-04 122.36 DOL	9.68		18.99	8154	4.27								49.21
08-04 136.45 DOL	9.81		20.14	8335	5.74								52.96
08-04 122.36 DOL	9.92		18.92	6028	3.88								48.75
08-04 156.24 Dol clean	10.00		20.59	7736	6.24								54.44
08-04 156.24 Dol saddle	10.02		20.74	7927	5.92			416					54.39

Comment	Mg wt.%	Al wt.%	Ca wt.%	Mn	Fe wt.%	S wt.%	Ba	Sr	Na	Si wt.%	K	Ti	Total
08-04 156.24 Dol saddle	10.07		20.73	7811	5.92								54.36
08-04 156.24 Dol saddle	10.07		20.42	7806	5.67								53.57
08-04 122.36 DOL	10.11		18.54	3815	2.66			501					46.72
08-04 156.24 Dol saddle	10.20		20.69	8983	6.00			419					54.77
08-04 122.36 DOL	10.29		18.29	5678	1.75								45.68
08-04 136.45 DOL	10.32		19.85	6321	4.47			485					51.48
08-04 156.24 Dol saddle	10.46		20.82	7169	5.08								53.88
08-04 156.24 Dol	10.49		20.95	7137	5.40								54.57
08-04 156.24 Dol saddle	10.49		20.92	8226	5.29			465					54.61
08-04 136.45 DOL	10.51		20.84	6446	5.14			568					54.07
08-04 136.45 DOL	10.58		20.43	7558	4.48			467					52.90
08-04 156.24 Dol saddle	10.62		20.71	8061	5.08			431					54.22
08-04 136.45 DOL	10.62		20.37	7091	5.25			459					53.84
08-04 156.24 Dol saddle	10.62		20.77	7595	4.95			424					54.07
08-04 136.45 DOL	10.65		20.23	5926	4.78			471					52.92
08-04 122.36 DOL	10.65		18.53	2756	1.89								46.48
08-04 122.36 DOL	10.66		19.07	6587	2.34								48.30
08-04 156.24 Dol saddle	10.67		20.77	7292	5.08								54.29
08-04 122.36 DOL	10.73		18.90	7739	1.74			435					47.55
08-04 122.36 DOL	10.74		19.09	5860	2.71								48.80
08-04 156.24 Dol saddle	10.79		20.81	7223	4.39			400					53.61
08-04 156.24 Dol	10.83		20.81	6639	4.76								54.13
08-04 122.36 DOL	10.88		19.09	4847	2.20								48.21
08-04 122.36 DOL	10.89		19.03	8523	1.53								47.82
08-04 136.45 DOL	10.91		20.71	6143	4.48			481					53.69
08-04 122.36 DOL	10.92		19.39	7588	2.39								49.33
08-04 122.36 DOL	10.95		19.11	9962	1.64								48.40
08-04 156.24 Dol saddle	10.98		20.82	7446	4.80								54.51
08-04 156.24 Dol saddle	11.01		20.70	7008	4.16								53.56
08-04 136.45 DOL	11.02		20.71	5761	3.70								52.77
08-04 136.45 DOL	11.07		20.92	6207	4.41								54.11
08-04 136.45 DOL	11.07		20.47	6750	4.14								53.20
08-04 136.45 qtz?	11.08		21.96	5820	2.32				10				52.81
08-04 136.45 DOL	11.10		20.52	5150	4.18			660					53.26
08-04 156.24 Dol	11.15	0.03	20.87	7038	4.04								53.90
08-04 136.45 DOL	11.16		20.88	7289	3.35								53.00
08-04 136.45 DOL	11.18		20.96	6517	4.08								53.99
08-04 156.24 Dol clean	11.23		20.75	9038	4.29			425					54.42
08-04 136.45 DOLr	11.26		20.61	6588	3.49								52.88
08-04 156.24 Dol clean	11.27		20.61	8427	3.77			431					53.54
08-04 156.24 Dol clean	11.28		20.58	6582	3.42								52.80
08-04 136.45 DOLr	11.28		20.23	5524	2.99								51.61
08-04 136.45 DOLr	11.31	0.02	20.68	6347	3.48			428					53.09
08-04 136.45 DOL	11.35		20.50	6141	3.20								52.43
08-04 136.45 DOLr	11.39		20.94	7628	2.75								52.76

Comment	Mg wt.%	Al wt.%	Ca wt.%	Mn	Fe wt.%	S wt.%	Ba	Sr	Na	Si wt.%	K	Ti	Total
08-04 136.45 DOL	11.41		20.75	8487	3.43								53.54
08-04 136.45 DOL	11.41		21.11	5979	3.07								53.21
08-07 17.95 CalDT	11.44		22.27	651									50.27
08-04 136.45 DOL	11.48		20.39	4339	2.47								51.38
08-04 136.45 DOL	11.48		20.52	5658	2.76			463					52.10
08-04 156.24 Dol clean	11.50		20.96	7417	3.35			532					53.71
08-04 156.24 Dol	11.56		21.07	5403	3.29			424					53.63
08-04 156.24 Dol saddle	11.59		20.83	8756	2.16								52.30
08-07 17.95 CalDT	11.60		22.71	484									51.11
08-04 156.24 Dol	11.65		21.07	8369	2.60								53.23
08-04 136.45 DOL	11.68		20.67	7854	2.86								53.05
08-04 136.45 DOL	11.72		20.04	4052	2.15								50.75
08-04 156.24 Dol clean	11.73		20.95	5241	3.09								53.49
08-04 156.24 Dol saddle	11.75		20.64	7281	2.39								52.41
08-04 156.24 Dol	11.75		21.20	8938	2.68								53.83
08-04 136.45 DOL	11.75		20.88	7957	2.78								53.33
08-04 156.24 Dol saddle	11.77		20.96	8007	3.29								54.12
08-04 136.45 qtz?	11.78		21.05	4703	2.22				114				52.45
08-04 136.45 qtz?	11.87		21.26	4457	2.21				29				52.84
08-04 136.45 DOL	11.87		20.67	5352	2.07			490					51.98
08-04 156.24 Dol	11.92		21.06	8388	2.08			498					53.05
08-04 156.24 Dol saddle	11.93		21.03	6825	2.34								53.16
08-04 156.24 Dol saddle	11.96		21.06	9210	2.62								53.86
08-04 136.45 DOL	11.96		20.15	7977	0.88			435					50.25
08-04 156.24 Dol clean	11.96		20.60	3941	2.04								51.80
08-04 136.45 DOLr	11.96		20.88	5658	2.95								53.62
08-04 156.24 Dol clean	11.98		20.97	5894	2.07								52.65
08-04 156.24 Dol saddle	12.01		20.97	9548	2.02			518					53.18
08-04 136.45 DOL	12.02		20.36	2876	1.89								51.20
08-04 136.45 DOL	12.05		20.45	5347	1.66			499					51.44
08-04 156.24 Dol clean	12.06		20.86	4087	2.27								52.69
08-04 156.24 Dol clean	12.06		21.14	5479	1.68								52.46
08-04 156.24 Dol clean	12.07		20.95	3449	1.98								52.33
08-04 136.45 DOLr	12.07		20.92	8389	2.44								53.56
08-04 156.24 Dol clean	12.08		20.75	3751	2.10			432					52.29
08-04 156.24 Dol clean	12.09		20.82	5440	1.76								52.17
08-07 17.95 CalDT	12.10		20.72	685	0.28								49.50
08-07 17.95 CalDT	12.11		20.90										49.42
08-04 156.24 Dol clean	12.11		20.98	3119	1.61								51.94
08-04 156.24 Dol clean	12.12		20.71	3144	2.05			448					52.20
08-04 136.45 DOL	12.12		20.94	6009	1.96								52.74
08-07 17.95 CalDT	12.13		20.27		0.10								48.66
08-07 17.95 CalDT	12.13		20.28		0.06								48.64
08-04 136.45 qtz?	12.14		21.43	5824	1.87				65				53.28
08-04 156.24 Dol clean	12.18		21.01	3968	2.03			433					52.78

Comment	Mg wt.%	Al wt.%	Ca wt.%	Mn	Fe wt.%	S wt.%	Ba	Sr	Na	Si wt.%	K	Ti	Total
08-04 156.24 Dol clean	12.19		21.02	6565	1.29								52.15
08-04 156.24 Dol clean	12.21		20.76	3456	1.92								52.24
08-04 136.45 qtz?	12.21		21.66	4786	1.05				67			107	52.58
08-04 156.24 Dol clean	12.22		20.89	4175	2.13			440					52.84
08-04 156.24 Dol clean	12.23		20.98	3752	1.52								52.13
08-04 156.24 Dol clean	12.26		20.84	2962	1.67			474					52.06
08-04 156.24 Dol clean	12.27		20.69	3120	1.66								51.82
08-07 17.95 CalDT	12.29		20.14	599	0.12								48.80
08-04 156.24 Dol clean	12.29		20.83	2853	1.46			473					51.82
08-04 136.45 qtz?	12.29		20.67	4578	2.53				159				53.19
08-04 156.24 Dol clean	12.34		20.99	4938	1.51								52.46
08-04 156.24 Dol saddle	12.35		20.95	5650	1.50								52.50
08-04 156.24 Dol clean	12.37		21.05	3970	1.58			515					52.58
08-04 136.45 qtz?	12.40		21.33	5320	2.29				24				54.10
08-07 17.95 CalDT	12.44		21.56	658									50.91
08-04 156.24 Dol clean	12.44		21.11	3316	1.85			435					53.08
08-04 136.45 DOL	12.59		20.70	3436	0.52			587					51.04
08-04 136.45 mus	12.66		22.57	3511	0.41	0.03			79				53.63
08-04 136.45 mus	13.35		22.32	4889	1.16								55.50
08-07 113.96 mys	13.84	0.05	9.49	2108	1.77				283	27.27	270		97.28
08-07 113.96 mys	13.86	0.06	9.63	1752	1.58				280	27.35	169		97.36
08-07 113.96 mys	13.89	0.05	9.64	2041	1.68				280	27.47	294		97.90
08-07 113.96 mys	13.98	0.05	9.56	1952	1.65					27.40	126		97.69
08-07 113.96 mys	13.99	0.05	9.31	1859	1.76				224	27.40	178		97.50
08-07 113.96 mys	14.00	0.07	9.59	1568	1.64				266	27.55	287		98.09
08-07 113.96 mys	14.00	0.03	9.54	1977	1.60				233	27.54			97.89
08-07 176.67 tlc	15.73	10.30		868	7.93					14.18	145		86.25
08-07 176.67 tlc	15.99	10.99		1200	6.13					14.24	195		85.84
08-07 176.67 tlc	16.33	10.63		1008	7.16					14.29			87.16
08-07 176.67 tlc	16.35	10.90		1224	6.14					14.36	162		86.55
08-07 176.67 tlc	16.51	10.97		1378	6.38					14.14			86.78
08-07 176.67 tlc	16.54	10.88		1361	6.20					14.18			86.49
08-07 176.67 tlc	16.61	10.53	0.03	1127	6.13				217	13.89	340		85.35
08-07 176.67 tlc	16.70	10.29	0.01	1046	6.37					14.17	121		85.80
08-07 176.67 tlc	16.79	11.03	0.02	1454	6.20					14.19	220		87.29
08-04 122.36 mus	17.67	0.10	0.03		0.89				148	29.69			94.26
08-04 111.66 mus	17.84	0.07	0.03		0.71	0.03				29.29	121		93.39
08-04 122.36 mus	17.86	0.09	0.02	687	0.93				78	29.29			93.70
08-04 122.36 mus	17.88	0.14	0.02		0.86				187	29.26			93.69
08-04 122.36 mus	17.93	0.16	0.08		1.02				127	29.36			94.35
08-04 136.45 mus	17.99	0.05	0.13		0.37				44	28.93			92.53
08-04 122.36 mus	18.02	0.07	0.03		0.75				130	30.24			95.76
08-07 113.96 mus	18.03	0.08	0.01		0.58					29.55			94.10
08-07 113.96 mus	18.04	0.04		541	1.09					29.68			94.98
08-04 136.45 mus	18.04	0.07	0.05		0.53				243	27.86			90.47

Comment	Mg wt.%	Al wt.%	Ca wt.%	Mn	Fe wt.%	S wt.%	Ba	Sr	Na	Si wt.%	K	Ti	Total
08-07 113.96 mus	18.08	0.06	0.01		1.28					29.99			95.99
08-04 111.66 mus	18.10	0.11			0.62					29.09	153		93.38
08-04 136.45 mus	18.11	0.07	0.04	570	1.11				159	28.74		128	93.23
08-04 111.66 mus	18.12	0.09	0.02		0.51					28.88			92.75
08-07 113.96 mus	18.13	0.10	0.03	520	0.73					29.52			94.45
08-04 111.66 mus	18.13	0.07	0.04		0.50					29.32			93.71
08-04 111.66 mus	18.15	0.10			0.58					29.05			93.23
08-04 111.66 mus	18.18	0.12	0.01	495	0.73					29.53			94.63
08-04 136.45 mus	18.18	0.10	0.03		1.53				269	27.30			90.84
08-04 136.45 mus	18.18	0.08	0.03		0.77				212	27.53			90.33
08-04 122.36 mus	18.20	0.08	0.07		0.98				99	29.54			94.99
08-04 111.66 mus	18.21	0.09	0.02		0.52					29.38	167		94.01
08-07 113.96 mus	18.22	0.08	0.02		1.34					29.55	146		95.37
08-04 111.66 mus	18.23	0.10	0.03		0.51					29.18	120		93.65
08-07 113.96 mus	18.24	0.11	0.03	479	0.58				227	29.37			94.19
08-07 113.96 mus	18.24	0.10	0.02	518	0.80					29.78			95.28
08-04 136.45 mus	18.25	0.09	0.05		0.51				157	26.57			88.09
08-07 113.96 mus	18.27	0.08	0.03		1.16					29.82			95.85
08-04 111.66 mus	18.33	0.12	0.02		0.70				176	29.55			94.84
08-07 113.96 mus	18.33	0.07			0.89				230	29.43	167		94.75
08-04 136.45 mus	18.36	0.10	0.09		0.37				67	28.55			92.38
08-07 113.96 mus	18.41	0.08	0.01	723	0.81					29.67			95.29
08-04 111.66 mus	18.45	0.10	0.05		0.53				176	29.51			94.70
08-07 113.96 mus	18.46	0.06			0.56					29.69			95.02
08-04 136.45 mus	18.50	0.08	0.07		0.48	0.03			276	25.61			86.45
08-07 113.96 mus	18.51	0.07	0.05		0.47					29.46			94.55
08-07 113.96 mus	18.55	0.06		559	0.69					29.62			95.20
08-04 111.66 mus	18.61	0.11			0.70				247	29.19			94.49
08-07 113.96 mus	18.64	0.07	0.07		0.41					29.64	121		95.11
08-07 113.96 mus	18.66	0.07	0.07		0.55					29.47			95.01

non-sulphide data detection limits 3 sigma (ppm)

Comment	Mg	Al	Ca	Mn	Fe	S	Ba	Sr	Na	Si	K	Ti
08-04 136.45 Cal	284	218	324	492	362	261	447	395				
08-04 156.24 Dol yellow	265	231	307	526	393	350	442	410				
08-04 156.24 Dol yellow	267	266	316	513	425	361	475	427				
08-04 156.24 Dol yellow	309	241	316	564	414	425	443	430				
08-04 156.24 Dol yellow	288	237	315	511	370	302	438	399				
08-04 122.36 Aufrac	324	268	233	663	535	670	517	469				
08-04 181.65 bt?	138	194	131	493	305	381	389		204	205	125	277
08-04 181.65 bt?	140	211	133	450	327	309	397		196	211	125	278
08-04 181.65 bt?	140	201	133	502	304	380	395		196	202	125	272
08-07 176.67 Qz	129	168	101	459	292	399	381		168	222	125	267
08-04 111.66 Qtz	125	170	99	457	276	261	366		165	215	115	270
08-04 181.65 bt?	137	196	130	468	297	389	403		185	198	119	287
08-07 176.67 Qz	122	171	97	432	298		387		162	226	114	267
08-04 111.66 mus	128	170	96	438	286	382	373		181	214	116	261
08-07 176.67 Qz	123	177	99	462	310	279	391		178	219	116	264
08-04 111.66 Qtz	123	159	95		272		382		173	214	119	277
08-07 176.67 Qz	125	183	102	452	300	279	371		173	224	112	280
08-04 111.66 Qtz	121	163	97	475	276		386		170	223	113	272
08-07 176.67 Qz	131	178	99	483	281	332	366		172	219	119	270
08-04 136.45 mus	125	167	99	446	266	279	374		171	217	116	280
08-07 113.96 Qz	122	178	96	478	296	358	381		166	226	117	278
08-07 176.67 Qz	128	168	95	465	284	379	376		171	220	114	287
08-07 176.67 Qz	127	161	93	424	292	423	378		189	222	118	286
08-07 113.96 Qz	127	171	92	463	287	298	378		177	221	114	263
08-07 113.96 Qz	120	180	95	461	283	314	372		184	223	112	278
08-07 176.67 Qz DT	126	177	96	444	286	391	380		176	216	112	253
08-04 181.65 bt?	139	197	140	469	294	312	388		190	201	118	287
08-04 136.45 DOL frac	235	227	302	527	359	340	439	383				
08-04 136.45 DOL frac	255	243	303	495	381	301	409	374				
08-04 136.45 DOL frac	262	222	318	501	373	328	435	378				
08-04 136.45 DOL frac	276	231	321	547	360	384	440	384				
08-04 122.36 Cal	254	225	302	482	405	303	425	388				
08-04 122.36 DOL frac	263	215	298	474	384	329	426	396				
08-04 136.45 DOL frac	234	225	294	465	387	333	420	377				
08-04 181.65 bt?	137	217	127	515	302	365	397		178	207	127	289
08-04 122.36 DOL frac	269	239	316	485	371	433	429	397				
08-04 136.45 DOL frac	268	207	304	470	371	342	414	363				
08-04 122.36 DOL frac	232	238	290	451	381	371	407	383				
08-04 122.36 DOL frac	285	227	310	492	370	316	428	388				
08-04 122.36 Cal	280	215	281	462	378	389	413	371				
08-04 122.36 DOL frac	244	250	287	470	363	302	416	370				
08-04 122.36 Cal	271	213	287	473	336	266	403	366				

Comment	Mg	Al	Ca	Mn	Fe	S	Ba	Sr	Na	Si	K	Ti
08-04 122.36 DOL frac	250	247	303	513	377	329	428	382				
08-07 17.95 CalDT	251	216	303	514	363	278	414	367				
08-04 122.36 Cal	252	226	305	504	378	304	428	393				
08-04 136.45 DOL	245	222	317	503	354	254	418	374				
08-04 136.45 Cal	266	233	328	536	393	328	436	381				
08-04 136.45 Cal	259	240	332	552	365	385	432	392				
08-07 17.95 Cal	245	202	294	463	383	253	412	371				
08-04 122.36 DOL frac	235	221	288	470	383	334	402	377				
08-04 136.45 Cal	254	233	327	535	393	290	430	398				
08-07 17.95 CalDT	248	205	293	510	358	361	418	359				
08-04 136.45 DOL	292	218	305	472	376	364	433	386				
08-07 17.95 Cal	267	212	300	489	359	225	413	358				
08-07 17.95 CalDT	260	211	299	446	385	333	411	366				
08-04 122.36 Cal	261	212	293	510	363	240	409	372				
08-07 17.95 Cal	275	244	333	528	341	328	450	389				
08-07 17.95 CalDT	270	223	319	454	377	320	436	370				
08-07 17.95 Cal	247	219	289	501	338	371	423	361				
08-04 122.36 DOL frac	275	212	283	466	347	302	406	366				
08-04 136.45 DOL	276	232	310	510	358	335	425	378				
08-04 136.45 Cal	261	210	329	523	368	395	432	392				
08-07 17.95 Cal	245	228	315	507	396	316	431	383				
08-07 17.95 Cal	262	224	328	525	392	352	431	395				
08-04 136.45 Cal	277	217	333	475	374	276	451	374				
08-04 136.45 Cal	278	237	330	508	382	329	434	387				
08-04 122.36 Cal	261	228	298	496	406	342	435	386				
08-04 181.65 bt?	139	194	127	458	300	373	402		188	209	131	290
08-04 136.45 Cal	258	248	330	492	363	304	439	391				
08-04 136.45 Cal	261	247	326	497	358	352	435	394				
08-04 136.45 Cal	280	233	327	518	366	352	436	395				
08-07 17.95 CalDT	246	224	305	497	379	342	404	373				
08-07 17.95 Cal	260	231	333	526	367	352	441	376				
08-04 136.45 DOL frac	259	205	301	479	348	363	425	366				
08-07 17.95 CalDT	231	214	304	450	379	343	394	374				
08-04 111.66 Qtz frac	145	168	171	519	304	315	410		199	133	100	316
08-07 17.95 Cal	275	217	330	512	368	352	432	386				
08-07 17.95 Cal	277	221	327	475	401	276	424	388				
08-07 17.95 Cal	256	220	326	517	407	330	430	388				
08-04 111.66 Qtz frac	141	177	178	508	316	304	409		193	139	96	319
08-04 136.45 Cal	256	241	330	499	373	276	438	388				
08-07 17.95 Cal	265	235	337	492	398	304	423	370				
08-07 17.95 CalDT	257	206	300	453	336	290	417	367				
08-07 17.95 Cal	254	225	311	483	349	302	411	369				
08-07 17.95 CalDT	236	233	297	477	380	240	410	380				
08-04 136.45 DOL frac	285	227	314	497	379	304	431	390				
08-07 17.95 Cal	267	222	311	521	364	291	428	375				

Comment	Mg	Al	Ca	Mn	Fe	S	Ba	Sr	Na	Si	K	Ti
08-07 17.95 CalDT	241	215	294	442	342	280	426	374				
08-07 17.95 Cal	255	226	296	457	359	344	427	373				
08-07 17.95 CalDT	280	244	288	510	346	291	415	377				
08-04 136.45 Cal	278	248	323	532	383	262	431	383				
08-07 17.95 Cal	261	234	319	451	408	397	423	374				
08-07 17.95 Cal	269	228	319	500	386	330	437	386				
08-04 136.45 Cal	268	224	310	464	381	292	408	361				
08-07 17.95 CalDT	228	213	303	469	370	303	405	380				
08-04 136.45 Cal	301	233	340	493	370	263	438	385				
08-04 136.45 Cal	280	1.#INF	315	503	394	315	416	377				
08-04 136.45 Cal	266	225	316	476	371	281	410	372				
08-04 136.45 Cal	267	255	330	504	386	407	431	384				
08-04 136.45 Cal	281	223	344	486	386	355	425	399				
08-04 136.45 Cal	295	223	316	499	422	306	424	391				
08-04 111.66 Qtz frac	133	161	169	537	325	301	407		127	106	91	274
08-04 181.65 bt	183	212	108	487	361	321	412		221	208	153	312
08-04 181.65 bt	186	206	111	531	353	382	413		229	212	159	297
08-04 181.65 bt	183	219	110	494	353	378	422		244	212	154	294
08-04 181.65 bt	182	214	106	526	329	365	402		229	211	151	306
08-04 181.65 bt	188	214	109	497	341	286	408		222	209	152	287
08-04 181.65 bt	181	223	112	496	346	314	413		230	210	156	298
08-04 181.65 bt	187	215	111	494	355	327	415		230	213	155	287
08-04 181.65 bt	182	208	107	495	356	326	419		225	216	152	292
08-04 181.65 bt	195	223	111	528	338	326	415		219	213	152	296
08-04 181.65 bt	184	220	112	495	355	327	411		220	212	151	290
08-04 181.65 bt	188	212	111	506	352	346	410		213	213	150	276
08-04 181.65 bt	192	210	110	471	352	327	418		218	215	157	292
08-04 181.65 bt	186	214	107	482	355	349	406		222	209	156	279
08-04 181.65 bt	188	212	106	474	348	306	415		229	208	153	293
08-04 156.24 Dol clean	348	223	241	453	388	351	372	397				
08-04 122.36 DOL	345	213	237	484	356	1.#INF	387	414				
08-04 122.36 DOL	352	258	238	435	363	410	382	401				
08-04 122.36 DOL	338	230	240	471	336	326	373	399				
08-04 122.36 DOL	335	240	242	495	349	341	377	390				
08-04 122.36 DOL	342	265	240	444	330	439	381	395				
08-04 122.36 DOL	349	278	258	482	381	343	389	414				
08-04 122.36 DOL	315	233	239	436	343	354	375	409				
08-04 122.36 DOL	348	255	234	443	333	300	373	395				
08-04 122.36 DOL	351	208	232	452	362	288	382	390				
08-04 122.36 DOL	324	250	241	449	338	355	375	414				
08-04 122.36 DOL	337	250	246	445	320	390	374	406				
08-04 136.45 DOL	357	246	246	470	359	315	374	401				
08-04 122.36 DOL	353	251	247	493	345	343	392	416				
08-04 156.24 Dol clean	358	253	242	469	354	353	377	394				
08-04 156.24 Dol saddle	328	226	240	414	375	271	371	391				

Comment	Mg	Al	Ca	Mn	Fe	S	Ba	Sr	Na	Si	K	Ti
08-04 156.24 Dol saddle	320	235	246	493	358	316	391	405				
08-04 156.24 Dol saddle	369	244	256	471	374	411	398	425				
08-04 122.36 DOL	328	251	231	469	343	302	361	385				
08-04 156.24 Dol saddle	336	235	237	446	377	355	377	399				
08-04 122.36 DOL	347	262	249	473	334	360	382	411				
08-04 136.45 DOL	361	259	271	491	354	398	404	406				
08-04 156.24 Dol saddle	353	273	259	484	378	398	402	441				
08-04 156.24 Dol	355	283	247	468	397	398	384	426				
08-04 156.24 Dol saddle	317	240	245	472	331	1.#INF	373	393				
08-04 136.45 DOL	319	245	233	471	371	388	374	391				
08-04 136.45 DOL	358	245	244	468	359	377	375	403				
08-04 156.24 Dol saddle	348	233	243	456	358	255	397	397				
08-04 136.45 DOL	335	233	239	422	373	341	372	401				
08-04 156.24 Dol saddle	339	230	244	462	347	389	380	401				
08-04 136.45 DOL	364	248	258	486	379	345	393	409				
08-04 122.36 DOL	355	263	257	481	352	331	384	416				
08-04 122.36 DOL	328	233	231	441	348	256	364	403				
08-04 156.24 Dol saddle	338	234	246	482	367	286	381	404				
08-04 122.36 DOL	337	231	253	462	348	359	386	411				
08-04 122.36 DOL	329	238	224	451	333	344	379	401				
08-04 156.24 Dol saddle	342	252	247	451	392	412	378	396				
08-04 156.24 Dol	352	252	247	477	389	238	391	424				
08-04 122.36 DOL	333	272	235	470	323	381	374	393				
08-04 122.36 DOL	360	245	254	481	329	333	393	409				
08-04 136.45 DOL	319	250	243	481	355	316	374	396				
08-04 122.36 DOL	330	243	236	419	354	317	378	402				
08-04 122.36 DOL	343	227	235	442	326	317	367	397				
08-04 156.24 Dol saddle	340	241	245	434	350	367	367	406				
08-04 156.24 Dol saddle	335	229	249	435	354	272	373	404				
08-04 136.45 DOL	370	251	255	471	358	1.#INF	398	425				
08-04 136.45 DOL	337	262	248	464	352	400	370	404				
08-04 136.45 DOL	341	245	239	455	320	342	379	403				
08-04 136.45 qtz?	214	205	145	488	289	307	402		190	150	104	276
08-04 136.45 DOL	349	254	255	479	344	279	394	398				
08-04 156.24 Dol	349	224	257	465	351	359	387	409				
08-04 136.45 DOL	356	263	261	436	348	344	393	416				
08-04 136.45 DOL	341	210	253	440	352	389	375	397				
08-04 156.24 Dol clean	350	244	251	441	354	273	377	400				
08-04 136.45 DOLr	354	258	254	477	338	359	392	429				
08-04 156.24 Dol clean	363	277	256	468	374	300	383	411				
08-04 156.24 Dol clean	351	231	245	431	362	343	368	404				
08-04 136.45 DOLr	351	280	264	444	382	313	399	419				
08-04 136.45 DOLr	340	212	245	456	350	255	376	396				
08-04 136.45 DOL	327	239	237	474	359	355	361	413				
08-04 136.45 DOLr	351	261	256	494	392	343	400	408				

Comment	Mg	Al	Ca	Mn	Fe	S	Ba	Sr	Na	Si	K	Ti
08-04 136.45 DOL	344	245	260	466	367	278	394	425				
08-04 136.45 DOL	329	240	248	462	339	342	369	403				
08-07 17.95 CalDT	340	240	267	444	362	254	381	397				
08-04 136.45 DOL	353	249	242	442	358	273	368	396				
08-04 136.45 DOL	369	272	247	461	388	313	390	416				
08-04 156.24 Dol clean	356	280	254	461	353	359	393	403				
08-04 156.24 Dol	350	270	246	435	389	360	400	415				
08-04 156.24 Dol saddle	360	272	261	465	352	345	390	415				
08-07 17.95 CalDT	369	250	263	445	354	370	403	413				
08-04 156.24 Dol	309	236	248	494	360	437	391	413				
08-04 136.45 DOL	366	241	259	478	356	387	396	415				
08-04 136.45 DOL	332	249	241	404	340	392	374	407				
08-04 156.24 Dol clean	348	256	240	415	339	272	380	404				
08-04 156.24 Dol saddle	358	256	245	443	350	374	392	432				
08-04 156.24 Dol	357	247	268	465	379	313	397	412				
08-04 136.45 DOL	352	270	247	392	354	317	373	398				
08-04 156.24 Dol saddle	355	261	245	428	319	412	371	402				
08-04 136.45 qtz?	217	209	147	454	307	256	392		187	155	110	290
08-04 136.45 qtz?	219	220	144	453	291	237	394		192	152	103	292
08-04 136.45 DOL	354	256	245	469	385	388	401	405				
08-04 156.24 Dol	364	270	258	465	352	297	390	411				
08-04 156.24 Dol saddle	347	269	247	455	362	298	384	422				
08-04 156.24 Dol saddle	347	234	239	423	356	380	378	411				
08-04 136.45 DOL	348	222	247	426	344	357	362	394				
08-04 156.24 Dol clean	351	223	260	445	374	374	389	422				
08-04 136.45 DOLr	363	255	247	454	355	374	398	421				
08-04 156.24 Dol clean	342	283	243	417	367	1.#INF	369	404				
08-04 156.24 Dol saddle	326	258	241	451	374	289	365	390				
08-04 136.45 DOL	359	278	244	468	327	414	374	400				
08-04 136.45 DOL	367	296	261	481	326	360	400	405				
08-04 156.24 Dol clean	338	252	234	472	346	343	375	403				
08-04 156.24 Dol clean	345	244	242	454	345	317	371	398				
08-04 156.24 Dol clean	379	263	265	469	369	330	391	424				
08-04 136.45 DOLr	346	275	255	447	385	297	395	409				
08-04 156.24 Dol clean	311	259	246	417	359	367	375	401				
08-04 156.24 Dol clean	351	228	242	439	331	381	382	397				
08-07 17.95 CalDT	372	255	275	454	336	359	395	426				
08-07 17.95 CalDT	369	246	259	463	383	345	390	409				
08-04 156.24 Dol clean	338	250	259	464	391	414	393	416				
08-04 156.24 Dol clean	358	241	249	473	336	220	372	396				
08-04 136.45 DOL	352	258	236	428	343	368	376	398				
08-07 17.95 CalDT	372	276	280	467	313	346	390	403				
08-07 17.95 CalDT	352	238	258	511	344	388	381	411				
08-04 136.45 qtz?	219	201	145	470	276	289	402		185	141	112	290
08-04 156.24 Dol clean	344	269	247	477	352	345	391	410				

Comment	Mg	Al	Ca	Mn	Fe	S	Ba	Sr	Na	Si	K	Ti
08-04 156.24 Dol clean	342	245	249	430	373	303	381	400				
08-04 156.24 Dol clean	345	227	246	422	357	381	374	400				
08-04 136.45 qtz?	217	214	145	479	295	272	381		185	144	101	266
08-04 156.24 Dol clean	321	244	242	443	344	332	377	391				
08-04 156.24 Dol clean	337	266	250	509	336	303	384	396				
08-04 156.24 Dol clean	365	246	258	464	353	361	395	405				
08-04 156.24 Dol clean	329	249	243	414	355	380	377	407				
08-07 17.95 CalDT	339	217	247	435	341	331	378	406				
08-04 156.24 Dol clean	370	266	261	456	330	374	385	402				
08-04 136.45 qtz?	219	208	149	451	280	297	388		188	154	106	291
08-04 156.24 Dol clean	352	257	244	427	347	304	373	396				
08-04 156.24 Dol saddle	336	228	229	434	349	318	376	397				
08-04 156.24 Dol clean	352	252	258	458	361	1.#INF	396	400				
08-04 136.45 qtz?	213	187	143	448	317	282	389		197	148	102	279
08-07 17.95 CalDT	355	232	261	436	333	422	378	400				
08-04 156.24 Dol clean	342	242	242	430	337	221	372	399				
08-04 136.45 DOL	338	227	243	425	334	380	366	376				
08-04 136.45 mus	214	201	147	447	285	246	385		180	143	106	281
08-04 136.45 mus	216	191	144	472	263	274	396		204	153	106	282
08-07 113.96 mys	208	183	126	471	298	282	393		181	208	120	281
08-07 113.96 mys	206	192	124	469	289	373	387		187	210	121	296
08-07 113.96 mys	210	185	123	455	288	319	382		178	205	115	284
08-07 113.96 mys	208	190	125	494	287	314	393		190	204	125	297
08-07 113.96 mys	207	203	124	442	322	329	389		183	207	113	283
08-07 113.96 mys	207	171	128	488	289	319	381		186	203	115	283
08-07 113.96 mys	211	194	128	460	284	289	395		185	209	117	291
08-07 176.67 tlc	223	232	97	457	300	348	368		183	194	102	272
08-07 176.67 tlc	216	220	90	455	286	314	377		169	196	116	250
08-07 176.67 tlc	213	215	95	446	305	304	370		180	197	121	264
08-07 176.67 tlc	218	216	93	465	306	375	370		180	204	110	268
08-07 176.67 tlc	215	219	95	422	298	283	367		187	197	113	265
08-07 176.67 tlc	223	218	97	448	298	319	367		176	203	122	283
08-07 176.67 tlc	219	190	96	471	308	325	360		177	191	112	263
08-07 176.67 tlc	219	211	93	442	302	293	365		189	201	117	267
08-07 176.67 tlc	219	213	90	471	284	340	376		182	203	111	261
08-04 122.36 mus	215	182	98	429	275	297	381		171	206	119	271
08-04 111.66 mus	223	200	97	475	301	259	387		173	217	112	264
08-04 122.36 mus	215	193	96	420	281	406	377		183	208	116	283
08-04 122.36 mus	214	186	96	484	265	351	377		172	212	116	282
08-04 122.36 mus	220	177	93	473	288	330	373		180	208	120	270
08-04 136.45 mus	215	206	96	482	298	273	375		166	225	117	258
08-04 122.36 mus	217	207	98	471	282	431	375		164	216	119	273
08-07 113.96 mus	211	197	96	459	293	302	363		173	206	112	278
08-07 113.96 mus	217	193	97	438	278	331	368		179	212	111	276
08-04 136.45 mus	210	196	96	470	291	259	375		177	210	116	286

Comment	Mg	Al	Ca	Mn	Fe	S	Ba	Sr	Na	Si	K	Ti
08-07 113.96 mus	221	190	99	447	293	298	378		168	211	124	263
08-04 111.66 mus	216	187	96	432	296	315	367		176	200	115	271
08-04 136.45 mus	216	192	97	423	278	371	365		178	213	110	270
08-04 111.66 mus	211	195	94	447	284	315	369		167	208	120	265
08-07 113.96 mus	214	189	95	440	278	368	381		165	215	118	278
08-04 111.66 mus	215	185	101	422	286	325	375		172	217	111	269
08-04 111.66 mus	218	189	93	447	272	303	380		171	208	122	261
08-04 111.66 mus	221	176	96	436	289	291	373		178	208	117	268
08-04 136.45 mus	219	207	97	468	289	1.#INF	374		179	217	120	273
08-04 136.45 mus	220	192	95	458	293	331	373		172	213	120	271
08-04 122.36 mus	222	192	98	469	301	331	384		177	214	115	265
08-04 111.66 mus	214	181	95	430	291	325	374		177	208	111	274
08-07 113.96 mus	215	190	100	446	298	325	367		171	208	110	270
08-04 111.66 mus	218	183	96	474	280	268	372		172	205	116	264
08-07 113.96 mus	217	180	95	470	262	296	374		167	209	117	286
08-07 113.96 mus	217	192	95	428	275	280	366		167	212	113	262
08-04 136.45 mus	214	201	98	473	306	272	383		167	217	113	269
08-07 113.96 mus	218	202	93	467	288	320	374		180	210	123	284
08-04 111.66 mus	219	197	96	456	289	325	370		173	207	118	262
08-07 113.96 mus	219	185	96	468	295	332	372		168	214	113	273
08-04 136.45 mus	213	188	94	438	301	297	369		179	214	110	264
08-07 113.96 mus	220	193	93	435	302	296	370		170	215	127	269
08-04 111.66 mus	209	198	94	463	271	334	366		168	212	118	276
08-07 113.96 mus	213	189	98	464	292	285	369		164	217	113	265
08-04 136.45 mus	216	187	99	476	312	245	376		161	210	125	267
08-07 113.96 mus	214	191	97	452	267	340	388		166	212	116	266
08-07 113.96 mus	217	189	98	438	294	351	374		169	214	116	259
08-04 111.66 mus	219	179	96	453	284	325	382		168	204	118	268
08-07 113.96 mus	221	194	100	454	294	369	369		183	215	105	254
08-07 113.96 mus	218	184	93	451	282	255	373		165	206	115	267

APPENDIX C
Whole-rock data

Whole-rock. Whole rock geochemical data for selected volcanic rocks and limestone rocks within the Tiger zone. Rock-type abbreviations are Vol = volcanic, Lst = limestone, and Lep = leopard calcite.

			SiO_2	Al_2O_3	Fe_2O_3(T)	MnO	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	LOI	Total
		Detection Limit	0.01 %	0.01 %	0.01 %	0.001 %	0.01 %	0.01 %	0.01 %	0.01 %	0.001 %	0.01 %		0.01 %
Sample ID	**Rock type**	**Analysis Method**	**FUS-ICP**	**FUS-ICP**	**FUS-ICP**	**FUS-ICP**	**FUS-ICP**	**FUS-ICP**	**FUS-ICP**	**FUS-ICP**	**FUS-ICP**	**FUS-ICP**	**FUS-ICP**	**FUS-ICP**
ER-2	Vol	G285302	38.02	13.63	13.40	0.185	14.05	5.83	0.00	0.06	1.98	0.53	11.00	98.69
ER-4	Vol	G285304	44.36	12.31	10.04	0.138	8.32	8.92	0.03	1.68	1.691	0.44	11.33	99.25
ER-6	Vol	G285306	41.72	15.05	13.15	0.070	9.00	5.95	0.25	5.01	1.508	0.21	8.20	100.10
ER-8	Vol	G285308	45.60	14.34	13.58	0.048	13.80	1.87	0.81	2.57	1.629	0.16	5.64	100.10
ER-10	Vol	G285309	41.56	15.39	10.82	0.107	7.96	8.74	2.96	0.92	1.724	0.20	10.11	100.50
ER-12	Vol	G285310	30.01	9.68	8.23	0.141	4.60	23.63	2.13	0.46	1.619	0.40	19.60	100.50
ER-14	Vol	G285311	52.47	14.75	9.52	0.065	6.44	6.59	4.20	0.96	1.568	0.26	2.49	99.31
ER-15	Vol	G285312	54.59	14.93	7.40	0.077	6.94	5.47	4.93	1.65	1.651	0.24	2.80	100.70
ER-17	Vol	G285314	54.75	15.37	12.83	0.024	4.17	0.72	0.10	4.81	2.221	0.49	3.45	98.93
ER-19	Vol	G285316	44.51	15.21	17.10	0.059	9.24	0.88	1.93	3.83	2.205	0.43	3.82	99.23
ER-20	Vol	G285317	39.88	15.13	17.82	0.068	9.99	1.70	0.08	7.38	2.131	0.45	4.23	98.86
09-61 184.60	Vol	G285321	47.87	14.56	15.38	0.059	7.78	4.26	0.25	5.43	1.544	0.21	2.42	99.76
08-07 29.00	Vol	G285323	41.27	15.08	11.74	0.072	6.88	11.22	0.15	4.39	1.491	0.18	7.96	100.40
08-07 117.49	Vol	G285324	39.59	14.88	12.81	0.197	5.55	11.46	1.23	4.12	2.382	0.39	7.58	100.20
09-64 121.00	Vol	G285327	39.25	14.40	11.94	0.165	8.14	10.84	1.87	1.39	2.002	0.32	9.10	99.42
10-99 5.50	Vol	G285318	49.83	18.58	13.48	0.104	2.25	1.51	0.20	7.22	3.008	0.61	2.66	99.45
10-99 284.50	Vol	G285319	45.99	14.91	23.55	0.022	2.86	0.64	0.36	5.83	3.807	0.07	1.77	99.81
09-64 135.10	Vol	G285326	44.94	19.84	14.00	0.085	3.58	3.09	1.04	6.47	2.763	1.09	2.43	99.34
ER-1	Lst	G285301	11.05	3.17	3.31	0.034	3.68	41.19	0.05	1.05	0.548	0.14	36.04	100.30
ER-3	Lst	G285303	1.40	0.21	0.35	0.019	4.42	50.12	< 0.01	0.05	0.013	< 0.01	43.80	100.40
ER-5	Lst	G285305	0.29	0.12	0.11	0.021	0.90	54.78	< 0.01	0.03	0.009	< 0.01	43.58	99.86
ER-7	Lst	G285307	6.66	0.22	0.49	0.017	1.84	50.18	< 0.01	0.09	0.025	< 0.01	41.10	100.60
ER-16	Lst	G285313	0.98	0.10	0.31	0.062	0.44	54.82	< 0.01	0.02	0.007	0.05	43.13	99.94
ER-18	Lst	G285315	1.30	0.45	0.66	0.107	0.48	53.55	< 0.01	0.14	0.113	0.03	42.79	99.63
10-99 578.80	Lep	G285320	36.74	15.63	24.70	0.022	2.63	3.91	0.84	5.74	2.109	0.67	5.76	98.74
10-73 469.39	Lep	G285322	28.73	9.31	7.30	0.109	4.68	24.89	0.44	2.96	2.067	0.53	15.00	96.00
08-07 246.65	Lep	G285325	22.29	8.75	7.65	0.132	2.71	31.02	0.32	2.55	2.154	0.51	22.81	100.90

Whole-rock. Cont.

		Au	Ag	As	Ba	Be	Bi	Br	Cd	Co	Cr	Cs	Cu	Hf	Hg	Ir	Mo
		1 ppb	0.5 ppm	1 ppm	1 ppm	1 ppm	2 ppm	0.5 ppm	0.5 ppm	0.1 ppm	0.5 ppm	0.2 ppm	1 ppm	0.2 ppm	1 ppm	1 ppb	2 ppm
Sample ID	**Rock type**	**INAA**	**MULT INAA / TD-ICP**	**INAA**	**FUS-ICP**	**FUS-ICP**	**TD-ICP**	**INAA**	**TD-ICP**	**INAA**	**INAA**	**INAA**	**TD-ICP**	**INAA**	**INAA**	**INAA**	**TD-ICP**
ER-2	Vol	< 1	< 0.5	15	24	< 1	< 2	< 0.5	< 0.5	51.4	349.0	< 0.2	2	4.4	< 1	< 1	< 2
ER-4	Vol	3	< 0.5	< 1	434	2	< 2	< 0.5	< 0.5	28.6	279.0	2.0	17	4.9	< 1	< 1	< 2
ER-6	Vol	< 1	< 0.5	< 1	819	< 1	< 2	< 0.5	< 0.5	62.6	281.0	5.5	70	2.4	< 1	< 1	< 2
ER-8	Vol	< 1	< 0.5	< 1	376	< 1	< 2	< 0.5	< 0.5	49.1	373.0	6.9	62	2.3	< 1	< 1	< 2
ER-10	Vol	< 1	< 0.5	5	232	< 1	< 2	< 0.5	< 0.5	42.6	234.0	1.5	76	2.1	< 1	< 1	< 2
ER-12	Vol	1	< 0.5	< 1	62	< 1	< 2	< 0.5	< 0.5	23.0	168.0	< 0.2	298	2.6	< 1	< 1	< 2
ER-14	Vol	< 1	< 0.5	< 1	216	1	< 2	< 0.5	< 0.5	41.0	273.0	1.4	4	2.8	< 1	< 1	< 2
ER-15	Vol	< 1	< 0.5	< 1	346	1	2	< 0.5	< 0.5	39.1	211.0	1.6	19	2.8	< 1	< 1	< 2
ER-17	Vol	5	< 0.5	3	1911	2	< 2	< 0.5	< 0.5	42.3	403.0	11.9	414	5.3	< 1	< 1	< 2
ER-19	Vol	< 1	< 0.5	1	677	2	< 2	< 0.5	< 0.5	57.3	375.0	43.9	4	4.8	< 1	< 1	< 2
ER-20	Vol	< 1	< 0.5	< 1	744	1	< 2	< 0.5	< 0.5	53.1	429.0	122	< 1	5.1	< 1	< 1	< 2
09-61 184.60	Vol	< 1	< 0.5	< 1	969	< 1	< 2	< 0.5	< 0.5	68.3	345.0	23.3	34	2.4	< 1	< 1	< 2
08-07 29.00	Vol	< 1	< 0.5	< 1	766	< 1	< 2	< 0.5	< 0.5	51.2	305.0	15.2	7	2.2	< 1	< 1	< 2
08-07 117.49	Vol	< 1	< 0.5	< 1	1186	1	< 2	< 0.5	< 0.5	66.8	380.0	6.2	76	4.1	< 1	< 1	< 2
09-64 121.00	Vol	< 1	< 0.5	< 1	549	1	< 2	< 0.5	< 0.5	63.5	439.0	2.5	6	3.2	< 1	< 1	< 2
10-99 5.50	Vol	4	< 0.5	4	2967	3	< 2	< 0.5	< 0.5	33.9	225.0	13.4	43	7.0	< 1	< 1	< 2
10-99 284.50	Vol	< 1	< 0.5	< 1	1016	2	< 2	< 0.5	< 0.5	22.5	72.8	22.5	< 1	6.5	< 1	< 1	< 2
09-64 135.10	Vol	2	< 0.5	< 1	2117	2	< 2	< 0.5	< 0.5	53.9	188.0	6.6	< 1	6.8	< 1	< 1	< 2
ER-1	Lst	< 1	< 0.5	3	180	< 1	< 2	0.8	< 0.5	6.9	68.0	1.4	7	1.4	< 1	< 1	< 2
ER-3	Lst	< 1	< 0.5	3	93	< 1	< 2	< 0.5	< 0.5	1.0	2.4	< 0.2	3	< 0.2	< 1	< 1	< 2
ER-5	Lst	10	< 0.5	< 1	75	< 1	< 2	0.8	< 0.5	0.5	< 0.5	< 0.2	3	< 0.2	< 1	< 1	3
ER-7	Lst	35	< 0.5	< 1	36	< 1	< 2	< 0.5	< 0.5	0.9	5.0	< 0.2	4	< 0.2	< 1	< 1	< 2
ER-16	Lst	< 1	< 0.5	3	26	< 1	< 2	< 0.5	< 0.5	1.1	2.5	< 0.2	4	< 0.2	< 1	< 1	2
ER-18	Lst	< 1	< 0.5	4	61	< 1	< 2	< 0.5	< 0.5	1.6	15.0	< 0.2	6	0.5	< 1	< 1	< 2
10-99 578.80	Lep	< 1	< 0.5	1	6636	3	< 2	< 0.5	0.6	44.1	231.0	11.0	299	7.8	< 1	< 1	< 2
10-73 469.39	Lep	< 1	< 0.5	< 1	1608	1	< 2	< 0.5	< 0.5	45.5	37.0	20.0	4	4.5	< 1	< 1	< 2
08-07 246.65	Lep	8	< 0.5	< 1	569	1	< 2	< 0.5	< 0.5	41.9	39.0	8.8	31	3.8	< 1	< 1	< 2

Whole-rock. Cont.

		Ni	Pb	Rb	Sb	S	Sc	Se	Sr	Ta	Th	U	V
		1 ppm	5 ppm	10 ppm	0.1 ppm	0.001 %	0.01 ppm	0.5 ppm	2 ppm	0.3 ppm	0.1 ppm	0.1 ppm	5 ppm
Sample ID	**Rock type**	**TD-ICP**	**TD-ICP**	**INAA**	**INAA**	**TD-ICP**	**INAA**	**INAA**	**FUS-ICP**	**INAA**	**INAA**	**INAA**	**FUS-ICP**
ER-2	Vol	248	< 5	< 10	< 0.1	0.004	23.10	< 0.5	105	2.9	6.8	2.3	96
ER-4	Vol	185	< 5	30	< 0.1	0.005	17.60	< 0.5	113	3.0	7.3	1.4	134
ER-6	Vol	219	< 5	60	0.2	0.005	25.90	< 0.5	88	0.8	2.1	0.9	205
ER-8	Vol	237	< 5	40	0.2	0.005	24.50	< 0.5	42	1.3	3.0	0.8	148
ER-10	Vol	154	< 5	40	0.4	0.037	23.30	< 0.5	114	< 0.3	1.8	< 0.1	178
ER-12	Vol	117	< 5	< 10	0.4	0.020	15.90	< 0.5	338	1.3	3.5	1.4	86
ER-14	Vol	139	< 5	< 10	< 0.1	0.004	21.40	< 0.5	729	< 0.3	3.1	< 0.1	137
ER-15	Vol	113	< 5	40	0.2	0.004	20.30	< 0.5	332	1.5	2.5	0.9	154
ER-17	Vol	388	< 5	90	0.6	0.019	23.80	< 0.5	19	3.6	7.8	1.4	151
ER-19	Vol	318	< 5	210	1.1	0.005	24.80	< 0.5	33	2.9	7.3	0.8	102
ER-20	Vol	392	< 5	750	2.4	0.030	26.20	< 0.5	27	3.0	6.6	1.3	122
09-61 184.60	Vol	257	< 5	90	0.7	0.035	25.00	< 0.5	85	< 0.3	1.9	0.6	216
08-07 29.00	Vol	216	< 5	60	0.2	0.050	24.40	< 0.5	84	< 0.3	1.7	< 0.1	200
08-07 117.49	Vol	251	< 5	60	0.3	0.015	26.70	< 0.5	174	2.0	3.7	1.4	320
09-64 121.00	Vol	281	< 5	< 10	0.3	0.005	29.60	< 0.5	219	1.4	3.4	< 0.1	307
10-99 5.50	Vol	54	< 5	140	0.7	0.417	18.50	< 0.5	44	5.0	8.4	1.9	276
10-99 284.50	Vol	104	9	160	0.6	0.008	17.40	< 0.5	25	3.5	5.1	< 0.1	187
09-64 135.10	Vol	201	< 5	110	0.7	0.004	21.50	< 0.5	108	4.9	10.2	1.6	184
ER-1	Lst	29	< 5	30	0.2	0.059	4.60	< 0.5	942	0.8	1.9	1.0	46
ER-3	Lst	4	< 5	< 10	< 0.1	0.012	0.31	< 0.5	150	< 0.3	0.1	0.8	< 5
ER-5	Lst	3	< 5	< 10	< 0.1	0.003	0.30	< 0.5	106	< 0.3	< 0.1	0.6	9
ER-7	Lst	4	< 5	< 10	< 0.1	0.009	0.49	< 0.5	236	< 0.3	0.3	0.4	5
ER-16	Lst	2	< 5	< 10	< 0.1	0.011	0.30	< 0.5	173	< 0.3	< 0.1	0.3	8
ER-18	Lst	5	< 5	< 10	0.2	0.031	2.20	< 0.5	187	< 0.3	0.6	0.5	13
10-99 578.80	Lep	120	< 5	270	0.7	4.900	16.20	1.5	222	3.6	7.5	2.6	177
10-73 469.39	Lep	87	< 5	180	0.2	1.120	10.00	< 0.5	126	2.1	3.6	1.0	136
08-07 246.65	Lep	86	< 5	50	0.3	0.025	9.84	< 0.5	119	1.9	2.9	0.6	137

Whole-rock. Cont.

		W	Y	Zn	Zr	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
		1 ppm	1 ppm	1 ppm	2 ppm	0.05 ppm	1 ppm	1 ppm	0.01 ppm	0.05 ppm	0.1ppm	0.05 ppm	0.01 ppm	g
Sample ID	**Rock type**	**INAA**	**FUS-ICP**	**MULT INAA / TD-ICP**	**FUS-ICP**	**INAA**	**INAA**	**INAA**	**INAA**	**INAA**	**INAA**	**INAA**	**INAA**	**INAA**
ER-2	Vol	< 1	20	121	190	46.00	80	39	6.88	2.06	1.0	1.76	0.08	1.271
ER-4	Vol	< 1	25	79	202	49.50	84	38	6.59	2.09	< 0.1	1.96	0.09	1.249
ER-6	Vol	< 1	17	90	80	16.30	28	14	3.47	1.31	0.5	1.73	0.10	1.503
ER-8	Vol	< 1	14	89	95	20.50	39	16	3.97	1.33	< 0.1	1.49	0.13	1.223
ER-10	Vol	< 1	19	119	85	10.50	20	10	3.44	1.13	< 0.1	1.55	0.03	1.505
ER-12	Vol	< 1	25	63	115	31.90	58	28	5.99	1.59	0.9	1.30	< 0.01	1.457
ER-14	Vol	< 1	19	78	109	21.80	36	16	4.31	1.61	0.8	1.42	0.08	1.513
ER-15	Vol	< 1	17	85	104	17.80	29	14	3.92	1.56	0.6	1.52	0.09	1.523
ER-17	Vol	< 1	28	98	201	51.50	86	44	8.29	2.42	1.3	2.13	0.19	1.228
ER-19	Vol	< 1	20	126	212	50.90	84	38	7.43	2.24	0.9	1.66	0.11	1.266
ER-20	Vol	< 1	24	121	203	45.80	74	40	7.91	2.30	1.1	2.00	0.13	1.270
09-61 184.60	Vol	< 1	16	95	86	18.10	33	18	3.76	1.36	0.4	1.48	0.08	1.519
08-07 29.00	Vol	< 1	17	82	79	13.90	25	11	3.38	1.27	< 0.1	1.60	0.04	1.472
08-07 117.49	Vol	< 1	21	153	172	31.60	55	28	6.22	2.02	0.8	1.61	< 0.01	1.681
09-64 121.00	Vol	< 1	20	117	142	25.60	44	23	5.16	1.64	1.0	1.60	0.01	1.603
10-99 5.50	Vol	< 1	44	60	322	97.90	184	78	13.5	4.63	1.9	3.49	0.34	1.506
10-99 284.50	Vol	4	15	78	315	56.90	101	49	8.63	3.24	0.9	1.16	< 0.01	1.700
09-64 135.10	Vol	< 1	41	84	336	84.50	139	59	11.4	3.84	1.4	3.36	0.32	1.492
ER-1	Lst	< 1	8	45	63	10.90	18	10	1.88	0.61	0.4	0.59	< 0.01	1.511
ER-3	Lst	< 1	2	5	5	1.25	< 1	3	0.13	0.08	< 0.1	0.06	< 0.01	1.774
ER-5	Lst	< 1	2	40	4	1.98	3	< 1	0.22	< 0.05	< 0.1	< 0.05	< 0.01	1.419
ER-7	Lst	< 1	3	4	4	3.06	4	< 1	0.32	0.14	< 0.1	0.11	< 0.01	1.547
ER-16	Lst	< 1	5	3	3	4.34	4	3	0.40	0.14	< 0.1	0.21	< 0.01	1.768
ER-18	Lst	< 1	16	2	22	9.30	20	5	1.75	0.61	0.4	1.00	< 0.01	1.536
10-99 578.80	Lep	9	35	40	346	43.80	85	41	9.26	2.41	1.4	2.70	0.28	1.779
10-73 469.39	Lep	< 1	16	18	192	42.50	75	33	6.96	2.46	0.9	1.15	< 0.01	1.611
08-07 246.65	Lep	< 1	14	43	172	33.60	61	30	6.26	2.21	0.8	0.88	< 0.01	1.565

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Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	LOI	Total	Au	Ag	Ag	As
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	ppb	ppm	ppm	ppm
Detection Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01		0.01	1	0.5	5	1
Analysis Method	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	INAA	TD-ICP	INAA	INAA
GXR-1 Meas													3230	32.1	31	428
GXR-1 Cert													3300	31	31	427
NIST 694 Meas	11.17	1.88	0.76	0.01	0.35	43.46	0.87	0.53	0.116	30.16						
NIST 694 Cert	11.2	1.8	0.79	0.0116	0.33	43.6	0.86	0.51	0.11	30.2						
DNC-1 Meas	46.65	18.52	9.89	0.148	10.08	11.37	1.89	0.22	0.485	0.08						
DNC-1 Cert	47.15	18.34	9.97	0.15	10.13	11.49	1.89	0.234	0.48	0.07						
GBW 07113 Meas	71.52	12.93	3.32	0.138	0.15	0.6	2.52	5.42	0.286	0.07						
GBW 07113 Cert	72.8	13	3.21	0.14	0.16	0.59	2.57	5.43	0.3	0.05						
GXR-4 Meas														3.6		
GXR-4 Cert														4		
SDC-1 Meas														< 0.5		
SDC-1 Cert														0.041		
SCO-1 Meas														< 0.5		
SCO-1 Cert														0.134		
GXR-6 Meas														< 0.5		
GXR-6 Cert														1.3		
NIST 1633b Meas	48.98	28.56	10.84	0.019	0.77	2.1	0.27	2.37	1.292	0.56						
NIST 1633b Cert	49.2	28.4	11.1	0.02	0.8	2.11	0.27	2.35	1.32	0.53						
W-2a Meas	52.61	15.14	10.9	0.169	6.29	11	2.18	0.61	1.078	0.14						
W-2a Cert	52.4	15.4	10.7	0.163	6.37	10.9	2.14	0.626	1.06	0.13						
SY-4 Meas	49.57	20.33	6.21	0.106	0.51	8.06	6.94	1.65	0.287	0.14						
SY-4 Cert	49.9	20.69	6.21	0.108	0.54	8.05	7.1	1.66	0.287	0.131						
BIR-1a Meas	48.04	15.61	11.28	0.173	9.55	13.14	1.83	0.02	0.968	0.02						
BIR-1a Cert	47.8	15.4	11.3	0.171	9.68	13.2	1.75	0.03	0.96	0.05						
DNC-1a Meas																
DNC-1a Cert																
OREAS 13b (4-Acid) Meas														1.1		
OREAS 13b (4-Acid) Cert														0.86		
G285305 Orig	0.3	0.12	0.11	0.021	0.9	54.46	< 0.01	0.03	0.01	< 0.01	43.58	99.55				
G285305 Dup	0.29	0.12	0.11	0.021	0.9	55.1	< 0.01	0.02	0.009	0.02	43.58	100.2				
G285308 Orig														< 0.5		
G285308 Dup														< 0.5		
G285322 Orig	28.7	9.37	7.21	0.109	4.68	24.82	0.44	2.96	2.065	0.53	15	95.87				
G285322 Dup	28.76	9.24	7.39	0.108	4.68	24.96	0.44	2.96	2.069	0.52	15	96.14				
Method Blank Method Blank														< 0.5		
Method Blank Method Blank														< 0.5		
Method Blank Method Blank														< 0.5		
Method Blank Method Blank														< 0.5		
Method Blank Method Blank													< 1		< 5	< 1

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Analyte Symbol	Ba	Be	Bi	Br	Cd	Co	Cr	Cs	Cu	Hf	Hg	Ir	Mo	Ni	Pb	Rb	Sb	S	Sc	Se
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm
Detection Limit	1	1	2	0.5	0.5	0.1	0.5	0.2	1	0.2	1	1	2	1	5	10	0.1	0.001	0.01	0.5
Analysis Method	FUS-ICP	FUS-ICP	TD-ICP	INAA	TD-ICP	INAA	INAA	INAA	TD-ICP	INAA	INAA	INAA	TD-ICP	TD-ICP	TD-ICP	INAA	INAA	TD-ICP	INAA	INAA
GXR-1 Meas			1410	1.3	3.2	8.3	11.6	4	1160	1	< 1		16	41	742	< 10	122	0.236	1.59	14.4
GXR-1 Cert			1380	0.5	3.3	8.2	12	3	1110	0.96	3.9		18	41	730	14	122	0.257	1.58	16.6
NIST 694 Meas																				
NIST 694 Cert																				
DNC-1 Meas	105																			
DNC-1 Cert	118																			
GBW 07113 Meas	486	4																		
GBW 07113 Cert	506	4																		
GXR-4 Meas			29		< 0.5				6600				314	53	57			1.82		
GXR-4 Cert			19		0.86				6520				310	42	52			1.77		
SDC-1 Meas			< 2		< 0.5				30				< 2	37	29			0.085		
SDC-1 Cert			2.6		0.08				30				0.25	38	25			0.065		
SCO-1 Meas			< 2		< 0.5				29				< 2	32	26					
SCO-1 Cert			0.37		0.14				28.7				1.37	27	31					
GXR-6 Meas			< 2		< 0.5				72				4	30	99			0.016		
GXR-6 Cert			0.29		1				66				2.4	27	101			0.016		
NIST 1633b Meas	704																			
NIST 1633b Cert	709																			
W-2a Meas	171	< 1																		
W-2a Cert	182	1.3																		
SY-4 Meas	333	3																		
SY-4 Cert	340	2.6																		
BIR-1a Meas	8	< 1																		
BIR-1a Cert	7	0.58																		
DNC-1a Meas									101					247						
DNC-1a Cert									100					247						
OREAS 13b (4-Acid) Meas									2400				8	2110				1.13		
OREAS 13b (4-Acid) Cert									2327				9	2247				1.2		
G285305 Orig	75	< 1																		
G285305 Dup	75	< 1																		
G285308 Orig			< 2		< 0.5				61				< 2	228	< 5			0.005		
G285308 Dup			< 2		< 0.5				63				< 2	246	< 5			0.004		
G285322 Orig	1599	1																		
G285322 Dup	1617	1																		
Method Blank Method Blank			< 2		< 0.5				< 1				< 2	< 1	< 5			< 0.001		
Method Blank Method Blank			< 2		< 0.5				< 1				< 2	< 1	< 5			< 0.001		
Method Blank Method Blank			< 2		< 0.5				< 1				< 2	< 1	< 5			< 0.001		
Method Blank Method Blank			< 2		< 0.5				< 1				< 2	< 1	< 5			< 0.001		
Method Blank Method Blank				< 0.5		< 0.1	< 0.5	< 0.2		< 0.2	< 1	< 1				< 10	< 0.1		< 0.01	< 0.5

Final Report
Activation Laboratories

Analyte Symbol	Sr	Ta	Th	U	V	W	Y	Zn	Zn	Zr	La	Ce	Nd	Sm	Eu	Tb	Yb	Lu	Mass
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	g
Detection Limit	2	0.3	0.1	0.1	5	1	1	1	50	2	0.05	1	1	0.01	0.05	0.1	0.05	0.01	
Analysis Method	FUS-ICP	INAA	INAA	INAA	FUS-ICP	INAA	FUS-ICP	TD-ICP	INAA	FUS-ICP	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA
GXR-1 Meas		< 0.3	2.4	31.7		174		746	740		7.98	18	16	3.28	< 0.05	0.8	2.15	0.28	
GXR-1 Cert		0.175	2.44	34.9		164		760	760		7.5	17	18	2.7	0.69	0.83	1.9	0.28	
NIST 694 Meas					1676														
NIST 694 Cert					1740														
DNC-1 Meas	143				158		16			35									
DNC-1 Cert	144				148		18			38									
GBW 07113 Meas	48				< 5		47			392									
GBW 07113 Cert	43				5		43			403									
GXR-4 Meas								85											
GXR-4 Cert								73											
SDC-1 Meas								102											
SDC-1 Cert								103											
SCO-1 Meas								97											
SCO-1 Cert								103											
GXR-6 Meas								133											
GXR-6 Cert								118											
NIST 1633b Meas	1042				302														
NIST 1633b Cert	1040				296														
W-2a Meas	194				281		20			89									
W-2a Cert	190				262		24			94									
SY-4 Meas	1189				< 5		119			559									
SY-4 Cert	1191				8		119			517									
BIR-1a Meas	107				339		14			16									
BIR-1a Cert	108				313		16			16									
DNC-1a Meas								58											
DNC-1a Cert								70											
OREAS 13b (4-Acid) Meas								111											
OREAS 13b (4-Acid) Cert								133											
G285305 Orig	106				8		2			4									
G285305 Dup	107				9		2			4									
G285308 Orig								88											
G285308 Dup								91											
G285322 Orig	127				135		16			191									
G285322 Dup	126				138		16			193									
Method Blank Method Blank								< 1											
Method Blank Method Blank								< 1											
Method Blank Method Blank								< 1											
Method Blank Method Blank								1											
Method Blank Method Blank		< 0.3	< 0.1	< 0.1		< 1			< 50		< 0.05	< 1	< 1	< 0.01	< 0.05	< 0.1	< 0.05	< 0.01	1

APPENDIX D

All microthermometric data

Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
08-04 145.59	Lw+Lc	1	Dol-1	Stage 1	P	-56.6	28					**365**		0.50	0.50	0.00
08-04 145.59	Lw+Lc	1	Dol-1	Stage 1	P	-56.6	28					**365**		0.50	0.50	0.00
08-04 145.59	Lw+Lc	1	Dol-1	Stage 1	P	-56.6	28					**365**		0.40	0.60	0.00
08-04 145.59	Lw+Lc	1	Dol-1	Stage 1	P	-56.3	29	-39						0.70	0.30	0.00
08-04 145.59	Lw+Lc	1	Dol-1	Stage 1	P	-56.3	29							0.70	0.30	0.00
08-04 145.59	Lw+Lc	1	Dol-1	Stage 1	P	-56.3	29						**397**	0.50	0.50	0.00
08-04 145.59	Lw+Lc	1	Dol-1	Stage 1	P	-56.2	29					**365**		0.70	0.30	0.00
08-04 145.59	Lw+Lc	1	Dol-1	Stage 1	P								**415**	0.50	0.50	0.00
08-04 145.59	Lw+Lc	1	Dol-1	Stage 1	P									0.50	0.50	0.00
08-04 145.59	Lw+Lc+Sh	1	Dol-1	Stage 1	P	-56.3	28			**45**	380			0.50	0.49	0.01
08-04 145.59	Lc+Lw	19	Dol-1	Stage 1	P	-56.8	15					**220**		0.30	0.70	0.00
08-04 145.59	Lc+Lw	19	Dol-1	Stage 1	P	-56.8	15							0.30	0.70	0.00
08-04 145.59	Lc+Lw	19	Dol-1	Stage 1	P	-56.6	22							0.40	0.60	0.00
08-04 145.59	Lc+Lw	19	Dol-1	Stage 1	P	-56.6	15					**290**		0.30	0.70	0.00
08-04 145.59	Lc+Lw	19	Dol-1	Stage 1	P									0.30	0.70	0.00
08-04 145.59	Lc+Lw	19	Dol-1	Stage 1	P		12					**290**		0.30	0.70	0.00
08-04 145.59	Lw+Lc	19	Dol-1	Stage 1	P	-56.6	20							0.40	0.60	0.00
08-04 145.59	Lw+Lc	19	Dol-1	Stage 1	P	-56.3	28 v	-35	-23	**24**				0.70	0.30	0.00
08-04 145.59	Lw+Lc+Sh	19	Dol-1	Stage 1	P	-65	29 v							0.85	0.10	0.05
08-04 145.59	Lw+Lc+Sh	19	Dol-1	Stage 1	P	-56.6	28	-35	-23	**24**				0.45	0.50	0.05
08-04 145.59	Lw+Lc+Sh	19	Dol-1	Stage 1	P	-56.6	25							0.65	0.30	0.05
08-04 145.59	Lw+Lc+Sh	19	Dol-1	Stage 1	P	-56.4	27							0.65	0.30	0.05
08-04 145.59	Lw+Lc+Sh	19	Dol-1	Stage 1	P	-56.4	27							0.65	0.30	0.05
08-04 145.59	Lw+Lc+Sh	19	Dol-1	Stage 1	P	-56.4	25 v			**37**	280	**290**		0.75	0.20	0.05
08-04 145.59	Lw+Lc+Sh	19	Dol-1	Stage 1	P									0.65	0.30	0.05
08-04 145.59	Lw+Lc+Sh	19	Dol-1	Stage 1	P									0.65	0.30	0.05
08-04 145.59	Lw+Lc+Sh	19	Dol-1	Stage 1	P		25 v					**320**		0.65	0.30	0.05
08-04 145.59	Lw+Lc+Sh+So	19	Dol-1	Stage 1	P	-65	30 v							0.85	0.10	0.05
08-04 145.59	Lw+Lc+Sh+So	19	Dol-1	Stage 1	P	-57.9	22 v					**250**		0.75	0.20	0.05
08-04 145.59	Lw+Lc+Sh+So	19	Dol-1	Stage 1	P	-56.4	25	-30	-8	**12**		**360**		0.75	0.20	0.05
09-59 111.30	Lw+Lc	20	Dol-1	Stage 1	P	-57								0.70	0.30	0.00
09-59 111.30	Lw+Lc	20	Dol-1	Stage 1	P									0.70	0.30	0.00
09-59 111.30	Lw+Lc	20	Dol-1	Stage 1	P									0.70	0.30	0.00
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P	-60								0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P	-60								0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P	-57		-35	-23	**24**				0.75	0.20	0.05
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P									0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P									0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P									0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P			-35	-22	**24**				0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P									0.65	0.30	0.05

Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P									0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P									0.85	0.10	0.05
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P			-35	-22	**24**				0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P									0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	20	Dol-1	Stage 1	P									0.65	0.30	0.05
09-59 111.30	Lw+Lc	21	Dol-1	Stage 1	P							**290**		0.70	0.30	0.00
09-59 111.30	Lw+Lc+Sh	21	Dol-1	Stage 1	P			-35	-22	**31**	188	**340**		0.60	0.30	0.10
09-59 111.30	Lw+Lc+Sh	21	Dol-1	Stage 1	P					**32**	194			0.70	0.20	0.10
09-59 111.30	Lw+Lc+Sh	21	Dol-1	Stage 1	P			-30	-22	**29**	130	**340**		0.60	0.30	0.10
09-59 111.30	Lw+Lc+Sh	21	Dol-1	Stage 1	P									0.60	0.30	0.10
09-59 111.30	Lw+Lc+Sh	21	Dol-1	Stage 1	P									0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	21	Dol-1	Stage 1	P									0.65	0.30	0.05
09-59 111.30	Lc+Lw	22	Dol-1	Stage 1	P	-56.4	23							0.20	0.80	0.00
09-59 111.30	Lw+Lc	22	Dol-1	Stage 1	P									0.90	0.10	0.00
09-59 111.30	Lw+Lc	22	Dol-1	Stage 1	P									0.90	0.10	0.00
09-59 111.30	Lw+Lc	22	Dol-1	Stage 1	P									0.90	0.10	0.00
09-59 111.30	Lw+Lc+Sh	22	Dol-1	Stage 1	P	-56.4	29 v	-35		**35**	250			0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	22	Dol-1	Stage 1	P	-56.4	30 v	-35		**35**	250			0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	22	Dol-1	Stage 1	P	-56.4				**31**	182			0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	22	Dol-1	Stage 1	P			-45		**35**	250			0.60	0.30	0.10
09-59 111.30	Lw+Lc+Sh	22	Dol-1	Stage 1	P									0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	22	Dol-1	Stage 1	P			-30		**32**	198			0.75	0.20	0.05
09-59 111.30	Lw+Lc+Sh+So	22	Dol-1	Stage 1	P	-56.4		-35		**35**	250			0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh+So	22	Dol-1	Stage 1	P	-56.4	30 v	-35		**35**	250			0.65	0.30	0.05
09-59 111.30	Lw+Lc	23	Dol-1	Stage 1	P	-56.4	30 v							0.70	0.30	
09-59 111.30	Lw+Lc	23	Dol-1	Stage 1	P	-56.4	27							0.70	0.30	
09-59 111.30	Lw+Lc	23	Dol-1	Stage 1	P	-56.4	30							0.70	0.30	
09-59 111.30	Lw+Lc	23	Dol-1	Stage 1	P	-56.4	30	-5	0					0.70	0.30	
09-59 111.30	Lw+Lc	23	Dol-1	Stage 1	P	-56.4	30 v							0.70	0.30	
09-59 111.30	Lw+Lc	23	Dol-1	Stage 1	P	-56.4	29							0.75	0.20	0.05
09-59 111.30	Lw+Lc	23	Dol-1	Stage 1	P	-56.4	28 v	-25	-15	**19**				0.80	0.20	
09-59 111.30	Lw+Lc	23	Dol-1	Stage 1	P	-56.4	29 v							0.80	0.20	
09-59 111.30	Lw+Lc	23	Dol-1	Stage 1	P									0.70	0.30	
09-59 111.30	Lw+Lc+Sh	23	Dol-1	Stage 1	P	-56.4								0.80	0.10	0.10
09-59 111.30	Lw+Lc+Sh	23	Dol-1	Stage 1	P	-56.4								0.50	0.30	0.20
09-59 111.30	Lw+Lc+Sh	23	Dol-1	Stage 1	P	-56.4	29							0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	23	Dol-1	Stage 1	P	-56.4	29							0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	23	Dol-1	Stage 1	P	-56.4	29							0.65	0.30	0.05
09-59 111.30	Lw+Lc+Sh	23	Dol-1	Stage 1	P	-56.4								0.70	0.20	0.10
09-59 111.30	Lw+Lc+Sh	23	Dol-1	Stage 1	P									0.85	0.10	0.05
08-04 136.45	Lc+Lw	30	Dol-1	Stage 1	P	-57.4	11					**250**		0.20	0.80	0.00

Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
08-04 136.45	Lc+Lw	30	Dol-1	Stage 1	P	-57.4	10					**300**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	30	Dol-1	Stage 1	P	-57.4	12					**300**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	30	Dol-1	Stage 1	P	-57.4	12					**350**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	30	Dol-1	Stage 1	P	-57.2	15					**230**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	30	Dol-1	Stage 1	P	-56.6	15					**250**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	31	Dol-1	Stage 1	P	-56.7	21					**420**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	31	Dol-1	Stage 1	P	-56.6	17							0.20	0.80	0.00
08-04 136.45	Lc+Lw	31	Dol-1	Stage 1	P	-56.6	18					**330**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	31	Dol-1	Stage 1	P	-56.6	17							0.20	0.80	0.00
08-04 136.45	Lc+Lw	31	Dol-1	Stage 1	P	-56.6	21							0.20	0.80	0.00
08-04 136.45	Lc+Lw	31	Dol-1	Stage 1	P	-56.6	22					**330**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	31	Dol-1	Stage 1	P	-56.6	21					**300**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	31	Dol-1	Stage 1	P	-56.6	21					**300**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	31	Dol-1	Stage 1	P	-56.6	21					**300**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	31	Dol-1	Stage 1	P	-56.6	22					**300**		0.20	0.80	0.00
08-04 136.45	Lc+Lw	31	Dol-1	Stage 1	P	-56.6	18					**340**		0.20	0.80	0.00
08-04 136.45	Lw+Lc	31	Dol-1	Stage 1	P	-56.7	28					**440**		0.70	0.30	0.00
08-04 136.45	Lw+Lc	31	Dol-1	Stage 1	P	-56.6	27					**340**		0.70	0.30	0.00
08-04 136.45	Lw+Lc	31	Dol-1	Stage 1	P	-56.6	18					**300**		0.70	0.30	0.00
08-04 136.45	Lw+Lc	31	Dol-1	Stage 1	P	-56.6	29					**315**		0.70	0.30	0.00
08-04 136.45	Lw+Lc+Sh+So	31	Dol-1	Stage 1	P	-56.6				**33**	215			0.85	0.10	0.05
08-04 136.45	Lw+Lc+Sh+So	31	Dol-1	Stage 1	P					**32**	211	**320**		0.85	0.10	0.05
08-04 163.64	Lc+Lw	24	Dol-2b	Stage 1	P	-56.9	17					**280**		0.20	0.80	0.00
08-04 163.64	Lc+Lw	24	Dol-2b	Stage 1	P	-56.6	9					**330**		0.10	0.90	0.00
08-04 163.64	Lc+Lw	24	Dol-2b	Stage 1	P	-56.6	6					**250**		0.10	0.90	0.00
08-04 163.64	Lc+Lw	24	Dol-2b	Stage 1	P	-56.6	15					**310**		0.10	0.90	0.00
08-04 163.64	Lc+Lw	24	Dol-2b	Stage 1	P	-56.6	7					**270**		0.10	0.90	0.00
08-04 163.64	Lc+Lw	24	Dol-2b	Stage 1	P	-56.6	9					**260**		0.10	0.90	0.00
08-04 163.64	Lc+Lw	24	Dol-2b	Stage 1	P	-56.6	5					**324**		0.10	0.90	0.00
08-04 163.64	Lc+Lw	24	Dol-2b	Stage 1	P	-56.6	4					**295**		0.10	0.90	0.00
08-04 163.64	Lc+Lw	24	Dol-2b	Stage 1	P	-56.5	14					**250**		0.10	0.90	0.00
08-04 163.64	Lw+Lc+Sh	24	Dol-2b	Stage 1	P	-56.6	27.3	-35	15	**19**		**280**		0.69	0.30	0.01
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	17					**250**		0.20	0.80	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	12					**250**		0.20	0.80	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	18					**250**		0.25	0.75	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	15					**250**		0.20	0.80	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	27					**220**		0.90	0.10	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	10					**300**		0.20	0.80	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	10					**300**		0.20	0.80	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	20					**230**		0.20	0.80	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	20							0.20	0.80	0.00

Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	18							0.20	0.80	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	20							0.20	0.80	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	19		9	**13**				0.20	0.80	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.6	18		9	**13**				0.20	0.80	0.00
08-04 163.64	Lc+Lw	25	Dol-2b	Stage 2b	P	-56.4	26 v	-23	13.8	**18**						
08-04 163.64	Lw+Lc+Sh	25	Dol-2b	Stage 2b	P	-56.6	23 v	-35		**38**	295			0.89	0.10	0.01
08-04 163.64	Lw+Lc+Sh	25	Dol-2b	Stage 2b	P	-56.6	29			**38**	300			0.65	0.30	0.05
08-04 163.64	Lw+Lc+Sh	25	Dol-2b	Stage 2b	P	-56.6	24			**35**	253			0.70	0.20	0.10
08-04 163.64	Lc+Lw	26	Dol-2b	Stage 2b	P	-57	3							0.20	0.80	0.00
08-04 163.64	Lc+Lw	26	Dol-2b	Stage 2b	P	-56.6	16							0.20	0.80	0.00
08-04 163.64	Lc+Lw	26	Dol-2b	Stage 2b	P	-56.6	16							0.20	0.80	0.00
08-04 163.64	Lc+Lw	26	Dol-2b	Stage 2b	P	-56.6	16							0.20	0.80	0.00
08-04 163.64	Lc+Lw	26	Dol-2b	Stage 2b	P	-56.6	16							0.20	0.80	0.00
08-04 163.64	Lc+Lw	26	Dol-2b	Stage 2b	P	-56.6	16							0.20	0.80	0.00
08-04 163.64	Lc+Lw	26	Dol-2b	Stage 2b	P	-56.6	16							0.20	0.80	0.00
08-04 163.64	Lc+Lw	26	Dol-2b	Stage 2b	P	-56.6	8							0.20	0.80	0.00
08-04 163.64	Lc+Lw	26	Dol-2b	Stage 2b	P	-56.6	12							0.20	0.80	0.00
08-04 163.64	Lc+Lw	26	Dol-2b	Stage 2b	P	-56.6	6							0.20	0.80	0.00
08-04 163.64	Lc+Lw	26	Dol-2b	Stage 2b	P	-56.6	9					**241**		0.20	0.80	0.00
08-04 163.64	Lw+Lc	26	Dol-2b	Stage 2b	P	-56.6	27	-35	-15	**19**				0.70	0.30	0.00
08-04 163.64	Lw+Lc	26	Dol-2b	Stage 2b	P	-56.6	27							0.70	0.30	0.00
08-04 163.64	Lw+Lc	26	Dol-2b	Stage 2b	P	-56.6	18							0.70	0.30	0.00
08-04 163.64	Lw+Lc	26	Dol-2b	Stage 2b	P	-56.6	12							0.70	0.30	0.00
08-04 163.64	Lw+Lc+Sh	26	Dol-2b	Stage 2b	P	-56.6	27	-35	-20	**32**	206	**300**		0.60	0.30	0.10
08-04 163.64	Lw+Lc+Sh	26	Dol-2b	Stage 2b	P	-56.6	27			**32**	206	**320**		0.60	0.30	0.10
08-04 163.64	Lw+Lc+Sh	26	Dol-2b	Stage 2b	P	-56.6	22	-35	-20	**33**	230	**240**		0.60	0.30	0.10
08-04 163.64	Lw+Lc+Sh	26	Dol-2b	Stage 2b	P	-56.6	22	-35	20	**22**		**260**		0.60	0.30	0.10
08-04 163.64	Lw+Lc+Sh	26	Dol-2b	Stage 2b	P	-56.6	24			**32**	206	**330**		0.60	0.30	0.10
08-07 209.30	Lw+V	2	Qz-1	Stage 3b	Unk			-35					**268**	0.95	0.05	0.00
08-07 209.30	Lw+Lc+Sh	3	Qz-1	Stage 3b	P	-60	2.5	-10		**30**	163	**230**		0.50	0.45	0.05
08-04 111.66	Lc+Lw	4	Qz-1	Stage 3b	P	-57.7	25	-11						0.20	0.80	0.00
08-04 111.66	Lc+Lw	4	Qz-1	Stage 3b	P		25							0.20	0.80	0.00
08-04 111.66	Lw+Lc	4	Qz-1	Stage 3b	P	-57	25	-25					**350**	0.90	0.10	0.00
08-04 111.66	Lw+Lc	4	Qz-1	Stage 3b	P		23	-20						0.70	0.30	0.00
08-04 111.66	Lw+Lc+Sh	4	Qz-1	Stage 3b	P	-57.8	22	-17						0.89	0.10	0.01
08-04 111.66	Lw+Lc+Sh	4	Qz-1	Stage 3b	P	-57.7	22	-35					**278**	0.70	0.29	0.01
08-04 111.66	Lw+Lc+Sh	4	Qz-1	Stage 3b	P	-57.4	22	-25						0.89	0.10	0.01
08-04 111.66	Lw+Lc+Sh+So	4	Qz-1	Stage 3b	P	-56.8								0.89	0.10	0.01
08-04 111.66	Lw+Lc+Sh+So	4	Qz-1	Stage 3b	P		17					**400**		0.69	0.30	0.01
08-04 111.66	Lw+Lc+Sh+So	4	Qz-1	Stage 3b	P		17						**409**	0.69	0.30	0.01
08-04 111.66	Lw+Lc+Sh+So	4	Qz-1	Stage 3b	P		20						**411**	0.69	0.30	0.01

All microthermometric data for each fluid inclusion. All abbreveations are described in main text.

Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
08-04 111.66	Lw+Lc+Sh+So	4	Qz-1	Stage 3b	P		20					**400**		0.69	0.30	0.01
08-04 111.66	Lc+Lw	5	Qz-1	Stage 3b	P	-57.1	11.5					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	5	Qz-1	Stage 3b	P	-57.1	11.5					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	5	Qz-1	Stage 3b	P	-57.1	11.5					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	5	Qz-1	Stage 3b	P	-57.1	11.5					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	5	Qz-1	Stage 3b	P	-57.1	11.5					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	5	Qz-1	Stage 3b	P	-57.1	11.5					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	5	Qz-1	Stage 3b	P	-57.1	11.5					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	5	Qz-1	Stage 3b	P	-57.1	11.5					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	5	Qz-1	Stage 3b	P	-57.1	11.5					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	5	Qz-1	Stage 3b	P	-57.1	11.5					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	5	Qz-1	Stage 3b	P	-57.1	13.7					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	6	Qz-1	Stage 3b	P	-57.1	15					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	6	Qz-1	Stage 3b	P	-56.8	13	-25				**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	6	Qz-1	Stage 3b	P	-56.8	19	-25				**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	6	Qz-1	Stage 3b	P	-56.8	19	-25				**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	6	Qz-1	Stage 3b	P	-56.8	10	-25				**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	6	Qz-1	Stage 3b	P	-56.8	14.9	-25				**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	6	Qz-1	Stage 3b	P	-56.8	15.6	-24				**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	6	Qz-1	Stage 3b	P	-56.8	15.6					**300**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	6	Qz-1	Stage 3b	P	-56.8						**300**		0.20	0.80	0.00
08-04 111.66	Lw+Lc+Sh+So	6	Qz-1	Stage 3b	P	-56.4	28			**42**	350	**360**		0.65	0.30	0.05
08-04 111.66	Lw+Lc+Sh+So	6	Qz-1	Stage 3b	P	-56.4	28	-30		**43**	360	**360**		0.65	0.30	0.05
08-04 111.66	Lc+Lw	7	Qz-1	Stage 3b	P	-61.6	6					**400**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	7	Qz-1	Stage 3b	P	-61.1	2					**230**		0.20	0.80	0.00
08-04 111.66	Lc+Lw	7	Qz-1	Stage 3b	P	-61.1	2	-30				**400**		0.20	0.80	0.00
08-04 111.66	Lw+Lc+Sh	7	Qz-1	Stage 3b	P	-63	2	-24				**281**		0.70	0.20	0.10
08-04 111.66	Lw+Lc+Sh	7	Qz-1	Stage 3b	P	-61.5	2	-25		**30**	154	**430**		0.70	0.20	0.10
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	16.6	-20						0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	14	-20						0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	13.1	-20						0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	16.6	-20	-12	**16**				0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	17.5							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	16							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	20.3							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	16.3							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	16.7							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	18.9							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	16.3							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	18.1							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	17.1							0.20	0.80	0.00

All microthermometric data for each fluid inclusion. All abbreveations are described in main text.

Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	13.2							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	14.9							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	18.5							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6	16.7							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.6								0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.4	17.9							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS	-57.4	18.9							0.20	0.80	0.00
08-04 111.66	Lc+Lw	8	Qz-1	Stage 3b	PS		18.9							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-57.2	11.4							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-57.2	15.4							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-57.2	9.8							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-57.2								0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-57.2	10.6							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-57.1	6.2							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	10.7							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	10							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	11.4							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	11.3							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	12							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	10.4							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	10.4							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	9.6							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	10.2							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	9.5							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8								0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	8.5							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	8.5							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.8	7.2							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	9.8							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	10.7							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	9.3							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7								0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7								0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	9.7							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	8.8							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	7.3							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7								0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	7.3							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	11.2							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	12.5							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	10.2							0.20	0.80	0.00

All microthermometric data for each fluid inclusion. All abbreveations are described in main text.

Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	9.6							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.7	9.6							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.6	11							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.6	11							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.6	11							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.6	11.2							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.6	11.2							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P	-56.6	10.5							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P									0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P		14.2							0.20	0.80	0.00
08-04 111.66	Lc+Lw	9	Qz-1	Stage 3b	P		10.5							0.20	0.80	0.00
08-04 111.66	Lc+Lw	10	Qz-1	Stage 3b	P	-57.2	6.7							0.20	0.80	0.00
08-04 111.66	Lc+Lw	10	Qz-1	Stage 3b	P	-57.2	6							0.20	0.80	0.00
08-04 111.66	Lc+Lw	10	Qz-1	Stage 3b	P	-57.2	7							0.20	0.80	0.00
08-04 111.66	Lc+Lw	10	Qz-1	Stage 3b	P	-57.2	7.1							0.20	0.80	0.00
08-04 111.66	Lc+Lw	10	Qz-1	Stage 3b	P	-57.2	6.6							0.20	0.80	0.00
08-04 111.66	Lc+Lw	10	Qz-1	Stage 3b	P	-57.2	7.1							0.20	0.80	0.00
08-04 111.66	Lc+Lw	10	Qz-1	Stage 3b	P	-57.2	5.7							0.20	0.80	0.00
08-04 111.66	Lc+Lw	10	Qz-1	Stage 3b	P	-57.2	6.9							0.20	0.80	0.00
08-04 111.66	Lc+Lw	10	Qz-1	Stage 3b	P	-57.2	6.1							0.20	0.80	0.00
08-04 111.66	Lw+Lc	10	Qz-1	Stage 3b	P	-57	19.5	-35						0.90	0.10	0.00
08-04 111.66	Lw+Lc	10	Qz-1	Stage 3b	P	-57	8.7	-30						0.50	0.50	0.00
08-04 111.66	Lw+Lc	10	Qz-1	Stage 3b	P									0.95	0.05	0.00
08-04 111.66	Lw+Lc+Sh	10	Qz-1	Stage 3b	P	-58.2	17	-26						0.94	0.05	0.01
08-04 111.66	Lw+Lc+Sh	10	Qz-1	Stage 3b	P									0.94	0.05	0.01
08-04 111.66	Lw+Lc+Sh+So	10	Qz-1	Stage 3b	P	-57.6	8.3	-30	2.7	**4**				0.19	0.80	0.01
08-07 209.30	Lc+Lw	11	Qz-1	Stage 3b	PS	-61.2	-1.3							0.20	0.80	0.00
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-60.8	8	-35						0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-60.8	8	-35						0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-60.3	3	-35						0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-60.3		-35						0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-60.3	5	-35						0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-60.3	7							0.80	0.18	0.02
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-60.1	10							0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-57.6	11	-35		**29**	130			0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-57.6	12	-35		**32**	200			0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-57.6	12	-35						0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-57.6	12	-35						0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-57.6	12	-35						0.80	0.15	0.05
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-56.8		-35						0.80	0.15	0.05
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-56.8		-35						0.80	0.15	0.05

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Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-56.8	12	-35						0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-56.8	10	-35						0.80	0.18	0.02
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS	-56.8		-35						0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS		10							0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS		10							0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS									0.80	0.19	0.01
08-07 209.30	Lw+Lc+Sh	11	Qz-1	Stage 3b	PS		7 to 9	-30	15	**19**						
10-76 429.68	Lc+Lw	12	Qz-1	Stage 3b	P	-57	8							0.60	0.40	0.00
10-76 429.68	Lc+Lw	12	Qz-1	Stage 3b	P	-56.9	25							0.70	0.30	0.00
10-76 429.68	Lc+Lw	12	Qz-1	Stage 3b	P	-56.9	26							0.70	0.30	0.00
10-76 429.68	Lc+Lw	12	Qz-1	Stage 3b	P	-56.9	25							0.70	0.30	0.00
10-76 429.68	Lc+Lw	12	Qz-1	Stage 3b	P	-56.7	25							0.30	0.70	0.00
10-76 429.68	Lc+Lw	12	Qz-1	Stage 3b	P	-56.7	27							0.30	0.70	0.00
10-76 429.68	Lc+Lw	12	Qz-1	Stage 3b	P	-56.6	23						**>300**	0.40	0.60	0.00
10-76 429.68	Lc+Lw	12	Qz-1	Stage 3b	P	-56.6	25						**>300**	0.40	0.60	0.00
10-76 429.68	Lc+Lw	12	Qz-1	Stage 3b	P	-56.6	23	-20						0.60	0.40	0.00
10-76 429.68	Lc+Lw	12	Qz-1	Stage 3b	P								**>300**	0.40	0.60	0.00
10-76 429.68	Lc+Lw	12	Qz-1	Stage 3b	P									0.50	0.50	0.00
10-76 429.68	Lw+Lc+nS	12	Qz-1	Stage 3b	P			-35		**32**	210		**200**	0.80	0.10	0.10
10-76 429.68	Lw+Lc+Sh	12	Qz-1	Stage 3b	P			-35	-20	**22**			**>300**	0.80	0.10	0.10
10-76 429.68	Lw+Lc+Sh	12	Qz-1	Stage 3b	P					**37**	288		**277**	0.80	0.10	0.10
10-76 429.68	Lw+Lc+Sh	12	Qz-1	Stage 3b	P			-35	-17.2	**32**	195			0.50	0.30	0.20
10-76 429.68	Lw+Lc+Sh	12	Qz-1	Stage 3b	P			-40		**32**	195					
10-76 429.68	Lw+Lc+Sh	12	Qz-1	Stage 3b	P									0.60	0.30	0.10
10-76 429.68	Lw+Lc+Sh+So	12	Qz-1	Stage 3b	P			-35	-20	**22**			**>300**	0.75	0.20	0.05
10-76 429.68	Lw+Lc+Sh+So	12	Qz-1	Stage 3b	P			-35	-20	**32**	195		**>300**	0.75	0.20	0.05
10-76 429.68	Lw+Lc+Sh+So	12	Qz-1	Stage 3b	P			-35	-20	**32**	195		**>300**	0.70	0.20	0.10
10-76 429.68	Lw+Lc+Sh+So	12	Qz-1	Stage 3b	P			-37.5	-24.4	**34**	238		**>300**	0.50	0.30	0.20
10-76 429.68	Lw+Lc+Sh+So	12	Qz-1	Stage 3b	P				-24.2	**31**	190			0.70	0.20	0.10
10-76 429.68	Lw+Lc+Sh+So	12	Qz-1	Stage 3b	P			-35	-13	**17**				0.70	0.30	0.00
10-76 429.68	Lw+Lc+Sh+So	12	Qz-1	Stage 3b	P			-40	-17.5	**32**	195			0.80	0.10	0.10
10-76 429.68	Lw+Lc+Sh+So	12	Qz-1	Stage 3b	P			-35		**33**	220			0.60	0.30	0.10
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.8	20							0.30	0.70	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.8	22							0.10	0.90	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.8	24							0.10	0.90	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.8	23							0.10	0.90	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.8	19							0.10	0.90	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.8	19							0.10	0.90	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.8	22							0.40	0.60	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.8	19							0.10	0.90	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.8	21							0.10	0.90	0.00

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Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.6	24							0.30	0.70	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.6	10							0.40	0.60	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.6	20							0.10	0.90	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.6	24							0.10	0.90	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.6	17							0.40	0.60	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.6	24							0.50	0.50	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.3	20							0.30	0.70	0.00
10-76 429.68	Lc+Lw	13	Qz-1	Stage 3b	P	-56.2	20							0.50	0.50	0.00
10-76 429.68	Lc+Lw+Sh	13	Qz-1	Stage 3b	P	-56.6	27							0.65	0.30	0.05
10-76 429.68	Lw+Lc	13	Qz-1	Stage 3b	P	-56.8	28							0.70	0.30	0.00
10-76 429.68	Lw+Lc	13	Qz-1	Stage 3b	P	-56.8	27							0.70	0.30	0.00
10-76 429.68	Lw+Lc	13	Qz-1	Stage 3b	P	-56.6	28							0.80	0.20	0.00
10-76 429.68	Lw+Lc	13	Qz-1	Stage 3b	P	-56.6	29							0.60	0.40	0.00
10-76 429.68	Lw+Lc+Sh	13	Qz-1	Stage 3b	P	-56.8								0.75	0.20	0.05
10-76 429.68	Lw+Lc+Sh	13	Qz-1	Stage 3b	P	-56.2	16							0.90	0.05	0.05
10-76 429.68	Lw+Lc+Sh	13	Qz-1	Stage 3b	P	-56.2	28	-32	-15	**19**				0.85	0.10	0.05
10-76 429.68	Lc+Lw	14	Qz-1	Stage 3b	P	-57.4								0.50	0.50	0.00
10-76 429.68	Lc+Lw	14	Qz-1	Stage 3b	P	-57.4	24							0.10	0.90	0.00
10-76 429.68	Lc+Lw	14	Qz-1	Stage 3b	P	-57.4	22							0.10	0.90	0.00
10-76 429.68	Lc+Lw	14	Qz-1	Stage 3b	P	-56.7	20							0.50	0.50	0.00
10-76 429.68	Lc+Lw	14	Qz-1	Stage 3b	P									0.10	0.90	0.00
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P	-57.4	25							0.65	0.30	0.05
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P	-56.6	23							0.65	0.30	0.05
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P					**33**	230			0.40	0.30	0.30
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P					**35**	250			0.80	0.10	0.10
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P			-30		**35**	250			0.80	0.10	0.10
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P					**34**	238			0.80	0.10	0.10
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P									0.90	0.05	0.05
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P			-40	-31	**29**			**250 v**	0.90	0.05	0.05
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P			-35	-23	**35**	250			0.80	0.10	0.10
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P			-35	-18	**32**	210			0.85	0.10	0.05
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P			-35		**35**	250			0.70	0.20	0.10
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P		16			**35**	250			0.90	0.05	0.05
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P			-35						0.70	0.20	0.10
10-76 429.68	Lw+Lc+Sh	14	Qz-1	Stage 3b	P			-35						0.85	0.10	0.05
10-76 429.68	Lw+Lc+Sh+So	14	Qz-1	Stage 3b	P	-56.6	25	-20						0.65	0.30	0.05
10-76 429.68	Lw+Lc+Sh+So	14	Qz-1	Stage 3b	P	-56.6	25							0.50	0.50	0.00
10-76 429.68	Lw+Lc+Sh+So	14	Qz-1	Stage 3b	P					**34**	238			0.80	0.10	0.10
10-76 429.68	Lw+Lc+Sh+So	14	Qz-1	Stage 3b	P			-30		**34**	238			0.80	0.10	0.10
10-76 429.68	Lw+Lc+Sh+So	14	Qz-1	Stage 3b	P			-35	-25	**35**	250			0.90	0.05	0.05
10-76 429.68	Lw+Lc+Sh+So	14	Qz-1	Stage 3b	P					**34**	238			0.90	0.05	0.05

All microthermometric data for each fluid inclusion. All abbreveations are described in main text.

Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
10-76 429.68	Lw+Lc+Sh+So	14	Qz-1	Stage 3b	P			-30		**34**	238			0.90	0.05	0.05
10-76 429.68	Lw+Lc+Sh+So	14	Qz-1	Stage 3b	P					**34**	238			0.90	0.05	0.05
10-76 429.68	Lw+Lc+Sh+So	14	Qz-1	Stage 3b	P			-30	-18	**34**	235			0.75	0.20	0.05
10-76 429.68	Lw+Lc+Sh+So	14	Qz-1	Stage 3b	P			-33	-20	**22**				0.70	0.20	0.10
10-76 429.68	Lw+V+nS	15	Qz-1	Stage 3b	Unk			-25	-6.9	**32**	209		**209**			
10-76 429.68	Lc+Lw	16	Qz-1	Stage 3b	PS		12							0.20	0.80	0.00
10-76 429.68	Lc+Lw	16	Qz-1	Stage 3b	PS		13							0.20	0.80	0.00
10-76 429.68	Lc+Lw	16	Qz-1	Stage 3b	PS		10							0.20	0.80	0.00
10-76 429.68	Lw+Lc+Sh	16	Qz-1	Stage 3b	P	-56.4	17	-38	-22	**33**	215			0.60	0.30	0.10
10-76 429.68	Lw+Lc+Sh	16	Qz-1	Stage 3b	P	-56.4	19	-35	-22	**35**	250			0.60	0.30	0.10
10-76 429.68	Lw+Lc+Sh	16	Qz-1	Stage 3b	P	-56.4	20	-35	-22	**35**	250			0.50	0.30	0.20
10-76 429.68	Lw+Lc+Sh	16	Qz-1	Stage 3b	P	-56.4	21	-35	-22	**33**	230			0.50	0.30	0.20
10-76 429.68	Lw+Lc+Sh	16	Qz-1	Stage 3b	P	-56.4	17	-35	-22	**33**	215			0.50	0.30	0.20
10-76 429.68	Lw+Lc+Sh	16	Qz-1	Stage 3b	P									0.75	0.05	0.20
10-76 429.68	Lw+Lc+Sh	16	Qz-1	Stage 3b	P									0.90	0.05	0.05
10-76 429.68		16	Qz-1	Stage 3b	P									0.75	0.05	0.20
10-76 429.68		16	Qz-1	Stage 3b	P									0.75	0.05	0.20
10-76 429.68		16	Qz-1	Stage 3b	P									0.75	0.05	0.20
10-76 429.68	Lw+V+nS	17	Qz-1	Stage 3b	Unk			24	28	**27**				0.75	0.05	0.20
10-76 429.68	Lw+V+nS	17	Qz-1	Stage 3b	Unk			24	28	**27**				0.75	0.05	0.20
10-76 429.68	Lw+V+nS	17	Qz-1	Stage 3b	Unk									0.75	0.05	0.20
10-76 429.68	Lw+V+nS	17	Qz-1	Stage 3b	Unk									0.75	0.05	0.20
10-76 429.68	Lc+Lw	18	Qz-1	Stage 3b	P	-57.7	12					**350**		0.20	0.80	0.00
10-76 429.68	Lc+Lw	18	Qz-1	Stage 3b	P	-57.6	13					**350**		0.20	0.80	0.00
10-76 429.68	Lc+Lw	18	Qz-1	Stage 3b	P	-57.5	13					**350**		0.20	0.80	0.00
10-76 429.68	Lc+Lw	18	Qz-1	Stage 3b	P	-57.5	15					**350**		0.20	0.80	0.00
10-76 429.68	Lc+Lw	18	Qz-1	Stage 3b	P	-57.4	12					**350**		0.20	0.80	0.00
10-76 429.68	Lc+Lw	18	Qz-1	Stage 3b	P	-57.3	18							0.40	0.60	0.00
10-76 429.68	Lc+Lw	18	Qz-1	Stage 3b	P	-57.1	18					**350**		0.40	0.60	0.00
10-76 429.68	Lc+Lw	18	Qz-1	Stage 3b	P	-57.1	20					**350**		0.40	0.60	0.00
10-76 429.68	Lc+Lw	18	Qz-1	Stage 3b	P	-57.1	16					**350**		0.40	0.60	0.00
10-76 429.68	Lc+Lw	18	Qz-1	Stage 3b	P	-57.1	15					**350**		0.30	0.70	0.00
10-76 429.68	Lc+Lw	18	Qz-1	Stage 3b	P	-56.9	14					**350**		0.40	0.60	0.00
10-76 429.68	Lw+Lc	18	Qz-1	Stage 3b	P	-56.6	17					**350**		0.50	0.50	0.00
10-76 429.68	Lw+Lc+Sh	18	Qz-1	Stage 3b	P									0.50	0.30	0.20
10-76 429.68	Lw+Lc+Sh+So	18	Qz-1	Stage 3b	P	-57.1	11					**390**		0.35	0.60	0.05
10-76 429.68	Lw+Lc+Sh+So	18	Qz-1	Stage 3b	P	-56.6	19			**33**	225	**350**		0.75	0.20	0.05
10-76 429.68	Lw+Lc+Sh+So	18	Qz-1	Stage 3b	P	-56.6	15	-35	-17	**36**	256	**350**		0.75	0.20	0.05
10-76 429.68	Lw+Lc+Sh+So	18	Qz-1	Stage 3b	P	-56.6	20	-30	-13	**33**	225	**350**		0.75	0.20	0.05
10-76 429.68	Lw+Lc+Sh+So	18	Qz-1	Stage 3b	P	-56.4	22	-30	-14	**33**	225	**350**		0.85	0.10	0.05
10-76 429.68	Lw+Lc+Sh+So	18	Qz-1	Stage 3b	P	-56.4	21			**33**	216	**350**		0.75	0.20	0.05

All microthermometric data for each fluid inclusion. All abbreveations are described in main text.

Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
10-76 429.68	Lw+Lc+Sh+So	18	Qz-1	Stage 3b	P					**36**	270	**350**		0.75	0.20	0.05
10-76 429.68	Lw+Lc+Sh+So	18	Qz-1	Stage 3b	P					**35**	240	**385**		0.75	0.20	0.05
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4	**6**			**158**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				2	**3**			**156**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				2	**3**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	27	Sp	Stage 4a	S				4.6	**7**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	28	Sp	Stage 4a	S			-13	0.8	**1**			**153**	0.02	0.98	0.00
09-18 250.00	Lw+V	29	Sp	Stage 4a	S			-10	3.1	**5**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	29	Sp	Stage 4a	S			-10	3.1	**5**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	29	Sp	Stage 4a	S			-10	3.1	**5**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	29	Sp	Stage 4a	S			-10	3.1	**5**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	29	Sp	Stage 4a	S			-10	3.1	**5**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	29	Sp	Stage 4a	S			-10	3.1	**5**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	29	Sp	Stage 4a	S			-10	3.1	**5**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	29	Sp	Stage 4a	S			-10	3.1	**5**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	29	Sp	Stage 4a	S			-10	3.1	**5**			**150**	0.02	0.98	0.00
09-18 250.00	Lw+V	29	Sp	Stage 4a	S			-10	3.1	**5**			**150**	0.02	0.98	0.00
Sc10-05 260.70	Lw+V	32	RP-Cal	INT	P			-30	12	**16**			**290**	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	32	RP-Cal	INT	P									0.95	0.05	0.00
Sc10-05 260.70	Lw+V	32	RP-Cal	INT	P								**290**	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	32	RP-Cal	INT	P			-20	-12	**16**			**290**	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	32	RP-Cal	INT	P			-30	-12	**16**			**290**	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	32	RP-Cal	INT	P			-30	-12	**16**			**290**	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	33	RP-Qz	INT	S			-30	-9	**13**			**220**	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	33	RP-Qz	INT	S			-30	12	**16**			**274**	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	33	RP-Qz	INT	S			-30	11.5	**15**			**274**	0.95	0.05	0.00

All microthermometric data for each fluid inclusion. All abbreveations are described in main text.

Sample ID	Type	assemblage	Phase	Stage	P PS S	TMCO2	THCO2	TFM	TM	wt % NaCl	TMhalite	TD	TH	L	V	S
Sc10-05 260.70	Lw+V	33	RP-Qz	INT	S			-30	11.5	15			274	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	33	RP-Qz	INT	S			-30	11.5	15				0.95	0.05	0.00
Sc10-05 260.70	Lw+V	33	RP-Qz	INT	S			-30	11	15			274	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	33	RP-Qz	INT	S			-30	11	15			235	0.95	0.05	0.00
Sc10-05 260.70	Lw+V+Sh	33	RP-Qz	INT	P			-33		30	150		260	0.85	0.10	0.05
Sc10-05 260.70	Lw+V+Sh	33	RP-Qz	INT	P			-30		26			235	0.85	0.10	0.05
Sc10-05 260.70	Lw+V+Sh	33	RP-Qz	INT	P			-33		30	155		294	0.85	0.10	0.05
Sc10-05 260.70	Lw+V+Sh	33	RP-Qz	INT	P			-33		30	155		250	0.85	0.10	0.05
Sc10-05 260.70	Lw+V+Sh	33	RP-Qz	INT	P			-33		30	150		300	0.85	0.10	0.05
Sc10-05 260.70	Lw+V+Sh	33	RP-Qz	INT	P			-33		30	150		325	0.85	0.10	0.05
Sc10-05 260.70	Lw+V+Sh	33	RP-Qz	INT	P			-33		30	155		325	0.85	0.10	0.05
Sc10-05 260.70	Lw+V+Sh	33	RP-Qz	INT	P			-33		30	150		285	0.85	0.10	0.05
Sc10-05 260.70	Lw+Lc+Sh	34	RP-Qz	INT	P	-56.7	26	-22			>350	350		0.85	0.10	0.05
Sc10-05 260.70	Lw+V	35	RP-Qz	INT	P			-22	2	3			230	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	35	RP-Qz	INT	P			-22	2	3			235	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	35	RP-Qz	INT	P			-22	2	3			208	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	35	RP-Qz	INT	P			-22	9	13			210	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	35	RP-Qz	INT	P				12	16			250	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	35	RP-Qz	INT	P			-22	9	13			220	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	35	RP-Qz	INT	P			-22	9	13			220	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	35	RP-Qz	INT	P				12	16			235	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	35	RP-Qz	INT	P			-22	12	16			230	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	35	RP-Qz	INT	P			-22	12	16			224	0.95	0.05	0.00
Sc10-05 260.70	Lw+V	35	RP-Qz	INT	P			-22	12	16			233	0.95	0.05	0.00
Sc10-05 260.70	Lw+Lc	36	RP-Qz	INT	P	-56.6	28							0.90	0.10	0.00
Sc10-05 260.70	Lw+Lc	36	RP-Qz	INT	P	-56.6	28	-33	6	9			320	0.90	0.10	0.00
Sc10-05 260.70	Lw+Lc	36	RP-Qz	INT	P	-56.6	28	-33	6	9		322		0.90	0.10	0.00
Sc10-05 260.70	Lw+Lc	36	RP-Qz	INT	P	-56.6	28		12	16			309	0.90	0.10	0.00
Sc10-05 260.70	Lw+Lc	36	RP-Qz	INT	P	-56.6	28		12	16		412		0.90	0.10	0.00
Sc10-05 260.70	Lw+Lc	36	RP-Qz	INT	P	-56.6	28	-22	12	16		412		0.90	0.10	0.00
Sc10-05 260.70	Lw+Lc	36	RP-Qz	INT	P	-56.6	28		12	16		340		0.90	0.10	0.00
Sc10-05 260.70	Lw+Lc	36	RP-Qz	INT	P	-56.6	28	-22	12	16		412		0.90	0.10	0.00
Sc10-05 260.70	Lw+Lc	36	RP-Qz	INT	P	-56.6	28		12	16		322		0.90	0.10	0.00
Sc10-05 260.70	Lw+Lc	36	RP-Qz	INT	P	-56.6	28		12	16			395	0.90	0.10	0.00
Sc10-05 260.70	Lw+Lc	36	RP-Qz	INT	P	-56.6	28		12	16				0.90	0.10	0.00

APPENDIX E

Monazite EPMA and U-Pb data

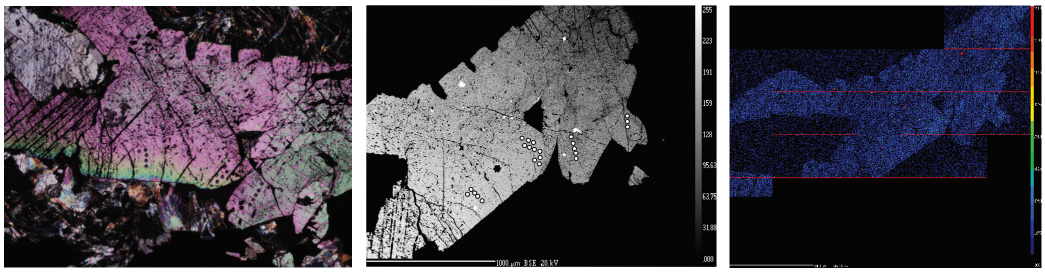
Monazite EPMA data. From thin secti on 08-04 136.45

Ca	Y	La	Ce	Pr	Nd	Pb	Th	U	P	Si	Total
275	0	185628	286756	48405	60611	0	0	0	132757	0	99
416	0	181038	288000	48301	62342	0	0	0	131502	0	99
244	0	183059	287854	46945	59071	0	0	0	126014	306	97
495	0	185278	285725	49487	58409	0	0	0	130702	191	98
572	0	181386	287849	49358	59028	0	0	0	131892	0	98
462	0	179429	287613	48962	59542	0	0	0	131425	223	98
467	0	178202	284978	49932	59505	0	0	0	132319	234	98
422	1669	176506	286996	50319	60783	0	0	10585	129866	246	99
440	1534	174758	285789	51448	58626	0	0	0	132167	0	98
464	0	171948	282816	50986	59621	0	0	10302	130065	0	97
369	0	164184	286130	50346	59492	0	0	0	129199	228	96
457	0	164427	283404	53282	58124	0	0	0	128346	0	95
469	0	161191	281068	52723	54022	0	0	0	125501	191	93
262	1773	159042	280905	53658	58063	0	0	0	129146	0	95
529	1406	150174	274363	54846	55115	0	0	0	126461	0	92
570	2075	148358	276312	54564	54518	0	0	0	127363	0	93
502	0	149381	276349	54538	54635	0	0	0	127339	218	93
473	1444	149174	276054	55754	54856	0	0	0	125215	243	92
451	0	149660	279068	55382	54696	0	0	0	127493	296	93
411	1410	154124	277127	54092	55272	0	0	0	128374	197	93
455	0	152374	280013	54173	56273	0	0	0	127212	297	94
492	0	150023	276480	53630	53209	0	0	0	125641	0	91
462	1582	152290	274978	55012	58735	0	0	0	126640	0	93
492	0	150261	277624	54336	54846	0	0	0	125895	416	92
439	0	148388	275252	54314	55640	0	0	0	125476	314	92
458	1447	148296	277872	54253	54582	0	0	0	127597	239	93
428	0	148939	279600	54128	53403	0	0	0	127501	372	93
435	0	146039	276839	55083	56109	0	0	0	125603	409	92
451	1550	147668	277644	54587	54066	0	0	0	125362	394	92
402	0	147557	279521	54470	55116	0	0	6385	127113	335	93
487	0	183555	287598	46436	59228	0	0	8892	131484	194	99
499	1733	176493	282917	46231	63920	0	0	14086	131947	211	99
240	1539	186270	283762	46105	61223	0	0	0	130396	215	98
420	2068	177063	283707	45724	65062	0	0	0	129480	260	97
316	1282	181513	285913	47257	63431	0	0	0	130806	223	98
322	1536	187683	288231	47156	60141	0	0	0	131943	0	99
445	2072	178131	285932	46782	63381	0	0	0	132634	0	98
412	1750	178285	283604	46979	63636	0	0	8275	133522	196	99
500	0	175617	283037	47265	64085	0	0	0	130249	227	97
589	2462	177245	285885	45097	64075	0	0	7879	129994	246	98
1234	1732	179734	277572	45678	63350	0	0	0	131767	247	98
613	1773	190714	279959	46094	58710	0	0	0	130919	0	98
397	2159	182177	281090	45900	61967	0	0	6063	128122	0	97
553	2604	173339	285846	45711	65002	0	0	8537	128177	0	97
407	1753	184407	283144	46657	58564	2438	0	0	129869	0	98
874	0	186206	284989	45407	58115	0	0	0	131386	211	98
1116	0	183015	281197	45626	60069	0	0	9948	129001	0	98
462	1384	188360	283756	46420	59993	0	0	0	131306	0	98
1179	1832	184570	285960	46524	59425	0	0	0	131540	0	99
450	0	186153	285952	46228	57841	0	0	0	130909	0	98
519	0	183204	286134	46588	61698	0	0	0	131129	0	98
649	0	183574	287265	46282	60277	0	0	6688	131616	208	99
492	1599	184842	285903	46846	59316	0	0	0	131142	214	98
504	0	186234	289611	45800	60874	0	0	0	129883	236	99
355	1669	180008	289081	46633	62123	0	0	0	129269	287	97

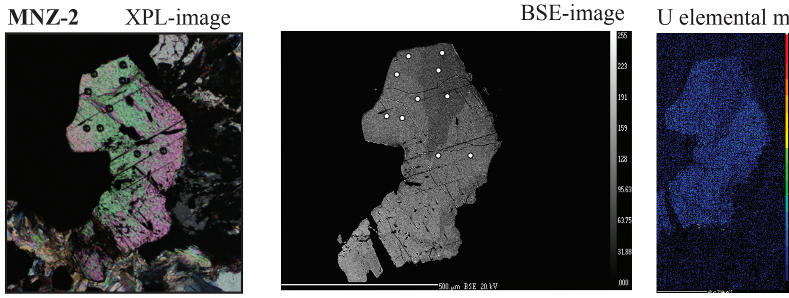
Ca	Y	La	Ce	Pr	Nd	Pb	Th	U	P	Si	Total
221	0	178953	287295	47258	64241	0	0	0	130521	251	98
386	1765	178158	283330	46527	63537	0	0	0	130866	286	97
158	1383	182893	291091	47810	62278	0	0	0	131506	0	99
424	1636	183352	284429	46891	60488	0	0	0	132349	286	98
407	0	183974	289678	44868	58844	0	0	0	131251	193	99
941	0	186656	284281	44510	61010	0	0	0	132931	0	98
842	1518	182626	286955	45773	62364	0	0	0	131719	0	98
1058	0	182645	284937	45935	60688	0	0	0	129916	0	98
893	1599	183191	283829	46619	60664	0	0	0	130005	205	98
556	0	175596	281411	44767	64353	0	0	9559	132447	0	98
522	1498	177173	286957	46710	63272	0	0	0	132183	0	99
430	1478	180367	285628	46402	64149	0	0	7019	131891	0	99
1323	0	185141	279958	46110	59671	0	0	10542	131186	0	98
695	2006	217343	335401	56278	76795	0	0	0	155136	0	116
866	2738	212987	331769	54995	72245	0	0	0	154185	0	115
1235	2032	186843	285437	45669	60240	0	0	0	130720	0	99
993	1854	190365	282880	46530	58587	0	0	0	131793	0	98
1026	0	188809	285564	46245	57853	0	0	0	131348	205	98
430	1395	189808	282933	45078	57716	0	0	0	133614	232	99
1244	1845	193174	283680	44771	54888	2082	0	0	133089	214	99
1081	1595	193089	284453	45929	57533	0	0	5313	133608	0	100
384	1647	178500	286021	46333	60779	0	0	14846	130798	0	99
421	2030	182357	283254	45689	61390	0	0	7482	132548	0	99
486	0	179359	280584	45669	64684	0	0	0	133836	0	98
388	0	182811	284360	46802	60572	0	0	7239	132326	0	98
923	1534	179704	282344	45556	64545	0	0	0	132869	0	98
892	0	200150	284617	46002	52786	0	0	0	131770	0	99
1294	1572	184638	281733	45724	60633	0	0	0	131029	0	97
388	1929	177988	284498	46112	63448	0	0	0	127365	0	97
428	1704	177288	285519	46569	64944	0	0	0	130488	0	98
475	1773	180093	287367	46751	62524	0	0	0	132703	0	98
420	2173	176779	282573	46205	63452	0	0	0	132098	0	98
442	2059	175176	284020	46868	67712	0	0	0	131536	0	98
352	1606	179159	285680	45943	66585	0	0	0	130868	0	98
962	1976	183654	280819	45360	61095	0	0	0	131396	0	98
1037	0	182896	278835	46508	62348	0	0	6082	130792	0	98
299	1682	186892	288264	45250	60850	0	0	0	130139	0	98
471	1916	187463	286346	45092	58644	0	0	0	128510	0	98
538	2083	186769	281957	46368	60143	0	0	0	130498	0	98
681	1616	186162	282227	47473	60557	0	0	0	130191	0	97
613	1683	184395	284161	46599	58800	0	0	0	131655	0	98

Ablation locations and images for LA-ICP-MS U-Pb analysis. See Figure 23 for spot locations and ID

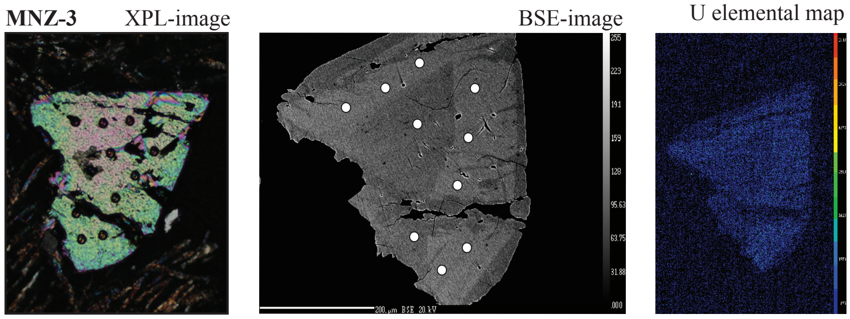
MNZ-1 XPL-image BSE-image U elemental map



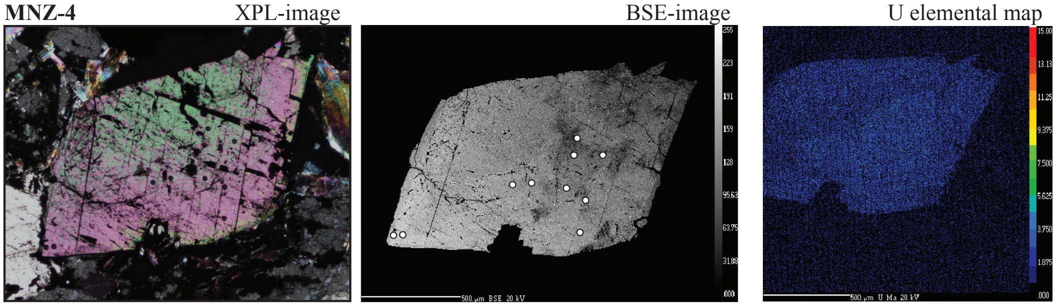
MNZ-2 XPL-image BSE-image U elemental map



MNZ-3 XPL-image BSE-image U elemental map



MNZ-4 XPL-image BSE-image U elemental map



Utilized and rejected data for U-Pb age determination from Isoplot.

sample name	^{206}Pb (cps)	^{204}Pb (cps)	^{207}Pb/^{206}Pb	2 σ	^{207}Pb/^{235}U	2 σ	^{206}Pb/^{238}U	2 σ	ρ
MNZ-1F	132237	145	0.04609	0.00097	0.05997	0.00569	0.00944	0.00087	0.975
MNZ-1G	125441	141	0.04834	0.00107	0.06350	0.00643	0.00953	0.00094	0.976
MNZ-1H	103135	120	0.04519	0.00103	0.05642	0.00590	0.00905	0.00092	0.976
MNZ-1I	94059	142	0.04648	0.00094	0.05996	0.00623	0.00936	0.00095	0.981
MNZ-1J	108596	113	0.04632	0.00096	0.06086	0.00588	0.00953	0.00090	0.977
MNZ-1Q	83498	120	0.04553	0.00094	0.05895	0.00585	0.00939	0.00091	0.978
MNZ-1R	89971	119	0.04532	0.00100	0.05898	0.00573	0.00944	0.00089	0.974
MNZ-1S	58444	147	0.04474	0.00122	0.05676	0.00569	0.00920	0.00089	0.962
MNZ-1T	48651	126	0.04481	0.00172	0.05799	0.00577	0.00939	0.00086	0.922
MNZ-1U	63607	130	0.04269	0.00193	0.05369	0.00597	0.00912	0.00093	0.914
MNZ-1V	54611	120	0.04235	0.00137	0.05586	0.00550	0.00957	0.00089	0.945
MNZ-1W	43687	107	0.03954	0.00184	0.04845	0.00610	0.00889	0.00104	0.929
MNZ-2A	113934	201	0.04523	0.00122	0.05947	0.00631	0.00954	0.00098	0.967
MNZ-2B	93490	163	0.04360	0.00179	0.05821	0.00695	0.00968	0.00109	0.939
MNZ-2C	84979	131	0.04346	0.00126	0.05357	0.00647	0.00894	0.00105	0.971
MNZ-2D	99099	128	0.04370	0.00171	0.05045	0.00552	0.00837	0.00085	0.934
MNZ-2E	101240	114	0.04426	0.00116	0.05740	0.00562	0.00941	0.00089	0.963
MNZ-2F	68292	155	0.04424	0.00121	0.05291	0.00513	0.00867	0.00081	0.959
MNZ-2G	51150	139	0.04060	0.00171	0.05031	0.00547	0.00899	0.00090	0.921
MNZ-2H	43415	144	0.04130	0.00259	0.05125	0.00578	0.00900	0.00084	0.832
MNZ-2I	100255	143	0.04333	0.00141	0.05366	0.00522	0.00898	0.00082	0.942
MNZ-2J	74823	163	0.04188	0.00188	0.04897	0.00565	0.00848	0.00090	0.921
MNZ-3B	90921	235	0.04544	0.00099	0.05258	0.00570	0.00839	0.00089	0.980
MNZ-3C	78636	208	0.04499	0.00146	0.05815	0.00674	0.00937	0.00104	0.960
MNZ-3D	83473	210	0.04548	0.00099	0.05302	0.00603	0.00846	0.00094	0.981
MNZ-3E	80443	200	0.04360	0.00260	0.05254	0.00618	0.00874	0.00089	0.862
MNZ-3F	85785	176	0.04598	0.00113	0.05763	0.00781	0.00909	0.00121	0.984
MNZ-3H	51017	168	0.04392	0.00151	0.05393	0.00572	0.00891	0.00089	0.946
MNZ-3I	93295	175	0.04588	0.00101	0.05327	0.00555	0.00842	0.00086	0.978
MNZ-3J	75885	144	0.04482	0.00114	0.05210	0.00609	0.00843	0.00096	0.976
MNZ-4A	117523	110	0.04589	0.00100	0.05618	0.00597	0.00888	0.00092	0.979
MNZ-4B	58059	107	0.04510	0.00141	0.05743	0.00711	0.00924	0.00111	0.968
MNZ-4C	96360	135	0.04557	0.00101	0.05836	0.00562	0.00929	0.00087	0.973
MNZ-4D	100430	133	0.04627	0.00094	0.05618	0.00598	0.00881	0.00092	0.982
MNZ-4E	107490	152	0.04597	0.00107	0.05818	0.00644	0.00918	0.00099	0.978
MNZ-4F	119453	148	0.04811	0.00111	0.06426	0.00587	0.00969	0.00086	0.968
MNZ-4G	111772	129	0.04575	0.00092	0.05731	0.00565	0.00908	0.00088	0.979
MNZ-4H	122861	123	0.04632	0.00087	0.05918	0.00553	0.00927	0.00085	0.979
MNZ-4I	91562	121	0.04628	0.00097	0.05555	0.00568	0.00871	0.00087	0.979
MNZ-4J	82493	118	0.04591	0.00117	0.05677	0.00563	0.00897	0.00086	0.967
culls									
~~MNZ-1K~~	~~38112~~	~~130~~	~~0.04197~~	~~0.00230~~	~~0.05773~~	~~0.00696~~	~~0.00998~~	~~0.00107~~	~~0.890~~
~~MNZ-1L~~	~~30758~~	~~127~~	~~0.03731~~	~~0.00370~~	~~0.04679~~	~~0.00651~~	~~0.00910~~	~~0.00089~~	~~0.701~~
~~MNZ-1M~~	~~30039~~	~~124~~	~~0.03962~~	~~0.00222~~	~~0.05387~~	~~0.00605~~	~~0.00986~~	~~0.00096~~	~~0.867~~
~~MNZ-1N~~	~~23654~~	~~107~~	~~0.03721~~	~~0.00259~~	~~0.04844~~	~~0.00583~~	~~0.00944~~	~~0.00093~~	~~0.815~~
~~MNZ-1O~~	~~21847~~	~~136~~	~~0.04421~~	~~0.00509~~	~~0.05915~~	~~0.00861~~	~~0.00970~~	~~0.00086~~	~~0.611~~
~~MNZ-1P~~	~~17577~~	~~120~~	~~0.03437~~	~~0.00415~~	~~0.04890~~	~~0.00754~~	~~0.01032~~	~~0.00099~~	~~0.622~~
~~MNZ-3G~~	~~41740~~	~~542~~	~~0.14005~~	~~0.03245~~	~~0.20891~~	~~0.05409~~	~~0.01082~~	~~0.00125~~	~~0.446~~
~~MNZ-3A~~	~~89625~~	~~435~~	~~0.05544~~	~~0.00432~~	~~0.07490~~	~~0.00968~~	~~0.00980~~	~~0.00101~~	~~0.798~~

sample name	$^{207}Pb^*/^{206}Pb^*$ age (Ma)	2 σ error (Ma)	$^{207}Pb^*/^{235}U$ age (Ma)	2 σ error (Ma)	$^{206}Pb^*/^{238}U$ age (Ma)	2 σ error (Ma)	% discordance
MNZ-1F	2	50	59	5	61	6	-2806.9
MNZ-1G	116	52	63	6	61	6	47.5
MNZ-1H	-45	54	56	6	58	6	229.3
MNZ-1I	22	48	59	6	60	6	-169.3
MNZ-1J	15	49	60	6	61	6	-321.3
MNZ-1Q	-27	49	58	6	60	6	322.8
MNZ-1R	-38	53	58	5	61	6	259.7
MNZ-1S	-70	65	56	5	59	6	185.7
MNZ-1T	-66	91	57	6	60	6	192.3
MNZ-1U	-186	109	53	6	59	6	132.1
MNZ-1V	-206	79	55	5	61	6	130.4
MNZ-1W	-381	117	48	6	57	7	115.5
MNZ-2A	-43	64	59	6	61	6	243.5
MNZ-2B	-133	99	57	7	62	7	147.4
MNZ-2C	-141	70	53	6	57	7	141.3
MNZ-2D	-128	94	50	5	54	5	142.7
MNZ-2E	-96	63	57	5	60	6	163.4
MNZ-2F	-97	66	52	5	56	5	158.0
MNZ-2G	-313	105	50	5	58	6	119.0
MNZ-2H	-269	152	51	6	58	5	122.0
MNZ-2I	-149	79	53	5	58	5	139.4
MNZ-2J	-234	110	49	5	54	6	123.8
MNZ-3B	-32	52	52	5	54	6	269.7
MNZ-3C	-56	77	57	6	60	7	208.0
MNZ-3D	-30	52	52	6	54	6	281.8
MNZ-3E	-133	141	52	6	56	6	142.7
MNZ-3F	-4	58	57	7	58	8	1710.3
MNZ-3H	-115	83	53	5	57	6	150.2
MNZ-3I	-8	52	53	5	54	5	741.6
MNZ-3J	-65	61	52	6	54	6	183.5
MNZ-4A	-8	52	56	6	57	6	811.0
MNZ-4B	-50	74	57	7	59	7	218.5
MNZ-4C	-25	53	58	5	60	6	341.7
MNZ-4D	12	48	56	6	57	6	-383.2
MNZ-4E	-4	55	57	6	59	6	1589.6
MNZ-4F	105	54	63	6	62	5	40.7
MNZ-4G	-15	48	57	5	58	6	482.3
MNZ-4H	14	45	58	5	59	5	-317.9
MNZ-4I	12	50	55	5	56	6	-368.4
MNZ-4J	-7	60	56	5	58	5	886.8
culls							
~~MNZ-1K~~	~~-229~~	~~133~~	~~57~~	~~7~~	~~64~~	~~7~~	~~128.6~~
~~MNZ-1L~~	~~-534~~	~~247~~	~~46~~	~~6~~	~~58~~	~~6~~	~~111.4~~
~~MNZ-1M~~	~~-376~~	~~140~~	~~53~~	~~6~~	~~63~~	~~6~~	~~117.4~~
~~MNZ-1N~~	~~-541~~	~~178~~	~~48~~	~~6~~	~~61~~	~~6~~	~~111.7~~
~~MNZ-1O~~	~~-99~~	~~261~~	~~58~~	~~8~~	~~62~~	~~6~~	~~163.6~~
~~MNZ-1P~~	~~-759~~	~~310~~	~~48~~	~~7~~	~~66~~	~~6~~	~~109.3~~
~~MNZ-3G~~	~~2228~~	~~354~~	~~193~~	~~44~~	~~69~~	~~8~~	~~97.4~~
~~MNZ-3A~~	~~430~~	~~165~~	~~73~~	~~9~~	~~63~~	~~6~~	~~85.8~~

sample name	$^{238}U/^{206}Pb$	2 σ	$^{207}Pb/^{206}Pb$	2 σ
MNZ-1F	105.956	9.799	0.046	0.001
MNZ-1G	104.962	10.374	0.048	0.001
MNZ-1H	110.449	11.271	0.045	0.001
MNZ-1I	106.878	10.895	0.046	0.001
MNZ-1J	104.952	9.907	0.046	0.001
MNZ-1Q	106.492	10.334	0.046	0.001
MNZ-1R	105.951	10.025	0.045	0.001
MNZ-1S	108.693	10.487	0.045	0.001
MNZ-1T	106.553	9.784	0.045	0.002
MNZ-1U	109.619	11.133	0.043	0.002
MNZ-1V	104.520	9.726	0.042	0.001
MNZ-1W	112.520	13.176	0.040	0.002
MNZ-2A	104.875	10.772	0.045	0.001
MNZ-2B	103.280	11.578	0.044	0.002
MNZ-2C	111.870	13.121	0.043	0.001
MNZ-2D	119.441	12.196	0.044	0.002
MNZ-2E	106.321	10.037	0.044	0.001
MNZ-2F	115.292	10.711	0.044	0.001
MNZ-2G	111.260	11.138	0.041	0.002
MNZ-2H	111.116	10.430	0.041	0.003
MNZ-2I	111.324	10.202	0.043	0.001
MNZ-2J	117.935	12.526	0.042	0.002
MNZ-3B	119.169	12.662	0.045	0.001
MNZ-3C	106.677	11.872	0.045	0.001
MNZ-3D	118.269	13.198	0.045	0.001
MNZ-3E	114.405	11.601	0.044	0.003
MNZ-3F	109.998	14.661	0.046	0.001
MNZ-3H	112.281	11.260	0.044	0.002
MNZ-3I	118.758	12.094	0.046	0.001
MNZ-3J	118.612	13.540	0.045	0.001
MNZ-4A	112.621	11.705	0.046	0.001
MNZ-4B	108.265	12.962	0.045	0.001
MNZ-4C	107.682	10.095	0.046	0.001
MNZ-4D	113.553	11.859	0.046	0.001
MNZ-4E	108.946	11.784	0.046	0.001
MNZ-4F	103.220	9.117	0.048	0.001
MNZ-4G	110.075	10.616	0.046	0.001
MNZ-4H	107.921	9.877	0.046	0.001
MNZ-4I	114.861	11.485	0.046	0.001
MNZ-4J	111.489	10.685	0.046	0.001
culls				
~~MNZ-1K~~	~~100.230~~	~~10.758~~	~~0.042~~	~~0.002~~
~~MNZ-1L~~	~~109.943~~	~~10.723~~	~~0.037~~	~~0.004~~
~~MNZ-1M~~	~~101.400~~	~~9.879~~	~~0.040~~	~~0.002~~
~~MNZ-1N~~	~~105.910~~	~~10.381~~	~~0.037~~	~~0.003~~
~~MNZ-1O~~	~~103.051~~	~~9.176~~	~~0.044~~	~~0.005~~
~~MNZ-1P~~	~~96.910~~	~~9.292~~	~~0.034~~	~~0.004~~
~~MNZ-3G~~	~~92.431~~	~~10.679~~	~~0.140~~	~~0.032~~
~~MNZ-3A~~	~~102.061~~	~~10.519~~	~~0.055~~	~~0.004~~