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Assessment Report on a Diamond Drill Program
for the Jackfish Property Mineral Claims
122023 and 281329

Syine Township

Thunder Bay Mining Division

District of Thunder Bay, Ontario

NTS 42D15

NAD83 Zone 16 UTM

504,107 mE 5,409,480 mN Latitude 48° 50’ 17.8”N Longitude 86° 56’ 38.5”W

May 22 – August 24, 2018

By Troy Gill, B.Sc., MAIG.
Sanatana Resources Inc.
#908-925 West Georgia Street
VANCOUVER, BC, V6C 3L2
Cl. #409847

May 21, 2020

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Summary

The Jackfish property is located within the Syine Township, on the north shore of Lake Superior in northwestern Ontario, approximately 250 km east of Thunder Bay (Figure 1). In total, the Jackfish property comprises 281 combined single and boundary cell mining claims covering an area of 3,769 hectares, held under option by Sanatana Resources Inc. from three separate parties. The property is accessed by bush trails off of the Trans-Canada Highway 17. All co-ordinates quoted in text or appearing on maps are either latitude and longitude or Universal Transverse Mercator (UTM) metres easting and northing using the North American Datum 83 (NAD83) Zone 16.

The property is located in the Wawa terrane of the Superior Province of the Canadian Shield specifically the Schreiber-Hemlo greenstone belt. The greenstone belt consists of metavolcanic and metasedimentary rocks into which the Terrace Bay pluton was emplaced. The property encompasses the eastern half of the Terrace Bay pluton as well as the contact metamorphic zone and part of the Schreiber-Hemlo greenstone belt supracrustal sequence of folded and foliated metavolcanic basalts and felsic flows and tuffs intercalated with metasedimentary rocks in the northern and eastern parts of the property. The Terrace Bay pluton is host to numerous small historic gold and base metal occurrences and there is potential to find others, perhaps of economic significance in current times.

Historic mining and exploration on the property dates back to the late 19th century. Since then various companies explored in the area completing surveys, including geophysical surveys, mapping, trenching, sampling and drilling and discovered several mineral occurrences.

A six hole, 930.4m BTW diamond drilling program was undertaken over two cell mining claims of the Jackfish property by Sanatana Resources Inc. (“Sanatana”) between the dates of May 22 and August 24, 2018. The drilling targeted coincident soil geochemical, magnetic and EM bedrock anomalies at a prospect called the Copper Soil Anomaly and a high-grade gold occurrence called the Creek Showing.

Elevated levels of copper (up to 3,140 ppm) were intercepted that appear to explain the copper soil anomaly. No significant gold intercept was encountered down dip from the Creek Showing. Based on the lack of significant assay results for gold or base metals from the drill program sampling no follow up drilling is recommended.

Introduction

A six hole, 930.4m BTW diamond drilling program was undertaken over two cell mining claims of the Jackfish property by Sanatana Resources Inc. ("Sanatana") between the dates of May 22 and August 24, 2018. The drilling targeted coincident soil geochemical, magnetic and EM bedrock anomalies at a prospect called the Copper Soil Anomaly.

This report presents the drilling data and assay results and provides some interpretations that will help to guide future exploration work on the Jackfish property.

Property Location, Description and Access

The Jackfish property is located within the Syine Township, on the north shore of Lake Superior in northwestern Ontario, approximately 250 km east of Thunder Bay (Figure 1). The property is centered on 504,107 mE 5,409,480 mN (NAD 83 Zone 16) or at Latitude 48° 50' 17.8"N Longitude 86° 56' 38.5"W.

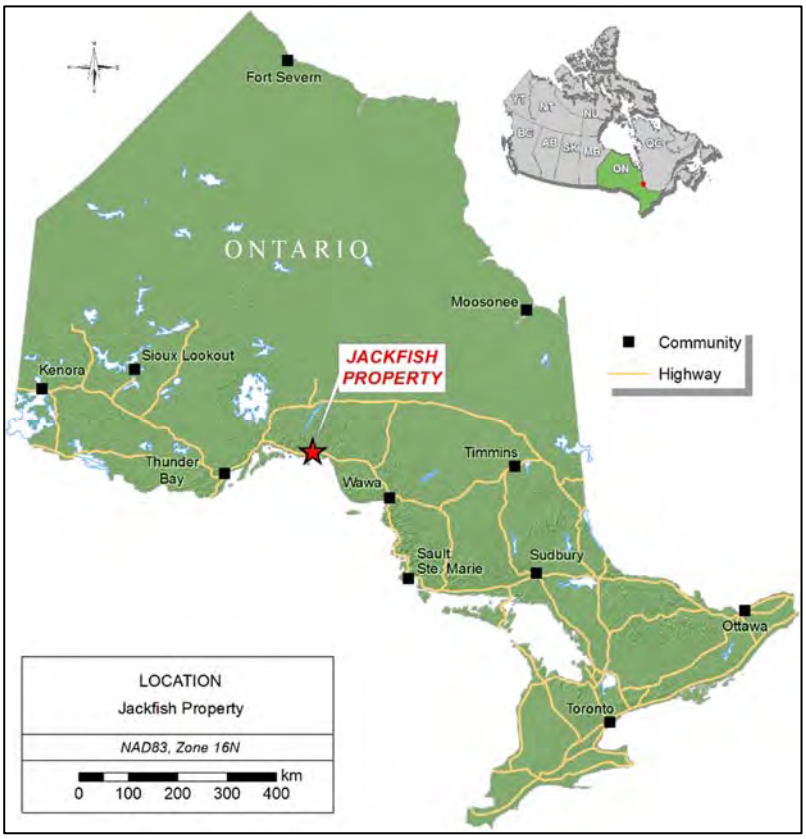


***Figure 1**: Property Location Map.*

In total, the Jackfish property comprises 281 combined single and boundary cell mining claims (Table 1) covering an area of 3,769 hectares, held under option by Sanatana with three optionor groups; Alto Ventures Ltd., Rudy Wahl and Richards et al (including Wayne Richards, Francine Richards and James Hamel) (Figure 2).

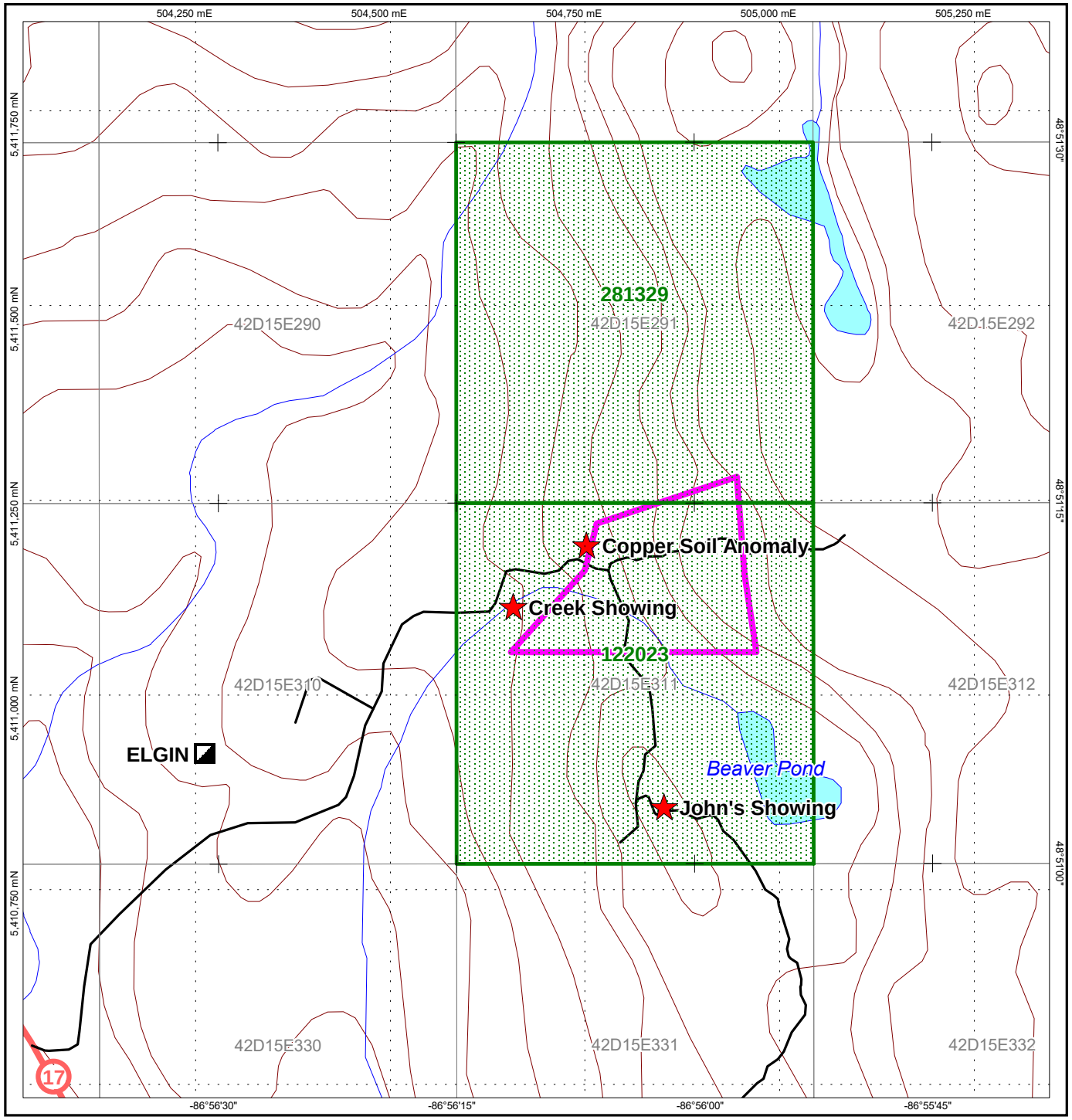
The property is accessed by travelling 20 km east of Terrace Bay or 63 km west from Marathon via Trans-Canada Highway 17. The mining claims are readily accessible off the Highway 17 by All-terrain vehicle (ATV) along bush trails (Figure 2).

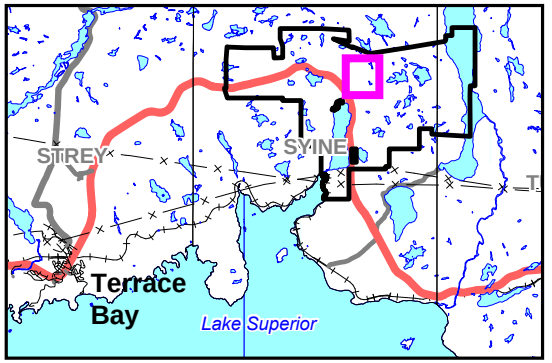
The terrain around the property is quite rugged and vegetation cover is moderately thick. There is a sparse to moderate amount of bedrock outcrop on the property, mostly along cliffs and at highway road cuttings, but exposure in the forest is commonly masked by moss cover.

The drill program was permitted under Exploration Permit PR-17-11146 for that covers claims held by Wayne Richards(Jackfish property) and those in partnership with James Hamel (Kellyn property), with drill holes completed specifically on the claims listed in Table 1 and the area shown on Figure 2.

***Table 1**: Diamond Drilling Program Cell Mining Claims.*

Tenure #	Township	Cell #	Type	Client ID	Holder
122023	SYINE	42D15E311	Single Cell Mining Claim	141000, 303657	50% Mark Hamel, 50% Wayne Richards
281329	SYINE	42D15E291	Single Cell Mining Claim	141000, 303657	50% Mark Hamel, 50% Wayne Richards





- Historical Workings
- Stripped Showings
- Highway 17
- Watercourse
- Quad Trail
- Contour
- Richards / Hamel Cell Mining Claims
- Provincial Grid
- Drilling Area
- Waterbody

%

200 0 200

Metres

Jackfish Property
Report Figure 2

2018 Copper Anomaly Drilling Area, Mining Claims and Key Locations

Author:	T. Gill	Date:	May 2020
Projection:	UTM NAD83 Zone 16	Scale:	1 : 7 500
Mapsheet:	NTS 042D15	MNDM:	Thunder Bay Mining Division

Property History

The exploration activity in the area of the Jackfish property started at the end of the 19th century sparked by the discovery of the Empress Mine in 1895 (Walker, 1967) in metavolcanic rocks of the Schreiber-Hemlo Greenstone Belt just north of the Terrace Bay Batholith. Relevant historical mining and exploration work conducted on the property, mostly sourced from assessment reports filed with the Ministry of Energy, Northern Development and Mines, is summarized in Table 2.

***Table 2**: Historical exploration work in the property area.*

Year	Company	Type of Work	Results	Assessment Report #
1882	Elgin Silver	Underground mining from 2 adits	No production data	42D15SW8353
1932	Siville-Ferrier Syndicate	Stripping, sampling	Up to 10.29 g/t Au over 0.91 m	42D15SW8353
1982	Micham Explorations Inc.	Magnetic and electromagnetic (VLF) surveys	No magnetic anomalies; several weak to moderate conductors	42D14SE1074
1983	Rose Resource Corp.	Magnetic and electromagnetic (VLF) surveys	10 EM conductors and no significant magnetic anomalies	42D15SE0128
1983	Wasabi Resources	Airborne magnetic and EM (VLF) survey	Identified 6 EM conductors	42D15SW0088
1983	Wasabi Resources	Ground proofing of airborne EM conductors	All 6 conductors sulfide iron formation with no Au values	42D15SW0066
1984	John Ferguson	Magnetic and electromagnetic surveys	No significant mag; 2 weak VLF anomalies	42D15SW0121
1984	Goldhurst Resources	Magnetic and electromagnetic surveys	No significant mag; 11 very weak EM conductors	42D15SW0116
1984	Goldhurst Resources	Drilling, 4 drill holes; total 305.1m (1001 feet)	Drill hole 84-04: 2.87 g/t Au over 2.44 m including 6.07g/t Au over 0.91m and 0.96g/t Au over 1.22m	42D15SW0118
1985	Micham Explorations Inc.	Mapping, trenching, sampling (58 rock samples)	Highest assay 13.54 g/t Au in quartz vein at N Siville showing outside of Jackfish claims	42D15SW0114
1985	Micham Explorations Inc.	Soil sampling (1521 samples)	Two anomalous areas: Empress structure W Siville showing; Mocan valley structure	42D15SW0115
1985	Micham Explorations Inc.	Diamond drilling 4 drill holes 482.9m (1584.2 ft)	Highest assays 1166 ppb Au over 1.52m; 1588 ppb Au over 1.83m, 44.23 g/t Au over 0.61 m	42D15SW0117
1986	John Ferguson	Stripping, de-watering, trenching; sampling	Highest assay 13.03 g/t Au; 4,075 g/t Ag	42D15SW0504
1986	John Ferguson	Magnetic and electromagnetic surveys	No significant results	42D15SW0111
1987	John Ferguson	Soil sampling	No significant results	42D15SW0106
1987	Forerunner Resources	Mapping, stripping, trenching, sampling	Highest assay 93.24 g/t Au; 109.03 g/t Ag; 1.2% Cu; 7.85% Pb	42D15SW0505
1987	Micham Explorations Inc.	Diamond drilling 10 drill holes 1674m	No assays recorded	42D15SW0109
1988	Beardmore Resources	Trenching, soil sampling, bedrock sampling	Highest assays: 21.05 g/t Au plus 13.3 g/t Ag and 11.45 g/t Au plus 0.2 g/t Ag	42D15SW8353
1989	J.R. Hamel	Sampling	Highest assay 93.26 g/t Au, 82.79 g/t Ag	42D15SW0110
1991	J.R. Hamel	Stripping and sampling	Highest assay 21.05 g/t Au and 26.06g/t Ag	42D15SW0102
1992	Beavercreek Exploration (J.R. Hamel)	Drilling 2 drill holes 28.04 m (92 ft)	Highest assay 12.21 g/t Au over 1.52 m	42D15SW0002
1994	Beavercreek Exploration (J.R. Hamel)	Drilling 5 drill holes 45.1 m (148 ft)	Best result: 0.51 g/t Au over 3.05 m	42D15SW0001
1995	George Daniels et al.	Stripping, trenching, sampling, line cutting, VLF survey	16.39 g/t Au on claim #1207882 Santoy Lake; 15.77 g/t Au Syine Twp. Historic claim #1224852	42D15NW0009
1996	Big Lake Geological Consulting on behalf of J. Ferguson	Mapping, sampling	Highest assays from trench 14.3 g/t Au and 16.39 g/t Au	42D15NW0038

Year	Company	Type of Work	Results	Assessment Report #
1996	George Daniels	Prospecting, stripping, trenching	Highest assays from trench 21.94 g/t Au	42D15NW0028
1996	Rudolph Wahl et al.,	Rock sampling (100 samples); soil sampling	No significant results	42D15SW0008
1997	Landis Mining Corp.	Evaluation of previous exploration activity in the area	20 lb composite grab sample: 22.97 g/t Au over 3.05 m from Empress structure	42D15SW2002
1998	George Daniels	Sampling	Highest assays from Jon's showing 1.45 g/t Au	42D15SW2003
1999	Cameco Gold Inc.	Line cutting; mag., IP; trenching; re-logging & re-sampling	DDH 441087-9: 8.07 g/t Au; 93.8 g/t Ag over 0.52 m; DDH 44184-7: 7.09 g/t Au; 19.8 g/t Ag over 1.4 m	42D15SW2010
2000	George Daniels	Trench cleaning, minor blasting	No results	42D15SW2013
2004	Brian Fowler	Line cutting; mag; prospecting, sampling (21)	Highest assay 324 ppb Au	42D15SW2024
2005	Phoenix Matachewan Mines	Prospecting sampling (19 rock samples)	Highest assay 262 ppb Au	20000001155
2007	Wayne Richards	Prospecting, mapping, stripping, sampling (4 samples)	No Au assays; two samples >100 g/t Ag	20000003831
2007	Alto Ventures Ltd.	Mapping, prospecting and sampling (47 rock samples)	Highest assay 2,278 ppb Au	20000002005
2008	Alto Ventures Ltd.	Drilling 2 drill holes 332 m on Empress structure	0.66 g/t Au over 2.3 m	20000003772
2009	Rudolph Wahl	Prospecting, mapping, sampling (22 samples)	No significant results	I20000004525
2010	Galahad Metals	Soil sampling (619 samples), mapping trenching, sampling (89 samples)	26.8 g/t Au and 119 g/t Ag; 24.7 g/t Au and 40.4 g/t Ag at creek showing	20000005783
2010	Bond et al.	Prospecting, mapping, rock samples (63 samples) and lake sediment samples (7 samples)	309 and 459 ppb Au	20000006073
2010	Bond et al.	Drilling 2 holes 240 m	No significant results	20000006073
2012	Rudolph Wahl	Prospecting, mapping, sampling (30 samples)	1.9 g/t Au sample # 997103	20000007183
2012	Hamel et al.	Prospecting , mapping, sampling (11 samples), diamond drilling	No significant results	20000007081, 2.53866
2014	Alto Ventures Ltd.	Bedrock sampling (21 samples)	No significant results	20000008044
2016	Wayne Richards	Diamond drilling, outcrop stripping, sampling	38.3g/t and 5.21g/t Au grab samples, no significant results from drilling	20000013548
2017	Wayne Richards	Ground VLF Survey	Weak conductors identified	20000015411

Regional Geological Setting

The property is located in the Wawa terrane of the Superior Province of the Canadian Shield, specifically the Schreiber-Hemlo greenstone belt (Figure 3). The greenstone belt in the region consists of metavolcanic and metasedimentary rocks into which the Terrace Bay pluton was emplaced.

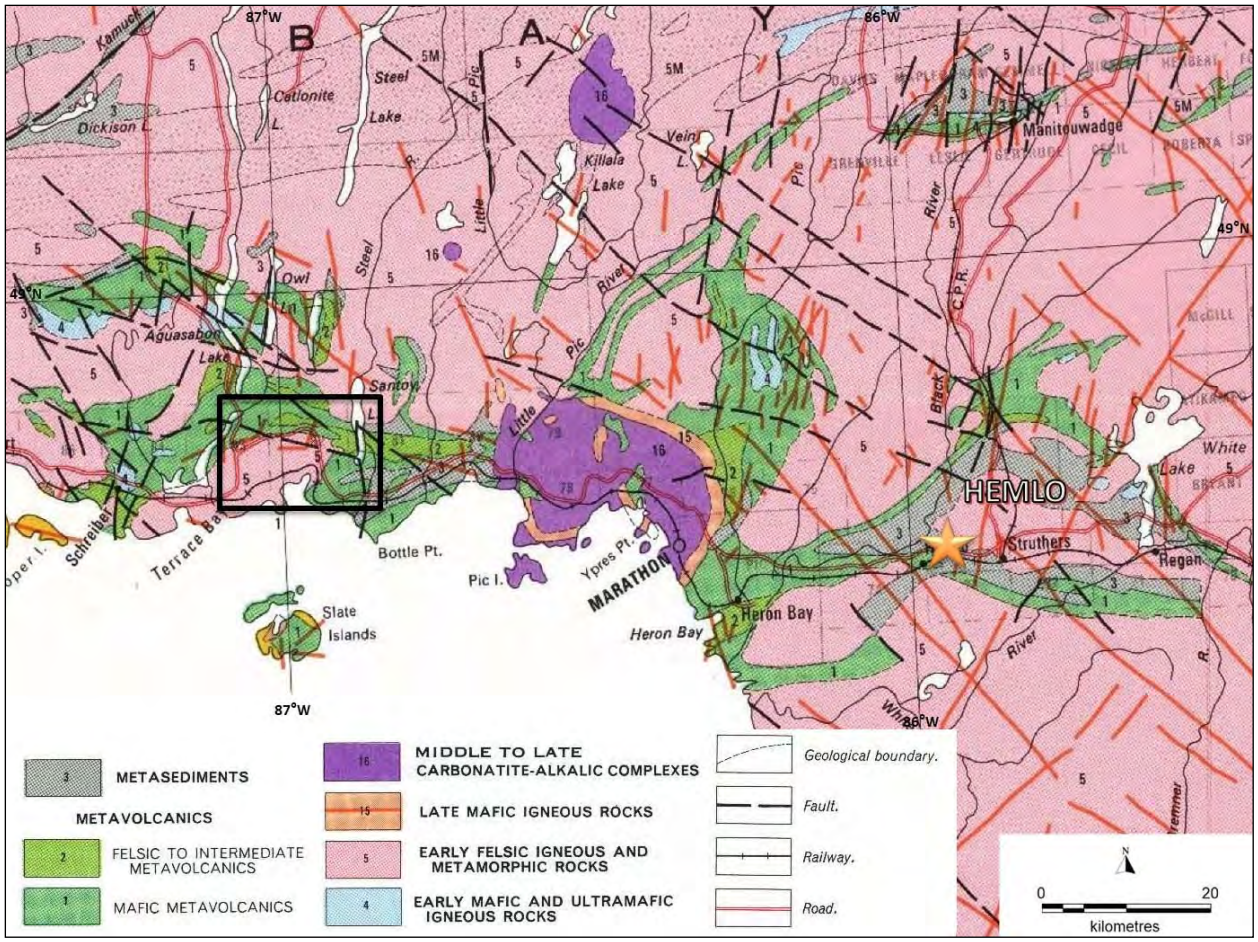
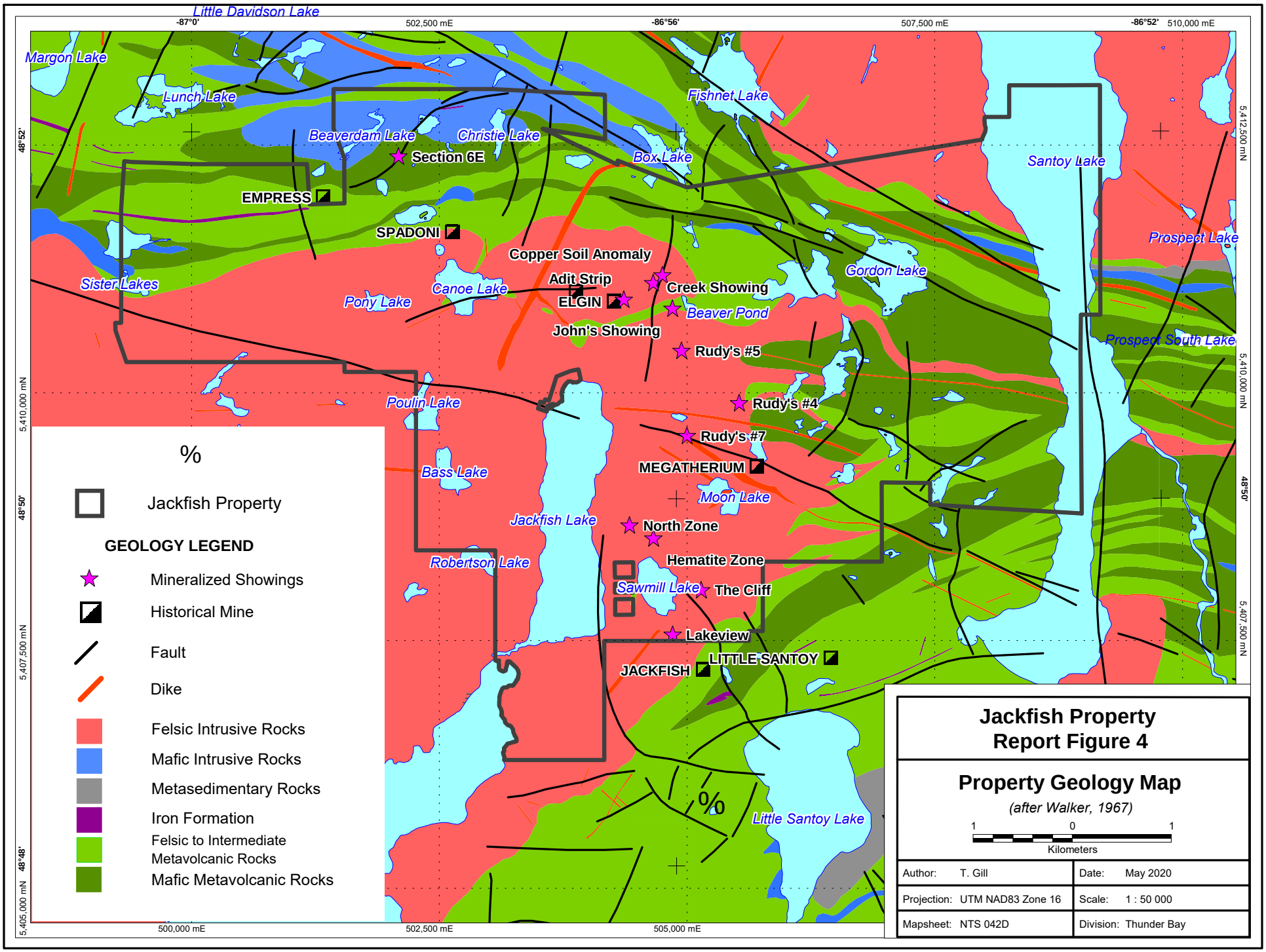


***Figure 3**: Regional Geological Setting Map (after Ayres et al, 1970).*

Property Geology and Mineralization

The Jackfish property straddles the eastern margin of the Terrace Bay Pluton where the granodiorite rocks of the intrusive contact the folded and foliated supracrustal sequence of the Schreiber-Hemlo greenstone belt in a combination of an intrusive and structural setting. The various rock types that have been observed or interpreted to underlie the area are depicted on the property geology map in Figure 4.

Gold, silver and base metal mineralization is known to occur and has been mined historically from quartz-carbonate veins in three different settings across the region; as lenses or stringers within shear zones of the greenstone belt, as networks parallel to the contact between the pluton and supracrustal rocks and as fracture fill within the pluton. These styles of orogenic gold deposits are the key targets of focus for exploration activities on the Jackfish property. The more prominent historical workings and currently active mineralized showings are shown on Figure 4.


Little Davidson Lake
-87°0'
502,500 mE
-86°56'
507,500 mE
-86°52'
510,000 mE
Margon Lake
Lunch Lake
Beaverdam Lake
Christie Lake
Section 6E
EMPRESS
SPADONI
Fishnet Lake
Box Lake
Santoy Lake
Prospect Lake
Copper Soil Anomaly
Adit Strip
ELGIN
Creek Showing
Beaver Pond
John's Showing
Rudy's #5
Rudy's #4
Rudy's #7
MEGATHERIUM
Moon Lake
North Zone
Hematite Zone
The Cliff
Lakeview
LITTLE SANTOY
JACKFISH
Sister Lakes
Pony Lake
Canoe Lake
Gordon Lake
Prospect South Lake
Poulin Lake
Bass Lake
Jackfish Lake
Robertson Lake
Sawmill Lake
Little Santoy Lake
48°52'
48°50'
48°48'
5,412,500 mN
5,410,000 mN
5,407,500 mN
5,405,000 mN
500,000 mE
502,500 mE
505,000 mE
%
Jackfish Property
GEOLOGY LEGEND
Mineralized Showings
Historical Mine
Fault
Dike
Felsic Intrusive Rocks
Mafic Intrusive Rocks
Metasedimentary Rocks
Iron Formation
Felsic to Intermediate Metavolcanic Rocks
Mafic Metavolcanic Rocks
Jackfish Property Report Figure 4
Property Geology Map
(after Walker, 1967)
1 0 1
Kilometers
Author: T. Gill
Date: May 2020
Projection: UTM NAD83 Zone 16
Scale: 1 : 50 000
Mapsheet: NTS 042D
Division: Thunder Bay

Exploration Work

A diamond drilling program was undertaken to test a significant copper soil anomaly previously identified on the property, defined by copper assay values up to 769 ppm, and a grab sample of mineralized float from the area that returned assay values of 14.9 g/t Au, 6.5% Cu, 7.5% Pb and 1.0% Zn. The copper soil anomaly sits over a mapped narrow structural enclave of greenstone sequence lithologies protruding into the Terrace Bay Pluton from the northeast (Figure 4). One drill hole collar location was specifically planned to test deep below the high-grade gold Creek Showing. Three bedrock electromagnetic (EM) anomalies coincident with the copper soil anomaly area were delineated from a Horizontal Loop Electromagnetic (HLEM) survey conducted prior to the drilling. Airborne magnetic data from a drone survey previously flown over the area also provided structural interpretation to help guide the placement of drill holes to test the target area.

Sanatana completed a six-BTW diamond drill hole drilling program in June, 2018, for a total of 930.4 metres drilled (Table 3). All of the drill core was processed for geotechnical information and geologically logged for lithology, structure, alteration and mineralization (Appendix 1). A total of 263 half-core samples from all the drilling were dispatched to Activation Laboratories Ltd. in Thunder Bay primarily for Fire Assay with an ICPOES (FA-ICP) finish analysis for gold as well as total digest ICPOES (TD-ICP) analyses for economic base metals and other elements (Appendix 2). Some samples were also submitted for XRF whole rock analysis to help with geological interpretation of the drill-hole logging. Three different Certified Reference Material (CRM) standard samples purchased from Analytical Solutions Ltd. Of Murmur, Ontario, were inserted blindly into the sample stream along with blank material and lab duplicates (collected from the pulverised sample) at every tenth sample on a rotating basis in order top check the lab results for Quality Assurance and Quality Control (QA/QC).

Where possible, each drill hole was surveyed at the collar and end of hole using a Reflex EZ-Shot survey tool. The casing was left in place at the collar for each hole and after the drill was removed from site the holes that were making water (non artesian) were plugged using bentonite chips and every hole was capped with a casing cap and bright orange steel flag (Figure 5).

***Table 3**: Diamond Drill Hole Summary Data.*

Hole #	Cell Mining Claim	Easting	Northing	Dip	Direction	Depth
JF-18-01	122203	504,750	5,411,160	-60°	000°	153.1 m
JF-18-02	281329	504,945	5,411,280	-60°	000°	144.0 m
JF-18-03	122203	504,970	5,411,055	-60°	000°	150.0 m
JF-18-04	122203	504,955	5,411,155	-60°	000°	150.0 m
JF-18-05	122203	504,765	5,411,220	-60°	000°	148.8 m
JF-18-06	122203	504,655	5,411,055	-60°	000°	184.5 m
						930.4 m

***Figure 6**: Example of Casing Cap and Flag at JF-18-02 Drill Site.*

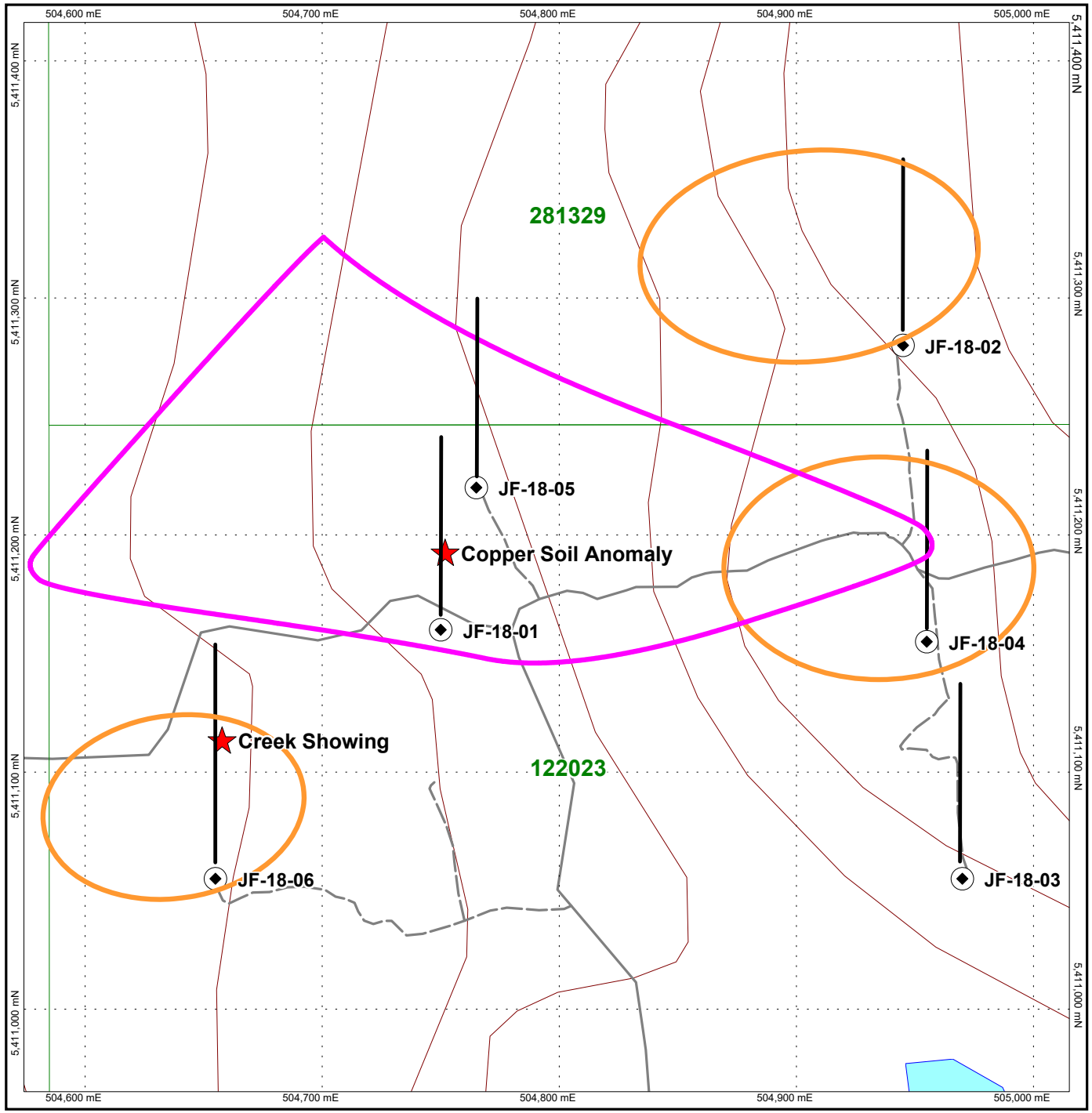
Interpretations

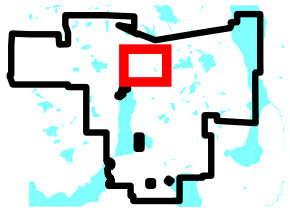
Once the lab results were received all the QA/QC data was reviewed to check for accuracy and precision of the data. Standard sample results were mostly found to be well within the two standard deviation limits for each of the CRM's as per their certificates (Appendix 3). This indicates high precision of the lab processing and analysis for trace levels of gold. The duplicate samples returned similar values indicating acceptable accuracy of the sampling and results. No gold was measured in any of the blanks meaning there was no smearing of gold between samples due to lab processing. The Actlabs assay results were determined to be reliable.

The six diamond drill holes provided an adequate test of the copper soil anomaly surface geochemical signature and the HLEM subsurface anomalies (Figure 6), although no significant gold or base metal assay values were intersected from the core sample intervals assayed. No obvious shear zone or quartz veining was observed in the drill core logging of JF-18-06 around the expected down dip projected depth interval from the Creek Showing (Figure 7a). This result implies that the Creek Showing mineralization perhaps pinches out at some point down plunge and unfortunately does not persist at depth.

Elevated levels of copper (up to 3,140 ppm) were intercepted (Figure 7b-c) that appear to explain the copper soil anomaly that was being tested. These assay results, along with the nature of the mineralization observed in the core like epidote altered hyaloclastite margins to relict basalt pillows, are thought to be indicative of volcanogenic massive sulphide (VMS) mineralization potential within the broader geological sequence in the area. However, much of the greenstone sequence lithologies logged in the drill core were deformed, altered and shot through with granitic intrusions from the Terrace Bay Pluton, making attempts to discern younging directions impossible. It would be difficult to try and use the results of this drilling program to follow up on VMS potential, given the structural enclave setting of the target area.

The EM anomalies from the HLEM survey perhaps reflect the variation in lithology and structural breaks rather than direct indication of gold or base metal mineralization, as no distinct and isolated conductor was modelled from the survey data.





Drill Hole

Mineralized Showing

HLEM Anomaly

+100ppm Cu Soil Anomaly Area

Cell Mining Claim

Skidder Trail

Vehicle Trail

Contour Line

N

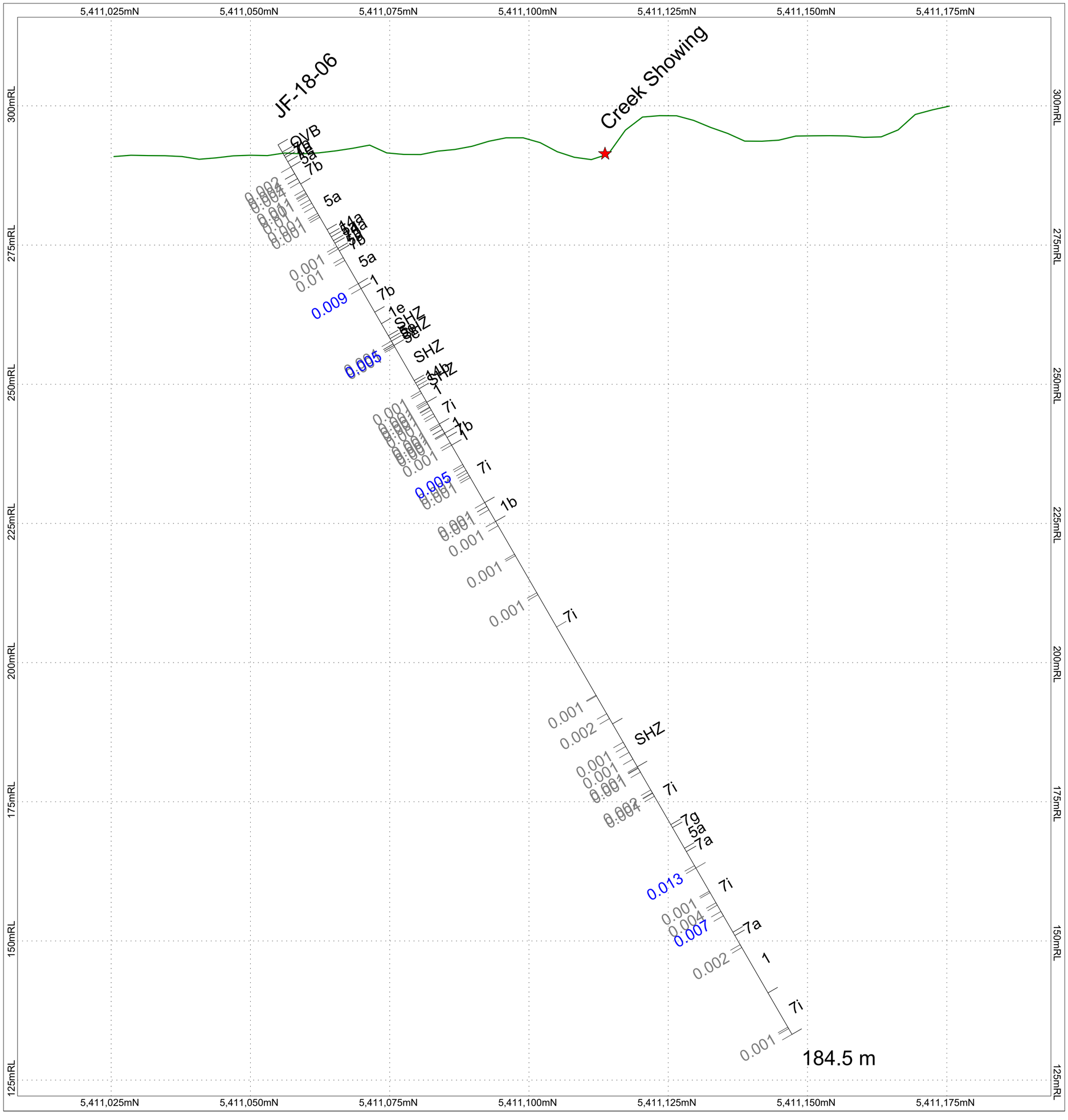
50 0 50 100

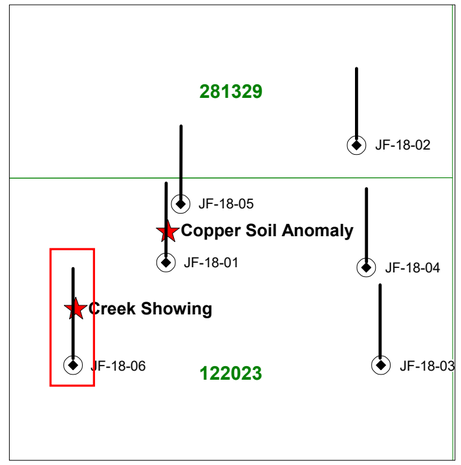
Metres

Jackfish Property Report Figure 6

2018 Copper Anomaly Drilling Location Map

Author:	T. Gill	Date:	May 2020
Projection:	UTM NAD83 Zone 16	Scale:	1 : 2 500
Mapsheet:	NTS 042D15	MNDM:	Thunder Bay Mining Division

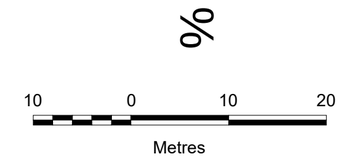




Au ppm

0.001 - 0.004
0.005 - 0.05
0.06 - 0.15
0.15 - 0.3

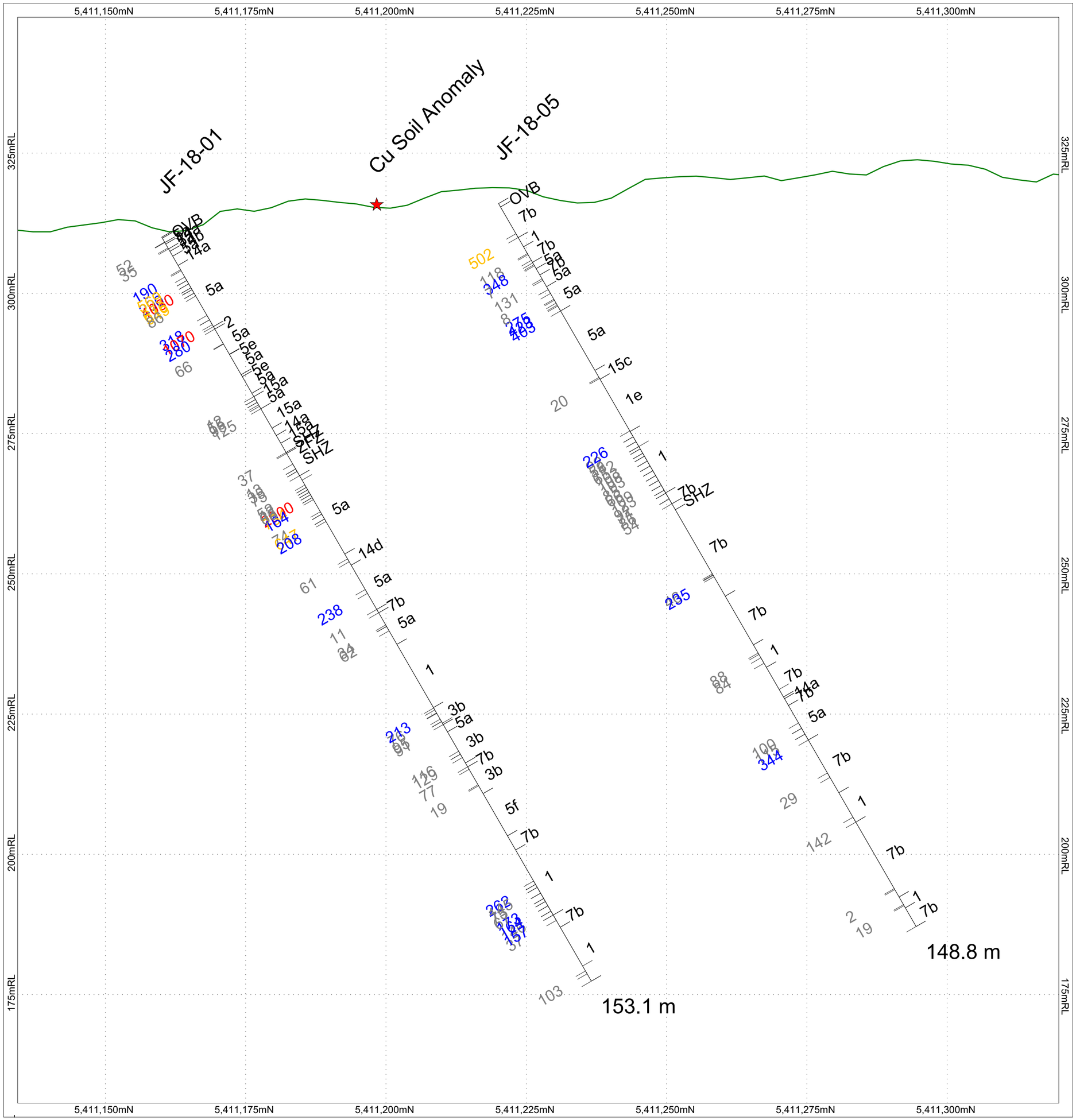
* See Drill Logsheets for Lithcodes.

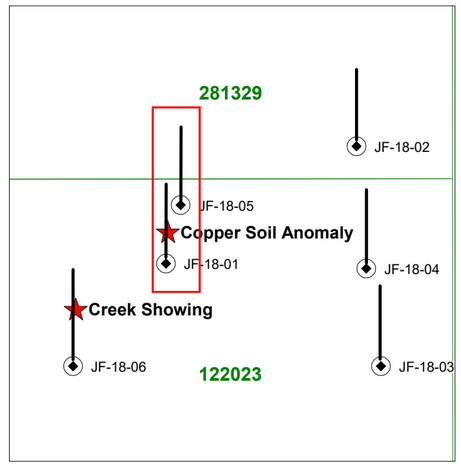


Jackfish Property
Report Figure 7a

2018 Copper Anomaly
Drill Section 1200
JF-18-06

Author: T. Gill	Date: May 2020
Projection: UTM NAD83 Zone 16	Scale: 1 : 500
Mapsheet: NTS 042D	MNDM: Thunder Bay Mining Division

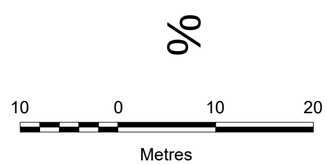




Cu ppm

0 - 150
150 - 500
500 - 1,000
1,000 - 3,140

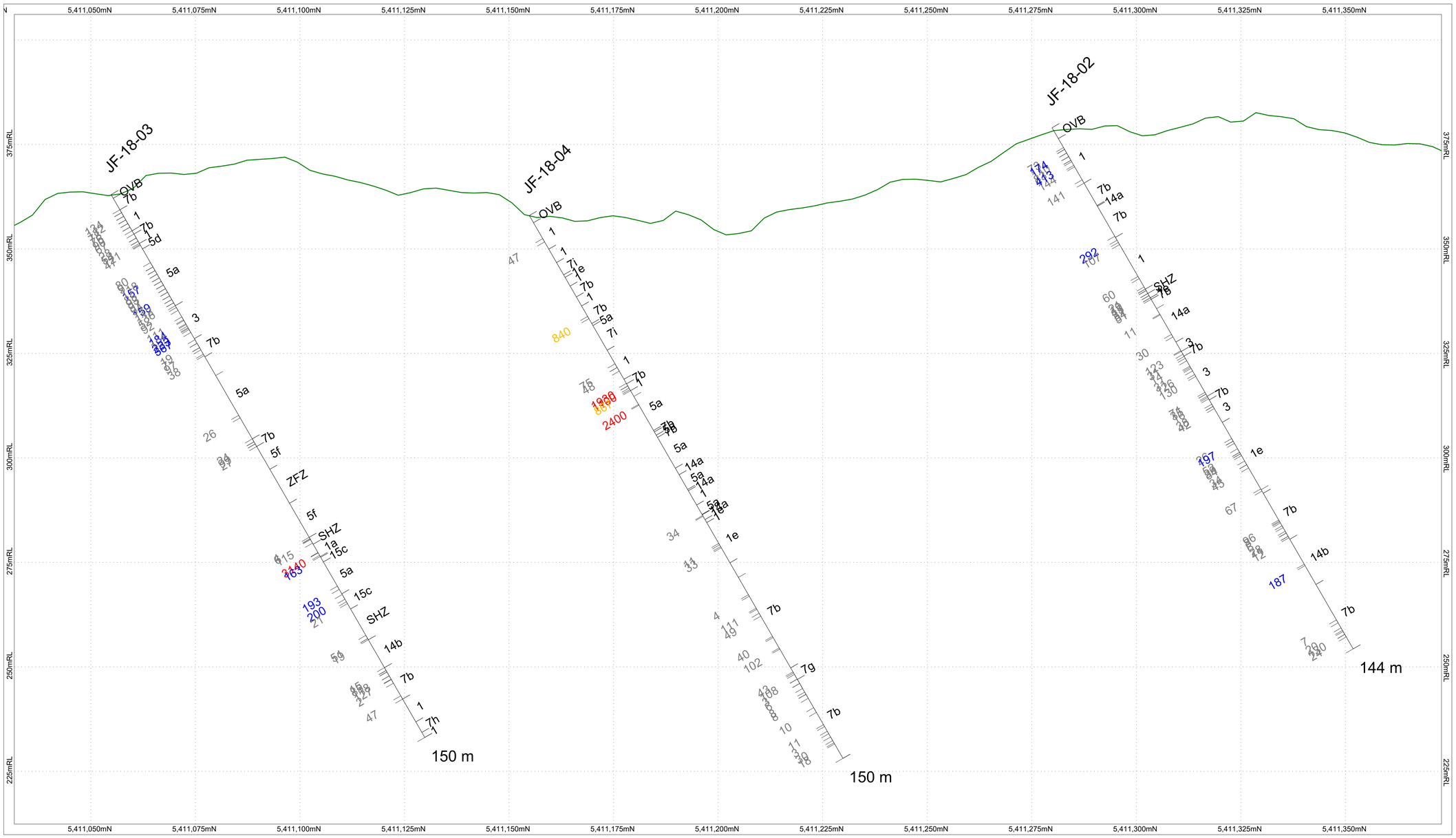
* See Drill Logsheets for Lithcodes.

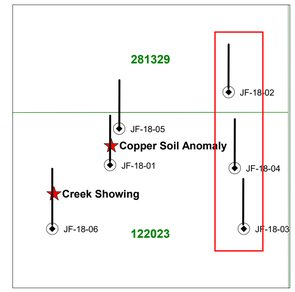


Jackfish Property
Report Figure 7b

2018 Copper Anomaly Drill Section 1300 JF-18-01 & JF-18-05

Author: T. Gill	Date: May 2020
Projection: UTM NAD83 Zone 16	Scale: 1 : 500
Mapsheet: NTS 042D	MNDM: Thunder Bay Mining Division





Cu ppm

0 - 150
150 - 500
500 - 1,000
1,000 - 3,140

* See Drill Logsheets for Lithcodes.

0/0

10 0 10 20
Metres

Jackfish Property
Report Figure 7c

2018 Copper Anomaly
Drill Section 1500
JF-18-02, JF-18-03 & JF-18-04

Author: T. Gill	Date: May 2020
Projection: UTM NAD83 Zone 16	Scale: 1 : 500
Mapsheet: NTS 042D	MNDM: Thunder Bay Mining Division

Conclusions and Recommendations

Based on the lack of significant assay results for gold or base metals from the drill program sampling and the limited area of prospective geology to pursue a VMS model directly at the copper soil anomaly target, no follow up drilling is recommended.

Cost Statement and Expenditure Distribution

All the Exploration Costs are described in Table 3 by Work Type and Associated Costs. Many of these costs for services, rentals or supplies were paid on invoices as a total charge for performing the work or as a total cost for items as shown on receipts (Appendix 3).

***Table 4**: 2018 Diamond Drill Program Exploration Activity and Associated Costs.*

Work / Cost Type	Description	From Date	To Date	Unit	Cost / Unit	Actual Cost
Exploratory Drilling – Core Drilling	Richards Exploration all in costs as per invoices	29/5/2018	30/6/2018	Invoiced	$104,675.28	$104,675
Labour	Troy Gill – Sanatana geologist	22/5/2018	24/8/2018	Day	$500	$33,000
Labour	Chris Woolverton – Sanatana geotechnician	4/6/2018	20/6/2018	Day	$350	$5950
Labour	Tim Robinson – Sanatana geological helper	4/6/2018	5/7/2018	Day	$250	$8000
Labour	Angus Gill – Contract geological helper	6/8/2018	24/8/2018	Day	$150	$2,850
Assays	Actlabs - Processing and assay all inclusive costs (including QA/QC) as invoiced	11/6/2018	16/8/2018	Invoiced	$12,586.38	$12,586
Lodging	Jackfish Cottages – Troy Gill as invoiced	23/5/2018	24/8/2018	Invoiced	$5,946.50	$5,946
Lodging	Jackfish Cottages – Chris Woolverton as invoiced	4/6/2018	19/6/2018	Invoiced	$1,369.20	$1,369
Lodging	Jackfish Cottages – Tim Robinson as invoiced	4/6/2018	4/7/2018	Invoiced	$2,648.45	$2,648
Food	All groceries as receipted	22/5/2018	17/8/2018	Receipts	$2,270.41	$2,270
Food	Drifters meals, food and beverages only, as receipted	28/5/2018	4/7/2018	Receipts	$285.21	$285
Transport	Westjet Airlines airfares – Troy Gill, ¼ of cost covering leg from Winnipeg or Toronto to Thunder Bay only	22/5/2018	24/8/2018	Invoiced	$363.25	$363
Transport	Westjet Airlines airfares – Chris Woolverton, ¼ of cost covering leg from Winnipeg or Toronto to Thunder Bay only	4/6/2018	20/6/2018	Invoiced	$290.25	$290
Transport	Westjet Airlines airfares – Tim Robinson, ¼ of cost covering leg from Winnipeg or Toronto to Thunder Bay only	4/6/2018	5/7/2018	Invoiced	$343.25	$343
Transport	Company truck use to and from site and Thunder Bay for a total of 3,906km	22/5/2018	24/8/2018	Km	$0.50	$1,953
Transport	Company ATV daily use throughout drill program and hole collar sealing and capping for a total of 56 days	23/5/2018	23/8/2018	Day	$80	$4,480
Rental	Hertz – Truck rental for field crew additional transport	4/6/2018	5/7/2018	Invoiced	$3,527.76	$3,528
Rental	Jackfish Cottages – Core shack and saw use plus hydro	4/6/2018	3/7/2018	Month	$1,000	$1,000
Rental	Reflex – EZ-Shot survey tool	11/6/2018	31/7/2018	Invoiced	$2,475.19	$2,475
Supplies	Sling Choker – Bentonite chips	15/8/2018	15/8/2018	Bag	$12.99	$104
Supplies	Garden Lake Timber – NQ core boxes	31/5/2018	15/6/2018	Each	$8.00	$1,824
Supplies	Sling Choker, Major Machine Works and Canadian Tire – supplies for capping and flagging drill hole collars	6/7/2018	12/7/2018	Receipts	$324.94	$325
Supplies	Chaltrek - DYMO tape used from previous purchase	29/5/2018	30/6/2018	Box	$18.60	$19
Supplies	Analytical Solutions Ltd. – OREAS Certified Reference Materials (standard samples), 10 used	4/6/2018	3/7/2018	Each	$5.75	$57
Supplies	Analytical Solutions Ltd. – Coarse Silica Blank, 9 used	4/6/2018	3/7/2018	Each	$4.00	$36
Supplies	Home Depot – Drilling and Core handling PPE	4/6/2018	4/6/2018	Receipt	$316.91	$317
Supplies	Chaltrek – Sample bags, 292 used	11/6/2018	11/6/2018	Each	$0.50	$146
Supplies	Richards Exploration - Core saw blades x 2	4/6/2018	3/7/2018	Each	$300	$600
Supplies	Staples – Core shack stationery	4/6/2018	4/6/2018	Receipt	$300.98	$301
Total						**$197,740**

The Exploration Cost of the entire drilling program was split between the two cell mining claims on a per metre drilled based on the location of the drill collar, for a total of 786.4m for claim 281329 and 144m for 122023 (Table 4) out of the 930.4m.

***Table 5**: Distribution of Exploration Costs across the Cell Mining Claims.*

Tenure #	Type	# Units	Authorized Instrument	Exploration Expenses	Consultation Expenses
122023	Single Cell Mining Claim	1	PR-17-11146	$30,605	$0
281329	Single Cell Mining Claim	1	PR-17-11146	$167,135	$0
			Total	**$197,740**	**$0**

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Statement of Qualifications

Troy Gill
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Telephone: 604-762-0380
Email: troy@sanatanaresources.com

I, Troy Gill, do hereby certify that:

1. I am employed as Exploration Manager for Sanatana Resources Inc.

2. I am responsible for the Report titled "Assessment Report on a Diamond Drill Program for the Jackfish Property Mineral Claims 122023 and 281329, Syine Township, Thunder Bay Mining Division, District of Thunder Bay, Ontario, NTS 42D15" dated May 21, 2020, and prepared for Sanatana Resources Inc.

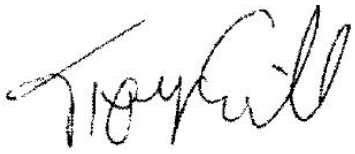
3. I hold the following academic qualifications: B.Sc. Geology (1993), University of Wollongong, NSW, Australia.

4. I am a member in good standing of the Australian Institute of Geoscientists (MAIG).

5. I have worked on a range of commodities including Au, Cu, Ni, diamonds, coal and iron ore in various geological settings in Australia and Canada since 1993.

6. This Report is compiled from data collected by or on behalf of Sanatana Resources Inc. in 2018. I conducted fieldwork, supervised the data acquisition and provided the data interpretation associated with this report.

Dated this 21st Day of May, 2020.



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Troy Gill, B.Sc., MAIG.

Exploration Manager, Sanatana Resources Inc.

Appendix 1: Diamond Drill Hole Logging Data

DRILL LOG TITLE PAGE

Hole ID	**JF-18-01**	***Project***	**Jackfish**

Section	1300	***Easting***	504758	***Source***	GPS
Site	Surface	***Northing***	5411177	***Azimuth***	0
Twp	Syine	***Elevation***	303	***Dip***	-60
		Grid	UTM NAD83	***Length***	153.10 ***m***

Logged by	Troy Gill	***DDH Started***	04-Jun-18
Geotechnician	Troy Gill	***DDH Finished***	07-Jun-18
Geotech Type	Basic	***Log Completed***	10-Jun-18
Drill Contractor	Richard's Exploration	***Last Updated***	18-Aug-18
Core Size	BTW		

DIP TESTS (other than Maxibor)

Depth	***Azimuth***	***Dip***	***Type***
5.00	0.30	-59.30	EZ

Available Analyses:	***FA*** Yes	***GRAV*** No	***MET*** No	***ICP*** Yes	***WR*** Yes

Summary

Designed to test the Cu soil anomaly.

Sanatana Resources Inc. Drill Log

Jackfish

Signature: _____

Initials: _____

JF-18-01

From	To	Litho
0.00	0.20	OVB

Drilled casing through one small boulder then straight into bedrock.

STRUCTURES					ALTERATION													VEINS								MINERALIZATION								SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
0.20	1.10	5a

Gabbro - Grey to variably pink-brown, variably coarse to medium grained, phaneritic, equigranular. Black crystals of pyroxene mixed with variably epidote altered to iron oxide stained feldspar. Very little quartz recognised. Some trace disemminated sulphide. Lower contact with diabse dike has a pyritic quartz vein running along it.

STRUCTURES					ALTERATION													VEINS								MINERALIZATION								SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
0.20	0.40	FRC	30	VW																								0.20	1.00	0	-	-									
					0.20	1.10	M												W	0.20	1.10	5	EGQV		QZ		1	65												
					FeOx M																																			
0.40	0.60	FRC	45	VW																								1.00	1.10	5	DISS	-					1.00	1.10	VR13001 B	0.003	CORE

From	To	Litho
1.10	1.40	14a

Diabase - Dark grey, fine grained, equigranular, weakly magnetic. Has two thin, irregular reddish coloured pegmatite veins running through it. Sharp but irregular lower contact. Most likely a xenolith in the gabbro.

STRUCTURES					ALTERATION													VEINS								MINERALIZATION								SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
1.10	1.40	FRC	75	VW	1.10	1.40														1.10	1.40	10						30												
																				Pegmatite																				

From	To	Litho
1.40	2.40	5a

Gabbro - Similar to first unit. Dominated by medium grained texture and hematite staining. Thin specular hematite veins present. Some epidote and minor sulphide towards end of unit.

STRUCTURES

From	To	Struct	CA	Strain
1.40	1.90	FRC	15	VW
1.90	2.40	FRC	60	VW

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
1.40	2.20	M												
2.20	2.40	M												M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
1.40	2.40	5					3	20

Fine specular hematite crystals

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
1.40	2.20	0	-	-				
2.20	2.40	10	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
2.20	2.40	VR13002 B	0.005	CORE

From	To	Litho
2.40	2.90	14b

Diabase - Green-grey, porphyritic small dark rounded to blocky phenocrysts presumably pyroxene in a dark fine matrix. Weakly magnetic. Sharp lower contact with gabbro.

STRUCTURES

From	To	Struct	CA	Strain
2.40	2.90	CNT	35	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
2.90	3.90	5a

Gabbro - starts out very course then mostly medium grained with remnants of more finer mafic xenoliths. Same hematite staining and some epidote alteration of feldspars.

STRUCTURES

From	To	Struct	CA	Strain
2.90	3.90	CNT	65	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
2.90	3.90	W												

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
3.90	5.80	14a

Diabase - Dark grey and strongly magnetic.

STRUCTURES

From	To	Struct	CA	Strain
3.90	5.80	CNT	65	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
3.90	5.80	14a

Diabase - Dark grey and strongly magnetic.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
5.80	18.40	5a

Gabbro - Grey to red-brown, similar to other gabbro units. Has many different xenolith and intrusion breccia textures and varies between coarse and medium grain size constantly. Rare grey-blue quartz grains identified. Significant dissemenated and clots of sulphide over intervals throughout. Chalcopyrite and pyrite distinguishable. Specular hematite and iron oxide-quartz-carbonate veins.Two thin greenish bands at 16.9 and 17m. Sharp intrusive contact at base.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																													5.80	6.70	0	-	-	HM	10							
5.80	18.40	BXD			5.80	18.40	M												W	5.80	18.40	5	RBV				1	10												
					FeOx M															*Qz,Hem,carb*																					
																													6.70	6.80	10	SM	-									
																																						6.70	6.90	VR13003 B	0.013	CORE
																													6.80	8.20	0	-	-									
																																						8.20	8.90	VR13004 B	0.075	CORE
																													8.20	12.10	10	DISS	-									
																																					8.90	9.60	VR13005 B	0.059	CORE
																																					9.60	10.40	VR13006 B	0.212	CORE
																																					10.40	10.80	VR13007 B	0.11	CORE
																																					10.80	11.50	VR13008 B	0.11	CORE
																																					11.50	12.10	VR13009 B	0.01	CORE
																																					12.10	12.10	VR13010 B	9.17	228
																													12.10	16.10	0	-	-	HM	10							
																																					16.10	17.00	VR13011 B	0.06	CORE
																													16.10	18.00	10	DISS	-									
																																					17.00	18.00	VR13012 B	0.146	CORE
																													18.00	18.40	0	-	-	HM	5							

From	To	Litho
18.40	18.90	2

Intermediate Volcanic - Green-grey, fine grained, variably banded. Some epidote and sericite alteration. Rare disseminated pyrite. Fulted structural lower contact.

STRUCTURES

From	To	Struct	CA	Strain
18.40	18.90	CNT	60	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
18.40	18.90	M		W										M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
18.40	18.90	5	RBV		QZ-CA		1	25

Hem

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
18.40	18.90	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
18.40	18.90	VR13013 B	0.011	CORE

From	To	Litho
18.90	24.10	5a

Gabbro - Similar to first unit, brown-grey, varying from medium to coarse grained with viens of pegmatitic perhaps granodiorite composition as well as pink-brown stained tonalite that looks to be relatively the youngest intrusive phase. Sharp intrusive lower contact with mafic dike.

STRUCTURES

From	To	Struct	CA	Strain
18.90	20.40	BXB	5	
20.40	24.00	FRC	55	
24.00	24.10	CNT	40	

tonalite

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
18.90	24.10	M												M

FeOx M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
18.90	21.40	1						
21.40	22.00	10	PEGV		QZ-TO			5
22.00	24.10	1						

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
18.90	21.90	0	-	-				
21.90	22.00	5	DISS	-				
22.00	24.10	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
21.90	22.00	VR13014 B	0.005	CORE

From	To	Litho
24.10	24.15	5e

Mafic Dike - Grey-black, porphyritic augite, olivine? and hornblend phenocrysts in an aphanitic groundmass. Strongly magnetic. Some fine desseminated pyrite and luecoxene at contacts. Some augites have a pink-bronze colour. Perhaps thin fingers of intrusive related to two other back at 17m and slightly wider one below at 28.30m. Very sharp intrsive contacts top and bottom show thin chill margin and tiny country rock xenoliths.

STRUCTURES

From	To	Struct	CA	Strain
24.10	24.15	CNT	35	

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
24.10	24.15	2	DISS	-				

From	To	Litho
24.15	28.30	5a

Gabbro - Similar to gabbro above. Lower contact with another mafic dike.

STRUCTURES

From	To	Struct	CA	Strain
24.15	28.20	FRC	60	
28.20	28.30	CNT	60	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
24.15	28.30	M												M

FeOx M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
24.15	25.80	1	PEGV		QZ-TO		1	60
25.80	25.90	5	SHV		CB		1	20

Talc-Chlorite

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
25.90	28.30	2	PEGV		QZ-TO		1	40

MINERALIZATION

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
28.30	28.70	5e

Mafic Dike - same as previous dike and probably connected / related. Also magnetic. 5cm xenolith of granodiorite and gabbro in the middle of the unit shows that it post-dates both country rocks. Sharp intrusive contacts top and bottom show same chilling and fine disseminated pyrite.

STRUCTURES

From	To	Struct	CA	Strain
28.30	28.70	CNT	40	

ALTERATION

VEINS

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
28.30	28.70	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
28.70	32.10	5a

Gabbro - Same gabbro unit. Bands of pink tinted tonalite +- carbonate

STRUCTURES

From	To	Struct	CA	Strain
28.70	32.00	FRC	65	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
28.70	32.10	M												W

FeOx M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
28.70	29.50	1	SHV				1	40

Ep

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
29.50	30.50	1	RBV		QZ-TO		2	35
30.50	32.10	1	RBV		QZ-HM		3	30

Carb, spec hem.

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
28.70	32.10	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
28.70	32.10	5a

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
32.00	32.10	CNT	50																																						

From	To	Litho
32.10	32.80	15a

Lamprophyre - Blue-grey, medium grained flakes of biotite phenocrysts in a fine mica-carbonate matrix, weakly foliated at times. Rare pyrite cubes. Sheared and carbonate veined lower contact.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
32.10	32.70	FRC	60																	32.10	32.80	1	RBV		QZ-HM				32.10	32.80	1	DISS	-								
																					Carb																			
32.70	32.80	CNT	5	M																																					
Pinches out both sides of core.																																									

From	To	Litho
32.80	35.30	5a

Gabbro - Same unit although moderately sheared against the lamprophyre above for the first 0.6m abd then more broader bands of pinkish tonalite for the remainder

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																						32.80	33.40	VR13015 B	0.001	CORE
																													32.80	34.50	2	DISS	-								
32.80	35.20	FRC	55	M																																					
					32.80	35.30	W												W	32.80	35.30	2	RBV		QZ-HM			1	60											
					FeOx W															*Carb, Py*																					
																																					33.40	34.00	VR13016 B	0.006	CORE
																																					34.00	34.50	VR13017 B	0.008	CORE
																													34.50	34.80	0	-	-								
																													34.80	35.30	3	DISS	-					34.80	35.30	VR13018 B	0.007	CORE

From	To	Litho
32.80	35.30	5a

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
35.20	35.30	CNT	65																																						

From	To	Litho
35.30	39.30	15a

Lamprophyre - similar biotite phenocrystic lamprophyre to above. Abruptly ends at contact with diabase dike.

STRUCTURES					ALTERATION														VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																				35.30	37.60	3	RBV		QZ-CB		3	40													
35.30	39.30	FOL	75	W	35.30	39.30						W																	35.30	39.30	1	DISS	-								
																				37.60	39.30	2	SHV		QZ-CB		3	70													

From	To	Litho
39.30	40.80	14a

Diabase - grey, fine grained, equigranular. Disseminated pyrite throughout. Not so magnetic. Wavy lower contact.

STRUCTURES					ALTERATION														VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
39.30	40.80	FRC	70																	39.30	40.80	1	STYV		QZ		3	30	39.30	40.80	5	DISS	-								

Fine

From	To	Litho
40.80	42.40	15a

Lamprophyre - similar to previous lamprophyre unit. Becomes progressively more foliated towards base and gradational contact.

STRUCTURES					ALTERATION														VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
40.80	42.40	FRC	60																	40.80	42.40	2	SHV		QZ-CB		6	20													

From	To	Litho
42.40	44.30	SHZ

Shearzone - Grey, strongly foliated to mylonitized country rock with stringers of qz-carb veining and alignments of micas into narrow lensoidal bands with quartz or cherty lozenges in places. Ends with refolding of bands against a fault gouge.

STRUCTURES

From	To	Struct	CA	Strain
42.40	44.30	FOL	60	VS

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
42.40	44.30	M					W		M					

Biotite S

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
42.40	44.30	1	STYV		CB		1	15

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
44.30	44.50	ZFZ

Fault Gouge Breccia - Red-brown, erratically foliated and brecciated, hematite stained, silicified with epidoate banding and carbonate filled voids. Presumably one of these very late, possibly keewenawen aged faults / shearzones like the Hematite Zone.

STRUCTURES

From	To	Struct	CA	Strain
44.30	44.50	CNT	75	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
44.30	44.50	S					W		M					M

Hm S

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type
44.30	44.30	VR13020 B	0.001	DUP
44.30	44.50	VR13019 B	0.001	CORE

From	To	Litho
44.50	49.10	SHZ

Shearzone - Continuation of the mylonitized country rock as per previous unit. Biotite various from fine to coarser grained abd strongly aligned with thin bands of quartz and minor carbonate. Large smokey quartz veins from 47.7 - 48.2m along with boudins of dark cherty rock with pink soft phenocrysts?. Slight reduction in shear intensity towards base, but a sharp contact back to country rock gabbro.

STRUCTURES

From	To	Struct	CA	Strain
44.50	49.10	FOL	75	VS

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
44.50	49.10	S					W		M					

Biotite S

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
44.50	49.10	5	SEVA		QZ		1	60

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
44.50	49.10	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
46.70	47.70	VR13021 B	0.001	CORE
47.70	48.20	VR13022 B	0.001	CORE
48.20	49.10	VR13023 B	0.003	CORE

From	To	Litho
49.10	65.20	5a

Gabbro - Same unit as previous although a significant amount of intrusive breccia texture with finer grained dark mafic xenoliths within the granodiorite sections breaking up the gabbro much more. Also more sulphide throughout and the appearance of chalcopyrite as well as pyrite and blebs of pyrrhotite (very magnetic and bronze-brown).

STRUCTURES

From	To	Struct	CA	Strain
49.10	65.20	BXD		

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
49.10	65.20	M												W

Hm M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
49.10	52.50	1	EGQV		QZ		1	40
52.50	53.00	10	RBV		QZ-HM		3	40
53.00	65.20	1	EGQV		QZ-TO		1	20

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
49.10	51.00	0	-	-				
51.00	52.00	1	DISS	-	PO	1	CP	1

Massive pyrrhotite

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
52.00	52.50	5	DISS	-				
52.50	53.00	10	DISS	-	CP	5		
53.00	53.60	5	DISS	-				
53.60	54.00	1	DISS	-				
54.00	56.50	0	-	-				
56.50	57.00	1	DISS	-				
57.00	58.00	5	DISS	-				
58.00	59.00	1	DISS	-				
59.00	65.20	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
51.00	51.50	VR13024 B	0.001	CORE
51.50	52.00	VR13025 B	0.001	CORE
52.00	52.50	VR13026 B	0.004	CORE
52.50	53.00	VR13027 B	0.04	CORE
53.00	53.60	VR13028 B	0.008	CORE
53.60	53.60	VR13030 B	0.001	BLK
53.60	54.00	VR13029 B	0.006	CORE
56.50	57.00	VR13031 B	0.003	CORE
57.00	58.00	VR13032 B	0.02	CORE
58.00	58.50	VR13033 B	0.014	CORE

From	To	Litho
65.20	67.50	14d

Diabase - Dark grey, medium grained, equigranular with large country rock xenoliths. Not as magnetic as other dikes.

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
65.20	67.50	14d

Diabase - Dark grey, medium grained, equigranular with large country rock xenoliths. Not as magnetic as other dikes.

STRUCTURES

From	To	Struct	CA	Strain
65.20	67.50	FRC	75	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
67.50	76.60	W												W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
65.20	67.50	2	LWV		QZ			
			Smokey					
67.50	76.60	2	RBV		QZ-TO		2	35

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
65.20	66.20	0	-	-				
66.20	66.80	2	DISS	-				
66.80	67.50	0	-	-				
67.50	72.50	1	DISS	-				
72.50	73.30	10	-	-				
73.30	76.60	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
66.20	66.80	VR13034 B	0.001	CORE
72.50	73.30	VR13035 B	0.007	CORE

From	To	Litho
67.50	76.60	5a

Gabbro - Same as previous units, more granodiorite intruding and bringing in fine grained mafic xenoliths with disseminated pyrite. One larger one at 172.5m could be an 80cm mafic dike. Ends at sharp intrusive contact with larger granodiorite porphyry dike.

STRUCTURES

From	To	Struct	CA	Strain
67.50	76.50	FRC	40	
76.50	76.60	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
67.50	76.60	W												W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
67.50	76.60	2	RBV		QZ-TO		2	35

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
67.50	72.50	1	DISS	-				
72.50	73.30	10	-	-				
73.30	76.60	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
72.50	73.30	VR13035 B	0.007	CORE

From	To	Litho
76.60	77.30	7b

Granodiorite - Pink-pale-grey, porphyritic, phaneritic, coarse grained. Sharp contacts either side with chilled margin gives a dike like intrusive setting. Minor coarse pyrite disseminated throughout.

STRUCTURES

From	To	Struct	CA	Strain
76.60	77.20	FRC	40	
77.20	77.30	CNT	60	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
76.60	77.30	W							W					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
76.60	77.30	1	RBV		QZ		2	15

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
76.60	77.30	2	SEUH	-				

SAMPLES

From	To	Sample	Au g/t	Type
76.60	77.30	VR13036 B	0.001	CORE
79.80	80.10	VR13037 B	0.001	CORE

From	To	Litho
76.60	77.30	7b

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																						80.10	81.00	VR13038 B	0.001	CORE

From	To	Litho
77.30	83.80	5a

Gabbro - Similar mixed gabbro unit with granodiorite intrusive breccia and thin tonalite dikes.

STRUCTURES					ALTERATION														VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																													77.30	79.80	0	-	-									
77.30	83.80	FRC	30		77.30	83.80	W											W	77.30	83.80	2	SHV		QZ		2	15													
																							Ch, Py																		
																													79.80	80.10	10	DISS	-									
																													80.10	81.00	2	DISS	-									
																													81.00	83.80	0	-	-									

From	To	Litho
83.80	96.80	1

Mafic Metavolcanic - Green-grey, mostly fine grained to aphanitic, massive, mixed with intrusive granodiorite and possibly gabbro intruding or variation in volcanic texture.

STRUCTURES					ALTERATION														VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
83.80	96.70	FRC	70																																							
					83.80	96.80	M			M								W	83.80	96.80	3	STYV		QZ-CB		5	30	83.80	96.80	0	-	-									
96.70	96.80	CNT	80																																							

From	To	Litho
96.80	100.30	3b

Meta-sediments - Blue-grey, poorly banded to massive, fine grained, variably magnetic. Several intervals of granodiorite intrusions showing the same hematite colouration and epidote altered feldspars.

STRUCTURES					ALTERATION														VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
96.80	100.30	3b

Meta-sediments - Blue-grey, poorly banded to massive, fine grained, variably magnetic. Several intervals of granodiorite intrusions showing the same hematite colouration and epidote altered feldspars.

STRUCTURES

From	To	Struct	CA	Strain
96.80	100.00	BDG	65	
100.00	100.30	CNT	20	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
96.80	100.30	VW			VW									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
96.80	100.30	2	STYV		QZ-CB		4	35

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
96.80	97.30	2	DISS	-				
97.30	97.90	0	-	-				
97.90	98.00	1	DISS	-				
98.00	99.10	0	-	-				
99.10	100.30	5	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
96.90	96.90	VR13040 B	3.37	215
96.90	97.30	VR13039 B	0.001	CORE
97.90	98.00	VR13041 B	0.001	CORE
99.20	99.70	VR13042 B	0.001	CORE
99.70	100.30	VR13043 B	0.001	CORE

From	To	Litho
100.30	101.80	5a

Gabbro - Starts off with granodiorite intrusion at the contact so difficult to tell if the gabbro is intrusive as well. Lower contact looks more like part of the sequence with the meta-sediments. Same gabbro texture with epidote altered feldspars.

STRUCTURES

From	To	Struct	CA	Strain
100.30	101.70	FRC	80	
101.70	101.80	CNT	80	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
100.30	101.80	W												W

Hm W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
100.30	101.80	1	STYV		QZ-CB		1	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

Initials: _____

From	To	Litho
101.80	108.20	3b

Meta-Sediments - Blue-grey, starts out mostly massive then from 106.4 - 107.1m thinly banded and folded, very pyritic and magnetic Iron Formation.

STRUCTURES

From	To	Struct	CA	Strain
101.80	106.40	FRC	70	
106.40	108.10	BDG	30	M
108.10	108.20	CNT	25	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
101.80	108.20	VW			VW									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
101.80	108.20	2	STYV		QZ-CB		4	80

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
101.80	105.80	0	-	-				
105.80	107.10	5	DISS	-				
107.10	108.20	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
105.80	106.40	VR13044 B	0.002	CORE
106.40	107.10	VR13045 B	0.003	CORE

From	To	Litho
108.20	109.00	7b

Granodiorite - Similar dike like significant interval of intrusion to 76.6m.

STRUCTURES

From	To	Struct	CA	Strain
108.20	109.00	FRC	70	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
108.20	109.00	W							W					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
108.20	109.00	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
109.00	114.50	3b

Meta-Sediments - Blue-grey, highly dissrupted and intruded, but mostly massive meta-seds. 112m there's a 20cm zone of small accicular amphibole phenocrysts.

STRUCTURES

From	To	Struct	CA	Strain
109.00	114.50	FRC	50	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
109.00	114.50	W			W									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
109.00	114.50	2	LWV		QZ		3	

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
109.00	114.50	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
109.00	109.50	VR13046 B	0.002	CORE
112.70	112.90	VR13047 B	0.001	CORE

From	To	Litho
114.50	123.20	5f

Pyroxenite - Pale green, mostly coarse grained, equigranular augite? Crystals at times heavily silica flooded and intruded by granodiorite in places.

STRUCTURES

From	To	Struct	CA	Strain
114.50	123.20	FRC	35	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
114.50	123.20	S			M				S					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
114.50	123.20	1	STYV		QZ-CB		2	40

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
123.20	126.10	7b

Granodiorite - Grey, hollocrystalline, equigranular, "fresh" looking compared to previous intervals that were oxidized. Xenoliths of dark mafics in patches gives a brecciated look.

STRUCTURES

From	To	Struct	CA	Strain
123.20	126.10	FRC	45	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
123.20	126.10	W			W									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
123.20	126.10	2	SHV		QZ-CB		4	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
123.20	126.10	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
126.10	139.50	1

Mafic Meta-volcanic - green, fine grained, massive, variably magnetic. Possibly wavy patterns are relic pillows? Disseminated pyrite cubes are focused around swirling quartz-carbonate veins at pillow margins or possible inter flow sediments? Especially in the lower Patches of granodiorite intrude especially in the first 5m. Sheared lower contact.

STRUCTURES

From	To	Struct	CA	Strain
126.10	139.40	FOL	40	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
126.10	139.50	W			W		W							

MG W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
126.10	130.50	3	RBV		QZ-CB		5	60
130.50	139.50	5	STYV		QZ-CB		8	15

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
126.10	132.50	0	-	-				
132.50	139.50	5	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
132.50	133.20	VR13048 B	0.004	CORE
133.20	133.20	VR13050 B	0.001	DUP
133.20	133.80	VR13049 B	0.001	CORE
133.80	135.00	VR13051 B	0.001	CORE
135.00	136.10	VR13052 B	0.001	CORE

From	To	Litho
126.10	139.50	1

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																					136.10	136.70	VR13053 B	0.001	CORE
																																					136.70	137.60	VR13054 B	0.003	CORE
																																					137.60	138.70	VR13055 B	0.001	CORE
																																					138.70	139.50	VR13056 B	0.002	CORE
139.40	139.50	CNT	10																																						

From	To	Litho
139.50	142.00	7b

Granodiorite - Similar to previous thicker intrusion of fresh looking granodiorite becoming intrusive breccia of greenstone xenoliths towards end of unit.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																					139.50	140.60	VR13057 B	0.001	CORE
139.50	142.00	FRC	60		139.50	142.00	VW					VW								139.50	142.00	1	RBV		QZ-CB		1	30	139.50	142.00	1	DISS	-							

From	To	Litho
142.00	153.10	1

Metavolcanics - Same unit as before, perhaps more massive dominated, still lots of granodiorite intruding.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
142.00	153.10	FRC	50		142.00	153.10	M			W										142.00	153.10	2	STYV		QZ-CB		2	20	142.00	153.10	2	DISS	-							
					MG M																																						
																																					151.00	151.60	VR13058 B	0.002	CORE

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GEOLOGICAL LOG FIELDS AND CODES DESCRIPTION

LITHOLOGY

Litho	Description
1	Mafic Metavolcanic (Unsubdivided)
1a	Massive basalt
1b	Pillow basalt
1c	Mafic Tuff
1d	Amygdaloidal Basalt
1f	Mafic Schist
1g	Amphibolite
1h	Mafic Gneiss
2	Intermediate Metavolcanic (Unsubdivided)
2a	Intermediate Flow
2b	Intermediate Lapilli tuff
2c	Intermediate Tuff breccia
2d	Volcanogenic sandstone to siltstone
2e	Intermediate Crystal tuff
2g	Intermediate Schist
2j	Intermediate Flow breccia
3	Felsic Metavolcanic (Unsubdivided)
3a	Felsic Flow
3b	Felsic Lapilli tuff
3c	Tuff breccia
3d	Quartz porphyritic volcanic
3e	Autoclastic flow breccia
3f	Hydrothermal breccia, with chlorite veining
3g	Felsic Schist

Litho	Description
4	Metasediment (Unsubdivided)
4a	Conglomerate, boulders and cobbles
4b	Pebbly sandstone, matrix supported
4c	Sandstone, arkosic sandstone, arenite
4d	Siltstone and mudstone
4e	Schist
4f	Chert
4g	Iron Formation
5	Mafic Intrusive (Unsubdivided)
5a	Gabbro
5b	Diorite
5c	Mafic Pegmatite
5g	Mafic Intrusive breccia
5h	Mafic Dike
6	Intermediate Intrusive (Unsubdivided)
6a	Quartz diorite
6b	Monzonite
6c	Monzodiorite with hematite-stained feldspar
6d	Syenite
6e	Feldspar porphyry
6em	Feldspar porphyry - mafic
6eq	Quartz-Feldspar Porphyry
6f	Intermediate Intrusive breccia
6g	Intermediate Dike

Litho	Description
7	Felsic Synvolcanic Intrusive (Unsubdivided)
7a	Tonalite
7b	Trondhjemite
7c	Granodiorite
7d	Chlorite bearing breccia
7e	Pegmatite dike
7f	Quartz porphyry
7g	Intrusion breccia
7h	Aplite dike
7i	Felsic Schist
8	Felsic post volcanic Intrusive (Unsubdivided)
8a	Biotite tonalite
8b	Biotite + amphibole tonalite
8c	Biotite granodiorite
8d	Biotite + amphibole granodiorite
8e	Amphibole quartz monzonite to granodiorite
8f	Quartz–potassium feldspar megacrystic granite
8g	Foliated / sheared granite
8h	Granite gneiss
8i	Xenolithic granite
8j	Granite: aplite and/or pegmatite
8k	Magnetite bearing granite

Litho	Description
9	Diabase (unsubdivided)
9a	Gabbro to quartz gabbro
9b	Plagioclase phyric diabase
9c	Fine grained diabase
9d	Medium grained diabase
9e	Coarse grained diabase
9f	Xenolithic diabase
10	Lamprophyre (unsubdivided)
10a	Porphyritic Lamprophyre (ferromagnesian)
10b	Porphyritic Lamporphyre (feldspathic)
10c	Ultramafic intrusive
OVB	overburden
QSW	quartz stockwork
QVO	quartz vein
SHZ	Shear zone
ZFZ	fault zone/gouge

ALTERATION

Min	Description
AB	Albite
AK	Ankerite
AM	Amphibole
BT	Biotite
CC	Calcite
CL	Chlorite
DL	Dolomite
EP	Epidote
FD	Feldspar
FU	Fuchsite
GP	Graphite
GT	Garnet
HB	Hornblende
LX	Leucoxene
MT	Magnetite
MU	Muscovite
PL	Plagioclase
PX	Pyroxene
SR	Sericite
TC	Talc
TR	Tourmaline

Int	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

MINERALIZATION

Style	Description
AN	Anhedral
CG	Coarse grained
DISS	Disseminated
EUH	Euhedral
FG	Fine grained
MS	Massive
MG	Medium grained
SM	Semi massive
SEUH	Sub-Euhedral
VLT	Veinlets

Min	Description
AS	Arsenopyrite
CP	Chalcopyrite
GN	Galena
MO	Molybdenite
PO	Pyrrhotite
SP	Sphalerite
HM	Hematite

VG	Description
VG	visible gold noted (historical)
VG1	weak (1 or 2 specks)
VG2	moderate (3-10 specks)
VG3	strong (>10 specks)
-	not recorded

STRUCTURE

Type	Description
-	Overburden
BDG	Bedding
BKY	Blocky
BXB	Breccia (brittle)
BXD	Breccia (ductile)
CNT	Contact
CRN	Crenulated
FLT	Fault
FOL	Foliation
FRC	Fracture
G	Gouge
LIN	Lineation
MS	Massive
SH	Shear
SSF	Small Scale Folds

Strain	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

VEINING

Style	Description
EGQV	Early Grey Quartz Vein(s)
LWV	Late White Vein(s)
RBV	Ribboned Vein
SEV	Sheeted Extension Vein(s)
SEVA	Sigmoidal Extension Vein Array
SHV	Shear Vein(s)
STYV	Stylolitic Vein

Type	Description
AK	Ankerite
CA	Calcite
CB	Carbonate
HE	Hematite
QZ	Quartz
QZ-AB	Quartz-Albite
QZ-AK	Quartz-Ankerite
QZ-CA	Quartz-Calcite
QZ-CB	Quartz-Carbonate
QZ-FU	Quartz-Fuchsite
QZ-TO	Quartz-Tourmaline
TO	Tourmaline

Sanatana Resources Inc.

CORE BOX RECORD

PROJECT: Jackfish

HOLE :	JF-18-01	**DATE:**	06/06/2018	**INTIALS:**	TSR

BOX #	FROM	TO	DYMO	PHOTO	BOX #	FROM	TO	DYMO	PHOTO
1	0.20	3.66	✓	✓	26	100.74	104.77	✓	✓
2	3.66	7.50	✓	✓	27	104.77	108.70	✓	✓
3	7.50	11.22	✓	✓	28	108.70	112.90	✓	✓
4	11.22	17.25	✓	✓	29	112.90	117.00	✓	✓
5	17.25	19.50	✓	✓	30	117.00	121.05	✓	✓
6	19.50	23.70	✓	✓	31	121.05	125.44	✓	✓
7	23.70	27.80	✓	✓	32	125.44	129.47	✓	✓
8	27.80	31.96	✓	✓	33	129.47	133.28	✓	✓
9	31.96	36.15	✓	✓	34	133.28	137.23	✓	✓
10	36.15	40.00	✓	✓	35	137.23	141.20	✓	✓
11	40.00	44.10	✓	✓	36	141.20	145.70	✓	✓
12	44.10	48.46	✓	✓	37	145.70	149.85	✓	✓
13	48.46	52.27	✓	✓	38	149.85	153.10	✓	✓
14	52.27	56.50	✓	✓	39		EOH		
15	56.50	60.78	✓	✓	40				
16	60.78	65.40	✓	✓	41				
17	65.40	69.54	✓	✓	42				
18	69.54	73.32	✓	✓	43				
19	73.32	77.29	✓	✓	44				
20	77.29	81.46	✓	✓	45				
21	81.46	85.50	✓	✓	46				
22	85.50	88.62	✓	✓	47				
23	88.62	92.48	✓	✓	48				
24	92.48	96.76	✓	✓	49				
25	96.76	100.74	✓	✓	50				

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GEOTECHNICAL LOG

PROJECT: Jackfish

HOLE :	JF-18-01	**DATE:**	05/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
0.2	1.5	1.3	0.2	25	7
1.5	3.0	1.5	0.3	32	3
3.0	4.5	1.5	1.0	19	2
4.5	6.0	1.5	0.7	13	6
6.0	7.5	1.5	0.3	29	8
7.5	9.0	1.8*	0.3	29	5
9.0	10.5	1.5	0.2	28	8
10.5	13.5	3.0	0.5	55	14
13.5	18.0	4.5	1.8	68	37
18.0	19.5	1.5	1.3	7	21
19.5	22.5	3.0	1.4	44	29
22.5	24.5	2.0	1.4	22	48
24.5	27.0	2.5	1.1	39	49
27.0	28.5	1.5	0.7	19	21
28.5	31.5	3.0	2.2	38	56
31.5	34.5	3.0	1.5	43	44
34.5	36.0	1.5	0.5	45	32
36.0	38.0	2.0	1.5	18	10
38.0	40.0	2.0	1.3	24	26
40.0	41.5	1.5	1.2	11	25
41.5	44.5	3.0	2.5	22	57
44.5	47.5	3.0	2.8	13	60
47.5	50.5	2.9	2.5	23	45
50.5	52.5	2.5	1.5	32	30
52.5	54.5	2.0	1.1	32	20

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT: Jackfish

HOLE :	JF-18-01	**DATE:**	05/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
54.5	56.5	2.0	0.6	35	24
56.5	59.0	2.5	1.5	25	24
59.0	60.5	1.3	0.1	46	16
60.5	63.0	2.1	1.0	46	28
63.0	66.0	2.8	1.5	29	28
66.0	67.5	1.5	1.3	12	9
67.5	70.5	3.0	0.9	60	24
70.5	72.0	1.4	0.4	27	11
72.0	73.5	1.4	0.7	33	9
73.5	76.5	3.0	1.5	44	28
76.5	78.0	1.5	1.2	13	11
78.0	79.5	1.5	1.3	13	7
79.5	82.5	3.0	2.6	10	23
82.5	84.0	1.5	1.0	17	8
84.0	85.5	10.3	0.5	57	10
85.5	88.5	3.0	1.2	100	20
88.5	91.5	3.0	2.0	26	32
91.5	94.5	3.0	2.8	11	47
94.5	967.5	3.0	2.3	17	39
967.5	100.5	2.9	2.3	17	34
100.5	103.5	2.9	2.2	29	35
103.5	105.0	1.5	0.8	21	16
105.0	108.0	3.0	2.8	16	50
108.0	109.5	1.5	1.0	22	9
109.5	111.0	1.5	1.2	18	35

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT:	Jackfish				
HOLE :	JF-18-01	**DATE:**	05/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
111.0	112.5	1.5	1.2	11	23
112.5	114.0	1.5	1.0	16	25
114.0	115.5	1.5	1.4	5	16
115.5	117.0	1.5	1.5	4	8
117.0	118.5	1.5	1.5	6	7
118.5	120.0	1.5	1.5	6	10
120.0	121.5	1.5	1.4	8	15
121.5	123.0	1.4	1.3	8	25
123.0	124.5	1.5	1.3	6	23
124.5	126.0	1.4	1.3	4	10
126.0	127.5	1.5	1.3	5	26
127.5	129.0	1.5	1.3	8	20
129.0	130.5	1.5	1.4	9	10
130.5	132.0	1.5	1.1	20	33
132.0	133.5	1.5	1.1	23	21
133.5	135.0	1.4	1.3	7	18
135.0	136.5	1.5	1.3	7	42
136.5	138.0	1.5	0.6	33	14
138.0	139.5	1.3	0.8	15	30
139.5	141.0	1.3	1.2	4	17
141.0	142.5	1.5	1.4	6	12
142.5	145.5	3.0	2.6	22	32
145.5	148.5	3.0	2.6	14	38
148.5	151.5	3.0	2.6	14	33
151.5	153.1	1.5	1.3	10	24

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-01			**DATE:** 06/06/2018			**INTIALS:** TSR	
Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
1	0.15	26	6.53	51	19.3	76	0.69
2	1.46	27	13.1	52	0.93	77	4.72
3	26.0	28	6.12	53	2.50	78	3.22
4	57.7	29	2.08	54	67.3	79	7.40
5	45.2	30	1.56	55	67.2	80	1.12
6	1.27	31	1.43	56	1.47	81	1.37
7	4.45	32	0.62	57	2.13	82	2.12
8	1.08	33	0.09	58	15.7	83	2.46
9	1.17	34	3.39	59	4.08	84	0.53
10	10.2	35	5.89	60	1.11	85	0.79
11	0.16	36	0.10	61	0.33	86	0.58
12	0.13	37	0.29	62	3.90	87	1.84
13	1.25	38	0.28	63	6.23	88	20.3
14	1.69	39	0.33	64	2.16	89	1.15
15	14.8	40	0.19	65	0.75	90	70.6
16	4.33	41	0.27	66	2.55	91	0.72
17	9.72	42	1.30	67	1.56	92	1.04
18	5.96	43	0.44	68	2.65	93	0.20
19	8.27	44	0.40	69	2.54	94	0.99
20	2.83	45	0.26	70	1.08	95	1.34
21	0.66	46	1.75	71	0.97	96	0.59
22	5.90	47	0.30	72	2.06	97	0.35
23	1.56	48	0.11	73	0.17	98	0.33
24	6.94	49	0.22	74	2.30	99	2.56
25	1.28	50	4.87	75	2.21	100	0.35

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-01			**DATE:** 06/06/2018			**INTIALS:** TSR	
Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
101	2.49	126	32.6	151	2.38	176	
102	0.72	127	14.6	152	7.36	177	
103	0.93	128	3.68	153	26.3	178	
104	1.44	129	12.5	154	EOH	179	
105	0.36	130	65.3	155		180	
106	74.1	131	17.8	156		181	
107	135	132	29.1	157		182	
108	70.5	133	23.4	158		183	
109	59.5	134	4.70	159		184	
110	55.2	135	30.9	160		185	
111	40.3	136	23.8	161		186	
112	20.8	137	70.9	162		187	
113	23.7	138	28.9	163		188	
114	562	139	37.8	164		189	
115	0.81	140	1.01	165		190	
116	0.27	141	17.1	166		191	
117	0.21	142	47.4	167		192	
118	0.47	143	0.78	168		193	
119	0.55	144	0.60	169		194	
120	127	145	2.83	170		195	
121	13.7	146	10.9	171		196	
122	4.60	147	35.1	172		197	
123	0.80	148	49.9	173		198	
124	3.28	149	86.3	174		199	
125	12.0	150	11.1	175		200	

Sanatana Resources Inc.

CHAIN OF CUSTODY

Laboratory:	ACTLABS THUNDER BAY		
Shipper:	SANATANA	Location:	JACKFISH
Pallet Box No:	N/A	Waybill No:	N/A
Packed By:	CHRIS WOOLVERTON	Date Packed:	
Date Shipped:		Date Received:	

	Sample From	Sample To	Tag No.	Received Intact (✓)
1	VR13001B	VR13012B	0001324	✓
2	VR13013B	VR13025B	0001380	✓
3	VR13026B	VR13037B	0001336	✓
4	VR13038B	VR13050B	0001204	✓
5	VR13051B	VR13058B	0001211	✓
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
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DRILL LOG TITLE PAGE

Hole ID	**JF-18-02**	***Project***	**Jackfish**

Section	1500	***Easting***	504941	***Source***	GPS
Site	Surface	***Northing***	5411295	***Azimuth***	0
Twp	Syine	***Elevation***	364	***Dip***	-60
		Grid	UTM NAD83	***Length***	144.00 ***m***

Logged by	Troy Gill	***DDH Started***	11-Jun-18
Geotechnician	Chris Woolverton	***DDH Finished***	13-Jun-18
Geotech Type	Basic	***Log Completed***	15-Jun-18
Drill Contractor	Richard's Exploration	***Last Updated***	18-Aug-18
Core Size	BTW		

DIP TESTS (other than Maxibor)

Depth	***Azimuth***	***Dip***	***Type***
5.00	2.70	-61.00	EZ

Available Analyses:	***FA*** Yes	***GRAV*** No	***MET*** No	***ICP*** No	***WR*** No

Summary

Designed to test coincident Max-Min anomaly and magnetic high.

Sanatana Resources Inc. Drill Log

Jackfish

Signature: _____

Initials: _____

JF-18-02

From	To	Litho
0.00	3.00	OVB

STRUCTURES					ALTERATION													VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
3.00	15.30	1

Mafic Metavolcanics - green-grey, fine grained, massive to relic flow textures, presumably basalt with significant number of granodiorite diking, especisally 10.7-14.4m and xenolithic intrusive breccia, especially around 10m. Very close to intrusive margin type of texture due to size and number of xenoliths. Carbonate vein brecciation within mafic intervals. Sericite along fractures. Pervassive chlorite alteration. Disseminated pyrite throughout mafic.

STRUCTURES					ALTERATION													VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
3.00	15.30	FRC	50	VW	3.00	15.30	M			W	VW	M								3.00	15.30	5	QVB	RBV	QZ-CB	QZ-HM		8	60	3.00	15.30	5	DISS	-								
					HM M																																	5.50	5.50	VR13060 B	0.001	BLK
																																					5.50	6.00	VR13059 B	0.005	CORE
																																						6.00	7.00	VR13061 B	0.008	CORE
																																					7.00	8.00	VR13062 B	0.003	CORE
																																						8.00	9.00	VR13063 B	0.004	CORE
																																					9.00	9.40	VR13064 B	0.012	CORE
																																						10.40	10.80	VR13065 B	0.003	CORE
																																					14.40	15.30	VR13066 B	0.003	CORE

From	To	Litho
15.30	21.50	7b

Granodiorite - Grey, coarse grained, hollocrystaline, equigranular, some patches with lots of mafic xenoliths with some that are fairly magnetic.

STRUCTURES					ALTERATION													VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
15.30	21.50	CNT	60		15.30	21.50	W					W								15.30	21.50	1	RBV		QZ-CB			2	30												
					HM W																																					

From	To	Litho
15.30	21.50	7b

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																					30.00	31.10	VR13067 B	0.027	CORE

From	To	Litho
21.50	21.70	14a

Diabase - Grey, fine grained, massive, strongly magnetic.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
21.50	21.70	CNT	60		21.50	21.70	W												W																						

From	To	Litho
21.70	30.30	7b

Granodiorite - continuation of the same unit. Could be more small patches of diabase dike inter-fingering down to 27m. Ends at a significant quartz vein.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
21.70	30.30	CNT	40	W																21.70	30.30	1	RBV		QZ-CB		2	30	21.70	30.30	1	DISS	-									

From	To	Litho
30.30	44.60	1

Metavolcanics - Grey, similar carbonate altered, weakly foliated, variably pyritic and magnetic, what presumably was a mafic volcanic sequence. 15cm tonalite dike at 40m.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
30.30	44.60	FRC	60	W	30.30	44.60	M	W		W		M								30.30	44.60	2	RBV		QZ-CB		3	30	30.30	44.60	1	DISS	-									
																																					31.70	32.30	VR13068 B	0.004	CORE
																																					41.10	41.10	VR13070 B	0.517	218
																																					41.10	41.70	VR13069 B	0.002	CORE
																																					44.00	44.60	VR13071 B	0.001	CORE
																																					44.60	45.00	VR13072 B	0.001	CORE

From	To	Litho
30.30	44.60	1

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																					45.00	45.80	VR13073 B	0.001	CORE
																																					45.80	46.40	VR13074 B	0.001	CORE
																																					46.40	47.00	VR13075 B	0.002	CORE

From	To	Litho
44.60	45.80	SHZ

Shear Zone - Dark green, chloritic, pyritic, strongly foliated. Two white quartz veins towards middle of unit.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
44.60	45.80	FOL	70	VS	44.60	45.80	S			S		M								44.60	45.80	5	LWV		QZ-CB		2	20	44.60	45.80	20	DISS	-									

From	To	Litho
45.80	47.00	1e

Mafic Schist - Light grey, highly foliated, carbonate altered biotite schist. Much less pyrite that the shear zone.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
45.80	47.00	FOL	75	S	45.80	47.00	M					M								45.80	47.00	1	RBV		QZ-CB		1	40	45.80	47.00	2	DISS	-									

From	To	Litho
47.00	47.40	7b

Granodiorite - pink-brown-grey, short interval of grasnodiorite similar to other unit, very hematite coloured.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
47.00	47.40	FRC	70		47.00	47.40	M													47.00	47.40	1	STYV		CB		1	30	47.00	47.40	2	DISS	-						47.00	47.40	VR13076 B	0.001	CORE
					HM M																																				

From	To	Litho
47.40	59.20	14a

Diabase - Grey, mostly massive with one or two small patches of epidote altered feldspar phenocrysts. Moderately magnetic. Xenoliths of coountry rock granodiorite and possibly sulphidic meta-sediments.

STRUCTURES

From	To	Struct	CA	Strain
47.40	59.20	FRC	60	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
47.40	59.20	W												W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
47.40	59.20	2	RBV		QZ-CB		3	50

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
47.40	59.20	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
51.50	51.70	VR13077 B	0.001	CORE
57.10	57.80	VR13078 B	0.001	CORE
61.60	61.60	VR13080 B	0.022	DUP
61.60	61.80	VR13079 B	0.022	CORE
62.60	63.20	VR13081 B	0.019	CORE

From	To	Litho
59.20	61.80	3

Meta-sediments - Grey, weakly banded, variably magnetic metamorphosed mudstone or iron formation. Wavy ribbons of carbonate veins follow along bedding / foliation planes, but not schist.

STRUCTURES

From	To	Struct	CA	Strain
59.20	61.80	BDG	15	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
59.20	61.80	M					M							W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
59.20	61.80	5	QVB		CB		10	40

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
59.20	61.80	2	DISS	-				

From	To	Litho
61.80	63.10	7b

Granodiorite - Grey, similar to previous units. Two large tonalite dikes at base of unit, both about 20cm separated by 10cm of granodiorite and contain pyrite.

STRUCTURES

From	To	Struct	CA	Strain
61.80	63.10	FRC	60	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
61.80	63.10													

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
61.80	63.10	1	RBV		QZ		1	60

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
61.80	63.10	2	DISS	-				

From	To	Litho
63.10	74.20	3

Meta-sediments - Grey, continuation of the same metasedimentary unit. Moderatley well banded fine grained units interbedded with fine grained massive units, originally thought to be dikes but really don't have the texure or intrusive occurrence. All very magnetic.

STRUCTURES

From	To	Struct	CA	Strain
63.10	74.20	BDG	30	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
63.10	74.20	M					M							W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
63.10	74.20	2	QVB		QZ-CB		5	40

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
63.10	74.20	2	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
63.70	64.40	VR13082 B	0.026	CORE
65.90	66.20	VR13083 B	0.017	CORE
66.50	67.20	VR13084 B	0.013	CORE
68.20	68.70	VR13085 B	0.004	CORE
73.10	73.60	VR13086 B	0.001	CORE
73.60	74.20	VR13087 B	0.001	CORE

From	To	Litho
74.20	75.20	7b

Grabodiorite - Light grey dike of granodiorite in the meta-seds. Some disseminated pyrite, especially around xenoliths of mineralized seds.

STRUCTURES

From	To	Struct	CA	Strain
74.20	75.20	FRC	60	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
74.20	75.20	1	RBV		QZ-CA		2	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
74.20	75.20	2	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
74.50	74.90	VR13088 B	0.001	CORE

From	To	Litho
75.20	81.40	3

meta-sediments - back into the same meta-seds unit. Upper section with lots more pyrite. Becomes epidote and chlorite altered from 79.6m and progressively more foliated towards base of unit until it becomes a schist.

STRUCTURES

From	To	Struct	CA	Strain
75.20	79.90	BDG	30	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
75.20	79.60	W					W							W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
75.20	81.40	2	QVB		QZ-CB		3	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
75.20	76.40	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
76.40	76.40	VR13090 B	0.001	BLK

From	To	Litho
75.20	81.40	3

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																					76.40	77.00	VR13089 B	0.015	CORE
																													76.40	77.60	15	DISS	-							
																																					77.00	77.60	VR13091 B	0.004	CORE
																													77.60	81.40	1	DISS	-							
					79.60	81.40	M			M		M							M																						
79.90	81.40	FOL	50	M																																					

From	To	Litho
81.40	101.00	1e

Mafic Schist - Brown-grye-white, strongly foliated, mainly biotite-quartz schist. Trace disseminaated pyrite scattered throughout but mainly concentrated around quartz veins where it becomes semi massive at times. Blue-grey coloured mineral occurs within the foliation as well as in veins, possibly reibeckite? See 85m.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																													81.40	85.90	1	DISS	-							
																				81.40	93.10	10	QVB		QZ-CB		5	20												
81.40	101.00	FOL	60	S																																					
																																				85.90	86.60	VR13092 B	0.001	CORE
																													85.90	94.00	5	DISS	-							
																																					86.60	87.20	VR13093 B	0.003	CORE
																																					88.70	89.70	VR13094 B	0.001	CORE
																																					89.70	90.10	VR13095 B	0.001	CORE
																																					90.10	90.60	VR13096 B	0.001	CORE
																																					92.10	93.10	VR13097 B	0.001	CORE
																																					93.10	94.00	VR13098 B	0.001	CORE
																				93.10	101.00	3	RBV		QZ-CB		3	40												
																													94.00	101.00	1	DISS	-							
																																					99.80	99.80	VR13100 B	3.57	215
																																					99.80	100.40	VR13099 B	0.001	CORE

From	To	Litho
101.00	113.70	7b

Granodiorite - Brown-grey, similar to other granodiorite units, some hematite colouration. Minor disseminated pyrite with concentrations around both the earlier quartz-tourmaline veins and the later qtz-carb-hem veins. Two thin ultramafic? Dikes at 107 and 108m (~5cm).

STRUCTURES

From	To	Struct	CA	Strain
101.00	113.60	FRC	55	
113.60	113.70	CNT	65	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
101.00	113.70	W							W					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
101.00	113.70	5	RBV	RBV	QZ-TO	QZ-HM	4	45

#2 CA = 25 and cross cuts #1, later

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
101.00	113.70	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
108.40	108.70	VR13101 B	0.001	CORE
108.90	109.20	VR13102 B	0.001	CORE
110.00	110.50	VR13103 B	0.001	CORE
111.50	112.00	VR13104 B	0.002	CORE
112.00	112.90	VR13105 B	0.001	CORE
112.90	113.30	VR13106 B	0.003	CORE

From	To	Litho
113.70	126.20	14b

Diabase Dike - Dark grey, medium grained, massive, magnetic. Well jointed, but few veins, mainly at upper and lower contacts. Late calcite-hematite veins.

STRUCTURES

From	To	Struct	CA	Strain
113.70	126.10	FRC	65	
		Other FRC CA=25		
126.10	126.20	CNT	25	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
113.70	126.20	VW			VW									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
113.70	126.20	1	RBV		CA		1	40

HM, EP

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
113.70	126.20	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
120.60	121.00	VR13107 B	0.001	CORE

JF-18-02

Initials: _____

From	To	Litho
126.20	144.00	7b

Granodiorite - Orange-brown-black, similar to other intervals, but very strongly hematite stained to the point that some could convincingly be syenitic, especially 138.2-138.9m. XRF sample requested to verify. Three pyritic quartz veins around this interval.

STRUCTURES

From	To	Struct	CA	Strain
126.20	144.00	FRC	50	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
126.20	144.00													

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
126.20	144.00	2	RBV				3	35

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
126.20	144.00	2	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
136.00	136.80	VR13108 B	0.001	CORE
138.20	138.20	VR13110 B	0.003	DUP
138.20	138.90	VR13109 B	0.002	CORE
139.20	140.00	VR13111 B	0.002	CORE
140.00	140.70	VR13112 B	0.001	CORE

Sanatana Resources Inc.

GEOLOGICAL LOG FIELDS AND CODES DESCRIPTION

LITHOLOGY

Litho	Description
1	Mafic Metavolcanic (Unsubdivided)
1a	Massive basalt
1b	Pillow basalt
1c	Mafic Tuff
1d	Amygdaloidal Basalt
1f	Mafic Schist
1g	Amphibolite
1h	Mafic Gneiss
2	Intermediate Metavolcanic (Unsubdivided)
2a	Intermediate Flow
2b	Intermediate Lapilli tuff
2c	Intermediate Tuff breccia
2d	Volcanogenic sandstone to siltstone
2e	Intermediate Crystal tuff
2g	Intermediate Schist
2j	Intermediate Flow breccia
3	Felsic Metavolcanic (Unsubdivided)
3a	Felsic Flow
3b	Felsic Lapilli tuff
3c	Tuff breccia
3d	Quartz porphyritic volcanic
3e	Autoclastic flow breccia
3f	Hydrothermal breccia, with chlorite veining
3g	Felsic Schist

Litho	Description
4	Metasediment (Unsubdivided)
4a	Conglomerate, boulders and cobbles
4b	Pebbly sandstone, matrix supported
4c	Sandstone, arkosic sandstone, arenite
4d	Siltstone and mudstone
4e	Schist
4f	Chert
4g	Iron Formation
5	Mafic Intrusive (Unsubdivided)
5a	Gabbro
5b	Diorite
5c	Mafic Pegmatite
5g	Mafic Intrusive breccia
5h	Mafic Dike
6	Intermediate Intrusive (Unsubdivided)
6a	Quartz diorite
6b	Monzonite
6c	Monzodiorite with hematite-stained feldspar
6d	Syenite
6e	Feldspar porphyry
6em	Feldspar porphyry - mafic
6eq	Quartz-Feldspar Porphyry
6f	Intermediate Intrusive breccia
6g	Intermediate Dike

Litho	Description
7	Felsic Synvolcanic Intrusive (Unsubdivided)
7a	Tonalite
7b	Trondhjemite
7c	Granodiorite
7d	Chlorite bearing breccia
7e	Pegmatite dike
7f	Quartz porphyry
7g	Intrusion breccia
7h	Aplite dike
7i	Felsic Schist
8	Felsic post volcanic Intrusive (Unsubdivided)
8a	Biotite tonalite
8b	Biotite + amphibole tonalite
8c	Biotite granodiorite
8d	Biotite + amphibole granodiorite
8e	Amphibole quartz monzonite to granodiorite
8f	Quartz–potassium feldspar megacrystic granite
8g	Foliated / sheared granite
8h	Granite gneiss
8i	Xenolithic granite
8j	Granite: aplite and/or pegmatite
8k	Magnetite bearing granite

Litho	Description
9	Diabase (unsubdivided)
9a	Gabbro to quartz gabbro
9b	Plagioclase phyric diabase
9c	Fine grained diabase
9d	Medium grained diabase
9e	Coarse grained diabase
9f	Xenolithic diabase
10	Lamprophyre (unsubdivided)
10a	Porphyritic Lamprophyre (ferromagnesian)
10b	Porphyritic Lamporphyre (feldspathic)
10c	Ultramafic intrusive
OVB	overburden
QSW	quartz stockwork
QVO	quartz vein
SHZ	Shear zone
ZFZ	fault zone/gouge

ALTERATION

Min	Description
AB	Albite
AK	Ankerite
AM	Amphibole
BT	Biotite
CC	Calcite
CL	Chlorite
DL	Dolomite
EP	Epidote
FD	Feldspar
FU	Fuchsite
GP	Graphite
GT	Garnet
HB	Hornblende
LX	Leucoxene
MT	Magnetite
MU	Muscovite
PL	Plagioclase
PX	Pyroxene
SR	Sericite
TC	Talc
TR	Tourmaline

Int	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

MINERALIZATION

Style	Description
AN	Anhedral
CG	Coarse grained
DISS	Disseminated
EUH	Euhedral
FG	Fine grained
MS	Massive
MG	Medium grained
SM	Semi massive
SEUH	Sub-Euhedral
VLT	Veinlets

Min	Description
AS	Arsenopyrite
CP	Chalcopyrite
GN	Galena
MO	Molybdenite
PO	Pyrrhotite
SP	Sphalerite
HM	Hematite

VG	Description
VG	visible gold noted (historical)
VG1	weak (1 or 2 specks)
VG2	moderate (3-10 specks)
VG3	strong (>10 specks)
-	not recorded

STRUCTURE

Type	Description
-	Overburden
BDG	Bedding
BKY	Blocky
BXB	Breccia (brittle)
BXD	Breccia (ductile)
CNT	Contact
CRN	Crenulated
FLT	Fault
FOL	Foliation
FRC	Fracture
G	Gouge
LIN	Lineation
MS	Massive
SH	Shear
SSF	Small Scale Folds

Strain	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

VEINING

Style	Description
EGQV	Early Grey Quartz Vein(s)
LWV	Late White Vein(s)
RBV	Ribboned Vein
SEV	Sheeted Extension Vein(s)
SEVA	Sigmoidal Extension Vein Array
SHV	Shear Vein(s)
STYV	Stylolitic Vein

Type	Description
AK	Ankerite
CA	Calcite
CB	Carbonate
HE	Hematite
QZ	Quartz
QZ-AB	Quartz-Albite
QZ-AK	Quartz-Ankerite
QZ-CA	Quartz-Calcite
QZ-CB	Quartz-Carbonate
QZ-FU	Quartz-Fuchsite
QZ-TO	Quartz-Tourmaline
TO	Tourmaline

Sanatana Resources Inc.

CORE BOX RECORD

PROJECT: Jackfish

HOLE :	JF-18-02	**DATE:**	12/06/2018	**INTIALS:**	TSR

BOX #	FROM	TO	DYMO	PHOTO	BOX #	FROM	TO	DYMO	PHOTO
1	3.00	6.95	✓	✓	26	105.29	109.55	✓	✓
2	6.95	11.00	✓	✓	27	109.55	113.70	✓	✓
3	11.00	15.00	✓	✓	28	113.70	117.72	✓	✓
4	15.00	19.10	✓	✓	29	117.72	121.50	✓	✓
5	19.10	23.30	✓	✓	30	121.50	125.56	✓	✓
6	23.30	27.45	✓	✓	31	125.56	129.61	✓	✓
7	27.45	31.55	✓	✓	32	129.61	133.64	✓	✓
8	31.55	35.54	✓	✓	33	133.64	137.76	✓	✓
9	35.54	39.38	✓	✓	34	137.76	141.87	✓	✓
10	39.38	43.42	✓	✓	35	141.87	144.00	✓	✓
11	43.42	46.87	✓	✓	36		EOH		
12	46.87	50.43	✓	✓	37				
13	50.43	55.20	✓	✓	38				
14	55.20	59.13	✓	✓	39				
15	59.13	63.30	✓	✓	40				
16	63.30	67.55	✓	✓	41				
17	67.55	71.68	✓	✓	42				
18	71.68	75.84	✓	✓	43				
19	75.84	80.23	✓	✓	44				
20	80.23	84.44	✓	✓	45				
21	84.44	88.74	✓	✓	46				
22	88.74	92.86	✓	✓	47				
23	92.86	97.07	✓	✓	48				
24	97.07	101.26	✓	✓	49				
25	101.26	105.29	✓	✓	50				

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT: Jackfish

HOLE :	JF-18-02	**DATE:**	13/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
3.0	6.0	3.1	1.8	50	11
6.0	7.5	1.4	0.8	15	25
7.5	10.5	2.8	2.1	42	20
10.5	12.0	1.8	1.5	9	19
12.0	15.0	3.0	2.5	18	12
15.0	18.0	3.0	2.8	14	46
18.0	21.0	3.0	2.6	9	24
21.0	24.0	3.0	2.7	10	10
24.0	27.0	3.0	3.0	6	39
27.0	30.0	3.0	2.8	11	30
30.0	33.0	3.1	1.9	50	23
33.0	36.0	3.1	1.4	51	28
36.0	39.0	3.1	1.5	45	25
39.0	42.0	3.0	2.8	12	29
42.0	45.0	3.0	2.7	50	30
45.0	48.0	3.2	1.4	100	43
48.0	49.5	1.7	1.5	8	50
49.5	52.5	2.9	0.9	19	27
52.5	54.0	1.5	1.5	5	75
54.0	57.0	3.0	2.3	32	65
57.0	60.0	3.1	2.2	27	75
60.0	61.5	1.5	1.4	4	100
61.5	64.5	3.0	2.8	7	60
64.5	67.5	3.0	2.8	13	100
67.5	70.5	2.9	2.4	24	40

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT: Jackfish

HOLE :	JF-18-02	**DATE:**	13/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
70.5	73.5	3.1	3.0	18	40
73.5	76.5	2.9	2.7	6	42
76.5	79.5	3.0	3.0	8	70
79.5	81.0	1.5	1.4	1	45
81.0	84.0	3.0	3.0	5	50
84.0	87.0	3.0	3.0	8	22
87.0	90.0	3.0	3.0	7	65
90.0	93.0	3.0	3.0	4	55
93.0	96.0	3.0	1.8	44	42
96.0	99.0	3.0	3.0	7	32
99.0	102.0	3.0	2.6	14	35
102.0	105.0	3.0	1.6	38	31
105.0	108.0	3.1	2.8	15	48
108.0	111.0	2.9	2.7	8	23
111.0	112.5	1.5	1.4	7	10
112.5	115.5	3.1	2.5	22	18
115.5	118.5	3.0	1.4	80	3
118.5	121.5	3.1	0.9	80	5
121.5	123.0	1.5	1.2	11	7
123.0	126.0	3.0	2.0	30	33
126.0	129.0	3.0	3.0	9	37
129.0	132.0	3.0	2.7	14	22
132.0	135.0	3.0	2.9	10	38
135.0	138.0	3.0	2.9	18	27
138.0	141.0	3.1	2.6	18	36
141.0	144.0	2.9	2.8	11	32

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-02 **DATE:** 12/06/2018 **INTIALS:** TSR

Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
1		26	60.7	51	9.82	76	0.630
2		27	9.81	52	14.6	77	1.90
3	26.5	28	58.8	53	1.20	78	1.16
4	24.8	29	27.1	54	0.540	79	0.230
5	81.7	30	25.1	55	2.14	80	0.850
6	22.8	31	0.340	56	3.12	81	3.18
7	29.1	32	10.1	57	0.740	82	0.370
8	9.43	33	2.71	58	14.1	83	0.270
9	12.7	34	11.4	59	0.870	84	0.230
10	4.10	35	21.3	60	1.76	85	0.380
11	10.0	36	10.4	61	4.38	86	0.860
12	3.06	37	22.3	62	8.77	87	0.180
13	0.630	38	16.9	63	2.81	88	0.700
14	0.310	39	18.9	64	10.7	89	0.230
15	7.03	40	6.34	65	5.71	90	0.280
16	0.110	41	85.2	66	0.400	91	0.160
17	1.94	42	56.2	67	23.6	92	0.300
18	1.83	43	2.42	68	46.5	93	0.210
19	28.0	44	16.0	69	3.63	94	0.880
20	0.855	45	0.230	70	1.61	95	0.270
21	1.03	46	0.450	71	9.62	96	0.190
22	25.1	47	3.43	72	12.8	97	0.350
23	37.6	48	0.260	73	5.63	98	0.230
24	56.0	49	1.64	74	18.5	99	12.5
25	14.3	50	2.77	75	0.220	100	35.3

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-02 **DATE:** 12/06/2018 **INTIALS:** TSR

Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
101	22.7	126	8.47	151		176	
102	0.420	127	2.66	152		177	
103	7.50	128	54.6	153		178	
104	0.480	129	2.18	154		179	
105	0.550	130	0.860	155		180	
106	0.890	131	0.290	156		181	
107	3.10	132	24.2	157		182	
108	20.9	133	2.88	158		183	
109	0.430	134	1.65	159		184	
110	0.230	135	14.0	160		185	
111	0.190	136	1.30	161		186	
112	0.080	137	6.42	162		187	
113	0.200	138	1.67	163		188	
114	30.6	139	0.330	164		189	
115	16.9	140	0.360	165		190	
116	19.3	141	4.06	166		191	
117	31.1	142	4.35	167		192	
118	28.3	143	0.818	168		193	
119	5.46	144	8.70	169		194	
120	19.5	145	EOH	170		195	
121	35.8	146		171		196	
122	30.8	147		172		197	
123	24.4	148		173		198	
124	27.5	149		174		199	
125	16.6	150		175		200	

Sanatana Resources Inc.

CHAIN OF CUSTODY

Laboratory:	ACT LABS, THUNDER BAY ON.		
Shipper:	SANATANA	Location:	JACKFISH
Pallet Box No:	N/A	Waybill No:	N/A
Packed By:	CHRIS WOOLVERTON	Date Packed:	JUNE 14, 2018
Date Shipped:	JUNE 15, 2018	Date Received:	

	Sample From	Sample To	Tag No.	Received Intact (✓)
1	VR13059B	VR13070B	0001300	✓
2	VR13071B	VR13080B	0001220	✓
3	VR13081B	VR13090B	0001388	✓
4	VR13091B	VR13100B	0001379	✓
5	VR13101B	VR13112B	0001366	✓
6				
7				
8				
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24				
25				

DRILL LOG TITLE PAGE

Hole ID	**JF-18-03**	***Project***	**Jackfish**

Section	1500	***Easting***	504967	***Source***	GPS
Site	Surface	***Northing***	5411064	***Azimuth***	0
Twp	Syine	***Elevation***	360	***Dip***	-60
		Grid	UTM NAD83	***Length***	150.00 ***m***

Logged by	Troy Gill	***DDH Started***	15-Jun-18
Geotechnician	Chris Woolverton	***DDH Finished***	17-Jun-18
Geotech Type	Basic	***Log Completed***	18-Jun-18
Drill Contractor	Richard's Exploration	***Last Updated***	18-Aug-18
Core Size	BTW		

DIP TESTS (other than Maxibor)

Depth	***Azimuth***	***Dip***	***Type***
145.00	10.60	-59.90	EZ

Available Analyses:	***FA*** Yes	***GRAV*** No	***MET*** No	***ICP*** Yes	***WR*** Yes

Summary

Designed to test a Max-Min anomaly and structural break in the mag.

Sanatana Resources Inc. Drill Log
Jackfish

Signature: ______________________

JF-18-03

Initials: ________

From	To	Litho
0.00	1.00	OVB

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
1.00	4.20	7b

Granodiorite Instruive Breccia - Grey, large xenoliths of gabbro textured mafic up to 50cm intervals of core. Grano is coarse grained, hollocrystaline, a little porphyritic to mostly equigranular. Gabbro is simply feldspar and a dark mineral, probably amphibole (metamorphosed), slight epidote tinge to feldspar. Xenoliths become fine grained towards end of unit.

STRUCTURES

From	To	Struct	CA	Strain
1.00	2.20	FRC	20	
2.20	4.20	FRC	50	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
1.00	4.20	W			W									W

HM W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
1.00	4.20	1	STYV		QZ-CB		4	70

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
1.00	4.20	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
4.20	10.00	1

Mafic Metavolcanics - Possiblyrelic pillowed basalt, dark green, swirling texture at certain intervals may be relic pillow margins, circular to elongate dots only 1 or 2mm near these could be amydule filled vessicles. Pervassive chlorite alteration. Disseminated pyrite and thing veinlets throughout. Some thin (5cm) granodiorite dikes.

STRUCTURES

From	To	Struct	CA	Strain
4.20	9.90	FRC	65	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
4.20	10.00	M			M									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
4.20	10.00	1	STYV		QZ-CB		7	25

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
4.20	10.00	5	VLT	-				

As well as disseminated and euhedral

SAMPLES

From	To	Sample	Au g/t	Type
4.20	5.00	VR13113 B	0.001	CORE
5.00	6.00	VR13114 B	0.001	CORE
6.00	7.00	VR13115 B	0.001	CORE
7.00	8.00	VR13116 B	0.001	CORE

From	To	Litho
4.20	10.00	1

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION								SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																					8.00	9.00	VR13117 B	0.001	CORE
																																					9.00	10.00	VR13118 B	0.001	CORE
9.90	10.00	CNT	40																																					

From	To	Litho
10.00	10.90	7b

Granodiorite - Brown-grey, wider interval of a dike with xenoliths of the mafic unit above and below.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION								SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
10.00	10.80	FRC	60																																					
					10.00	10.90	W			W										10.00	10.90	1	RBV		QZ-HM				10.00	10.90	1	DISS	-								
10.80	10.90	CNT	15																																					

From	To	Litho
10.90	13.50	1

Meta-Mafic Volcanic - Dark green, continuation of same unit, less pyrite veinlets. Becomes carbonate vein brecciated at 12m abd sheared from 12.9m to contact.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION								SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																					10.90	10.90	VR13120 B	0.001	BLK
10.90	12.00	FLT	50																																		10.90	12.00	VR13119 B	0.001	CORE
																				10.90	12.50	1	RBV		QZ-CB		2	15											
					10.90	12.80	W			W																																
																													10.90	12.90	1	DISS	-								
12.00	12.90	BXB	60																																		12.00	12.90	VR13121 B	0.001	CORE
																				12.50	13.50	10	SHV		QZ-CB		25	60											
					12.80	13.50	M			M		M																													
12.90	13.50	FOL	70	M																									12.90	13.50	5	DISS	-					12.90	13.50	VR13122 B	0.007	CORE

JF-18-03

Initials: _____

From	To	Litho
13.50	15.00	5d

Ultramafic Schist - Light grey, carbonate-talc-magnetite weakly foliated, possible serpentine and or chlorite. Very magnetic, greasy feel.

STRUCTURES

From	To	Struct	CA	Strain
13.50	14.90	FOL	40	W
14.90	15.00	CNT	50	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
13.50	15.00	S	S	W	W		S							

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
13.50	15.00	1	RBV		QZ-CB		4	25

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
13.50	15.00	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
13.80	14.00	VR13123 B	0.171	CORE

From	To	Litho
15.00	30.70	5a

Gabbro - Grey, medium grained, hollocrystalline, equigranular. Weakly foliated with thin fractures of pyrite as well as disseminated pyrite almost throughout.
Ends with granodiorite dikes with xenoliths that change to the meta-sed unit below at contact.

STRUCTURES

From	To	Struct	CA	Strain
15.00	21.20	FRC	15	
21.20	30.70	FRC	45	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
15.00	30.70	W												W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
15.00	30.70	2	RBV		QZ-CB		3	20

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
15.00	18.80	1	DISS	-				
18.80	30.70	5	VLT	-				

SAMPLES

From	To	Sample	Au g/t	Type
18.80	20.00	VR13124 B	0.001	CORE
20.00	21.00	VR13125 B	0.001	CORE
21.00	22.00	VR13126 B	0.002	CORE
22.00	23.00	VR13127 B	0.004	CORE
23.00	24.00	VR13128 B	0.001	CORE
24.00	24.00	VR13130 B	10.1	228
24.00	25.00	VR13129 B	0.001	CORE
25.00	26.00	VR13131 B	0.004	CORE
26.00	27.00	VR13132 B	0.002	CORE
27.00	28.00	VR13133 B	0.003	CORE
28.00	29.00	VR13134 B	0.002	CORE

From	To	Litho
15.00	30.70	5a

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																						29.00	29.90	VR13135 B	0.003	CORE
																																					29.90	30.70	VR13136 B	0.001	CORE

From	To	Litho
30.70	39.80	3

Meta-Sediments and thin mafic flows - Green-grey, interbeds of thinner mudstone and thicker cherty units perhaps interbedded with thicker basalt flows. Some thin granodiorite dikes here and there. Pyrite mostly within mudstone layers, but also along thinkveinlet or fracturs and near grano dikes

STRUCTURES					ALTERATION														VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
30.70	37.00	BDG	60	W																																						
					30.70	39.80	W			W				W					W	30.70	39.80	1	RBV		QZ-CB		3	50	30.70	39.80	2	DISS	-									
																																						31.20	32.00	VR13137 B	0.003	CORE
																																						33.80	34.60	VR13138 B	0.003	CORE
																																						34.80	34.80	VR13140 B	0.003	DUP
																																						34.80	35.70	VR13139 B	0.001	CORE
																																						35.90	36.40	VR13141 B	0.001	CORE
																																						36.80	37.00	VR13142 B	0.001	CORE
37.00	39.70	BDG	40	W																																						
																																						37.30	38.10	VR13143 B	0.004	CORE
39.70	39.80	CNT	30																																							

From	To	Litho
39.80	44.80	7b

Granodiorite - Brown-grey, xenolithic (mostly mafic), similar granodiorite to other units, moderately hematite coloured feldspars and quartz, also in some veining. Significant carbonate-chlorite shear veins at 42.5m.

STRUCTURES					ALTERATION														VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
39.80	39.90	CNT	20	W																																						
																													39.80	42.90	3	DISS	-	CP	1							

From	To	Litho
39.80	44.80	7b

Granodiorite - Brown-grey, xenolithic (mostly mafic), similar granodiorite to other units, moderately hematite coloured feldspars and quartz, also in some veining. Significant carbonate-chlorite shear veins at 42.5m.

STRUCTURES

From	To	Struct	CA	Strain
39.90	44.70	FRC	50	
44.70	44.80	CNT	70	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
39.80	44.80	M			W		W							W

HM M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
39.80	44.80	7	SHV	LWV	QZ-CB	QZ	5	20

QZ-CB-CH SHV

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
42.90	44.10	1	DISS	-				
44.10	44.80	3	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
40.10	41.10	VR13144 B	0.001	CORE
41.10	42.30	VR13145 B	0.001	CORE
42.30	42.90	VR13146 B	0.003	CORE
44.10	44.50	VR13147 B	0.001	CORE

From	To	Litho
44.80	67.50	5a

Gabbro - Grey, medium grained, hollocrystalling, equigranular. Essentially feldspar and a dark mineral, presumably pyroxene, although slightly magnetic, so some magnetite. Tonalite likedikes at 66.7m CA = 30. Last 10cm hornfels of amphibole, maybe hornblend short crystals.

STRUCTURES

From	To	Struct	CA	Strain
44.80	61.00	FRC	70	
61.00	61.70	SH	50	M
61.70	67.40	FRC	55	
67.40	67.50	CNT	40	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
44.80	61.00	W			W									
61.00	61.70	M			M		W							
61.70	67.50	W			W									

Ankerite W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
44.80	61.00	1	RBV		QZ-CB		3	15

+ CH

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
61.00	61.70	25	LWV	SHV	QZ	CB	20	40
61.70	67.50	1	RBV		QZ-CB		3	20

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
44.80	67.50	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
61.00	61.70	VR13148 B	0.001	CORE

From	To	Litho
67.50	69.60	7b

Granodiorite - Brown-green, similar coarse granodiorite with gabbro and pyroxenite xenoliths. Xeno's are altered with epidote, chlorite and pyrite. Grano has hematite staining.

STRUCTURES

From	To	Struct	CA	Strain
67.50	69.50	FRC	70	
69.50	69.60	CNT	25	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
67.50	69.60	M			M									W

HM M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
67.50	69.60	1	RBV		QZ-CB		4	55

EP

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
67.50	69.60	3	EUH	-	CP	1		

SAMPLES

From	To	Sample	Au g/t	Type
67.50	67.50	VR13150 B	0.001	BLK
67.50	68.30	VR13149 B	0.007	CORE
68.30	68.90	VR13151 B	0.003	CORE
68.90	69.60	VR13152 B	0.001	CORE

From	To	Litho
69.60	75.90	5f

Pyroxenite - Dark green, medium to coarse grained at times, though mostly equigranular. Pyroxene and amphibole crystals metamorphosed presumably from basalt. Unit ends abruptly at a carbonate-hematite vein where it becomes part of a fault melange.

STRUCTURES

From	To	Struct	CA	Strain
69.60	75.80	FRC	70	
75.80	75.90	CNT	25	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
69.60	75.90	M			M									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
69.60	75.90	1	RBV		QZ-HM		2	50

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
69.60	75.90	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
75.90	85.30	ZFZ

Fault Zone - Brown and green, variably brecciated, sheared and veined fault with some sections of country rock caught in between, though often stained with hematite (oxidized). Thought to be a rift related fault.

STRUCTURES

From	To	Struct	CA	Strain
75.90	85.30	FRC	50	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
75.90	85.30	M			W		M							

HM S

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
75.90	85.30	5	RBV		QZ-HM		5	15

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
75.90	85.30	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
85.30	94.70	5f

Pyroxenite - Dark green, same unit prior to fault zone.

STRUCTURES

From	To	Struct	CA	Strain
85.30	94.70	FRC	60	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
85.30	94.70	M			M									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
85.30	94.70	1	RBV		QZ-CB		1	40

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
85.30	94.70	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
94.70	96.60	SHZ

Shear Zone - within the pyroxenite. Becomes progressively more foliated towards a 5cm central quartz vein. Some ankerite colouration and banding.

STRUCTURES

From	To	Struct	CA	Strain
94.70	96.60	FOL	30	S

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
94.70	96.60	M			M		M							

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
94.70	96.60	5	RBV		QZ		5	40
	PY							

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
94.70	96.60	3	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
94.70	95.10	VR13153 B	0.001	CORE
95.10	95.30	VR13154 B	0.001	CORE
95.30	96.30	VR13155 B	0.006	CORE

From	To	Litho
96.60	100.20	1a

Massive basalt Flow with Hyaloclastite - Green-grey, medium grained gabbro textured mafic with three separate sectrions of hyaloclastite textures. Perhaps these are pillow margins? One at 99m has semi massive chalcopyrite-pyrrhotite-epidote. Some hematite reddening of coarse grained sections, could be granodiorite intruding.

STRUCTURES

From	To	Struct	CA	Strain
96.60	100.10	FRC	50	
100.10	100.20	CNT	60	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
96.60	100.20	M			M		W							M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
96.60	100.20	1	STYV		CB		2	70

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
96.60	98.90	1	DISS	-				
98.90	99.00	5	DISS	-	CP	2	PO	10
99.00	100.20	2	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
98.90	99.00	VR13156 B	0.061	CORE
99.70	100.00	VR13157 B	0.003	CORE

From	To	Litho
100.20	101.50	15c

Ultramafic Dike - Dark grey, carbonate-chlorite-magnetite rock. Massive, granular texture.

STRUCTURES

From	To	Struct	CA	Strain
100.20	100.40	FLT	40	
101.40	101.50	CNT	40	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
100.20	101.50	M			M		M							

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
100.20	101.50	1	RBV		CB		3	55

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
100.20	101.50	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
101.50	110.30	5a

Gabbro - Grey-brown, similar medium to coarse and slightly reddened gabbro prior to pyroxenite alteration / metamorphism. Some epidote at 109m contains sulphides and has that altered relic pillow look. Some hornfelsed granodiorite sections with accicular amphiboles (107.9m and 108.1m)

STRUCTURES

From	To	Struct	CA	Strain
101.50	110.20	FRC	60	
110.20	110.30	CNT	70	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
101.50	110.30	W			W									W

HM W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
101.50	110.30	1	RBV	STYV	QZ-CB	CB	4	40

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
101.50	110.30	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
108.20	109.10	VR13158 B	0.003	CORE

From	To	Litho
110.30	114.50	15c

Ultramafic Rock - Light grey, fine grained, mostly carbonate and a dark mineral, perhasps pyroxene or tremolite plus magnetite, ie Tremolite-Carbonate-Magnetite rock. Slightly silicifed, weakly foliated. Sheared and foliated sections include talc and chlorite with quartz veining but not a lot of sulphide. Unit ends at a reddened, silicified tonalite dike.

STRUCTURES

From	To	Struct	CA	Strain
110.30	110.60	FRC	40	W
110.60	111.80	SH	30	VS

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
110.30	110.60	M					M		W					
110.60	111.80	S	M		S		S							

MT

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
110.30	114.50	2	SHV		QZ-CB		4	30

CH, mostly in the shear zones.

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
110.30	114.50	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
110.50	110.50	VR13160 B	0.52	218
110.50	111.80	VR13159 B	0.002	CORE

From	To	Litho
110.30	114.50	15c

(Continued from previous page)

STRUCTURES					ALTERATION													VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
111.80	112.50	FRC	75	W	111.80	112.50	M					M		W																											
					MT																																				
112.50	112.90	SH	30	VS	112.50	112.90	S	M		S		S																														
																																						112.50	113.00	VR13161 B	0.002	CORE
112.90	113.10	FRC	80	W	112.90	113.10	M					M		W																											
					MT																																				
113.10	113.70	SH	80	VS	113.10	113.70	S	M		S		S																														
113.70	114.50	CNT	65		113.70	114.50	M					M		W																											
					MT																																				

From	To	Litho
114.50	123.00	SHZ

Shear Zone - Light grey-green, essentially the ultramafic unit becomes progressively intensely foliated right after the silicified tonalite dike in the first 10cm, into a mostly carbonate-chlorite schist. Still slightly magnetic. Crenulation cleavage at 122m. Ends at a thick (25cm) white quartz vein.

STRUCTURES					ALTERATION													VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
114.50	122.00	FOL	60	VS																																					
																				114.50	122.70	10	SHV	RBV	CB	QZ-CB	6	30													
																				SHV in FOL @ CA 60																					
					114.50	123.00	VS			S		S																	114.50	123.00	0	-	-									
					MT W																																					
																																						121.80	122.70	VR13162 B	0.008	CORE
122.00	122.10	CRN	15	S																																					
122.10	123.00	CNT	50																																						
																				122.70	123.00	95	LWV			QZ-CH	3	60										122.70	123.00	VR13163 B	0.001	CORE

From	To	Litho
123.00	130.70	14b

Diabase Dike - Grey, fine grained chilled margins at upper and lower contacts becomes medium grained through the bulk of the dike. Very dark, mafic, equigranular massive rock. Calcite-hematite-chlorite veining at 125m is rift related and late.

STRUCTURES

From	To	Struct	CA	Strain
123.00	130.70	FRC	50	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
123.00	130.70				CH									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
123.00	130.70	1	STYV		CA-		3	10

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
123.00	130.70	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
130.70	139.40	7b

Granodiorite - Green-brown, mixed unit of partly intrusion brecciated granodiorite with large xenoliths of meta-basalt or vice versa, a meta-basalt sequence intruded by dike fingers of granodiorite. The intrusion is moslty hematite stained and very coarse grained. Also a long section from (133.9-138.4m) is strongly epidote and carbonate altered and weakly foliated, both grano and mafics. Mafic intervals have veinlets of pyrite.

STRUCTURES

From	To	Struct	CA	Strain
130.70	139.40	FRC	45	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
130.70	133.90	W			W									
		HM W												
133.90	138.40	VS			M		S							VS
		137.2m Leucoxene												
138.40	139.40	M			W		W							M
		HM M												

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
130.70	139.40	3	RBV		QZ-CB		2	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
130.70	139.40	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
130.70	131.50	VR13164 B	0.001	CORE
131.50	131.90	VR13165 B	0.014	CORE
131.90	133.00	VR13166 B	0.314	CORE
133.00	133.90	VR13167 B	0.01	CORE
134.00	135.00	VR13168 B	0.001	CORE
138.50	138.50	VR13170 B	0.003	DUP
138.50	139.40	VR13169 B	0.003	CORE

From	To	Litho
139.40	145.70	1

Mafic-Metavolcanic - Green-grey, fine to medium grained, massive with some possible relic pillow textures. One or two thin (10cm) grano dikes. Becomes sheared against the porphyry below from 144.5m. Minor quartz veining and trace fine disseminated pyrite.

STRUCTURES

From	To	Struct	CA	Strain
139.40	144.50	FRC	70	
144.50	145.70	FOL	70	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
139.40	144.70	W			W									
		HM W												
144.70	145.70	W			W		W							

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
139.40	145.70	1	RBV		CB		3	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
139.40	145.70	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
145.70	148.60	7h

Felsic Porphyry Dikes - Pink-greem, sequence of three variably porphyritic silicified felsic dikes with sheared up mafics caught up in between. Plus a small interval of granodiorite at 146.7m. Some coarse recrystallized pyroxene intervals in the mafics where they are less deformed are flooded with carbonate.

STRUCTURES

From	To	Struct	CA	Strain
145.70	146.10	CNT	40	
146.10	147.00	FOL	70	M
147.00	147.50	CNT	80	
147.50	147.80	CNT	60	W
147.80	148.60	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
145.70	146.10	M							M					
146.10	147.00	M			M		M							
147.00	147.50	M							M					
147.50	147.80	M			M		M							
147.80	148.60	M							M					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
145.70	146.80	1	RBV		QZ-CB		2	15
146.80	147.00	10	SHV		CB		20	70
147.00	148.60	2	RBV		CB		3	20

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
145.70	148.60	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
148.60	150.00	1

Meta-Mafic-Volcanic - Green-grey, massive, fine grained. Perhaps some textures of relic pillows. Disseminated pyrite cubes.

STRUCTURES

From	To	Struct	CA	Strain
148.60	150.00	FRC	70	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
148.60	150.00	W			W									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
148.60	150.00	1	STYV		CB		3	30
		CH						

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
148.60	150.00	2	EUH	-				

SAMPLES

From	To	Sample	Au g/t	Type

JF-18-03

Initials: _____

From	To	Litho
148.60	150.00	1

Meta-Mafic-Volcanic - Green-grey, massive, fine grained. Perhaps some textures of relic pillows. Disseminated pyrite cubes.

STRUCTURES					ALTERATION													VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

Sanatana Resources Inc.

GEOLOGICAL LOG FIELDS AND CODES DESCRIPTION

LITHOLOGY

Litho	Description
1	Mafic Metavolcanic (Unsubdivided)
1a	Massive basalt
1b	Pillow basalt
1c	Mafic Tuff
1d	Amygdaloidal Basalt
1f	Mafic Schist
1g	Amphibolite
1h	Mafic Gneiss
2	Intermediate Metavolcanic (Unsubdivided)
2a	Intermediate Flow
2b	Intermediate Lapilli tuff
2c	Intermediate Tuff breccia
2d	Volcanogenic sandstone to siltstone
2e	Intermediate Crystal tuff
2g	Intermediate Schist
2j	Intermediate Flow breccia
3	Felsic Metavolcanic (Unsubdivided)
3a	Felsic Flow
3b	Felsic Lapilli tuff
3c	Tuff breccia
3d	Quartz porphyritic volcanic
3e	Autoclastic flow breccia
3f	Hydrothermal breccia, with chlorite veining
3g	Felsic Schist

Litho	Description
4	Metasediment (Unsubdivided)
4a	Conglomerate, boulders and cobbles
4b	Pebbly sandstone, matrix supported
4c	Sandstone, arkosic sandstone, arenite
4d	Siltstone and mudstone
4e	Schist
4f	Chert
4g	Iron Formation
5	Mafic Intrusive (Unsubdivided)
5a	Gabbro
5b	Diorite
5c	Mafic Pegmatite
5g	Mafic Intrusive breccia
5h	Mafic Dike
6	Intermediate Intrusive (Unsubdivided)
6a	Quartz diorite
6b	Monzonite
6c	Monzodiorite with hematite-stained feldspar
6d	Syenite
6e	Feldspar porphyry
6em	Feldspar porphyry - mafic
6eq	Quartz-Feldspar Porphyry
6f	Intermediate Intrusive breccia
6g	Intermediate Dike

Litho	Description
7	Felsic Synvolcanic Intrusive (Unsubdivided)
7a	Tonalite
7b	Trondhjemite
7c	Granodiorite
7d	Chlorite bearing breccia
7e	Pegmatite dike
7f	Quartz porphyry
7g	Intrusion breccia
7h	Aplite dike
7i	Felsic Schist
8	Felsic post volcanic Intrusive (Unsubdivided)
8a	Biotite tonalite
8b	Biotite + amphibole tonalite
8c	Biotite granodiorite
8d	Biotite + amphibole granodiorite
8e	Amphibole quartz monzonite to granodiorite
8f	Quartz–potassium feldspar megacrystic granite
8g	Foliated / sheared granite
8h	Granite gneiss
8i	Xenolithic granite
8j	Granite: aplite and/or pegmatite
8k	Magnetite bearing granite

Litho	Description
9	Diabase (unsubdivided)
9a	Gabbro to quartz gabbro
9b	Plagioclase phyric diabase
9c	Fine grained diabase
9d	Medium grained diabase
9e	Coarse grained diabase
9f	Xenolithic diabase
10	Lamprophyre (unsubdivided)
10a	Porphyritic Lamprophyre (ferromagnesian)
10b	Porphyritic Lamporphyre (feldspathic)
10c	Ultramafic intrusive
OVB	overburden
QSW	quartz stockwork
QVO	quartz vein
SHZ	Shear zone
ZFZ	fault zone/gouge

ALTERATION

Min	Description
AB	Albite
AK	Ankerite
AM	Amphibole
BT	Biotite
CC	Calcite
CL	Chlorite
DL	Dolomite
EP	Epidote
FD	Feldspar
FU	Fuchsite
GP	Graphite
GT	Garnet
HB	Hornblende
LX	Leucoxene
MT	Magnetite
MU	Muscovite
PL	Plagioclase
PX	Pyroxene
SR	Sericite
TC	Talc
TR	Tourmaline

Int	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

MINERALIZATION

Style	Description
AN	Anhedral
CG	Coarse grained
DISS	Disseminated
EUH	Euhedral
FG	Fine grained
MS	Massive
MG	Medium grained
SM	Semi massive
SEUH	Sub-Euhedral
VLT	Veinlets

Min	Description
AS	Arsenopyrite
CP	Chalcopyrite
GN	Galena
MO	Molybdenite
PO	Pyrrhotite
SP	Sphalerite
HM	Hematite

VG	Description
VG	visible gold noted (historical)
VG1	weak (1 or 2 specks)
VG2	moderate (3-10 specks)
VG3	strong (>10 specks)
-	not recorded

STRUCTURE

Type	Description
-	Overburden
BDG	Bedding
BKY	Blocky
BXB	Breccia (brittle)
BXD	Breccia (ductile)
CNT	Contact
CRN	Crenulated
FLT	Fault
FOL	Foliation
FRC	Fracture
G	Gouge
LIN	Lineation
MS	Massive
SH	Shear
SSF	Small Scale Folds

Strain	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

VEINING

Style	Description
EGQV	Early Grey Quartz Vein(s)
LWV	Late White Vein(s)
RBV	Ribboned Vein
SEV	Sheeted Extension Vein(s)
SEVA	Sigmoidal Extension Vein Array
SHV	Shear Vein(s)
STYV	Stylolitic Vein

Type	Description
AK	Ankerite
CA	Calcite
CB	Carbonate
HE	Hematite
QZ	Quartz
QZ-AB	Quartz-Albite
QZ-AK	Quartz-Ankerite
QZ-CA	Quartz-Calcite
QZ-CB	Quartz-Carbonate
QZ-FU	Quartz-Fuchsite
QZ-TO	Quartz-Tourmaline
TO	Tourmaline

Sanatana Resources Inc.

CORE BOX RECORD

PROJECT: Jackfish

HOLE :	JF-18-03	**DATE:**	16/06/2018	**INTIALS:**	TSR

BOX #	FROM	TO	DYMO	PHOTO	BOX #	FROM	TO	DYMO	PHOTO
1	1.00	5.10	✓	✓	26	103.65	107.81	✓	✓
2	5.10	9.18	✓	✓	27	107.81	112.00	✓	✓
3	9.18	13.44	✓	✓	28	112.00	116.26	✓	✓
4	13.44	17.76	✓	✓	29	116.26	120.38	✓	✓
5	17.76	21.86	✓	✓	30	120.38	124.45	✓	✓
6	21.86	26.06	✓	✓	31	124.45	128.50	✓	✓
7	26.06	30.44	✓	✓	32	128.50	132.59	✓	✓
8	30.44	34.65	✓	✓	33	132.59	136.61	✓	✓
9	34.65	38.90	✓	✓	34	136.61	140.81	✓	✓
10	38.90	42.97	✓	✓	35	140.81	145.00	✓	✓
11	42.97	47.22	✓	✓	36	145.00	149.10	✓	✓
12	47.22	51.50	✓	✓	37	149.10	150.00	✓	✓
13	51.50	55.50	✓	✓	38		EOH		
14	55.50	59.75	✓	✓	39				
15	59.75	63.70	✓	✓	40				
16	63.70	67.85	✓	✓	41				
17	67.85	71.95	✓	✓	42				
18	71.95	75.76	✓	✓	43				
19	75.76	79.58	✓	✓	44				
20	79.58	83.59	✓	✓	45				
21	83.59	87.50	✓	✓	46				
22	87.50	91.67	✓	✓	47				
23	91.67	97.47	✓	✓	48				
24	97.47	99.67	✓	✓	49				
25	99.67	103.65	✓	✓	50				

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT: Jackfish

HOLE :	JF-18-03	**DATE:**	16/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
1.00	1.50	0.50	0.20	14	6
1.50	3.00	1.50	0.60	27	30
3.00	4.50	1.50	1.20	8	15
4.50	6.00	1.50	1.00	6	17
6.00	8.00	2.00	1.40	25	8
8.00	9.50	1.40	0.80	17	15
9.50	12.50	3.00	1.10	19	16
12.50	15.50	3.00	2.10	32	34
15.50	18.50	3.00	2.50	15	21
18.50	21.50	3.00	1.90	34	28
21.50	23.00	1.50	1.40	5	25
23.00	26.00	3.00	2.80	12	26
26.00	29.00	2.90	2.60	14	40
29.00	32.00	3.00	2.20	24	41
32.00	35.00	3.00	2.30	19	70
3.50	38.00	3.00	2.50	16	41
38.00	41.00	3.00	2.80	21	38
41.00	42.50	1.50	1.20	16	23
42.50	45.50	3.00	2.10	32	37
45.50	48.50	3.00	2.70	16	54
48.50	51.50	2.90	2.30	21	32
51.50	54.50	3.00	2.70	21	16
54.50	57.50	2.90	2.30	25	24
57.50	60.50	3.00	2.50	22	37
60.50	63.50	3.10	2.60	40	34

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT:	Jackfish				
HOLE :	JF-18-03	**DATE:**	16/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
63.50	66.50	3.00	2.10	29	53
66.50	69.50	3.00	1.90	30	33
69.50	72.50	3.00	0.60	62	14
72.50	75.50	3.20	1.00	60	22
75.50	78.50	3.10	1.10	100	20
78.50	81.50	3.00	1.30	80	30
81.50	83.00	1.50	0.70	20	8
83.00	86.00	3.00	0.90	32	27
86.00	87.50	1.50	0.80	20	7
87.50	90.50	2.90	1.50	40	11
90.50	93.50	3.10	0.90	55	3
93.50	95.00	1.80	0.30	50	13
95.00	98.00	3.00	2.30	32	28
98.00	101.00	3.00	1.30	54	29
101.00	102.50	1.50	1.10	10	23
102.50	105.50	2.90	0.90	51	8
105.50	107.00	1.60	0.80	11	9
107.00	110.00	3.00	2.20	31	10
110.00	112.00	1.90	0.70	80	13
112.00	115.00	3.00	2.50	40	35
115.00	116.50	1.30	1.20	3	25
116.50	119.50	3.00	2.80	10	37
119.50	121.00	1.50	1.40	6	11
121.00	124.00	3.00	2.70	22	27
124.00	127.00	3.00	2.30	16	7

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT:	Jackfish				
HOLE :	JF-18-03	**DATE:**	16/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
127.00	128.50				
128.50	131.50	3.00	2.70	20	24
131.50	133.00	1.50	1.10	22	7
133.00	136.00	3.00	0.70	80	9
136.00	138.00	2.00	0.30	37	17
138.00	141.00	3.10	1.40	55	38
141.00	142.50	1.50	0.30	42	11
142.50	144.00	1.50	0.40	32	15
144.00	147.00	3.00	2.70	13	32
147.00	150.00	3.00	2.90	8	20
	EOH				

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-03 **DATE:** 16/06/2018 **INTIALS:** TSR

Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
1	1.16	26	2.92	51	25.7	76	1.15
2	4.80	27	1.61	52	3.59	77	0.400
3	0.840	28	5.41	53	0.800	78	0.570
4	2.79	29	13.2	54	0.820	79	0.480
5	9.47	30	10.2	55	0.850	80	0.430
6	24.4	31	1.44	56	1.69	81	0.450
7	81.0	32	100	57	1.52	82	3.05
8	98.8	33	47.1	58	0.940	83	3.69
9	75.8	34	62.3	59	0.780	84	0.260
10	11.8	35	38.3	60	0.670	85	0.340
11	2.58	36	50.5	61	7.75	86	0.350
12	11.5	37	5.13	62	0.790	87	0.790
13	27.1	38	46.2	63	1.01	88	0.270
14	167	39	53.6	64	1.39	89	0.420
15	45.1	40	10.2	65	1.07	90	0.540
16	1.42	41	4.52	66	0.810	91	0.650
17	1.34	42	2.26	67	2.31	92	0.580
18	6.29	43	1.38	68	19.6	93	0.570
19	6.23	44	23.9	69	10.0	94	8.25
20	9.61	45	9.12	70	0.390	95	17.2
21	6.06	46	0.530	71	0.540	96	18.1
22	3.21	47	43.1	72	0.400	97	0.610
23	25.8	48	27.1	73	0.430	98	1.34
24	2.21	49	3.86	74	0.490	99	174
25	9.82	50	1.55	75	0.530	100	4.08

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-03 **DATE:** 16/06/2018 **INTIALS:** TSR

Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
101	77.7	126	22.8	151		176	
102	0.670	127	29.6	152		177	
103	7.19	128	18.7	153		178	
104	3.87	129	12.8	154		179	
105	5.80	130	14.4	155		180	
106	1.20	131	8.77	156		181	
107	1.00	132	0.870	157		182	
108	8.16	133	19.7	158		183	
109	154	134	0.220	159		184	
110	9.52	135	0.130	160		185	
111	0.510	136	0.160	161		186	
112	9.02	137	3.93	162		187	
113	64.1	138	0.250	163		188	
114	19.8	139	1.30	164		189	
115	2.66	140	0.330	165		190	
116	0.480	141	0.600	166		191	
117	9.26	142	0.680	167		192	
118	13.4	143	0.430	168		193	
119	0.280	144	1.63	169		194	
120	0.350	145	0.420	170		195	
121	8.28	146	1.16	171		196	
122	0.590	147	0.420	172		197	
123	2.14	148	0.810	173		198	
124	15.4	149	32.5	174		199	
125	20.4	150	16.6	175		200	

Sanatana Resources Inc.

CHAIN OF CUSTODY

Laboratory:	ACTLABS, THUNDER BAY		
Shipper:	SANATANA	Location:	JACKFISH
Pallet Box No:	N/A	Waybill No:	N/A
Packed By:	CHRIS WOOLVERTON	Date Packed:	JUNE 18, 2018
Date Shipped:	JUNE 20, 2018	Date Received:	

	Sample From	Sample To	Tag No.	Received Intact (✓)
1	VR13113B	VR13122B	0001210	✓
2	VR13123B	VR13130B	0001213	✓
3	VR13131B	VR13140B	0001332	✓
4	VR13141B	VR13150B	0001349	✓
5	VR13151B	VR13160B	0001397	✓
6	VR13161B	VR13170B	0001307	✓
7				
8				
9				
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21				
22				
23				
24				
25				

DRILL LOG TITLE PAGE

Hole ID	**JF-18-04**	***Project***	**Jackfish**

Section	1500	***Easting***	504971	***Source***	GPS
Site	Surface	***Northing***	5411152	***Azimuth***	0
Twp	Syine	***Elevation***	355	***Dip***	-60
		Grid	UTM NAD83	***Length***	150.00 ***m***

Logged by	Troy Gill	***DDH Started***	18-Jun-18
Geotechnician	Troy Gill	***DDH Finished***	20-Jun-18
Geotech Type	Basic	***Log Completed***	03-Jul-18
Drill Contractor	Richard's Exploration	***Last Updated***	19-Aug-18
Core Size	BTW		

DIP TESTS (other than Maxibor)

Depth	*Azimuth*	*Dip*	*Type*
5.00	353.40	-59.60	EZ
145.00	9.60	-56.60	EZ

Available Analyses: ***FA*** Yes ***GRAV*** No ***MET*** No ***ICP*** Yes ***WR*** Yes

Summary

Designed to test a Max-Min anomaly and a structural break in the mag.

Sanatana Resources Inc. Drill Log

Jackfish

Signature: _____

Initials: _____

JF-18-04

From	To	Litho
0.00	2.00	OVB

overburden

STRUCTURES					ALTERATION													VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
2.00	9.30	1

fine grained micaeous metavolcanic. Granodiorite fingering with xenoliths of metavolcanics. Sulphide carbonate rich bandings @4.75. may represent sedimentation between pillow lavas. Moderate epidote alt @8m. Carbonate sulphide rich inclusion @4.6m. Both mineralisation zones may represent hiatus between flows and reaction with seawater to form minerals.

STRUCTURES					ALTERATION													VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																													4.50	4.80	2	MG	-					6.40	7.30	VR13263 B	0.001	CORE
																				6.75	6.77	2	EGQV		QZ-AB			60													
					7.95	8.00	M												M																							

From	To	Litho
9.30	13.00	1

fine grained mafic metavolcanic minor epidote alteration multiple calcite veining.

STRUCTURES					ALTERATION													VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																				9.35	11.80	4	LWV		CA			55													

From	To	Litho
13.00	16.40	7i

coarse grained granodiorite interfingering with fine grained mafic metavolcanics. Xenoliths of metavolcanics within granodiorite. Occassional minor disseminated chalcopyrite

STRUCTURES					ALTERATION													VEINS									MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

JF-18-04

Initials: _____

From	To	Litho
13.00	16.40	7i

coarse grained granodiorite interfingering with fine grained mafic metavolcanics. Xenoliths of metavolcanics within granodiorite. Occassional minor disseminated chalcopyrite

STRUCTURES					ALTERATION													VEINS								MINERALIZATION								SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																													13.00	16.40	1	-	-	CP	1								

From	To	Litho
16.40	17.10	1e

weakly foliated mafic schist with haematite alteration around shear zone. Reddy Brown minerals alligned with fault could be biotite or amphiboles. DISS sulphides present

STRUCTURES					ALTERATION													VEINS								MINERALIZATION								SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
16.40	17.40	FLT	50	M																									16.40	17.40	1	DISS	-	CP	1								
					16.40	19.50	W												W																							

From	To	Litho
19.50	22.50	7b

coarse grained granodiorite interfingered with mafic metavolcanics

STRUCTURES					ALTERATION													VEINS								MINERALIZATION								SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
22.50	25.00	1

fn grained mafic metavolcanics micaeous. Potentially pillow basalts. Some banding present @24.35 could represent contact between pillow flows. Small granodiorite veins. Deformation present @23m

STRUCTURES					ALTERATION													VEINS								MINERALIZATION								SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
22.90	23.00	SH	10	W																																				

From	To	Litho
25.00	29.85	7b

mostly coarse grained granodiorite with xenoliths of fine to med grained biotite rich mafic metavolcanics. Contains disseminated sulphides throughout e.g. 28-28.5 noticeable DISSS PY @27.95

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
27.95	28.00	W												W
28.00	28.50	W												W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
29.12	29.13	1	EGQV		QZ			40
29.80	29.85	1	EGQV		QZ			20

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
27.95	28.00	2	DISS	-	CP	2		
28.00	28.50	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
27.90	28.50	VR13264 B	0.009	CORE

From	To	Litho
29.85	30.40	5a

medium grained meta gabbro

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
30.40	37.23	7i

fine grained meta basalt interfingered with coarse grained granodiorite. Sulphide veinlets @35.70. DISS PY from 35.30-35.70 associated with epidote alteration.

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
35.70	35.75	W												W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
35.40	35.75	1	DISS	-				
35.70	35.75	1	VLT	-	CP	1		

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
37.23	45.25	1

fine to medium grained mafic meta-volcanic. W-m epidote alteration. Minor quartz granodiorite veining 1%. Minor carbonate veining. Noticeable disseminated cubic sulphides throughout. Some present in carbonate veining up to 4mm diameter crystals.

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
37.23	44.48	W												W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
37.23	44.45	1	LWV		CA			30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

 Initials: ________

From	To	Litho
37.23	45.25	1

(Continued from previous page)

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
44.45	44.45	1	VBX		QZ-AB			50

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
38.00	44.48	1	DISS	-	CP	1		

some VLT styles also

SAMPLES

From	To	Sample	Au g/t	Type
41.00	42.00	VR13265B	0.002	CORE
42.00	43.00	VR13266B	0.001	CORE

From	To	Litho
45.25	46.50	7b

mostly coarse grained granodiorite interfingererd with fine grained mafic metavolcanics. Different composition granodiorites indicatiing different intrusive phases. Minor sulphide veinlets.

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
44.48	46.50	1	VLT	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
46.50	48.40	1

IRON FORMATION Some Granodioroite intrusions with xenolothis of medium grained amphibole rich metavolcanics. Meatvolcanics highly deformed and magnetic. (magnetite or pyrrhotite) epidote alteration also present. Large quartx vein plus smaller calcite veins. Pyrite crystals variable size up to 4mm (coarse)

STRUCTURES

From	To	Struct	CA	Strain
46.50	47.10	FLT	10	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
46.85	46.95	M												M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
46.80	47.00	5	SHV		QZ			95

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
46.55	47.10	2	CG	-				

also some dissmenated and vlt sulphides

SAMPLES

From	To	Sample	Au g/t	Type
47.10	47.70	VR13268B	0.055	CORE
48.10	48.10	VR13270B	0.001	BLK
48.10	48.40	VR13269B	0.02	CORE

From	To	Litho
48.40	59.40	5a

m-c grained meta gabbro with quartz-granodiorite veining with assocciated Sulphide veinlets and in thin sulphide containing bands, perhaps representing the contact beetween basalt flows. Fine grained mafic magnetic (magentite or pyyrohotite) heavy metavolcanics interfingered with the gabbro. Metavolcanic are micaeous (bitotite). Some DISS sulphides present throughout.

STRUCTURES

From	To	Struct	CA	Strain
52.15	52.50	FLT	55	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
48.40	52.15	2	LWV		QZ			35

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
48.40	52.15	1	VLT	-				
48.44	59.40	1	DISS	-				
52.15	54.30	3	MG	-	CP	1		

DISS pyrite present also

SAMPLES

From	To	Sample	Au g/t	Type
52.20	52.40	VR13271 B	0.062	CORE

From	To	Litho
59.40	59.80	7b

coarse grained granodiorite dyke with distinct contacts

STRUCTURES

From	To	Struct	CA	Strain
62.10	62.15	CNT	90	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
60.30	64.45	1	LWV		CB			50
65.05	65.15	2	LWV		QZ			45

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
61.30	69.83	5a

m-c grained metagabbro getting coarser towards base of the unit. Minor quartz veining. Small shear zone @ 67.70-68.10 (mylonite) second fault zone @69.10-69.30. haematite alteration. Noticeable bioite mica throughout unit. Large quartz vein @65.10 and small carbonate veins throughout

STRUCTURES

From	To	Struct	CA	Strain
67.70	68.10	SH	70	M
69.10	69.30	SH	60	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
65.74	69.83													

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
65.74	69.83	3	SHV		QZ-CB			30

and LWV

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
69.83	71.63	14a

fine grained mafic metavolcanic dyke with minor DISS PY mineralization

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																													69.83	71.63	1	DISS	-									

From	To	Litho
71.63	75.70	5a

m-c grained micaeous metagabbro. 2-3cm diameter quartz carn vein @71.90-72.20.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																				71.90	72.20	4	LWV		QZ-CB			80													

From	To	Litho
75.70	76.05	14a

fine grained mafic metavolcanic dyke rich in amphiboles and biotite.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
76.05	80.00	1

m-c grained chlorite altered amphibole biotite rich metagabbro with shear zone @ 79.68-79.78

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
					76.05	80.00	M			M																															
79.68	79.78	SH	30	M																																					

From	To	Litho
80.00	82.60	5a

m grained chlorite altered gabbro interfingered with coarse granodiorite

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

Initials: _____

From	To	Litho
80.00	82.60	5a

m grained chlorite altered gabbro interfingered with coarse granodiorite

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
80.00	82.60	M			M									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
82.60	82.68	14a

fine grained diabase dyke

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
82.68	84.02	1e

biotite mica schist with shear zone @82.68-83.20 with quartz vein 2-3 cm diamter. 4cm diameter carbonate bearing syke containing Large black phenocrysts (pyrx/ampihiboles). Minor HM alteration

STRUCTURES

From	To	Struct	CA	Strain
82.68	83.20	SH	89	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
82.68	84.02	W												

HM

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
82.68	83.20	10	LWV		QZ-CB			80

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type
82.90	83.10	VR13272 B	0.001	CORE

From	To	Litho
84.02	84.85	1

fine grained amphibole rich metavolcanic with carbonate veining and shear zone @84.05-84.10

STRUCTURES

From	To	Struct	CA	Strain
84.05	84.10	SH	60	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
84.05	84.85	2	LWV		CB			

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
84.85	95.95	1e

mylonite schist. Large 10m shear zone. Large central 40cm quartz vein @90.60-91m. 2nd quartz vein @91.15 some banded mineralization PY/CP @88m banded nature may inidcate sedimentary protolith.

STRUCTURES

From	To	Struct	CA	Strain
84.85	95.95	SH	90	VS

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
84.85	95.95	5	SHV		QZ-CB			

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
87.80	88.10	1	DISS	-	CP	1		
			FINE GRAINED ALSO					
94.90	95.95	1	DISS	-	CP	1		

SAMPLES

From	To	Sample	Au g/t	Type
90.60	91.00	VR13273 B	0.005	CORE
91.50	91.80	VR13274 B	0.073	CORE

From	To	Litho
95.95	125.00	7b

Predominantly coarse grained granodiorite with xenoliths of f-m grained mafic metavolcanics, coarser grained met-gabbros. Some sections of strong chl-epi alteration. Sedimentary package at 115.3-115.4 indicated by layering. Minor shear zones from 115-118.

STRUCTURES

From	To	Struct	CA	Strain
115.00	118.00	SH	80	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
104.85	105.15	S			S									S
104.85	105.15	M			M									M
110.00	110.65	S			S									S
110.00	119.55	M												M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
102.00	103.00	10	LWV		CB			50
114.75	115.30	1	LWV		QZ-CB			90

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
95.95	98.00	2	DISS	-	CP	2		
			some CG and SM sulpide textures					
97.90	97.95	1	DISS	-				
99.95	100.05	1	DISS	-				
106.86	106.90	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
104.80	105.20	VR13275 B	0.001	CORE
108.50	108.80	VR13276 B	0.003	CORE
109.90	110.70	VR13277 B	0.001	CORE
116.30	116.60	VR13278 B	0.001	CORE

From	To	Litho
95.95	125.00	7b

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																												116.30	116.65	2	DISS	-	CP	1								
																												116.65	116.77	1	DISS	-								
117.48	117.59	SH	90	M																																					
																																					119.50	119.50	VR13280 B	8.62	228
																																					119.50	119.80	VR13279 B	0.003	CORE
					119.55	119.80	S			S									S																					
																				122.00	125.00	2	LWV		QZ-CB		70													
124.80	125.00	FLT	80	M	124.80	125.00	S												S																					

HM also

From	To	Litho
125.00	128.20	7g

epidote altered coarse grained porphyry with fingers of granodiorite of different phases with associated haematite alteration.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
					125.00	128.20				M									M																							

some HM alteration also

																																						126.10	126.40	VR13281 B	0.002	CORE
																																						126.80	128.10	VR13282 B	0.001	CORE

From	To	Litho
128.20	150.00	7b

sulphide rich coarse grained granodiorite cross cut by quartz-cb veining. Large quartz vein 128.50-129.15. sulphide rich zone @133.20. large CP phenocryst. DISS sulphides @131.90. m-c grained sulphides associated with vein @136.70 and 144.65-145.10. coarse grained - DISS cubic sulphides in close proximity with qz-cb veins. Other noticeable sulphides at 145.75-146. quartz vein @146.85.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																				128.50	129.15	5	LWV		QZ			45													
																																					129.30	130.70	VR13284 B	0.001	CORE
																																					131.70	132.30	VR13285 B	0.004	CORE

From	To	Litho
128.20	150.00	7b

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION										SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																												131.90	131.95	1	DISS	-										
																																						132.30	133.40	VR13286 B	0.001	CORE
																												133.10	133.30	2	CG	-	CP	2							
																												large cp phenocryst 1cm diamter														
																																						136.00	137.30	VR13287 B	0.001	CORE
																												136.65	136.75	1	VLT	-	CP	1							
																												and DISS														
																																						140.70	141.20	VR13288 B	0.001	CORE
																																					142.50	142.50	VR13290 B	0.001	DUP
																																						142.50	143.20	VR13289 B	0.001	CORE
																																					144.10	145.10	VR13291 B	0.001	CORE
																				144.65	145.10	2	LWV		QZ-CB		70	144.65	145.10	1	VLT	-	CP	1							
																												and DISS														
																																						145.70	146.00	VR13292 B	0.001	CORE
																												145.75	146.00	1	DISS	-										
																				146.80	146.90	1	LWV		QZ		60															

From	To	Litho
59.80	60.70	5a

samer as overlying gabbro unit above the previous dyke. Gabbro rich in amphiboles. Large white phenocrysts (plagioclase) Potentially some pillows indicated by small bands

STRUCTURES					ALTERATION														VEINS								MINERALIZATION										SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
60.70	61.30	7b

coarse grained granodiorite dyke with distinct contacts CA 45

STRUCTURES					ALTERATION														VEINS								MINERALIZATION										SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
17.10	19.50	1

fine to medium grained chlorite altered mafic metavolcanic

STRUCTURES					ALTERATION													VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
					17.10	19.50	M			M																														

Sanatana Resources Inc.

GEOLOGICAL LOG FIELDS AND CODES DESCRIPTION

LITHOLOGY

Litho	Description
1	Mafic Metavolcanic (Unsubdivided)
1a	Massive basalt
1b	Pillow basalt
1c	Mafic Tuff
1d	Amygdaloidal Basalt
1f	Mafic Schist
1g	Amphibolite
1h	Mafic Gneiss
2	Intermediate Metavolcanic (Unsubdivided)
2a	Intermediate Flow
2b	Intermediate Lapilli tuff
2c	Intermediate Tuff breccia
2d	Volcanogenic sandstone to siltstone
2e	Intermediate Crystal tuff
2g	Intermediate Schist
2j	Intermediate Flow breccia
3	Felsic Metavolcanic (Unsubdivided)
3a	Felsic Flow
3b	Felsic Lapilli tuff
3c	Tuff breccia
3d	Quartz porphyritic volcanic
3e	Autoclastic flow breccia
3f	Hydrothermal breccia, with chlorite veining
3g	Felsic Schist

Litho	Description
4	Metasediment (Unsubdivided)
4a	Conglomerate, boulders and cobbles
4b	Pebbly sandstone, matrix supported
4c	Sandstone, arkosic sandstone, arenite
4d	Siltstone and mudstone
4e	Schist
4f	Chert
4g	Iron Formation
5	Mafic Intrusive (Unsubdivided)
5a	Gabbro
5b	Diorite
5c	Mafic Pegmatite
5g	Mafic Intrusive breccia
5h	Mafic Dike
6	Intermediate Intrusive (Unsubdivided)
6a	Quartz diorite
6b	Monzonite
6c	Monzodiorite with hematite-stained feldspar
6d	Syenite
6e	Feldspar porphyry
6em	Feldspar porphyry - mafic
6eq	Quartz-Feldspar Porphyry
6f	Intermediate Intrusive breccia
6g	Intermediate Dike

Litho	Description
7	Felsic Synvolcanic Intrusive (Unsubdivided)
7a	Tonalite
7b	Trondhjemite
7c	Granodiorite
7d	Chlorite bearing breccia
7e	Pegmatite dike
7f	Quartz porphyry
7g	Intrusion breccia
7h	Aplite dike
7i	Felsic Schist
8	Felsic post volcanic Intrusive (Unsubdivided)
8a	Biotite tonalite
8b	Biotite + amphibole tonalite
8c	Biotite granodiorite
8d	Biotite + amphibole granodiorite
8e	Amphibole quartz monzonite to granodiorite
8f	Quartz–potassium feldspar megacrystic granite
8g	Foliated / sheared granite
8h	Granite gneiss
8i	Xenolithic granite
8j	Granite: aplite and/or pegmatite
8k	Magnetite bearing granite

Litho	Description
9	Diabase (unsubdivided)
9a	Gabbro to quartz gabbro
9b	Plagioclase phyric diabase
9c	Fine grained diabase
9d	Medium grained diabase
9e	Coarse grained diabase
9f	Xenolithic diabase
10	Lamprophyre (unsubdivided)
10a	Porphyritic Lamprophyre (ferromagnesian)
10b	Porphyritic Lamporphyre (feldspathic)
10c	Ultramafic intrusive
OVB	overburden
QSW	quartz stockwork
QVO	quartz vein
SHZ	Shear zone
ZFZ	fault zone/gouge

ALTERATION

Min	Description
AB	Albite
AK	Ankerite
AM	Amphibole
BT	Biotite
CC	Calcite
CL	Chlorite
DL	Dolomite
EP	Epidote
FD	Feldspar
FU	Fuchsite
GP	Graphite
GT	Garnet
HB	Hornblende
LX	Leucoxene
MT	Magnetite
MU	Muscovite
PL	Plagioclase
PX	Pyroxene
SR	Sericite
TC	Talc
TR	Tourmaline

Int	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

MINERALIZATION

Style	Description
AN	Anhedral
CG	Coarse grained
DISS	Disseminated
EUH	Euhedral
FG	Fine grained
MS	Massive
MG	Medium grained
SM	Semi massive
SEUH	Sub-Euhedral
VLT	Veinlets

Min	Description
AS	Arsenopyrite
CP	Chalcopyrite
GN	Galena
MO	Molybdenite
PO	Pyrrhotite
SP	Sphalerite
HM	Hematite

VG	Description
VG	visible gold noted (historical)
VG1	weak (1 or 2 specks)
VG2	moderate (3-10 specks)
VG3	strong (>10 specks)
-	not recorded

STRUCTURE

Type	Description
-	Overburden
BDG	Bedding
BKY	Blocky
BXB	Breccia (brittle)
BXD	Breccia (ductile)
CNT	Contact
CRN	Crenulated
FLT	Fault
FOL	Foliation
FRC	Fracture
G	Gouge
LIN	Lineation
MS	Massive
SH	Shear
SSF	Small Scale Folds

Strain	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

VEINING

Style	Description
EGQV	Early Grey Quartz Vein(s)
LWV	Late White Vein(s)
RBV	Ribboned Vein
SEV	Sheeted Extension Vein(s)
SEVA	Sigmoidal Extension Vein Array
SHV	Shear Vein(s)
STYV	Stylolitic Vein

Type	Description
AK	Ankerite
CA	Calcite
CB	Carbonate
HE	Hematite
QZ	Quartz
QZ-AB	Quartz-Albite
QZ-AK	Quartz-Ankerite
QZ-CA	Quartz-Calcite
QZ-CB	Quartz-Carbonate
QZ-FU	Quartz-Fuchsite
QZ-TO	Quartz-Tourmaline
TO	Tourmaline

Sanatana Resources Inc.

CORE BOX RECORD

PROJECT: Jackfish

HOLE :	JF-18-04	**DATE:**	19/06/2018	**INTIALS:**	TSR

BOX #	FROM	TO	DYMO	PHOTO	BOX #	FROM	TO	DYMO	PHOTO
1	2.00	6.19	✓	✓	26	105.75	110.03	✓	✓
2	6.19	10.24	✓	✓	27	110.03	114.20	✓	✓
3	10.24	13.91	✓	✓	28	114.20	118.43	✓	✓
4	13.91	18.12	✓	✓	29	118.43	122.56	✓	✓
5	18.12	22.41	✓	✓	30	122.56	126.70	✓	✓
6	22.41	26.66	✓	✓	31	126.70	130.72	✓	✓
7	26.66	30.90	✓	✓	32	130.72	135.05	✓	✓
8	30.90	35.07	✓	✓	33	135.05	139.58	✓	✓
9	35.07	39.24	✓	✓	34	139.58	143.58	✓	✓
10	39.24	43.50	✓	✓	35	143.58	147.70	✓	✓
11	43.50	47.66	✓	✓	36	147.70	150.00	✓	✓
12	47.66	52.02	✓	✓	37		EOH		
13	52.02	46.14	✓	✓	38				
14	46.14	60.28	✓	✓	39				
15	60.28	64.38	✓	✓	40				
16	64.38	68.57	✓	✓	41				
17	68.57	72.38	✓	✓	42				
18	72.38	76.58	✓	✓	43				
19	76.58	80.58	✓	✓	44				
20	80.58	84.93	✓	✓	45				
21	84.93	89.02	✓	✓	46				
22	89.02	93.20	✓	✓	47				
23	93.20	97.52	✓	✓	48				
24	97.52	101.65	✓	✓	49				
25	101.65	105.75	✓	✓	50				

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT:	Jackfish				
HOLE :	JF-18-04	**DATE:**	19/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
2.0	3.0	0.9	0.1	60	4
3.0	4.5	1.5	0.8	45	14
4.5	6.0	1.5	1.4	4	16
6.0	7.5	1.5	1.1	20	10
7.5	9.0	1.5	1.1	15	35
9.0	10.5	1.5	1.4	7	40
10.5	13.5	3.2	2.5	21	60
13.5	16.5	3.0	2.7	14	40
16.5	19.5	3.0	2.7	23	9
19.5	22.5	3.0	2.7	21	9
22.5	25.5	3.0	3.0	4	8
25.5	28.5	3.0	2.0	15	14
28.5	31.5	3.0	2.0	26	29
31.5	34.5	36.0	2.0	35	16
34.5	37.5	3.0	2.7	13	26
37.5	40.5	3.0	2.8	12	22
40.5	43.5	3.0	2.7	12	38
43.5	46.5	3.0	2.8	11	24
46.5	49.5	3.0	2.8	9	21
49.5	52.5	3.0	2.9	4	5
52.5	55.5	3.0	1.4	39	6
55.5	58.5	3.0	0.4	47	9
58.5	61.5	3.2	1.3	50	13
61.5	64.5	3.0	2.2	26	12
64.5	67.5	3.0	0.5	67	24

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT:	Jackfish				
HOLE :	JF-18-04	**DATE:**	19/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
67.5	70.5	3.0	2.1	26	31
70.5	7.2	1.6	0.0	25	1
72.0	75.0	3.0	0.6	100	9
75.0	78.0	3.1	0.6	55	3
78.0	79.5	1.6	0.3	26	4
79.5	82.5	3.0	1.3	40	22
82.5	85.5	3.0	1.2	18	33
85.5	87.0	1.5	1.2	6	6
87.0	90.0	3.0	1.9	36	25
90.0	93.0	3.1	0.7	75	30
93.0	96.0	3.0	2.3	31	23
96.0	99.0	3.0	2.8	15	11
99.0	102.0	3.0	2.6	19	21
102.0	105.0	3.0	1.9	25	37
105.0	108.0	3.0	2.2	35	20
108.0	111.0	2.9	2.6	19	29
111.0	114.0	3.0	2.7	16	19
114.0	117.0	3.0	2.6	24	43
117.0	120.0	3.0	2.1	35	22
120.0	123.0	3.0	1.9	26	33
123.0	126.0	3.0	3.0	8	48
126.0	127.5	1.4	1.3	9	22
127.5	130.5	3.0	2.7	13	19
130.5	133.5	3.0	2.9	11	21
133.5	136.5	3.0	2.7	9	45

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT:	Jackfish				
HOLE :	JF-18-04	**DATE:**	19/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
136.5	138.0	1.5	1.5	2	11
138.0	141.0	3.0	2.9	11	6
141.0	144.0	3.0	2.8	11	12
144.0	147.0	3.0	2.9	9	43
147.0	150.0	3.0	3.0	3	25
	EOH				

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-04 **DATE:** 19/06/2018 **INTIALS:** TSR

Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
1		26	2.83	51	1.40	76	0.370
2	10.4	27	76.7	52	0.400	77	0.500
3	0.760	28	84.1	53	0.630	78	0.240
4	0.680	29	29.5	54	54.5	79	1.10
5	1.44	30	0.690	55	0.511	80	0.490
6	0.870	31	0.280	56	0.540	81	24.4
7	1.03	32	21.9	57	0.510	82	0.720
8	4.49	33	2.60	58	0.530	83	0.480
9	8.97	34	1.81	59	0.480	84	0.400
10	11.9	35	8.78	60	0.460	85	0.510
11	13.5	36	1.02	61	3.66	86	0.430
12	1.14	37	1.70	62	1.96	87	0.360
13	1.06	38	1.42	63	15.1	88	0.430
14	2.51	39	0.860	64	6.54	89	1.41
15	2.29	40	0.670	65	6.38	90	0.330
16	0.910	41	1.01	66	0.400	91	0.380
17	0.290	42	0.660	67	0.150	92	0.320
18	0.580	43	0.980	68	0.500	93	0.290
19	0.810	44	1.19	69	0.417	94	0.300
20	0.260	45	1.26	70	0.280	95	0.490
21	11.1	46	1.80	71	0.130	96	0.200
22	4.16	47	2372	72	0.120	97	0.320
23	21.9	48	62.7	73	0.530	98	0.150
24	1.03	49	1.02	74	0.460	99	0.080
25	1.65	50	0.870	75	0.460	100	0.960

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-04 **DATE:** 19/06/2018 **INTIALS:** TSR

Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
101	0.570	126	0.340	151		176	
102	166	127	0.230	152		177	
103	4.19	128	20.6	153		178	
104	10.8	129	0.080	154		179	
105	126	130	0.100	155		180	
106	0.660	131	0.290	156		181	
107	2.28	132	0.450	157		182	
108	0.500	133	5.84	158		183	
109	2.00	134	0.750	159		184	
110	79.9	135	0.200	160		185	
111	62.7	136	2.20	161		186	
112	0.540	137	0.630	162		187	
113	9.89	138	5.01	163		188	
114	9.16	139	3.27	164		189	
115	0.780	140	1.12	165		190	
116	28.3	141	2.02	166		191	
117	0.870	142	0.480	167		192	
118	1.43	143	0.210	168		193	
119	1.35	144	1.40	169		194	
120	49.5	145	0.190	170		195	
121	6.98	146	0.280	171		196	
122	0.420	147	1.45	172		197	
123	0.180	148	0.200	173		198	
124	0.190	149	0.240	174		199	
125	0.350	150	0.860	175		200	

Sanatana Resources Inc.

CHAIN OF CUSTODY

Laboratory:	ACTLABS THUNDER BAY		
Shipper:	SANATANA	Location:	JACKFISH
Pallet Box No:	N/A	Waybill No:	N/A
Packed By:	TIM ROBINSON	Date Packed:	JULY 4, 2018
Date Shipped:	JULY 6, 2018	Date Received:	

	Sample From	Sample To	Tag No.	Received Intact (✓)
1	VR13263B	VR13272B	0001217	✓
2	VR13273B	VR13282B	0001262	✓
3	VR13283B	VR13292B	0001353	✓
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

DRILL LOG TITLE PAGE

Hole ID	**JF-18-05**	***Project***	**Jackfish**

Section	1400	***Easting***	504772	***Source***	GPS
Site	Surface	***Northing***	5411226	***Azimuth***	0
Twp	Syine	***Elevation***	316	***Dip***	-60
		Grid	UTM NAD83	***Length***	148.80 ***m***

Logged by	Tim Robinson	***DDH Started***	21-Jun-18
Geotechnician	Tim Robinson	***DDH Finished***	24-Jun-18
Geotech Type	Basic	***Log Completed***	28-Jun-18
Drill Contractor	Richard's Exploration	***Last Updated***	19-Aug-18
Core Size	BTW		

DIP TESTS (other than Maxibor)

Depth	***Azimuth***	***Dip***	***Type***
5.00	1.30	-58.70	EZ
143.80	11.10	-52.50	EZ

Available Analyses:	***FA*** Yes	***GRAV*** No	***MET*** No	***ICP*** Yes	***WR*** Yes

Summary

Designed to test coincident Max-Min and magnetic high anomalies.

Sanatana Resources Inc. Drill Log

Jackfish

Signature: ______________________

JF-18-05

Initials: ________

From	To	Litho
0.00	0.70	OVB

Overburden

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
0.70	7.00	7b

coarse grained granodiorite with minor xenoliths of fine grained metavolcanic rocks. Minor sulphide mineralisation in veinlets. Quartz veining present 1-2cm. 2 phases of granodiorite dyke intrusion indicated by lighter coloured (late phase) dykes with higher quartz content.

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
0.70	7.00	W			W									W

Haematite alt present

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
4.60	4.75	1	LWV		CA-			145

1-2cm diameter

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
6.30	6.64	1	VLT	-	CP	1		

SAMPLES

From	To	Sample	Au g/t	Type
6.20	7.00	VR13171B	0.048	CORE
10.30	10.50	VR13172B	0.022	CORE
11.70	12.20	VR13173B	0.029	CORE
12.60	12.80	VR13174B	0.001	CORE
15.50	15.80	VR13175B	0.003	CORE
17.70	18.50	VR13176B	0.001	CORE
19.70	19.90	VR13177B	0.016	CORE
20.50	20.90	VR13178B	0.09	CORE
21.10	21.10	VR13180B	0.001	BLK
21.10	22.10	VR13179B	0.108	CORE
35.80	36.00	VR13181B	0.001	CORE
46.80	48.00	VR13182B	0.002	CORE

From	To	Litho
0.70	7.00	7b

(Continued from previous page)

STRUCTURES					ALTERATION													VEINS								MINERALIZATION								SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																					48.00	49.00	VR13183 B	0.001	CORE
																																					49.00	50.00	VR13184 B	0.001	CORE
																																					50.00	50.50	VR13185 B	0.001	CORE
																																					50.50	51.40	VR13186 B	0.001	CORE
																																					51.40	52.00	VR13187 B	0.001	CORE
																																					52.00	53.00	VR13188 B	0.001	CORE
																																					53.00	54.00	VR13189 B	0.002	CORE
																																					54.00	55.00	VR13191 B	0.001	CORE
																																					55.00	56.00	VR13192 B	0.001	CORE
																																					56.00	57.00	VR13193 B	0.001	CORE
																																					57.00	58.00	VR13194 B	0.002	CORE
																																					58.00	59.00	VR13195 B	0.001	CORE
																																					59.00	59.60	VR13196 B	0.001	CORE
																																					59.60	60.80	VR13197 B	0.001	CORE
																																					60.80	61.80	VR13198 B	0.001	CORE
																																					76.20	76.20	VR13200 B	0.001	DUP
																																					76.20	76.40	VR13199 B	0.001	CORE
																																					76.50	76.80	VR13201 B	0.004	CORE
																																					92.50	92.80	VR13202 B	0.001	CORE
																																					93.50	94.60	VR13203 B	0.001	CORE
																																					106.90	108.00	VR13204 B	0.004	CORE
																																					108.00	109.20	VR13205 B	0.003	CORE
																																					109.20	110.40	VR13206 B	0.003	CORE
																																					117.20	118.10	VR13207 B	0.001	CORE
																																					126.30	127.30	VR13208 B	0.001	CORE

From	To	Litho
0.70	7.00	7b

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																																						141.00	141.00	VR13210 B	0.001	BLK
																																					141.00	141.20	VR13209 B	0.001	CORE
																																					144.30	144.50	VR13211 B	0.001	CORE

From	To	Litho
7.00	8.90	1

fine grained carbonate talc magenetite rich metavolcanic dyke. Moderately reactive and soft

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
8.90	12.10	7b

coarse grained granodiorite with noticeable chlorite epidote alteration.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
					9.05	11.60	M			W									M																							
																				9.20	9.50	3	LWV		QZ-HM			150													

From	To	Litho
12.10	13.40	5a

Medium-Coarse grained chl-epi altered gabbro with xenoliths of fine grained mafic metavolcanic. Strong epiodite alt around mafic clast at 12.70 and epidote banding at 10.40

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
					12.10	13.40	S			M									S																							

strong epi alt around mafic clast at 12.70 and epidote banding a 10.40

From	To	Litho
13.40	14.70	7b

coarse grained granodiorite

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
14.70	17.10	5a

medium-coarse grained gabbro with minor epidote alteration around veinlets. Large xenolith of fine grained metavolcanic @ 16.10m some carbonate veinlets near fault zone @15.60-15.75. fault zone is HM altered and contains coarse grained sulphide crytsals associated with carbonate veilets. Some disseminated sulphides @16.80. vein bearing sulphides at 16.70 in epidote rich veins.

STRUCTURES

From	To	Struct	CA	Strain
15.60	15.75	FLT	30	M

HM altered fault zone

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
15.60	15.75													

Mod HM alteration arounf fault

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
16.50	16.60	1	LWV		HM			20

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
15.60	15.75	1	CG	-	CP	1		

coarse grained fault zone associated sulphides

16.68	16.72	1	VLT	-	CP	1		
16.78	16.82	1	DISS	-	CP	1		

From	To	Litho
17.10	22.10	5a

coarse grained meta gabbro with xenoliths of fine grained mafic metavolcanics. Small granodioritic dykes cross cutting. Shear zone present at the end of the unit with minor cubic m-c grained sulphide mineralisation. Epidote alteration in metagabbro. Shear zone present at 19.60-19.75. Disseminated sulphides present towards upper part of the interval and veinlet sulphides @20.15m

STRUCTURES

From	To	Struct	CA	Strain
19.60	19.75	SH	35	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
17.60	18.00	2	LWV		QZ-HM			160

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
18.00	18.10	1	VLT	-	CP	1		
19.60	19.90	1	SM	-	CP	1		
20.10	22.10	1	DISS	-	CP	1		

JF-18-05

Initials: _____

From	To	Litho
22.10	34.35	5a

med to coarse grained meta gabbro with epidote alteration of feldspars and xenoliths of fine grained mafic metavolcanics. Veinlet sulphides @23.15. minor quartz-HM veining throughout unit. Epidote veinlets. Fingers of coarse grained granodiorite. Carbonate dykes with large black/red phenocryts (Augite/jasper?) 34.15-34.25 prior to fault. Fault zone at unit end @34.25-34.35

STRUCTURES

From	To	Struct	CA	Strain
34.25	34.35	FLT	80	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
22.10	34.35				W									W

weak-moderate

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
34.10	34.35	5	SHV		CB			

carbonate with large black phenocrrysts potentially augite or jasper

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
34.35	36.15	15c

fine grained ultramafic dyke brown colour possibly biotite. Large phenocryst of a black material (amphibole or biotite) weekly magnetic. No carbonate. Minor carbonate HM veining throughout with minor shear zone @ 34.95m

STRUCTURES

From	To	Struct	CA	Strain
34.93	34.97	SH	80	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
36.15	46.90	1e

large shear zone. Mafic mica schist. Variations in foliation magnitude. Ultra mafic carbonate bearing dykes with large phenocrysts of black mineral at upper part of shear zone. Disseminated sulphides ~37m. Haematite epidote alteration occuring in banding throughout the shear zone most likely in occurrence to structural weakness although no offset visisble. Large quartz vein @ 45.65- 45.90. SM sulphides present 46.80-46.95. Reiberkite present in vein @ 44.80-45m and also again @46m.

STRUCTURES

From	To	Struct	CA	Strain
36.15	46.90	FOL	45	S
37.40	37.80	SH	90	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
42.50	46.40				M									M

Varies M-S

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
36.60	36.80	2	SHV		CB			85

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
36.90	37.10	1	DISS	-	CP	1		

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
36.15	46.90	1e

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																				45.65	45.90	3	LWV		QZ			95													
																													46.80	46.90	1	SM	-	CP	1						

From	To	Litho
46.90	59.55	1

multi-lithology: fn grained mafic metavolcanic, with granodiorite fingers and granodiorite dykes crosscutting. Mafic xenoliths. Coarse feldspar porphyry, meta-gabbro fingers. Prominent chlorite epidote alteration @47m. Rocks are strongly magnetic indicating either magnetite or potentially pyrrhotite. Bleacing and texture may point towards pillow basalt formation. Two major silica intrusions 47.15, 50.60-51.10 with feldspar rich alteration margins. Silica is opaque grey colour. Sulphides present 46.80-47.50 in association with quartz veins. More veilet mineralization @48.20. coarse grained blocky. Diss sulphides 48.10-48.55. CP veinlets @50.20. strong epi chl alt @ 54.90. some quartz-hm present throughout.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																													46.90	47.50	1	VLT	-	CP	1						
																													and DISS												
					47.00	47.15	W												M																							
					W-M																																					
																				47.15	47.25	1	LWV		QZ			105													
																													48.10	48.55	1	DISS	-	CP	1						
																													48.18	48.22	1	CG	-	CP	1						
																				50.60	51.10	1	LWV		QZ			65													
																													52.77	59.55	1	DISS	-	CP	1						
																													VLT and MG also												
																																						53.00	53.00	VR13190 B	0.53	218
																				57.00	59.50	4	LWV		QZ-HM			55													

From	To	Litho
59.55	61.80	7b

chlorite altered m - coarse grained granodiorite small exnoliths of finer grained mafic metavolcanics. Quartz-HM veining

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
					59.55	61.80	W			W										59.55	61.80	1	LWV		CA-			40													

From	To	Litho
61.80	63.00	SHZ

chlorite carbonate maybe talc. Soft with fractures. Very reactive. Some schistose fabric.

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
61.80	63.00	W			W									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
63.00	80.80	7b

medium to coarse grained granodiorite with xenoliths of fine grained mafic metavolcanics some strong epidote alteration towards upper part of the unit in veins e.g. 63.35m more alteration @ 65m quartz vein @69.70 has alteration margins granite has a purple hue towards mid section of the unit. Cubic pyrite crystals in mafic xenolith @ 64.55. the second half of the unit has noticeable chlorite alteration of feldspars throughout. Variations in grainsize of granodiorite. Fingers of gabbro e.g. @76.80 DISS and VLT sulphides and asscoiated magnetism (pyrrhotite or magnetite). More prominent chlorite alteration from 78-80.80m

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
63.33	63.47	S			M									S
64.90	65.10				M									M
78.00	80.80				S									

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
65.50	71.90	2	LWV		QZ			120
69.65	69.70	3	LWV		QZ			30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
64.50	64.55	1	MG	-	CP	1		
76.65	76.85	1	DISS	-	CP	1		

AND VLT SULPHIDES

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
80.80	90.83	7b

multi-lithic. Coarse grained grano diorite interfingered with m-c grained meta-gabbro, finer xenoliths of metavolcanic basalt. Multiple quartz veining. Interrestingly fibrous texture present in metavolcanics @81.30-81.50. some minor sulphide mineralisation @ 86.80 (DISS) and 89.45 (VLT). Specular haematite at 90.60

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
80.80	90.83	10	LWV		QZ-HM			120
			variable orientation. Stockwork veining.					
85.70	85.80	2	VBX		QZ-HM			70

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
86.78	87.82	1	DISS	-	CP	1		

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
80.80	90.83	7b

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION										SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																													89.43	89.47	1	VLT	-	CP	1								
																													90.60	90.62	0	-	-	HM	1								
																													specular haematite													

From	To	Litho
90.83	95.45	1

mostly mafic metavolcanics. Medium to coarse grained gabbbro with slithers of granodiorite containing xenoliths of finer grained mafic metavolcanic. Some minor shearing and haematite altertion present. Mineralisation asscoiated with shear zone @93.90, @94.5, SOME some smaller sections of DISS PY too. Specular haematite crystals present @90.60

STRUCTURES					ALTERATION														VEINS								MINERALIZATION										SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																													93.60	93.62	1	MG	-	CP	1								
93.85	93.95	SH	10	W																									93.90	94.50	1	VLT	-	CP	1								
																													disseminated also													
94.40	94.50	FLT	45	M																																							
95.15	95.25	FLT	20	W																																							

From	To	Litho
95.45	101.55	7b

mainly coarse grained granodiorite with xenoliths of medium grained heavily chlorite altered metavolcanic. Haematite alteration at the base of the unit. No visible mineralisation.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION										SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
					95.45	101.55				S																																	

From	To	Litho
101.55	101.90	14a

fine grained diabase dyke with larger black phenocrysts

STRUCTURES					ALTERATION														VEINS								MINERALIZATION										SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
101.55	101.90	14a

fine grained diabase dyke with larger black phenocrysts

STRUCTURES					ALTERATION													VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
101.90	103.30	7b

continuation of granodiorite above the dyke

STRUCTURES					ALTERATION													VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
103.30	110.40	5a

coarse grained gabbro. Large plagioclase phenocrysts. Some chlorite alteration with xenoliths and fingering of finer grained metavolcanics. Xenolthis from nearby shear zone contains schistose textures. Large green vein carbonate vein @106.75. sulphides associated with quartz vein @107.57 (blocky cubic m-c grained). Large sulphide presence 107.25-109.80 disseminated M-C grained near quartz vein and stockwork mineralisation 109.12-109.50

STRUCTURES					ALTERATION													VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																				106.70	106.80	2	LWV		CB			15												
																				dark emerald green mineral. Carbonate, soft.																				
																													107.25	109.20	2	DISS	-	CP	2					
																													multi style mineralisation also includes VLT CG/MG											
																													107.25	109.80	1	DISS	-	CP	1					
																													107.55	107.60	2	CG	-	CP	2					
																													asscoaited with nearby quartz vein											
																				107.57	107.65	2	LWV		QZ			10												
																													109.12	109.50	2	VLT	-	CP	2					
																													stockwork veins											

From	To	Litho
110.40	121.25	7b

mostly coarse grained granodiorite or feldspar porphyry with xenoliths of fine grained mafic metavolcanics. Large quartz vein present 110.50-110.75. vein has halo of alteration either potassic or haemitite. M-c grained sulphide associated with veinlet @ 111.40. additional large quartz vein @ 113.65-114.05. m grained sulphides in surrounding grano. Phenocrysts of dark mineral (pyrx or bio) near base of the unit. Fault zone @117.05-117.23 haematite and epidote altered. Large amphiboles in grano above fault. Diss sulphides throughout falut alteration zone.

STRUCTURES

From	To	Struct	CA	Strain
117.05	117.23	FLT	30	M

haematite altered fault zone

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
116.80	118.80	S												S

potentially potassic/haematite also

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
110.50	110.75	5	LWV		QZ-HM			30
113.65	114.50	10	LWV		QZ			10
117.05	117.23	2	LWV		QZ			30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
111.35	111.45	1	VLT	-	CP	1		
113.50	114.15	1	DISS	-	CP	1		
117.50	118.00	1	DISS	-	CP	1		

medium grained present also

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
121.25	127.30	1

mainly sulphide rich fine grained mafic metavolcanincs with quartz veining and slither of granodiorite. Veining is stockwork style. Mineralisation is disseminated by concentrated around quartz carbonate veining.

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
121.25	127.30	10	LWV		QZ-CB			

stockwork

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
126.25	127.30	1	DISS	-	CP	1		

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
127.30	142.72	7b

mainly coarse grained granodiorite with xenoliths of darker granitoid feldspar porphyry blocks and xenoliths of finer grained mafic metavocanic. Some minor quartz veining present. Disseminated to m grained mineralization from 133.133.5 quaartz veining at 135.3-135.4. haematite alteration in surrounding granitoid felspars. Epidote alt in veinlets @137.71

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
127.30	142.72	7b

(Continued from previous page)

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																				130.85	131.70	2	LWV		QZ			30													
																													133.00	133.50	1	DISS	-	CP	1						
																				135.30	135.40	2	LWV		QZ-HM			85													
					137.31	137.32	M												M																						
138.80	139.05	FLT	40	W																																					

From	To	Litho
142.72	144.95	1

xenolith of fine grained mafic metavolcanics with surrounding granodiorite units. Large feldspar phenocryss present in mafic rock. Slither of granodiorite and minor quartz veining associate with grano.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																				142.72	144.95	1	LWV		QZ			50													

From	To	Litho
144.95	148.80	7b

coarse grained granodiorite with quartz veining. Haematite alteration of granodiorite around quartz veining. Possible fault weakness ~148m. Haematite alteration of proposed fault zone.

STRUCTURES					ALTERATION														VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
																				144.95	148.80	2	LWV		QZ-HM			30													
																				variable 30-90																				
147.95	148.05	FLT	80	W																																					
haematite alteration																																								
					148.00	148.80	M																																		
					HM																																			

Sanatana Resources Inc.

GEOLOGICAL LOG FIELDS AND CODES DESCRIPTION

LITHOLOGY

Litho	Description
1	Mafic Metavolcanic (Unsubdivided)
1a	Massive basalt
1b	Pillow basalt
1c	Mafic Tuff
1d	Amygdaloidal Basalt
1f	Mafic Schist
1g	Amphibolite
1h	Mafic Gneiss
2	Intermediate Metavolcanic (Unsubdivided)
2a	Intermediate Flow
2b	Intermediate Lapilli tuff
2c	Intermediate Tuff breccia
2d	Volcanogenic sandstone to siltstone
2e	Intermediate Crystal tuff
2g	Intermediate Schist
2j	Intermediate Flow breccia
3	Felsic Metavolcanic (Unsubdivided)
3a	Felsic Flow
3b	Felsic Lapilli tuff
3c	Tuff breccia
3d	Quartz porphyritic volcanic
3e	Autoclastic flow breccia
3f	Hydrothermal breccia, with chlorite veining
3g	Felsic Schist

Litho	Description
4	Metasediment (Unsubdivided)
4a	Conglomerate, boulders and cobbles
4b	Pebbly sandstone, matrix supported
4c	Sandstone, arkosic sandstone, arenite
4d	Siltstone and mudstone
4e	Schist
4f	Chert
4g	Iron Formation
5	Mafic Intrusive (Unsubdivided)
5a	Gabbro
5b	Diorite
5c	Mafic Pegmatite
5g	Mafic Intrusive breccia
5h	Mafic Dike
6	Intermediate Intrusive (Unsubdivided)
6a	Quartz diorite
6b	Monzonite
6c	Monzodiorite with hematite-stained feldspar
6d	Syenite
6e	Feldspar porphyry
6em	Feldspar porphyry - mafic
6eq	Quartz-Feldspar Porphyry
6f	Intermediate Intrusive breccia
6g	Intermediate Dike

Litho	Description
7	Felsic Synvolcanic Intrusive (Unsubdivided)
7a	Tonalite
7b	Trondhjemite
7c	Granodiorite
7d	Chlorite bearing breccia
7e	Pegmatite dike
7f	Quartz porphyry
7g	Intrusion breccia
7h	Aplite dike
7i	Felsic Schist
8	Felsic post volcanic Intrusive (Unsubdivided)
8a	Biotite tonalite
8b	Biotite + amphibole tonalite
8c	Biotite granodiorite
8d	Biotite + amphibole granodiorite
8e	Amphibole quartz monzonite to granodiorite
8f	Quartz–potassium feldspar megacrystic granite
8g	Foliated / sheared granite
8h	Granite gneiss
8i	Xenolithic granite
8j	Granite: aplite and/or pegmatite
8k	Magnetite bearing granite

Litho	Description
9	Diabase (unsubdivided)
9a	Gabbro to quartz gabbro
9b	Plagioclase phyric diabase
9c	Fine grained diabase
9d	Medium grained diabase
9e	Coarse grained diabase
9f	Xenolithic diabase
10	Lamprophyre (unsubdivided)
10a	Porphyritic Lamprophyre (ferromagnesian)
10b	Porphyritic Lamporphyre (feldspathic)
10c	Ultramafic intrusive
OVB	overburden
QSW	quartz stockwork
QVO	quartz vein
SHZ	Shear zone
ZFZ	fault zone/gouge

ALTERATION

Min	Description
AB	Albite
AK	Ankerite
AM	Amphibole
BT	Biotite
CC	Calcite
CL	Chlorite
DL	Dolomite
EP	Epidote
FD	Feldspar
FU	Fuchsite
GP	Graphite
GT	Garnet
HB	Hornblende
LX	Leucoxene
MT	Magnetite
MU	Muscovite
PL	Plagioclase
PX	Pyroxene
SR	Sericite
TC	Talc
TR	Tourmaline

Int	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

MINERALIZATION

Style	Description
AN	Anhedral
CG	Coarse grained
DISS	Disseminated
EUH	Euhedral
FG	Fine grained
MS	Massive
MG	Medium grained
SM	Semi massive
SEUH	Sub-Euhedral
VLT	Veinlets

Min	Description
AS	Arsenopyrite
CP	Chalcopyrite
GN	Galena
MO	Molybdenite
PO	Pyrrhotite
SP	Sphalerite
HM	Hematite

VG	Description
VG	visible gold noted (historical)
VG1	weak (1 or 2 specks)
VG2	moderate (3-10 specks)
VG3	strong (>10 specks)
-	not recorded

STRUCTURE

Type	Description
-	Overburden
BDG	Bedding
BKY	Blocky
BXB	Breccia (brittle)
BXD	Breccia (ductile)
CNT	Contact
CRN	Crenulated
FLT	Fault
FOL	Foliation
FRC	Fracture
G	Gouge
LIN	Lineation
MS	Massive
SH	Shear
SSF	Small Scale Folds

Strain	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

VEINING

Style	Description
EGQV	Early Grey Quartz Vein(s)
LWV	Late White Vein(s)
RBV	Ribboned Vein
SEV	Sheeted Extension Vein(s)
SEVA	Sigmoidal Extension Vein Array
SHV	Shear Vein(s)
STYV	Stylolitic Vein

Type	Description
AK	Ankerite
CA	Calcite
CB	Carbonate
HE	Hematite
QZ	Quartz
QZ-AB	Quartz-Albite
QZ-AK	Quartz-Ankerite
QZ-CA	Quartz-Calcite
QZ-CB	Quartz-Carbonate
QZ-FU	Quartz-Fuchsite
QZ-TO	Quartz-Tourmaline
TO	Tourmaline

Sanatana Resources Inc.

CORE BOX RECORD

PROJECT: Jackfish

HOLE :	JF-18-05			**DATE:**	22/06/2018		**INTIALS:**	TSR	
BOX #	**FROM**	**TO**	**DYMO**	**PHOTO**	**BOX #**	**FROM**	**TO**	**DYMO**	**PHOTO**
1	0.70	4.50	✓	✓	26	101.70	105.88	✓	✓
2	4.50	8.34	✓	✓	27	105.88	110.10	✓	✓
3	8.34	12.20	✓	✓	28	110.10	114.35	✓	✓
4	12.20	15.85	✓	✓	29	114.35	118.50	✓	✓
5	15.85	19.77	✓	✓	30	118.50	122.64	✓	✓
6	19.77	23.76	✓	✓	31	122.64	126.76	✓	✓
7	23.76	27.60	✓	✓	32	126.76	130.98	✓	✓
8	27.60	31.60	✓	✓	33	130.98	135.12	✓	✓
9	31.60	35.70	✓	✓	34	135.12	139.43	✓	✓
10	35.70	40.00	✓	✓	35	139.43	143.67	✓	✓
11	40.00	44.25	✓	✓	36	143.67	147.91	✓	✓
12	44.25	48.45	✓	✓	37	147.91	148.80	✓	✓
13	48.45	52.77	✓	✓	38		EOH		
14	52.77	57.02	✓	✓	39				
15	57.02	60.75	✓	✓	40				
16	60.75	64.76	✓	✓	41				
17	64.76	28.21	✓	✓	42				
18	28.21	72.78	✓	✓	43				
19	72.78	77.01	✓	✓	44				
20	77.01	80.82	✓	✓	45				
21	80.82	85.11	✓	✓	46				
22	85.11	89.27	✓	✓	47				
23	89.27	93.19	✓	✓	48				
24	93.19	97.50	✓	✓	49				
25	97.50	101.70	✓	✓	50				

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT: Jackfish

HOLE :	JF-18-05	**DATE:**	22/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
0.70	1.00	0.30	0.00	10	1
1.00	2.00	1.00	0.50	15	2
2.00	2.50	0.60	0.30	9	2
2.50	4.00	1.60	0.60	35	5
4.00	5.50	1.60	3.00	40	13
5.50	7.00	1.60	0.40	31	5
7.00	8.50	1.50	1.10	18	0
8.50	10.00	1.50	1.10	18	16
10.00	11.50	1.50	0.50	32	11
11.50	13.00	1.80	0.80	28	13
13.00	14.50	1.50	0.70	20	8
14.50	17.50	3.00	1.90	28	17
17.50	20.50	3.00	1.40	41	15
20.50	23.50	3.00	1.80	34	36
23.50	26.50	3.00	1.50	40	20
26.50	29.50	3.00	0.90	42	14
29.50	32.50	3.00	0.80	39	13
32.50	35.50	3.00	1.80	36	29
35.50	38.50	3.00	2.80	8	35
38.50	41.50	3.00	2.70	8	25
41.50	44.50	3.00	2.80	10	30
44.50	47.50	3.00	2.80	7	30
47.50	50.50	3.00	2.60	17	70
50.50	53.50	3.00	2.90	9	34
53.50	56.50	3.00	3.00	5	39

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT: Jackfish

HOLE :	JF-18-05	**DATE:**	22/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
56.50	59.50	3.00	2.90	12	45
59.50	62.50	3.00	0.60	100	15
62.50	65.50	3.00	1.10	50	35
65.50	68.50	3.00	1.10	40	22
68.50	71.50	3.00	1.20	47	24
71.50	74.50	3.00	1.50	44	36
74.50	77.50	3.00	2.20	37	36
77.50	80.50	3.00	1.60	54	20
80.50	83.50	3.00	1.80	39	27
83.50	88.00	4.40	2.60	48	51
88.00	89.50	1.50	0.30	50	10
89.50	91.50	2.00	0.80	60	9
91.50	94.50	3.00	1.30	65	23
94.50	97.50	3.00	1.90	38	15
97.50	100.50	3.00	2.70	11	50
100.50	103.50	3.00	2.70	16	13
103.50	106.50	3.00	2.90	9	22
106.50	109.50	2.90	2.70	10	37
109.50	112.50	3.00	2.60	18	29
112.50	114.00	1.40	0.90	20	4
114.00	115.50	1.50	1.20	9	10
115.50	118.50	3.00	2.70	12	11
118.50	121.50	3.00	2.60	19	9
121.50	124.50	3.00	2.60	18	5
124.50	127.50	3.00	2.80	12	23

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT:	Jackfish				
HOLE :	JF-18-05	**DATE:**	22/06/2018	**INTIALS:**	TSR

FROM	TO	REC	RQD	FRACT	VEINS
127.50	130.50	3.00	2.40	15	15
130.50	133.50	3.00	2.70	14	15
133.50	136.50	2.90	2.90	10	17
136.50	139.50	3.00	3.00	6	17
139.50	142.50	3.00	2.90	10	7
142.50	145.50	3.00	2.60	13	16
145.50	147.00	1.50	1.40	11	4
147.00	148.80	1.80	1.70	6	5
	EOH				

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-05 **DATE:** 22/06/2018 **INTIALS:** TSR

Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
1	11.2	26	0.679	51	3.53	76	16.9
2	11.5	27	4.43	52	113	77	130
3	3.62	28	0.416	53	117	78	27.6
4	14.2	29	0.258	54	138	79	3.16
5	7.34	30	0.540	55	195	80	0.340
6	6.67	31	2.75	56	43.3	81	19.3
7	39.3	32	0.570	57	50.7	82	63.3
8	63.0	33	0.670	58	187	83	3.90
9	8.13	34	0.850	59	84.8	84	4.52
10	4.64	35	0.340	60	39.8	85	4.68
11	9.95	36	0.715	61	60.4	86	5.38
12	5.08	37	0.310	62	105	87	6.77
13	36.7	38	0.340	63	32.8	88	22.6
14	18.7	39	0.290	64	11.5	89	0.520
15	22.4	40	0.540	65	22.1	90	8.59
16	20.4	41	0.010	66	5.84	91	0.490
17	12.9	42	0.450	67	0.605	92	0.830
18	0.810	43	0.390	68	2.25	93	0.470
19	3.41	44	0.170	69	4.77	94	0.580
20	14.9	45	0.440	70	0.820	95	0.480
21	12.2	46	2.59	71	1.18	96	13.2
22	4.58	47	160	72	0.980	97	4.62
23	1.52	48	2.65	73	1.30	98	3.14
24	7.95	49	149	74	10.3	99	0.850
25	9.45	50	263	75	9.16	100	3.67

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-05 **DATE:** 22/06/2018 **INTIALS:** TSR

Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
101	4.77	126	0.173	151		176	
102	0.510	127	35.6	152		177	
103	4.91	128	3.35	153		178	
104	3.06	129	0.250	154		179	
105	0.780	130	1.29	155		180	
106	5.24	131	0.340	156		181	
107	43.2	132	0.380	157		182	
108	64.8	133	7.80	158		183	
109	4.79	134	6.44	159		184	
110	34.8	135	4.51	160		185	
111	0.840	136	0.740	161		186	
112	4.05	137	0.320	162		187	
113	0.300	138	3.88	163		188	
114	0.350	139	1.71	164		189	
115	0.319	140	3.82	165		190	
116	2.06	141	2.77	166		191	
117	0.360	142	9.23	167		192	
118	0.810	143	0.460	168		193	
119	0.430	144	0.560	169		194	
120	18.5	145	0.290	170		195	
121	7.76	146	0.600	171		196	
122	2.08	147	6.24	172		197	
123	16.2	148	1.53	173		198	
124	5.08	149	EOH	174		199	
125	0.650	150		175		200	

Sanatana Resources Inc.

CHAIN OF CUSTODY

Laboratory:	ACTLABS THUNDER BAY		
Shipper:	PUROLATOR	Location:	JACKFISH
Pallet Box No:	N/A	Waybill No:	331466785309
Packed By:	TIM ROBINSON	Date Packed:	JUNE 30, 2018
Date Shipped:	JULY 3, 2018	Date Received:	

	Sample From	Sample To	Tag No.	Received Intact (✓)
1	VR13171B	VR13180B	0001236	✓
2	VR13181B	VR13190B	0001264	✓
3	VR13191B	VR13200B	0001261	✓
4	VR13201B	VR13211B	0001382	✓
5				
6				
7				
8				
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25				

DRILL LOG TITLE PAGE

Hole ID	**JF-18-06**	***Project***	**Jackfish**

Section	FF SECTION	***Easting***	504656	***Source***	GPS
Site	Surface	***Northing***	5411053	***Azimuth***	0
Twp	Syine	***Elevation***	286	***Dip***	-60
		Grid	UTM NAD83	***Length***	184.50 ***m***

Logged by	Troy Gill	***DDH Started***	27-Jun-18
Geotechnician	Troy Gill	***DDH Finished***	30-Jun-18
Geotech Type	Basic	***Log Completed***	02-Jul-18
Drill Contractor	Richard's Exploration	***Last Updated***	19-Aug-18
Core Size	BTW		

DIP TESTS (other than Maxibor)

Depth	*Azimuth*	*Dip*	*Type*
5.00	4.70	-59.80	EZ
180.00	12.60	-59.10	EZ

Available Analyses: ***FA*** Yes ***GRAV*** No ***MET*** No ***ICP*** Yes ***WR*** No

Summary

Designed to test the Creek Au Showing.

Sanatana Resources Inc. Drill Log

Jackfish

Signature: _____

Initials: _____

JF-18-06

From	To	Litho
0.00	1.50	OVB

STRUCTURES					ALTERATION													VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type

From	To	Litho
1.50	2.20	7b

Granodiorite - Dark grey, xenolithic with mafic inclusions, medium grained, equigranular, slightly weathered. 1cm wide vein running almost down core axis has blue tinge, otherwise just a quartz-carbonate vein.

STRUCTURES					ALTERATION													VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
1.50	2.20	CNT	25		1.50	2.20	M			M										1.50	2.20	10	RBV		QZ-CB		1	10	1.50	2.20	1	DISS	-								

Blue

From	To	Litho
2.20	2.60	7a

Tonalite Dike - Light grey, along with a massive, cryptocrystalline cherty quartz vein? Mainly feldspar and quartz with minor dark mineral.

STRUCTURES					ALTERATION													VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
2.20	2.60	CNT	10		2.20	2.60	M							M						2.20	2.60	1	RBV		CB		2	35	2.20	2.60	0	-	-								

From	To	Litho
2.60	3.50	1e

Mafic Schist - Brown-black, biotite-carbonate-quartz schist with some feldspar porphyroblasts?

STRUCTURES					ALTERATION													VEINS								MINERALIZATION									SAMPLES				
From	To	Struct	CA	Strain	From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP	From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA	From	To	PY%	Style	VG	Min	Min%	Min2	M2%	From	To	Sample	Au g/t	Type
2.60	3.50	FOL	75	M	2.60	3.50	M						M							2.60	3.50	5	RBV	RBV	QZ-TO	QZ-CB	4	60	2.60	3.50	1	DISS	-								

From	To	Litho
3.50	4.60	5a

Gabbro - Dark Green-brown, medium grained with chlorite altered dark minerals and hematized to epidote altered feldspars.

STRUCTURES

From	To	Struct	CA	Strain
3.50	4.60	FRC	80	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
3.50	4.60	M			M									M

HM M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
3.50	4.60	1	RBV		QZ-CB		1	50

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
3.50	4.60	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
4.60	8.10	7b

Granodiorite - Orange to green-brown, starts out as coarse grained, reddened and silicified dike that becomes sheared and chlorite altered xenolithic granodiorite intrusion breccia. Mega xenolith at the end of feldspar porphyritic rock.

STRUCTURES

From	To	Struct	CA	Strain
4.60	6.00	FRC	45	
6.00	6.60	SH	30	M
6.60	8.00	FRC	20	
8.00	8.10	CNT	50	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
4.60	5.90	S							S					
5.90	6.60	M			M									
6.60	8.10	W			W									

HM M

HM W

HM W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
4.60	8.10	1	RBV		QZ-CB		1	50

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
4.60	6.00	1	DISS	-	CP	1		
6.00	8.10	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
4.60	6.00	VR13212 B	0.002	CORE
6.00	7.00	VR13213 B	0.004	CORE
7.00	7.80	VR13214 B	0.004	CORE

From	To	Litho
8.10	17.60	5a

Gabbro - Brown-green, medium grained, variably hematite stained and epidote stained feldspar and pyroxene with sporadic patches of epidote-chlorite alteration associated with thin bands of pyrite. Also some sulphides around thin (8 - 10cm) granodiorite dikes.

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
8.10	17.60	5a

Gabbro - Brown-green, medium grained, variably hematite stained and epidote stained feldspar and pyroxene with sporadic patches of epidote-chlorite alteration associated with thin bands of pyrite. Also some sulphides around thin (8 - 10cm) granodiorite dikes.

STRUCTURES

From	To	Struct	CA	Strain
8.10	17.60	FRC	40	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
8.10	17.60	2	SHV		QZ-CB		3	20

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
8.10	17.60	3	VLT	-				

SAMPLES

From	To	Sample	Au g/t	Type
9.40	10.00	VR13215 B	0.011	CORE
10.20	10.60	VR13216 B	0.001	CORE
11.40	12.10	VR13217 B	0.01	CORE
12.90	14.20	VR13218 B	0.001	CORE
14.60	14.60	VR13220 B	8.7	228
14.60	15.00	VR13219 B	0.001	CORE

From	To	Litho
17.60	18.50	14a

Diabase Dike - black, small dark phenocrysts, magnetic, minor pyrite in a fracture.

STRUCTURES

From	To	Struct	CA	Strain
17.60	18.40	FRC	70	
18.40	18.50	CNT	40	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
17.60	18.50	1	STYV		CB		2	50

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
17.60	18.50	2	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
18.50	19.10	5a

Gabbro - Continuation of the same gabbro unit.

STRUCTURES

From	To	Struct	CA	Strain
18.50	19.10	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
18.50	19.10	M			M									M

HM M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
18.50	19.10	5	RBV		QZ-HM		3	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
18.50	19.10	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
19.10	19.90	14a

Diabase Dike - Another finger of the same diabase. A little less porphyritic, more fine grained and massive.

STRUCTURES

From	To	Struct	CA	Strain
19.10	19.90	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
19.90	20.40	7b

Granodiorite - Orange, grey-blue quartz eyes really stick out, but otherwise fairly coarse equigranular.dike.

STRUCTURES

From	To	Struct	CA	Strain
19.90	20.40	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
19.90	20.40	M												

HM M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
19.90	20.40	1	STYV		CB		2	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
19.90	20.40	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
20.40	21.50	5a

Gabbro - Continuation of gabbro unit.

STRUCTURES

From	To	Struct	CA	Strain
20.40	21.50	CNT	25	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
20.40	21.50	M			W									M

HM M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
20.40	21.50	2	SHV		CB		3	50

CH

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
20.40	21.50	2	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
21.50	22.00	7b

Granodiorite - Orange-brown, another dike.

STRUCTURES

From	To	Struct	CA	Strain
21.50	22.00	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
21.50	22.00	M							W					

HM M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
22.00	28.80	5a

Gabbro - Similar to previous. Some narrow granodiorite dikes in places. Thin chloritic shear zone at 23.5m.

STRUCTURES

From	To	Struct	CA	Strain
22.00	23.50	FRC	70	
23.50	23.80	SH	5	M
23.80	28.80	CNT	85	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
22.00	28.80	M			M									W

HM M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
22.00	28.80	3	RBV		QZ-HM		5	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
22.00	28.80	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
23.40	24.00	VR13222 B	0.01	CORE

From	To	Litho
28.80	29.80	1

Mafic-Metavolcanic - Dark gree-grey, fine grained and massive with disseminated pyrite throughout as well as concentrated along veinlets. Weakly foliated in places especialy around shear vein at 29.2m.

STRUCTURES

From	To	Struct	CA	Strain
28.80	29.80	CNT	45	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
28.80	29.80	W			W		W		W					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
28.80	29.80	5	RBV		QZ-CB		15	75

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
28.80	29.80	5	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
28.80	29.80	VR13223 B	0.009	CORE

From	To	Litho
29.80	34.70	7b

Granodiorite - Brown-grey, medium to coarse grained, hollocrystalline, phaneritic. Lots of the feldspars are still hematite stained and some have epidote alteration. Quartz is still smoky but doesn't stand out as much as previous units. Minor disseminated pyrite at lower contact. Xenolithic below 33.5m, mafic inclusions.

STRUCTURES

From	To	Struct	CA	Strain
29.80	34.60	FRC	50	
34.60	34.70	CNT	60	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
29.80	34.70	W			W				W					W

HM W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
29.80	34.70	2	RBV		QZ		2	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
29.80	34.50	0	-	-				
34.50	34.70	3	DISS	-				

From	To	Litho
34.70	37.10	1e

Mafic Schist - Dark brown, medium grained, weakly foliated biotite-carbonate schist. Some disseminated pyrite cubes.

STRUCTURES

From	To	Struct	CA	Strain
34.70	37.00	FOL	40	W
37.00	37.10	CNT	35	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
34.70	37.10	M			W		M							

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
34.70	37.10	3	RBV		CA-		5	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
34.70	37.10	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
37.10	39.60	SHZ

Shear Zone - Light green-grey and white, highly mylonitized chlorite, quartz and carbonate and weakly magnetic schist. Epidote - hematite altered fault breccia 8cm wide at 39.4m. Unit ends at a 3cm bucky quartz vein.

STRUCTURES

From	To	Struct	CA	Strain
37.10	39.60	FOL	75	VS

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
37.10	39.60	VS			S		M		S					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
37.10	39.60	5	RBV		QZ-CB		18	70

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
37.10	39.60	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
39.60	40.20	5e

Mafic Dike - Dark grey, fine grained, massive to weakly foliated, moderatley magnetic, silicified and carbonated. Possibly represents the original rock that has been sheared. Trace disseminated pyrite.

STRUCTURES

From	To	Struct	CA	Strain
39.60	40.20	CNT	70	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
39.60	40.20	W			W		W		W					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
39.60	40.20	1	STYV		QZ-HM		23	40

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
39.60	40.20	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
40.20	40.70	SHZ

Shear Zone - A similar narrow interval of shearing between two massive mafic units. Ends at complex shear vein.

STRUCTURES

From	To	Struct	CA	Strain
40.20	40.70	FOL	70	VS

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
40.20	40.70	S			S		S		S					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
40.20	40.70	25	SHV		QZ-CB		34	60

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
40.20	40.70	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
40.70	41.60	5e

Mafic Dike - Similar to previous one although significant fine disseminated pyrite in upper part. Calcite-hematite vein at 41.3m has pyrite as well, then amount of sulphide seems to decrease below this. The unit also ends with a shear vein.

STRUCTURES

From	To	Struct	CA	Strain
40.70	41.60	CNT	70	M

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
40.70	41.60	M			M		M		M					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
40.70	41.60	5	RBV		CA-		3	20

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
40.70	41.30	5	DISS	-				
41.30	41.60	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
40.70	41.30	VR13224 B	0.001	CORE
41.30	41.60	VR13225 B	0.005	CORE

From	To	Litho
41.60	48.90	SHZ

Shear Zone - Similar to previous sheared units, perhaps a little "fresher" looking at times with biotite rather than chlorite dominating the micaceaous schistosity. Sharp contact with diabase dike and reddening of the foliation for 40cm above.

STRUCTURES

From	To	Struct	CA	Strain
41.60	48.90	FOL	80	VS

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
41.60	48.90	S			S		S		S					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
41.60	48.90	10	STYV		QZ-CB		19	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
41.60	48.90	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
41.60	41.90	VR13226 B	0.001	CORE

From	To	Litho
48.90	49.40	14b

Diabase Dike - Dark grey, massive with medium grained greenish feldspar phenocrysts. Magnetic.

STRUCTURES

From	To	Struct	CA	Strain
48.90	49.40	CNT	75	

From	To	Litho
49.40	50.60	SHZ

Shear Zone - Final section of shear zone, similar to others. Chloritic crushed zone at 50.4m seems to run in same orientation as the foliation.

STRUCTURES

From	To	Struct	CA	Strain
49.40	50.60	FOL	60	S

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
49.40	50.60	S			S		M	M						

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
49.40	50.60	3	VBX		QZ		23	75

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
49.40	50.60	0	-	-				

From	To	Litho
50.60	53.40	1

Mafic Metavolcanic - Dark green-grey, massive, aphanitic, patches of epidote alteration perhaps represent relic pillow textures. Intervals of more concentrated pyrite both disseminated and in veinlets.

STRUCTURES

From	To	Struct	CA	Strain
50.60	53.30	FRC	65	
53.30	53.40	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
50.60	53.40	W			W									W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
50.60	53.40	2	STYV		CB		18	20

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
50.60	51.10	1	DISS	-				
51.10	51.50	5	VLT	-				
51.50	53.10	2	DISS	-				
53.10	53.40	3	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
51.10	51.50	VR13227 B	0.001	CORE
53.10	53.40	VR13228 B	0.001	CORE

From	To	Litho
53.40	57.90	7i

Granodiorite Intrusion Breccia - Orange-green-grey, mixed zone of coarse hematite stained granodiorite dykes and xenolithic intrusive with longer intervals of mafic meta-volcanic mega-xenoliths, most of which are mineralized with disseminated and veinlet pyrite.

STRUCTURES

From	To	Struct	CA	Strain
53.40	57.90	FRC	70	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
53.40	57.90	M			M									W
HM M														

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
53.40	57.90	1	RBV		QZ-CB		6	20

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
53.40	53.70	1	DISS	-				
53.70	55.00	3	DISS	-				
55.00	57.90	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
53.70	53.70	VR13230 B	0.001	DUP
53.70	54.40	VR13229 B	0.001	CORE
54.50	55.00	VR13231 B	0.001	CORE
55.80	56.30	VR13232 B	0.001	CORE

From	To	Litho
57.90	59.80	1

Mafic Meta-Volcanic - Green-grey, moslty fine grained and massive with lighter green epidote altered vlotches that are thought to possibly be relic pillow textures. Disseminated pyrite along foliation in strongly magnetic intervals (IF?) or with veining.

STRUCTURES

From	To	Struct	CA	Strain
57.90	58.20	FOL	35	M
58.20	59.80	CNT	40	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
57.90	59.80	W			W									
w														

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
57.90	59.80	1	STYV		CB		23	40

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
57.90	58.20	5	DISS	-				
58.20	59.80	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
57.90	58.20	VR13233 B	0.001	CORE
58.20	59.00	VR13234 B	0.001	CORE
59.00	59.80	VR13235 B	0.001	CORE

From	To	Litho
59.80	60.70	7b

Granodiorite - Orange, coarse grained, equigranular, hematite stained dike.

STRUCTURES

From	To	Struct	CA	Strain
59.80	60.70	CNT	50	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
59.80	60.70	W			W				W					
HM W														

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
59.80	60.70	3	RBV		QZ-CH		3	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
59.80	60.00	3	DISS	-				
60.00	60.70	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
59.80	60.00	VR13236 B	0.001	CORE

From	To	Litho
60.70	62.30	1

Mafic Meta-Volcanic - Similar to previous units.

STRUCTURES

From	To	Struct	CA	Strain
60.70	62.30	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
60.70	62.30	W			W									W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
60.70	62.30	1	STYV		CB		27	60

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
60.70	61.80	1	DISS	-				
61.80	62.30	3	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
61.80	62.30	VR13237 B	0.001	CORE

From	To	Litho
62.30	74.20	7i

Granodiorite Intrusion Breccia - Orange-brown to green-grey, mixed zone of granodiorite, often with large xenoliths and longer intervals of altered pillow basalt forming a mega breccia.

STRUCTURES

From	To	Struct	CA	Strain
62.30	74.20	FRC	70	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
62.30	74.20	M			M									W

HM M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
62.30	74.20	3	VBX		CA-		18	15

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
62.30	74.20	2	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
66.30	66.70	VR13238 B	0.005	CORE
67.50	67.50	VR13240 B	0.001	BLK
67.50	68.00	VR13239 B	0.001	CORE
68.60	69.00	VR13241 B	0.001	CORE

From	To	Litho
74.20	78.10	1b

Pillow Basalr - Dark green-grey, mostly massive, fine grained to aphanitic, with blotchy lighter coloured epidote altered sections thought to be relic pillows, similar to other units. Some parts are foliated with wisps of carbonate veinlets.

STRUCTURES

From	To	Struct	CA	Strain
74.20	75.20	FOL	40	W
75.20	77.70	FRC	60	
77.70	78.10	FOL	55	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
74.20	78.10	W			W		W							W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
74.20	78.10	1	SHV		QZ-CB		21	25

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
74.20	78.10	2	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
74.20	75.00	VR13242 B	0.001	CORE
75.00	75.70	VR13243 B	0.001	CORE

From	To	Litho
78.10	120.10	7i

Granodiorite Intrusive Breccia - Light-grey, dark-grey, dark-green, mixed zone of mega xenolith mafic and possibly bedded meta-sediments (90m) forming a breccia with interfingered phases of the granodiorite intrusion intot he greenstone sequence. Later tonalite dike at 107m (40cm) adds to the complexity of the unit. Quartz-ankerite veins at 114m with sulphides.

SAMPLES

From	To	Sample	Au g/t	Type
78.10	79.00	VR13244 B	0.001	CORE

From	To	Litho
78.10	120.10	7i

Granodiorite Intrusive Breccia - Light-grey, dark-grey, dark-green, mixed zone of mega xenolith mafic and possibly bedded meta-sediments (90m) forming a breccia with interfingered phases of the granodiorite intrusion intot he greenstone sequence. Later tonalite dike at 107m (40cm) adds to the complexity of the unit. Quartz-ankerite veins at 114m with sulphides.

STRUCTURES

From	To	Struct	CA	Strain
78.10	120.10	FRC	40	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
78.10	120.10	W			W		W							W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
78.10	120.10	5	RBV		QZ-CB		11	50

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
78.10	120.10	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
84.90	85.20	VR13245 B	0.001	CORE
92.90	93.30	VR13246 B	0.001	CORE
114.15	114.30	VR13247 B	0.001	CORE
118.00	119.00	VR13248 B	0.002	CORE

From	To	Litho
120.10	129.00	SHZ

Shear Zone - Grey, variably weakly deformed greenstone sequence of relic pillowed basalts and potentially banded meta-sediments (some you could loosely call iron formation), interfingered with granodiorite intrusion. Basically the same unit as above that was prviously sheared to an extent prior to the implacement of the granodiorite.

STRUCTURES

From	To	Struct	CA	Strain
120.10	129.00	FLT	65	W

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
120.10	129.00	M			M		W							W

MT M

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
120.10	129.00	2	RBV		QZ-CB			25

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
120.10	129.00	3	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
123.90	123.90	VR13250 B	3.31	215
123.90	124.80	VR13249 B	0.001	CORE
126.00	127.40	VR13251 B	0.001	CORE

From	To	Litho
129.00	141.00	7i

Granodiorite Intrusive breccia - Same unit as before the shear zone. Ankerite occurs filing pillow voids with epidote rim surrounding. Bands of pyrite and magnetic layering thought to be iron formation in the greenstone sequence.

STRUCTURES

From	To	Struct	CA	Strain

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%

SAMPLES

From	To	Sample	Au g/t	Type
129.00	129.20	VR13252 B	0.001	CORE

From	To	Litho
129.00	141.00	7i

Granodiorite Intrusive breccia - Same unit as before the shear zone. Ankerite occurs filing pillow voids with epidote rim surrounding. Bands of pyrite and magnetic layering thought to be iron formation in the greenstone sequence.

STRUCTURES

From	To	Struct	CA	Strain
129.00	141.00	BDG	20	W
		???		

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
129.00	141.00	W			W		W							W
141.60	144.60	S			M		S		W					
144.60	145.90	W			W									W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
129.00	141.00	2	RBV		QZ-CB		13	35
141.00	141.60	3	VBX		QZ		9	60
141.60	145.90	1	RBV		CB		6	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
129.00	141.00	2	DISS	-				
141.00	141.60	2	DISS	-				
141.60	145.90	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type
129.30	130.10	VR13253 B	0.001	CORE
133.80	134.40	VR13254 B	0.002	CORE
134.50	135.10	VR13255 B	0.001	CORE

From	To	Litho
141.00	141.60	7g

Feldspar Porphyry Dike - Dark green, epidote stained coarse feldspar phenocrysts in a fine chloritic matrix. Some gry-blue quartz with alteration rims. Also magnetic.

STRUCTURES

From	To	Struct	CA	Strain
141.00	141.60	CNT	60	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
141.00	141.60	M			M				W					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
141.00	141.60	3	VBX		QZ		9	60

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
141.00	141.60	2	DISS	-				

From	To	Litho
141.60	145.90	5a

Gabbro - Light grey with a white speckled appearance at times due to carbonate alteration and a weak schistoicity. Otherwise the typical medium grained, equigranular feldspar and pyroxene texture is apparent like other similar gabbro units. Some narrow granodiorite dikes.

STRUCTURES

From	To	Struct	CA	Strain
141.60	145.90	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
141.60	144.60	S			M		S		W					
144.60	145.90	W			W									W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
141.60	145.90	1	RBV		CB		6	30

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
141.60	145.90	0	-	-				

From	To	Litho
145.90	146.60	7a

Tonalite Dike - white-grey, late phase intrusive dike, basically quartz, white feldspar and minor dark mineral, possibly biotite.

STRUCTURES

From	To	Struct	CA	Strain
145.90	146.60	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
145.90	146.60	M							M					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
145.90	146.60	1	STYV		CA-		5	60

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
145.90	146.60	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
146.60	163.30	7i

Granodiorite Intrusion Breccia - Grey, similar sequence of greenstone lithologies broken into sections by interfingered granodiorite intrusions and also intervals of xenolithic intrusion breccia.

STRUCTURES

From	To	Struct	CA	Strain
146.60	159.00	FRC	70	
159.00	160.00	FOL	45	M
160.00	163.30	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
146.60	163.30	M			M		W							W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
146.60	163.30	5	RBV		QZ		22	50

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
146.60	154.80	1	DISS	-				
154.80	155.10	5	DISS	-				
155.10	157.20	1	DISS	-				
157.20	157.70	3	DISS	-				
157.70	159.00	1	DISS	-				
159.00	160.00	7	DISS	-				
160.00	163.30	1	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
149.50	150.00	VR13256 B	0.013	CORE
154.80	155.10	VR13257 B	0.001	CORE
157.20	157.70	VR13258 B	0.004	CORE
159.00	159.00	VR13260 B	0.007	DUP
159.00	159.90	VR13259 B	0.007	CORE

From	To	Litho
163.30	164.00	7a

Tonalite Dike - white-grey, similar to previous later felsic phase dike. 10cm chilled margins either end silicified with acicular amphibole phenocrysts.

STRUCTURES

From	To	Struct	CA	Strain
163.30	164.00	CNT	30	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
163.30	164.00	M							M					

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
163.30	164.00	1	STYV		CB		4	80

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
163.30	164.00	0	-	-				

SAMPLES

From	To	Sample	Au g/t	Type

From	To	Litho
164.00	175.90	1

Mafic Meta-volcanic - Grey, mostly massive and fine grained with a few minor coarse felsic dikes running through.

STRUCTURES

From	To	Struct	CA	Strain
164.00	175.90	FRC	70	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
164.00	175.90	W			W		W							

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
164.00	175.90	3	STYV		CB		14	40

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
164.00	175.90	2	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
165.90	166.50	VR13261 B	0.002	CORE

From	To	Litho
175.90	184.50	7i

Granodiorite Intrusion Breccia - Grey, similar texture to other units where fingers of granodiorite break up the greenstone sequence into intervals of mega-xenoliths.

STRUCTURES

From	To	Struct	CA	Strain
175.90	184.50	FRC	55	

ALTERATION

From	To	INT	TC	SR	CH	SE	CB	FU	SI	CA	TO	C	AB	EP
175.90	184.50	M			M		W							W

VEINS

From	To	Vn%	Style 1	Style 2	Type 1	Type 2	V/m	CA
175.90	184.50	7	RBV		QZ-CB		22	20

MINERALIZATION

From	To	PY%	Style	VG	Min	Min%	Min2	M2%
175.90	184.50	2	DISS	-				

SAMPLES

From	To	Sample	Au g/t	Type
183.00	183.30	VR13262 B	0.001	CORE

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GEOLOGICAL LOG FIELDS AND CODES DESCRIPTION

LITHOLOGY

Litho	Description
1	Mafic Metavolcanic (Unsubdivided)
1a	Massive basalt
1b	Pillow basalt
1c	Mafic Tuff
1d	Amygdaloidal Basalt
1f	Mafic Schist
1g	Amphibolite
1h	Mafic Gneiss
2	Intermediate Metavolcanic (Unsubdivided)
2a	Intermediate Flow
2b	Intermediate Lapilli tuff
2c	Intermediate Tuff breccia
2d	Volcanogenic sandstone to siltstone
2e	Intermediate Crystal tuff
2g	Intermediate Schist
2j	Intermediate Flow breccia
3	Felsic Metavolcanic (Unsubdivided)
3a	Felsic Flow
3b	Felsic Lapilli tuff
3c	Tuff breccia
3d	Quartz porphyritic volcanic
3e	Autoclastic flow breccia
3f	Hydrothermal breccia, with chlorite veining
3g	Felsic Schist

Litho	Description
4	Metasediment (Unsubdivided)
4a	Conglomerate, boulders and cobbles
4b	Pebbly sandstone, matrix supported
4c	Sandstone, arkosic sandstone, arenite
4d	Siltstone and mudstone
4e	Schist
4f	Chert
4g	Iron Formation
5	Mafic Intrusive (Unsubdivided)
5a	Gabbro
5b	Diorite
5c	Mafic Pegmatite
5g	Mafic Intrusive breccia
5h	Mafic Dike
6	Intermediate Intrusive (Unsubdivided)
6a	Quartz diorite
6b	Monzonite
6c	Monzodiorite with hematite-stained feldspar
6d	Syenite
6e	Feldspar porphyry
6em	Feldspar porphyry - mafic
6eq	Quartz-Feldspar Porphyry
6f	Intermediate Intrusive breccia
6g	Intermediate Dike

Litho	Description
7	Felsic Synvolcanic Intrusive (Unsubdivided)
7a	Tonalite
7b	Trondhjemite
7c	Granodiorite
7d	Chlorite bearing breccia
7e	Pegmatite dike
7f	Quartz porphyry
7g	Intrusion breccia
7h	Aplite dike
7i	Felsic Schist
8	Felsic post volcanic Intrusive (Unsubdivided)
8a	Biotite tonalite
8b	Biotite + amphibole tonalite
8c	Biotite granodiorite
8d	Biotite + amphibole granodiorite
8e	Amphibole quartz monzonite to granodiorite
8f	Quartz–potassium feldspar megacrystic granite
8g	Foliated / sheared granite
8h	Granite gneiss
8i	Xenolithic granite
8j	Granite: aplite and/or pegmatite
8k	Magnetite bearing granite

Litho	Description
9	Diabase (unsubdivided)
9a	Gabbro to quartz gabbro
9b	Plagioclase phyric diabase
9c	Fine grained diabase
9d	Medium grained diabase
9e	Coarse grained diabase
9f	Xenolithic diabase
10	Lamprophyre (unsubdivided)
10a	Porphyritic Lamprophyre (ferromagnesian)
10b	Porphyritic Lamporphyre (feldspathic)
10c	Ultramafic intrusive
OVB	overburden
QSW	quartz stockwork
QVO	quartz vein
SHZ	Shear zone
ZFZ	fault zone/gouge

ALTERATION

Min	Description
AB	Albite
AK	Ankerite
AM	Amphibole
BT	Biotite
CC	Calcite
CL	Chlorite
DL	Dolomite
EP	Epidote
FD	Feldspar
FU	Fuchsite
GP	Graphite
GT	Garnet
HB	Hornblende
LX	Leucoxene
MT	Magnetite
MU	Muscovite
PL	Plagioclase
PX	Pyroxene
SR	Sericite
TC	Talc
TR	Tourmaline

Int	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

MINERALIZATION

Style	Description
AN	Anhedral
CG	Coarse grained
DISS	Disseminated
EUH	Euhedral
FG	Fine grained
MS	Massive
MG	Medium grained
SM	Semi massive
SEUH	Sub-Euhedral
VLT	Veinlets

Min	Description
AS	Arsenopyrite
CP	Chalcopyrite
GN	Galena
MO	Molybdenite
PO	Pyrrhotite
SP	Sphalerite
HM	Hematite

VG	Description
VG	visible gold noted (historical)
VG1	weak (1 or 2 specks)
VG2	moderate (3-10 specks)
VG3	strong (>10 specks)
-	not recorded

STRUCTURE

Type	Description
-	Overburden
BDG	Bedding
BKY	Blocky
BXB	Breccia (brittle)
BXD	Breccia (ductile)
CNT	Contact
CRN	Crenulated
FLT	Fault
FOL	Foliation
FRC	Fracture
G	Gouge
LIN	Lineation
MS	Massive
SH	Shear
SSF	Small Scale Folds

Strain	Description
VW	Very Weak
W	Weak
M	Moderate
S	Strong
VS	Very Strong
-	Not Recorded

VEINING

Style	Description
EGQV	Early Grey Quartz Vein(s)
LWV	Late White Vein(s)
RBV	Ribboned Vein
SEV	Sheeted Extension Vein(s)
SEVA	Sigmoidal Extension Vein Array
SHV	Shear Vein(s)
STYV	Stylolitic Vein

Type	Description
AK	Ankerite
CA	Calcite
CB	Carbonate
HE	Hematite
QZ	Quartz
QZ-AB	Quartz-Albite
QZ-AK	Quartz-Ankerite
QZ-CA	Quartz-Calcite
QZ-CB	Quartz-Carbonate
QZ-FU	Quartz-Fuchsite
QZ-TO	Quartz-Tourmaline
TO	Tourmaline

Sanatana Resources Inc.

CORE BOX RECORD

PROJECT: Jackfish

HOLE :	JF-18-06	**DATE:**	28/06/2018	**INTIALS:**	TG

BOX #	FROM	TO	DYMO	PHOTO	BOX #	FROM	TO	DYMO	PHOTO
1	1.50	5.60	✓	✓	26	103.77	108.00	✓	✓
2	5.60	9.70	✓	✓	27	108.00	111.94	✓	✓
3	9.70	13.50	✓	✓	28	111.94	116.03	✓	✓
4	13.50	17.60	✓	✓	29	116.03	120.25	✓	✓
5	17.60	21.60	✓	✓	30	120.25	124.41	✓	✓
6	21.60	25.50	✓	✓	31	124.41	128.50	✓	✓
7	25.50	29.50	✓	✓	32	128.50	132.47	✓	✓
8	29.50	33.50	✓	✓	33	132.47	136.47	✓	✓
9	33.50	37.60	✓	✓	34	136.47	140.85	✓	✓
10	37.60	41.90	✓	✓	35	140.85	145.07	✓	✓
11	41.90	46.20	✓	✓	36	145.07	149.09	✓	✓
12	46.20	50.20	✓	✓	37	149.09	153.24	✓	✓
13	50.20	54.40	✓	✓	38	153.24	157.50	✓	✓
14	54.40	58.50	✓	✓	39	157.50	161.73	✓	✓
15	58.50	62.80	✓	✓	40	161.73	165.75	✓	✓
16	62.80	66.80	✓	✓	41	165.75	169.70	✓	✓
17	66.80	70.90	✓	✓	42	169.70	173.80	✓	✓
18	70.90	75.00	✓	✓	43	173.80	177.90	✓	✓
19	75.00	79.20	✓	✓	44	177.90	187.00	✓	✓
20	79.20	83.40	✓	✓	45	187.00	184.50	✓	✓
21	83.40	87.42	✓	✓	46		EOH		
22	87.42	91.62	✓	✓	47				
23	91.62	95.60	✓	✓	48				
24	95.60	99.59	✓	✓	49				
25	99.59	103.77	✓	✓	50				

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT:	Jackfish				
HOLE :	JF-18-06	**DATE:**	28/06/2018	**INTIALS:**	TG

FROM	TO	REC	RQD	FRACT	VEINS
1.6	3.0	1.4	0.5	15	8
3.0	6.0	2.9	2.4	18	4
6.0	9.0	3.0	1.0	32	6
9.0	12.0	3.0	1.5	24	21
12.0	13.5	1.5	0.6	12	4
13.5	16.5	3.0	1.6	25	6
16.5	19.5	3.0	1.9	22	11
19.5	22.5	3.0	1.6	33	19
22.5	25.5	3.0	1.1	40	14
25.5	27.0	3.0	1.3	8	8
27.0	30.0	3.0	1.9	20	53
30.0	31.5	1.5	1.0	13	6
31.5	33.0	1.5	0.7	16	5
33.0	36.0	3.0	1.3	28	16
36.0	39.0	2.9	2.1	31	57
39.0	42.0	3.0	2.9	7	66
42.0	45.0	3.0	2.8	12	56
45.0	48.0	3.0	1.4	27	48
48.0	51.0	2.9	1.6	35	43
51.0	54.0	3.0	2.9	10	58
54.0	57.0	3.0	2.0	16	36
57.0	58.5	1.5	0.8	9	9
58.5	61.5	3.0	2.1	15	5
61.5	64.5	3.0	2.5	19	54
64.5	67.5	3.0	2.1	21	48

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT: Jackfish

HOLE :	JF-18-06	**DATE:**	28/06/2018	**INTIALS:**	TG

FROM	TO	REC	RQD	FRACT	VEINS
67.5	69.0	1.5	0.8	10	31
69.0	72.0	3.0	2.7	13	59
72.0	75.0	3.0	1.8	23	65
75.0	78.0	2.9	2.4	17	65
78.0	81.0	3.0	2.6	20	68
81.0	84.0	2.9	2.7	12	32
84.0	87.0	3.0	2.6	13	30
87.0	90.0	3.0	2.8	16	55
90.0	93.0	3.0	2.3	17	46
93.0	96.0	3.0	2.1	25	30
96.0	99.0	2.9	2.4	9	29
99.0	102.0	3.0	2.3	15	43
102.0	105.0	3.0	2.8	8	28
105.0	108.0	3.0	2.6	19	21
108.0	111.0	3.0	2.7	13	55
111.0	114.0	3.1	2.5	17	33
114.0	117.0	2.9	2.7	11	33
117.0	120.0	3.1	2.5	22	35
120.0	123.0	3.0	2.5	23	16
123.0	126.0	3.0	2.9	16	20
126.0	129.0	3.0	2.9	96	21
129.0	132.0	2.9	2.5	18	33
132.0	135.0	3.0	2.6	13	80
135.0	136.5	1.5	1.4	3	43
136.5	139.5	3.0	2.8	11	33

Sanatana Resources Inc.

GEOTECHNICAL LOG

PROJECT:	Jackfish				
HOLE :	JF-18-06	**DATE:**	28/06/2018	**INTIALS:**	TG

FROM	TO	REC	RQD	FRACT	VEINS
139.5	142.5	3.0	2.9	5	27
142.5	145.5	3.0	2.7	16	17
145.5	147.0	1.5	1.4	5	8
147.0	150.0	3.0	2.7	15	22
150.0	153.0	3.0	2.8	14	75
153.0	156.0	3.0	2.6	16	75
156.0	159.0	2.9	2.8	11	25
159.0	162.0	3.0	2.9	9	52
162.0	165.0	3.0	2.9	8	50
165.0	166.5	1.5	1.1	10	40
166.5	169.5	3.0	2.3	30	52
169.5	172.5	3.0	2.5	15	61
172.5	175.5	3.0	2.6	21	72
175.5	178.5	3.0	2.8	10	42
178.5	181.5	3.0	2.9	10	67
181.5	184.5	3.0	2.7	19	68

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-06 **DATE:** 30/06/2018 **INTIALS:** TSR

Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
1	26.7	26	0.540	51	0.350	76	18.2
2	0.390	27	0.870	52	1.34	77	21.2
3	18.1	28	0.400	53	1.04	78	31.3
4	2.40	29	0.120	54	12.1	79	102
5	0.680	30	0.130	55	0.160	80	42.8
6	0.130	31	3.59	56	37.3	81	32.4
7	1.12	32	5.75	57	12.0	82	19.4
8	0.230	33	0.530	58	118	83	89.5
9	0.690	34	2.51	59	2.14	84	1.78
10	1.21	35	0.580	60	0.070	85	47.7
11	0.400	36	0.230	61	18.4	86	10.3
12	0.390	37	0.420	62	1.14	87	44.5
13	0.170	38	0.230	63	1.40	88	128
14	0.390	39	0.230	64	45.8	89	69.9
15	0.246	40	10.6	65	6.47	90	26.1
16	1.05	41	29.1	66	2.14	91	30.9
17	8.13	42	0.160	67	21.9	92	61.4
18	78.6	43	0.260	68	36.5	93	8.68
19	2.76	44	0.340	69	21.3	94	103
20	2.23	45	0.276	70	0.450	95	7.44
21	0.500	46	0.190	71	51.8	96	97.1
22	0.260	47	3.92	72	82.4	97	73.0
23	0.370	48	2.82	73	24.5	98	124
24	0.014	49	15.4	74	0.170	99	103
25	0.580	50	0.390	75	28.0	100	91.2

Sanatana Resources Inc.

MAGNETIC SUSCEPTIBILITY

PROJECT: Jackfish

HOLE : JF-18-06			**DATE:** 30/06/2018			**INTIALS:** TSR	
Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units	Depth (m)	X 10^{-3} SI units
101	111	126	31.1	151	58.2	176	6.45
102	73.7	127	116	152	38.8	177	7.10
103	12.6	128	11.1	153	6.45	178	1.24
104	61.3	129	33.3	154	80.8	179	3.68
105	11.4	130	53.2	155	64.9	180	0.830
106	77.7	131	112	156	2.45	181	1.45
107	165	132	5.80	157	4.55	182	0.260
108	16.1	133	27.9	158	13.9	183	16.2
109	65.0	134	71.0	159	21.4	184	1.49
110	0.230	135	37.4	160	5.94	185	EOH
111	46.8	136	58.1	161	106	186	
112	97.7	137	119	162	45.2	187	
113	5.45	138	93.8	163	1.13	188	
114	0.970	139	2.06	164	3.37	189	
115	2.64	140	24.9	165	2.48	190	
116	47.9	141	71.3	166	2.42	191	
117	2.97	142	1.20	167	40.1	192	
118	40.1	143	35.3	168	6.07	193	
119	37.9	144	29.4	169	0.570	194	
120	0.250	145	65.9	170	3.39	195	
121	0.470	146	2.22	171	0.540	196	
122	92.5	147	0.180	172	0.412	197	
123	16.7	148	3.88	173	0.590	198	
124	0.370	149	0.980	174	6.65	199	
125	74.7	150	32.8	175	6.69	200	

Sanatana Resources Inc.

CHAIN OF CUSTODY

Laboratory:	ACTLABS THUNDER BAY		
Shipper:	PUROLATOR	Location:	JACKFISH
Pallet Box No:	N/A	Waybill No:	1413 5472 6533 85 70
Packed By:	TIM ROBINSON	Date Packed:	JULY 3, 2018
Date Shipped:	JULY 4, 298	Date Received:	

	Sample From	Sample To	Tag No.	Received Intact (✓)
1	VR13212B	VR13221B	0001393	✓
2	VR13222B	VR13231B	0001304	✓
3	VR13232B	VR13241B	0001322	✓
4	VR13242B	VR13251B	0001268	✓
5	VR13252B	VR13262B	0001252	✓
6				
7				
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22				
23				
24				
25				

Appendix 2: Actlabs Assay Certificates

Quality Analysis ... *Innovative Technologies*

Date Submitted: 11-Jun-18
Invoice No.: A18-07599
Invoice Date: 23-Jul-18
Your Reference: Jackfish

Sanatana Resources
908-925 West Georgia st
Vancouver
BC V6C 3L2
Canada

ATTN: Troy Gill

CERTIFICATE OF ANALYSIS

58 Core samples were submitted for analysis.

The following analytical package(s) were requested: Code 1A2-ICP Tbay Au-Fire Assay ICPOES 30g

Code 1F2-Tbay Total Digestion ICP(TOTAL)

REPORT **A18-07599**

Notes:

Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

ACTIVATION LABORATORIES LTD.
1201 Walsh Street West, Thunder Bay, Ontario, Canada, P7E 4X6
TELEPHONE +807 622-6707 or +1.888.228.5227 FAX +1.905.648.9613
E-MAIL Tbay@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Date Submitted: 11-Jun-18
Invoice No.: A18-07599
Invoice Date: 23-Jul-18
Your Reference: Jackfish

Sanatana Resources
908-925 West Georgia st
Vancouver
BC V6C 3L2
Canada

ATTN: Troy Gill

CERTIFICATE OF ANALYSIS

58 Core samples were submitted for analysis.

The following analytical package(s) were requested: Code 4C (1-10) Whole Rock Analysis-XRF

REPORT **A18-07599**

Notes:

Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

ACTIVATION LABORATORIES LTD.
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613
E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13001B	3	< 0.3	6.24	6	460	1	< 2	3.33	< 0.3	39	136	52	5.29	15	< 1	1.66	3.21	31	884	< 1	2.73	62	0.134
VR13002B	5	< 0.3	7.12	5	499	2	< 2	4.58	< 0.3	37	137	35	7.55	22	1	1.64	4.92	17	1180	< 1	2.70	157	0.273
VR13003B	13	0.3	7.41	20	614	2	< 2	5.39	0.7	37	181	190	7.54	21	2	1.48	4.61	22	1110	< 1	2.85	118	0.179
VR13004B	75	0.4	7.80	< 3	992	1	< 2	5.12	0.5	32	113	569	6.73	22	2	2.03	3.89	22	988	5	2.81	84	0.225
VR13005B	59	< 0.3	7.47	14	> 1000	1	< 2	5.31	< 0.3	33	141	290	6.65	20	< 1	1.92	3.93	20	981	2	2.59	88	0.199
VR13006B	212	0.5	7.28	< 3	876	1	2	5.04	0.4	36	119	1030	7.09	21	2	1.89	3.90	28	949	8	2.63	110	0.225
VR13007B	110	< 0.3	7.57	< 3	954	2	< 2	4.52	< 0.3	30	130	616	5.91	21	< 1	2.04	3.23	29	853	14	2.91	68	0.198
VR13008B	110	< 0.3	7.45	< 3	956	2	< 2	4.56	< 0.3	28	134	549	5.97	22	1	1.53	2.95	26	889	1	3.17	59	0.203
VR13009B	10	< 0.3	7.86	< 3	970	2	< 2	5.01	0.3	25	107	86	5.65	22	2	2.09	3.05	35	940	2	3.34	55	0.199
VR13010B	9170	2.0	5.33	64	215	< 1	< 2	3.92	0.4	33	396	133	4.62	12	1	0.88	4.50	33	727	7	1.21	193	0.032
VR13011B	60	0.4	6.14	3	705	2	< 2	5.92	0.3	37	112	318	7.90	19	1	2.45	2.91	36	910	3	2.71	100	0.163
VR13012B	146	0.4	7.17	< 3	564	2	3	5.30	0.4	29	92	1070	6.17	20	4	1.64	3.09	22	931	4	3.32	72	0.179
VR13013B	11	< 0.3	8.77	< 3	317	1	< 2	4.90	< 0.3	32	54	280	6.44	24	3	1.28	2.19	22	887	< 1	3.64	35	0.107
VR13014B	5	< 0.3	7.74	< 3	698	2	< 2	4.74	0.5	28	90	66	6.12	21	1	1.85	3.47	22	958	< 1	2.97	64	0.168
VR13015B	< 2	< 0.3	7.54	< 3	> 1000	2	< 2	3.58	< 0.3	20	60	12	4.49	18	1	2.56	2.63	33	751	1	2.98	40	0.158
VR13016B	6	< 0.3	7.09	< 3	777	2	< 2	3.67	< 0.3	18	53	55	4.16	19	1	2.15	2.24	23	688	< 1	3.27	26	0.131
VR13017B	8	< 0.3	7.45	< 3	651	3	< 2	3.38	< 0.3	18	65	93	3.91	20	< 1	1.98	2.15	18	670	< 1	3.62	25	0.125
VR13018B	7	< 0.3	6.83	< 3	757	2	< 2	4.22	< 0.3	22	104	125	4.62	17	1	1.88	2.96	22	817	< 1	3.31	34	0.175
VR13019B	< 2	< 0.3	4.26	< 3	488	4	< 2	4.82	< 0.3	36	751	37	4.76	12	< 1	1.92	6.05	35	778	< 1	1.85	318	0.196
VR13020B	< 2	0.3	4.33	< 3	501	4	< 2	4.89	< 0.3	36	622	36	4.83	13	< 1	2.60	6.14	35	814	< 1	1.86	327	0.206
VR13021B	< 2	0.3	4.01	11	> 1000	20	< 2	4.11	0.9	45	616	13	5.20	13	< 1	2.79	8.28	87	1210	< 1	2.02	471	0.174
VR13022B	< 2	< 0.3	1.62	< 3	> 1000	14	< 2	0.83	< 0.3	14	257	35	2.53	8	< 1	0.80	2.10	39	718	1	1.29	104	0.058
VR13023B	3	0.7	4.99	7	959	11	< 2	5.26	0.4	39	405	75	6.67	16	< 1	2.42	5.87	69	1250	13	2.76	169	0.171
VR13024B	< 2	< 0.3	6.92	< 3	467	1	< 2	5.88	0.3	34	112	52	7.28	19	1	1.21	4.22	21	1090	1	2.60	75	0.153
VR13025B	< 2	< 0.3	6.69	3	571	1	< 2	6.10	< 0.3	33	125	42	6.79	18	2	1.29	4.49	21	1070	< 1	2.43	73	0.158
VR13026B	4	< 0.3	7.63	11	621	1	< 2	6.15	0.9	36	123	83	7.35	21	5	1.49	4.31	24	1050	< 1	2.83	82	0.185
VR13027B	40	1.6	6.38	< 3	245	4	2	5.92	1.7	35	122	2000	6.59	19	< 1	3.00	4.20	44	1940	< 1	2.94	83	0.272
VR13028B	8	0.3	7.76	33	663	1	2	5.51	0.5	29	159	734	6.77	21	4	1.47	3.79	23	930	< 1	3.12	113	0.281
VR13029B	6	< 0.3	6.34	4	320	< 1	< 2	7.18	0.3	43	222	164	8.52	20	2	1.04	5.41	18	1160	< 1	1.89	95	0.237
VR13030B	< 2	< 0.3	0.25	< 3	15	< 1	< 2	0.07	< 0.3	1	8	4	1.49	< 1	< 1	0.05	0.05	9	233	< 1	0.05	3	0.003
VR13031B	3	< 0.3	6.47	< 3	385	1	< 2	6.04	0.3	37	129	74	8.06	20	< 1	1.23	4.18	20	1190	< 1	2.05	84	0.156
VR13032B	20	0.5	6.89	< 3	550	1	3	5.28	0.4	45	180	647	8.00	20	1	2.01	4.13	33	1080	< 1	2.73	102	0.141
VR13033B	14	0.4	6.62	5	498	2	< 2	5.49	0.4	35	101	208	8.75	20	< 1	1.78	3.12	25	1040	< 1	2.83	69	0.186
VR13034B	< 2	< 0.3	7.46	< 3	439	1	< 2	4.56	< 0.3	34	65	61	6.69	19	2	1.95	2.88	26	1070	< 1	2.43	74	0.144
VR13035B	7	0.5	6.97	< 3	864	2	< 2	5.42	0.3	38	140	238	7.27	20	< 1	2.10	4.99	32	1270	< 1	2.40	147	0.297
VR13036B	< 2	0.4	7.45	< 3	964	2	< 2	1.76	< 0.3	8	23	11	1.96	17	< 1	2.35	0.62	9	295	1	3.26	20	0.044
VR13037B	< 2	< 0.3	6.02	< 3	558	3	< 2	6.92	< 0.3	19	139	34	5.65	16	< 1	1.84	3.20	40	2700	< 1	2.50	55	0.145
VR13038B	< 2	< 0.3	7.39	< 3	561	2	< 2	5.29	< 0.3	31	218	62	6.32	19	2	1.53	3.43	23	1320	< 1	3.14	69	0.177
VR13039B	< 2	< 0.3	7.15	4	614	1	< 2	6.58	< 0.3	39	89	213	7.27	19	1	2.36	3.80	31	1110	< 1	1.97	60	0.219
VR13040B	3370	0.9	6.38	32	173	< 1	< 2	5.59	0.3	41	210	144	7.09	15	< 1	0.52	4.36	20	1160	2	1.76	127	0.042
VR13041B	< 2	< 0.3	7.18	< 3	894	2	< 2	6.45	0.4	34	106	76	6.52	17	< 1	2.81	3.80	36	1150	< 1	1.98	43	0.177
VR13042B	< 2	< 0.3	6.74	4	581	1	< 2	5.66	< 0.3	43	254	95	6.59	16	1	1.55	5.01	29	1180	< 1	2.25	165	0.130

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13043B	< 2	< 0.3	6.77	< 3	737	1	< 2	6.50	0.4	41	178	91	7.07	17	1	1.93	4.71	30	1270	< 1	2.11	104	0.196
VR13044B	2	< 0.3	7.32	< 3	447	2	< 2	5.37	0.4	51	120	116	9.75	20	3	2.16	3.70	30	1640	< 1	2.36	128	0.108
VR13045B	3	< 0.3	6.81	< 3	248	4	3	6.34	0.4	47	111	129	9.01	19	1	2.24	3.13	33	1780	3	2.93	121	0.099
VR13046B	2	< 0.3	6.93	< 3	191	< 1	3	7.63	0.4	57	102	77	9.89	20	2	0.76	2.84	28	1870	< 1	2.08	121	0.093
VR13047B	< 2	< 0.3	6.19	3	338	2	< 2	6.72	0.4	37	300	19	6.75	18	< 1	1.04	5.05	16	1300	< 1	2.33	131	0.299
VR13048B	4	< 0.3	7.06	13	258	1	< 2	7.13	0.5	49	123	262	9.32	21	5	0.82	2.22	16	1950	< 1	2.42	92	0.107
VR13049B	< 2	< 0.3	7.09	< 3	183	< 1	< 2	7.79	0.6	48	142	145	8.45	20	2	0.72	1.76	12	1600	< 1	1.43	136	0.135
VR13050B	< 2	< 0.3	7.41	< 3	189	< 1	< 2	8.06	0.6	49	131	146	8.93	22	< 1	0.75	1.87	12	1680	< 1	1.50	134	0.143
VR13051B	< 2	< 0.3	7.29	< 3	439	1	< 2	5.14	0.6	40	94	75	7.87	18	2	1.51	3.08	22	1470	1	2.21	107	0.105
VR13052B	< 2	< 0.3	6.96	< 3	561	2	2	6.13	0.4	43	99	67	9.07	19	< 1	1.51	3.30	26	2050	2	2.16	113	0.115
VR13053B	< 2	< 0.3	7.91	< 3	77	< 1	< 2	8.84	< 0.3	53	99	173	8.00	19	2	0.34	1.47	5	2160	< 1	1.51	131	0.130
VR13054B	3	< 0.3	6.05	5	45	< 1	< 2	12.0	< 0.3	38	81	164	7.92	15	1	0.20	1.32	8	2500	< 1	0.61	96	0.096
VR13055B	< 2	< 0.3	7.40	< 3	209	< 1	< 2	8.62	0.4	48	124	146	8.47	19	< 1	0.91	1.58	7	2120	< 1	1.44	127	0.133
VR13056B	2	< 0.3	7.02	< 3	274	3	2	7.31	0.5	41	164	157	8.47	20	1	1.07	2.65	30	1680	< 1	2.31	135	0.113
VR13057B	< 2	< 0.3	6.79	< 3	520	3	< 2	6.00	< 0.3	33	180	37	6.00	19	1	2.04	2.81	35	1370	< 1	2.68	124	0.132
VR13058B	2	< 0.3	6.44	6	595	2	< 2	5.01	0.3	38	113	103	5.44	16	< 1	1.90	4.54	34	1050	< 1	2.73	151	0.132

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13001B	< 3	< 5	0.17	19	472	< 2	0.28	< 5	< 10	119	< 5	15	73	54									
VR13002B	< 3	< 5	0.03	22	580	4	0.54	< 5	< 10	180	< 5	31	103	85									
VR13003B	< 3	< 5	0.05	23	850	3	0.43	< 5	< 10	163	6	22	100	111									
VR13004B	8	< 5	0.14	20	1090	< 2	0.41	< 5	< 10	152	< 5	21	91	79									
VR13005B	4	< 5	0.06	22	932	< 2	0.42	< 5	< 10	160	< 5	22	83	78									
VR13006B	6	< 5	0.13	22	936	< 2	0.49	< 5	< 10	170	< 5	29	91	98	0.005	0.136	0.015	52.91	13.94	9.87	0.131	6.38	7.43
VR13007B	7	< 5	0.08	19	1030	< 2	0.41	< 5	< 10	151	< 5	19	78	79									
VR13008B	5	< 5	0.23	15	1260	3	0.46	< 5	< 10	151	< 5	17	83	67									
VR13009B	6	< 5	0.14	17	1010	< 2	0.38	< 5	< 10	148	< 5	19	89	74									
VR13010B	41	< 5	0.92	19	92	< 2	0.23	< 5	< 10	126	15	10	77	51									
VR13011B	7	< 5	0.54	18	699	4	0.41	< 5	< 10	166	< 5	22	88	80									
VR13012B	6	< 5	0.18	19	1100	6	0.40	< 5	< 10	158	< 5	18	77	72									
VR13013B	4	< 5	0.19	29	663	< 2	0.32	< 5	< 10	132	< 5	20	82	55	< 0.005	0.035	0.003	52.90	16.60	8.91	0.122	3.44	7.02
VR13014B	4	< 5	0.02	20	958	< 2	0.45	< 5	< 10	166	< 5	20	87	93									
VR13015B	13	< 5	0.08	16	778	7	0.34	< 5	< 10	136	< 5	12	69	84									
VR13016B	10	< 5	0.07	15	932	3	0.29	< 5	< 10	120	< 5	13	60	79									
VR13017B	28	< 5	0.06	15	787	< 2	0.28	< 5	< 10	116	< 5	13	61	83									
VR13018B	10	< 5	0.45	16	1080	11	0.34	< 5	< 10	137	< 5	14	59	100									
VR13019B	21	< 5	0.02	14	584	3	0.36	< 5	< 10	82	47	37	69	55									
VR13020B	20	< 5	0.03	14	589	8	0.36	< 5	< 10	82	40	37	72	136									
VR13021B	56	< 5	0.07	15	514	< 2	0.33	< 5	< 10	112	< 5	64	128	142									
VR13022B	36	< 5	0.05	5	177	4	0.09	< 5	< 10	54	< 5	22	91	9									
VR13023B	70	< 5	0.05	25	490	< 2	0.39	< 5	< 10	183	< 5	46	134	126									
VR13024B	4	< 5	0.11	26	940	4	0.56	< 5	< 10	202	< 5	20	86	62									
VR13025B	3	< 5	0.05	26	759	7	0.48	< 5	< 10	200	< 5	18	80	55									
VR13026B	< 3	< 5	0.07	25	1060	< 2	0.50	< 5	< 10	199	6	20	85	55									
VR13027B	7	< 5	1.34	22	716	6	0.45	< 5	< 10	141	< 5	52	126	86									
VR13028B	5	< 5	0.15	20	1130	12	0.45	< 5	< 10	174	7	23	88	73									
VR13029B	< 3	< 5	0.07	35	887	< 2	0.56	< 5	< 10	239	< 5	23	90	55									
VR13030B	< 3	< 5	< 0.01	< 4	26	< 2	0.04	< 5	< 10	6	< 5	3	2	26									
VR13031B	< 3	< 5	0.06	28	766	< 2	0.56	< 5	< 10	208	< 5	23	84	84									
VR13032B	3	< 5	0.54	26	746	4	0.56	< 5	< 10	195	< 5	22	95	91									
VR13033B	9	< 5	0.35	18	839	< 2	0.49	< 5	< 10	201	< 5	24	79	131									
VR13034B	8	< 5	0.16	22	648	4	0.57	< 5	< 10	169	< 5	20	86	79									
VR13035B	< 3	< 5	0.47	23	946	< 2	0.51	< 5	< 10	178	< 5	33	89	220									
VR13036B	8	< 5	0.03	< 4	723	3	0.16	< 5	< 10	46	< 5	7	30	97	< 0.005	< 0.005	< 0.003	71.18	13.36	2.73	0.041	1.08	2.47
VR13037B	7	< 5	0.49	17	511	6	0.46	< 5	< 10	110	< 5	54	106	50									
VR13038B	9	< 5	0.11	21	897	6	0.28	< 5	< 10	124	< 5	20	86	69									
VR13039B	7	< 5	0.59	20	1090	7	0.52	< 5	< 10	189	< 5	20	75	100									
VR13040B	12	< 5	0.48	33	101	2	0.50	< 5	< 10	227	6	17	76	51									
VR13041B	7	< 5	0.30	25	775	8	0.49	< 5	< 10	179	< 5	17	77	76									

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13042B	3	< 5	0.44	26	608	10	0.46	< 5	< 10	179	< 5	16	66	69									
VR13043B	< 3	< 5	0.38	27	650	6	0.56	< 5	< 10	200	< 5	20	81	77									
VR13044B	< 3	< 5	0.53	32	455	8	0.81	< 5	< 10	261	7	25	112	48									
VR13045B	4	< 5	1.38	29	328	< 2	0.70	< 5	< 10	222	10	39	127	54									
VR13046B	5	< 5	0.55	31	433	4	0.64	< 5	< 10	218	< 5	26	109	35									
VR13047B	8	< 5	0.19	23	774	3	0.53	< 5	< 10	168	< 5	29	99	96									
VR13048B	9	< 5	0.94	26	429	< 2	0.45	< 5	< 10	145	< 5	23	111	32									
VR13049B	< 3	< 5	0.40	28	346	5	0.25	< 5	< 10	91	< 5	25	86	17									
VR13050B	< 3	< 5	0.39	30	359	7	0.37	< 5	< 10	124	< 5	26	89	25									
VR13051B	< 3	< 5	0.39	24	358	2	0.54	< 5	< 10	158	< 5	21	104	43									
VR13052B	< 3	< 5	0.88	27	415	6	0.69	< 5	< 10	188	< 5	28	123	43									
VR13053B	< 3	< 5	0.59	33	281	< 2	0.42	6	< 10	114	< 5	25	88	21									
VR13054B	5	< 5	0.67	23	266	5	0.36	< 5	< 10	99	< 5	24	78	29									
VR13055B	< 3	< 5	0.45	30	310	< 2	0.31	< 5	< 10	101	< 5	26	96	17	0.009	0.022	0.016	49.60	15.38	12.59	0.307	2.69	12.92
VR13056B	6	< 5	1.25	26	706	5	0.82	< 5	< 10	234	8	26	106	46									
VR13057B	12	< 5	0.43	19	711	8	0.40	< 5	< 10	124	< 5	20	100	74									
VR13058B	< 3	< 5	0.21	17	592	9	0.35	< 5	< 10	128	< 5	17	85	114									

Analyte Symbol	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%
Lower Limit	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13001B								
VR13002B								
VR13003B								
VR13004B								
VR13005B								
VR13006B	3.80	2.36	0.83	0.45	0.05	0.037	1.57	99.91
VR13007B								
VR13008B								
VR13009B								
VR13010B								
VR13011B								
VR13012B								
VR13013B	5.13	1.36	1.79	0.24	0.02	0.060	2.12	99.77
VR13014B								
VR13015B								
VR13016B								
VR13017B								
VR13018B								
VR13019B								
VR13020B								
VR13021B								
VR13022B								
VR13023B								
VR13024B								
VR13025B								
VR13026B								
VR13027B								
VR13028B								
VR13029B								
VR13030B								
VR13031B								
VR13032B								
VR13033B								
VR13034B								
VR13035B								
VR13036B	4.69	2.71	0.24	0.09	0.02	0.012	0.73	99.36
VR13037B								
VR13038B								
VR13039B								
VR13040B								
VR13041B								

Analyte Symbol	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%
Lower Limit	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13042B								
VR13043B								
VR13044B								
VR13045B								
VR13046B								
VR13047B								
VR13048B								
VR13049B								
VR13050B								
VR13051B								
VR13052B								
VR13053B								
VR13054B								
VR13055B	1.95	1.01	1.63	0.30	0.04	0.057	2.04	100.6
VR13056B								
VR13057B								
VR13058B								

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
SDC-1 Meas			8.37	< 3	583	3		1.10		18	49	31	4.77	23	< 1	2.43	1.03	35	906		1.53	37	0.061
SDC-1 Cert			8.34	0.220	630	3.00		1.00		18.0	64.00	30.000	4.82	21.00	0.20	2.72	1.02	34	880.00		1.52	38.0	0.0690
GXR-6 Meas		0.4	14.1	226	> 1000	1	< 2	0.23	0.4	13	63	63	5.02	34	4	1.78	0.65	39	976	3	0.11	24	0.037
GXR-6 Cert		1.30	17.7	330	1300	1.40	0.290	0.180	1.00	13.8	96.0	66.0	5.58	35.0	0.0680	1.87	0.609	32.0	1010	2.40	0.104	27.0	0.0350
BE-N Meas																							
BE-N Cert																							
AC-E Meas																							
AC-E Cert																							
OREAS 13P Meas																							
OREAS 13P Cert																							
OREAS 14P Meas										678		9310	32.4									> 10000	
OREAS 14P Cert										750		9970	37.2									21000	
BIR-1a Meas																							
BIR-1a Cert																							
NCS DC70009 (GBW07241) Meas																							
NCS DC70009 (GBW07241) Cert																							
DNC-1a Meas					88					54	201	97		14				5				243	
DNC-1a Cert					118					57	270	100		15				5.2				247	
OREAS 904 (4 ACID) Meas		0.8	6.47	108	181	10	6	0.05		97	52	6240	6.77	16		2.87	0.58	17	456	2	0.04	45	0.110
OREAS 904 (4 ACID) Cert		0.551	6.30	98.0	194	7.86	4.05	0.0460		83.0	54.0	6120	6.68	16.7		3.31	0.556	16.7	410	2.12	0.0340	40.1	0.0980
SBC-1 Meas				11	695	3	< 2		0.6	23	93	32		27				161		2		88	
SBC-1 Cert				25.7	788.0	3.20	0.70		0.40	22.7	109	31.0		27.0				163		2		83	
OREAS 214 Meas	2980																						
OREAS 214 Cert	3030																						
OREAS 214 Meas	3100																						
OREAS 214 Cert	3030																						
OREAS 218 Meas	517																						
OREAS 218 Cert	531																						
OREAS 218 Meas	536																						
OREAS 218 Cert	531																						
VR13013B Orig	13																						
VR13013B Dup	10																						
VR13020B Orig		0.4	4.37	6	506	4	< 2	4.94	< 0.3	36	614	36	4.94	12	< 1	2.50	6.26	36	842	< 1	1.88	332	0.208
VR13020B Dup		0.3	4.28	< 3	497	4	< 2	4.84	< 0.3	37	629	36	4.73	13	< 1	2.70	6.02	35	786	< 1	1.84	323	0.204
VR13022B Orig	< 2																						
VR13022B Dup	< 2																						
VR13031B Orig	3																						

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13031B Dup	3																						
VR13037B Orig		< 0.3	5.98	< 3	555	3	< 2	6.82	< 0.3	19	149	33	5.60	16	1	1.89	3.17	40	2680	< 1	2.48	54	0.152
VR13037B Dup		< 0.3	6.06	< 3	561	3	< 2	7.01	< 0.3	18	129	34	5.71	17	< 1	1.80	3.24	40	2720	< 1	2.51	56	0.137
VR13048B Orig	4																						
VR13048B Dup	4																						
VR13051B Orig	< 2	< 0.3	7.29	< 3	439	1	< 2	5.14	0.6	40	94	75	7.87	18	2	1.51	3.08	22	1470	1	2.21	107	0.105
VR13051B Split PREP DUP	< 2	< 0.3	7.48	4	483	1	< 2	5.26	< 0.3	41	90	76	8.32	18	2	1.64	3.23	23	1520	2	2.27	110	0.109
VR13056B Orig	3																						
VR13056B Dup	2																						
VR13057B Orig		< 0.3	6.98	< 3	522	3	< 2	6.04	< 0.3	33	191	38	6.09	19	1	1.83	2.84	35	1380	< 1	2.69	126	0.135
VR13057B Dup		< 0.3	6.59	< 3	518	3	< 2	5.96	< 0.3	32	169	36	5.92	19	2	2.25	2.77	35	1360	< 1	2.66	123	0.129
Method Blank	< 2																						
Method Blank	< 2																						
Method Blank	< 2																						
Method Blank	< 2																						
Method Blank																							
Method Blank		< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001
Method Blank		< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
SDC-1 Meas	26	< 5		15	168		0.15	< 5	< 10	51	< 5		105	20									
SDC-1 Cert	25.00	0.54		17.00	180.00		0.606	0.70	3.10	102.00	0.80		103.00	290.00									
GXR-6 Meas	92	< 5	0.02	22	45	< 2		< 5	< 10	103	< 5	11	123	63									
GXR-6 Cert	101	3.60	0.0160	27.6	35.0	0.0180		2.20	1.54	186	1.90	14.0	118	110									
BE-N Meas															0.007	0.010	0.032	38.61	10.29	13.09	0.201	13.06	14.16
BE-N Cert															0.008	0.009	0.034	38.2	10.1	12.8	0.200	13.1	13.9
AC-E Meas																		70.24	14.84	2.54	0.056	0.05	0.35
AC-E Cert																		70.35	14.70	2.56	0.058	0.03	0.34
OREAS 13P Meas															0.011	0.326	0.299						
OREAS 13P Cert															0.0120	0.313	0.293						
OREAS 14P Meas																							
OREAS 14P Cert																							
BIR-1a Meas																		47.52	15.54	11.68	0.175	9.76	13.32
BIR-1a Cert																		47.96	15.50	11.30	0.175	9.700	13.30
NCS DC70009 (GBW07241) Meas																		71.56	10.95	5.64	0.092	0.12	4.17
NCS DC70009 (GBW07241) Cert																		71.27	11.15	5.60	0.090	0.14	4.17
DNC-1a Meas	< 3	< 5		27	120		0.29			137		16	64	35									
DNC-1a Cert	6.3	0.96		31	144		0.29			148		18.0	70	38.0									
OREAS 904 (4 ACID) Meas	26	< 5	0.06	11	31			< 5	10	86	< 5	37	30	83									
OREAS 904 (4 ACID) Cert	10.6	1.48	0.0630	11.2	27.2			0.520	8.43	76.0	2.12	31.5	26.3	171									
SBC-1 Meas	30	< 5		19	168		0.51	< 5	< 10	213	5	33	195	115									
SBC-1 Cert	35.0	1.01		20.0	178.0		0.51	0.89	5.76	220.0	1.60	36.5	186	134.0									
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
VR13013B Orig																							
VR13013B Dup																							
VR13020B Orig	19	< 5	0.03	14	599	7	0.35	< 5	< 10	82	34	38	75	134									
VR13020B Dup	22	< 5	0.03	14	578	10	0.36	< 5	< 10	82	46	37	69	138									
VR13022B Orig																							

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13022B Dup																							
VR13031B Orig																							
VR13031B Dup																							
VR13037B Orig	7	29	0.51	17	505	7	0.54	< 5	< 10	123	< 5	54	103	62									
VR13037B Dup	7	< 5	0.48	18	517	6	0.37	< 5	< 10	96	< 5	54	110	38									
VR13048B Orig																							
VR13048B Dup																							
VR13051B Orig	< 3	< 5	0.39	24	358	2	0.54	< 5	< 10	158	< 5	21	104	43									
VR13051B Split PREP DUP	< 3	< 5	0.46	25	369	3	0.62	< 5	< 10	172	< 5	22	107	45									
VR13056B Orig																							
VR13056B Dup																							
VR13057B Orig	13	< 5	0.44	20	721	12	0.49	< 5	< 10	161	< 5	20	102	93									
VR13057B Dup	10	< 5	0.42	18	701	3	0.31	< 5	< 10	87	< 5	20	97	55									
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank															< 0.005	< 0.005	< 0.003	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01
Method Blank	< 3	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5									
Method Blank	< 3	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5									

Analyte Symbol	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5
Unit Symbol	%	%	%	%	%	%
Lower Limit	0.01	0.01	0.01	0.01	0.01	0.003
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
SDC-1 Meas						
SDC-1 Cert						
GXR-6 Meas						
GXR-6 Cert						
BE-N Meas	3.35	1.38	2.71	1.07	0.06	0.043
BE-N Cert	3.18	1.39	2.61	1.05	0.0500	0.042
AC-E Meas	6.66	4.52	0.11			
AC-E Cert	6.54	4.49	0.11			
OREAS 13P Meas						
OREAS 13P Cert						
OREAS 14P Meas						
OREAS 14P Cert						
BIR-1a Meas	1.83	0.04	0.97	0.03		
BIR-1a Cert	1.82	0.030	0.96	0.021		
NCS DC70009 (GBW07241) Meas	0.11	1.58	0.05			
NCS DC70009 (GBW07241) Cert	0.12	1.58	0.044			
DNC-1a Meas						
DNC-1a Cert						
OREAS 904 (4 ACID) Meas						
OREAS 904 (4 ACID) Cert						
SBC-1 Meas						
SBC-1 Cert						
OREAS 214 Meas						
OREAS 214 Cert						
OREAS 214 Meas						
OREAS 214 Cert						
OREAS 218 Meas						
OREAS 218 Cert						
OREAS 218 Meas						
OREAS 218 Cert						
VR13013B Orig						
VR13013B Dup						
VR13020B Orig						
VR13020B Dup						
VR13022B Orig						
VR13022B Dup						

Analyte Symbol	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5
Unit Symbol	%	%	%	%	%	%
Lower Limit	0.01	0.01	0.01	0.01	0.01	0.003
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13031B Orig						
VR13031B Dup						
VR13037B Orig						
VR13037B Dup						
VR13048B Orig						
VR13048B Dup						
VR13051B Orig						
VR13051B Split PREP DUP						
VR13056B Orig						
VR13056B Dup						
VR13057B Orig						
VR13057B Dup						
Method Blank						
Method Blank						
Method Blank						
Method Blank						
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.003
Method Blank						
Method Blank						

Quality Analysis ... *Innovative Technologies*

Date Submitted: 15-Jun-18
Invoice No.: A18-07786
Invoice Date: 16-Aug-18
Your Reference: Jackfish

Sanatana Resources
908-925 West Georgia st
Vancouver
BC V6C 3L2
Canada

ATTN: Troy Gill

CERTIFICATE OF ANALYSIS

54 Core samples were submitted for analysis.

The following analytical package(s) were requested: Code 4C (1-10) Whole Rock Analysis-XRF

REPORT **A18-07786**

Notes:

Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

ACTIVATION LABORATORIES LTD.
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613
E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Date Submitted: 15-Jun-18
Invoice No.: A18-07786
Invoice Date: 16-Aug-18
Your Reference: Jackfish

Sanatana Resources
908-925 West Georgia st
Vancouver
BC V6C 3L2
Canada

ATTN: Troy Gill

CERTIFICATE OF ANALYSIS

54 Core samples were submitted for analysis.

The following analytical package(s) were requested: Code 1A2-ICP Tbay Au-Fire Assay ICPOES 30g

Code 1F2-Tbay Total Digestion ICP(TOTAL)

REPORT **A18-07786**

Notes:

Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

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Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13059B	5	< 0.3	7.04	< 3	399	1	< 2	3.87	0.5	26	45	73	6.65	22	2	2.00	2.42	27	1160	< 1	3.17	43	0.087
VR13060B	< 2	< 0.3	0.22	< 3	18	< 1	< 2	0.02	< 0.3	2	13	2	1.28	1	< 1	0.07	0.02	9	163	< 1	0.04	2	0.002
VR13061B	8	0.3	6.51	< 3	434	1	< 2	3.38	< 0.3	32	19	174	8.30	19	< 1	2.21	2.30	27	1130	< 1	2.80	18	0.087
VR13062B	3	< 0.3	6.94	< 3	436	< 1	< 2	3.51	< 0.3	31	22	110	8.41	20	4	1.70	2.42	31	1210	< 1	2.58	23	0.118
VR13063B	4	< 0.3	7.32	< 3	346	< 1	< 2	4.24	< 0.3	28	43	83	6.87	21	< 1	1.33	2.42	29	1160	< 1	2.98	47	0.104
VR13064B	12	0.4	6.39	< 3	471	< 1	< 2	3.34	< 0.3	36	20	413	8.28	20	1	1.88	2.72	30	1170	< 1	2.38	32	0.123
VR13065B	3	0.3	7.57	< 3	387	< 1	< 2	4.10	0.3	31	61	144	6.84	21	< 1	1.23	2.54	20	899	< 1	3.21	44	0.092
VR13066B	3	0.4	7.31	< 3	623	1	< 2	3.69	< 0.3	32	58	141	7.27	22	< 1	2.12	2.68	31	985	< 1	2.39	40	0.090
VR13067B	27	0.5	6.68	< 3	743	2	< 2	3.97	< 0.3	30	148	292	4.97	21	1	2.34	2.97	34	793	< 1	3.09	107	0.152
VR13068B	4	< 0.3	5.76	< 3	717	2	< 2	4.17	< 0.3	24	139	107	4.66	21	< 1	1.30	3.07	36	705	< 1	2.93	86	0.201
VR13069B	2	< 0.3	6.23	< 3	488	2	< 2	3.65	< 0.3	18	80	60	3.28	19	< 1	1.10	1.34	18	644	3	3.83	31	0.076
VR13070B	517	0.3	6.74	4	117	< 1	< 2	6.84	< 0.3	44	174	161	8.38	16	< 1	0.22	4.34	12	1400	< 1	1.92	92	0.042
VR13071B	< 2	< 0.3	7.37	< 3	651	4	< 2	3.85	< 0.3	21	94	21	4.42	21	< 1	2.26	2.70	34	821	< 1	3.56	78	0.142
VR13072B	< 2	< 0.3	7.13	< 3	230	6	< 2	2.83	< 0.3	31	316	19	6.83	25	< 1	1.55	5.60	59	1190	< 1	2.38	138	0.146
VR13073B	< 2	< 0.3	5.42	3	194	3	< 2	1.65	< 0.3	24	135	45	4.45	17	< 1	1.93	2.84	33	632	< 1	2.45	70	0.107
VR13074B	< 2	0.4	7.17	< 3	137	4	< 2	2.04	< 0.3	36	190	31	6.20	21	< 1	2.49	4.39	46	807	< 1	3.02	111	0.185
VR13075B	2	< 0.3	6.64	< 3	425	2	< 2	5.96	< 0.3	34	200	54	6.21	17	< 1	2.30	4.40	37	1140	< 1	2.44	106	0.199
VR13076B	< 2	< 0.3	7.60	< 3	466	2	< 2	4.52	0.3	23	88	51	4.47	22	< 1	1.63	2.64	23	731	5	3.32	77	0.144
VR13077B	< 2	0.4	7.44	< 3	231	2	< 2	4.53	< 0.3	31	98	11	6.59	18	< 1	1.06	3.26	30	1050	1	3.67	78	0.102
VR13078B	< 2	< 0.3	6.92	< 3	222	2	< 2	4.62	< 0.3	32	94	30	5.81	22	< 1	1.04	3.06	25	984	< 1	3.37	78	0.103
VR13079B	22	0.3	5.48	< 3	272	< 1	< 2	6.68	< 0.3	32	36	123	7.89	18	< 1	1.58	2.57	33	1320	< 1	2.41	42	0.109
VR13080B	22	< 0.3	5.67	< 3	270	< 1	< 2	6.68	< 0.3	32	33	129	7.78	18	< 1	1.57	2.54	32	1280	< 1	2.37	41	0.104
VR13081B	19	0.5	6.85	< 3	214	1	< 2	2.71	0.7	12	51	31	3.09	17	< 1	0.98	1.02	16	480	< 1	3.81	24	0.050
VR13082B	26	< 0.3	7.52	< 3	155	< 1	< 2	4.12	< 0.3	30	56	14	6.05	19	< 1	0.85	2.96	30	1040	< 1	3.02	80	0.087
VR13083B	17	< 0.3	6.55	< 3	651	2	< 2	4.39	< 0.3	33	128	31	5.18	20	< 1	2.54	4.53	41	802	1	2.65	224	0.186
VR13084B	13	< 0.3	7.04	3	235	< 1	< 2	5.09	< 0.3	38	47	126	9.55	22	2	0.85	3.02	25	1370	< 1	2.06	48	0.097
VR13085B	4	0.4	7.07	< 3	76	< 1	< 2	4.92	< 0.3	42	63	130	9.79	22	2	0.38	3.00	18	1380	< 1	2.37	37	0.092
VR13086B	< 2	< 0.3	7.24	7	111	< 1	< 2	3.50	< 0.3	33	83	71	7.35	18	< 1	0.87	3.08	31	1260	< 1	2.77	85	0.098
VR13087B	< 2	< 0.3	7.21	< 3	283	1	< 2	3.63	< 0.3	23	61	35	5.83	19	< 1	1.58	2.53	29	936	< 1	3.60	72	0.078
VR13088B	< 2	< 0.3	5.91	< 3	310	2	< 2	2.37	< 0.3	10	60	16	2.14	18	< 1	0.47	0.99	14	480	< 1	4.45	27	0.066
VR13089B	15	0.3	5.69	< 3	131	3	< 2	5.36	< 0.3	33	83	38	6.67	20	< 1	1.95	2.93	26	1150	< 1	3.33	75	0.106
VR13090B	< 2	< 0.3	0.20	< 3	23	< 1	< 2	0.02	< 0.3	2	12	< 1	0.22	< 1	< 1	0.04	0.02	9	147	< 1	0.04	1	0.002
VR13091B	4	< 0.3	6.95	< 3	219	3	< 2	4.23	< 0.3	23	67	42	5.10	19	< 1	1.82	2.32	22	852	4	3.96	55	0.076
VR13092B	< 2	0.5	4.24	< 3	712	12	< 2	4.89	< 0.3	43	585	26	5.43	14	< 1	3.03	7.56	85	1570	3	1.42	378	0.179
VR13093B	3	1.4	4.79	< 3	> 1000	10	2	5.19	0.4	39	291	197	4.96	15	< 1	2.81	5.90	59	1870	16	2.15	267	0.181
VR13094B	< 2	0.6	4.58	< 3	551	6	< 2	4.59	0.4	37	396	52	5.16	14	< 1	3.18	6.43	57	1040	7	1.61	288	0.167
VR13095B	< 2	0.5	4.94	< 3	692	4	< 2	4.56	0.4	39	345	39	5.12	15	1	2.63	6.60	52	958	< 1	1.82	310	0.201
VR13096B	< 2	0.6	5.74	5	603	3	< 2	4.63	< 0.3	33	280	84	5.16	14	< 1	1.34	5.26	42	923	< 1	2.69	206	0.207
VR13097B	< 2	0.5	5.34	< 3	56	4	< 2	6.08	0.3	45	255	34	6.65	14	< 1	1.66	4.67	34	1310	< 1	2.80	109	0.190
VR13098B	< 2	0.5	5.31	< 3	685	10	< 2	5.36	< 0.3	34	539	45	5.36	14	< 1	2.72	5.32	51	1130	4	2.42	174	0.157
VR13099B	< 2	< 0.3	5.05	< 3	> 1000	7	< 2	8.13	< 0.3	28	378	67	5.49	15	< 1	2.36	3.85	48	1730	< 1	2.09	86	0.129
VR13100B	3570	0.9	5.99	26	162	< 1	< 2	5.64	< 0.3	40	229	143	6.73	17	< 1	0.46	4.34	20	1130	2	1.59	129	0.034

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13101B	< 2	< 0.3	5.78	< 3	560	3	< 2	5.13	< 0.3	26	143	96	5.12	18	< 1	2.18	3.59	60	968	< 1	2.05	118	0.179
VR13102B	< 2	0.3	6.94	3	446	2	< 2	2.26	< 0.3	8	44	8	1.82	20	< 1	0.65	0.76	11	307	< 1	4.26	23	0.051
VR13103B	< 2	< 0.3	6.84	4	231	2	< 2	2.56	0.5	10	55	6	2.15	17	< 1	0.51	1.01	16	399	< 1	4.20	27	0.058
VR13104B	2	0.8	5.32	< 3	207	3	22	2.15	< 0.3	8	51	28	2.00	12	< 1	0.32	0.68	15	396	7	3.44	21	0.045
VR13105B	< 2	< 0.3	5.96	< 3	70	2	< 2	2.57	< 0.3	8	48	11	1.95	16	< 1	0.19	0.76	15	420	1	3.95	21	0.052
VR13106B	3	< 0.3	6.45	20	101	3	< 2	2.71	< 0.3	12	43	12	2.13	19	4	0.24	0.90	21	411	10	4.36	21	0.045
VR13107B	< 2	0.3	5.77	< 3	235	< 1	< 2	5.77	0.3	46	98	187	10.4	20	3	1.20	3.27	25	1610	< 1	1.54	53	0.057
VR13108B	< 2	< 0.3	6.43	< 3	648	3	< 2	3.59	1.1	14	122	7	2.73	20	< 1	1.17	1.51	32	475	< 1	3.81	43	0.071
VR13109B	2	5.2	6.91	< 3	472	3	4	1.48	< 0.3	6	39	20	1.44	17	< 1	1.18	0.41	7	190	3	3.92	10	0.030
VR13110B	3	1.7	6.80	4	522	3	< 2	1.58	< 0.3	6	42	23	1.43	17	< 1	1.17	0.39	7	203	< 1	3.98	10	0.027
VR13111B	2	0.3	7.10	< 3	> 1000	3	< 2	1.96	< 0.3	14	74	130	2.67	21	< 1	1.48	1.21	22	402	2	3.52	31	0.076
VR13112B	< 2	< 0.3	7.20	< 3	777	2	< 2	4.18	< 0.3	17	88	24	4.47	22	< 1	1.37	2.30	40	780	< 1	3.01	62	0.113

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13059B	7	< 5	0.16	24	328	< 2	0.12	< 5	< 10	98	< 5	18	118	28									
VR13060B	< 3	< 5	< 0.01	< 4	3	< 2	0.02	< 5	< 10	3	< 5	3	3	31									
VR13061B	8	< 5	0.69	27	264	< 2	0.38	< 5	< 10	88	< 5	16	110	20									
VR13062B	10	< 5	0.86	27	296	5	0.42	< 5	< 10	76	< 5	24	100	23									
VR13063B	4	5	0.48	22	334	< 2	0.38	< 5	< 10	79	< 5	21	112	45									
VR13064B	4	< 5	0.86	26	339	< 2	0.51	< 5	< 10	87	< 5	23	117	33									
VR13065B	6	< 5	0.38	21	474	< 2	0.47	< 5	< 10	122	< 5	19	90	71									
VR13066B	6	< 5	0.25	21	459	< 2	0.49	< 5	< 10	139	< 5	20	103	71									
VR13067B	17	< 5	0.66	16	479	< 2	0.49	< 5	< 10	132	13	19	168	124									
VR13068B	8	< 5	0.35	13	662	10	0.50	< 5	< 10	130	< 5	20	83	143									
VR13069B	11	< 5	0.37	9	635	< 2	0.35	< 5	< 10	82	12	15	49	109									
VR13070B	4	< 5	0.15	44	95	< 2	0.60	< 5	< 10	268	< 5	21	74	48									
VR13071B	9	< 5	0.39	14	567	3	0.37	< 5	< 10	114	< 5	20	109	130									
VR13072B	4	< 5	1.29	29	198	< 2	0.62	< 5	< 10	209	8	23	246	125									
VR13073B	18	< 5	1.21	16	182	11	0.45	< 5	< 10	126	7	17	200	93									
VR13074B	12	< 5	1.82	21	215	4	0.46	< 5	< 10	176	< 5	23	199	130									
VR13075B	6	< 5	0.45	20	503	< 2	0.44	< 5	< 10	154	< 5	20	99	110									
VR13076B	5	< 5	0.42	13	707	4	0.41	< 5	< 10	110	< 5	19	85	110									
VR13077B	3	< 5	1.39	19	155	< 2	0.65	< 5	< 10	140	< 5	26	136	122									
VR13078B	< 3	< 5	0.46	18	156	4	0.71	< 5	< 10	165	< 5	22	93	125									
VR13079B	7	< 5	1.05	22	200	< 2	0.53	< 5	< 10	127	< 5	22	87	61									
VR13080B	8	< 5	1.03	22	203	3	0.43	< 5	< 10	113	< 5	23	88	45									
VR13081B	6	< 5	0.44	8	337	6	0.32	< 5	< 10	80	< 5	10	38	102									
VR13082B	< 3	< 5	0.24	21	261	< 2	0.28	< 5	< 10	89	< 5	18	87	59									
VR13083B	8	< 5	0.48	16	382	9	0.45	< 5	< 10	130	< 5	18	102	125									
VR13084B	7	< 5	0.44	28	313	< 2	0.43	< 5	< 10	118	< 5	23	98	39									
VR13085B	8	< 5	0.68	29	151	< 2	0.74	< 5	< 10	212	< 5	23	93	66									
VR13086B	< 3	< 5	0.24	22	191	< 2	0.57	< 5	< 10	143	< 5	18	130	101									
VR13087B	< 3	< 5	0.17	19	183	< 2	0.26	< 5	< 10	82	< 5	14	97	66									
VR13088B	5	< 5	0.54	5	279	< 2	0.20	< 5	< 10	46	< 5	10	38	108									
VR13089B	5	< 5	2.49	17	286	12	0.65	< 5	< 10	158	6	20	96	113									
VR13090B	< 3	< 5	< 0.01	< 4	3	< 2	0.02	< 5	< 10	3	< 5	2	2	22									
VR13091B	4	< 5	1.32	16	315	4	0.50	< 5	< 10	104	< 5	13	79	89									
VR13092B	66	< 5	0.04	19	422	6	0.36	< 5	< 10	131	< 5	44	148	153	0.006	0.009	0.085	43.60	8.50	8.17	0.229	12.60	7.24
VR13093B	185	< 5	0.48	18	597	8	0.32	< 5	< 10	103	9	57	159	164									
VR13094B	47	< 5	0.65	17	355	6	0.30	< 5	< 10	129	< 5	27	124	122									
VR13095B	16	< 5	0.15	17	400	< 2	0.35	< 5	< 10	128	< 5	31	109	199									
VR13096B	13	< 5	0.85	20	443	< 2	0.36	< 5	< 10	118	< 5	26	70	141									
VR13097B	37	< 5	3.17	20	629	< 2	0.35	< 5	< 10	114	< 5	29	82	90									
VR13098B	34	< 5	0.31	24	579	12	0.37	< 5	< 10	150	< 5	40	90	105									
VR13099B	20	< 5	0.26	27	570	< 2	0.33	< 5	< 10	151	< 5	52	107	100									

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13100B	16	< 5	0.45	35	81	< 2	0.44	< 5	< 10	202	< 5	16	74	44									
VR13101B	9	< 5	0.12	17	590	3	0.37	< 5	< 10	121	< 5	26	101	127									
VR13102B	7	< 5	0.23	4	555	< 2	0.16	< 5	< 10	40	< 5	12	27	110									
VR13103B	4	< 5	0.38	5	455	< 2	0.18	< 5	< 10	45	7	12	36	111									
VR13104B	28	< 5	0.51	4	273	< 2	0.13	< 5	< 10	33	< 5	27	28	85									
VR13105B	6	< 5	0.48	4	238	< 2	0.15	< 5	< 10	34	< 5	24	30	87									
VR13106B	14	< 5	0.62	4	245	2	0.15	6	< 10	40	< 5	25	43	97									
VR13107B	< 3	< 5	0.12	32	209	< 2	0.73	< 5	< 10	320	< 5	25	113	103	0.006	0.025	0.009	49.30	13.23	15.53	0.232	5.54	8.67
VR13108B	7	7	0.33	9	391	4	0.22	< 5	< 10	78	6	13	76	96									
VR13109B	51	< 5	0.65	< 4	570	< 2	0.11	< 5	< 10	22	< 5	18	22	95	< 0.005	< 0.005	< 0.003	72.04	13.51	2.13	0.029	0.71	1.91
VR13110B	53	< 5	0.57	< 4	569	2	0.11	< 5	< 10	21	< 5	18	20	79									
VR13111B	28	< 5	0.34	6	639	< 2	0.20	< 5	< 10	54	< 5	19	59	100									
VR13112B	12	< 5	0.12	13	620	2	0.35	< 5	< 10	106	< 5	20	80	109									

Analyte Symbol	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%
Lower Limit	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13059B								
VR13060B								
VR13061B								
VR13062B								
VR13063B								
VR13064B								
VR13065B								
VR13066B								
VR13067B								
VR13068B								
VR13069B								
VR13070B								
VR13071B								
VR13072B								
VR13073B								
VR13074B								
VR13075B								
VR13076B								
VR13077B								
VR13078B								
VR13079B								
VR13080B								
VR13081B								
VR13082B								
VR13083B								
VR13084B								
VR13085B								
VR13086B								
VR13087B								
VR13088B								
VR13089B								
VR13090B								
VR13091B								
VR13092B	2.11	4.32	0.62	0.43	0.19	0.030	10.91	99.04
VR13093B								
VR13094B								
VR13095B								
VR13096B								
VR13097B								
VR13098B								
VR13099B								

Analyte Symbol	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%
Lower Limit	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13100B								
VR13101B								
VR13102B								
VR13103B								
VR13104B								
VR13105B								
VR13106B								
VR13107B	2.34	1.50	1.42	0.14	0.04	0.069	1.89	99.94
VR13108B								
VR13109B	6.18	1.40	0.19	0.07	0.04	0.008	1.50	99.74
VR13110B								
VR13111B								
VR13112B								

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
SDC-1 Meas			7.79	< 3	550	3		1.11		19	31	28	4.64	22	< 1	2.13	1.05	36	876		1.41	35	0.056
SDC-1 Cert			8.34	0.220	630	3.00		1.00		18.0	64.00	30.000	4.82	21.00	0.20	2.72	1.02	34	880.00		1.52	38.0	0.0690
BE-N Meas																							
BE-N Cert																							
AC-E Meas																							
AC-E Cert																							
OREAS 13P Meas																							
OREAS 13P Cert																							
OREAS 14P Meas										660		9430	31.1									> 10000	
OREAS 14P Cert										750		9970	37.2									21000	
Oreas 72a (4 Acid Digest) Meas				< 3						150	189	318	9.21									6380	
Oreas 72a (4 Acid Digest) Cert				14.7						157	228	316	9.63									6930.000	
BIR-1a Meas																							
BIR-1a Cert																							
NCS DC70009 (GBW07241) Meas																							
NCS DC70009 (GBW07241) Cert																							
DNC-1a Meas					84					55	217	101		14				5				247	
DNC-1a Cert					118					57	270	100		15				5.2				247	
OREAS 904 (4 ACID) Meas		0.6	6.20	109	173	10	< 2	0.05		98	53	6340	6.76	18		2.53	0.62	17	453	2	0.04	47	0.101
OREAS 904 (4 ACID) Cert		0.551	6.30	98.0	194	7.86	4.05	0.0460		83.0	54.0	6120	6.68	16.7		3.31	0.556	16.7	410	2.12	0.0340	40.1	0.0980
SBC-1 Meas				20	608	3	< 2		0.4	23	93	29		27				162		3		86	
SBC-1 Cert				25.7	788.0	3.20	0.70		0.40	22.7	109	31.0		27.0				163		2		83	
OREAS 214 Meas	3030																						
OREAS 214 Cert	3030																						
OREAS 214 Meas	3100																						
OREAS 214 Cert	3030																						
OREAS 218 Meas	517																						
OREAS 218 Cert	531																						
OREAS 218 Meas	552																						
OREAS 218 Cert	531																						
OREAS 923 (4 Acid) Meas		2.4	6.71	11	338	3	13	0.50	< 0.3	25	76	4440	6.49	21		1.46	1.85	33	1000	< 1	0.30	40	0.067
OREAS 923 (4 Acid) Cert		1.60	7.29	7.61	434	2.42	21.4	0.473	0.420	23.1	71.0	4230	6.43	20.3		2.51	1.69	31.4	950	0.930	0.324	35.8	0.0630
OREAS 621 (4 Acid) Meas		67.9	6.38	69		2	5	2.16	302	32	23	3820	3.73	26		0.58	0.55	15	493	14	1.26	39	0.038

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
OREAS 621 (4 Acid) Cert		69.0	6.40	77.0		1.69	3.93	1.97	284	29.3	37.1	3630	3.70	24.6		2.20	0.507	14.2	532	13.6	1.31	26.2	0.0359
VR13071B Orig	2	< 0.3	7.34	6	653	4	< 2	3.86	< 0.3	21	94	21	4.40	21	1	2.25	2.70	35	824	< 1	3.55	78	0.138
VR13071B Dup	< 2	0.3	7.40	< 3	650	4	< 2	3.84	< 0.3	22	93	21	4.44	21	< 1	2.28	2.70	34	819	< 1	3.57	78	0.146
VR13082B Orig	23																						
VR13082B Dup	30																						
VR13085B Orig		0.3	7.08	< 3	76	< 1	< 2	4.91	< 0.3	41	69	129	9.81	22	2	0.37	3.00	18	1370	< 1	2.38	37	0.091
VR13085B Dup		0.4	7.07	4	76	< 1	< 2	4.92	< 0.3	42	58	130	9.78	22	2	0.38	3.00	18	1390	2	2.35	37	0.093
VR13092B Orig	< 2																						
VR13092B Dup	< 2																						
VR13106B Orig	4																						
VR13106B Dup	3																						
VR13108B Orig	< 2	< 0.3	6.43	< 3	648	3	< 2	3.59	1.1	14	122	7	2.73	20	< 1	1.17	1.51	32	475	< 1	3.81	43	0.071
VR13108B Split PREP DUP	< 2	< 0.3	6.41	< 3	635	3	< 2	3.61	0.3	14	107	7	2.78	20	< 1	1.31	1.50	33	480	< 1	3.80	44	0.072
VR13109B Orig		8.3	6.79	< 3	652	3	5	1.47	< 0.3	6	46	21	1.42	17	2	1.17	0.41	7	192	2	3.86	10	0.030
VR13109B Dup		2.1	7.03	< 3	293	3	3	1.49	< 0.3	6	32	20	1.45	18	< 1	1.19	0.41	7	187	3	3.98	9	0.030
Method Blank	< 2																						
Method Blank	< 2																						
Method Blank	< 2																						
Method Blank	< 2																						
Method Blank																							
Method Blank		< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001
Method Blank		< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
SDC-1 Meas	22	< 5		16	158		0.09	< 5	< 10	32	< 5		101	23									
SDC-1 Cert	25.00	0.54		17.00	180.00		0.606	0.70	3.10	102.00	0.80		103.00	290.00									
BE-N Meas															0.007	0.010	0.032	38.61	10.29	13.09	0.201	13.06	14.16
BE-N Cert															0.008	0.009	0.034	38.2	10.1	12.8	0.200	13.1	13.9
AC-E Meas																		70.24	14.84	2.54	0.056	0.05	0.35
AC-E Cert																		70.35	14.70	2.56	0.058	0.03	0.34
OREAS 13P Meas															0.011	0.326	0.299						
OREAS 13P Cert															0.0120	0.313	0.293						
OREAS 14P Meas																							
OREAS 14P Cert																							
Oreas 72a (4 Acid Digest) Meas			1.63																				
Oreas 72a (4 Acid Digest) Cert			1.74																				
BIR-1a Meas																		47.52	15.54	11.68	0.175	9.76	13.32
BIR-1a Cert																		47.96	15.50	11.30	0.175	9.700	13.30
NCS DC70009 (GBW07241) Meas																		71.56	10.95	5.64	0.092	0.12	4.17
NCS DC70009 (GBW07241) Cert																		71.27	11.15	5.60	0.090	0.14	4.17
DNC-1a Meas	< 3	< 5		29	117		0.26			132		15	59	34									
DNC-1a Cert	6.3	0.96		31	144		0.29			148		18.0	70	38.0									
OREAS 904 (4 ACID) Meas	9	5	0.06	12	26			< 5	< 10	84	< 5	37	29	112									
OREAS 904 (4 ACID) Cert	10.6	1.48	0.0630	11.2	27.2			0.520	8.43	76.0	2.12	31.5	26.3	171									
SBC-1 Meas	28	< 5		17	152		0.49	< 5	< 10	204	13	28	185	116									
SBC-1 Cert	35.0	1.01		20.0	178.0		0.51	0.89	5.76	220.0	1.60	36.5	186	134.0									
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
OREAS 923 (4 Acid) Meas	83	< 5	0.69	13	38		0.42	< 5	< 10	93	9	28	347	135									
OREAS 923 (4 Acid) Cert	83.0	1.29	0.691	13.1	43.0		0.405	0.860	3.06	91.0	4.85	26.4	345	116									

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
OREAS 621 (4 Acid) Meas	> 5000	18	4.60	6	66		0.19	< 5	< 10	34	< 5	12	> 10000	170									
OREAS 621 (4 Acid) Cert	13600	139	4.48	6.24	91.0		0.149	1.96	2.83	31.8	2.35	11.1	52200	168									
VR13071B Orig	10	< 5	0.37	14	568	4	0.36	< 5	< 10	113	< 5	20	110	130									
VR13071B Dup	8	< 5	0.41	14	565	2	0.38	< 5	< 10	114	< 5	20	108	130									
VR13082B Orig																							
VR13082B Dup																							
VR13085B Orig	4	< 5	0.68	30	151	< 2	0.71	< 5	< 10	193	< 5	23	93	62									
VR13085B Dup	11	< 5	0.67	29	150	< 2	0.77	< 5	< 10	231	< 5	23	94	70									
VR13092B Orig																							
VR13092B Dup																							
VR13106B Orig																							
VR13106B Dup																							
VR13108B Orig	7	7	0.33	9	391	4	0.22	< 5	< 10	78	6	13	76	96									
VR13108B Split PREP DUP	9	< 5	0.33	9	381	< 2	0.21	< 5	< 10	78	7	13	82	89									
VR13109B Orig	52	< 5	0.65	< 4	567	4	0.11	< 5	< 10	21	5	17	21	96	< 0.005	0.005	< 0.003	72.03	13.53	2.12	0.027	0.70	1.89
VR13109B Dup	49	< 5	0.65	< 4	573	< 2	0.11	< 5	< 10	22	< 5	18	23	93	< 0.005	< 0.005	0.006	72.05	13.50	2.13	0.030	0.72	1.94
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank															< 0.005	< 0.005	< 0.003	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01
Method Blank	< 3	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5									
Method Blank	< 3	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5									

Analyte Symbol	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%
Lower Limit	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
SDC-1 Meas								
SDC-1 Cert								
BE-N Meas	3.35	1.38	2.71	1.07	0.06	0.043		
BE-N Cert	3.18	1.39	2.61	1.05	0.0500	0.042		
AC-E Meas	6.66	4.52	0.11					
AC-E Cert	6.54	4.49	0.11					
OREAS 13P Meas								
OREAS 13P Cert								
OREAS 14P Meas								
OREAS 14P Cert								
Oreas 72a (4 Acid Digest) Meas								
Oreas 72a (4 Acid Digest) Cert								
BIR-1a Meas	1.83	0.04	0.97	0.03				
BIR-1a Cert	1.82	0.030	0.96	0.021				
NCS DC70009 (GBW07241) Meas	0.11	1.58	0.05					
NCS DC70009 (GBW07241) Cert	0.12	1.58	0.044					
DNC-1a Meas								
DNC-1a Cert								
OREAS 904 (4 ACID) Meas								
OREAS 904 (4 ACID) Cert								
SBC-1 Meas								
SBC-1 Cert								
OREAS 214 Meas								
OREAS 214 Cert								
OREAS 214 Meas								
OREAS 214 Cert								
OREAS 218 Meas								
OREAS 218 Cert								
OREAS 218 Meas								
OREAS 218 Cert								
OREAS 923 (4 Acid) Meas								
OREAS 923 (4 Acid) Cert								
OREAS 621 (4								

Analyte Symbol	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%
Lower Limit	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
Acid) Meas								
OREAS 621 (4 Acid) Cert								
VR13071B Orig								
VR13071B Dup								
VR13082B Orig								
VR13082B Dup								
VR13085B Orig								
VR13085B Dup								
VR13092B Orig								
VR13092B Dup								
VR13106B Orig								
VR13106B Dup								
VR13108B Orig								
VR13108B Split PREP DUP								
VR13109B Orig	6.20	1.40	0.18	0.07	0.03	0.009	1.53	99.74
VR13109B Dup	6.17	1.41	0.19	0.07	0.04	0.007	1.47	99.73
Method Blank								
Method Blank								
Method Blank								
Method Blank								
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.003		
Method Blank								
Method Blank								

Quality Analysis ... *Innovative Technologies*

Date Submitted: 21-Jun-18
Invoice No.: A18-08006
Invoice Date: 31-Jul-18
Your Reference: Jackfish

Sanatana Resources
908-925 West Georgia st
Vancouver
BC V6C 3L2
Canada

ATTN: Troy Gill

CERTIFICATE OF ANALYSIS

58 Core samples were submitted for analysis.

The following analytical package(s) were requested: Code 1A2-ICP Tbay Au-Fire Assay ICPOES 30g

Code 1F2-Tbay Total Digestion ICP(TOTAL)

REPORT **A18-08006**

Notes:

Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

ACTIVATION LABORATORIES LTD.
1201 Walsh Street West, Thunder Bay, Ontario, Canada, P7E 4X6
TELEPHONE +807 622-6707 or +1.888.228.5227 FAX +1.905.648.9613
E-MAIL Tbay@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Date Submitted: 21-Jun-18
Invoice No.: A18-08006
Invoice Date: 31-Jul-18
Your Reference: Jackfish

Sanatana Resources
908-925 West Georgia st
Vancouver
BC V6C 3L2
Canada

ATTN: Troy Gill

CERTIFICATE OF ANALYSIS

58 Core samples were submitted for analysis.

The following analytical package(s) were requested: Code 4C (1-10) Whole Rock Analysis-XRF

Code UT-7 Sodium Peroxide Fusion (ICP & ICPMS)

REPORT **A18-08006**

Notes:

Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

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E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13113B	< 2	< 0.3	6.98	< 3	435	1	< 2	5.69	< 0.3	37	109	134	7.01	21	< 1	0.87	2.86	11	1960	< 1	2.35	87	0.156
VR13114B	< 2	< 0.3	8.10	< 3	232	< 1	2	5.48	< 0.3	50	21	112	11.0	24	< 1	0.57	1.62	16	3350	< 1	2.14	35	0.106
VR13115B	< 2	< 0.3	7.40	< 3	297	< 1	2	4.94	< 0.3	36	28	78	10.0	22	< 1	0.83	1.84	14	3080	< 1	2.04	33	0.100
VR13116B	< 2	< 0.3	7.12	< 3	324	< 1	< 2	5.42	< 0.3	36	30	76	9.52	21	< 1	0.63	1.76	12	2930	< 1	1.96	29	0.104
VR13117B	< 2	< 0.3	6.26	< 3	280	< 1	< 2	4.35	< 0.3	41	23	90	10.6	22	< 1	0.65	1.66	15	2650	< 1	2.18	31	0.096
VR13118B	< 2	< 0.3	6.65	3	279	< 1	3	5.22	< 0.3	39	19	67	8.71	24	< 1	0.56	1.38	11	2370	< 1	2.70	34	0.100
VR13119B	< 2	< 0.3	6.33	< 3	237	< 1	< 2	6.67	< 0.3	48	374	28	7.28	16	< 1	0.86	5.14	14	1240	< 1	2.01	146	0.051
VR13120B	< 2	< 0.3	0.23	< 3	13	< 1	< 2	0.03	< 0.3	1	15	1	1.17	< 1	< 1	0.05	0.03	8	132	< 1	0.05	2	0.002
VR13121B	< 2	< 0.3	6.52	< 3	231	< 1	< 2	6.91	< 0.3	41	195	54	7.90	17	< 1	0.71	4.82	16	1220	< 1	2.29	88	0.028
VR13122B	7	< 0.3	6.06	< 3	292	1	< 2	6.02	< 0.3	40	122	121	6.64	15	< 1	0.63	4.46	46	1060	1	2.36	78	0.069
VR13124B	< 2	< 0.3	7.28	< 3	99	< 1	< 2	6.96	0.4	45	63	80	7.58	20	< 1	0.50	4.25	7	1340	< 1	2.16	60	0.029
VR13125B	< 2	< 0.3	8.62	9	14	< 1	< 2	0.52	< 0.3	2	7	9	1.41	22	< 1	3.39	0.18	21	218	2	6.28	4	0.002
VR13126B	2	< 0.3	7.36	< 3	117	< 1	< 2	6.94	< 0.3	46	49	118	8.25	17	< 1	0.68	4.30	9	1370	1	2.22	59	0.034
VR13127B	4	< 0.3	7.25	5	132	< 1	< 2	6.78	< 0.3	47	67	157	8.31	17	< 1	0.78	4.26	12	1350	< 1	2.20	65	0.035
VR13128B	< 2	< 0.3	6.86	< 3	102	< 1	< 2	6.96	< 0.3	45	70	85	8.04	16	< 1	0.62	4.32	9	1340	< 1	2.23	62	0.033
VR13129B	< 2	< 0.3	7.32	6	123	< 1	< 2	7.17	< 0.3	47	74	93	8.21	17	< 1	0.67	4.48	9	1340	< 1	2.20	61	0.032
VR13130B	10100	1.7	5.11	65	197	< 1	< 2	4.04	< 0.3	33	494	135	4.45	13	< 1	0.80	4.50	33	695	6	1.13	196	0.026
VR13131B	4	< 0.3	7.33	< 3	171	< 1	2	6.74	< 0.3	45	62	97	7.79	18	< 1	0.84	4.14	10	1250	< 1	2.20	62	0.035
VR13132B	2	< 0.3	7.18	< 3	110	< 1	< 2	7.06	< 0.3	44	42	94	7.92	17	< 1	0.62	4.28	11	1320	< 1	2.22	59	0.029
VR13133B	3	< 0.3	6.73	< 3	114	< 1	< 2	6.10	< 0.3	47	47	159	7.28	17	2	0.55	4.01	12	1160	< 1	2.27	57	0.028
VR13134B	2	< 0.3	7.27	< 3	124	< 1	< 2	6.57	< 0.3	44	50	112	7.78	16	< 1	0.62	4.19	12	1220	< 1	2.25	62	0.031
VR13135B	3	< 0.3	6.93	< 3	187	< 1	< 2	6.68	< 0.3	44	49	138	7.32	16	< 1	0.75	4.14	10	1230	< 1	2.13	64	0.029
VR13136B	< 2	0.3	6.99	< 3	506	2	< 2	5.66	< 0.3	32	121	52	5.65	21	< 1	0.86	4.18	20	987	< 1	2.84	128	0.241
VR13137B	3	< 0.3	7.24	< 3	197	< 1	< 2	5.93	< 0.3	33	43	92	7.30	20	< 1	0.57	1.94	19	1810	< 1	1.60	30	0.080
VR13138B	3	< 0.3	6.54	< 3	200	< 1	3	5.74	< 0.3	42	89	111	9.24	23	< 1	0.59	2.43	18	2080	< 1	1.98	47	0.095
VR13139B	< 2	< 0.3	7.23	6	401	< 1	2	5.63	< 0.3	60	82	184	8.33	22	2	1.02	2.27	18	1370	< 1	2.21	114	0.083
VR13140B	3	< 0.3	7.89	< 3	394	< 1	< 2	5.63	< 0.3	59	71	183	8.21	22	< 1	1.03	2.31	18	1330	< 1	2.14	115	0.086
VR13141B	< 2	< 0.3	7.54	< 3	524	< 1	< 2	4.93	< 0.3	56	66	135	7.30	22	< 1	1.03	2.21	16	919	< 1	2.70	119	0.083
VR13142B	< 2	< 0.3	8.00	4	374	< 1	< 2	3.85	< 0.3	55	49	233	6.43	22	< 1	0.71	1.86	15	813	< 1	3.30	108	0.075
VR13143B	4	< 0.3	7.94	< 3	258	< 1	2	4.43	< 0.3	73	59	367	8.41	23	< 1	0.75	2.20	17	1080	< 1	2.54	135	0.075
VR13144B	< 2	< 0.3	5.95	< 3	256	2	< 2	7.15	< 0.3	49	180	19	7.62	22	< 1	0.70	5.32	10	1240	< 1	2.44	136	0.221
VR13145B	< 2	< 0.3	4.60	< 3	237	1	< 2	6.74	< 0.3	42	305	7	6.21	14	< 1	0.62	5.45	9	1070	< 1	1.90	132	0.099
VR13146B	3	< 0.3	6.87	3	512	1	< 2	4.87	< 0.3	33	119	97	5.16	20	< 1	0.80	4.08	23	762	< 1	2.83	95	0.151
VR13147B	< 2	< 0.3	6.56	< 3	456	1	< 2	6.55	< 0.3	30	61	38	6.24	19	< 1	0.72	3.59	18	1050	< 1	2.98	47	0.175
VR13148B	< 2	< 0.3	2.77	< 3	85	< 1	< 2	8.48	< 0.3	38	737	26	5.28	8	< 1	0.55	5.89	22	1160	2	0.89	131	0.026
VR13149B	7	< 0.3	6.05	< 3	308	2	< 2	6.86	< 0.3	43	243	24	7.01	21	< 1	0.84	4.94	19	1090	< 1	2.46	162	0.212
VR13150B	< 2	< 0.3	0.23	< 3	14	< 1	< 2	0.04	< 0.3	< 1	20	2	0.94	< 1	< 1	0.06	0.03	8	111	1	0.05	2	0.002
VR13151B	3	< 0.3	5.73	< 3	421	2	< 2	6.40	< 0.3	38	139	99	6.83	18	< 1	0.74	4.71	17	987	< 1	2.47	139	0.176
VR13152B	< 2	< 0.3	5.40	15	423	2	< 2	6.45	< 0.3	46	176	27	6.39	19	4	1.04	5.99	19	1010	< 1	2.21	188	0.279
VR13153B	< 2	< 0.3	4.61	< 3	599	1	< 2	7.70	< 0.3	44	228	4	6.44	17	< 1	2.53	6.35	30	1120	< 1	1.59	237	0.264
VR13154B	< 2	< 0.3	2.32	< 3	866	< 1	< 2	11.0	< 0.3	22	154	6	3.14	8	< 1	0.87	2.48	15	1100	< 1	0.76	94	0.197
VR13155B	6	< 0.3	5.67	< 3	561	2	< 2	7.13	< 0.3	42	246	115	5.84	15	< 1	2.02	4.69	29	1050	3	2.32	110	0.083

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13156B	61	0.9	6.06	< 3	742	< 1	< 2	5.57	< 0.3	93	219	3140	11.6	23	< 1	1.03	4.68	27	870	< 1	1.96	221	0.203
VR13157B	3	< 0.3	6.05	< 3	486	< 1	2	6.52	< 0.3	50	263	163	8.26	27	< 1	0.84	3.77	21	1130	3	2.04	142	0.143
VR13158B	3	< 0.3	7.09	< 3	574	1	< 2	5.21	< 0.3	32	128	193	6.22	22	< 1	0.98	3.49	19	835	< 1	2.75	109	0.151
VR13159B	2	< 0.3	6.32	< 3	317	2	< 2	4.73	< 0.3	40	369	200	6.16	18	< 1	0.93	5.27	42	863	< 1	2.25	96	0.142
VR13160B	520	< 0.3	6.41	6	112	< 1	< 2	6.70	< 0.3	44	112	156	8.03	16	< 1	0.21	4.13	12	1290	< 1	2.04	92	0.035
VR13161B	2	< 0.3	3.34	< 3	> 1000	3	< 2	8.60	< 0.3	46	486	21	5.92	13	< 1	1.44	7.32	50	1220	< 1	0.62	395	0.204
VR13162B	8	0.5	4.12	< 3	888	3	< 2	4.88	< 0.3	43	633	51	4.81	13	< 1	1.89	8.39	38	948	< 1	1.50	444	0.165
VR13163B	< 2	< 0.3	1.20	5	213	< 1	< 2	2.87	< 0.3	7	85	19	2.10	3	< 1	0.48	1.13	7	531	1	0.49	41	0.121
VR13164B	< 2	< 0.3	6.77	< 3	537	2	< 2	4.80	< 0.3	28	126	15	5.37	20	< 1	1.49	3.66	48	824	< 1	2.66	104	0.155
VR13165B	14	0.3	5.65	< 3	542	2	< 2	5.26	< 0.3	27	146	85	4.96	17	< 1	1.75	3.97	51	891	< 1	1.73	116	0.219
VR13166B	314	0.5	8.13	3	329	2	< 2	2.15	< 0.3	42	167	118	7.16	27	< 1	0.96	3.24	54	866	1	3.46	143	0.103
VR13167B	10	< 0.3	7.22	< 3	458	2	< 2	4.60	< 0.3	44	442	127	7.21	23	< 1	1.16	4.18	35	1140	< 1	2.35	209	0.092
VR13168B	< 2	< 0.3	5.43	< 3	118	4	< 2	9.74	< 0.3	25	187	2	4.04	19	< 1	0.31	5.10	3	1050	< 1	1.13	77	0.058
VR13169B	3	< 0.3	7.15	< 3	531	2	< 2	4.87	< 0.3	24	159	47	4.34	22	< 1	1.43	3.31	16	769	< 1	2.88	89	0.106
VR13170B	3	< 0.3	7.46	< 3	554	2	< 2	4.83	< 0.3	24	127	43	4.19	23	< 1	1.46	3.19	15	746	< 1	3.02	81	0.107
VR13123B	171																						

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.01	5	10	3	3	2	0.01	2	0.8
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
VR13113B	5	< 5	0.30	26	773	12	0.43	< 5	< 10	161	< 5	25	93	72									
VR13114B	< 3	< 5	0.43	36	284	3	0.48	< 5	< 10	176	< 5	24	100	55									
VR13115B	< 3	< 5	0.26	29	272	< 2	0.50	< 5	< 10	167	< 5	22	95	53									
VR13116B	< 3	< 5	0.22	30	250	3	0.41	< 5	< 10	155	< 5	22	91	46									
VR13117B	7	< 5	0.30	28	308	6	0.66	< 5	< 10	241	< 5	19	97	61									
VR13118B	9	< 5	0.09	28	285	< 2	0.16	< 5	< 10	164	< 5	18	146	26									
VR13119B	5	< 5	0.04	30	370	3	0.30	< 5	< 10	172	< 5	16	101	39									
VR13120B	< 3	< 5	< 0.01	< 4	3	< 2	0.02	< 5	< 10	3	< 5	2	1	30									
VR13121B	< 3	< 5	0.08	35	392	< 2	0.30	< 5	< 10	191	< 5	15	80	28									
VR13122B	8	< 5	0.55	27	394	< 2	0.39	< 5	< 10	163	5	15	103	65									
VR13124B	6	< 5	0.21	34	260	4	0.39	< 5	< 10	211	< 5	14	68	32									
VR13125B	< 3	< 5	< 0.01	< 4	35	< 2	0.02	< 5	< 10	10	< 5	3	24	25									
VR13126B	6	< 5	0.20	36	286	10	0.42	< 5	< 10	224	< 5	15	73	32									
VR13127B	< 3	< 5	0.26	34	320	4	0.41	< 5	< 10	223	< 5	15	78	34									
VR13128B	< 3	< 5	0.22	34	275	< 2	0.42	< 5	< 10	226	< 5	15	67	30									
VR13129B	5	< 5	0.28	37	281	5	0.43	< 5	< 10	235	< 5	16	62	35									
VR13130B	37	< 5	0.87	18	78	< 2	0.22	< 5	< 10	124	15	10	79	47									
VR13131B	5	< 5	0.25	35	327	20	0.33	< 5	< 10	190	< 5	15	63	31									
VR13132B	5	< 5	0.19	35	268	< 2	0.37	< 5	< 10	201	< 5	15	64	30									
VR13133B	5	8	0.36	33	268	9	0.36	< 5	< 10	199	< 5	14	59	29									
VR13134B	5	6	0.30	35	278	5	0.39	< 5	< 10	212	< 5	14	63	37									
VR13135B	4	< 5	0.19	33	328	< 2	0.39	< 5	< 10	210	< 5	14	69	31									
VR13136B	5	< 5	0.10	18	965	< 2	0.44	< 5	< 10	142	< 5	28	87	130									
VR13137B	< 3	< 5	0.21	27	313	< 2	0.40	< 5	< 10	154	< 5	19	88	51									
VR13138B	4	< 5	0.74	25	351	18	0.76	< 5	< 10	241	< 5	20	82	58									
VR13139B	< 3	5	1.09	25	401	12	0.56	< 5	< 10	158	< 5	17	90	33									
VR13140B	4	< 5	1.08	28	394	4	0.44	< 5	< 10	104	< 5	18	88	19									
VR13141B	< 3	< 5	0.90	26	289	< 2	0.40	< 5	< 10	97	< 5	17	91	19									
VR13142B	< 3	< 5	0.77	23	307	< 2	0.40	< 5	< 10	109	< 5	18	84	28									
VR13143B	< 3	< 5	1.28	29	259	< 2	0.41	< 5	< 10	101	< 5	17	106	25									
VR13144B	7	< 5	0.12	29	660	7	0.52	< 5	< 10	199	< 5	31	94	90									
VR13145B	< 3	6	0.04	29	468	12	0.30	< 5	< 10	159	< 5	16	86	61									
VR13146B	< 3	< 5	0.08	17	797	7	0.42	< 5	< 10	149	< 5	22	76	100									
VR13147B	3	< 5	0.04	21	763	3	0.49	< 5	< 10	170	< 5	21	72	87									
VR13148B	3	< 5	0.03	29	205	3	0.20	< 5	< 10	140	< 5	10	55	23									
VR13149B	11	< 5	0.12	24	930	< 2	0.40	< 5	< 10	150	< 5	36	101	60									
VR13150B	< 3	< 5	< 0.01	< 4	5	< 2	0.02	< 5	< 10	4	< 5	3	3	30									
VR13151B	16	< 5	0.20	26	831	< 2	0.43	< 5	< 10	166	< 5	31	87	64									
VR13152B	6	6	0.05	23	781	4	0.42	< 5	< 10	145	< 5	29	107	82									
VR13153B	10	< 5	0.17	21	730	4	0.37	< 5	< 10	152	< 5	30	118	60									
VR13154B	11	< 5	0.66	12	1300	5	0.21	< 5	< 10	50	< 5	24	51	31									

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.01	5	10	3	3	2	0.01	2	0.8
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
VR13155B	12	< 5	0.30	33	718	< 2	0.46	< 5	< 10	194	6	21	104	38									
VR13156B	7	6	0.64	30	2480	7	0.69	< 5	< 10	244	< 5	32	104	86									
VR13157B	6	< 5	0.38	25	1600	13	0.89	< 5	< 10	312	< 5	26	90	61									
VR13158B	< 3	< 5	0.14	18	1260	3	0.44	< 5	< 10	178	< 5	26	92	59									
VR13159B	5	5	0.31	24	739	< 2	0.40	< 5	< 10	153	< 5	19	95	61									
VR13160B	< 3	< 5	0.13	40	96	< 2	0.21	< 5	< 10	130	< 5	20	75	20									
VR13161B	< 3	< 5	0.11	15	754	6	0.42	< 5	< 10	111	< 5	20	77	132									
VR13162B	12	< 5	0.05	16	802	11	0.28	< 5	< 10	109	< 5	16	60	114									
VR13163B	< 3	< 5	0.03	< 4	541	< 2	0.09	< 5	< 10	17	< 5	7	19	8									
VR13164B	13	5	0.10	18	818	13	0.41	< 5	< 10	137	< 5	22	74	101									
VR13165B	15	< 5	0.20	14	564	6	0.33	< 5	< 10	121	< 5	24	81	134									
VR13166B	27	< 5	0.45	23	627	< 2	0.48	< 5	< 10	199	< 5	14	112	122									
VR13167B	10	< 5	0.33	21	722	< 2	0.50	< 5	< 10	192	< 5	16	116	86									
VR13168B	3	< 5	0.02	18	873	< 2	0.22	< 5	< 10	65	< 5	20	65	74									
VR13169B	5	< 5	0.08	17	937	6	0.32	< 5	< 10	111	< 5	15	59	79									
VR13170B	7	< 5	0.08	16	958	< 2	0.32	< 5	< 10	108	< 5	15	56	78									
VR13123B															1.84	12	< 10	4	< 3	< 2	5.46	< 2	3.0

Analyte Symbol	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Ge	Ho	Hf	In	K	La	Li	Mg	Mn	Mo	Nb	Nd	Ni
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.2	30	0.1	2	0.3	0.1	0.1	0.05	0.2	0.1	0.7	0.2	10	0.2	0.1	0.4	3	0.01	3	1	2.4	0.4	10
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
VR13113B																							
VR13114B																							
VR13115B																							
VR13116B																							
VR13117B																							
VR13118B																							
VR13119B																							
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VR13151B																							
VR13152B																							
VR13153B																							
VR13154B																							

Analyte Symbol	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Ge	Ho	Hf	In	K	La	Li	Mg	Mn	Mo	Nb	Nd	Ni
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.2	30	0.1	2	0.3	0.1	0.1	0.05	0.2	0.1	0.7	0.2	10	0.2	0.1	0.4	3	0.01	3	1	2.4	0.4	10
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
VR13155B																							
VR13156B																							
VR13157B																							
VR13158B																							
VR13159B																							
VR13160B																							
VR13161B																							
VR13162B																							
VR13163B																							
VR13164B																							
VR13165B																							
VR13166B																							
VR13167B																							
VR13168B																							
VR13169B																							
VR13170B																							
VR13123B	95.9	1710	0.1	47	0.7	0.4	0.2	7.67	5.5	0.6	5.9	0.2	< 10	< 0.2	< 0.1	1.3	< 3	15.0	1070	9	< 2.4	2.1	570

Analyte Symbol	Pb	Pr	Rb	S	Sb	Se	Si	Sm	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn
Unit Symbol	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.8	0.1	0.4	0.01	2	0.8	0.01	0.1	0.5	3	0.2	0.1	6	0.1	0.01	0.1	0.1	0.1	5	0.7	0.1	0.1	30
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
VR13113B																							
VR13114B																							
VR13115B																							
VR13116B																							
VR13117B																							
VR13118B																							
VR13119B																							
VR13120B																							
VR13121B																							
VR13122B																							
VR13124B																							
VR13125B																							
VR13126B																							
VR13127B																							
VR13128B																							
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VR13130B																							
VR13131B																							
VR13132B																							
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VR13134B																							
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VR13136B																							
VR13137B																							
VR13138B																							
VR13139B																							
VR13140B																							
VR13141B																							
VR13142B																							
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VR13145B																							
VR13146B																							
VR13147B																							
VR13148B																							
VR13149B																							
VR13150B																							
VR13151B																							
VR13152B																							
VR13153B																							
VR13154B																							

Analyte Symbol	Pb	Pr	Rb	S	Sb	Se	Si	Sm	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn
Unit Symbol	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.8	0.1	0.4	0.01	2	0.8	0.01	0.1	0.5	3	0.2	0.1	6	0.1	0.01	0.1	0.1	0.1	5	0.7	0.1	0.1	30
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
VR13155B																							
VR13156B																							
VR13157B																							
VR13158B																							
VR13159B																							
VR13160B																							
VR13161B																							
VR13162B																							
VR13163B																							
VR13164B																							
VR13165B																							
VR13166B																							
VR13167B																							
VR13168B																							
VR13169B																							
VR13170B																							
VR13123B	5.6	0.4	0.8	0.01	< 2	4.4	17.1	0.6	< 0.5	160	0.4	0.1	< 6	0.1	0.13	< 0.1	0.1	0.6	42	1.0	3.7	0.4	< 30

Analyte Symbol	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Lower Limit	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13113B																	
VR13114B																	
VR13115B																	
VR13116B																	
VR13117B																	
VR13118B																	
VR13119B																	
VR13120B																	
VR13121B																	
VR13122B																	
VR13124B																	
VR13125B																	
VR13126B																	
VR13127B																	
VR13128B																	
VR13129B																	
VR13130B																	
VR13131B																	
VR13132B																	
VR13133B																	
VR13134B																	
VR13135B																	
VR13136B																	
VR13137B	< 0.005	0.014	0.013	56.05	14.35	10.79	0.270	3.18	8.55	2.22	0.63	1.81	0.21	0.04	0.060	2.13	100.3
VR13138B	0.005	0.013	0.016	50.96	15.17	13.40	0.306	4.01	8.38	2.78	0.68	1.98	0.24	0.04	0.066	2.58	100.6
VR13139B																	
VR13140B																	
VR13141B																	
VR13142B																	
VR13143B																	
VR13144B																	
VR13145B																	
VR13146B																	
VR13147B																	
VR13148B																	
VR13149B																	
VR13150B																	
VR13151B																	
VR13152B																	
VR13153B																	
VR13154B																	

Analyte Symbol	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Lower Limit	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13155B																	
VR13156B																	
VR13157B																	
VR13158B																	
VR13159B																	
VR13160B																	
VR13161B																	
VR13162B																	
VR13163B																	
VR13164B																	
VR13165B																	
VR13166B																	
VR13167B																	
VR13168B	< 0.005	< 0.005	0.020	53.73	11.14	6.24	0.155	8.69	14.71	1.67	0.33	0.49	0.16	0.07	0.019	2.46	99.87
VR13169B																	
VR13170B																	
VR13123B	0.014	0.007	0.132	38.01	3.62	11.72	0.157	23.92	8.01	0.01	< 0.01	0.22	0.03	0.36	0.017	14.05	100.3

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
SDC-1 Meas			8.03	< 3	549	3		1.11		18	40	29	4.80	27	< 1	2.37	1.05	36	856		1.45	35	0.054
SDC-1 Cert			8.34	0.220	630	3.00		1.00		18.0	64.00	30.000	4.82	21.00	0.20	2.72	1.02	34	880.00		1.52	38.0	0.0690
GXR-6 Meas		< 0.3	12.8	262	> 1000	1	< 2	0.22	< 0.3	12	53	61	4.75	34	< 1	1.55	0.62	40	909	4	0.10	24	0.033
GXR-6 Cert		1.30	17.7	330	1300	1.40	0.290	0.180	1.00	13.8	96.0	66.0	5.58	35.0	0.0680	1.87	0.609	32.0	1010	2.40	0.104	27.0	0.0350
BE-N Meas																							
BE-N Cert																							
AC-E Meas																							
AC-E Cert																							
NIST 696 Meas																							
NIST 696 Cert																							
NIST 696 Meas																							
NIST 696 Cert																							
NIST 696 Meas																							
NIST 696 Cert																							
OREAS 14P Meas										712		> 10000	35.0									> 10000	
OREAS 14P Cert										750		9970	37.2									21000	
Oreas 72a (4 Acid Digest) Meas				< 3						166	192	348	9.88									7210	
Oreas 72a (4 Acid Digest) Cert				14.7						157	228	316	9.63									6930.000	
BIR-1a Meas																							
BIR-1a Cert																							
OREAS 131a (Fusion) Meas																							
OREAS 131a (Fusion) Cert																							
OREAS 131a (Fusion) Meas																							
OREAS 131a (Fusion) Cert																							
OREAS 131a (Fusion) Meas																							
OREAS 131a (Fusion) Cert																							
OREAS 131a (Fusion) Meas																							
OREAS 131a (Fusion) Cert																							
MP-1b Meas																							
MP-1b Cert																							
MP-1b Meas																							
MP-1b Cert																							
MP-1b Meas																							
MP-1b Cert																							

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
MP-1b Meas																							
MP-1b Cert																							
MP-1b Meas																							
MP-1b Cert																							
MP-1b Meas																							
MP-1b Cert																							
MP-1b Meas																							
MP-1b Cert																							
OREAS 101a (Fusion) Meas																							
OREAS 101a (Fusion) Cert																							
NCS DC73304 (GBW 07106) Meas																							
NCS DC73304 (GBW 07106) Cert																							
AMIS 0129 Meas																							
AMIS 0129 Cert																							
AMIS 0129 Meas																							
AMIS 0129 Cert																							
DNC-1a Meas					85					55	141	102		15				5				253	
DNC-1a Cert					118					57	270	100		15				5.2				247	
OREAS 13b (fusion) Meas																							
OREAS 13b (fusion) Cert																							
OREAS 13b (fusion) Meas																							
OREAS 13b (fusion) Cert																							
OREAS 904 (4 ACID) Meas		0.8	6.32	102	180	10	6	0.05		100	55	6710	7.05	18		2.32	0.62	17	442	2	0.04	49	0.103
OREAS 904 (4 ACID) Cert		0.551	6.30	98.0	194	7.86	4.05	0.0460		83.0	54.0	6120	6.68	16.7		3.31	0.556	16.7	410	2.12	0.0340	40.1	0.0980
NCS DC19014 Meas																							
NCS DC19014 Cert																							
NCS DC19014 Meas																							
NCS DC19014 Cert																							
SBC-1 Meas				19	646	3	< 2		0.3	23	78	30		26				157		2		85	
SBC-1 Cert				25.7	788.0	3.20	0.70		0.40	22.7	109	31.0		27.0				163		2		83	

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
OREAS 922 (Peroxide Fusion) Meas																							
OREAS 922 (Peroxide Fusion) Cert																							
OREAS 922 (Peroxide Fusion) Meas																							
OREAS 922 (Peroxide Fusion) Cert																							
OREAS 621 (Peroxide Fusion) Meas																							
OREAS 621 (Peroxide Fusion) Cert																							
OREAS 621 (Peroxide Fusion) Meas																							
OREAS 621 (Peroxide Fusion) Cert																							
OREAS 621 (Peroxide Fusion) Meas																							
OREAS 621 (Peroxide Fusion) Cert																							
OREAS 214 Meas	3160																						
OREAS 214 Cert	3030																						
OREAS 214 Meas	3060																						
OREAS 214 Cert	3030																						
OREAS 218 Meas	521																						
OREAS 218 Cert	531																						
OREAS 218 Meas	520																						
OREAS 218 Cert	531																						
NIST 88b (XRF) Meas																							
NIST 88b (XRF) Cert																							
VR13117B Orig		< 0.3	6.77	< 3	279	< 1	< 2	4.33	< 0.3	40	20	88	10.4	22	< 1	0.70	1.66	14	2600	< 1	2.16	30	0.091
VR13117B Dup		< 0.3	5.74	3	281	< 1	3	4.37	< 0.3	41	26	92	10.8	22	< 1	0.60	1.66	15	2700	< 1	2.20	32	0.101
VR13122B Orig	9																						
VR13122B Dup	5																						
VR13133B Orig	3																						

Analyte Symbol	Au	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P
Unit Symbol	ppb	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%
Lower Limit	2	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001
Method Code	FA-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13133B Dup	3																						
VR13137B Orig		< 0.3	7.32	< 3	199	< 1	< 2	5.95	< 0.3	34	41	93	7.40	20	< 1	0.58	1.95	19	1830	< 1	1.61	31	0.081
VR13137B Dup		< 0.3	7.15	< 3	196	< 1	< 2	5.90	< 0.3	33	45	91	7.20	20	< 1	0.57	1.94	19	1790	< 1	1.59	30	0.080
VR13143B Orig	4																						
VR13143B Dup	3																						
VR13155B Orig		< 0.3	5.75	< 3	564	2	< 2	7.19	< 0.3	42	243	115	5.88	15	< 1	2.10	4.74	29	1050	2	2.32	116	0.084
VR13155B Dup		< 0.3	5.59	< 3	557	2	< 2	7.07	< 0.3	42	249	115	5.79	15	< 1	1.95	4.65	28	1060	3	2.32	103	0.083
VR13158B Orig	3																						
VR13158B Dup	3																						
VR13163B Orig	< 2	< 0.3	1.20	5	213	< 1	< 2	2.87	< 0.3	7	85	19	2.10	3	< 1	0.48	1.13	7	531	1	0.49	41	0.121
VR13163B Split PREP DUP	4	< 0.3	1.32	< 3	226	< 1	< 2	3.01	< 0.3	7	96	23	2.25	4	< 1	0.50	1.20	7	570	2	0.52	45	0.128
VR13167B Orig	9																						
VR13167B Dup	10																						
VR13123B Orig																							
VR13123B Dup																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank	< 2																						
Method Blank	< 2																						
Method Blank	< 2																						
Method Blank		< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001
Method Blank		< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001
Method Blank		< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001
Method Blank		< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001
Method Blank		< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.01	5	10	3	3	2	0.01	2	0.8
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
SDC-1 Meas	20	< 5		15	172		0.12	< 5	< 10	37	< 5		104	25									
SDC-1 Cert	25.00	0.54		17.00	180.00		0.606	0.70	3.10	102.00	0.80		103.00	290.00									
GXR-6 Meas	82	< 5	0.01	21	40	< 2		< 5	< 10	146	< 5	10	115	72									
GXR-6 Cert	101	3.60	0.0160	27.6	35.0	0.0180		2.20	1.54	186	1.90	14.0	118	110									
BE-N Meas																							
BE-N Cert																							
AC-E Meas																							
AC-E Cert																							
NIST 696 Meas															> 25.0								
NIST 696 Cert															28.9								
NIST 696 Meas															> 25.0								
NIST 696 Cert															28.9								
NIST 696 Meas															> 25.0								
NIST 696 Cert															28.9								
OREAS 14P Meas																							
OREAS 14P Cert																							
Oreas 72a (4 Acid Digest) Meas			1.67																				
Oreas 72a (4 Acid Digest) Cert			1.74																				
BIR-1a Meas																							
BIR-1a Cert																							
OREAS 131a (Fusion) Meas																87		881				84	
OREAS 131a (Fusion) Cert																91		865				80	
OREAS 131a (Fusion) Meas																							
OREAS 131a (Fusion) Cert																							
OREAS 131a (Fusion) Meas																							
OREAS 131a (Fusion) Cert																							
OREAS 131a (Fusion) Meas																							
OREAS 131a (Fusion) Cert																							
MP-1b Meas																> 10000					2.48		
MP-1b Cert																23000.00					2.47		
MP-1b Meas																> 10000					2.54		

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.01	5	10	3	3	2	0.01	2	0.8
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
MP-1b Cert																23000.00					2.47		
MP-1b Meas																					2.54		
MP-1b Cert																					2.47		
MP-1b Meas																					2.55		
MP-1b Cert																					2.47		
MP-1b Meas																					2.56		
MP-1b Cert																					2.47		
MP-1b Meas																					2.60		
MP-1b Cert																					2.47		
MP-1b Meas																					2.56		
MP-1b Cert																					2.47		
OREAS 101a (Fusion) Meas																							
OREAS 101a (Fusion) Cert																							
NCS DC73304 (GBW 07106) Meas																							
NCS DC73304 (GBW 07106) Cert																							
AMIS 0129 Meas																							
AMIS 0129 Cert																							
AMIS 0129 Meas																							
AMIS 0129 Cert																							
DNC-1a Meas	3	< 5		28	123		0.27			139		15	60	32									
DNC-1a Cert	6.3	0.96		31	144		0.29			148		18.0	70	38.0									
OREAS 13b (fusion) Meas															8.48						5.57		
OREAS 13b (fusion) Cert															8.41						5.57		
OREAS 13b (fusion) Meas															8.33						5.65		
OREAS 13b (fusion) Cert															8.41						5.57		
OREAS 904 (4 ACID) Meas	18	< 5	0.06	12	28			< 5	< 10	80	< 5	36	26	173									
OREAS 904 (4 ACID) Cert	10.6	1.48	0.0630	11.2	27.2			0.520	8.43	76.0	2.12	31.5	26.3	171									
NCS DC19014 Meas																							
NCS DC19014 Cert																							

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.01	5	10	3	3	2	0.01	2	0.8
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
NCS DC19014 Meas																							
NCS DC19014 Cert																							
SBC-1 Meas	29	< 5		18	165		0.49	< 5	< 10	213	< 5	32	189	106									
SBC-1 Cert	35.0	1.01		20.0	178.0		0.51	0.89	5.76	220.0	1.60	36.5	186	134.0									
OREAS 922 (Peroxide Fusion) Meas															7.45						0.50		
OREAS 922 (Peroxide Fusion) Cert															7.59						0.49		
OREAS 922 (Peroxide Fusion) Meas															7.79						0.50		
OREAS 922 (Peroxide Fusion) Cert															7.59						0.49		
OREAS 621 (Peroxide Fusion) Meas															6.74						2.07		
OREAS 621 (Peroxide Fusion) Cert															6.63						2.00		
OREAS 621 (Peroxide Fusion) Meas															6.66						2.10		
OREAS 621 (Peroxide Fusion) Cert															6.63						2.00		
OREAS 621 (Peroxide Fusion) Meas															6.55						2.16		
OREAS 621 (Peroxide Fusion) Cert															6.63						2.00		
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
NIST 88b (XRF) Meas																							

Analyte Symbol	Pb	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Al	As	B	Ba	Be	Bi	Ca	Cd	Ce
Unit Symbol	ppm	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm
Lower Limit	3	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.01	5	10	3	3	2	0.01	2	0.8
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
NIST 88b (XRF) Cert																							
VR13117B Orig	7	< 5	0.30	31	311	4	0.52	< 5	< 10	210	< 5	21	94	55									
VR13117B Dup	8	< 5	0.30	24	305	8	0.80	< 5	< 10	272	< 5	17	99	67									
VR13122B Orig																							
VR13122B Dup																							
VR13133B Orig																							
VR13133B Dup																							
VR13137B Orig	4	< 5	0.21	28	317	< 2	0.46	< 5	< 10	163	< 5	19	87	55									
VR13137B Dup	< 3	< 5	0.21	27	310	< 2	0.35	< 5	< 10	144	< 5	19	88	47									
VR13143B Orig																							
VR13143B Dup																							
VR13155B Orig	13	< 5	0.30	33	715	< 2	0.47	< 5	< 10	197	6	21	107	40									
VR13155B Dup	12	< 5	0.29	32	721	4	0.45	< 5	< 10	191	6	21	101	36									
VR13158B Orig																							
VR13158B Dup																							
VR13163B Orig	< 3	< 5	0.03	< 4	541	< 2	0.09	< 5	< 10	17	< 5	7	19	8									
VR13163B Split PREP DUP	5	< 5	0.03	< 4	564	< 2	0.10	< 5	< 10	19	< 5	8	21	13									
VR13167B Orig																							
VR13167B Dup																							
VR13123B Orig																							
VR13123B Dup																							
Method Blank															< 0.01	< 5	< 10	< 3	< 3	< 2	0.02	< 2	< 0.8
Method Blank															0.01						0.03		
Method Blank															0.02						0.03		
Method Blank															0.01						< 0.01		
Method Blank															0.01						0.04		
Method Blank															< 0.01						< 0.01		
Method Blank															< 0.01						0.02		
Method Blank															< 0.01						0.01		
Method Blank															< 0.01						0.05		
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank	< 3	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5									
Method Blank	< 3	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5									
Method Blank	< 3	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5									
Method Blank	< 3	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5									
Method Blank	< 3	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5									

Analyte Symbol	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Ge	Ho	Hf	In	K	La	Li	Mg	Mn	Mo	Nb	Nd	Ni
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.2	30	0.1	2	0.3	0.1	0.1	0.05	0.2	0.1	0.7	0.2	10	0.2	0.1	0.4	3	0.01	3	1	2.4	0.4	10
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
SDC-1 Meas																							
SDC-1 Cert																							
GXR-6 Meas																							
GXR-6 Cert																							
BE-N Meas																							
BE-N Cert																							
AC-E Meas																							
AC-E Cert																							
NIST 696 Meas																							
NIST 696 Cert																							
NIST 696 Meas																							
NIST 696 Cert																							
NIST 696 Meas																							
NIST 696 Cert																							
OREAS 14P Meas																							
OREAS 14P Cert																							
Oreas 72a (4 Acid Digest) Meas																							
Oreas 72a (4 Acid Digest) Cert																							
BIR-1a Meas																							
BIR-1a Cert																							
OREAS 131a (Fusion) Meas	20.0			302				5.73															
OREAS 131a (Fusion) Cert	25			324				5.90															
OREAS 131a (Fusion) Meas								5.80															
OREAS 131a (Fusion) Cert								5.90															
OREAS 131a (Fusion) Meas								5.82															
OREAS 131a (Fusion) Cert								5.90															
OREAS 131a (Fusion) Meas								5.84															
OREAS 131a (Fusion) Cert								5.90															
MP-1b Meas				> 10000				7.95						561				< 0.01					
MP-1b Cert				30700				8.19						565.0000				0.024					
MP-1b Meas				> 10000				8.09						569				0.02					

Analyte Symbol	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Ge	Ho	Hf	In	K	La	Li	Mg	Mn	Mo	Nb	Nd	Ni
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.2	30	0.1	2	0.3	0.1	0.1	0.05	0.2	0.1	0.7	0.2	10	0.2	0.1	0.4	3	0.01	3	1	2.4	0.4	10
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
MP-1b Cert				30700				8.19						565.0000				0.024					
MP-1b Meas								8.09										0.02					
MP-1b Cert								8.19										0.024					
MP-1b Meas								8.05										0.02					
MP-1b Cert								8.19										0.024					
MP-1b Meas								8.16										0.02					
MP-1b Cert								8.19										0.024					
MP-1b Meas								8.17										0.02					
MP-1b Cert								8.19										0.024					
MP-1b Meas								7.96										0.03					
MP-1b Cert								8.19										0.024					
OREAS 101a (Fusion) Meas								11.3							2.3			1.25					
OREAS 101a (Fusion) Cert								11.06							2.34			1.23					
NCS DC73304 (GBW 07106) Meas																							
NCS DC73304 (GBW 07106) Cert																							
AMIS 0129 Meas								43.0															
AMIS 0129 Cert								43.573															
AMIS 0129 Meas								42.9															
AMIS 0129 Cert								43.573															
DNC-1a Meas																							
DNC-1a Cert																							
OREAS 13b (fusion) Meas								8.47							2.2			3.06					
OREAS 13b (fusion) Cert								8.41							2.30			3.01					
OREAS 13b (fusion) Meas								8.54							2.2			3.01					
OREAS 13b (fusion) Cert								8.41							2.30			3.01					
OREAS 904 (4 ACID) Meas																							
OREAS 904 (4 ACID) Cert																							
NCS DC19014 Meas								52.8															
NCS DC19014 Cert								53.92															

Analyte Symbol	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Ge	Ho	Hf	In	K	La	Li	Mg	Mn	Mo	Nb	Nd	Ni
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.2	30	0.1	2	0.3	0.1	0.1	0.05	0.2	0.1	0.7	0.2	10	0.2	0.1	0.4	3	0.01	3	1	2.4	0.4	10
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
NCS DC19014 Meas								53.4															
NCS DC19014 Cert								53.92															
SBC-1 Meas																							
SBC-1 Cert																							
OREAS 922 (Peroxide Fusion) Meas								5.88							2.6			1.66					
OREAS 922 (Peroxide Fusion) Cert								5.71							2.60			1.61					
OREAS 922 (Peroxide Fusion) Meas								5.63							2.6			1.60					
OREAS 922 (Peroxide Fusion) Cert								5.71							2.60			1.61					
OREAS 621 (Peroxide Fusion) Meas								3.74							2.2			0.51					
OREAS 621 (Peroxide Fusion) Cert								3.71							2.23			0.516					
OREAS 621 (Peroxide Fusion) Meas								3.81							2.1			0.51					
OREAS 621 (Peroxide Fusion) Cert								3.71							2.23			0.516					
OREAS 621 (Peroxide Fusion) Meas								3.95							2.2			0.52					
OREAS 621 (Peroxide Fusion) Cert								3.71							2.23			0.516					
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
NIST 88b (XRF) Meas																							

Analyte Symbol	Co	Cr	Cs	Cu	Dy	Er	Eu	Fe	Ga	Gd	Ge	Ho	Hf	In	K	La	Li	Mg	Mn	Mo	Nb	Nd	Ni
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.2	30	0.1	2	0.3	0.1	0.1	0.05	0.2	0.1	0.7	0.2	10	0.2	0.1	0.4	3	0.01	3	1	2.4	0.4	10
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
NIST 88b (XRF) Cert																							
VR13117B Orig																							
VR13117B Dup																							
VR13122B Orig																							
VR13122B Dup																							
VR13133B Orig																							
VR13133B Dup																							
VR13137B Orig																							
VR13137B Dup																							
VR13143B Orig																							
VR13143B Dup																							
VR13155B Orig																							
VR13155B Dup																							
VR13158B Orig																							
VR13158B Dup																							
VR13163B Orig																							
VR13163B Split PREP DUP																							
VR13167B Orig																							
VR13167B Dup																							
VR13123B Orig																							
VR13123B Dup																							
Method Blank	< 0.2	< 30	0.1	< 2	< 0.3	< 0.1	< 0.1	< 0.05	0.2	< 0.1	< 0.7	< 0.2	10	< 0.2	< 0.1	< 0.4	< 3	< 0.01	< 3	1	< 2.4	< 0.4	< 10
Method Blank								< 0.05							< 0.1			< 0.01					
Method Blank								< 0.05							< 0.1			< 0.01					
Method Blank								< 0.05							< 0.1			< 0.01					
Method Blank								< 0.05							< 0.1			< 0.01					
Method Blank								< 0.05							< 0.1			< 0.01					
Method Blank								< 0.05							< 0.1			< 0.01					
Method Blank								< 0.05							< 0.1			< 0.01					
Method Blank								< 0.05							< 0.1			< 0.01					
Method Blank																							
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Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							

Analyte Symbol	Pb	Pr	Rb	S	Sb	Se	Si	Sm	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn
Unit Symbol	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.8	0.1	0.4	0.01	2	0.8	0.01	0.1	0.5	3	0.2	0.1	6	0.1	0.01	0.1	0.1	0.1	5	0.7	0.1	0.1	30
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
SDC-1 Meas																							
SDC-1 Cert																							
GXR-6 Meas																							
GXR-6 Cert																							
BE-N Meas																							
BE-N Cert																							
AC-E Meas																							
AC-E Cert																							
NIST 696 Meas																							
NIST 696 Cert																							
NIST 696 Meas																							
NIST 696 Cert																							
NIST 696 Meas																							
NIST 696 Cert																							
OREAS 14P Meas																							
OREAS 14P Cert																							
Oreas 72a (4 Acid Digest) Meas																							
Oreas 72a (4 Acid Digest) Cert																							
BIR-1a Meas																							
BIR-1a Cert																							
OREAS 131a (Fusion) Meas	> 5000			4.66	50																		> 10000
OREAS 131a (Fusion) Cert	17400.00			4.82	49																		28400.00
OREAS 131a (Fusion) Meas				4.79																			
OREAS 131a (Fusion) Cert				4.82																			
OREAS 131a (Fusion) Meas				4.77																			
OREAS 131a (Fusion) Cert				4.82																			
OREAS 131a (Fusion) Meas				4.57																			
OREAS 131a (Fusion) Cert				4.82																			
MP-1b Meas	> 5000			13.7			16.3		> 10000											1120			> 10000
MP-1b Cert	20900			13.79			16.79		16100											1100.000			167000
MP-1b Meas	> 5000			13.5			16.1		> 10000											1050			> 10000

Analyte Symbol	Pb	Pr	Rb	S	Sb	Se	Si	Sm	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn
Unit Symbol	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.8	0.1	0.4	0.01	2	0.8	0.01	0.1	0.5	3	0.2	0.1	6	0.1	0.01	0.1	0.1	0.1	5	0.7	0.1	0.1	30
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
MP-1b Cert	20900			13.79			16.79		16100											1100.000			167000
MP-1b Meas				13.3			16.2																
MP-1b Cert				13.79			16.79																
MP-1b Meas				13.6			16.6																
MP-1b Cert				13.79			16.79																
MP-1b Meas				13.6			16.3																
MP-1b Cert				13.79			16.79																
MP-1b Meas				13.9			16.1																
MP-1b Cert				13.79			16.79																
MP-1b Meas				13.2			16.7																
MP-1b Cert				13.79			16.79																
OREAS 101a (Fusion) Meas															0.42								
OREAS 101a (Fusion) Cert															0.395								
NCS DC73304 (GBW 07106) Meas																							
NCS DC73304 (GBW 07106) Cert																							
AMIS 0129 Meas															13.8								
AMIS 0129 Cert															13.75								
AMIS 0129 Meas															13.7								
AMIS 0129 Cert															13.75								
DNC-1a Meas																							
DNC-1a Cert																							
OREAS 13b (fusion) Meas				1.19			22.6								0.71								
OREAS 13b (fusion) Cert				1.19			22.9								0.711								
OREAS 13b (fusion) Meas				1.17			22.2								0.73								
OREAS 13b (fusion) Cert				1.19			22.9								0.711								
OREAS 904 (4 ACID) Meas																							
OREAS 904 (4 ACID) Cert																							
NCS DC19014 Meas				0.08																			
NCS DC19014 Cert				0.064																			

Analyte Symbol	Pb	Pr	Rb	S	Sb	Se	Si	Sm	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn
Unit Symbol	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.8	0.1	0.4	0.01	2	0.8	0.01	0.1	0.5	3	0.2	0.1	6	0.1	0.01	0.1	0.1	0.1	5	0.7	0.1	0.1	30
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
NCS DC19014 Meas				0.09																			
NCS DC19014 Cert				0.064																			
SBC-1 Meas																							
SBC-1 Cert																							
OREAS 922 (Peroxide Fusion) Meas				0.39			29.9								0.45								
OREAS 922 (Peroxide Fusion) Cert				0.389			30.51								0.439								
OREAS 922 (Peroxide Fusion) Meas				0.39			> 30.0								0.44								
OREAS 922 (Peroxide Fusion) Cert				0.389			30.51								0.439								
OREAS 621 (Peroxide Fusion) Meas				4.37			27.4								0.19								
OREAS 621 (Peroxide Fusion) Cert				4.51			28.1								0.181								
OREAS 621 (Peroxide Fusion) Meas				4.61			27.4								0.19								
OREAS 621 (Peroxide Fusion) Cert				4.51			28.1								0.181								
OREAS 621 (Peroxide Fusion) Meas				4.45			27.7								0.19								
OREAS 621 (Peroxide Fusion) Cert				4.51			28.1								0.181								
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
NIST 88b (XRF) Meas																							

Analyte Symbol	Pb	Pr	Rb	S	Sb	Se	Si	Sm	Sn	Sr	Ta	Tb	Te	Th	Ti	Tl	Tm	U	V	W	Y	Yb	Zn
Unit Symbol	ppm	ppm	ppm	%	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.8	0.1	0.4	0.01	2	0.8	0.01	0.1	0.5	3	0.2	0.1	6	0.1	0.01	0.1	0.1	0.1	5	0.7	0.1	0.1	30
Method Code	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2	FUS-MS-Na2O2
NIST 88b (XRF) Cert																							
VR13117B Orig																							
VR13117B Dup																							
VR13122B Orig																							
VR13122B Dup																							
VR13133B Orig																							
VR13133B Dup																							
VR13137B Orig																							
VR13137B Dup																							
VR13143B Orig																							
VR13143B Dup																							
VR13155B Orig																							
VR13155B Dup																							
VR13158B Orig																							
VR13158B Dup																							
VR13163B Orig																							
VR13163B Split PREP DUP																							
VR13167B Orig																							
VR13167B Dup																							
VR13123B Orig																							
VR13123B Dup																							
Method Blank	< 0.8	< 0.1	< 0.4	< 0.01	< 2	1.0	< 0.01	< 0.1	< 0.5	< 3	0.2	< 0.1	< 6	< 0.1	< 0.01	< 0.1	< 0.1	0.2	< 5	0.8	0.1	< 0.1	< 30
Method Blank				< 0.01			< 0.01								< 0.01								
Method Blank				< 0.01			< 0.01								< 0.01								
Method Blank				< 0.01			< 0.01								< 0.01								
Method Blank				< 0.01			< 0.01								< 0.01								
Method Blank				< 0.01			< 0.01								< 0.01								
Method Blank				< 0.01			< 0.01								< 0.01								
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Method Blank																							

Analyte Symbol	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Lower Limit	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
SDC-1 Meas																	
SDC-1 Cert																	
GXR-6 Meas																	
GXR-6 Cert																	
BE-N Meas	0.007	0.010	0.032	38.61	10.29	13.09	0.201	13.06	14.16	3.35	1.38	2.71	1.07	0.06	0.043		
BE-N Cert	0.008	0.009	0.034	38.2	10.1	12.8	0.200	13.1	13.9	3.18	1.39	2.61	1.05	0.0500	0.042		
AC-E Meas				70.24	14.84	2.54	0.056	0.05	0.35	6.66	4.52	0.11					
AC-E Cert				70.35	14.70	2.56	0.058	0.03	0.34	6.54	4.49	0.11					
NIST 696 Meas																	
NIST 696 Cert																	
NIST 696 Meas																	
NIST 696 Cert																	
NIST 696 Meas																	
NIST 696 Cert																	
OREAS 14P Meas																	
OREAS 14P Cert																	
Oreas 72a (4 Acid Digest) Meas																	
Oreas 72a (4 Acid Digest) Cert																	
BIR-1a Meas				47.52	15.54	11.68	0.175	9.76	13.32	1.83	0.04	0.97	0.03				
BIR-1a Cert				47.96	15.50	11.30	0.175	9.700	13.30	1.82	0.030	0.96	0.021				
OREAS 131a (Fusion) Meas																	
OREAS 131a (Fusion) Cert																	
OREAS 131a (Fusion) Meas																	
OREAS 131a (Fusion) Cert																	
OREAS 131a (Fusion) Meas																	
OREAS 131a (Fusion) Cert																	
OREAS 131a (Fusion) Meas																	
OREAS 131a (Fusion) Cert																	
MP-1b Meas																	
MP-1b Cert																	
MP-1b Meas																	
MP-1b Cert																	

Analyte Symbol	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Lower Limit	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
MP-1b Meas																	
MP-1b Cert																	
MP-1b Meas																	
MP-1b Cert																	
MP-1b Meas																	
MP-1b Cert																	
MP-1b Meas																	
MP-1b Cert																	
MP-1b Meas																	
MP-1b Cert																	
OREAS 101a (Fusion) Meas																	
OREAS 101a (Fusion) Cert																	
NCS DC73304 (GBW 07106) Meas				90.25	3.57	3.31		0.04	0.29	0.04	0.65		0.23				
NCS DC73304 (GBW 07106) Cert				90.36	3.52	3.22		0.082	0.30	0.061	0.65		0.222				
AMIS 0129 Meas																	
AMIS 0129 Cert																	
AMIS 0129 Meas																	
AMIS 0129 Cert																	
DNC-1a Meas																	
DNC-1a Cert																	
OREAS 13b (fusion) Meas																	
OREAS 13b (fusion) Cert																	
OREAS 13b (fusion) Meas																	
OREAS 13b (fusion) Cert																	
OREAS 904 (4 ACID) Meas																	
OREAS 904 (4 ACID) Cert																	
NCS DC19014 Meas																	
NCS DC19014 Cert																	
NCS DC19014 Meas																	

Analyte Symbol	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Lower Limit	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
NCS DC19014 Cert																	
SBC-1 Meas																	
SBC-1 Cert																	
OREAS 922 (Peroxide Fusion) Meas																	
OREAS 922 (Peroxide Fusion) Cert																	
OREAS 922 (Peroxide Fusion) Meas																	
OREAS 922 (Peroxide Fusion) Cert																	
OREAS 621 (Peroxide Fusion) Meas																	
OREAS 621 (Peroxide Fusion) Cert																	
OREAS 621 (Peroxide Fusion) Meas																	
OREAS 621 (Peroxide Fusion) Cert																	
OREAS 621 (Peroxide Fusion) Meas																	
OREAS 621 (Peroxide Fusion) Cert																	
OREAS 214 Meas																	
OREAS 214 Cert																	
OREAS 214 Meas																	
OREAS 214 Cert																	
OREAS 218 Meas																	
OREAS 218 Cert																	
OREAS 218 Meas																	
OREAS 218 Cert																	
NIST 88b (XRF) Meas				1.04	0.31	0.29	0.014	20.98	30.61	0.04		0.02	0.01				
NIST 88b (XRF) Cert				1.13	0.360	0.280	0.0160	21.0	30.1	0.0300		0.0200	0.00400				

Analyte Symbol	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Lower Limit	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.003		0.01
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13117B Orig																	
VR13117B Dup																	
VR13122B Orig																	
VR13122B Dup																	
VR13133B Orig																	
VR13133B Dup																	
VR13137B Orig																	
VR13137B Dup																	
VR13143B Orig																	
VR13143B Dup																	
VR13155B Orig																	
VR13155B Dup																	
VR13158B Orig																	
VR13158B Dup																	
VR13163B Orig																	
VR13163B Split PREP DUP																	
VR13167B Orig																	
VR13167B Dup																	
VR13123B Orig	0.015	0.006	0.131	38.09	3.67	11.71	0.157	23.88	8.03	0.01	< 0.01	0.23	0.03	0.35	0.016	14.08	100.4
VR13123B Dup	0.014	0.007	0.132	37.94	3.57	11.72	0.156	23.96	8.00	0.02	< 0.01	0.22	0.03	0.36	0.018	14.03	100.2
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank	< 0.005	< 0.005	< 0.003	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.003		
Method Blank																	
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Method Blank																	

Quality Analysis ... *Innovative Technologies*

Date Submitted: 06-Jul-18
Invoice No.: A18-08807
Invoice Date: 31-Jul-18
Your Reference: Jackfish

Sanatana Resources
908-925 West Georgia st
Vancouver
BC V6C 3L2
Canada

ATTN: Troy Gill

CERTIFICATE OF ANALYSIS

30 Core samples were submitted for analysis.

The following analytical package(s) were requested: Code 4C (1-10) Whole Rock Analysis-XRF

REPORT **A18-08807**

Notes:

Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

ACTIVATION LABORATORIES LTD.
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613
E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Date Submitted: 06-Jul-18
Invoice No.: A18-08807
Invoice Date: 31-Jul-18
Your Reference: Jackfish

Sanatana Resources
908-925 West Georgia st
Vancouver
BC V6C 3L2
Canada

ATTN: Troy Gill

CERTIFICATE OF ANALYSIS

30 Core samples were submitted for analysis.

The following analytical package(s) were requested: Code 1A2-ICP Tbay Au-Fire Assay ICPOES 30g

Code 1F2-Tbay Total Digestion ICP(TOTAL)

REPORT **A18-08807**

Notes:

Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

ACTIVATION LABORATORIES LTD.
1201 Walsh Street West, Thunder Bay, Ontario, Canada, P7E 4X6
TELEPHONE +807 622-6707 or +1.888.228.5227 FAX +1.905.648.9613
E-MAIL Tbay@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Analyte Symbol	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P	Pb
Unit Symbol	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%	ppm
Lower Limit	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001	3
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13263B	0.5	6.66	< 3	474	1	< 2	4.58	< 0.3	25	123	47	4.00	18	< 1	1.35	3.56	15	624	< 1	3.21	163	0.154	6
VR13264B	< 0.3	5.81	4	423	< 1	< 2	5.94	< 0.3	54	500	840	7.53	18	< 1	1.10	5.62	16	922	< 1	2.11	191	0.071	5
VR13265B	< 0.3	5.13	< 3	24	< 1	< 2	6.14	< 0.3	68	632	75	8.71	13	< 1	0.14	8.65	22	1390	< 1	0.55	433	0.019	9
VR13266B	< 0.3	4.75	< 3	48	< 1	< 2	5.87	< 0.3	67	618	48	7.92	12	< 1	0.23	8.43	20	1340	< 1	0.66	421	0.017	< 3
VR13267B	0.8	3.40	< 3	286	< 1	2	4.38	< 0.3	103	612	1930	25.6	31	< 1	0.96	3.35	11	1120	< 1	1.19	205	0.017	16
VR13268B	0.7	0.93	4	72	< 1	5	2.56	< 0.3	114	273	1100	44.9	33	< 1	0.19	1.25	2	1160	< 1	0.69	133	0.016	25
VR13269B	0.7	3.85	< 3	170	< 1	< 2	1.51	< 0.3	83	87	867	22.7	20	< 1	0.28	0.44	2	441	4	2.30	128	0.053	15
VR13270B	< 0.3	0.22	< 3	13	< 1	< 2	0.02	< 0.3	< 1	45	1	0.26	< 1	< 1	0.06	0.02	8	47	< 1	0.05	< 1	0.002	< 3
VR13271B	1.0	5.80	< 3	726	1	2	2.96	< 0.3	83	90	2400	16.9	19	3	1.37	2.18	15	703	< 1	2.24	66	0.118	5
VR13272B	0.3	4.00	< 3	704	2	< 2	5.74	< 0.3	40	432	34	4.68	13	< 1	2.19	5.42	29	1150	< 1	1.59	244	0.163	11
VR13273B	2.3	1.46	5	185	3	4	3.28	0.6	15	329	11	2.16	8	3	1.13	3.13	16	698	16	0.46	148	0.051	34
VR13274B	29.8	3.86	< 3	386	12	129	4.52	0.8	42	725	33	5.80	21	< 1	3.36	7.69	55	1230	66	0.47	409	0.140	575
VR13275B	< 0.3	6.54	< 3	286	< 1	< 2	7.12	< 0.3	24	41	4	7.91	20	< 1	0.44	1.21	8	947	< 1	2.41	34	0.093	6
VR13276B	< 0.3	6.55	11	761	< 1	2	7.63	< 0.3	44	71	111	11.0	19	< 1	2.05	3.29	43	1650	< 1	1.66	122	0.102	< 3
VR13277B	< 0.3	6.76	< 3	113	< 1	< 2	8.58	< 0.3	23	43	49	6.65	20	< 1	0.35	2.00	9	1140	< 1	1.99	44	0.115	6
VR13278B	< 0.3	5.19	4	447	3	< 2	8.09	< 0.3	41	393	40	5.83	15	2	2.24	5.32	46	1500	1	1.90	155	0.150	14
VR13279B	< 0.3	5.84	3	240	< 1	< 2	6.88	< 0.3	24	42	102	6.51	24	< 1	0.49	1.20	8	996	< 1	2.56	36	0.069	8
VR13280B	1.7	4.88	59	192	< 1	< 2	3.91	< 0.3	32	509	128	4.27	13	< 1	0.77	4.28	32	689	6	1.07	192	0.025	39
VR13281B	< 0.3	7.16	6	204	1	< 2	5.27	< 0.3	13	37	43	3.59	22	< 1	1.36	0.68	14	484	4	2.35	39	0.033	8
VR13282B	< 0.3	7.44	3	290	1	< 2	4.79	< 0.3	21	33	108	3.48	22	< 1	1.08	0.79	14	465	2	3.17	58	0.038	5
VR13283B	< 0.3	5.78	< 3	550	3	< 2	3.23	< 0.3	17	53	3	2.74	16	< 1	1.32	1.28	22	493	3	3.01	38	0.084	10
VR13284B	< 0.3	7.71	5	717	4	< 2	4.52	< 0.3	21	38	6	3.37	23	< 1	1.58	1.54	22	681	13	4.25	42	0.095	9
VR13285B	< 0.3	7.48	4	725	5	< 2	2.98	< 0.3	11	58	8	2.86	22	< 1	1.72	1.71	38	628	410	4.41	45	0.107	16
VR13286B	0.5	6.16	< 3	> 1000	8	< 2	2.69	< 0.3	11	53	8	2.86	19	< 1	1.15	1.44	34	507	3	4.11	37	0.098	27
VR13287B	< 0.3	5.95	< 3	416	3	< 2	2.72	< 0.3	13	46	10	2.51	20	< 1	1.08	1.10	22	443	26	3.69	39	0.074	16
VR13288B	< 0.3	6.17	< 3	> 1000	3	< 2	3.90	< 0.3	12	51	11	3.23	23	< 1	1.87	1.44	30	920	< 1	3.18	37	0.168	17
VR13289B	< 0.3	6.81	< 3	> 1000	3	< 2	2.97	< 0.3	11	47	3	2.61	21	< 1	1.67	1.37	29	486	< 1	3.45	38	0.084	13
VR13290B	< 0.3	7.07	< 3	> 1000	3	< 2	2.99	< 0.3	11	50	3	2.66	21	< 1	1.77	1.38	29	481	< 1	3.50	38	0.088	9
VR13291B	0.6	6.82	7	448	5	< 2	3.95	< 0.3	19	52	30	3.57	25	< 1	1.41	1.51	31	849	40	4.36	41	0.142	19
VR13292B	0.4	7.04	< 3	355	4	< 2	3.82	< 0.3	16	44	18	3.43	24	< 1	1.59	1.69	33	743	32	4.54	40	0.117	7

Analyte Symbol	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O
Unit Symbol	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%	%
Lower Limit	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13263B	< 5	0.19	12	818	< 2	0.37	< 5	< 10	89	< 5	16	67	143										
VR13264B	< 5	1.27	25	590	3	0.35	< 5	< 10	167	< 5	17	190	60										
VR13265B	< 5	0.23	30	80	< 2	0.32	< 5	< 10	187	< 5	13	144	26										
VR13266B	< 5	0.15	27	72	< 2	0.29	< 5	< 10	167	< 5	11	89	26										
VR13267B	< 5	1.02	17	351	< 2	0.23	< 5	10	444	< 5	9	376	40										
VR13268B	7	0.21	4	120	< 2	0.11	< 5	30	351	< 5	5	486	36										
VR13269B	< 5	0.54	6	443	< 2	0.17	< 5	10	105	5	10	158	87										
VR13270B	< 5	< 0.01	< 4	3	< 2	0.02	< 5	< 10	2	< 5	2	1	26										
VR13271B	7	0.74	11	943	< 2	0.34	< 5	< 10	102	6	22	98	135										
VR13272B	< 5	0.08	14	787	11	0.42	< 5	< 10	108	< 5	21	64	133										
VR13273B	13	0.03	8	303	< 2	0.10	< 5	< 10	46	< 5	9	61	36										
VR13274B	< 5	0.04	18	373	12	0.33	< 5	< 10	174	< 5	20	218	122										
VR13275B	< 5	0.03	22	495	8	0.35	< 5	< 10	100	< 5	20	59	49										
VR13276B	< 5	0.33	22	711	< 2	0.86	< 5	< 10	221	< 5	17	101	43										
VR13277B	< 5	0.11	24	585	2	0.35	< 5	< 10	107	< 5	26	39	47	< 0.005	0.009	0.003	51.20	14.27	10.47	0.175	3.50	13.01	2.96
VR13278B	21	0.50	22	426	< 2	0.36	< 5	< 10	141	6	23	101	74										
VR13279B	< 5	0.06	13	422	11	0.49	< 5	< 10	158	< 5	13	63	68										
VR13280B	< 5	0.89	18	75	< 2	0.21	< 5	< 10	119	15	9	73	45										
VR13281B	< 5	0.13	8	329	11	0.22	< 5	< 10	62	< 5	8	53	77										
VR13282B	< 5	0.22	8	315	11	0.22	< 5	< 10	68	< 5	10	62	78										
VR13283B	< 5	0.66	6	586	9	0.22	< 5	< 10	54	< 5	17	54	109										
VR13284B	< 5	0.91	7	657	5	0.21	< 5	< 10	53	5	28	61	144	< 0.005	< 0.005	< 0.003	54.13	15.89	5.14	0.098	2.60	6.43	6.73
VR13285B	< 5	0.41	8	659	5	0.25	< 5	< 10	69	< 5	35	65	130										
VR13286B	< 5	0.40	7	781	3	0.22	< 5	< 10	65	< 5	40	53	151										
VR13287B	< 5	0.72	5	466	< 2	0.19	< 5	< 10	49	8	26	40	107										
VR13288B	< 5	0.23	7	757	< 2	0.22	< 5	< 10	71	< 5	34	61	105										
VR13289B	< 5	0.11	6	875	7	0.21	< 5	< 10	58	< 5	14	55	117										
VR13290B	< 5	0.13	6	861	6	0.22	< 5	< 10	60	< 5	15	54	122										
VR13291B	< 5	1.28	8	617	14	0.22	< 5	< 10	63	< 5	52	71	144										
VR13292B	< 5	1.21	8	486	9	0.25	< 5	< 10	65	< 5	36	67	181										

Analyte Symbol	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total	Au
Unit Symbol	%	%	%	%	%	%	%	ppb
Lower Limit	0.01	0.01	0.01	0.01	0.003		0.01	2
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FA-ICP
VR13263B								< 2
VR13264B								9
VR13265B								2
VR13266B								< 2
VR13267B								74
VR13268B								55
VR13269B								20
VR13270B								< 2
VR13271B								62
VR13272B								< 2
VR13273B								5
VR13274B								73
VR13275B								< 2
VR13276B								3
VR13277B	0.40	2.03	0.33	0.03	0.053	1.99	100.4	< 2
VR13278B								< 2
VR13279B								3
VR13280B								8620
VR13281B								2
VR13282B								< 2
VR13283B								< 2
VR13284B	1.99	0.42	0.23	0.02	0.014	5.35	99.06	< 2
VR13285B								4
VR13286B								< 2
VR13287B								< 2
VR13288B								< 2
VR13289B								< 2
VR13290B								< 2
VR13291B								< 2
VR13292B								< 2

Analyte Symbol	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P	Pb
Unit Symbol	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%	ppm
Lower Limit	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001	3
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
MICA-FE Meas																							
MICA-FE Cert																							
SDC-1 Meas		8.03	< 3	549	3		1.11		18	40	29	4.80	27	< 1	2.37	1.05	36	856		1.45	35	0.054	20
SDC-1 Cert		8.34	0.220	630	3.00		1.00		18.0	64.00	30.000	4.82	21.00	0.20	2.72	1.02	34	880.00		1.52	38.0	0.0690	25.00
GXR-6 Meas	< 0.3	12.8	262	> 1000	1	< 2	0.22	< 0.3	12	53	61	4.75	34	< 1	1.55	0.62	40	909	4	0.10	24	0.033	82
GXR-6 Cert	1.30	17.7	330	1300	1.40	0.290	0.180	1.00	13.8	96.0	66.0	5.58	35.0	0.0680	1.87	0.609	32.0	1010	2.40	0.104	27.0	0.0350	101
BE-N Meas																							
BE-N Cert																							
AC-E Meas																							
AC-E Cert																							
OREAS 14P Meas									712		> 10000	35.0									> 10000		
OREAS 14P Cert									750		9970	37.2									21000		
Oreas 72a (4 Acid Digest) Meas			< 3						166	192	348	9.88									7210		
Oreas 72a (4 Acid Digest) Cert			14.7						157	228	316	9.63									6930.000		
Oreas 73a (Fusion) Meas																							
Oreas 73a (Fusion) Cert																							
BIR-1a Meas																							
BIR-1a Cert																							
DNC-1a Meas				85					55	141	102		15				5				253		3
DNC-1a Cert				118					57	270	100		15				5.2				247		6.3
OREAS 904 (4 ACID) Meas	0.8	6.32	102	180	10	6	0.05		100	55	6710	7.05	18		2.32	0.62	17	442	2	0.04	49	0.103	18
OREAS 904 (4 ACID) Cert	0.551	6.30	98.0	194	7.86	4.05	0.0460		83.0	54.0	6120	6.68	16.7		3.31	0.556	16.7	410	2.12	0.0340	40.1	0.0980	10.6
SBC-1 Meas			19	646	3	< 2		0.3	23	78	30		26				157		2		85		29
SBC-1 Cert			25.7	788.0	3.20	0.70		0.40	22.7	109	31.0		27.0				163		2		83		35.0
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
VR13272B Orig																							
VR13272B Dup																							
VR13280B Orig	1.7	4.81	60	189	< 1	< 2	3.89	< 0.3	31	528	126	4.24	13	< 1	0.76	4.23	31	673	6	1.06	192	0.025	38
VR13280B Dup	1.8	4.96	59	195	< 1	< 2	3.93	< 0.3	32	491	130	4.30	12	< 1	0.78	4.33	32	704	7	1.09	192	0.026	40
VR13282B Orig																							
VR13282B Dup																							
VR13284B Orig																							
VR13284B Dup																							
VR13292B Orig																							

Analyte Symbol	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P	Pb
Unit Symbol	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%	ppm
Lower Limit	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001	3
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13292B Dup																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3

Analyte Symbol	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O
Unit Symbol	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%	%
Lower Limit	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
MICA-FE Meas														< 0.005	< 0.005	< 0.003	34.51	19.48	25.70	0.346	4.58	0.47	0.35
MICA-FE Cert														0.003	0.001	0.004	34.4	19.5	25.6	0.350	4.55	0.430	0.300
SDC-1 Meas	< 5		15	172		0.12	< 5	< 10	37	< 5		104	25										
SDC-1 Cert	0.54		17.00	180.00		0.606	0.70	3.10	102.00	0.80		103.00	290.00										
GXR-6 Meas	< 5	0.01	21	40	< 2		< 5	< 10	146	< 5	10	115	72										
GXR-6 Cert	3.60	0.0160	27.6	35.0	0.0180		2.20	1.54	186	1.90	14.0	118	110										
BE-N Meas														0.006	0.010	0.032	38.53	10.17	13.16	0.202	13.09	14.16	3.36
BE-N Cert														0.008	0.009	0.034	38.2	10.1	12.8	0.200	13.1	13.9	3.18
AC-E Meas																	70.32	14.82	2.56	0.057	0.06	0.37	6.67
AC-E Cert																	70.35	14.70	2.56	0.058	0.03	0.34	6.54
OREAS 14P Meas																							
OREAS 14P Cert																							
Oreas 72a (4 Acid Digest) Meas		1.67																					
Oreas 72a (4 Acid Digest) Cert		1.74																					
Oreas 73a (Fusion) Meas														0.041	0.117	1.854	36.33	2.50			31.85		
Oreas 73a (Fusion) Cert														0.041	0.115	1.833	36.4	2.38			32.5		
BIR-1a Meas																	48.31	15.55	11.87	0.180	9.73	13.62	1.82
BIR-1a Cert																	47.96	15.50	11.30	0.175	9.700	13.30	1.82
DNC-1a Meas	< 5		28	123		0.27			139		15	60	32										
DNC-1a Cert	0.96		31	144		0.29			148		18.0	70	38.0										
OREAS 904 (4 ACID) Meas	< 5	0.06	12	28			< 5	< 10	80	< 5	36	26	173										
OREAS 904 (4 ACID) Cert	1.48	0.0630	11.2	27.2			0.520	8.43	76.0	2.12	31.5	26.3	171										
SBC-1 Meas	< 5		18	165		0.49	< 5	< 10	213	< 5	32	189	106										
SBC-1 Cert	1.01		20.0	178.0		0.51	0.89	5.76	220.0	1.60	36.5	186	134.0										
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
VR13272B Orig																							
VR13272B Dup																							
VR13280B Orig	< 5	0.88	17	75	< 2	0.21	< 5	< 10	117	15	9	76	43										
VR13280B Dup	< 5	0.90	18	76	5	0.21	< 5	< 10	121	14	9	71	46										
VR13282B Orig																							
VR13282B Dup																							
VR13284B Orig														< 0.005	< 0.005	0.007	54.29	15.89	5.18	0.099	2.61	6.45	6.74

Analyte Symbol	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co_3O_4	CuO	NiO	SiO_2	Al_2O_3	Fe_2O_3(T)	MnO	MgO	CaO	Na_2O
Unit Symbol	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%	%
Lower Limit	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13284B Dup														< 0.005	< 0.005	< 0.003	53.97	15.89	5.09	0.097	2.59	6.41	6.73
VR13292B Orig																							
VR13292B Dup																							
Method Blank																							
Method Blank																							
Method Blank														< 0.005	< 0.005	< 0.003	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5										
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5										
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5										
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5										
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5										

Analyte Symbol	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total	Au
Unit Symbol	%	%	%	%	%	%	%	ppb
Lower Limit	0.01	0.01	0.01	0.01	0.003		0.01	2
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FA-ICP
MICA-FE Meas	8.73	2.47	0.41	0.01	0.029			
MICA-FE Cert	8.75	2.50	0.450	0.01	0.024			
SDC-1 Meas								
SDC-1 Cert								
GXR-6 Meas								
GXR-6 Cert								
BE-N Meas	1.38	2.69	1.08	0.06	0.046			
BE-N Cert	1.39	2.61	1.05	0.0500	0.042			
AC-E Meas	4.54	0.11						
AC-E Cert	4.49	0.11						
OREAS 14P Meas								
OREAS 14P Cert								
Oreas 72a (4 Acid Digest) Meas								
Oreas 72a (4 Acid Digest) Cert								
Oreas 73a (Fusion) Meas				0.29				
Oreas 73a (Fusion) Cert				0.29				
BIR-1a Meas	0.02	0.99	0.02					
BIR-1a Cert	0.030	0.96	0.021					
DNC-1a Meas								
DNC-1a Cert								
OREAS 904 (4 ACID) Meas								
OREAS 904 (4 ACID) Cert								
SBC-1 Meas								
SBC-1 Cert								
OREAS 214 Meas								3040
OREAS 214 Cert								3030
OREAS 218 Meas								532
OREAS 218 Cert								531
VR13272B Orig								< 2
VR13272B Dup								< 2
VR13280B Orig								
VR13280B Dup								
VR13282B Orig								< 2
VR13282B Dup								2
VR13284B Orig	2.00	0.42	0.23	0.02	0.014	5.35	99.31	
VR13284B Dup	1.98	0.42	0.23	0.02	0.015	5.35	98.80	

Analyte Symbol	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total	Au
Unit Symbol	%	%	%	%	%	%	%	ppb
Lower Limit	0.01	0.01	0.01	0.01	0.003		0.01	2
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FA-ICP
VR13292B Orig								< 2
VR13292B Dup								< 2
Method Blank								< 2
Method Blank								< 2
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.003			
Method Blank								
Method Blank								
Method Blank								
Method Blank								
Method Blank								

Quality Analysis ... *Innovative Technologies*

Date Submitted: 04-Jul-18
Invoice No.: A18-08637
Invoice Date: 31-Jul-18
Your Reference:

Sanatana Resources
908-925 West Georgia st
Vancouver
BC V6C 3L2
Canada

ATTN: Troy Gill

CERTIFICATE OF ANALYSIS

41 Core samples were submitted for analysis.

The following analytical package(s) were requested: Code 1A2-ICP Tbay Au-Fire Assay ICPOES 30g

Code 1F2-Tbay Total Digestion ICP(TOTAL)

REPORT **A18-08637**

Notes:

Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

ACTIVATION LABORATORIES LTD.
1201 Walsh Street West, Thunder Bay, Ontario, Canada, P7E 4X6
TELEPHONE +807 622-6707 or +1.888.228.5227 FAX +1.905.648.9613
E-MAIL Tbay@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Date Submitted: 04-Jul-18
Invoice No.: A18-08637
Invoice Date: 31-Jul-18
Your Reference:

Sanatana Resources
908-925 West Georgia st
Vancouver
BC V6C 3L2
Canada

ATTN: Troy Gill

CERTIFICATE OF ANALYSIS

41 Core samples were submitted for analysis.

The following analytical package(s) were requested: Code 4C (1-10) Whole Rock Analysis-XRF

REPORT **A18-08637**

Notes:

Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

ACTIVATION LABORATORIES LTD.
41 Bittern Street, Ancaster, Ontario, Canada, L9G 4V5
TELEPHONE +905 648-9611 or +1.888.228.5227 FAX +1.905.648.9613
E-MAIL Ancaster@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Analyte Symbol	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P	Pb
Unit Symbol	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%	ppm
Lower Limit	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001	3
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13171B	< 0.3	6.90	< 3	> 1000	2	< 2	5.25	< 0.3	31	102	502	6.40	20	< 1	1.60	3.40	14	1000	< 1	2.72	87	0.167	6
VR13172B	< 0.3	6.84	< 3	949	2	< 2	5.95	< 0.3	29	77	118	5.43	19	< 1	1.23	3.22	9	964	< 1	3.01	59	0.183	6
VR13173B	< 0.3	7.06	< 3	> 1000	2	< 2	5.33	< 0.3	25	77	348	5.50	20	< 1	2.18	3.05	5	987	< 1	2.89	50	0.154	5
VR13174B	< 0.3	6.87	< 3	211	1	< 2	6.18	< 0.3	29	90	7	5.70	25	< 1	0.51	3.28	4	1000	< 1	3.18	49	0.161	11
VR13175B	< 0.3	6.69	< 3	543	2	< 2	5.32	< 0.3	26	80	131	5.20	19	< 1	1.32	2.77	10	875	< 1	3.19	52	0.178	9
VR13176B	< 0.3	7.09	< 3	553	3	< 2	4.75	< 0.3	28	92	8	5.48	20	< 1	1.70	3.09	23	872	< 1	3.39	46	0.174	11
VR13177B	< 0.3	5.57	6	813	1	< 2	6.35	< 0.3	30	121	275	6.07	17	< 1	1.72	2.47	30	927	1	2.73	57	0.129	< 3
VR13178B	< 0.3	6.70	< 3	> 1000	2	< 2	5.44	< 0.3	30	122	423	6.07	19	< 1	1.58	3.28	19	963	1	3.29	53	0.162	4
VR13179B	< 0.3	7.18	< 3	912	2	< 2	5.33	< 0.3	33	110	403	6.23	20	< 1	1.78	3.30	24	959	2	3.32	68	0.167	10
VR13180B	< 0.3	0.23	< 3	17	< 1	< 2	0.02	< 0.3	< 1	6	1	0.31	< 1	< 1	0.06	0.02	9	50	< 1	0.05	2	0.002	< 3
VR13181B	< 0.3	7.63	< 3	808	2	< 2	3.34	< 0.3	15	22	20	3.94	24	< 1	2.17	1.68	16	587	< 1	3.93	19	0.146	21
VR13182B	0.3	4.96	< 3	399	2	< 2	4.52	< 0.3	17	56	226	14.9	16	2	1.58	2.31	13	4310	2	2.31	31	0.090	14
VR13183B	< 0.3	4.94	< 3	373	1	5	4.81	< 0.3	22	11	92	14.8	17	< 1	2.68	2.62	15	4640	1	2.46	16	0.063	5
VR13184B	< 0.3	5.93	< 3	190	1	4	5.30	< 0.3	24	13	58	16.3	18	< 1	1.10	2.63	13	5230	< 1	1.68	14	0.077	7
VR13185B	0.5	5.45	< 3	224	2	3	4.88	< 0.3	17	12	112	20.5	19	< 1	1.07	2.38	12	8000	3	1.45	12	0.052	6
VR13186B	< 0.3	6.03	7	325	2	< 2	3.10	< 0.3	13	18	65	6.87	17	< 1	1.20	0.90	7	1870	3	2.87	12	0.033	9
VR13187B	< 0.3	5.94	< 3	141	1	2	6.44	< 0.3	27	36	103	14.5	18	< 1	0.65	1.95	7	3360	2	1.54	19	0.064	5
VR13188B	< 0.3	6.44	< 3	215	1	2	5.71	< 0.3	29	25	108	13.4	19	< 1	0.97	1.90	13	3190	< 1	2.17	19	0.061	7
VR13189B	0.4	6.35	6	110	1	< 2	6.63	< 0.3	29	19	103	15.5	18	< 1	0.68	1.92	9	3780	< 1	1.72	19	0.078	12
VR13190B	< 0.3	6.70	4	121	< 1	< 2	7.00	< 0.3	46	112	163	8.75	17	< 1	0.22	4.43	12	1360	< 1	2.17	95	0.039	< 3
VR13191B	< 0.3	7.05	< 3	229	< 1	3	4.78	< 0.3	32	19	85	12.8	22	< 1	1.14	2.57	22	2440	< 1	2.27	19	0.074	4
VR13192B	< 0.3	6.67	4	534	1	< 2	6.15	< 0.3	25	44	66	7.95	20	< 1	1.29	2.32	15	1850	< 1	2.54	36	0.109	8
VR13193B	< 0.3	6.68	< 3	394	< 1	< 2	3.92	< 0.3	29	28	109	9.78	20	< 1	1.61	2.32	22	1820	< 1	2.19	17	0.067	< 3
VR13194B	< 0.3	6.60	< 3	358	1	5	4.22	< 0.3	31	22	123	11.4	22	< 1	1.48	2.40	27	2040	< 1	2.15	16	0.077	8
VR13195B	< 0.3	6.95	< 3	252	1	< 2	4.39	< 0.3	22	23	92	8.92	20	< 1	1.07	1.87	20	1950	< 1	2.73	16	0.068	7
VR13196B	< 0.3	6.63	< 3	216	< 1	< 2	4.78	< 0.3	28	17	71	8.23	21	< 1	0.79	1.78	19	2160	< 1	2.96	14	0.081	6
VR13197B	< 0.3	6.49	< 3	432	3	< 2	5.49	< 0.3	31	120	86	7.11	17	< 1	1.01	3.33	23	1510	< 1	3.77	76	0.102	10
VR13198B	< 0.3	6.57	< 3	> 1000	5	< 2	3.61	< 0.3	44	285	54	6.22	19	< 1	2.36	5.17	51	1360	< 1	3.49	185	0.124	14
VR13199B	< 0.3	6.87	< 3	294	1	< 2	6.43	< 0.3	30	60	46	6.36	21	< 1	0.39	1.78	5	1140	< 1	4.12	74	0.111	7
VR13200B	< 0.3	7.29	< 3	294	1	< 2	6.58	0.3	31	63	46	6.47	20	< 1	0.40	1.82	5	1160	< 1	4.11	74	0.116	7
VR13201B	< 0.3	6.37	< 3	530	< 1	4	4.78	< 0.3	41	11	235	16.6	30	< 1	3.36	4.78	103	2710	< 1	0.61	23	0.210	6
VR13202B	< 0.3	6.62	< 3	585	2	< 2	7.05	< 0.3	41	138	88	7.20	18	< 1	1.59	4.64	32	1160	< 1	2.44	71	0.240	9
VR13203B	< 0.3	6.26	< 3	581	2	< 2	6.64	1.0	43	258	84	6.60	16	< 1	2.05	5.47	34	1160	< 1	2.20	124	0.191	7
VR13204B	1.3	6.17	4	321	13	31	5.02	< 0.3	25	70	100	4.72	19	< 1	2.21	2.87	51	2300	127	3.56	64	0.132	107
VR13205B	< 0.3	5.54	< 3	367	6	< 2	3.99	< 0.3	30	47	115	6.63	18	< 1	1.92	2.29	32	1490	< 1	3.19	41	0.088	14
VR13206B	< 0.3	7.14	< 3	432	2	< 2	4.27	< 0.3	38	65	344	9.21	21	< 1	1.77	3.36	33	1310	< 1	2.84	66	0.112	5
VR13207B	0.6	6.71	< 3	725	4	< 2	4.09	< 0.3	14	61	29	2.76	23	< 1	1.33	0.79	15	564	2	3.95	31	0.101	10
VR13208B	0.3	7.55	< 3	326	2	< 2	4.65	< 0.3	21	31	142	5.08	25	< 1	1.10	1.49	22	1090	< 1	3.05	35	0.070	7
VR13209B	< 0.3	7.22	< 3	927	2	< 2	2.78	< 0.3	11	35	2	2.64	20	< 1	1.67	1.37	13	415	< 1	3.16	39	0.084	7
VR13210B	< 0.3	0.22	< 3	20	< 1	< 2	0.02	< 0.3	< 1	8	< 1	0.21	< 1	< 1	0.05	0.01	8	92	< 1	0.05	< 1	0.002	4
VR13211B	< 0.3	6.84	< 3	585	1	< 2	4.48	< 0.3	26	105	19	4.53	19	< 1	1.11	3.26	17	747	< 1	2.86	130	0.097	3

Analyte Symbol	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O
Unit Symbol	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%	%
Lower Limit	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
VR13171B	< 5	0.07	19	950	< 2	0.38	< 5	< 10	148	< 5	19	88	58										
VR13172B	< 5	0.04	19	1380	8	0.38	< 5	< 10	150	< 5	23	77	72										
VR13173B	< 5	0.05	19	1360	14	0.37	< 5	< 10	150	< 5	21	78	79										
VR13174B	8	0.01	19	1480	7	0.36	< 5	< 10	165	6	14	74	44										
VR13175B	< 5	0.21	17	851	8	0.36	< 5	< 10	145	< 5	22	59	71										
VR13176B	< 5	0.16	19	811	< 2	0.37	5	< 10	154	< 5	20	80	105										
VR13177B	< 5	0.45	15	627	8	0.33	< 5	< 10	141	< 5	15	67	60										
VR13178B	< 5	0.07	20	909	4	0.38	< 5	< 10	156	< 5	17	80	56										
VR13179B	< 5	0.07	20	978	< 2	0.33	< 5	< 10	148	< 5	17	82	55										
VR13180B	< 5	< 0.01	< 4	5	< 2	0.02	< 5	< 10	3	< 5	3	2	25										
VR13181B	< 5	0.17	9	924	3	0.19	< 5	< 10	55	< 5	14	74	106	< 0.005	0.006	0.014	61.09	16.09	5.70	0.083	2.70	4.59	5.78
VR13182B	< 5	1.08	13	512	4	0.40	< 5	< 10	127	< 5	17	81	77										
VR13183B	< 5	1.12	18	328	< 2	0.60	< 5	< 10	196	< 5	13	84	84										
VR13184B	< 5	0.32	22	321	9	0.73	< 5	< 10	208	< 5	19	82	87										
VR13185B	15	0.46	17	346	7	0.61	< 5	< 10	171	8	17	90	87										
VR13186B	< 5	0.27	8	358	6	0.29	< 5	< 10	92	< 5	9	41	69										
VR13187B	< 5	0.68	21	226	9	0.48	< 5	< 10	191	< 5	19	79	79										
VR13188B	6	0.80	20	308	11	0.41	< 5	< 10	183	< 5	18	86	82										
VR13189B	< 5	0.93	25	223	< 2	0.43	< 5	< 10	211	< 5	20	82	88										
VR13190B	6	0.15	40	97	< 2	0.50	< 5	< 10	231	< 5	21	77	42										
VR13191B	< 5	0.60	26	295	< 2	0.58	< 5	< 10	226	< 5	19	93	98										
VR13192B	< 5	0.28	20	1040	< 2	0.50	< 5	< 10	178	< 5	28	90	77										
VR13193B	< 5	0.52	23	310	16	0.68	< 5	< 10	207	< 5	18	93	86										
VR13194B	< 5	0.81	23	310	4	0.73	< 5	< 10	244	< 5	18	102	91										
VR13195B	< 5	0.43	21	352	6	0.47	< 5	< 10	131	< 5	18	84	65										
VR13196B	< 5	0.36	23	358	3	0.42	< 5	< 10	188	< 5	18	101	67										
VR13197B	< 5	0.25	24	729	3	0.23	< 5	< 10	110	< 5	24	85	39										
VR13198B	< 5	0.14	21	858	2	0.36	< 5	< 10	151	< 5	33	112	74										
VR13199B	< 5	0.04	20	840	< 2	0.10	< 5	< 10	45	< 5	24	77	35										
VR13200B	< 5	0.05	21	853	7	0.20	< 5	< 10	60	< 5	25	77	48										
VR13201B	< 5	0.44	37	656	< 2	0.65	< 5	< 10	144	8	44	222	76										
VR13202B	< 5	0.34	23	1110	< 2	0.47	< 5	< 10	179	< 5	20	75	64										
VR13203B	18	0.26	23	786	< 2	0.43	< 5	< 10	167	7	18	77	68										
VR13204B	6	1.10	15	631	9	0.38	< 5	< 10	104	5	96	176	117										
VR13205B	< 5	1.62	15	429	< 2	0.59	< 5	< 10	120	< 5	40	108	79										
VR13206B	< 5	0.92	22	426	16	0.51	< 5	< 10	95	< 5	25	108	40										
VR13207B	< 5	0.45	9	695	< 2	0.23	< 5	< 10	69	7	26	36	132	< 0.005	0.008	0.010	60.24	14.79	3.96	0.075	1.32	5.61	5.70
VR13208B	< 5	0.43	16	555	4	0.35	< 5	< 10	76	< 5	20	68	86										
VR13209B	< 5	0.02	6	886	11	0.23	< 5	< 10	55	< 5	14	46	118	< 0.005	< 0.005	0.021	65.72	15.31	4.07	0.062	2.34	3.98	4.99
VR13210B	< 5	< 0.01	< 4	4	< 2	0.02	< 5	< 10	2	< 5	2	2	24										
VR13211B	< 5	0.05	14	747	7	0.34	< 5	< 10	118	< 5	15	72	115	< 0.005	0.009	0.017	58.08	14.55	7.06	0.111	5.68	6.71	4.68

Analyte Symbol	K2O	TiO2	P2O5	Cr2O3	V2O5	LOI	Total	Au
Unit Symbol	%	%	%	%	%	%	%	ppb
Lower Limit	0.01	0.01	0.01	0.01	0.003		0.01	2
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FA-ICP
VR13171B								48
VR13172B								22
VR13173B								29
VR13174B								< 2
VR13175B								3
VR13176B								< 2
VR13177B								16
VR13178B								90
VR13179B								108
VR13180B								< 2
VR13181B	2.61	0.70	0.36	0.04	0.022	0.85	100.6	< 2
VR13182B								2
VR13183B								< 2
VR13184B								< 2
VR13185B								< 2
VR13186B								< 2
VR13187B								< 2
VR13188B								< 2
VR13189B								2
VR13190B								530
VR13191B								< 2
VR13192B								< 2
VR13193B								< 2
VR13194B								2
VR13195B								< 2
VR13196B								< 2
VR13197B								< 2
VR13198B								< 2
VR13199B								< 2
VR13200B								< 2
VR13201B								4
VR13202B								< 2
VR13203B								< 2
VR13204B								4
VR13205B								3
VR13206B								3
VR13207B	1.81	0.40	0.24	0.03	0.019	5.20	99.41	< 2
VR13208B								< 2
VR13209B	2.14	0.42	0.21	0.04	0.016	1.05	100.4	< 2
VR13210B								< 2
VR13211B	1.42	0.64	0.25	0.05	0.027	1.47	100.8	< 2

Analyte Symbol	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P	Pb
Unit Symbol	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%	ppm
Lower Limit	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001	3
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
MICA-FE Meas																							
MICA-FE Cert																							
SDC-1 Meas		8.03	< 3	549	3		1.11		18	40	29	4.80	27	< 1	2.37	1.05	36	856		1.45	35	0.054	20
SDC-1 Cert		8.34	0.220	630	3.00		1.00		18.0	64.00	30.000	4.82	21.00	0.20	2.72	1.02	34	880.00		1.52	38.0	0.0690	25.00
GXR-6 Meas	< 0.3	12.8	262	> 1000	1	< 2	0.22	< 0.3	12	53	61	4.75	34	< 1	1.55	0.62	40	909	4	0.10	24	0.033	82
GXR-6 Cert	1.30	17.7	330	1300	1.40	0.290	0.180	1.00	13.8	96.0	66.0	5.58	35.0	0.0680	1.87	0.609	32.0	1010	2.40	0.104	27.0	0.0350	101
BE-N Meas																							
BE-N Cert																							
AC-E Meas																							
AC-E Cert																							
OREAS 14P Meas									712		> 10000	35.0									> 10000		
OREAS 14P Cert									750		9970	37.2									21000		
Oreas 72a (4 Acid Digest) Meas			< 3						166	192	348	9.88									7210		
Oreas 72a (4 Acid Digest) Cert			14.7						157	228	316	9.63									6930.000		
Oreas 73a (Fusion) Meas																							
Oreas 73a (Fusion) Cert																							
BIR-1a Meas																							
BIR-1a Cert																							
DNC-1a Meas				85					55	141	102		15				5				253		3
DNC-1a Cert				118					57	270	100		15				5.2				247		6.3
OREAS 904 (4 ACID) Meas	0.8	6.32	102	180	10	6	0.05		100	55	6710	7.05	18		2.32	0.62	17	442	2	0.04	49	0.103	18
OREAS 904 (4 ACID) Cert	0.551	6.30	98.0	194	7.86	4.05	0.0460		83.0	54.0	6120	6.68	16.7		3.31	0.556	16.7	410	2.12	0.0340	40.1	0.0980	10.6
SBC-1 Meas			19	646	3	< 2		0.3	23	78	30		26				157		2		85		29
SBC-1 Cert			25.7	788.0	3.20	0.70		0.40	22.7	109	31.0		27.0				163		2		83		35.0
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
OREAS 217 (Fire Assay) Meas																							
OREAS 217 (Fire Assay) Cert																							
OREAS 215 (Fire																							

Analyte Symbol	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P	Pb
Unit Symbol	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%	ppm
Lower Limit	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001	3
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
Assay) Meas																							
OREAS 215 (Fire Assay) Cert																							
VR13175B Orig	< 0.3	6.74	< 3	547	2	< 2	5.34	< 0.3	26	81	132	5.22	18	< 1	1.33	2.78	10	880	< 1	3.21	51	0.180	8
VR13175B Dup	< 0.3	6.65	4	538	2	< 2	5.31	< 0.3	25	80	130	5.18	19	< 1	1.32	2.75	10	870	< 1	3.17	52	0.176	10
VR13180B Orig																							
VR13180B Dup																							
VR13184B Orig	0.3	5.88	< 3	189	1	3	5.28	< 0.3	23	16	57	16.1	17	< 1	1.10	2.62	12	5200	< 1	1.67	14	0.075	8
VR13184B Dup	< 0.3	5.99	< 3	191	1	4	5.32	< 0.3	25	10	58	16.6	19	4	1.10	2.65	13	5270	< 1	1.69	13	0.078	6
VR13191B Orig																							
VR13191B Dup																							
VR13192B Orig																							
VR13192B Dup																							
VR13200B Orig																							
VR13200B Dup																							
VR13207B Orig	0.6	6.17	< 3	716	3	< 2	3.98	< 0.3	14	63	29	2.70	24	< 1	1.27	0.78	15	559	3	3.88	31	0.100	8
VR13207B Dup	0.5	7.26	< 3	734	4	< 2	4.21	< 0.3	13	58	28	2.83	23	< 1	1.39	0.81	15	569	1	4.02	31	0.102	11
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank																							

Analyte Symbol	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O
Unit Symbol	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%	%
Lower Limit	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
MICA-FE Meas														< 0.005	< 0.005	< 0.003	34.51	19.48	25.70	0.346	4.58	0.47	0.35
MICA-FE Cert														0.003	0.001	0.004	34.4	19.5	25.6	0.350	4.55	0.430	0.300
SDC-1 Meas	< 5		15	172		0.12	< 5	< 10	37	< 5		104	25										
SDC-1 Cert	0.54		17.00	180.00		0.606	0.70	3.10	102.00	0.80		103.00	290.00										
GXR-6 Meas	< 5	0.01	21	40	< 2		< 5	< 10	146	< 5	10	115	72										
GXR-6 Cert	3.60	0.0160	27.6	35.0	0.0180		2.20	1.54	186	1.90	14.0	118	110										
BE-N Meas														0.006	0.010	0.032	38.53	10.17	13.16	0.202	13.09	14.16	3.36
BE-N Cert														0.008	0.009	0.034	38.2	10.1	12.8	0.200	13.1	13.9	3.18
AC-E Meas																	70.32	14.82	2.56	0.057	0.06	0.37	6.67
AC-E Cert																	70.35	14.70	2.56	0.058	0.03	0.34	6.54
OREAS 14P Meas																							
OREAS 14P Cert																							
Oreas 72a (4 Acid Digest) Meas		1.67																					
Oreas 72a (4 Acid Digest) Cert		1.74																					
Oreas 73a (Fusion) Meas														0.041	0.117	1.854	36.33	2.50			31.85		
Oreas 73a (Fusion) Cert														0.041	0.115	1.833	36.4	2.38			32.5		
BIR-1a Meas																	48.31	15.55	11.87	0.180	9.73	13.62	1.82
BIR-1a Cert																	47.96	15.50	11.30	0.175	9.700	13.30	1.82
DNC-1a Meas	< 5		28	123		0.27			139		15	60	32										
DNC-1a Cert	0.96		31	144		0.29			148		18.0	70	38.0										
OREAS 904 (4 ACID) Meas	< 5	0.06	12	28			< 5	< 10	80	< 5	36	26	173										
OREAS 904 (4 ACID) Cert	1.48	0.0630	11.2	27.2			0.520	8.43	76.0	2.12	31.5	26.3	171										
SBC-1 Meas	< 5		18	165		0.49	< 5	< 10	213	< 5	32	189	106										
SBC-1 Cert	1.01		20.0	178.0		0.51	0.89	5.76	220.0	1.60	36.5	186	134.0										
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
OREAS 217 (Fire Assay) Meas																							
OREAS 217 (Fire Assay) Cert																							

Analyte Symbol	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Co3O4	CuO	NiO	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O
Unit Symbol	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	%	%	%	%	%
Lower Limit	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	0.005	0.005	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF
OREAS 215 (Fire Assay) Meas																							
OREAS 215 (Fire Assay) Cert																							
VR13175B Orig	< 5	0.21	17	859	4	0.36	< 5	< 10	145	< 5	22	59	71										
VR13175B Dup	< 5	0.21	16	842	11	0.36	< 5	< 10	144	< 5	22	59	71										
VR13180B Orig																							
VR13180B Dup																							
VR13184B Orig	< 5	0.29	21	318	6	0.71	< 5	< 10	206	< 5	18	80	85										
VR13184B Dup	< 5	0.34	22	324	11	0.75	< 5	< 10	211	11	19	83	88										
VR13191B Orig																							
VR13191B Dup																							
VR13192B Orig																							
VR13192B Dup																							
VR13200B Orig																							
VR13200B Dup																							
VR13207B Orig	< 5	0.44	8	670	3	0.23	< 5	< 10	69	8	24	36	133										
VR13207B Dup	< 5	0.46	9	720	< 2	0.23	< 5	< 10	69	7	28	36	131										
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank														< 0.005	< 0.005	< 0.003	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.01	< 0.01
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5										
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5										
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5										
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5										
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5										
Method Blank																							

Analyte Symbol	K2O	TiO2	P2O5	Cr2O3	V2O5	Au
Unit Symbol	%	%	%	%	%	ppb
Lower Limit	0.01	0.01	0.01	0.01	0.003	2
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FA-ICP
MICA-FE Meas	8.73	2.47	0.41	0.01	0.029	
MICA-FE Cert	8.75	2.50	0.450	0.01	0.024	
SDC-1 Meas						
SDC-1 Cert						
GXR-6 Meas						
GXR-6 Cert						
BE-N Meas	1.38	2.69	1.08	0.06	0.046	
BE-N Cert	1.39	2.61	1.05	0.0500	0.042	
AC-E Meas	4.54	0.11				
AC-E Cert	4.49	0.11				
OREAS 14P Meas						
OREAS 14P Cert						
Oreas 72a (4 Acid Digest) Meas						
Oreas 72a (4 Acid Digest) Cert						
Oreas 73a (Fusion) Meas				0.29		
Oreas 73a (Fusion) Cert				0.29		
BIR-1a Meas	0.02	0.99	0.02			
BIR-1a Cert	0.030	0.96	0.021			
DNC-1a Meas						
DNC-1a Cert						
OREAS 904 (4 ACID) Meas						
OREAS 904 (4 ACID) Cert						
SBC-1 Meas						
SBC-1 Cert						
OREAS 214 Meas						3060
OREAS 214 Cert						3030
OREAS 214 Meas						2960
OREAS 214 Cert						3030
OREAS 218 Meas						540
OREAS 218 Cert						531
OREAS 218 Meas						535
OREAS 218 Cert						531
OREAS 217 (Fire Assay) Meas						340
OREAS 217 (Fire Assay) Cert						338

Analyte Symbol	K2O	TiO2	P2O5	Cr2O3	V2O5	Au
Unit Symbol	%	%	%	%	%	ppb
Lower Limit	0.01	0.01	0.01	0.01	0.003	2
Method Code	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FUS-XRF	FA-ICP
OREAS 215 (Fire Assay) Meas						3610
OREAS 215 (Fire Assay) Cert						3540
VR13175B Orig						
VR13175B Dup						
VR13180B Orig						< 2
VR13180B Dup						< 2
VR13184B Orig						
VR13184B Dup						
VR13191B Orig						< 2
VR13191B Dup						< 2
VR13192B Orig						< 2
VR13192B Dup						< 2
VR13200B Orig						< 2
VR13200B Dup						< 2
VR13207B Orig						< 2
VR13207B Dup						< 2
Method Blank						< 2
Method Blank						< 2
Method Blank						< 2
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.003	
Method Blank						
Method Blank						
Method Blank						
Method Blank						
Method Blank						
Method Blank						< 2

Quality Analysis ... *Innovative Technologies*

Date Submitted: 04-Jul-18
Invoice No.: A18-08745
Invoice Date: 31-Jul-18
Your Reference: Jackfish

Sanatana Resources
908-925 West Georgia st
Vancouver
BC V6C 3L2
Canada

ATTN: Troy Gill

CERTIFICATE OF ANALYSIS

51 Core samples were submitted for analysis.

The following analytical package(s) were requested: Code 1A2-ICP Tbay Au-Fire Assay ICPOES 30g

Code 1F2-Tbay Total Digestion ICP(TOTAL)

REPORT **A18-08745**

Notes:

Values which exceed the upper limit should be assayed for accurate numbers.

CERTIFIED BY:

Emmanuel Eseme , Ph.D.
Quality Control

ACTIVATION LABORATORIES LTD.
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E-MAIL Tbay@actlabs.com ACTLABS GROUP WEBSITE www.actlabs.com

Analyte Symbol	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P	Pb
Unit Symbol	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%	ppm
Lower Limit	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001	3
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13212B	< 0.3	6.97	< 3	999	2	< 2	1.63	< 0.3	7	21	40	1.63	19	< 1	1.82	0.62	12	292	< 1	3.55	16	0.035	15
VR13213B	< 0.3	6.30	< 3	823	3	< 2	6.08	< 0.3	30	219	172	5.59	19	< 1	2.05	3.24	46	1690	1	2.45	119	0.135	16
VR13214B	< 0.3	6.82	4	770	3	< 2	5.04	< 0.3	29	115	113	5.44	20	< 1	1.49	2.95	29	1060	< 1	3.18	79	0.166	13
VR13215B	0.3	6.84	9	772	2	< 2	4.35	< 0.3	37	87	346	6.48	21	3	1.89	2.76	36	1270	1	2.77	53	0.147	21
VR13216B	0.4	7.25	< 3	> 1000	2	< 2	3.07	< 0.3	18	37	84	4.67	20	< 1	1.56	1.88	26	1020	< 1	2.67	24	0.118	13
VR13217B	0.4	6.82	< 3	> 1000	2	< 2	3.63	< 0.3	29	41	364	4.78	23	< 1	1.44	1.86	31	1120	2	2.88	26	0.115	15
VR13218B	0.4	6.59	< 3	> 1000	2	< 2	3.28	< 0.3	16	43	68	4.30	21	< 1	1.41	1.79	25	1130	< 1	2.82	21	0.110	11
VR13219B	< 0.3	6.09	< 3	934	2	< 2	2.74	< 0.3	16	43	54	4.95	21	< 1	1.07	1.76	33	894	< 1	2.96	21	0.106	14
VR13220B	1.7	5.04	72	199	< 1	< 2	4.05	< 0.3	33	547	136	4.50	13	< 1	0.81	4.49	33	710	6	1.15	196	0.026	36
VR13221B	< 0.3	6.40	< 3	> 1000	2	< 2	3.70	< 0.3	13	68	4	3.41	18	< 1	1.55	1.74	24	775	< 1	3.37	29	0.092	10
VR13222B	< 0.3	6.79	< 3	998	2	< 2	3.02	< 0.3	23	91	233	4.52	21	< 1	2.14	2.67	40	774	< 1	2.76	48	0.116	10
VR13223B	0.4	7.15	< 3	680	2	< 2	3.46	0.7	29	180	124	4.25	19	< 1	2.25	2.52	42	673	3	3.27	99	0.077	7
VR13224B	0.6	7.03	< 3	749	4	< 2	3.16	0.4	15	30	51	3.57	21	< 1	1.19	1.64	19	631	8	5.19	14	0.138	55
VR13225B	< 0.3	6.28	< 3	> 1000	5	< 2	4.95	0.4	14	28	39	4.32	21	< 1	0.93	1.92	17	2850	1	4.75	16	0.167	48
VR13226B	1.1	3.68	< 3	934	12	< 2	4.21	0.3	36	643	13	5.13	15	< 1	2.68	5.84	53	1460	5	1.18	228	0.171	110
VR13227B	< 0.3	6.68	3	186	1	< 2	5.00	< 0.3	45	338	82	7.13	20	< 1	2.01	3.48	17	1670	< 1	2.75	158	0.124	7
VR13228B	< 0.3	6.66	< 3	315	< 1	< 2	5.01	< 0.3	49	108	109	7.65	20	< 1	0.95	1.53	16	2440	< 1	2.67	136	0.111	8
VR13229B	< 0.3	7.63	4	341	< 1	< 2	5.37	< 0.3	63	110	75	9.86	21	< 1	1.17	2.20	20	2980	< 1	2.36	169	0.123	16
VR13230B	< 0.3	7.27	< 3	334	< 1	4	5.32	< 0.3	62	112	74	9.68	21	< 1	1.16	2.16	19	2990	< 1	2.31	169	0.118	18
VR13231B	< 0.3	5.65	< 3	126	< 1	< 2	5.94	< 0.3	48	121	56	9.14	20	< 1	0.52	1.77	16	3180	< 1	2.51	130	0.118	7
VR13232B	< 0.3	6.69	< 3	247	< 1	< 2	6.87	< 0.3	60	119	117	11.9	21	< 1	1.14	1.62	16	3350	< 1	1.78	159	0.116	11
VR13233B	< 0.3	6.94	< 3	368	< 1	< 2	6.41	< 0.3	60	80	144	12.9	22	< 1	1.77	2.40	23	2780	< 1	1.40	126	0.108	6
VR13234B	< 0.3	7.71	< 3	136	< 1	< 2	6.20	< 0.3	59	108	84	9.16	21	< 1	0.81	2.00	12	2970	< 1	2.26	159	0.134	7
VR13235B	< 0.3	7.38	6	208	< 1	< 2	5.61	< 0.3	60	105	78	8.30	20	< 1	0.99	1.85	15	2780	< 1	2.80	160	0.139	5
VR13236B	< 0.3	6.02	< 3	310	4	< 2	3.89	< 0.3	20	44	109	3.17	18	< 1	0.86	0.75	9	1180	3	4.05	53	0.059	8
VR13237B	< 0.3	7.34	< 3	574	< 1	< 2	6.73	< 0.3	51	99	203	9.12	23	< 1	1.84	2.22	19	3040	< 1	1.72	120	0.147	12
VR13238B	0.4	6.82	4	288	2	< 2	5.16	1.8	37	102	65	7.61	22	< 1	1.25	2.70	28	1900	< 1	2.75	116	0.135	168
VR13239B	< 0.3	6.74	< 3	161	< 1	< 2	5.81	< 0.3	51	122	125	9.49	18	< 1	1.32	2.48	47	2510	< 1	1.28	130	0.109	8
VR13240B	< 0.3	0.29	< 3	16	< 1	< 2	0.03	< 0.3	< 1	10	2	0.62	< 1	< 1	0.06	0.02	8	98	< 1	0.05	4	0.002	< 3
VR13241B	< 0.3	6.73	6	209	< 1	2	8.37	< 0.3	59	106	113	9.87	23	4	0.92	1.81	15	3430	< 1	1.31	158	0.112	40
VR13242B	< 0.3	5.79	< 3	171	2	< 2	7.22	< 0.3	41	99	78	9.20	22	< 1	0.75	1.66	16	3610	< 1	2.99	92	0.136	14
VR13243B	< 0.3	5.67	< 3	202	3	< 2	6.85	< 0.3	45	102	74	9.13	14	< 1	0.93	1.69	17	3240	< 1	2.92	96	0.125	12
VR13244B	< 0.3	6.29	< 3	573	4	< 2	4.20	< 0.3	33	84	314	6.33	21	< 1	1.36	1.61	17	1550	< 1	3.19	76	0.119	14
VR13245B	< 0.3	5.74	< 3	285	1	< 2	7.02	< 0.3	47	82	83	7.14	18	< 1	0.98	1.65	18	1520	< 1	2.78	107	0.102	12
VR13246B	< 0.3	6.17	< 3	504	2	< 2	7.36	< 0.3	36	55	94	7.36	20	< 1	1.35	1.85	44	3920	< 1	3.31	83	0.196	16
VR13247B	< 0.3	4.71	< 3	754	2	< 2	7.29	< 0.3	34	194	28	7.41	21	< 1	2.98	5.36	119	3960	1	1.59	198	0.165	8
VR13248B	< 0.3	7.25	< 3	276	< 1	5	6.13	< 0.3	55	109	125	9.07	22	< 1	0.78	1.42	13	3040	< 1	2.52	137	0.137	< 3
VR13249B	< 0.3	6.44	< 3	533	2	< 2	6.04	< 0.3	39	171	97	9.14	18	< 1	2.10	3.54	41	2150	< 1	2.28	86	0.156	5
VR13250B	0.8	5.90	24	164	< 1	< 2	5.75	< 0.3	41	229	144	6.94	15	< 1	0.47	4.36	20	1100	< 1	1.81	132	0.032	19
VR13251B	< 0.3	5.99	< 3	387	2	< 2	6.62	< 0.3	32	87	114	9.17	17	< 1	1.25	2.31	31	4290	< 1	2.59	66	0.142	10
VR13252B	< 0.3	6.26	< 3	138	< 1	4	9.99	< 0.3	30	71	54	7.70	18	< 1	0.41	1.50	7	4020	< 1	1.51	49	0.139	8
VR13253B	< 0.3	6.17	< 3	205	2	< 2	6.53	< 0.3	33	73	61	9.72	18	< 1	0.69	1.83	23	3110	< 1	2.49	50	0.128	< 3

Analyte Symbol	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P	Pb
Unit Symbol	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%	ppm
Lower Limit	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001	3
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
VR13254B	< 0.3	6.57	< 3	353	2	< 2	5.01	< 0.3	38	100	70	6.70	19	< 1	1.32	1.59	35	1780	< 1	3.63	119	0.110	9
VR13255B	< 0.3	6.17	< 3	171	< 1	< 2	6.55	< 0.3	35	78	120	8.40	18	< 1	0.62	1.86	19	2900	< 1	1.87	94	0.105	12
VR13256B	< 0.3	5.24	< 3	641	4	< 2	6.82	< 0.3	42	178	703	6.85	19	< 1	2.46	5.02	73	3600	< 1	2.36	172	0.089	11
VR13257B	< 0.3	5.87	< 3	534	2	< 2	6.92	< 0.3	31	62	91	6.52	15	< 1	1.34	1.33	32	4670	< 1	3.67	91	0.111	17
VR13258B	< 0.3	6.25	< 3	799	1	< 2	5.32	< 0.3	20	78	35	4.69	16	< 1	1.90	2.53	38	888	1	2.53	36	0.137	8
VR13259B	< 0.3	5.38	< 3	187	1	3	5.46	< 0.3	56	123	507	7.58	20	< 1	0.92	2.00	24	1240	2	2.72	117	0.117	11
VR13260B	< 0.3	6.34	< 3	130	1	< 2	5.22	< 0.3	57	119	510	7.75	20	< 1	0.97	2.02	23	1120	1	2.64	116	0.108	10
VR13261B	< 0.3	6.10	< 3	217	< 1	< 2	6.26	< 0.3	37	96	65	8.43	15	< 1	1.69	4.42	45	2790	< 1	2.29	55	0.080	6
VR13262B	< 0.3	5.99	< 3	266	5	< 2	5.73	0.3	22	80	47	7.69	18	< 1	1.33	3.38	41	2090	< 1	3.23	44	0.051	5

Analyte Symbol	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Au
Unit Symbol	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Lower Limit	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	2
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FA-ICP
VR13212B	< 5	0.03	< 4	622	< 2	0.12	< 5	< 10	31	< 5	8	29	75	2
VR13213B	< 5	0.11	16	772	< 2	0.30	< 5	< 10	113	< 5	25	105	97	4
VR13214B	< 5	0.16	16	770	10	0.33	< 5	< 10	110	< 5	25	90	106	4
VR13215B	< 5	0.81	14	760	2	0.35	< 5	< 10	132	6	16	118	115	11
VR13216B	< 5	0.17	10	783	< 2	0.32	< 5	< 10	95	< 5	15	111	134	< 2
VR13217B	< 5	0.54	9	849	< 2	0.32	< 5	< 10	95	< 5	15	115	131	10
VR13218B	< 5	0.20	9	710	< 2	0.31	< 5	< 10	91	< 5	12	124	129	< 2
VR13219B	< 5	0.08	8	670	< 2	0.31	< 5	< 10	95	< 5	12	117	125	< 2
VR13220B	< 5	0.93	18	78	< 2	0.21	< 5	< 10	122	15	10	79	48	8700
VR13221B	8	0.04	9	796	< 2	0.22	< 5	< 10	81	< 5	10	70	89	< 2
VR13222B	< 5	0.07	14	724	< 2	0.29	< 5	< 10	109	< 5	15	90	89	10
VR13223B	< 5	0.46	15	637	< 2	0.32	< 5	< 10	105	< 5	14	59	111	9
VR13224B	< 5	0.17	8	841	11	0.31	< 5	< 10	73	< 5	25	84	135	< 2
VR13225B	6	0.16	13	1190	25	0.32	< 5	< 10	76	< 5	83	124	151	5
VR13226B	< 5	0.03	16	496	< 2	0.29	< 5	< 10	121	< 5	44	193	28	< 2
VR13227B	7	0.16	21	275	< 2	0.16	< 5	< 10	99	5	24	74	32	< 2
VR13228B	< 5	0.54	18	252	15	0.36	< 5	< 10	84	< 5	18	60	21	< 2
VR13229B	< 5	0.36	25	298	8	0.17	< 5	< 10	115	< 5	24	84	15	< 2
VR13230B	< 5	0.35	24	291	< 2	0.17	< 5	< 10	121	< 5	24	83	16	< 2
VR13231B	< 5	0.33	17	246	< 2	0.63	< 5	< 10	189	< 5	19	69	46	< 2
VR13232B	< 5	0.51	22	251	< 2	0.27	< 5	< 10	94	< 5	22	85	13	< 2
VR13233B	< 5	0.72	26	219	5	0.32	< 5	< 10	97	< 5	23	88	15	< 2
VR13234B	< 5	0.50	26	172	< 2	0.39	< 5	< 10	85	< 5	26	71	19	< 2
VR13235B	5	0.52	25	208	< 2	0.41	< 5	< 10	79	< 5	25	67	16	< 2
VR13236B	< 5	0.39	9	403	< 2	0.31	< 5	< 10	58	< 5	14	38	39	< 2
VR13237B	< 5	0.61	25	389	< 2	0.45	< 5	< 10	104	< 5	25	108	23	< 2
VR13238B	< 5	0.53	19	414	6	0.49	< 5	< 10	137	7	21	590	68	5
VR13239B	< 5	0.64	21	222	2	0.36	< 5	< 10	77	< 5	21	92	10	< 2
VR13240B	< 5	< 0.01	< 4	7	< 2	0.03	< 5	< 10	3	< 5	2	2	27	< 2
VR13241B	< 5	0.43	24	354	3	0.37	< 5	< 10	129	< 5	23	131	27	< 2
VR13242B	< 5	0.67	20	444	12	0.35	< 5	< 10	89	< 5	33	95	11	< 2
VR13243B	< 5	0.74	18	420	< 2	0.35	< 5	< 10	74	< 5	32	93	16	< 2
VR13244B	< 5	0.91	15	708	9	0.46	< 5	< 10	114	< 5	31	61	87	< 2
VR13245B	< 5	0.86	16	510	< 2	0.31	< 5	< 10	56	< 5	18	61	26	< 2
VR13246B	< 5	0.72	15	793	9	0.39	< 5	< 10	72	< 5	59	121	33	< 2
VR13247B	< 5	0.40	19	1340	21	0.37	< 5	< 10	127	< 5	42	208	69	< 2
VR13248B	< 5	0.66	23	388	3	0.64	< 5	< 10	135	< 5	23	73	40	2
VR13249B	< 5	0.41	23	623	10	0.67	5	< 10	176	< 5	23	84	64	< 2
VR13250B	< 5	0.41	32	83	< 2	0.25	< 5	< 10	120	< 5	16	75	26	3310
VR13251B	< 5	0.59	18	731	< 2	0.33	< 5	< 10	83	< 5	35	107	28	< 2
VR13252B	< 5	0.17	24	364	< 2	0.14	< 5	< 10	95	< 5	26	62	23	< 2
VR13253B	< 5	0.80	21	303	< 2	0.39	< 5	< 10	86	< 5	23	95	34	< 2

Analyte Symbol	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Au
Unit Symbol	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Lower Limit	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	2
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FA-ICP
VR13254B	< 5	0.36	18	407	6	0.36	< 5	< 10	77	< 5	20	64	33	2
VR13255B	< 5	0.32	18	391	< 2	0.32	< 5	< 10	106	< 5	18	74	40	< 2
VR13256B	< 5	0.32	19	786	17	0.39	< 5	< 10	128	< 5	43	193	47	13
VR13257B	< 5	0.42	12	790	14	0.41	< 5	< 10	69	< 5	39	103	25	< 2
VR13258B	< 5	0.10	16	773	7	0.32	< 5	< 10	125	< 5	15	62	76	4
VR13259B	< 5	2.48	16	562	13	0.61	< 5	< 10	198	< 5	21	94	69	7
VR13260B	< 5	2.49	19	681	12	0.61	< 5	< 10	194	< 5	22	95	69	7
VR13261B	< 5	0.18	32	412	< 2	0.22	< 5	< 10	123	< 5	29	116	14	2
VR13262B	< 5	0.58	28	372	7	0.39	< 5	< 10	169	< 5	37	103	76	< 2

Analyte Symbol	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P	Pb
Unit Symbol	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%	ppm
Lower Limit	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001	3
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
SDC-1 Meas		8.03	< 3	549	3		1.11		18	40	29	4.80	27	< 1	2.37	1.05	36	856		1.45	35	0.054	20
SDC-1 Cert		8.34	0.220	630	3.00		1.00		18.0	64.00	30.000	4.82	21.00	0.20	2.72	1.02	34	880.00		1.52	38.0	0.0690	25.00
GXR-6 Meas	< 0.3	12.8	262	> 1000	1	< 2	0.22	< 0.3	12	53	61	4.75	34	< 1	1.55	0.62	40	909	4	0.10	24	0.033	82
GXR-6 Cert	1.30	17.7	330	1300	1.40	0.290	0.180	1.00	13.8	96.0	66.0	5.58	35.0	0.0680	1.87	0.609	32.0	1010	2.40	0.104	27.0	0.0350	101
OREAS 14P Meas									712		> 10000	35.0									> 10000		
OREAS 14P Cert									750		9970	37.2									21000		
Oreas 72a (4 Acid Digest) Meas			< 3						166	192	348	9.88									7210		
Oreas 72a (4 Acid Digest) Cert			14.7						157	228	316	9.63									6930.000		
DNC-1a Meas				85					55	141	102		15				5				253		3
DNC-1a Cert				118					57	270	100		15				5.2				247		6.3
OREAS 904 (4 ACID) Meas	0.8	6.32	102	180	10	6	0.05		100	55	6710	7.05	18		2.32	0.62	17	442	2	0.04	49	0.103	18
OREAS 904 (4 ACID) Cert	0.551	6.30	98.0	194	7.86	4.05	0.0460		83.0	54.0	6120	6.68	16.7		3.31	0.556	16.7	410	2.12	0.0340	40.1	0.0980	10.6
SBC-1 Meas			19	646	3	< 2		0.3	23	78	30		26				157		2		85		29
SBC-1 Cert			25.7	788.0	3.20	0.70		0.40	22.7	109	31.0		27.0				163		2		83		35.0
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 214 Meas																							
OREAS 214 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
OREAS 218 Meas																							
OREAS 218 Cert																							
VR13219B Orig	< 0.3	6.33	< 3	966	2	< 2	2.80	< 0.3	17	46	54	5.06	20	< 1	1.10	1.80	33	919	< 1	3.00	21	0.109	13
VR13219B Dup	< 0.3	5.84	< 3	901	2	< 2	2.68	< 0.3	16	41	54	4.84	22	1	1.03	1.73	32	869	< 1	2.92	21	0.103	14
VR13221B Orig																							
VR13221B Dup																							
VR13231B Orig																							
VR13231B Dup																							
VR13241B Orig																							
VR13241B Dup																							
VR13246B Orig	< 0.3	6.19	3	505	2	< 2	7.36	< 0.3	37	52	92	7.36	17	< 1	1.34	1.84	44	3900	< 1	3.31	82	0.196	15
VR13246B Dup	< 0.3	6.16	< 3	503	2	< 2	7.37	< 0.3	35	57	96	7.36	22	< 1	1.37	1.85	45	3950	< 1	3.30	83	0.197	17
VR13256B Orig																							
VR13256B Dup																							
VR13257B Orig	< 0.3	5.85	< 3	535	2	< 2	6.93	< 0.3	31	63	88	6.54	17	< 1	1.35	1.32	32	4670	< 1	3.66	92	0.110	16
VR13257B Dup	< 0.3	5.89	< 3	533	2	< 2	6.91	< 0.3	32	61	94	6.49	13	< 1	1.34	1.33	32	4680	< 1	3.68	90	0.113	17
VR13261B Orig	< 0.3	6.10	< 3	217	< 1	< 2	6.26	< 0.3	37	96	65	8.43	15	< 1	1.69	4.42	45	2790	< 1	2.29	55	0.080	6
VR13261B Split PREP DUP	< 0.3	5.88	< 3	211	< 1	< 2	6.09	< 0.3	37	79	68	8.22	15	< 1	1.64	4.29	44	2710	< 1	2.23	54	0.073	6

Analyte Symbol	Ag	Al	As	Ba	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	K	Mg	Li	Mn	Mo	Na	Ni	P	Pb
Unit Symbol	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	ppm	ppm	%	%	ppm	ppm	ppm	%	ppm	%	ppm
Lower Limit	0.3	0.01	3	7	1	2	0.01	0.3	1	1	1	0.01	1	1	0.01	0.01	1	1	1	0.01	1	0.001	3
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP
Method Blank																							
Method Blank																							
Method Blank																							
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3
Method Blank	< 0.3	< 0.01	< 3	< 7	< 1	< 2	< 0.01	< 0.3	< 1		< 1	< 0.01	< 1	< 1	< 0.01	< 0.01	< 1		< 1	< 0.01	< 1	< 0.001	< 3

Analyte Symbol	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Au
Unit Symbol	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Lower Limit	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	2
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FA-ICP
SDC-1 Meas	< 5		15	172		0.12	< 5	< 10	37	< 5		104	25	
SDC-1 Cert	0.54		17.00	180.00		0.606	0.70	3.10	102.00	0.80		103.00	290.00	
GXR-6 Meas	< 5	0.01	21	40	< 2		< 5	< 10	146	< 5	10	115	72	
GXR-6 Cert	3.60	0.0160	27.6	35.0	0.0180		2.20	1.54	186	1.90	14.0	118	110	
OREAS 14P Meas														
OREAS 14P Cert														
Oreas 72a (4 Acid Digest) Meas		1.67												
Oreas 72a (4 Acid Digest) Cert		1.74												
DNC-1a Meas	< 5		28	123		0.27			139		15	60	32	
DNC-1a Cert	0.96		31	144		0.29			148		18.0	70	38.0	
OREAS 904 (4 ACID) Meas	< 5	0.06	12	28			< 5	< 10	80	< 5	36	26	173	
OREAS 904 (4 ACID) Cert	1.48	0.0630	11.2	27.2			0.520	8.43	76.0	2.12	31.5	26.3	171	
SBC-1 Meas	< 5		18	165		0.49	< 5	< 10	213	< 5	32	189	106	
SBC-1 Cert	1.01		20.0	178.0		0.51	0.89	5.76	220.0	1.60	36.5	186	134.0	
OREAS 214 Meas														2930
OREAS 214 Cert														3030
OREAS 214 Meas														3070
OREAS 214 Cert														3030
OREAS 218 Meas														561
OREAS 218 Cert														531
OREAS 218 Meas														516
OREAS 218 Cert														531
VR13219B Orig	< 5	0.09	9	687	< 2	0.32	< 5	< 10	96	< 5	13	119	128	
VR13219B Dup	< 5	0.08	8	653	< 2	0.31	< 5	< 10	94	7	11	114	122	
VR13221B Orig														4
VR13221B Dup														< 2
VR13231B Orig														< 2
VR13231B Dup														< 2
VR13241B Orig														< 2
VR13241B Dup														< 2
VR13246B Orig	< 5	0.73	15	782	7	0.36	< 5	< 10	68	< 5	59	121	32	
VR13246B Dup	< 5	0.71	15	803	11	0.42	< 5	< 10	76	< 5	59	120	33	
VR13256B Orig														14
VR13256B Dup														12
VR13257B Orig	< 5	0.42	12	786	9	0.41	< 5	< 10	69	< 5	39	102	24	
VR13257B Dup	< 5	0.41	13	795	20	0.41	< 5	< 10	69	< 5	40	104	26	
VR13261B Orig	< 5	0.18	32	412	< 2	0.22	< 5	< 10	123	< 5	29	116	14	2
VR13261B Split PREP DUP	< 5	0.19	31	396	< 2	0.21	< 5	< 10	111	< 5	28	115	14	2

Analyte Symbol	Sb	S	Sc	Sr	Te	Ti	Tl	U	V	W	Y	Zn	Zr	Au
Unit Symbol	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Lower Limit	5	0.01	4	1	2	0.01	5	10	2	5	1	1	5	2
Method Code	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	FA-ICP
Method Blank														< 2
Method Blank														< 2
Method Blank														< 2
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5	
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5	
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5	
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5	
Method Blank	< 5	< 0.01	< 4	< 1	< 2	< 0.01	< 5	< 10	< 2	< 5	< 1	< 1	< 5	

Appendix 3: Analytical Solutions Ltd. Certified Reference Material (CRM) Certificates

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CERTIFICATE OF ANALYSIS FOR

GOLD ORE

CERTIFIED REFERENCE MATERIAL

OREAS 215

Table 1. Certified Values, SD's, 95% Confidence and Tolerance Limits for OREAS 215

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
Fire Assay						
Au, Gold (ppm)	3.54	0.097	3.51	3.57	3.53*	3.56*
Aqua Regia Digestion						
Au, Gold (ppm)	3.41	0.129	3.36	3.46	3.39†	3.42†

*Gold Tolerance Limits for typical 30g fire assay charge weight determined from 20 x 85mg NAA results and the Sampling Constant (Ingamells & Switzer, 1973);
†Gold Tolerance Limits for typical 25g aqua regia sample weight determined as above;
Please note: intervals may appear asymmetric due to rounding.

The homogeneity of OREAS 215 is of a level such that ***no sampling error exists*** for a conventional fire assay or aqua regia determination.

INTRODUCTION

OREAS reference materials are intended to provide a low cost method of evaluating and improving the quality of analysis of geological samples. To the geologist they provide a means of implementing quality control in analytical data sets generated in exploration from the grass roots level through to prospect evaluation, and in grade control at mining operations. To the analyst they provide an effective means of calibrating analytical equipment, assessing new techniques and routinely monitoring in-house procedures.

SOURCE MATERIALS

Certified Reference Material (CRM) OREAS 215 was prepared from a blend of Archean greenstone-hosted Wilber Lode primary ore from the Andy Well Gold Mine and barren Cambrian greenstone sourced from a quarry north of Melbourne, Australia. The Wilber Lode is a shear-hosted, narrow vein, quartz lode-style gold deposit situated within the Meekatharra-Wydgee greenstone belt in the Archean Yilgarn Craton of Western Australia. The common primary mineral assemblage, as stated by Mason and Harris (2011, 2012, cited in Hingston et al, 2014), is quartz, calcite, chlorite, fuchsite, pyrite, galena, sphalerite, chalcopyrite and gold. The host rock consists of a complex sequence of Archean meta-basalt and meta-porphyritic rocks derived from a primary mineralogy of albite, actinolite, chlorite, sericite, biotite, calcite, zoisite, muscovite, quartz and titanate. The Andy Well deposit is located approximately 45km north of Meekatharra in the Murchison region of Western Australia.

The approximate major and trace element composition of OREAS 215 is provided in Table 2. The non-certified values contained in this table are the means of duplicate assays from one laboratory.

Table 2. Approximate major and trace element data for OREAS 215.

Constituent	Unit	Value	Constituent	Unit	Value	Constituent	Unit	Value
Fire Assay								
Pd	ppb	*10*	Pt	ppb	*12*			
Borate Fusion ICP								
Al	wt.%	*6.42*	Ho	ppm	*0.64*	Sn	ppm	*1.00*
Ba	ppm	*179*	K	wt.%	*0.423*	Sr	ppm	*85*
Ca	wt.%	*5.81*	La	ppm	*4.70*	Ta	ppm	*0.20*
Ce	ppm	*10.8*	Lu	ppm	*0.29*	Tb	ppm	*0.48*
Cr	ppm	*342*	Mg	wt.%	*4.39*	Th	ppm	*0.94*
Cs	ppm	*0.36*	Mn	wt.%	*0.116*	Ti	wt.%	*0.480*
Dy	ppm	*2.92*	Na	wt.%	*1.84*	Tm	ppm	*0.28*
Er	ppm	*1.81*	Nb	ppm	*3.10*	TOT_ICP	wt.%	*100.62*
Eu	ppm	*0.73*	Nd	ppm	*6.95*	U	ppm	*0.26*
Fe	wt.%	*6.86*	P	wt.%	*0.033*	V	ppm	*246*
Ga	ppm	*14.1*	Pr	ppm	*1.45*	W	ppm	*6.00*
Gd	ppm	*2.60*	Rb	ppm	*13.3*	Y	ppm	*16.6*
Ge	ppm	*< 5*	Si	wt.%	*25.43*	Yb	ppm	*1.78*
Hf	ppm	*1.55*	Sm	ppm	*1.92*	Zr	ppm	*61*
Thermogravimetry								
LOI^{1000}	wt.%	*4.77*						

Table 2 continued.

Constituent	Unit	Value	Constituent	Unit	Value	Constituent	Unit	Value
Infrared Combustion								
C	wt.%	*0.470*	S	wt.%	*0.410*			
4-Acid Digestion								
Ag	ppm	*0.650*	Li	ppm	*20.0*	Sc	ppm	*35.0*
Cd	ppm	*0.60*	Mo	ppm	*< 1*	Zn	ppm	*81*
Co	ppm	*40.0*	Ni	ppm	*141*			
Cu	ppm	*145*	Pb	ppm	*16.5*			
Aqua Regia Digestion								
As	ppm	*32.8*	In	ppm	*0.023*	Se	ppm	*0.80*
Bi	ppm	*0.33*	Re	ppm	*0.002*	Te	ppm	*0.17*
Hg	ppm	*0.074*	Sb	ppm	*0.32*	Tl	ppm	*0.060*

COMMINUTION AND HOMOGENISATION PROCEDURES

The material constituting OREAS 215 was prepared in the following manner:

- drying to constant mass at 105°C;
- crushing and milling of the barren material to 95% minus 75 microns;
- crushing and milling of the ore material to 100% minus 30 microns;
- blending in appropriate proportions to achieve the desired grade;
- packaging in 60 and 100g units sealed in laminated foil pouches and 1kg units in plastic jars.

ANALYTICAL PROGRAM

Thirty-three commercial analytical laboratories participated in the program to certify gold (as reported in Table 1) by the following methods:

- Gold via 25-40g fire assay with AAS (25 labs) or ICP-OES (7 labs) finish;
- Instrumental neutron activation analysis for Au on 20 x 85mg subsamples to confirm homogeneity (1 laboratory).
- Gold via 15-50g aqua regia digestion with ICP-MS (11 labs), AAS (7 labs) or ICP-OES (1 lab) finish.

For the round robin program, twenty 1.4kg test units were taken at predetermined intervals during the bagging stage, immediately following homogenisation and are considered representative of the entire batch. The six samples received by each laboratory were obtained by taking two 120g scoop splits from each of three separate 1.4kg test units. This format enabled a nested Analysis of Variance (ANOVA) treatment of the results to evaluate homogeneity, i.e. to ascertain whether between-unit variance is greater than within-unit variance. Table 1 presents the certified values together with their associated 1SD's, 95% confidence and tolerance limits. Table 2 provides indicative major and trace element data and Table 3 shows the gold neutron activation analysis (NAA) results for twenty 85mg subsamples determined by the Australian Nuclear Science & Technology Organisation (ANSTO) located in Lucas Heights, NSW, Australia. Table 4 provides

performance gate intervals for the certified values of each method group based on their pooled 1SD's. Tabulated results of all elements (including Au NAA analyses) together with uncorrected means, medians, standard deviations, relative standard deviations and percent deviation of lab means from the corrected mean of means (PDM[3]) are presented in the detailed certification data for this CRM (**OREAS 215 Datapack.xlsx**).

Table 3. Neutron Activation Analysis of Au on 20 x 85mg subsamples.

Replicate No	NAA 0.09g
1	3.63
2	3.70
3	3.58
4	3.57
5	3.55
6	3.53
7	3.71
8	3.80
9	3.69
10	3.72
11	3.75
12	3.65
13	3.62
14	3.66
15	3.63
16	3.70
17	3.72
18	3.66
19	3.51
20	3.58
Mean	3.65
Median	3.66
Std Dev.	0.078
Rel.Std.Dev.	2.13%
PDM[3]	2.95%

STATISTICAL ANALYSIS

Certified Values, Confidence Limits, Standard Deviations and Tolerance Limits (Table 1) have been determined for gold by two methods: fire assay and aqua regia digestion. These statistics were calculated following the removal of individual, laboratory dataset (batch) and 3SD outliers (single iteration). For individual outliers within a laboratory batch the z-score test is used in combination with a second method that determines the per cent deviation of the individual value from the batch median. Outliers in general are selected on the basis of z-scores > 2.5 and with per cent deviations (i) > 3 and (ii) more than three times the average absolute per cent deviation for the batch. In certain instances statistician's prerogative has been employed in discriminating outliers. Each laboratory data set mean is tested for outlying status based on z-score discrimination and rejected if > 2.5. After individual and laboratory data set (batch) outliers have been eliminated a non-iterative 3 standard deviation filter is applied, with those values lying outside this window also relegated to outlying status.

Certified Values are the means of accepted laboratory means after outlier filtering. The NAA data is omitted from determination of the certified value for gold and is used solely for the calculation of Tolerance Limits and homogeneity evaluation of OREAS 215.

95% Confidence Limits are inversely proportional to the number of participating laboratories and inter-laboratory agreement. It is a measure of the reliability of the certified value. A 95% confidence interval indicates a 95% probability that the true value of the analyte under consideration lies between the upper and lower limits. *95% Confidence Limits should not be used as control limits for laboratory performance.*

Standard Deviation values (1SDs) are reported in Table 1 and provide an indication of a level of performance that might reasonably be expected from a laboratory being monitored by this CRM in a QA/QC program. The SD's take into account errors attributable to measurement uncertainty and CRM variability. For an effective CRM the contribution of the latter should be negligible in comparison to measurement errors. The SD values thus include all sources of measurement uncertainty: between-lab variance, within-run variance (precision errors) and CRM variability. OREAS prepared reference materials have a level of homogeneity such that the observed variance from repeated analysis has its origin almost exclusively in the analytical process rather than the reference material itself.

The SD for each analyte's certified value is calculated from the same filtered data set used to determine the certified value, i.e. after removal of any individual, lab dataset (batch) and 3SD outliers (single iteration). These outliers can only be removed after the absolute homogeneity of the CRM has been independently established, i.e. the outliers must be confidently deemed to be analytical rather than arising from inhomogeneity of the CRM. **The standard deviation is then calculated for each analyte from the pooled accepted analyses generated from the certification program.**

In the application of SD's in monitoring performance it is important to note that not all laboratories function at the same level of proficiency and that different methods in use at a particular laboratory have differing levels of precision. Each laboratory has its own inherent SD (for a specific concentration level and analyte-method pair) based on the analytical process and this SD is not directly related to the round robin program.

The majority of data generated in the round robin program was produced by a selection of world class laboratories. The SD's thus generated are more constrained than those that would be produced across a randomly selected group of laboratories. To produce more generally achievable SD's the 'pooled' SD's provided in this report include inter-lab bias. This 'one size fits all' approach may require revision at the discretion of the QC manager concerned following careful scrutiny of QC control charts.

Table 4 shows **Performance Gates** calculated for two and three standard deviations. As a guide these intervals may be regarded as warning or rejection for multiple 2SD outliers, or rejection for individual 3SD outliers in QC monitoring, although their precise application should be at the discretion of the QC manager concerned. A second method utilises a 5% window calculated directly from the certified value. Standard deviation is also shown in relative percent for one, two and three relative standard deviations (1RSD, 2RSD and 3RSD) to facilitate an appreciation of the magnitude of these numbers and a comparison with the 5% window. Caution should be exercised when concentration levels approach lower limits of detection of the analytical methods employed as performance gates calculated from standard deviations tend to be excessively wide whereas those determined by the 5% method are too narrow.

Table 4. Performance Gates for OREAS 215.

Constituent	Certified Value	Absolute Standard Deviations					Relative Standard Deviations			5% window	
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD	Low	High
Fire Assay											
Au, ppm	3.54	0.097	3.35	3.74	3.25	3.83	2.72%	5.45%	8.17%	3.37	3.72
Aqua Regia Digestion											
Au, ppm	3.41	0.129	3.15	3.67	3.02	3.80	3.79%	7.58%	11.37%	3.24	3.58

Tolerance Limits (ISO Guide 3207) were determined by NAA using the reduced analytical subsample method which utilises the known relationship between standard deviation and analytical subsample weight (Ingamells and Switzer, 1973). In this approach the sample aliquot is substantially reduced to a point where most of the variability in replicate assays should be due to inhomogeneity of the reference material and measurement error becomes negligible. In this instance a subsample weight of 85 milligrams was employed and the 1RSD (across the twenty subsamples) of 2.13%, or 0.11% at a conventional 30g fire assay charge weight, confirms the exceptional level of gold homogeneity in OREAS 215. The homogeneity is of a level such that ***no sampling error exists*** for a conventional fire assay or aqua regia determination.

The meaning of tolerance limits may be illustrated for gold by fire assay, where 99% of the time (1-α=0.99) at least 95% of subsamples (ρ=0.95) will have concentrations lying between 3.53 and 3.56ppm. Put more precisely, this means that if the same number of subsamples were taken and analysed in the same manner repeatedly, 99% of the tolerance intervals so constructed would cover at least 95% of the total population, and 1% of the tolerance intervals would cover less than 95% of the total population (ISO Guide 35).

The homogeneity of OREAS 215 has also been evaluated in a **nested ANOVA** of the round robin program. Each of the thirty-three round robin laboratories received six samples per CRM and these samples were made up of paired samples from three different, non-adjacent sampling intervals. The purpose of the ANOVA evaluation is to test that no statistically significant difference exists in the variance between-units to that of the variance within-units. This allows an assessment of homogeneity across the entire prepared batch of OREAS 215. The test was performed using the following parameters:

- Gold Fire Assay – 192 samples (32 laboratories each providing analyses on 3 pairs of samples);
- Aqua Regia Digestion – 114 samples (19 laboratories each providing analyses on 3 pairs of samples);
- Significance Level α = P (type I error) = 0.05;
- Null Hypothesis, H_0: Between-unit variance is no greater than within-unit variance (reject H_0 if *p*-value < 0.05);
- Alternative Hypothesis, H_1: Between-unit variance is greater than within-unit variance.

P-values are a measure of probability where values less than 0.05 indicate a greater than 95% probability that the observed differences in within-unit and between-unit variances are real. The dataset was filtered for both individual and laboratory data set (batch) outliers prior to the calculation of the *p*-value. This process derived *p*-values of 0.97 for Au by fire assay

and 0.99 for Au by aqua regia digestion. Both p-values are insignificant and the Null Hypothesis is retained.

It is important to note that ANOVA is not an absolute measure of homogeneity. Rather, it establishes whether or not the analytes are distributed in a similar manner throughout the packaging run of OREAS 215 and whether the variance between two subsamples from the same unit is statistically distinguishable to the variance from two subsamples taken from any two separate units. A reference material therefore, can possess poor absolute homogeneity yet still pass a relative homogeneity test if the within-unit heterogeneity is large and similar across all units.

Based on the statistical analysis of the results of the inter-laboratory certification program it can be concluded that OREAS 215 is fit-for-purpose as a certified reference material (see 'Intended Use' below).

PARTICIPATING LABORATORIES

1. Actlabs, Ancaster, Ontario, Canada
2. ALS, Brisbane, QLD, Australia
3. ALS, Johannesburg, South Africa
4. ALS, Lima, Peru
5. ALS, Loughrea, Galway, Ireland
6. ALS, Perth, WA, Australia
7. ALS, Reno, Nevada, USA
8. ALS, Vancouver, BC, Canada
9. American Assay Laboratories, Sparks, Nevada, USA
10. ANSTO, Lucas Heights, NSW, Australia
11. Bureau Veritas Commodities Canada Ltd, Vancouver, BC, Canada
12. Bureau Veritas Geoanalytical, Adelaide, SA, Australia
13. Bureau Veritas Geoanalytical, Perth, WA, Australia
14. Bureau Veritas Minerals, Santiago, Chile
15. Inspectorate America Corporation (BV), Sparks, Nevada, USA
16. Inspectorate de Mexico (BV), S.A. de C.V., Hermosillo, Sonora, Mexico
17. Intertek Genalysis, Adelaide, SA, Australia
18. Intertek Genalysis, Perth, WA, Australia
19. Intertek Testing Services, Cupang, Muntinlupa, Philippines
20. Intertek Testing Services, Hidden Valley, Wau, PNG
21. Intertek Testing Services, Shunyi, Beijing, China
22. McClelland Laboratories Inc., Sparks, Nevada, USA
23. Ok Tedi Mine Lab, Mt Fubilan, Western Province, PNG
24. PT Geoservices Ltd, Cikarang, Jakarta Raya, Indonesia
25. PT Intertek Utama Services, Jakarta Timur, DKI Jakarta, Indonesia
26. SGS Australia Mineral Services, Perth (Newburn), WA, Australia
27. SGS Canada Inc., Vancouver, BC, Canada
28. SGS del Peru, Lima, Peru
29. SGS Geosol Laboratorios Ltda, Vespasiano, Minas Gerais, Brazil
30. SGS Lakefield Research Ltd, Lakefield, Ontario, Canada
31. SGS Mineral Services, Townsville, QLD, Australia
32. SGS South Africa Pty Ltd, Booysens, Gauteng, South Africa
33. Skyline, Sparks, Nevada, USA
34. TSL Laboratories Inc., Saskatoon, Saskatchewan, Canada

PREPARER AND SUPPLIER OF THE REFERENCE MATERIAL

Reference material OREAS 215 has been prepared, certified and is supplied by:

ORE Research & Exploration Pty Ltd
37A Hosie Street
Bayswater North VIC 3153
AUSTRALIA

Tel: +613-9729 0333
Fax: +613-9729 8338
Web: www.ore.com.au
Email: info@ore.com.au

It is available in unit sizes of 60 and 100g (single-use laminated foil pouches) and 1kg (plastic jars).

INTENDED USE

OREAS 215 is intended for the following uses:

- for the monitoring of laboratory performance in the analysis of gold by fire assay and aqua regia digestion in geological samples;
- for the verification of gold fire assay and aqua regia digestion methods;
- for the calibration of instruments used in the determination of gold.

STABILITY AND STORAGE INSTRUCTIONS

OREAS 215 has been prepared from primary gold ore diluted with barren greenstone. It is low in reactive sulphide (~0.4 wt.%) and in its unopened state and under normal conditions of storage has a shelf life beyond ten years. Its stability will be monitored at regular intervals and purchasers notified if any changes are observed.

INSTRUCTIONS FOR CORRECT USE

The certified values for OREAS 215 refer to the concentration level in its packaged state. It should not be dried prior to weighing and analysis.

HANDLING INSTRUCTIONS

Fine powders pose a risk to eyes and lungs and therefore standard precautions such as the use of safety glasses and dust masks are advised.

TRACEABILITY

The analytical samples were selected in a manner to represent the entire batch of prepared CRM. This ‘representivity’ was maintained in each submitted laboratory sample batch and ensures the user that the data is traceable from sample selection through to the analytical results that underlie the consensus values. Each analytical data set has been validated by its assayer through the inclusion of internal reference materials and QC checks during analysis. The laboratories were chosen on the basis of their competence

(from past performance in inter-laboratory programs) for a particular analytical method, analyte or analyte suite, and sample matrix. Most of these laboratories have and maintain ISO 17025 accreditation. The certified values presented in this report are calculated from the means of accepted data following robust statistical treatment as detailed in this report.

LEGAL NOTICE

Ore Research & Exploration Pty Ltd has prepared and statistically evaluated the property values of this reference material to the best of its ability. The Purchaser by receipt hereof releases and indemnifies Ore Research & Exploration Pty Ltd from and against all liability and costs arising from the use of this material and information.

QMS ACCREDITED

ORE Pty Ltd is accredited to ISO 9001:2008 by Lloyd's Register Quality Assurance Ltd for its quality management system including development, manufacturing, certification and supply of CRMs.

CERTIFYING OFFICER

Craig Hamlyn (B.Sc. Hons - Geology), Technical Manager - ORE P/L

REFERENCES

Ingamells, C. O. and Switzer, P. (1973), Talanta 20, 547-568.
ISO Guide 30 (1992), Terms and definitions used in connection with reference materials.
ISO Guide 31 (2000), Reference materials – Contents of certificates and labels.
ISO Guide 3207 (1975), Statistical interpretation of data - Determination of a statistical tolerance interval.
ISO Guide 35 (2006), Certification of reference materials - General and statistical principals.

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OREAS
Certified Reference Materials

CERTIFICATE OF ANALYSIS FOR

GOLD ORE

CERTIFIED REFERENCE MATERIAL

OREAS 218

Table 1. Certified Values, SD's, 95% Confidence and Tolerance Limits for OREAS 218.

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
Pb Fire Assay						
Au, Gold (ppm)	0.531	0.017	0.526	0.536	0.508*	0.554*
Aqua Regia Digestion						
Au, Gold (ppm)	0.524	0.020	0.516	0.532	0.499†	0.549†
Gas / Liquid Pycnometry						
SG, Specific Gravity (Unity)	3.01	0.059	2.98	3.04	2.98	3.04

*Gold Tolerance Limits for typical 30g fire assay charge weight determined from 20 x 1g INAA results and the Sampling Constant (Ingamells & Switzer, 1973);
†Gold Tolerance Limits for typical 25g aqua regia sample weight determined as above;
Please note: intervals may appear asymmetric due to rounding.

The homogeneity of OREAS 218 is of a level such that ***sampling error is minor*** for a conventional fire assay or aqua regia determination.

INTRODUCTION

OREAS reference materials are intended to provide a low cost method of evaluating and improving the quality of analysis of geological samples. To the geologist they provide a means of implementing quality control in analytical data sets generated in exploration from the grass roots level through to prospect evaluation, and in grade control at mining operations. To the analyst they provide an effective means of calibrating analytical equipment, assessing new techniques and routinely monitoring in-house procedures.

SOURCE MATERIALS

Certified Reference Material (CRM) OREAS 218 was prepared from a blend of Archean greenstone-hosted Wilber Lode primary ore from the Andy Well Gold Mine and barren Cambrian greenstone sourced from a quarry north of Melbourne, Australia. The Wilber Lode is a shear-hosted, narrow vein, quartz lode-style gold deposit situated within the Meekatharra-Wydgee greenstone belt in the Archean Yilgarn Craton of Western Australia. The common primary mineral assemblage, as stated by Mason and Harris (2011, 2012, cited in Hingston et al, 2014), is quartz, calcite, chlorite, fuchsite, pyrite, galena, sphalerite, chalcopyrite and gold. The host rock consists of a complex sequence of Archean meta-basalt and meta-porphyritic rocks derived from a primary mineralogy of albite, actinolite, chlorite, sericite, biotite, calcite, zoisite, muscovite, quartz and titanate. The Andy Well deposit is located approximately 45km north of Meekatharra in the Murchison region of Western Australia.

The approximate major and trace element composition of OREAS 218 is provided in Table 2. The non-certified values contained in this table are the means of duplicate assays from one laboratory.

COMMINUTION AND HOMOGENISATION PROCEDURES

The material constituting OREAS 218 was prepared in the following manner:

- drying to constant mass at 105°C;
- crushing and milling of the barren material to 98% minus 75 microns;
- crushing and milling of the ore material to 100% minus 30 microns;
- blending in appropriate proportions to achieve the desired grade;
- packaging in 60g units sealed in laminated foil pouches and 1kg units in plastic jars.

ANALYTICAL PROGRAM

Thirty commercial analytical laboratories participated in the program to certify gold (as reported in Table 1) by the following methods:

- Gold via 10-50g fire assay with AAS (24 labs) or ICP-OES (6 labs) finish;
- Instrumental neutron activation analysis for Au on 20 x 1g subsamples to confirm homogeneity (1 laboratory).
- Gold via 15-50g aqua regia digestion with ICP-MS (12 labs), AAS (8 labs) or ICP-OES (1 lab) finish. It is important to note that in the analytical industry there is no

standardisation of the aqua regia digestion process. Aqua regia is a partial empirical digest and differences in recoveries for various analytes are commonplace. These are caused by variations in the digest conditions which can include the ratio of nitric to hydrochloric acids, acid strength, temperatures, leach times and secondary digestions.

- Specific gravity by gas (15 labs) or liquid (4 labs) pycnometry.

For the round robin program twenty 1.5kg test units were taken at predetermined intervals during the bagging stage, immediately following final blending, and are considered representative of the entire batch. The six samples received by each laboratory were obtained by taking two 110g scoop splits from each of three separate 1kg test units. This format enabled nested ANOVA treatment of the results to evaluate homogeneity, i.e. to ascertain whether between-unit variance is greater than within-unit variance. Table 1 presents the certified values together with their associated 1SD's, 95% confidence and tolerance limits and Table 2 shows 66 indicative values for major and trace element composition. Gold homogeneity has been evaluated and confirmed by instrumental neutron activation analysis (INAA) on twenty 1 gram sample portions (see Table 3 below) and by a nested ANOVA program for both fire assay and aqua regia digestion (see '**nested ANOVA**' section). Table 4 provides performance gate intervals for the certified values based on their pooled 1SD's. Tabulated results of all elements (including Au INAA analyses) together with uncorrected means, medians, standard deviations, relative standard deviations and percent deviation of lab means from the corrected mean of means (PDM[3]) are presented in the detailed certification data for this CRM (**OREAS 218 DataPack.xlsx**).

Table 2. Approximate major and trace element data for OREAS 218.

Constituent	Unit	Value	Constituent	Unit	Value	Constituent	Unit	Value
Pb Fire Assay								
Pd	ppb	*8.33*	Pt	ppb	*10.0*			
Borate Fusion XRF								
Al_2O_3	wt.%	*13.50*	K_2O	wt.%	*0.233*	P_2O_5	wt.%	*0.103*
CaO	wt.%	*10.10*	MgO	wt.%	*7.10*	S	wt.%	*0.144*
Cl	ppm	*10.0*	MnO	wt.%	*0.190*	SiO_2	wt.%	*49.20*
Fe_2O_3	wt.%	*12.05*	Na_2O	wt.%	*2.90*	TiO_2	wt.%	*1.12*
Thermogravimetry								
LOI^{1000}	wt.%	*3.16*						
Laser Ablation								
Ag	ppm	*0.150*	Hf	ppm	*1.67*	Sm	ppm	*2.60*
As	ppm	*4.60*	Ho	ppm	*0.83*	Sn	ppm	*1.20*
Ba	ppm	*144*	In	ppm	*0.038*	Sr	ppm	*113*
Be	ppm	*0.40*	La	ppm	*3.74*	Ta	ppm	*0.18*
Bi	ppm	*0.060*	Lu	ppm	*0.36*	Tb	ppm	*0.57*
Cd	ppm	*0.10*	Mn	wt.%	*0.147*	Te	ppm	*< 0.2*
Ce	ppm	*9.72*	Mo	ppm	*1.00*	Th	ppm	*0.34*
Co	ppm	*48.3*	Nb	ppm	*3.36*	Ti	wt.%	*0.640*
Cr	ppm	*203*	Nd	ppm	*7.64*	Tl	ppm	*< 0.2*
Cs	ppm	*0.18*	Ni	ppm	*99*	Tm	ppm	*0.33*

Note: the number of significant figures reported is not a reflection of the level of certainty of stated values. They are instead an artefact of ORE's in-house CRM-specific LIMS.

Table 2 continued.

Constituent	Unit	Value	Constituent	Unit	Value	Constituent	Unit	Value
Laser Ablation continued								
Cu	ppm	*152*	Pb	ppm	*2.50*	U	ppm	*0.013*
Dy	ppm	*3.92*	Pr	ppm	*1.53*	V	ppm	*304*
Er	ppm	*2.38*	Rb	ppm	*3.68*	W	ppm	*1.13*
Eu	ppm	*0.99*	Re	ppm	*0.008*	Y	ppm	*21.7*
Ga	ppm	*14.9*	Sb	ppm	*0.45*	Yb	ppm	*2.48*
Gd	ppm	*2.84*	Sc	ppm	*42.0*	Zn	ppm	*85*
Ge	ppm	*1.45*	Se	ppm	*< 5*	Zr	ppm	*60*

Note: the number of significant figures reported is not a reflection of the level of certainty of stated values. They are instead an artefact of ORE's in-house CRM-specific LIMS.

STATISTICAL ANALYSIS

Certified Values, Confidence Limits, Standard Deviations and Tolerance Limits (Table 1) have been determined for each analyte following removal of individual, laboratory dataset (batch) and 3SD outliers (single iteration). For individual outliers within a laboratory batch the z-score test is used in combination with a second method that determines the per cent deviation of the individual value from the batch median. Outliers in general are selected on the basis of z-scores > 2.5 and with per cent deviations (i) > 3 and (ii) more than three times the average absolute per cent deviation for the batch. In certain instances statistician's prerogative has been employed in discriminating outliers. Each laboratory data set mean is tested for outlying status based on z-score discrimination and rejected if > 2.5. After individual and laboratory data set (batch) outliers have been eliminated a non-iterative 3 standard deviation filter is applied, with those values lying outside this window also relegated to outlying status.

Certified Values are the means of accepted laboratory means after outlier filtering. The INAA data (see Table 3) is omitted from determination of the certified value for Au and is used solely for the calculation of Tolerance Limits and homogeneity evaluation of OREAS 218.

95% Confidence Limits are inversely proportional to the number of participating laboratories and inter-laboratory agreement. It is a measure of the reliability of the certified value. A 95% confidence interval indicates a 95% probability that the true value of the analyte under consideration lies between the upper and lower limits. *95% Confidence Limits should not be used as control limits for laboratory performance.*

Indicative (uncertified) values (Table 2) are provided for the major and trace elements determined by borate fusion XRF (Al_2O_3 to TiO_2) and laser ablation with ICP-MS (Ag to Zr) and are the means of duplicate assays from Bureau Veritas, Perth. Additional indicative values by other analytical methods are present where the number of laboratories reporting a particular analyte is insufficient (< 5) to support certification or where inter-laboratory consensus is poor.

Standard Deviation values (1SDs) are reported in Table 1 and provide an indication of a level of performance that might reasonably be expected from a laboratory being monitored by this CRM in a QA/QC program. The SD's take into account errors attributable to measurement uncertainty and CRM variability. For an effective CRM the contribution of

the latter should be negligible in comparison to measurement errors. The SD values thus include all sources of measurement uncertainty: between-lab variance, within-run variance (precision errors) and CRM variability. OREAS prepared reference materials have a level of homogeneity such that the observed variance from repeated analysis has its origin almost exclusively in the analytical process rather than the reference material itself.

The SD for each analyte's certified value is calculated from the same filtered data set used to determine the certified value, i.e. after removal of any individual, lab dataset (batch) and 3SD outliers (single iteration). These outliers can only be removed after the absolute homogeneity of the CRM has been independently established, i.e. the outliers must be confidently deemed to be analytical rather than arising from inhomogeneity of the CRM. **The standard deviation is then calculated for each analyte from the pooled accepted analyses generated from the certification program.**

In the application of SD's in monitoring performance it is important to note that not all laboratories function at the same level of proficiency and that different methods in use at a particular laboratory have differing levels of precision. Each laboratory has its own inherent SD (for a specific concentration level and analyte-method pair) based on the analytical process and this SD is not directly related to the round robin program.

The majority of data generated in the round robin program was produced by a selection of world class laboratories. The SD's thus generated are more constrained than those that would be produced across a randomly selected group of laboratories. To produce more generally achievable SD's the 'pooled' SD's provided in this report include inter-lab bias. This 'one size fits all' approach may require revision at the discretion of the QC manager concerned following careful scrutiny of QC control charts.

Table 4 shows **Performance Gates** calculated for two and three standard deviations. As a guide these intervals may be regarded as warning or rejection for multiple 2SD outliers, or rejection for individual 3SD outliers in QC monitoring, although their precise application should be at the discretion of the QC manager concerned. A second method utilises a 5% window calculated directly from the certified value. Standard deviation is also shown in relative percent for one, two and three relative standard deviations (1RSD, 2RSD and 3RSD) to facilitate an appreciation of the magnitude of these numbers and a comparison with the 5% window. Caution should be exercised when concentration levels approach lower limits of detection of the analytical methods employed as performance gates calculated from standard deviations tend to be excessively wide whereas those determined by the 5% method are too narrow.

Tolerance Limits (ISO Guide 3207) were determined by INAA using the reduced analytical subsample method that utilises the known relationship between standard deviation and analytical subsample weight (Ingamells and Switzer, 1973). In this approach the sample aliquot is substantially reduced to a point where most of the variability in replicate assays should be due to inhomogeneity of the reference material (a sampling error is thereby induced) and measurement error becomes negligible.

In this instance a subsample weight of 1 gram was employed and the 1RSD of 1.35% calculated for a 30g fire assay or aqua regia sample (7.22% at 1g weight) confirms the high level of gold homogeneity in OREAS 218. The homogeneity is of a level such that ***sampling error is minor*** for a conventional fire assay or aqua regia determination.

Please note that these RSD's and tolerance limits pertain to the homogeneity of the CRM only and should not be used as control limits for laboratory performance.

Table 3. Instrumental Neutron Activation Analysis of Au (ppm) on 20 x 1g subsamples.

Replicate No	INAA 1g
1	0.489
2	0.545
3	0.522
4	0.465
5	0.506
6	0.506
7	0.536
8	0.541
9	0.534
10	0.475
11	0.516
12	0.468
13	0.566
14	0.506
15	0.588
16	0.579
17	0.542
18	0.521
19	0.503
20	0.598
Mean	0.525
Median	0.522
Std Dev.	0.038
Rel.Std.Dev.	7.22%
PDM[3]	-1.10%

The meaning of tolerance limits may be illustrated for gold by fire assay, where 99% of the time (1-α=0.99) at least 95% of subsamples (ρ=0.95) will have concentrations lying between 0.508 and 0.554ppm. Put more precisely, this means that if the same number of subsamples were taken and analysed in the same manner repeatedly, 99% of the tolerance intervals so constructed would cover at least 95% of the total population, and 1% of the tolerance intervals would cover less than 95% of the total population (ISO Guide 35).

The gold homogeneity of OREAS 218 has also been evaluated in a **nested ANOVA** of the round robin program. Each of the thirty round robin laboratories received six samples per CRM and these samples were made up of paired samples from three different, non-adjacent sampling intervals. The purpose of the ANOVA evaluation is to test that no statistically significant difference exists in the variance between-units to that of the variance within-units. This allows an assessment of homogeneity across the entire prepared batch of OREAS 218. The test was performed using the following parameters:

- Gold fire assay – 174 samples (29 laboratories each providing analyses on 3 pairs of samples);
- Gold aqua regia digestion – 126 samples (21 laboratories each providing analyses on 3 pairs of samples);

- Null Hypothesis, H_0: Between-unit variance is no greater than within-unit variance (reject H_0 if *p*-value < 0.05);
- Alternative Hypothesis, H_1: Between-unit variance is greater than within-unit variance.

P-values are a measure of probability where values less than 0.05 indicate a greater than 95% probability that the observed differences in within-unit and between-unit variances are real. The dataset was filtered for both individual and laboratory data set (batch) outliers prior to the calculation of the *p*-value. This process derived *p*-values of 1.00 for Au by fire assay and 0.99 for Au by aqua regia digestion. Both p-values are insignificant and the Null Hypothesis is retained.

It is important to note that ANOVA is not an absolute measure of homogeneity. Rather, it establishes whether or not the analytes are distributed in a similar manner throughout the packaging run of OREAS 218 and whether the variance between two subsamples from the same unit is statistically distinguishable to the variance from two subsamples taken from any two separate units. A reference material therefore, can possess poor absolute homogeneity yet still pass a relative homogeneity test if the within-unit heterogeneity is large and similar across all units.

Based on the statistical analysis of the results of the inter-laboratory certification program it can be concluded that OREAS 218 is fit-for-purpose as a certified reference material (see 'Intended Use' below).

Table 4. Performance Gates for OREAS 218.

Constituent	Certified Value	Absolute Standard Deviations					Relative Standard Deviations			5% window	
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD	Low	High
Pb Fire Assay											
Au, ppm	0.531	0.017	0.497	0.565	0.480	0.582	3.21%	6.41%	9.62%	0.505	0.558
Aqua Regia Digestion											
Au, ppm	0.524	0.020	0.484	0.564	0.464	0.584	3.85%	7.69%	11.54%	0.498	0.550
Gas / Liquid Pycnometry											
SG, Unity	3.01	0.059	2.89	3.13	2.83	3.19	1.96%	3.93%	5.89%	2.86	3.16

PARTICIPATING LABORATORIES

1. Actlabs, Ancaster, Ontario, Canada
2. Actlabs, Coquimbo, Curarta, Chile
3. ALS, Brisbane, QLD, Australia
4. ALS, Lima, Peru
5. ALS, Loughrea, Galway, Ireland
6. ALS, Perth, WA, Australia
7. ALS, Vancouver, BC, Canada
8. American Assay Laboratories, Sparks, Nevada, USA
9. Bureau Veritas Commodities Canada Ltd, Vancouver, BC, Canada

10. Bureau Veritas Geoanalytical, Adelaide, SA, Australia
11. Bureau Veritas Geoanalytical, Perth, WA, Australia
12. Bureau Veritas Kalassay, Kalgoorlie, WA, Australia
13. Bureau Veritas Minerals, Hermosillo, Sonora, Mexico
14. Bureau Veritas, Abidjan, Cote D'ivoire
15. Intertek Genalysis, Perth, WA, Australia
16. Intertek Testing Services, Cupang, Muntinlupa, Philippines
17. Kinross Brasil Mineração, Paracatu, Minas Gerais, Brazil
18. McClelland Laboratories Inc., Sparks, Nevada, USA
19. MinAnalytical Services, Perth, WA, Australia
20. Nagrom, Perth, WA, Australia
21. Newcrest Laboratory Services, Orange, NSW, Australia
22. PT Geoservices Ltd, Cikarang, Jakarta Raya, Indonesia
23. PT Intertek Utama Services, Jakarta Timur, DKI Jakarta, Indonesia
24. SGS Australia Mineral Services, Perth, WA, Australia
25. SGS del Peru, Lima, Peru
26. SGS Lakefield Research Ltd, Lakefield, Ontario, Canada
27. SGS Mineral Services, Townsville, QLD, Australia
28. SGS, Randfontein, Gauteng, South Africa
29. Shiva Analyticals Ltd, Bangalore North, Karnataka, India
30. Sucofindo Mineral Lab, Cibitung, West Java, Indonesia

PREPARER AND SUPPLIER

Certified reference material OREAS 218 is prepared, certified and supplied by:

ORE RESEARCH & EXPLORATION

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It is available in unit sizes of 60 and 100g (single-use laminated foil pouches) and 1kg (plastic jars).

INTENDED USE

OREAS 218 is intended for the following uses:

- for the monitoring of laboratory performance in the analysis of gold by fire assay, gold by aqua regia digestion and specific gravity by pycnometry in geological samples;
- for the verification of analytical methods (gold fire assay, gold aqua regia digestion and specific gravity by pycnometry);
- for the calibration of instruments used in the determination of gold or specific gravity.

STABILITY AND STORAGE INSTRUCTIONS

OREAS 218 has been prepared from primary gold ore diluted with barren greenstone. It is low in reactive sulphide (~0.14 wt.% S) and in its unopened state and under normal conditions of storage has a shelf life beyond ten years. Its stability will be monitored at regular intervals and purchasers notified if any changes are observed.

INSTRUCTIONS FOR CORRECT USE

The certified values for OREAS 218 refer to the concentration level in its packaged state. It should not be dried prior to weighing and analysis.

HANDLING INSTRUCTIONS

Fine powders pose a risk to eyes and lungs and therefore standard precautions such as the use of safety glasses and dust masks are advised.

TRACEABILITY

The analytical samples were selected in a manner to represent the entire batch of prepared CRM. This 'representivity' was maintained in each submitted laboratory sample batch and ensures the user that the data is traceable from sample selection through to the analytical results that underlie the consensus values. Each analytical data set has been validated by its assayer through the inclusion of internal reference materials and QC checks during analysis. The laboratories were chosen on the basis of their competence (from past performance in inter-laboratory programs) for a particular analytical method, analyte or analyte suite, and sample matrix. Most of these laboratories have and maintain ISO 17025 accreditation. The certified values presented in this report are calculated from the means of accepted data following robust statistical treatment as detailed in this report.

LEGAL NOTICE

Ore Research & Exploration Pty Ltd has prepared and statistically evaluated the property values of this reference material to the best of its ability. The Purchaser by receipt hereof releases and indemnifies Ore Research & Exploration Pty Ltd from and against all liability and costs arising from the use of this material and information.

QMS ACCREDITED

ORE Pty Ltd is accredited to ISO 9001:2008 by Lloyd's Register Quality Assurance Ltd for its quality management system including development, manufacturing, certification and supply of CRMs.

CERTIFYING OFFICER

Craig Hamlyn (B.Sc. Hons - Geology), Technical Manager - ORE P/L

REFERENCES

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OREAS
Certified Reference Materials

CERTIFICATE OF ANALYSIS FOR

GOLD ORE

CERTIFIED REFERENCE MATERIAL

OREAS 228

Table 1. Certified Values, SD's, 95% Confidence and Tolerance Limits for OREAS 228.

Constituent	Certified Value	1SD	95% Confidence Limits		95% Tolerance Limits	
			Low	High	Low	High
Pb Fire Assay						
Au, Gold (ppm)	8.73	0.279	8.63	8.83	8.62	8.84
Aqua Regia Digestion						
Au, Gold (ppm)	8.72	0.390	8.54	8.90	8.60	8.84
Gas / Liquid Pycnometry						
SG, Specific Gravity (Unity)	2.74	0.049	2.71	2.78	2.72	2.77

*Gold Tolerance Limits for typical 30g fire assay charge weight determined from 20 x 1g INAA results and the Sampling Constant (Ingamells & Switzer, 1973);
†Gold Tolerance Limits for typical 25g aqua regia sample weight determined as above;
Please note: intervals may appear asymmetric due to rounding.

The homogeneity of OREAS 228 is of a level such that ***sampling error is negligible*** for a conventional fire assay or aqua regia determination.

INTRODUCTION

OREAS reference materials are intended to provide a low cost method of evaluating and improving the quality of analysis of geological samples. To the geologist they provide a means of implementing quality control in analytical data sets generated in exploration from the grass roots level through to prospect evaluation, and in grade control at mining operations. To the analyst they provide an effective means of calibrating analytical equipment, assessing new techniques and routinely monitoring in-house procedures.

SOURCE MATERIALS

Certified Reference Material (CRM) OREAS 228 was prepared from Archean greenstone-hosted Wilber Lode primary ore from the Andy Well Gold Mine. The Wilber Lode is a shear-hosted, narrow vein, quartz lode-style gold deposit situated within the Meekatharra-Wydgee greenstone belt in the Archean Yilgarn Craton of Western Australia. The common primary mineral assemblage, as stated by Mason and Harris (2011, 2012, cited in Hingston et al, 2014), is quartz, calcite, chlorite, fuchsite, pyrite, galena, sphalerite, chalcopyrite and gold. The host rock consists of a complex sequence of Archean meta-basalt and meta-porphyritic rocks derived from a primary mineralogy of albite, actinolite, chlorite, sericite, biotite, calcite, zoisite, muscovite, quartz and titanate. The Andy Well deposit is located approximately 45km north of Meekatharra in the Murchison region of Western Australia.

The approximate major and trace element composition of OREAS 228 is provided in Table 2. The non-certified values contained in this table are the means of duplicate assays from one laboratory.

COMMINUTION AND HOMOGENISATION PROCEDURES

The material constituting OREAS 228 was prepared in the following manner:

- drying to constant mass at 105°C;
- crushing and milling of the ore material to 100% minus 30 microns;
- blending in appropriate proportions to achieve the desired grade;
- packaging in 60g units sealed in laminated foil pouches and 1kg units in plastic jars.

ANALYTICAL PROGRAM

Thirty commercial analytical laboratories participated in the program to certify gold (as reported in Table 1) by the following methods:

- Gold via 25-50g fire assay with AAS (22 labs), ICP-OES (4 labs) or gravimetric (1 lab) finish;
- Instrumental neutron activation analysis for Au on 20 x 1g subsamples to confirm homogeneity (1 laboratory).
- Gold via 15-50g aqua regia digestion with ICP-MS (13 labs), AAS (7 labs) or ICP-OES (1 lab) finish. It is important to note that in the analytical industry there is no standardisation of the aqua regia digestion process. Aqua regia is a partial

empirical digest and differences in recoveries for various analytes are commonplace. These are caused by variations in the digest conditions which can include the ratio of nitric to hydrochloric acids, acid strength, temperatures, leach times and secondary digestions.

- Specific gravity by gas (12 labs) or liquid (4 labs) pycnometry.

For the round robin program twenty 1.5kg test units were taken at predetermined intervals during the bagging stage, immediately following final blending, and are considered representative of the entire batch. The six samples received by each laboratory were obtained by taking two 110g scoop splits from each of three separate 1kg test units. This format enabled nested ANOVA treatment of the results to evaluate homogeneity, i.e. to ascertain whether between-unit variance is greater than within-unit variance. Table 1 presents the certified values together with their associated 1SD's, 95% confidence and tolerance limits and Table 2 shows 66 indicative values for major and trace element composition. Gold homogeneity has been evaluated and confirmed by instrumental neutron activation analysis (INAA) on twenty 1 gram sample portions (see Table 3 below) and by a nested ANOVA program for both fire assay and aqua regia digestion (see '**nested ANOVA**' section). Table 4 provides performance gate intervals for the certified values based on their pooled 1SD's. Tabulated results of all elements (including Au INAA analyses) together with uncorrected means, medians, standard deviations, relative standard deviations and percent deviation of lab means from the corrected mean of means (PDM[3]) are presented in the detailed certification data for this CRM (**OREAS 228 DataPack.xlsx**).

Table 2. Approximate major and trace element data for OREAS 228.

Constituent	Unit	Value	Constituent	Unit	Value	Constituent	Unit	Value
Pb Fire Assay								
Pd	ppb	*3.33*	Pt	ppb	*< 5*			
Borate Fusion XRF								
Al_2O_3	wt.%	*9.99*	K_2O	wt.%	*0.916*	P_2O_5	wt.%	*0.065*
BaO	ppm	*300*	MgO	wt.%	*7.30*	S	wt.%	*0.883*
CaO	wt.%	*5.62*	MnO	wt.%	*0.090*	SiO_2	wt.%	*59.96*
Fe_2O_3	wt.%	*6.34*	Na_2O	wt.%	*1.55*	TiO_2	wt.%	*0.360*
Thermogravimetry								
LOI^{1000}	wt.%	*6.06*						
Laser Ablation								
Ag	ppm	*2.10*	Hf	ppm	*1.42*	Sm	ppm	*1.24*
As	ppm	*71*	Ho	ppm	*0.37*	Sn	ppm	*0.60*
Ba	ppm	*233*	In	ppm	*0.075*	Sr	ppm	*84*
Be	ppm	*1.40*	La	ppm	*6.08*	Ta	ppm	*0.14*
Bi	ppm	*0.65*	Lu	ppm	*0.18*	Tb	ppm	*0.32*
Cd	ppm	*0.35*	Mn	wt.%	*0.079*	Te	ppm	*< 0.2*
Ce	ppm	*10.6*	Mo	ppm	*6.30*	Th	ppm	*1.86*
Co	ppm	*34.3*	Nb	ppm	*1.93*	Ti	wt.%	*0.228*

Note: the number of significant figures reported is not a reflection of the level of certainty of stated values. They are instead an artefact of ORE's in-house CRM-specific LIMS.

Table 2 continued.

Constituent	Unit	Value	Constituent	Unit	Value	Constituent	Unit	Value
Laser Ablation continued								
Cr	ppm	*663*	Nd	ppm	*4.92*	Tl	ppm	*0.30*
Cs	ppm	*0.71*	Ni	ppm	*206*	Tm	ppm	*0.16*
Cu	ppm	*128*	Pb	ppm	*40.0*	U	ppm	*0.47*
Dy	ppm	*1.35*	Pr	ppm	*1.43*	V	ppm	*135*
Er	ppm	*0.93*	Rb	ppm	*30.1*	W	ppm	*15.0*
Eu	ppm	*0.42*	Re	ppm	*0.008*	Y	ppm	*10.6*
Ga	ppm	*12.4*	Sb	ppm	*1.00*	Yb	ppm	*1.00*
Gd	ppm	*1.56*	Sc	ppm	*12.7*	Zn	ppm	*68*
Ge	ppm	*1.08*	Se	ppm	*< 5*	Zr	ppm	*54*

Note: the number of significant figures reported is not a reflection of the level of certainty of stated values. They are instead an artefact of ORE's in-house CRM-specific LIMS.

STATISTICAL ANALYSIS

Certified Values, Confidence Limits, Standard Deviations and Tolerance Limits (Table 1) have been determined for each analyte following removal of individual, laboratory dataset (batch) and 3SD outliers (single iteration). For individual outliers within a laboratory batch the z-score test is used in combination with a second method that determines the per cent deviation of the individual value from the batch median. Outliers in general are selected on the basis of z-scores > 2.5 and with per cent deviations (i) > 3 and (ii) more than three times the average absolute per cent deviation for the batch. In certain instances statistician's prerogative has been employed in discriminating outliers. Each laboratory data set mean is tested for outlying status based on z-score discrimination and rejected if > 2.5. After individual and laboratory data set (batch) outliers have been eliminated a non-iterative 3 standard deviation filter is applied, with those values lying outside this window also relegated to outlying status.

Certified Values are the means of accepted laboratory means after outlier filtering. The INAA data (see Table 3) is omitted from determination of the certified value for Au and is used solely for the calculation of Tolerance Limits and homogeneity evaluation of OREAS 228.

95% Confidence Limits are inversely proportional to the number of participating laboratories and inter-laboratory agreement. It is a measure of the reliability of the certified value. A 95% confidence interval indicates a 95% probability that the true value of the analyte under consideration lies between the upper and lower limits. *95% Confidence Limits should not be used as control limits for laboratory performance.*

Indicative (uncertified) values (Table 2) are provided for the major and trace elements determined by borate fusion XRF (Al_2O_3 to TiO_2) and laser ablation with ICP-MS (Ag to Zr) and are the means of duplicate assays from Bureau Veritas, Perth. Additional indicative values by other analytical methods are present where the number of laboratories reporting a particular analyte is insufficient (< 5) to support certification or where inter-laboratory consensus is poor.

Standard Deviation values (1SDs) are reported in Table 1 and provide an indication of a level of performance that might reasonably be expected from a laboratory being monitored by this CRM in a QA/QC program. The SD's take into account errors attributable to measurement uncertainty and CRM variability. For an effective CRM the contribution of the latter should be negligible in comparison to measurement errors. The SD values thus include all sources of measurement uncertainty: between-lab variance, within-run variance (precision errors) and CRM variability. OREAS prepared reference materials have a level of homogeneity such that the observed variance from repeated analysis has its origin almost exclusively in the analytical process rather than the reference material itself.

The SD for each analyte's certified value is calculated from the same filtered data set used to determine the certified value, i.e. after removal of any individual, lab dataset (batch) and 3SD outliers (single iteration). These outliers can only be removed after the absolute homogeneity of the CRM has been independently established, i.e. the outliers must be confidently deemed to be analytical rather than arising from inhomogeneity of the CRM. **The standard deviation is then calculated for each analyte from the pooled accepted analyses generated from the certification program.**

In the application of SD's in monitoring performance it is important to note that not all laboratories function at the same level of proficiency and that different methods in use at a particular laboratory have differing levels of precision. Each laboratory has its own inherent SD (for a specific concentration level and analyte-method pair) based on the analytical process and this SD is not directly related to the round robin program.

The majority of data generated in the round robin program was produced by a selection of world class laboratories. The SD's thus generated are more constrained than those that would be produced across a randomly selected group of laboratories. To produce more generally achievable SD's the 'pooled' SD's provided in this report include inter-lab bias. This 'one size fits all' approach may require revision at the discretion of the QC manager concerned following careful scrutiny of QC control charts.

Table 4 shows **Performance Gates** calculated for two and three standard deviations. As a guide these intervals may be regarded as warning or rejection for multiple 2SD outliers, or rejection for individual 3SD outliers in QC monitoring, although their precise application should be at the discretion of the QC manager concerned. A second method utilises a 5% window calculated directly from the certified value. Standard deviation is also shown in relative percent for one, two and three relative standard deviations (1RSD, 2RSD and 3RSD) to facilitate an appreciation of the magnitude of these numbers and a comparison with the 5% window. Caution should be exercised when concentration levels approach lower limits of detection of the analytical methods employed as performance gates calculated from standard deviations tend to be excessively wide whereas those determined by the 5% method are too narrow.

Tolerance Limits (ISO Guide 3207) were determined by INAA using the reduced analytical subsample method that utilises the known relationship between standard deviation and analytical subsample weight (Ingamells and Switzer, 1973). In this approach the sample aliquot is substantially reduced to a point where most of the variability in replicate assays should be due to inhomogeneity of the reference material (a sampling error is thereby induced) and measurement error becomes negligible.

In this instance a subsample weight of 1 gram was employed and the 1RSD of 0.39% calculated for a 30g fire assay or aqua regia sample (2.14% at 1g weight) confirms the

high level of gold homogeneity in OREAS 228. The homogeneity is of a level such that ***sampling error is negligible*** for a conventional fire assay or aqua regia determination.

Please note that these RSD's and tolerance limits pertain to the homogeneity of the CRM only and should not be used as control limits for laboratory performance.

Table 3. Instrumental Neutron Activation Analysis of Au (ppm) on 20 x 1g subsamples.

Replicate No	INAA 1g
1	9.10
2	8.69
3	8.91
4	8.89
5	8.63
6	8.85
7	8.68
8	9.19
9	8.76
10	8.81
11	8.50
12	8.91
13	8.64
14	8.98
15	8.64
16	8.46
17	8.81
18	8.99
19	8.93
20	8.87
Mean	8.81
Median	8.83
Std Dev.	0.189
Rel.Std.Dev.	2.14%
PDM[3]	0.98%

The meaning of tolerance limits may be illustrated for gold by fire assay, where 99% of the time (1-α=0.99) at least 95% of subsamples (ρ=0.95) will have concentrations lying between 8.62 and 8.84ppm. Put more precisely, this means that if the same number of subsamples were taken and analysed in the same manner repeatedly, 99% of the tolerance intervals so constructed would cover at least 95% of the total population, and 1% of the tolerance intervals would cover less than 95% of the total population (ISO Guide 35).

The gold homogeneity of OREAS 228 has also been evaluated in a **nested ANOVA** of the round robin program. Each of the thirty round robin laboratories received six samples per CRM and these samples were made up of paired samples from three different, non-adjacent sampling intervals. The purpose of the ANOVA evaluation is to test that no statistically significant difference exists in the variance between-units to that of the variance within-units. This allows an assessment of homogeneity across the entire prepared batch of OREAS 228. The test was performed using the following parameters:

- Gold fire assay – 156 samples (26 laboratories each providing analyses on 3 pairs of samples);
- Gold aqua regia digestion – 120 samples (20 laboratories each providing analyses on 3 pairs of samples);
- Null Hypothesis, H_0: Between-unit variance is no greater than within-unit variance (reject H_0 if *p*-value < 0.05);
- Alternative Hypothesis, H_1: Between-unit variance is greater than within-unit variance.

P-values are a measure of probability where values less than 0.05 indicate a greater than 95% probability that the observed differences in within-unit and between-unit variances are real. The dataset was filtered for both individual and laboratory data set (batch) outliers prior to the calculation of the *p*-value. This process derived *p*-values of 0.905 for Au by fire assay and 0.968 for Au by aqua regia digestion. Both p-values are insignificant and the Null Hypothesis is retained.

It is important to note that ANOVA is not an absolute measure of homogeneity. Rather, it establishes whether or not the analytes are distributed in a similar manner throughout the packaging run of OREAS 228 and whether the variance between two subsamples from the same unit is statistically distinguishable to the variance from two subsamples taken from any two separate units. A reference material therefore, can possess poor absolute homogeneity yet still pass a relative homogeneity test if the within-unit heterogeneity is large and similar across all units.

Based on the statistical analysis of the results of the inter-laboratory certification program it can be concluded that OREAS 228 is fit-for-purpose as a certified reference material (see 'Intended Use' below).

Table 4. Performance Gates for OREAS 228.

Constituent	Certified Value	Absolute Standard Deviations					Relative Standard Deviations			5% window	
		1SD	2SD Low	2SD High	3SD Low	3SD High	1RSD	2RSD	3RSD	Low	High
Pb Fire Assay											
Au, ppm	8.73	0.279	8.17	9.29	7.89	9.57	3.20%	6.40%	9.61%	8.29	9.16
Aqua Regia Digestion											
Au, ppm	8.72	0.390	7.94	9.50	7.55	9.89	4.47%	8.94%	13.42%	8.28	9.16
Gas / Liquid Pycnometry											
SG, Unity	2.74	0.049	2.65	2.84	2.60	2.89	1.80%	3.59%	5.39%	2.61	2.88

PARTICIPATING LABORATORIES

1. Actlabs, Ancaster, Ontario, Canada
2. ALS, Brisbane, QLD, Australia
3. ALS, Lima, Peru
4. ALS, Loughrea, Galway, Ireland
5. ALS, Perth, WA, Australia

6. ALS, Vancouver, BC, Canada
7. Bureau Veritas, Abidjan, Cote D'ivoire
8. Bureau Veritas Commodities Canada Ltd, Vancouver, BC, Canada
9. Bureau Veritas Geoanalytical, Adelaide, SA, Australia
10. Bureau Veritas Geoanalytical, Perth, WA, Australia
11. Inspectorate (BV), Lima, Peru
12. Intertek Genalysis, Adelaide, SA, Australia
13. Intertek Genalysis, Perth, WA, Australia
14. Intertek Testing Services, Cupang, Muntinlupa, Philippines
15. MinAnalytical Services, Perth, WA, Australia
16. Nagrom, Perth, WA, Australia
17. Newcrest Services Laboratory (NSL), Orange, NSW, Australia
18. PT Geoservices Ltd, Cikarang, Jakarta Raya, Indonesia
19. PT Intertek Utama Services, Jakarta Timur, DKI Jakarta, Indonesia
20. SGS, Randfontein, Gauteng, South Africa
21. SGS Australia Mineral Services, Kalgoorlie, WA, Australia
22. SGS Australia Mineral Services, Perth, WA, Australia
23. SGS del Peru, Lima, Peru
24. SGS Lakefield Research Ltd, Lakefield, Ontario, Canada
25. SGS Mineral Services, Townsville, QLD, Australia
26. Shiva Analyticals Ltd, Bangalore North, Karnataka, India
27. Sucofindo Mineral Lab, Cibitung, West Java, Indonesia
28. Sucofindo Mineral Lab, Timika, Papua, Indonesia

PREPARER AND SUPPLIER

Certified reference material OREAS 228 is prepared, certified and supplied by:

ORE RESEARCH & EXPLORATION

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AUSTRALIA

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Fax: +613-9729 8338
Web: www.ore.com.au
Email: info@ore.com.au

It is available in unit sizes of 60g (single-use laminated foil pouches) and 1kg (plastic jars).

INTENDED USE

OREAS 228 is intended for the following uses:

- for the monitoring of laboratory performance in the analysis of gold by fire assay, gold by aqua regia digestion and specific gravity by pycnometry in geological samples;
- for the verification of analytical methods (gold fire assay, gold aqua regia digestion and specific gravity by pycnometry);
- for the calibration of instruments used in the determination of gold or specific gravity.

STABILITY AND STORAGE INSTRUCTIONS

OREAS 228 has been prepared from primary gold ore. It is low in reactive sulphide (~0.88 wt.%) and in its unopened state and under normal conditions of storage has a shelf life beyond ten years. Its stability will be monitored at regular intervals and purchasers notified if any changes are observed.

INSTRUCTIONS FOR CORRECT USE

The certified values for OREAS 228 refer to the concentration level in its packaged state. It should not be dried prior to weighing and analysis.

HANDLING INSTRUCTIONS

Fine powders pose a risk to eyes and lungs and therefore standard precautions such as the use of safety glasses and dust masks are advised.

TRACEABILITY

The analytical samples were selected in a manner to represent the entire batch of prepared CRM. This 'representivity' was maintained in each submitted laboratory sample batch and ensures the user that the data is traceable from sample selection through to the analytical results that underlie the consensus values. Each analytical data set has been validated by its assayer through the inclusion of internal reference materials and QC checks during analysis. The laboratories were chosen on the basis of their competence (from past performance in inter-laboratory programs) for a particular analytical method, analyte or analyte suite, and sample matrix. Most of these laboratories have and maintain ISO 17025 accreditation. The certified values presented in this report are calculated from the means of accepted data following robust statistical treatment as detailed in this report.

LEGAL NOTICE

Ore Research & Exploration Pty Ltd has prepared and statistically evaluated the property values of this reference material to the best of its ability. The Purchaser by receipt hereof releases and indemnifies Ore Research & Exploration Pty Ltd from and against all liability and costs arising from the use of this material and information.

QMS ACCREDITED

ORE Pty Ltd is accredited to ISO 9001:2008 by Lloyd's Register Quality Assurance Ltd for its quality management system including development, manufacturing, certification and supply of CRMs.

CERTIFYING OFFICER

Craig Hamlyn (B.Sc. Hons - Geology), Technical Manager - ORE P/L

REFERENCES

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ISO Guide 31 (2000), Reference materials – Contents of certificates and labels.

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Hingston, R., Wellman, T. and Sternadt, G. (2014), The Geology of the Wilber Deposit, Andy Well Gold Project, Murchison District, Western Australia (pages 55-63, 9th International Mining Geology Conference 2014 - Proceedings - AusIMM).

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CERTIFICATE OF ANALYSIS FOR COARSE SILICA BLANK MATERIAL

SUMMARY STATISTICS

Constituent	Recommended Value
Gold, Au (ppb)	<5

The expected upper limits for the majority of ICP elements after an aqua regia digest have been set at 5 times the lower detection limit of the analytical method. Upper limits for Cu, Fe and Mn are based on the average plus 2 standard deviations for all results.

Different analytical or preparation methods may return higher element concentrations.

Analytical results are included on the last page of this certificate for information purposes only.

Constituent	Recommended Upper Limit	Constituent	Recommended Upper Limit
Al (%)	0.08	Ag (ppm)	1
As (ppm)	5	Ba (ppm)	50
Be (ppm)	2.5	Bi (ppm)	10
Ca (%)	0.05	Cd (ppm)	2.5
Co (ppm)	5	Cr (ppm)	5
Cu (ppm)	25	Fe (%)*	0.7
Ga (ppm)	50	Hg (ppm)	5
K (%)	0.05	La (ppm)	50
Mg (%)	0.05	Mn (ppm)*	75
Mo (ppm)	5	Na (%)	0.05
Ni (ppm)	5	P (ppm)	50
Pb (ppm)	10	S (%)	0.05
Sb (ppm)	10	Sc (ppm)	5
Sr (ppm)	5	V (ppm)	5
Ti (%)	0.05	Zn (ppm)	10

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INTRODUCTION

Barren coarse material ("a blank") is submitted with samples for crushing and pulverizing to determine if there has been contamination or sample cross-contamination in preparation. Elevated values for blanks may also indicate sources of contamination in the fire assay procedure (contaminated reagents or crucibles) or sample solution carry-over during instrumental finish.

SOURCE MATERIALS

The source deposit is situated in Carboniferous sedimentary rocks of the Maritimes Basin in New Brunswick. The Cassidy Lake occurrence is an unconsolidated deposit of nearly pure silica of Cretaceous age.

The expected grain size distribution is:

mm	Percent
> 8	<1
6.3 - 8	4
4.75 - 6.3	32
4 - 4.75	27
2 - 4	35
<2	2

ANALYTICAL PROGRAM

Randomly selected sub-samples were submitted for crushing, pulverizing and analysis. Samples were assayed eleven times at ALS Minerals in Vancouver, B.C. The following methods were employed:

- Au by 30 gm Fire Assay with ICP finish, and
- 35 elements by aqua regia digestion with ICP-AES finish.

INTENDED USE

The Coarse Silica Blank Material is a blank material intended for the monitoring of laboratory performance in the contamination of gold during the processes of crushing, pulverizing and analysis.

It is important to set appropriate recommended values based on the project.

PACKAGING

The Coarse Silica Blank Material is available in 100gm, 500gm or 5kg bags.

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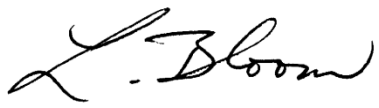
LEGAL NOTICE

Analytical Solutions Ltd has prepared and statistically evaluated the property values of this reference material to the best of its ability. The Purchaser by receipt hereof releases and indemnifies Analytical Solutions Ltd from and against all liability and costs arising from the use of this material and information.

CERTIFYING OFFICER

Lynda Bloom, M.Sc., P.Geo., President, Analytical Solutions Ltd.



ANALYTICAL RESULTS

	Constituents																	
SAMPLE	**Au**	**Ag**	**Al**	**As**	**B**	**Ba**	**Be**	**Bi**	**Ca**	**Cd**	**Co**	**Cr**	**Cu**	**Fe****	**Ga**	**Hg**	**K**	**La**	**Mg**
DESCRIPTION	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**%**	**ppm**	**%**
1B	<0.001	<0.2	0.08	<2	<10	10	<0.5	<2	0.08	<0.5	1	3	32*	0.44	<10	<1	0.02	<10	0.04
2B	0.001	<0.2	0.06	<2	<10	<10	<0.5	<2	0.01	<0.5	1	3	1	0.44	<10	<1	0.01	<10	0.01
3B	<0.001	<0.2	0.07	<2	<10	10	<0.5	<2	0.01	<0.5	<1	4	4	0.46	<10	<1	0.01	<10	0.01
4B	<0.001	<0.2	0.07	<2	<10	10	<0.5	<2	0.01	<0.5	<1	3	1	0.53	<10	<1	0.01	<10	0.01
5B	<0.001	<0.2	0.05	<2	<10	10	<0.5	<2	0.01	<0.5	<1	3	2	0.36	<10	<1	0.01	<10	0.01
1A	<0.001	<0.2	0.05	<2	<10	<10	<0.5	<2	0.01	<0.5	1	3	1	0.41	<10	<1	0.01	<10	0.01
2A	<0.001	<0.2	0.06	<2	<10	<10	<0.5	<2	0.01	<0.5	<1	4	3	0.49	<10	<1	0.01	<10	0.01
3A	<0.001	<0.2	0.05	<2	<10	<10	<0.5	<2	0.01	<0.5	<1	3	1	0.37	<10	<1	0.01	<10	0.01
4A	0.002	<0.2	0.04	<2	<10	10	<0.5	<2	0.01	<0.5	<1	3	2	0.44	<10	<1	0.01	<10	0.01
5A	<0.001	<0.2	0.04	<2	<10	<10	<0.5	<2	0.01	<0.5	<1	3	1	0.4	<10	<1	0.01	<10	<0.01
NB	<0.001	<0.2	0.03	<2	<10	<10	<0.5	<2	<0.01	<0.5	1	4	8	0.7	<10	<1	0.01	<10	<0.01
	Constituents																		
SAMPLE	**Mn**	**Mo**	**Na**	**Ni**	**P**	**Pb**	**S**	**Sb**	**Sc**	**Sr**	**Th**	**Ti**	**Tl**	**U**	**V**	**W**	**Zn**		
DESCRIPTION	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**%**	**ppm**	**ppm**	**ppm**	**ppm**	**ppm**		
1B	51	<1	0.01	15*	10	3	0.01	<2	<1	1	<20	<0.01	<10	<10	1	<10	3		
2B	51	<1	0.01	1	20	2	<0.01	<2	<1	1	<20	<0.01	<10	<10	1	<10	3		
3B	51	<1	0.01	2	20	<2	<0.01	<2	<1	1	<20	<0.01	<10	<10	1	<10	2		
4B	58	<1	0.01	1	20	<2	<0.01	<2	<1	1	<20	<0.01	<10	<10	1	<10	2		
5B	40	<1	0.01	1	10	<2	0.01	<2	<1	1	<20	<0.01	<10	<10	1	<10	2		
1A	47	<1	0.01	1	20	<2	<0.01	<2	<1	1	<20	<0.01	<10	<10	1	<10	2		
2A	56	<1	0.01	1	10	2	<0.01	<2	<1	1	<20	<0.01	<10	<10	1	<10	2		
3A	41	<1	<0.01	1	10	2	<0.01	<2	<1	1	<20	<0.01	<10	<10	1	<10	<2		
4A	49	<1	<0.01	1	10	<2	<0.01	<2	<1	1	<20	<0.01	<10	<10	1	<10	<2		
5A	50	<1	<0.01	<1	10	2	<0.01	<2	<1	1	<20	<0.01	<10	<10	1	<10	<2		
NB	75	<1	<0.01	5	10	<2	0.01	<2	<1	1	<20	<0.01	<10	<10	<1	<10	<2		

* Sub-sample 1B assayed 32 ppm Cu. It was re-assayed and reported 35 ppm Cu; it is also slightly elevated in Ni and Ca. The elevated Cu value was investigated and no source of contamination was identified. Sub-sample (1B) was the only case that reported elevated Cu, Ni or Ca and was the first sample in the batch, it is assumed that there was sample carry-over from the previous analytical job. The recommended upper limit for Cu has been set at 25 ppm to reflect the average + 2 SD of the reported values.

** Fe values will vary according to the type of pulverizing equipment and the weight of the sub-sample. All steel pulverizing bowls transfer metal to the sample and steel contaminants can vary. Internal laboratory tests of silica sand used for cleaning between batches reported 0.3% Fe. The reported Fe values average 0.45% but the proportion that should be attributed to contamination by pulverizing equipment cannot be determined. The user should expect Fe values to report less than 0.5% but it should not be assumed that higher Fe values are necessarily a result of sample cross-contamination or analytical contamination.

Appendix 4: Invoices Supporting Expenditure

Withheld for client confidentiality.