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**Report on Sampling of Claim 4268835**

**December 21, 2015**

**Paul W. Adams**

Mining claim 4268835 is situated directly south of the three open pits (phosphate mines) formerly operated by Agrium. This claim was considered as an open pit target by Agrium but was rejected in favor of closing the site (Agrium personal correspondence). Nevertheless one can find various amounts of residuum at the surface near the few outcrops located on the claim and along the stream (see figure 1 for sample locations). Recently, Agrium Inc. removed its processing mill and re vegetated most of their former site. Unfortunately to restart the site, costs will be prohibited.

The apatite on the site ( $P_2O_5$ ) occurs as residuum sand. Unfortunately it has very low phosphate availability. This means that although one may collect 30% phosphate material from the site, it is useless as fertilizer without serious chemical and physical alterations. Agrium for example used acidification treatments in Alberta to render this material biologically available. We collected and tested this material both for total  $P_2O_5$  and the biologically available.

The owner of the property is one of the three partners in Northfil Resources Inc. Northfil Resources owns the Matheson Micronizing Facility in Matheson Ontario. This report looks at 1) some samples of the outcrops and residuum on the property – in particular what is the geochemistry of this material 2) what is the percentage phosphate in the residuum on the site, and how much of it is biologically available i.e. agriculture standard citric acid test and 3) does this phosphate material (residuum) have properties which may enable it to be processed in the Northfil Plant.

## General Sampling

There is a lot of information in the assessment files and general geology on this site. Prior to Agrium developing it, at one time was considered a potential copper project, as well Sheritt Gordon Mines studied the vermiculite located on this claim. Consequently we have conducted some preliminary sampling of the minerals on the property.

Sample locations are outlined on the map. These samples were collected on September 3, 2015 with Paul Adams and Francis Archibald of Taykwa Tagamou Nation.

Date	Activity		Hours on Site	Room and Board	Km Travelled
02/09/2015	Travel to site – reconnaissance		0	80.00 motel 45.00 food	834
03/09/2015	Collect samples J1-J4 and H1-H4		8		84
04/09/2015	Return to Toronto		0	60.00 food	834

## Sample Description

J1	Heavily gossan some visible mica, heavy some chalcopyrite
J2	Pyroxenite, with some sulphides, mica present
J3	Similar to above
J4	Mica/ vermiculite very black in pyroxenite zone, very magnetic
H5	Appears to be almost pure magnetite vein, some described in the assessment work

H6	Visible copper, no sulphides/ maybe a little chalcopyrite
H7	Chalcopyrite, mica very heavy rock visible sulphides
H8	Greenish colored lime green rock ? perhaps some dyke structre along documented pyroxenate interface
H9	Serpentine? Dark green looks high magnesium

## Results

Actlab Report Number: A15-09472 outlines the geochemistry of 8 samples collected this summer. There were no surprises in the samples. Of note sample H6 has >10000 ppm copper and when retested ( Actlab report A15-09472-2) the sample was confirmed at 1.27% copper – not too surprising as this was explored as a possible base metal deposit . The other interesting sample (H5) produced a pure magnetite at 51% iron level. One of the huge difficulties Agrium had processing their ore was the high magnetite. Finally, the H9 sample has 29 % magnesium which is of possible interest for fertilizer production see below.

## Phosphate Sampling

The phosphate residuum was sampled by Paul Adams and David Hall. Mr. Hall was engaged as he is an expert in phosphate. Currently David is working in Saudi Arabia for a joint Mosaic/Ma'am Phosphate project. The mining claim has been heavily drilled by Agrium. According to Agrium staff they believed the residuum on the claim could be as high as 30% P2O5. The objective of this sampling was to confirm the surface presence of this material as a source for our further tests.

At the time of the sampling, we were aware of the significant deposit on this claim from discussions with Agrium staff. However as mentioned this is an igneous source phosphate which is not suitable for direct application fertilizers as there is literally no biologically available phosphate (see Actlab Report ON14-E-OCT15-001 <1%

available phosphate) This report tests 29% P2O5 material for available phosphate, and gets less than 1% available phosphate.

The residuum was collected along the creek at a point's r1-r4. This location was selected as it is documented on Sherrit reports and was easy for us to get for the experiments. The samples were collected August 31, 2014.

Date	Activity		Hours on Site	Room and Board	Km Travelled
30/08/2014	Travel to site – reconnaissance		0	75.00 motel 54.00 food	834
31/08/2014	Collect samples R1-r4		6	80.00 motel 45.00 food	84
01/9/2014	Travel to Cobalt Perform Metallurgical Testing on residuum		10 Dave Hall 300.00 Polymet Invoice for grinding and facility use	100.00 motel 60 food	360
02/9/2014	Return To Toronto From Cobalt			30.00 food	474 km

### Outcrops and Residuum Values

Preliminary metallurgical work was performed by David Hall at Polymet Resources. Mr. Hall (a metallurgist) was attempting to develop a method where as a commercial fertilizer could be produced at Northfil Micronizing Mill. Initial characterization is presented in the table below. The field samples were combined and split into 4 components based on screening and magnetic separation. This process was chosen as it mimicked the method used in the Agrium mill. Analysis of this material included a full ICP as well as some of the rare earth components (Actlab Report A14-04326 ).

### **Methods:**

As discussed above this method separated the material into 2 fractions <325 mesh (fines) and greater (coarse) followed by magnetic separation in an aqueous solution with a rare earth magnet copying the methods used in the Agrium mill. Not surprisingly we get about the same concentrate values up to 29 % P<sub>2</sub>O<sub>5</sub> in the coarse magnetic fraction as Agrium stated they achieved in their mill. As an added test the samples were also boiled and retested. The results are color coded below and show no difference indicating consistency in the samples indicating a lack of surface contamination. Essentially, this work simply confirms the separation methods used by Agrium.

Unfortunately, the available phosphate levels of this material are less than 1%. See ON14-E-OCT15-001. This is primarily because igneous phosphate deposits have a very low available phosphate. Agrium shipped the material after the above concentration to Alberta where it was rendered biologically available via acidification. Following

Report Number: A14-04326

Report Date: 11/7/2014

Analyte Symbol	Al2O3	CaO	Cr2O3	Fe2O3(T)	K2O	MgO	MnO	Na2O	P2O5	SiO2	TiO2	LOI	
												%	%
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%
Detection Limit	0.01	0.01	0.01	0.01	0.01	0.01	0.001	0.01	0.002	0.01	0.01	0.01	0.01
Analysis Method	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
KP-101	2.97	24.96	0.01	24.53	0.04	0.72	0.578	0.12	20.02	7.33	4.27	10.34	95.89
KP-102	1.41	5.34	0.01	52.64	< 0.01	0.87	1.542	0.04	4.949	2.39	13.87	14.71	97.77
KP-103	1.82	37.4	0.01	12.94	0.02	0.52	0.079	0.14	29.01	7.45	1.25	5.94	96.57
KP-104	2.24	5.15	0.02	50.94	0.02	1.22	1.372	0.05	5.14	3.63	10.81	16.93	97.52
KP-105	5.61	28.95	0.03	16.97	0.06	0.94	0.19	0.14	23.97	8.97	2.39	7.55	95.76
KP-106	7.73	25.55	< 0.01	14.4	0.04	0.89	0.195	0.12	22.67	7.43	1.83	12.12	92.98

ON14-E-OCT23-001

Report Number: A14-07985

Report Date: 5/11/2014

Analyte Symbol	Al2O3	CaO	Cr2O3	Fe2O3(T)	K2O	MgO	MnO	Na2O	P2O5	SiO2	TiO2	LOI	
												%	%
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%
Detection Limit	0.01	0.01	0.01	0.01	0.01	0.01	0.001	0.01	0.002	0.01	0.01	0.01	0.01
Analysis Method	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
E14-00434	3.09	21.73	< 0.01	27.31	0.16	0.65	0.041	0.17	13.51	6.29	0.66	17.58	91.19
E14-00435	2.51	32.06	< 0.01	14.18	0.04	0.5	0.035	0.12	25.31	11.33	0.63	10.55	97.26
E14-00436	1.82	34.99	< 0.01	11.81	0.08	0.27	0.039	0.12	28.61	10.55	0.6	8.02	96.91
E14-00437	1.87	25.16	< 0.01	24.53	0.06	0.47	0.144	0.08	20.26	8.41	3.06	13.83	97.89
E14-00438	2.57	32.26	< 0.01	15.34	0.04	0.43	0.038	0.12	26.2	10.94	0.68	8.78	97.4

the acidification treatment Agrium would achieve a 100% available phosphate level in their top liquid fertilizer.

In order to produce a commercial product from this material at the Northfil Plant there are essentially two methods 1) adding soda ash plus a high magnesium silicate ore source (serpentine) to the phosphate rock and heating the material to 800 C (thermophosphate fertilizer) then grinding the material or b) grinding the material very finely (micronizing). Both of these methods were investigated. The following experiments all use the coarse non magnetic component of the above separation. Therefore all test below start with 29% P<sub>2</sub>O<sub>5</sub> and attempt to render this biologically available.

### **Thermophosphate Fertilizer**

Thermophosphate fertilizers are produced by mixing a high magnesium/silica ore source with a phosphate rock source and heating it at very high temperature. This method of fertilizer production has been around since the 1930's and there is a tremendous amount in the literature on it. The success of this method depends on the specific ore source thus there is no guarantee it will produce a fertilizer with a significant biologically available component (available phosphate as determined by a citric acid test). These niche fertilizers are popular for monocot crop production such as rice. Typically, these fertilizers are produced in an electric arc furnace at a temperature in excess of 1500C. Unfortunately, the Northfil Plant does not have an arc furnace, only high temperature rotary kiln.

An alternative and cheaper method is to produce the material at a lower temperature by combining the phosphate rock with a high silica/ magnesium ore source and using soda ash (catalyst reduces temperature required) in a rotary kiln. The test below attempt to determine the available phosphate with varying amounts of

soda ash added. Again we are using the residuum ore source with a serpentine source. The goal is to determine the available phosphate in the ore not the total.

Ore Source	Phosphate Ore Ratio	Serpentine Ratio	Soda Ash Ratio	Available Phosphate (ppm)	Available Silica (ppm)
Phosphate	8	4	1	13.77	
Phosphate	8	4	.05	13.99	
Phosphate	8	2	1	7.73	
Phosphate	8	2	.05	9.95	
Phosphate	7	1	1	4.87	
Phosphate	7	1	.05	5.56	
Yoorin				10.65	
Serpentine		4	1		295
Serpentine		7	1		52
Serpentine		10	1		1163

See Actlab Report ON14-E-SEP12-001

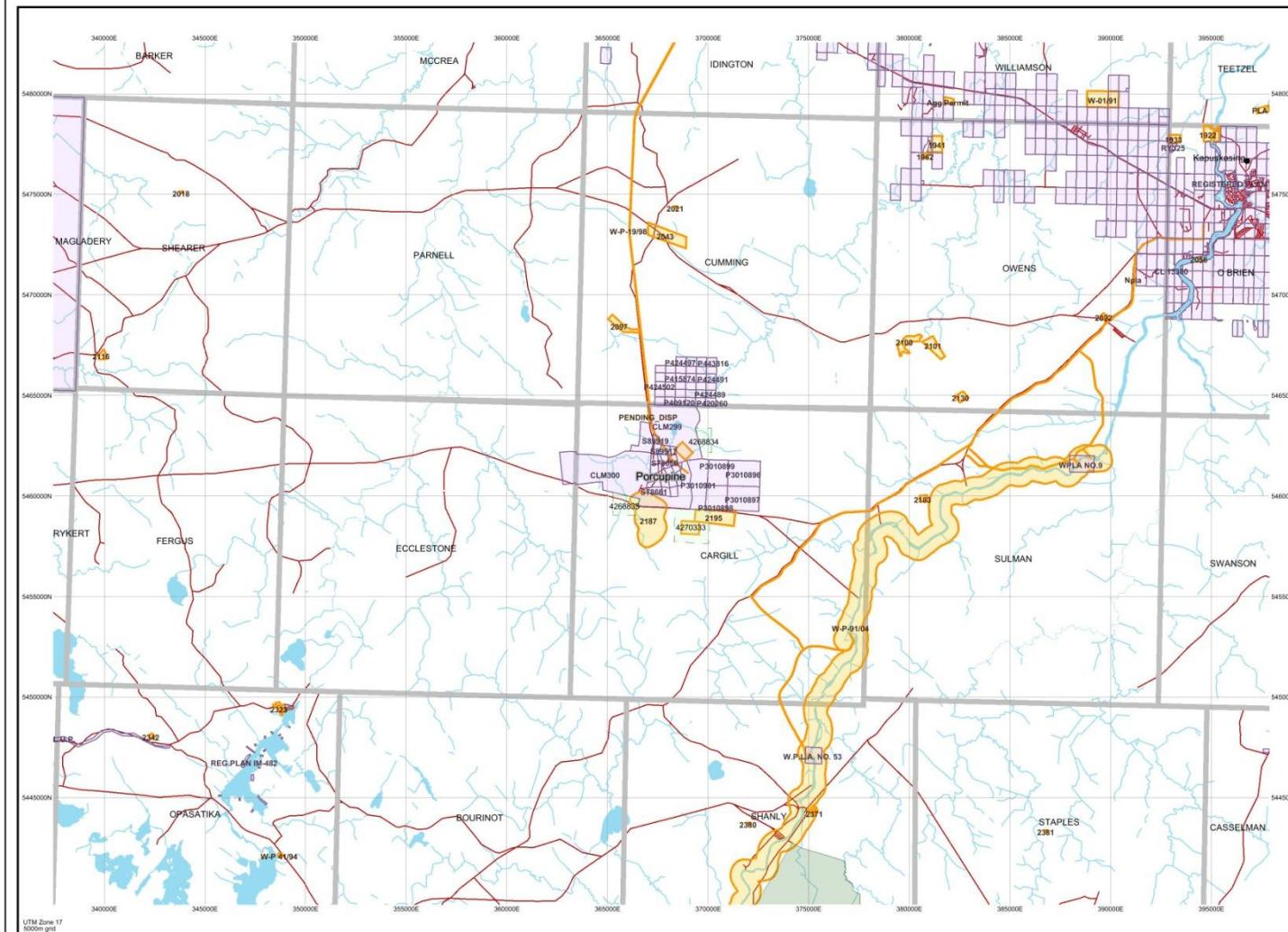
## Results

The ore source used had a phosphate level of 29% total phosphate and our control is labelled Yoorin a commercially available fertilizer produced in Brazil. Using this method of mixing the ore source with different ratios of serpentine and soda ash we were able to achieve a maximum of 13.99% available phosphate or render it about 50% available. This exceeds the values produced by the Brazilian Thermosphosphate fertilizer Yoorin and confirms that a commercial fertilizer could be produced at the Northfil plant from this material.

**Fine Grinding:**

The Northfil plant is by nature a micronizing plant; currently it is set up to micronize graphite down to 1 micron. Another method of rendering igneous phosphate biologically available is by fine grinding. We micronized 2 samples to 400 mesh and 1 micron. Both produced about 3% available phosphate which is too low for commercial use and very expensive for only 3% available see Actlab reports Ont 15 April1 and Ont 15 June17 .

Date / Time of Issue: Sun Mar 23 14:06:21 EST 2014

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 Sudbury ON P3E 6B5  
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Toll Free: Tel: 1 (888) 415-9845 ext 5740 (option 1)  
 Fax: 1 (777) 970-1444

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 Topographic Data Source: Land Information Ontario  
 Mining Land Tenure Source: Provincial Mining Recorders' Office

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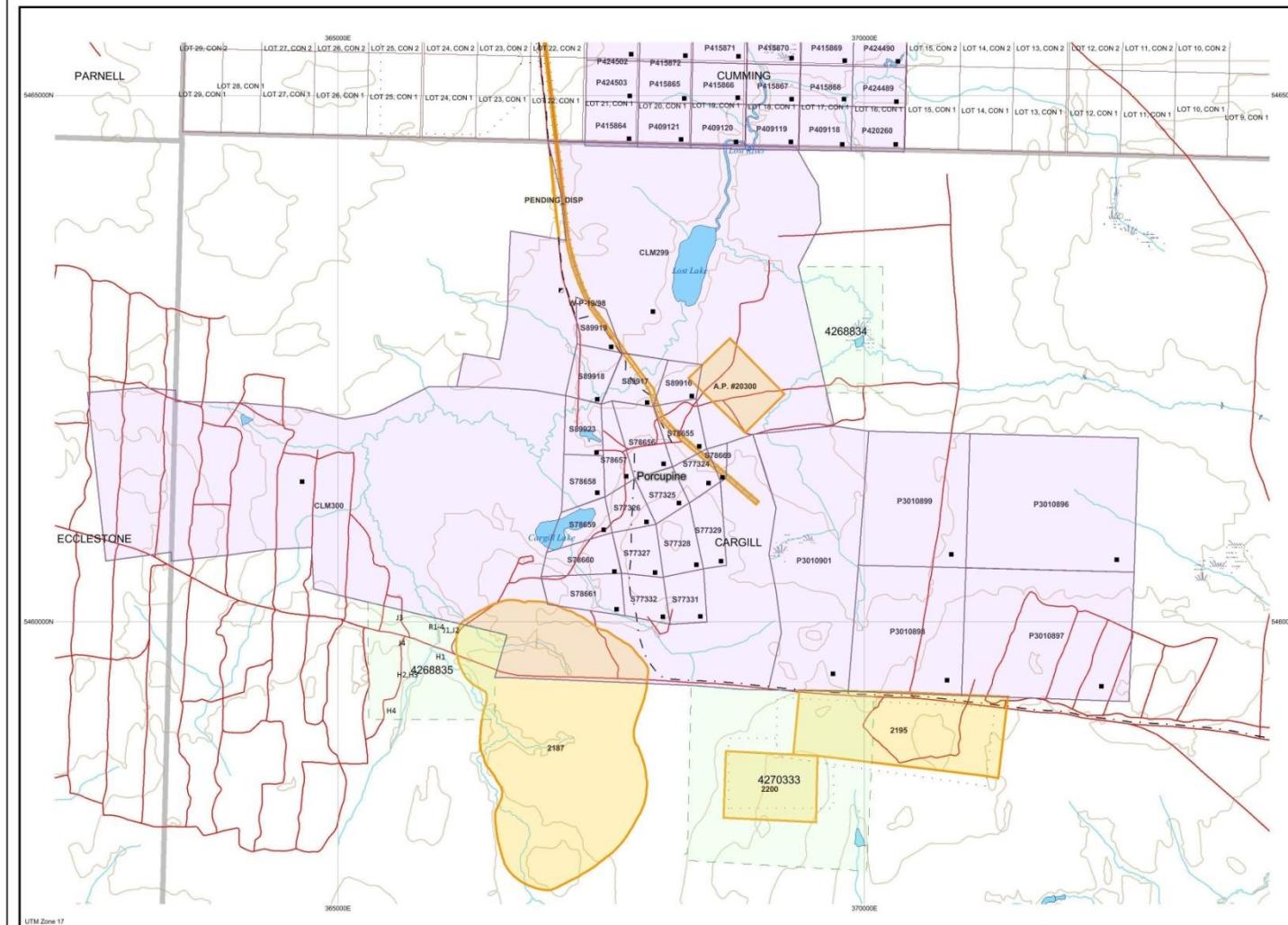
**ADMINISTRATIVE DISTRICTS / DIVISIONS**
 Mining Division  
 Land Titles/Registry Division  
 Ministry of Natural Resources District

 Porcupine  
 COCHRANE  
 HEARST


Scale 1:204800

True North





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Toll Free: Tel: 1 (888) 415-9845 ext 57400 (UTM 8 degree)  
 Fax: 1 (705) 970-1444  
 Map Datum: NAD 83  
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 HEARST


## LAND TENURE WITHDRAWAL DESCRIPTIONS (list may not be complete)

Identifier	Type	Date	Description
2097	Wsm	Jan 1, 2001	PENDING AGGREGATE PERMIT
2187	Wsm	Jan 1, 2001	PENDING APPLICATION UNDER THE PUBLIC LANDS ACT NOTICE RECEIVED JU 2 (DUCKS UNLIMITED ECC ESTONE MARSH PROJECT)
2195	Wsm	Jan 1, 2001	AGGREGATE PERMIT NO. 20028
2200	Wsm	Jan 1, 2001	AGGREGATE PERMIT NO. 20300 - Category 1
#2000	Wsm	Sept 2, 1998	PENDING AGGREGATE PERMIT NO. 213908
PENDING DISPER	Wsm	Jul 2, 1998	SEC 35 W-P-1998 22/0998 M+S 195150
W-P-1998	Wsm	Jun 12, 1998	<a href="http://www.mndm.gov.on.ca/mismpge.htm?&id=04_e.html">W-P-91/04 M+S withdrawal S.35 Mining Act 1950, November 10, 2004 Click to link to withdrawal order</a>
W-P-91/04	Wsm	Nov 10, 2004	True North

## IMPORTANT NOTICES

Areas under which special regulation, limitations or conditions exist that affect normal prospecting, staking and mineral development.  
 Type Description  
 Note  
 Note: APPENDIX FOR THE PUBLIC LANDS ACT, 1950, SECTION 263 AND 308  
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 Porcupine  
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 HEARST

**TOPOGRAPHIC**

Administrative Boundaries	Land Tenure
Freehold Patent	Surface And Mining Rights
Township	Surface Rights Only
Concession, Lot	Mining Rights Only
Provincial Park	
Indian Reserve	
Cliff, Pit & Pile	
Contour	
Mine Shafts	
Mine Headframe	
Railway	
Road	
Trail	
Natural Gas Pipeline	
Utilities	
Tower	

Licence of Occupation
Uses Not Specified
Surface And Mining Rights
Surface Rights Only
Mining Rights Only

Licence of Occupation

Uses Not Specified

Surface And Mining Rights

Surface Rights Only

Mining Rights Only

Order In Council (Not open for staking)

Land Use Permit

Order In Council Withdrawal Types

Areas Withdrawn from Disposition

Mining Acts Withdrawal Types

Surface And Mining Rights Withdrawn

Surface Rights Only Withdrawn

Mining Rights Only Withdrawn

Order In Council Withdrawal Types

Surface And Mining Rights Withdrawn

Surface Rights Only Withdrawn

Mining Rights Only Withdrawn

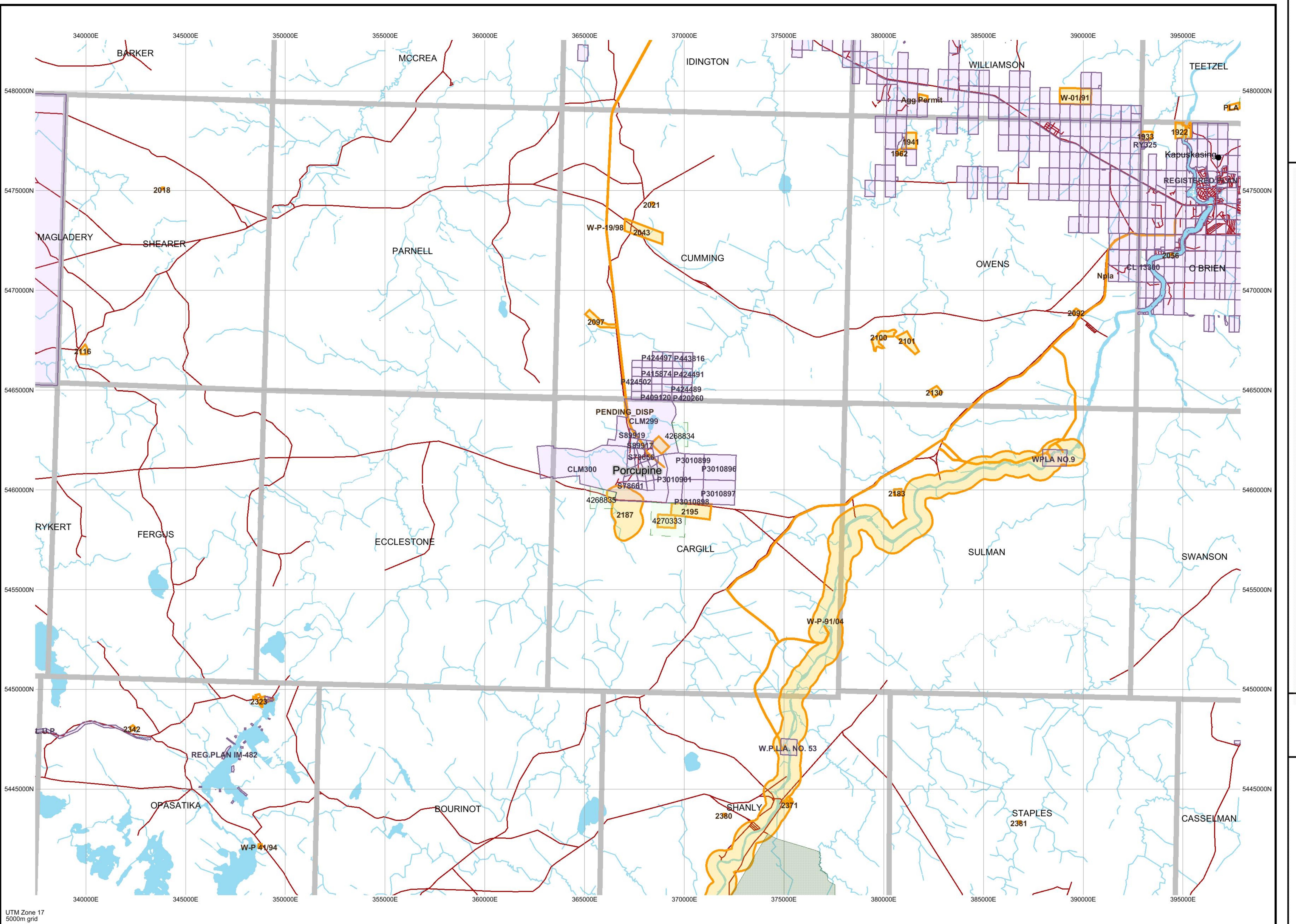
Ns

IMPORTANT NOTICES

Scale 1:209490

3km 0km 9km

True North



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Map Datum: NAD 83  
 Projection: UTM (6 degree)  
 Topographic Data Source: Land Information Ontario  
 Mining Land Tenure Source: Provincial Mining Recorders' Office

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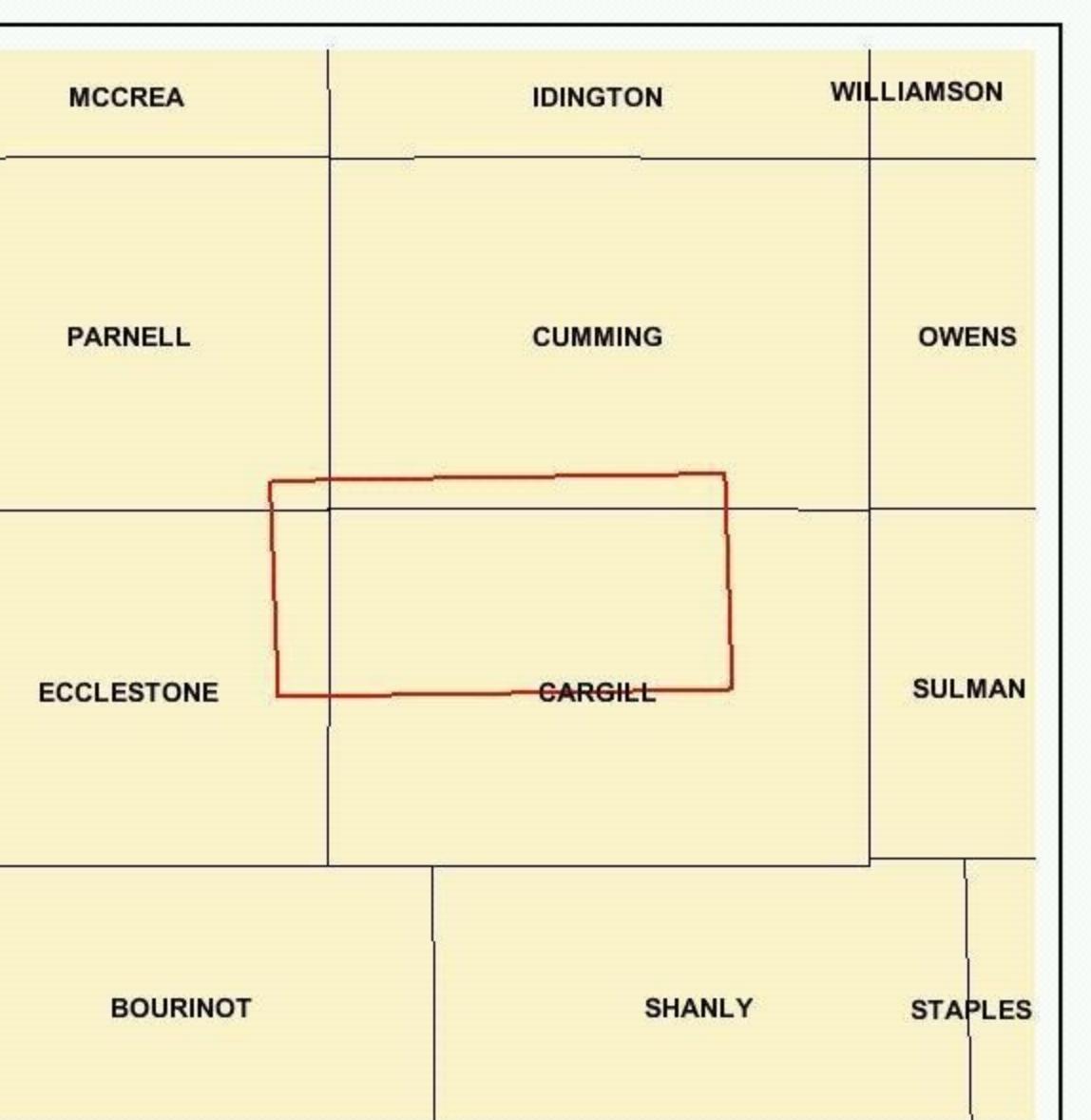
Porcupine  
COCHRANE  
HEARST

**TOPOGRAPHIC**

- Administrative Boundaries
- Township
- Concession, Lot
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- Mine Headframe
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- Road
- Trail
- Natural Gas Pipeline
- Utilities
- Tower

**Land Tenure**

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- Mining Rights Only
- Leasehold Patent
- Surface And Mining Rights
- Surface Rights Only
- Mining Rights Only
- Licence of Occupation
- Uses Not Specified
- Surface And Mining Rights
- Surface Rights Only
- Mining Rights Only



- LAND TENURE WITHDRAWALS
- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| 1234                              | Areas Withdrawn from Disposition    |
| Wsm                               | Mining Acts Withdrawal Types        |
| Ws                                | Surface And Mining Rights Withdrawn |
| Wm                                | Surface Rights Only Withdrawn       |
| Order In Council Withdrawal Types | Mining Rights Only Withdrawn        |
| W'sm                              | Surface And Mining Rights Withdrawn |
| W's                               | Surface Rights Only Withdrawn       |
| W'm                               | Mining Rights Only Withdrawn        |

IMPORTANT NOTICES

Scale 1:40000  
700m 0m 2.1km

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2195	Wsm	Jan 1, 2001	AGGREGATE PERMIT NO. 20018
2200	Wsm	Jan 1, 2001	AGGREGATE PERMIT NO. 20026
A.P. #20300	Wsm	Sep 3, 1998	AGGREGATE PERMIT NO. 20300 - Category 11
PENDING_DISP	Wsm	Jul 2, 2002	Pending disposition CL 10936
W-P-19/98	Wsm	Jun 22, 1998	SEC.35 W-P-19/98 22/06/98 M+S 195150
W-P-91/04	Wsm	Nov 10, 2004	<a href="http://www.mndm.gov.on.ca/mines/lands/withdrawals/2004/wp91-04_e.html">W-P-91/04 M+S withdrawal S.35 Mining Act RSO 1999, November 10, 2004 Click to link to withdrawal order</a>

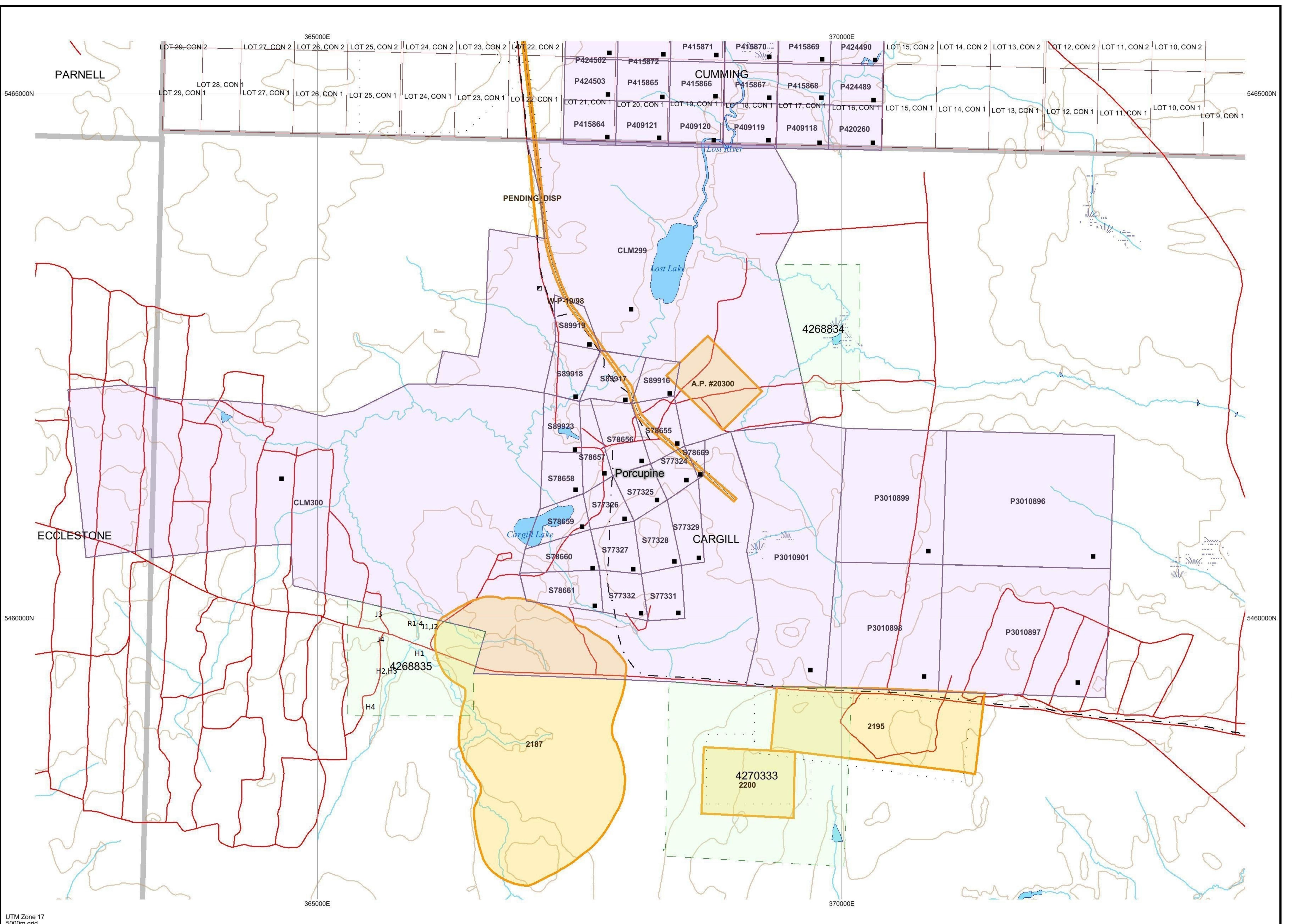
True North

IMPORTANT NOTICES

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Type	Description
------	-------------

Nplia APPLICATION FOR SRO, PUBLIC LANDS ACT, SEE SECTION 28(3) AND 30(B) OF THE MINING ACT.



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Quality Analysis ...



Innovative Technologies

Date Submitted: 24-Jun-14  
Invoice No.: A14-04326  
Invoice Date: 25-Jul-14  
Your Reference: KAP SANDS

Paul Adams  
20 Colinayre  
Toronto ON M1T 3A9  
Canada

ATTN: Paul Adams

## CERTIFICATE OF ANALYSIS

10 Crushed Rock samples were submitted for analysis.

The following analytical package was requested:

REPORT      A14-04326

Code 8-Nb2O5, Ta2O5 & ZrO2 - XRF Option XRF  
Code 8-Phosphate XRF Phosphate majors-XRF Package  
Code 8-REE Assay Package Major Elements Fusion ICP(WRA)/Trace Elements Fusion ICP/MS(WRA4B2)

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Notes:

Total includes all elements in % oxide to the left of total.

CERTIFIED BY:

  
\_\_\_\_\_  
Emmanuel Eseme , Ph.D.  
Quality Control

ACTIVATION LABORATORIES LTD.  
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**Results**

Analyte Symbol	Al2O3	CaO	Cr2O3	Fe2O3(T <sub>1</sub> )	K2O	MgO	MnO	Na2O	P205	SiO2	TiO2	LOI 1000C	Total	Ta2O5	Nb2O5	ZrO2	SiO2	Al2O3	Fe2O3(T <sub>1</sub> )	MnO	MgO	CaO	Na2O	
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Detection Limit	0.01	0.01	0.01	0.01	0.01	0.01	0.001	0.01	0.002	0.01	0.01	0.01	0.01	0.003	0.003	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01
Analysis Method	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-XR F	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	
KP-101	2.97	24.96	0.01	24.53	0.04	0.72	0.578	0.12	20.02	7.33	4.27	10.34	95.89											
KP-102	1.41	5.34	0.01	52.64	< 0.01	0.87	1.542	0.04	4.949	2.39	13.87	14.71	97.77	0.014	0.183	0.144	2.28	1.59	52.86	1.500	0.88	5.51	0.03	
KP-103	1.82	37.40	0.01	12.94	0.02	0.52	0.079	0.14	29.01	7.45	1.25	5.94	96.57	< 0.003	0.035	0.707	7.60	2.12	12.45	0.076	0.56	36.94	0.18	
KP-104	2.24	5.15	0.02	50.94	0.02	1.22	1.372	0.05	5.140	3.63	10.81	16.93	97.52	0.012	0.144	0.145	3.50	2.53	51.55	1.340	1.24	5.43	0.04	
KP-105	5.61	28.95	0.03	16.97	0.06	0.94	0.190	0.14	23.97	8.97	2.39	7.55	95.76	0.008	0.066	0.588	8.94	5.96	16.40	0.178	0.92	28.18	0.15	
KP-106	7.73	25.55	< 0.01	14.40	0.04	0.89	0.195	0.12	22.67	7.43	1.83	12.12	92.98											

**Results**

Analyte Symbol	K2O	TiO2	P2O5	LOI	Total	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As	Rb	Sr	Y	Zr	Nb	Mo	Ag
Unit Symbol	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	1	5	2	2	2	4	1	2	0.5
Analysis Method	FUS-ICP	FUS-MS	FUS-ICP	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS															
KP-101																							
KP-102	< 0.01	13.49	4.92	14.94	98.01	39	10	1008	70	343	180	180	600	36	4	7	< 2	1208	258	851	936	< 2	8.3
KP-103	0.06	1.218	29.76	6.05	97.01	36	7	419	30	212	50	190	170	28	4	9	< 2	2936	347	3829	170	< 2	
KP-104	0.03	10.53	5.17	17.40	98.75	62	13	1147	80	335	120	180	580	54	7	12	< 2	1385	428	819	718	< 2	8.3
KP-105	0.08	2.222	24.23	7.78	95.04	101	17	1146	60	209	70	270	410	65	8	15	< 2	3617	785	3818	349	< 2	
KP-106																							

**Results**

Analyte Symbol	In	Sn	Sb	Cs	Ba	Bi	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Detection Limit	0.2	1	0.5	0.5	3	0.4	0.1	0.1	0.05	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.05	0.1	0.05	0.1	0.04	0.2	0.1	1
Analysis Method	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-ICP	FUS-MS																		
KP-101																								
KP-102	< 0.2	7	< 0.5	< 0.5	646	< 0.4	668	1400	174	674	117	31.3	83.5	11.0	52.9	9.3	23.4	2.95	16.9	2.28	13.4	123	< 1	
KP-103	< 0.2	6	< 0.5	< 0.5	472	< 0.4	1120	2720	316	1300	234	62.6	156	19.1	88.2	13.5	30.6	3.50	19.1	2.72	65.2	32.9	1	
KP-104	< 0.2	9	< 0.5	< 0.5	729	< 0.4	1410	2830	334	1280	212	56.1	146	19.1	90.3	15.7	39.2	4.74	27.6	3.63	13.1	103	< 1	
KP-105	< 0.2	24	< 0.5	< 0.5	1201	< 0.4	2350	5340	601	2420	439	121	305	39.5	187	29.7	68.9	8.26	46.6	6.49	52.2	66.3	2	
KP-106																								

**Results**

Analyte Symbol	Tl	Pb	Th	U
Unit Symbol	ppm	ppm	ppm	ppm
Detection Limit	0.1	5	0.1	0.1
Analysis Method	FUS-MS	FUS-MS	FUS-MS	FUS-MS
KP-101				
KP-102	0.3	40	34.3	23.9
KP-103	< 0.1	35	64.8	25.7
KP-104	0.3	65	47.2	48.9
KP-105	< 0.1	120	46.3	78.3
KP-106				

QC

Analyte Symbol	Al2O3	CaO	Cr2O3	Fe2O3(T )	K2O	MgO	MnO	Na2O	P205	SiO2	TiO2	LOI 1000C	Total	Ta2O5	Nb2O5	ZrO2	SiO2	Al2O3	Fe2O3(T )	MnO	MgO	CaO	Na2O	
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Detection Limit	0.01	0.01	0.01	0.01	0.01	0.001	0.01	0.002	0.01	0.01		0.01	0.003	0.003	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	
Analysis Method	FUS-XR F	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP																	
DH-1a Meas																								
DH-1a Cert																								
NIST 694 Meas	1.78	43.93	0.11	0.79	0.54	0.34	0.011	0.88	30.23	11.66	0.12							10.92	1.89	0.73	0.012	0.34	42.47	0.86
NIST 694 Cert	1.80	43.6	0.10	0.790	0.510	0.330	0.0116	0.860	30.2	11.2	0.110							11.2	1.80	0.790	0.0116	0.330	43.6	0.860
DNC-1 Meas																		47.07	18.46	9.90	0.145	10.26	11.45	1.89
DNC-1 Cert																		47.15	18.34	9.97	0.150	10.13	11.49	1.890
GBW 07113 Meas																		72.58	13.00	3.22	0.140	0.17	0.62	2.44
GBW 07113 Cert																		72.8	13.0	3.21	0.140	0.160	0.590	2.57
MICA-FE Meas	19.55	0.47	0.02	25.65	8.78	4.74	0.348	0.33	0.423	34.98	2.52													
MICA-FE Cert	19.5	0.430	0.01	25.6	8.75	4.55	0.350	0.300	0.450	34.4	2.50													
LKSD-3 Meas																								
LKSD-3 Cert																								
W-2a Meas																		52.92	15.59	11.00	0.168	6.41	11.14	2.20
W-2a Cert																		52.4	15.4	10.7	0.163	6.37	10.9	2.14
SY-4 Meas																		50.44	20.72	6.26	0.108	0.52	8.16	6.98
SY-4 Cert																		49.9	20.69	6.21	0.108	0.54	8.05	7.10
CTA-AC-1 Meas																								
CTA-AC-1 Cert																								
BIR-1a Meas																		48.33	15.83	11.44	0.173	9.73	13.63	1.81
BIR-1a Cert																		47.96	15.50	11.30	0.175	9.700	13.30	1.82
NCS DC86312 Meas																								
NCS DC86312 Cert																								
ZW-C Meas																	0.009	0.012						
ZW-C Cert																	0.010	0.011						
VS-N Meas																	0.103	0.103	0.102					
VS-N Cert																	0.098	0.10	0.095					
NCS DC86302 Meas																		75.56	15.17	0.59	0.038	0.08	0.66	4.49
NCS DC86302 Cert																		73.99	14.86	0.593	0.036	0.069	0.584	4.67
NCS DC70014 Meas																								
NCS DC70014 Cert																								
NCS DC86316 Meas																								
NCS DC86316 Cert																								
NCS DC70009 (GBW07241) Meas																								
NCS DC70009 (GBW07241) Cert																								
OREAS 100a (Fusion) Meas																								
OREAS 100a (Fusion) Cert																								
OREAS 101a (Fusion) Meas																								
OREAS 101a (Fusion) Cert																								
JR-1 Meas																								
JR-1 Cert																								
NCS DC86318 Meas																								
NCS DC86318 Cert																								
NCS DC19003a	4.44	1.09		75.19		3.26	0.350			4.13	13.20													

Analyte Symbol	Al2O3	CaO	Cr2O3	Fe2O3(T)	K2O	MgO	MnO	Na2O	P205	SiO2	TiO2	LOI	Total	Ta2O5	Nb2O5	ZrO2	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	
Detection Limit	0.01	0.01	0.01	0.01	0.01	0.001	0.01	0.002	0.01	0.01		0.01	0.003	0.003	0.003	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	
Analysis Method	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-XR	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	
Meas																								
NCS DC19003a Cert	4.40	1.05		75.45		3.17	0.364			3.96	12.96													
SX18-01 Meas														0.005	0.679	0.091								
SX18-01 Cert														0.005	0.695	0.093								
SARM 3 Meas														0.151	1.462									
SARM 3 Cert														0.14	1.49									
USZ 42-2006 Meas																								
USZ 42-2006 Cert																								
KP-102 Orig																	2.29	1.59	52.76	1.507	0.89	5.53	0.03	
KP-102 Dup																	2.26	1.59	52.97	1.493	0.88	5.49	0.03	
KP-103 Orig																	7.57	2.11	12.28	0.075	0.56	36.75	0.18	
KP-103 Dup																	7.62	2.13	12.61	0.076	0.56	37.13	0.18	
KP-104 Orig																	3.50	2.50	52.16	1.340	1.24	5.50	0.04	
KP-104 Dup																	3.50	2.55	50.95	1.340	1.24	5.36	0.04	
KP-105 Orig																	8.95	5.99	16.37	0.178	0.93	28.20	0.15	
KP-105 Dup																	8.93	5.94	16.43	0.178	0.91	28.16	0.15	
Method Blank	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.001	< 0.01	< 0.002	< 0.01	< 0.01													
Method Blank														< 0.003	< 0.003	< 0.003								
Method Blank																								

**QC**

Analyte Symbol	K2O	TiO2	P205	LOI	Total	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	
Unit Symbol	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Detection Limit	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	1	5	2	2	2	4	1	2	0.5	
Analysis Method	FUS-ICP	FUS-MS	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS																	
DH-1a Meas																								
DH-1a Cert																								
NIST 694 Meas	0.54	0.117	30.21						1660															
NIST 694 Cert	0.510	0.110	30.2						1740															
DNC-1 Meas	0.22	0.495	0.05			31		156	260	58	250	100	80							141	16	36		
DNC-1 Cert	0.234	0.480	0.070			31		148	270	57	247	100	70							144.0	18.0	38		
GBW 07113 Meas	5.39	0.284	0.05			5	4	5											41	47	381			
GBW 07113 Cert	5.43	0.300	0.0500			5.00	4.00	5.00											43.0	43.0	403			
MICA-FE Meas																								
MICA-FE Cert																								
LKSD-3 Meas									80	31	50	30							77			< 2	2.5	
LKSD-3 Cert									87.0	30.0	47.0	35.0							78.0			2.00	2.70	
W-2a Meas	0.62	1.087	0.13			36	< 1	279												193	20	89		
W-2a Cert	0.626	1.06	0.130			36.0	1.30	262												190	24.0	94.0		
SY-4 Meas	1.68	0.292	0.13			< 1	3	8												1208	122	544		
SY-4 Cert	1.66	0.287	0.131			1.1	2.6	8.0												1191	119	517		
CTA-AC-1 Meas																								
CTA-AC-1 Cert																								
BIR-1a Meas	0.02	0.978	0.02			43	< 1	339	380	52	160	130	80	15						109	15	16		
BIR-1a Cert	0.030	0.96	0.021			44	0.58	310	370	52	170	125	70	16						110	16	18		
NCS DC86312 Meas																								
NCS DC86312 Cert																								
ZW-C Meas															1000									
ZW-C Cert																								

Analyte Symbol	K2O	TiO2	P205	LOI	Total	Sc	Be	V	Cr	Co	Ni	Cu	Zn	Ga	Ge	As	Rb	Sr	Y	Zr	Nb	Mo	Ag	
Unit Symbol	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Detection Limit	0.01	0.001	0.01		0.01	1	1	5	20	1	20	10	30	1	1	5	2	2	2	4	1	2	0.5	
Analysis Method	FUS-ICP	FUS-MS	FUS-ICP	FUS-ICP	FUS-MS	FUS-MS																		
VS-N Meas																								
VS-N Cert																								
NCS DC86302 Meas	3.88	0.012	< 0.01				1354																	
NCS DC86302 Cert	3.89	0.016	0.013				1315																	
NCS DC70014 Meas										26	70	2610	7400	25									270	16.6
NCS DC70014 Cert										26	70	2600	7400	25.2									270	16.7
NCS DC86316 Meas																								
NCS DC86316 Cert																								
NCS DC70009 (GBW07241) Meas									30			940		16	11	73	500							
NCS DC70009 (GBW07241) Cert									30			960		16.5	11.2	69.9	500							
OREAS 100a (Fusion) Meas										17		170												25
OREAS 100a (Fusion) Cert										18.1		169												24.1
OREAS 101a (Fusion) Meas										49		440												22
OREAS 101a (Fusion) Cert										48.8		434												21.9
JR-1 Meas										< 20	< 10		16			245								0.7
JR-1 Cert										1.67	2.68		16.1			257								0.031
NCS DC86318 Meas																								
NCS DC86318 Cert																								
NCS DC19003a Meas																								
NCS DC19003a Cert																								
SX18-01 Meas																								
SX18-01 Cert																								
SARM 3 Meas																								
SARM 3 Cert																								
USZ 42-2006 Meas																								
USZ 42-2006 Cert																								
KP-102 Orig	< 0.01	13.52	4.95	14.94	98.01	39	10	1013	80	347	180	190	600	36	4	7	< 2	1216	259	844	936	< 2	8.3	
KP-102 Dup	< 0.01	13.47	4.89	14.94	98.01	39	10	1004	70	339	170	180	610	36	4	7	< 2	1199	257	858	936	< 2	8.3	
KP-103 Orig	0.06	1.199	29.58	6.17	96.52	36	7	416	30	213	50	190	170	28	4	9	< 2	2916	344	3936	174	< 2		
KP-103 Dup	0.06	1.237	29.94	5.94	97.49	37	7	421	30	212	50	180	170	29	4	9	< 2	2956	349	3722	167	< 2		
KP-104 Orig	0.03	10.49	5.18	17.40	99.37	62	13	1143	90	359	140	210	590	55	7	13	< 2	1374	426	830	732	< 2	8.7	
KP-104 Dup	0.03	10.57	5.15	17.40	98.13	63	13	1152	80	311	100	160	570	52	7	12	< 2	1397	430	808	704	< 2	7.8	
KP-105 Orig	0.08	2.226	24.21	8.01	95.28	102	17	1148	60	208	60	280	410	65	8	15	< 2	3632	787	3794	350	< 2		
KP-105 Dup	0.08	2.219	24.25	7.55	94.80	101	17	1144	60	209	70	270	410	65	8	15	< 2	3601	784	3842	349	< 2		
Method Blank										< 20	< 1	< 20	< 10	< 30	< 1	< 1	< 5	< 2						
Method Blank																								
Method Blank																								

QC

Analyte Symbol	In	Sn	Sb	Cs	Ba	Bi	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Detection Limit	0.2	1	0.5	0.5	3	0.4	0.1	0.1	0.05	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.04	0.2	0.1	1	
Analysis Method	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-ICP	FUS-MS																		
DH-1a Meas																								
DH-1a Cert																								
NIST 694 Meas																								
NIST 694 Cert																								
DNC-1 Meas				103		3.7				4.8		0.57									2.0			
DNC-1 Cert						118		3.6			5.20		0.59									2.0		
GBW 07113 Meas						492																		
GBW 07113 Cert						506																		
MICA-FE Meas																								
MICA-FE Cert																								
LKSD-3 Meas				2.4			48.6	92.3		43.8	8.0	1.39			4.8					2.7	0.40			
LKSD-3 Cert				2.30			52.0	90.0		44.0	8.00	1.50			4.90					2.70	0.400			
W-2a Meas						171																		
W-2a Cert						182																		
SY-4 Meas						361																		
SY-4 Cert						340																		
CTA-AC-1 Meas							2140	3310		1090	159	43.5	117	14.2						10.3	1.05			
CTA-AC-1 Cert							2176	3326		1087	162	46.7	124	13.9						11.4	1.08			
BIR-1a Meas			0.6	17		0.6	2.0				1.1	0.51								1.6				
BIR-1a Cert			0.58	6		0.63	1.9				1.1	0.55								1.7				
NCS DC86312 Meas							2400	186		1590			230	34.5	183	35.6	96.3	14.2	86.6	11.9				
NCS DC86312 Cert							2360	190		1600			225.0	34.6	183	36	96.2	15.1	87.79	11.96				
ZW-C Meas		1290																			9.5			
ZW-C Cert		1300																			9.7			
VS-N Meas																								
VS-N Cert																								
NCS DC86302 Meas																								
NCS DC86302 Cert																								
NCS DC70014 Meas		180			80.3	44.8	88.6	10.1	38.7	8.0	1.68	7.1	1.2	6.5	1.3	3.4	0.57	3.4	0.48					
NCS DC70014 Cert		180			80.3	45.3	87.0	10.8	39.9	8.0	1.8	7.4	1.1	6.7	1.3	3.5	0.57	3.3	0.50					
NCS DC86316 Meas																				712				
NCS DC86316 Cert																				712				
NCS DC70009 (GBW07241) Meas	1.3	1700		43.8		21.9	56.6	7.19	29.9	12.0		13.8	3.2	20.4	4.3	12.5	2.35	15.6				2200		
NCS DC70009 (GBW07241) Cert	1.3	1701		41		23.7	60.3	7.9	32.9	12.5		14.8	3.3	20.7	4.5	13.4	2.2	14.9				2200		
OREAS 100a (Fusion) Meas						251	461	44.3	145	23.6	3.55		3.6	22.1	4.8	13.9	2.34	14.7	2.06					
OREAS 100a (Fusion) Cert						260	463	47.1	152	23.6	3.71		3.80	23.2	4.81	14.9	2.31	14.9	2.26					
OREAS 101a (Fusion) Meas						817	1450	131	401	51.6	8.22		5.6	32.0	6.5	18.8	2.93	18.2	2.46					
OREAS 101a (Fusion) Cert						816	1396	134	403	48.8	8.06		5.92	33.3	6.46	19.5	2.90	17.5	2.66					
JR-1 Meas	< 0.2		20.6			18.9	45.4	5.52	22.6	5.5		5.2	1.0	6.0		3.8	0.65	4.5	0.66		1.8			
JR-1 Cert	0.028		20.8			19.7	47.2	5.58	23.3	6.03		5.06	1.01	5.69		3.61	0.67	4.55	0.71		1.86			
NCS DC86318 Meas						1930	418	701	3120	1620	18.1	2020	471	3160	559	1660	261	1750	250					
NCS DC86318 Cert						1960	430	740	3430	1720	18.91	2095	470	3220	560	1750	270	1840	260.0					
NCS DC19003a Meas																								

Analyte Symbol	In	Sn	Sb	Cs	Ba	Bi	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	0.2	1	0.5	0.5	3	0.4	0.1	0.1	0.05	0.1	0.1	0.05	0.1	0.1	0.1	0.1	0.1	0.05	0.1	0.04	0.2	0.1	1
Analysis Method	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-ICP	FUS-MS																	
NCS DC19003a Cert																							
SX18-01 Meas																							
SX18-01 Cert																							
SARM 3 Meas																							
SARM 3 Cert																							
USZ 42-2006 Meas							20700	27700	2290	6150	501	87.7											
USZ 42-2006 Cert							21100	27600	2300	6500	539	87.22											
KP-102 Orig	< 0.2	7	< 0.5	< 0.5	648	< 0.4	671	1390	173	672	117	31.1	84.1	11.1	53.1	9.3	23.4	2.94	16.9	2.32	13.4	123	< 1
KP-102 Dup	< 0.2	7	< 0.5	< 0.5	644	< 0.4	665	1410	175	676	117	31.5	82.9	10.9	52.8	9.2	23.4	2.95	17.0	2.25	13.4	123	< 1
KP-103 Orig	< 0.2	6	< 0.5	< 0.5	476	< 0.4	1110	2720	317	1300	234	62.5	154	19.2	88.0	13.6	30.6	3.49	19.0	2.76	67.7	33.9	2
KP-103 Dup	< 0.2	5	< 0.5	< 0.5	467	< 0.4	1120	2710	316	1300	235	62.6	158	19.1	88.4	13.4	30.6	3.50	19.3	2.69	62.7	31.9	1
KP-104 Orig	< 0.2	8	< 0.5	< 0.5	725	< 0.4	1400	2840	335	1270	211	56.3	146	19.2	90.4	15.7	38.8	4.70	27.4	3.67	13.2	104	< 1
KP-104 Dup	< 0.2	9	0.5	< 0.5	734	< 0.4	1420	2820	333	1280	213	55.9	147	19.1	90.1	15.8	39.6	4.79	27.9	3.60	13.0	102	1
KP-105 Orig	< 0.2	24	< 0.5	< 0.5	1203	< 0.4	2330	5300	597	2390	434	120	302	39.3	185	29.3	68.6	8.18	45.7	6.40	51.1	64.9	2
KP-105 Dup	< 0.2	23	< 0.5	< 0.5	1198	< 0.4	2370	5390	605	2450	444	121	308	39.7	189	30.2	69.2	8.34	47.4	6.58	53.3	67.7	2
Method Blank																							
Method Blank																							
Method Blank	< 0.2	< 1	< 0.5	< 0.5		< 0.4	< 0.1	< 0.1	< 0.05	< 0.1	< 0.1	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.1	< 0.04	< 0.2	< 0.1	< 1

## QC

Analyte Symbol	Tl	Pb	Th	U
Unit Symbol	ppm	ppm	ppm	ppm
Detection Limit	0.1	5	0.1	0.1
Analysis Method	FUS-MS	FUS-MS	FUS-MS	FUS-MS
DH-1a Meas			921	
DH-1a Cert			910	
NIST 694 Meas				
NIST 694 Cert				
DNC-1 Meas				
DNC-1 Cert				
GBW 07113 Meas				
GBW 07113 Cert				
MICA-FE Meas				
MICA-FE Cert				
LKSD-3 Meas		11.3	4.4	
LKSD-3 Cert		11.4	4.60	
W-2a Meas				
W-2a Cert				
SY-4 Meas				
SY-4 Cert				
CTA-AC-1 Meas		23.3	4.0	
CTA-AC-1 Cert		21.8	4.4	
BIR-1a Meas	< 5			
BIR-1a Cert	3			
NCS DC86312 Meas				
NCS DC86312 Cert				
ZW-C Meas				
ZW-C Cert				

Analyte Symbol	Tl	Pb	Th	U
Unit Symbol	ppm	ppm	ppm	ppm
Detection Limit	0.1	5	0.1	0.1
Analysis Method	FUS-MS	FUS-MS	FUS-MS	FUS-MS
VS-N Meas				
VS-N Cert				
NCS DC86302 Meas				
NCS DC86302 Cert				
NCS DC70014 Meas	27200			
NCS DC70014 Cert	27200			
NCS DC86316 Meas				
NCS DC86316 Cert				
NCS DC70009 (GBW07241) Meas		28.1		
NCS DC70009 (GBW07241) Cert		28.3		
OREAS 100a (Fusion) Meas		52.0	134	
OREAS 100a (Fusion) Cert		51.6	135	
OREAS 101a (Fusion) Meas		37.5	422	
OREAS 101a (Fusion) Cert		36.6	422	
JR-1 Meas	1.6	26.7	8.5	
JR-1 Cert	1.56	26.7	8.88	
NCS DC86318 Meas				
NCS DC86318 Cert				
NCS DC19003a Meas				
NCS DC19003a Cert				
SX18-01 Meas				
SX18-01 Cert				
SARM 3 Meas				
SARM 3 Cert				
USZ 42-2006 Meas				
USZ 42-2006 Cert				
KP-102 Orig	0.3	37	34.4	23.8
KP-102 Dup	0.3	43	34.3	24.0
KP-103 Orig	< 0.1	36	65.3	25.8
KP-103 Dup	< 0.1	33	64.3	25.5
KP-104 Orig	0.3	58	46.5	48.7
KP-104 Dup	0.3	72	47.8	49.1
KP-105 Orig	< 0.1	121	46.7	77.3
KP-105 Dup	< 0.1	120	45.9	79.3
Method Blank				
Method Blank				
Method Blank	< 0.1	< 5	< 0.1	< 0.1

**Quality Analysis ...**



**Innovative Technologies**

**Date Submitted:** 03-Nov-15  
**Invoice No.:** A15-09472 (i)  
**Invoice Date:** 26-Nov-15  
**Your Reference:**

Paul Adams  
20 Colinayre  
Toronto ON M1T 3A9  
Canada

ATTN: Paul Adams

## CERTIFICATE OF ANALYSIS

9 Rock samples were submitted for analysis.

The following analytical package was requested:

Code 1H INAA(INAAGEO)/Total Digestion ICP(TOTAL)

REPORT      **A15-09472 (i)**

This report may be reproduced without our consent. If only selected portions of the report are reproduced, permission must be obtained. If no instructions were given at time of sample submittal regarding excess material, it will be discarded within 90 days of this report. Our liability is limited solely to the analytical cost of these analyses. Test results are representative only of material submitted for analysis.

**Notes:**

Elements which exceed the upper limits should be analyzed by assay techniques. Some elements are reported by multiple techniques. These are indicated by MULT.

CERTIFIED BY:

  
\_\_\_\_\_  
Emmanuel Eseme , Ph.D.  
Quality Control

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**Results**

Analyte Symbol	Cu
Unit Symbol	%
Lower Limit	0.001
Method Code	ICP-OES
H6	1.27

**QC**

Analyte Symbol	Cu
Unit Symbol	%
Lower Limit	0.001
Method Code	ICP-OES
MP-1b Meas	3.15
MP-1b Cert	3.069
CCU-1d Meas	23.9
CCU-1d Cert	23.93
CZN-4 Meas	0.393
CZN-4 Cert	0.403
PTC-1b Meas	7.90
PTC-1b Cert	7.97
H6 Orig	1.27
H6 Dup	1.28
Method Blank	0.002

Quality Analysis ...



Innovative Technologies

Date Submitted: 03-Nov-15

Invoice No.: A15-09472

Invoice Date: 19-Nov-15

Your Reference:

Paul Adams  
20 Colinayre  
Toronto ON M1T 3A9  
Canada

ATTN: Paul Adams

## CERTIFICATE OF ANALYSIS

9 Rock samples were submitted for analysis.

The following analytical package was requested:

Code 1H INAA(INAAGEO)/Total Digestion ICP(TOTAL)

REPORT      **A15-09472**

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Notes:

Elements which exceed the upper limits should be analyzed by assay techniques. Some elements are reported by multiple techniques. These are indicated by MULT.

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**Results**

Analyte Symbol	Au	Ag	Cu	Cd	Mo	Pb	Ni	Zn	S	Al	As	Ba	Be	Bi	Br	Ca	Co	Cr	Cs	Eu	Fe	Hf	Hg
Unit Symbol	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	
Lower Limit	2	0.3	1	0.3	1	3	1	1	0.01	0.01	0.5	50	1	2	0.5	0.01	1	2	1	0.2	0.01	1	1
Method Code	INAA	MULT INAA / TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	MULT INAA / TD-ICP	MULT INAA / TD-ICP	TD-ICP	INAA	INAA	TD-ICP	TD-ICP	INAA	TD-ICP	INAA	INAA	INAA	INAA	INAA	INAA	INAA	
J1	< 2	0.6	214	< 0.3	< 1	8	70	107	0.20	1.88	9.8	250	3	< 2	< 0.5	10.2	46	288	< 1	2.0	13.0	8	< 1
J2	< 2	< 0.3	219	< 0.3	< 1	5	43	127	0.43	4.08	5.0	1340	5	< 2	< 0.5	5.55	82	23	2	3.3	12.6	11	< 1
J3	< 2	< 0.3	32	0.7	< 1	7	106	299	0.02	2.42	< 0.5	1390	< 1	6	< 0.5	0.21	114	100	< 1	< 0.2	36.9	< 1	< 1
J4	< 2	< 0.3	9	< 0.3	< 1	< 3	71	148	0.01	7.04	2.3	2700	< 1	< 2	< 0.5	0.14	86	32	8	< 0.2	11.5	< 1	< 1
H5	< 2	0.5	13	0.9	< 1	13	586	36	0.01	0.20	< 0.5	< 50	< 1	4	< 0.5	0.03	122	917	< 1	< 0.2	51.0	< 1	< 1
H6	16	1.5	> 10000	< 0.3	< 1	14	109	102	1.43	6.00	8.5	< 50	< 1	3	< 0.5	0.06	166	56	< 1	0.4	15.5	2	< 1
H7	42	5.0	541	0.4	8	45	69	993	8.45	1.36	151	< 50	< 1	< 2	< 0.5	2.47	30	593	< 1	< 0.2	23.8	< 1	< 1
H8	< 2	< 0.3	23	< 0.3	< 1	< 3	200	51	0.05	4.86	5.1	< 50	< 1	< 2	< 0.5	14.5	57	551	< 1	1.7	9.04	2	< 1
H9	< 2	< 0.3	8	< 0.3	< 1	7	3360	91	0.01	0.52	6.6	< 50	< 1	< 2	< 0.5	0.58	243	137	< 1	< 0.2	2.37	< 1	< 1

**Results**

Analyte Symbol	Ir	K	Li	Mg	Mn	Na	P	Rb	Sb	Sc	Se	Sr	Ta	Ti	Th	U	V	W	Y	La	Ce	Nd	Sm
Unit Symbol	ppb	%	ppm	%	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	5	0.01	1	0.01	1	0.01	0.001	15	0.1	0.1	3	1	0.5	0.01	0.2	0.5	2	1	1	0.5	3	5	0.1
Method Code	INAA	TD-ICP	TD-ICP	TD-ICP	TD-ICP	INAA	TD-ICP	INAA	INAA	INAA	INAA	TD-ICP	INAA	TD-ICP	INAA	TD-ICP	INAA	TD-ICP	INAA	INAA	INAA	INAA	INAA
J1	< 5	0.65	3	5.63	1810	0.92	0.008	44	< 0.1	23.4	< 3	183	13.7	0.91	2.1	< 0.5	248	< 1	17	21.1	63	29	8.5
J2	< 5	3.57	8	6.06	1560	1.71	0.017	214	< 0.1	9.0	< 3	480	23.4	0.23	6.6	< 0.5	64	< 1	23	54.8	133	63	14.0
J3	< 5	1.71	3	3.49	2860	0.35	0.002	140	< 0.1	5.1	< 3	42	7.1	1.71	< 0.2	< 0.5	458	< 1	3	8.9	14	7	1.5
J4	< 5	6.46	33	8.92	1460	0.67	0.007	421	< 0.1	2.1	< 3	68	< 0.5	0.51	< 0.2	< 0.5	42	< 1	1	3.7	11	< 5	0.5
H5	< 5	0.02	< 1	4.80	1140	0.03	0.002	< 15	< 0.1	2.1	< 3	1	< 0.5	0.04	< 0.2	< 0.5	22	< 1	< 1	< 0.5	< 3	< 5	0.1
H6	< 5	0.05	40	2.62	1190	0.03	0.029	< 15	< 0.1	34.4	63	2	< 0.5	0.60	< 0.2	< 0.5	319	< 1	24	14.3	37	14	4.5
H7	< 5	0.03	2	3.69	750	0.40	0.014	< 15	1.2	11.9	50	19	< 0.5	0.25	< 0.2	< 0.5	113	< 1	6	1.7	< 3	< 5	0.6
H8	< 5	0.11	13	6.78	2790	0.10	0.004	< 15	< 0.1	22.1	< 3	45	< 0.5	0.29	< 0.2	< 0.5	91	< 1	24	6.4	22	10	4.0
H9	< 5	0.03	1	21.4	1150	0.07	0.002	< 15	< 0.1	7.1	< 3	7	< 0.5	0.06	< 0.2	< 0.5	31	< 1	3	1.6	4	< 5	0.5

**Results**

Analyte Symbol	Sn	Tb	Yb	Lu	Mass
Unit Symbol	%	ppm	ppm	ppm	g
Lower Limit	0.01	0.5	0.2	0.05	
Method Code	INAA	INAA	INAA	INAA	INAA
J1	< 0.01	< 0.5	1.1	< 0.05	43.9
J2	< 0.01	< 0.5	1.1	< 0.05	34.1
J3	< 0.01	< 0.5	< 0.2	< 0.05	46.9
J4	< 0.01	< 0.5	< 0.2	< 0.05	22.3
H5	< 0.01	< 0.5	< 0.2	< 0.05	40.7
H6	< 0.01	< 0.5	2.3	0.13	35.1
H7	< 0.01	< 0.5	0.7	< 0.05	37.5
H8	< 0.01	< 0.5	1.6	< 0.05	40.0
H9	< 0.01	< 0.5	< 0.2	< 0.05	27.6

## QC

Analyte Symbol	Au	Ag	Ag	Cu	Cd	Mo	Pb	Ni	Ni	Zn	Zn	S	Al	As	Ba	Be	Bi	Br	Ca	Co	Cr	Cs	Eu	
Unit Symbol	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Lower Limit	2	0.3	5	1	0.3	1	3	1	20	1	50	0.01	0.01	0.5	50	1	2	0.5	0.01	1	2	1	0.2	
Method Code	INAA	TD-ICP	INAA	TD-ICP	TD-ICP	TD-ICP	TD-ICP	TD-ICP	INAA	TD-ICP	INAA	TD-ICP	TD-ICP	INAA	INAA	TD-ICP	TD-ICP	INAA	TD-ICP	INAA	INAA	INAA	INAA	
GXR-4 Meas		5.5			6610	0.4	317	47	42		76		1.81	6.32			2	16		1.07				
GXR-4 Cert		4.0			6520	0.860	310	52.0	42.0		73.0		1.77	7.20			1.90	19.0		1.01				
SDC-1 Meas				27			23	35		101				7.56			3			1.06				
SDC-1 Cert				30.000			25.00	38.0		103.00			8.34			3.00			1.00					
GXR-6 Meas	< 0.3			66	0.5	< 1	96	25		133		0.02	12.4			1	< 2		0.17					
GXR-6 Cert	1.30			66.0	1.00	2.40	101	27.0		118		0.0160	17.7			1.40	0.290		0.180					
DNC-1a Meas				92			4	249		61														
DNC-1a Cert				100.00			6.3	247		70.0														
SBC-1 Meas				32	< 0.3	1	31	89		198						3	< 2							
SBC-1 Cert				31.0000	0.40	2.40	35.0	82.8		186.0						3.20	0.70							
OREAS 45d (4-Acid) Meas				370		6	22	240		45		0.04	7.63			< 1	< 2		0.19					
OREAS 45d (4-Acid) Cert				371.0		2.500	21.8	231.0		45.7		0.049	8.150			0.79	0.31		0.185					
SdAR-M2 (U.S.G.S.) Meas				222	5.0	9	832	49		795						7	< 2							
SdAR-M2 (U.S.G.S.) Cert				236.0000		5.1	13.3	808	48.8		760						6.6	1.05						
DMMAS 118 Meas	1750														1800	1150					45	83		
DMMAS 118 Cert	1729														1661	1264					45	83		
J1 Orig		1.0		216	< 0.3	4	9	69		107		0.22	1.87			2	4		10.1					
J1 Dup		0.3		211	< 0.3	< 1	7	72		106		0.18	1.89			3	< 2		10.3					
Method Blank	< 0.3			< 1	< 0.3	< 1	< 3	< 1		< 1		< 0.01	0.02			< 1	< 2		< 0.01					
Method Blank	< 0.3			< 1	< 0.3	< 1	< 3	< 1		< 1		< 0.01	< 0.01			< 1	< 2		< 0.01					
Method Blank	< 0.3			< 1	< 0.3	< 1	< 3	< 1		< 1		< 0.01	< 0.01			< 1	< 2		< 0.01					
Method Blank	< 0.3			< 1	< 0.3	< 1	< 3	< 1		< 1		< 0.01	< 0.01			< 1	< 2		< 0.01					
Method Blank	< 2			< 5					< 20		< 50				< 0.5	< 50			< 0.5		< 1	< 2	< 1	< 0.2

## QC

Analyte Symbol	Fe	Hf	Hg	Ir	K	Li	Mg	Mn	Na	P	Rb	Sb	Sc	Se	Sr	Ta	Ti	Th	V	W	Y	La		
Unit Symbol	%	ppm	ppm	ppb	%	ppm	%	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	
Lower Limit	0.01	1	1	5	0.01	1	0.01	1	0.01	0.001	15	0.1	0.1	3	1	0.5	0.01	0.2	0.5	2	1	1	0.5	
Method Code	INAA	INAA	INAA	INAA	TD-ICP	TD-ICP	TD-ICP	TD-ICP	INAA	TD-ICP	INAA	INAA	INAA	INAA	TD-ICP	INAA	TD-ICP	INAA	INAA	TD-ICP	INAA	TD-ICP	INAA	
GXR-4 Meas					4.25	11	1.71	168		0.135					226		0.29		92		16			
GXR-4 Cert					4.01	11.1	1.66	155		0.120					221		0.29		87.0		14.0			
SDC-1 Meas					2.63	34	0.97	880		0.050					169		0.23		58					
SDC-1 Cert					2.72	34.00	1.02	880.00		0.0690					180.00		0.606		102.00					
GXR-6 Meas					1.80	34	0.61	1070		0.034					37				91		14			
GXR-6 Cert					1.87	32.0	0.609	1010		0.0350					35.0				186		14.0			
DNC-1a Meas						5									131		0.27		140		17			
DNC-1a Cert						5.20									144.0		0.29				148.0000		18.0	
SBC-1 Meas						152									176		0.51		222		34			
SBC-1 Cert						163.0									178.0		0.51		220.0		36.5			
OREAS 45d (4-Acid) Meas					0.41	22	0.24	523		0.035					32		0.21		115		13			
OREAS 45d (4-Acid) Cert					0.412	21.50	0.245	490.000		0.042					31.30		0.773		235.0		9.53			
SdAR-M2 (U.S.G.S.) Meas						18									144				26		30			

Analyte Symbol	Fe	Hf	Hg	Ir	K	Li	Mg	Mn	Na	P	Rb	Sb	Sc	Se	Sr	Ta	Ti	Th	U	V	W	Y	La
Unit Symbol	%	ppm	ppm	ppb	%	ppm	%	ppm	%	%	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Lower Limit	0.01	1	1	5	0.01	1	0.01	1	0.01	0.001	15	0.1	0.1	3	1	0.5	0.01	0.2	0.5	2	1	1	0.5
Method Code	INAA	INAA	INAA	INAA	TD-ICP	TD-ICP	TD-ICP	TD-ICP	INAA	TD-ICP	INAA	INAA	INAA	INAA	TD-ICP	INAA	TD-ICP	INAA	INAA	TD-ICP	INAA	TD-ICP	INAA
SdAR-M2 (U.S.G.S.) Cert						17.9									144					25.2		32.7	
DMMAS 118 Meas	3.34								2.23			6.9	6.5						17.1				16.7
DMMAS 118 Cert	3.25								2.21			6.6	6.1						15.9				16.9
J1 Orig					0.65	3	5.61	1820		0.014					182		1.41			327		17	
J1 Dup					0.64	3	5.65	1800		0.002					183		0.40			170		17	
Method Blank					< 0.01	< 1	< 0.01			< 0.001					< 1		< 0.01			< 2		< 1	
Method Blank					< 0.01	< 1	< 0.01			< 0.001					< 1		< 0.01			< 2		< 1	
Method Blank					< 0.01	< 1	< 0.01			< 0.001					< 1		< 0.01			< 2		< 1	
Method Blank					< 0.01	< 1	< 0.01			< 0.001					< 1		< 0.01			< 2		< 1	
Method Blank	< 0.01	< 1	< 1	< 5					< 0.01		< 15	< 0.1	< 0.1	< 3			< 0.5		< 0.2	< 0.5		< 1	< 0.5

**QC**

Analyte Symbol	Ce	Nd	Sm	Sn	Tb	Yb	Lu	Mass
Unit Symbol	ppm	ppm	ppm	%	ppm	ppm	ppm	g
Lower Limit	3	5	0.1	0.01	0.5	0.2	0.05	
Method Code	INAA	INAA	INAA	INAA	INAA	INAA	INAA	INAA
GXR-4 Meas								
GXR-4 Cert								
SDC-1 Meas								
SDC-1 Cert								
GXR-6 Meas								
GXR-6 Cert								
DNC-1a Meas								
DNC-1a Cert								
SBC-1 Meas								
SBC-1 Cert								
OREAS 45d (4-Acid) Meas								
OREAS 45d (4-Acid) Cert								
SdAR-M2 (U.S.G.S.) Meas								
SdAR-M2 (U.S.G.S.) Cert								
DMMAS 118 Meas	32		2.2					
DMMAS 118 Cert	30		2.2					
J1 Orig								
J1 Dup								
Method Blank								
Method Blank								
Method Blank								
Method Blank	< 3	< 5	< 0.1	< 0.01	< 0.5	< 0.2	< 0.05	30.0



## Analytical Report

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00194  
Sample Number: KP-111  
Sample Description: Water

Test Code	Test Value	Units
Potassium	1.26	%
Phosphorus	0.19	%
Total Kjeldahl Nitrogen	< 0.1	%

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Steve Jenkins, PhD



## Analytical Report

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00411  
Sample Number:  
Sample Description: KP-103

Test Code	Test Value	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	5.04	%
Phosphorous soluble in 2% Citric Acid	2.20	%

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## Analytical Report

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00423  
Sample Number:  
Sample Description: Low pH Sands

Test Code	Test Value	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	0.99	%
Phosphorous soluble in 2% Citric Acid	0.43	%

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## Analytical Report

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00434  
Sample Number:  
Sample Description: Boiled Fines  
Submitted For: Kapsands

Test Code	Test Value	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	1.61	%
Phosphorous soluble in 2% Citric Acid	0.71	%

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00435  
Sample Number:  
Sample Description: Boiled Mids  
Submitted For: Kapsands

Test Code	Test Value	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	0.95	%
Phosphorous soluble in 2% Citric Acid	0.41	%

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00436  
Sample Number:  
Sample Description: Boiled Coarse  
Submitted For: Kapsands

Test Code	Test Value	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	0.86	%
Phosphorous soluble in 2% Citric Acid	0.37	%

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00437  
Sample Number:  
Sample Description: Control Tails  
Submitted For: Kapsands

Test Code	Test Value	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	0.57	%
Phosphorous soluble in 2% Citric Acid	0.25	%

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00438  
Sample Number:  
Sample Description: Non Mag Filtered  
Submitted For: Kapsands

Test Code	Test Value	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	0.93	%
Phosphorous soluble in 2% Citric Acid	0.40	%

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## Analytical Report

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00316  
Sample Number: SERP 4:1  
Sample Description:

Test Code	Test Value (As Received)	Units
Available Silicon	294	ppm

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00317  
Sample Number: SERP 7:1  
Sample Description:

Test Code	Test Value (As Received)	Units
Available Silicon	52	ppm

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00318  
Sample Number: SERP 10:1  
Sample Description:

Test Code	Test Value (As Received)	Units
Available Silicon	1,163	ppm

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00319  
Sample Number: P-8-4-1  
Sample Description:

Test Code	Test Value (As Received)	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	13.77	%
Phosphorous soluble in 2% Citric Acid	6.01	%

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Paul Adams  
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Toronto, Ontario M1T 3A9

Sample ID: E14-00320  
Sample Number: P-8-4-.05  
Sample Description:

Test Code	Test Value (As Received)	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	13.99	%
Phosphorous soluble in 2% Citric Acid	6.11	%

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Paul Adams  
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Toronto, Ontario M1T 3A9

Sample ID: E14-00321  
Sample Number: P-8-2-1  
Sample Description:

Test Code	Test Value (As Received)	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	7.73	%
Phosphorous soluble in 2% Citric Acid	3.38	%

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Paul Adams  
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Toronto, Ontario M1T 3A9

Sample ID: E14-00322  
Sample Number: P-8-2-05  
Sample Description:

Test Code	Test Value (As Received)	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	9.95	%
Phosphorous soluble in 2% Citric Acid	4.34	%

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00323  
Sample Number: P-7-1-1  
Sample Description:

Test Code	Test Value (As Received)	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	4.87	%
Phosphorous soluble in 2% Citric Acid	2.13	%

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Paul Adams  
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Sample ID: E14-00324  
Sample Number: P-7-1-05  
Sample Description:

Test Code	Test Value (As Received)	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	5.56	%
Phosphorous soluble in 2% Citric Acid	2.43	%

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E14-00325  
Sample Number: YOORIN  
Sample Description:

Test Code	Test Value (As Received)	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	10.65	%
Phosphorous soluble in 2% Citric Acid	4.65	%

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## Analytical Report

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Paul Adams  
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Toronto, Ontario M1T 3A9

Sample ID: E15-00229  
Sample Number:  
Sample Description: Sample 1

Test Code	Test Value	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	3.30	%
Phosphorous soluble in 2% Citric Acid	1.44	%

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## Analytical Report

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Paul Adams  
20 Colinayre Cres.  
Toronto, Ontario M1T 3A9

Sample ID: E15-00431  
Sample Number:  
Sample Description: Sample 1

Test Code	Test Value	Units
Available Phosphorous as P2O5 (2% Citric Acid Extraction)	3.46%	
Phosphorous soluble in 2% Citric Acid	1.51%	

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