

TECHNICAL MEMORANDUM

Radioactive and REE characterization of Ore and Waste samples at Authier Lithium project

Date: December 3, 2020

Executive Summary

This document has been prepared by Gustavo Delendatti, Independent Geologist, Member of Australian Institute of Geoscientists (MAIG 3552), as per the request of Sayona Québec Inc. (SYA) to answer the Questions 14, 15 and 16 sent by the Ministère de l'Environnement et de la Lutte contre les changements climatiques following the submission of the environmental impact study for the Authier project, located in the municipality of La Motte (Abitibi- Témiscamingue) released in January 2020.

- Question 14 (QC-14) refers to the presence of radioactive substances being possible in the type of deposit present at the project site and the completion by the initiator of the necessary tests to determine if mine tailings and waste rock are considered radioactive within the meaning of Directive 019
- Question 15 (QC-15) refers to the presence of Rare Earth Elements (REE)
- Question 16 (QC-16) refers to the representativeness of the samples analyzed vs the composition of the Authier waste rock.

For answering the above questions, SYA assayed Uranium, Thorium and rare-earth minerals (REE) for five (5) diamond core samples of lithium mineralized pegmatite and five (5) diamond core samples of ultramafic waste rock (ultramaphic shale) of Authier project at SGS Canada Inc. Lakefield Research Environmental Laboratory for Trace Metals Scan ICP-MS, 4 acid digest; and RA226 by Gamma Spectroscopy subcontracted to SRC (Saskatchewan Research Council) Environmental Analytical Laboratories, both accredited laboratories under ISO/IEC 17025 standards accredited by the Standards Council of Canada. Additionally, 11 samples out of 31 overburden samples taken for "Caractérisation physicochimique de l'état initial des sols avant l'implantation d'un projet industriel, project Authier, La Motte" conducted at Norinfra, services de Ingenierie, were assayed for Cesium, Niobium, Rubidium, Tantalum, Thallium and Strontium combined with previous ICP on 31 samples that included Uranium. A gamma ray field surface survey over eleven (11) points of Authier project was completed by Forages SGE aiming to evaluate the levels of both natural radioactivity and the U and Th concentrations on project surface using an spectrometer RS-125 (serial number 2230) made by Radiation Solutions Inc. from Mississauga, Canada which is self-calibrating with natural radioactivity (K, U, Th).

Based in the information gathered for this report the author considers that:

- There is no significant risk associated with the presence of radioactive elements in the Authier deposit for tailings, waste rock and overburden (QC-14).
- There is no significant risk associated with the presence of REE in the Authier deposit for tailings, waste rock and overburden (QC-15).
- The samples analyzed are representative of the composition of the Authier waste rock (QC-16).

QC - 14 The presence of radioactive substances being possible in the type of deposit present at the project site, the initiator must carry out the necessary tests to determine if mine tailings and waste rock are considered radioactive within the meaning of Directive 019. Where applicable, it must provide a description of the risk associated with the management of these residues, an appropriate management method as well as preventive and risk mitigation. Overburden should also be assessed unless detailed professional advice can be demonstrate that there is no risk of radioactivity and come to a decision that the assessment is not necessary.

Sayona Quebec has conducted an assaying and evaluation on the content of radioactive elements and REE elements at Authier project aiming to assess whether mine tailings, waste rock and overburden are considered radioactive within the meaning of Directive 019 as well as to assess the presence of rare-earth elements (REE) in the above described rock units.

For this purpose, Uranium, Thorium, and rare-earth minerals (REE) for five (5) diamond core samples of lithium mineralized pegmatite and five (5) diamond core samples of ultramafic waste rock (ultramaphic shale) of Authier project where assayed at SGS Canada Inc. Lakefield Research Environmental Laboratory for Trace Metals Scan ICP-MS, 4 acid digest which is an accredited laboratory under ISO/IEC 17025 standards accredited by the Standards Council of Canada. Additionally, 11 samples out of 31 overburden samples taken for “Caractérisation physicochimique de l'état initial des sols avant l'implantation d'un projet industriel, project Authier, La Motte” conducted at Norinfra, services de Ingenierie, were assayed for Cesium, Niobium, Rubidium, Tantalum, Thallium and Strontium combined with previous ICP on 31 samples that included Uranium.

The 5 samples of Authier mineralized pegmatite returned an Uranium mean content of 5.62 ppm (equivalent to 6.63 ppm U₃O₈ or 0.0007 % U₃O₈) ranging from 3.62 ppm to 8.18 ppm Uranium and a Thorium mean content of 1.34 ppm ranging from 1.01 ppm to 1.53 ppm Thorium.

The 5 samples of Authier ultramaphic waste rock returned an Uranium mean content of 0.09 ppm (equivalent to 6.63 ppm U₃O₈ or 0.0007 % U₃O₈) ranging from 0.031 ppm to 0.21 ppm Uranium and a Thorium mean content of 0.28 ppm ranging from 0.16 ppm to 0.46 ppm Thorium.

The Uranium (U) and Thorium (Th) content in the main pegmatite dyke at Authier project is within the background of regional granite rocks in the area and it is not economic even as by-product of lithium. The mean background for granites in earth crust is 60 ppm. U and Th content in ultramaphic metamorphic wall rock is even lower, ranging from 0.031 ppm up to 0.21 ppm.

The 31 overburden samples returned Uranium 238 (U) below 10 ppm. Eleven (11) samples out of 31 samples were also for Cesium (below 0.05 ppm), Niobium (below 0.01 ppm), Rubidium (below 0.05 ppm), Tantalum (below 0.05 ppm), Thallium (mean value of 0.25 ppm ranging from 0.2 ppm to 0.3 ppm) and Strontium (mean value of 0.035 ppm ranging from 0.03 ppm to 0.04 ppm)

The gamma ray field surface survey over eleven (11) points of Authier project mean content of 4.5 ppm (equivalent to 5.31 ppm U₃O₈ or 0.0005 % U₃O₈) ranging from 0.9 ppm to 9.2 ppm Uranium and a Thorium mean content of 21.96 ppm ranging from 5.1 ppm to 37.8 ppm Thorium. (Table 2)

For reference purposes the Villeneuve Uranium Mine in Quebec (albite – microcline pegmatite) returned grades of 0.08 % U₃O₈ with economic grades of 0.27 % U₃O₈ (Énergie et Ressources Naturelles Québec, 1979). The McArthur River Mine, located in northern Saskatchewan, Canada, is the world's largest high-

grade uranium deposit with a proven and probable reserves (December 31, 2013) of 1,037,400 tonnes at an average grade of 15.76% U₃O₈ (360.5 Million pounds) (Cameco, 2020; Canadian Nuclear Safety Commission, 2020) with ore grades + 10,000 times higher than the values returned at Authier. The Uranium and Thorium results at Authier have shown no economic potential, with U and Th values not sufficiently above background values for intermediate to felsic intrusive rocks and pegmatite dykes to be deemed economic.

Activity concentration of radionuclides was performed using gamma ray spectrometry using pulps of the 5 pegmatite samples and 5 ultramaphic waste samples described before.

The 5 pegmatite samples returned mean Radium-226 of 0.102 Bq/g, Radium-228 of 0.021 Bq/g, Thorium-228 of 0.016 Bq/g, Thorium-232 (calculated) of 0.012 Bq/g, Lead-210 of 0.098 Bq/g and Uranium-238 (calculated) of 0.072 Bq/g. (Table 1)

The 5 ultramaphic waste rock samples returned mean Radium-226 of 0.033 Bq/g, Radium-228 of 0.0042 Bq/g, Thorium-228 of <0.004 Bq/g, Thorium-232 (calculated) of 0.0006 Bq/g, Lead-210 of 0.019 Bq/g and Uranium-238 (calculated) of 0.0006 Bq/g.

The activity concentration found in pegmatite is considered within normal ranges for granitic rock. The activity concentration for ultramaphic waste rock is much lower, in several cases below detection limit.

The author considers that there is no significant risk associated with the presence of radioactive elements in the Authier deposit for tailings, waste rock and overburden.

QC - 15 The presence of rare earth elements is not addressed in the EIS. Initiator must indicate how the presence of rare earth elements was verified and how this aspect was taken into account in the project. In the event of the presence of elements rare earths, the initiator must assess the associated risks, in particular the impacts on quality of the final effluent.

The presence of rare earths elements (REE) was assessed at Authier. REE consist of a group of 14 metallic elements (lanthanides) from lanthanum (atomic number "Z"= 57) to lutetium (Z=71) plus yttrium (Z=39). A commonly used subdivision of the REE consists of the light REE ("LREE") including cerium, lanthanum, praseodymium, neodymium, promethium, samarium, and europium; and the heavy REE ("HREE") including gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutecium and yttrium.

REE analyses were received from the laboratory as parts per million (ppm) or (µg/g) for the individual elements. REE oxides (REO) concentrations are then calculated by conversion factors based on the appropriate oxide formulae. REE typically occur in nature in the 3+ state with Eu also occurring in the 2+ state and Ce in the 4+ state. Results are commonly presented as the summatory of REE (TREE) or the summatory of REO (TREO). TREE includes the summatory of HREE (THREE) and LREE (TLREE), which means that TREE = THREE + TLREE

The 5 samples of Authier mineralized pegmatite returned an THREE + Y mean content of 6.86 ppm (equivalent to 0.0006 % THREO + Y) ranging from 4.25 ppm to 8.32 ppm THREE + Y; and a TLREE mean content of 7.56 ppm (equivalent to 0.004 % TLREE) ranging from 4.49 ppm to 9.94 ppm TLREE. (Table 3)

The 5 samples of Authier mineralized pegmatite returned a total TREE mean content of 13.74 ppm (equivalent to 0.007 % TREO) ranging from 8.74 ppm to 17.2 ppm TREE. (Table 4)

The 5 samples of Authier ultramafic waste rock returned an THREE + Y mean content of 21.94 ppm (equivalent to 0.011 % THREO + Y) ranging from 7.77 ppm to 48.55 ppm THREE + Y; and a TLREE mean content of 13.24 ppm (equivalent to 0.0013 % TLREO) ranging from 4.19 ppm to 23.45 ppm TLREE.

The 5 samples of Authier ultramafic waste rock returned a total TREE mean content of 35.19 ppm (equivalent to 0.018 % TREO) ranging from 11.96 ppm to 72 ppm TREE.

The TREE crustal abundance for granite plutonic rocks is 168.4 ppm encompassing the summatory of HREE and LREE elements (Castor and Hendrick, 2006).

The total TREE content returned by both the main pegmatite dyke and the ultramafic waste rock at Authier project are 13.74 ppm and 35.19 ppm respectively being considerable lower than the mean crustal abundance for granite rocks (168.4 ppm) and it is not economic even as by-product of lithium.

For reference purposes the Nechalacho project in Canada has a resource of 4.27 Mt at 1.37 % TREO (Weng *et al*, 2015; Snow *et al*, 2012); IAMGOLD REE project in Canada has a reserve of 7.7 Mt at 1.65 % TREO (Snow *et al*, 2012). The TREE results at Authier have shown no economic potential with TREE values lower than other Ur, Th and REE occurrences at Canada (Scott *et al*, 2012) and not sufficiently above background values for granite intrusive rocks to be deemed economic.

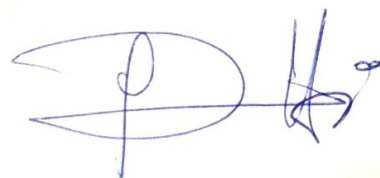
The author considers that there is no significant risk associated with the presence of REE in the Authier deposit for tailings, waste rock and overburden.

QC-16 The representativeness of the samples analyzed vs the composition of the Authier waste rock

The Authier mineralised pegmatite (ore) trends east-west, dips 45° to 55° to the north and is hosted by metamorphosed volcano-sedimentary lithologies which were gathered at project scale as a single and main unit of waste rock named “ultramafic to mafic rock assemblage” (UMW) which encompasses four (4) lithologies with a similar mineral and geochemical signature including principally ultramafic (peridotitic) to mafic metavolcanic flows with less abundant basaltic metavolcanics and metasedimentary units described as hornblende-chlorite-biotite schists (shale).

By review of geological logs in the drilling database it is concluded that 95 % of the waste rock of Authier project is the “ultramafic to mafic assemblage” (UMW). The remaining 5 % is barren pegmatite and minor granodiorite which, because the white – light colour, are difficult to separate of pegmatite ore and could be considered ore internal dilution.

The author considers that the ultramafic to mafic waste rock unit (UMW) analysed are representative of the composition of the Authier waste rock

A handwritten signature in blue ink, appearing to read 'Gustavo Delendatti', with a stylized flourish at the end.

Gustavo Delendatti (MAIG 3552)

References

- Canadian Nuclear Safety Commission, 2020, [McArthur River Mine - Canadian Nuclear Safety Commission](#)
- Cameco, 2020, [McArthur River/Key Lake - Suspended - Uranium Operations - Businesses - Cameco](#)
- Castor, S.B. and Hedrick, J.B. (2006) Rare Earth Elements. Industrial Minerals Volume, 7th Edition, Society for Mining, Metallurgy, and Exploration, Littleton, Colorado, 769-792.
- Énergie et Ressources Naturelles Québec, 1979. Geological Report on Prospect for the development of high-grade Uranium Ore at Villeneuve Uranium Mine, Papineau County, Province of Quebec, Canada. <http://gq.mines.gouv.qc.ca/documents/examine/GM34300/GM34300.pdf> GM 34300, 1979.
- Snow, J., Pelletier, P., Eddy. S., 2012, IAMGOLD Corporation REE project, Corporate presentation, Hong Kong, 2012.
- Scott, J.M.J., Peterson, T.D., Eddy. S., 2012, U, Th and REE occurrences within Nuelin granite at Nuelin Lake, Nunavut: recent observations. Geological Survey of Canada, Current research 2012-1, 11 pp. doi: 10.4095/289393
- Weng, Z.H., Jowitt, S.M., and McCurdy, M.W., 2012, A Detailed Assessment of Global Rare Earth Element Resources: Opportunities and Challenges. Society of Economic Geologists, Inc. Economic Geology, v. 110, pp. 1925–1952

Table 1: Mean Activity Concentration for Radioactive elements assayed (5 pegmatites and 5 ultramafic waste samples)

		Activity Concentration (Bq/g)											
		Radium-228		Thorium-228		Radium-226		Lead-210		Thorium-232 calculated		Uranium-238 calculated	
N° of Samples	Rock Type	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range
5	Pegmatite	0.021	0.005 - 0.04	0.016	0.009-0.02	0.102	0.03-0.2	0.098	0.05-0.2	0.012	0.007-0.014	0.072	0.047-0.11
5	UMW	0.0042*	0.002*-0.005*	<0.004	<0.004	0.033*	0.025-0.03*	0.019*	0.015*-0.02*	0.0006*	0.0005*-0.001	0.0006*	0.0005*-0.001
UMW: Ultramafic to mafic waste rock // *: assays below detection limit – half of minimum detection limit considered for mean calculation													

Table 2: Uranium (U) and Thorium (Th) readings from gamma ray field surface survey completed at Authier project. CPS is counts per second

Point ID	East	North	CPS	U_ppm	Th_ppm
1	705290	5360758	68	4.5	26
2	706319	5360814	41	5.6	9.8
3	706830	5361066	59	4.3	24.7
4	707295	5360560	30	2.2	5.8
5	707787	5360330	58	5.5	20.2
6	707558	5360205	62	4.4	31.3
7	707412	5360399	48	0.9	19.4
8	706755	5360325	85	9.2	37.8
9	706395	5360092	31	3.7	10.1
10	706432	5360317	81	4.8	35
11	707117	5360277	46	4.3	21.5

Table 3: Heavy REE assay results. 1 µg/g = 1 ppm

Sample ID	Rock Type	Yttrium	Dysprosium	Erbium	Gadolinium	Holmium	Lutetium	Terbium	Thulium	Ytterbium	HREE SUM	HREE + Y SUM	HREE + Y Mean
		µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
J165925	Spod Peg	2.89	0.71	0.14	1.61	0.070	0.006	0.33	0.12	0.14	3.13	6.02	0.67
J165926	Spod Peg	1.49	0.45	0.052	1.15	0.030	0.0005	0.25	0.078	0.042	2.050	3.54	0.390
J165928	Spod Peg	2.69	0.67	0.12	1.58	0.058	0.0005	0.28	0.070	0.098	2.880	5.57	0.620
J165929	Spod Peg	1.54	0.44	0.064	1.18	0.034	0.0005	0.21	0.056	0.052	2.040	3.58	0.400
J165930	Spod Peg	3.80	0.74	0.32	1.26	0.12	0.025	0.22	0.074	0.29	3.050	6.85	0.760
J165931	UMW	3.83	0.66	0.46	0.53	0.15	0.060	0.13	0.086	0.46	2.540	6.37	0.710
J165932	UMW	6.63	1.26	0.76	1.01	0.27	0.094	0.21	0.13	0.71	4.440	11.07	1.230
J165933	UMW	24.2	3.79	3.18	2.46	0.95	0.58	0.52	0.52	3.57	15.570	39.80	4.400
J165934	UMW	12.0	2.23	1.49	1.72	0.48	0.21	0.34	0.22	1.44	8.130	20.10	2.200
J165935	UMW	7.26	1.44	0.88	1.37	0.31	0.12	0.24	0.13	0.86	5.350	12.61	1.400

Table 4: Light REE assay results. 1 µg/g = 1 ppm

Sample ID	Rock Type	Cerium	Europium	Lanthanum	Neodymium	Praseodymium	Samarium	LREE SUM	LREE Mean
		µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g	µg/g
J165925	Spod Peg	3.02	0.004	0.92	2.13	0.49	1.95	8.51	1.42
J165926	Spod Peg	1.32	0.005	0.44	0.83	0.20	1.05	3.85	0.64
J165928	Spod Peg	3.00	0.061	0.93	2.06	0.47	1.86	8.38	1.40
J165929	Spod Peg	1.68	0.048	0.52	1.05	0.26	1.21	4.77	0.79
J165930	Spod Peg	2.46	0.12	0.92	1.72	0.39	1.28	6.89	1.15
J165931	UMW	1.31	0.19	0.53	1.02	0.20	0.34	3.59	0.60
J165932	UMW	2.38	0.23	0.66	2.14	0.41	0.72	6.54	1.09
J165933	UMW	7.69	0.61	3.03	5.81	1.13	1.80	20.07	3.35
J165934	UMW	3.45	0.34	1.19	3.32	0.58	1.20	1.68	1.68
J165935	UMW	6.63	0.46	3.01	4.25	0.90	1.14	16.39	2.73

UMW: Ultramafic to mafic waste



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13-November-2020

Date Rec. : 28 October 2020
LR Report: CA14754-OCT20

Copy: #1

CERTIFICATE OF ANALYSIS

Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: J165925	6: J165926	7: J165928	8: J165929	9: J165930	10: J165931	11: J165932	12: J165933	13: J165934	14: J165935
Sample Date & Time					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ag [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Al [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	56000	57000	67000	60000	61000	23000	26000	71000	48000	34000
As [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	1.8	1.2	1.0	1.1	0.6	0.6	0.5	0.9	< 0.5	4.4
Ba [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	2.80	4.18	5.72	200	95	0.96	0.53	270	9.72	380
Be [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	31	130	52	90	39	2.86	6.43	0.36	12	16
Bi [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	13	0.89	7.30	2.78	7.75	1.56	1.03	0.15	0.18	1.16
Ca [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	780	940	2700	1300	11000	33000	51000	52000	43000	45000
Cd [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	0.10	0.03	0.07	0.04	0.15	0.05	0.11	0.10	0.07	0.11
Co [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	0.46	0.39	0.78	0.88	23	93	86	48	78	73
Cr [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	41	69	61	62	260	990	1100	120	930	970
Cu [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	0.8	0.9	1.4	1.0	4.0	26	110	75	0.7	36
Fe [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	4400	3700	4600	3800	22000	67000	64000	88000	80000	65000
K [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	17000	22000	1600	33000	26000	2700	210	4700	1300	23000
Li [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	5800	3700	5100	1300	3400	130	34	570	360	980
Mg [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	140	140	930	1200	36000	160000	130000	40000	100000	100000
Mn [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	1000	580	1000	300	910	1100	1300	1600	2200	1800
Mo [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	2.2	0.7	0.3	1.7	0.2	0.1	0.1	1.0	< 0.1	3.6



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LR Report :

CA14754-OCT20

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: J165925	6: J165926	7: J165928	8: J165929	9: J165930	10: J165931	11: J165932	12: J165933	13: J165934	14: J165935
Ni [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	0.6	1.5	2.0	6.3	350	1600	1200	120	770	960
Pb [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	14	12	9.25	13	8.07	0.71	10	3.06	1.79	3.40
S [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	39	24	19	24	45	690	1400	57	65	170
Sb [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Se [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Sn [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	< 6	8.6	< 6	6.7	7.7	< 6	< 6	< 6	< 6	6.2
Sr [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	3.17	4.14	76	21	34	31	15	150	50	29
Ti [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	39	28	20	43	500	1100	1400	3500	2900	1600
Tl [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	9.06	15	0.63	15	15	2.13	0.36	0.62	0.48	13
U [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	7.14	3.62	8.18	5.49	3.69	0.044	0.11	0.071	0.031	0.21
V [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	1.2	1.2	3.2	2.3	31	85	120	240	190	120
W [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	2.57	0.35	1.93	0.36	1.17	0.37	0.17	0.13	0.68	0.13
Y [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	2.89	1.49	2.69	1.54	3.80	3.83	6.63	24.2	12.0	7.26
Zn [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	98	75	35	53	120	60	65	87	110	98
Zr [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	9.39	5.72	12	6.19	6.04	1.38	0.90	17	4.91	6.51
Ce [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	3.02	1.32	3.00	1.68	2.46	1.31	2.38	7.69	3.45	6.63
Cs [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	47	110	20	85	490	97	3.97	18	43	870
Dy [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	0.71	0.45	0.67	0.44	0.74	0.66	1.26	3.79	2.23	1.44
Er [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	0.14	0.052	0.12	0.064	0.32	0.46	0.76	3.18	1.49	0.88
Eu [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	0.004	0.005	0.061	0.048	0.12	0.19	0.23	0.61	0.34	0.46
Ga [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	52	54	56	49	48	9.02	7.74	12	12	29
Gd [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	1.61	1.15	1.58	1.18	1.26	0.53	1.01	2.46	1.72	1.37
Ge [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	< 0.3	< 0.3	< 0.3	< 0.3	0.3	0.5	0.7	1.1	1.2	0.5
Hf [µg/g]	10-Nov-20	00:06	11-Nov-20	13:42	2.1	1.6	2.6	1.5	1.5	0.2	0.2	0.9	0.4	0.3
Ho [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	0.070	0.030	0.058	0.034	0.12	0.15	0.27	0.95	0.48	0.31
In [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	0.21	0.17	0.13	0.13	0.13	0.08	0.08	0.10	0.08	0.07
La [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	0.92	0.44	0.93	0.52	0.92	0.53	0.66	3.03	1.19	3.01
Lu [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	0.006	< 0.001	< 0.001	< 0.001	0.025	0.060	0.094	0.58	0.21	0.12
Nd [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	2.13	0.83	2.06	1.05	1.72	1.02	2.14	5.81	3.32	4.25
Pr [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	0.49	0.20	0.47	0.26	0.39	0.20	0.41	1.13	0.58	0.90
Rb [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	1300	1900	80.2	2100	2000	290	12.2	120	69.3	1700



SGS Canada Inc.

P.O. Box 4300 - 185 Concession St.

Lakefield - Ontario - KOL 2HO

Phone: 705-652-2000 FAX: 705-652-6365

LR Report :

CA14754-OCT20

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: J165925	6: J165926	7: J165928	8: J165929	9: J165930	10: J165931	11: J165932	12: J165933	13: J165934	14: J165935
Sm [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	1.95	1.05	1.86	1.21	1.28	0.34	0.72	1.80	1.20	1.14
Ta [µg/g]	10-Nov-20	00:06	11-Nov-20	13:43	21	27	32	25	26	1.32	0.56	1.79	1.08	2.84
Tb [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	0.33	0.25	0.28	0.21	0.22	0.13	0.21	0.52	0.34	0.24
Th [µg/g]	10-Nov-20	00:06	11-Nov-20	13:43	1.34	1.01	1.47	1.35	1.53	0.32	0.16	0.46	0.25	0.21
Tm [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	0.12	0.078	0.070	0.056	0.074	0.086	0.13	0.52	0.22	0.13
Yb [µg/g]	11-Nov-20	10:54	13-Nov-20	09:14	0.14	0.042	0.098	0.052	0.29	0.46	0.71	3.57	1.44	0.86

Catharine Arnold



Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

Votre # du projet: C058434
Votre # Bordereau: N/A

Attention: Theodore Scodras

Bureau Veritas Laboratories
889 Montée de Liesse
Ville St-Laurent, QC
CANADA H4T 1P5

Date du rapport: 2020/12/07
Rapport: R6439916
Version: 1 - Finale

CERTIFICAT D'ANALYSES

DE DOSSIER BV LABS: C0V0616

Reçu: 2020/11/24, 08:50

Matrice: Sol
Nombre d'échantillons reçus: 11

Analyses	Quantité	Date de l' extraction	Date Analysé	Méthode de laboratoire	Méthode d'analyse
NORM Group Analysis	5	N/A	2020/11/27	BQL SOP-00007	Gamma Spectrometry
NORM Group Analysis	6	N/A	2020/11/28	BQL SOP-00007	Gamma Spectrometry

Remarques:

Laboratoires Bureau Veritas sont certifiés ISO/IEC 17025 pour certains paramètres précis des portées d'accréditation. Sauf indication contraire, les méthodes d'analyses utilisées par Labs BV s'inspirent des méthodes de référence d'organismes provinciaux, fédéraux et américains, tels que le CCME, le MELCC, l'EPA et l'APHA.

Toutes les analyses présentées ont été réalisées conformément aux procédures et aux pratiques relatives à la méthodologie, à l'assurance qualité et au contrôle de la qualité généralement appliqués par les employés de Labs BV (sauf s'il en a été convenu autrement par écrit entre le client et Labs BV). Toutes les données de laboratoire rencontrent les contrôles statistiques et respectent tous les critères de CQ et les critères de performance des méthodes, sauf s'il en a été signalé autrement. Tous les blancs de méthode sont rapportés, toutefois, les données des échantillons correspondants ne sont pas corrigées pour la valeur du blanc, sauf indication contraire. Le cas échéant, sauf indication contraire, l'incertitude de mesure n'a pas été prise en considération lors de la déclaration de la conformité à la norme de référence.

Les responsabilités de Labs BV sont restreintes au coût réel de l'analyse, sauf s'il en a été convenu autrement par écrit. Il n'existe aucune autre garantie, explicite ou implicite. Le client a fait appel à Labs BV pour l'analyse de ses échantillons conformément aux méthodes de référence mentionnées dans ce rapport. L'interprétation et l'utilisation des résultats sont sous l'entière responsabilité du client et ne font pas partie des services offerts par Labs BV, sauf si convenu autrement par écrit. Labs BV ne peut pas garantir l'exactitude des résultats qui dépendent des renseignements fournis par le client ou son représentant.

Les résultats des échantillons solides, sauf les biotes, sont rapportés en fonction de la masse sèche, sauf indication contraire. Les analyses organiques ne sont pas corrigées en fonction de la récupération, sauf pour les méthodes de dilution isotopique.

Les résultats s'appliquent seulement aux échantillons analysés. Si l'échantillonnage n'est pas effectué par Labs BV, les résultats se rapportent aux échantillons fournis pour analyse.

Le présent rapport ne doit pas être reproduit, sinon dans son intégralité, sans le consentement écrit du laboratoire.

Lorsque la méthode de référence comprend un suffixe « m », cela signifie que la méthode d'analyse du laboratoire contient des modifications validées et appliquées afin d'améliorer la performance de la méthode de référence.



Votre # du projet: C058434
Votre # Bordereau: N/A

Attention: Theodore Scodras

Bureau Veritas Laboratories
889 Montée de Liesse
Ville St-Laurent, QC
CANADA H4T 1P5

Date du rapport: 2020/12/07
Rapport: R6439916
Version: 1 - Finale

CERTIFICAT D'ANALYSES

DE DOSSIER BV LABS: C0V0616

Reçu: 2020/11/24, 08:50

clé de cryptage

Veuillez adresser toute question concernant ce certificat d'analyse à votre chargé(e) de projets
Mayank Nigam,
Courriel: Mayank.Nigam@bvlabs.com
Téléphone (905) 826-3080

=====

Ce rapport a été produit et distribué en utilisant une procédure automatisée sécuritaire.

Lab BV a mis en place des procédures qui protègent contre l'utilisation non autorisée de la signature électronique et emploie les <<signataires>> requis, conformément à l'ISO/CEI 17025. Veuillez vous référer à la page des signatures de validation pour obtenir les détails des validations pour chaque division.



RÉSULTATS D'ANALYSES POUR LES ÉCHANTILLONS DE SOL

Identification BV Labs		OFQ390	OFW943	OFW944	OFW945	OFW946		
Date d'échantillonnage		2019/07/16	2019/07/16	2019/07/16	2019/07/14 11:55	2019/07/16		
# Bordereau		N/A	N/A	N/A	N/A	N/A		
	Unités	IP4177-TR3 -2	IP4178-TR6 -2	IP4179-TR5 -2	IP4180-TR7 -1 (2020TR7-1)	IP4181-TR8 -1	LDR	Lot CQ
Lead-210	Bq/g	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7077508
Radium-226	Bq/g	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7077508

LDR = limite de détection rapportée

Lot CQ = Lot Contrôle Qualité

Identification BV Labs		OFW947	OFW948	OFW949	OFW950	OFW951		
Date d'échantillonnage		2019/07/16	2019/07/16	2019/07/16	2019/07/16	2019/07/16		
# Bordereau		N/A	N/A	N/A	N/A	N/A		
	Unités	IP4182-TR14 -2	IP4183-TR18 -1	IP4184 -TR21 -2	IP4185 -TR29 -2	IP4186 -TR32 -1	LDR	Lot CQ
Lead-210	Bq/g	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7077508
Radium-226	Bq/g	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	7077508

LDR = limite de détection rapportée

Lot CQ = Lot Contrôle Qualité

Identification BV Labs		OFW952		
Date d'échantillonnage		2019/07/16		
# Bordereau		N/A		
	Unités	IP4208 -TR6 -2 DT1	LDR	Lot CQ
Lead-210	Bq/g	<0.10	0.10	7077508
Radium-226	Bq/g	<0.10	0.10	7077508
LDR = limite de détection rapportée				
Lot CQ = Lot Contrôle Qualité				



**BUREAU
VERITAS**

Dossier BV Labs: COV0616

Date du rapport: 2020/12/07

Bureau Veritas Laboratories

Votre # du projet: C058434

REMARQUES GÉNÉRALES

Les résultats s'appliquent seulement pour les paramètres analysés.



RAPPORT ASSURANCE QUALITÉ

Lot Lot	Init	Type CQ	Groupe	Date Analysé	Valeur	Réc	Unités	Limites CQ
7077508	DS2	MRC	Lead-210	2020/11/26		90	%	74 - 126
			Radium-226	2020/11/26		97	%	74 - 126
7077508	DS2	Blanc de méthode	Lead-210	2020/11/26	<0.10		Bq/g	
			Radium-226	2020/11/26	<0.10		Bq/g	
7077508	DS2	RPD [OFW943-01]	Lead-210	2020/11/27	NC		%	N/A
			Radium-226	2020/11/27	NC		%	N/A

N/A = Non Applicable

Duplicata: Deux parties aliquotes distinctes obtenues à partir d'un même échantillon et soumises en même temps au même processus analytique du prétraitement au dosage. Les duplicatas servent à vérifier la variance de la mesure.

MRC: Un échantillon de concentration connue préparé dans des conditions rigoureuses par un organisme externe. Utilisé pour vérifier la justesse de la méthode.

Blanc de méthode: Une partie aliquote de matrice pure soumise au même processus analytique que les échantillons, du prétraitement au dosage. Sert à évaluer toutes contaminations du laboratoire.

NC (RPD du duplicata) : La RPD du duplicata n'a pas été calculée. La concentration de l'échantillon ou du duplicata était trop faible pour permettre le calcul de la RPD (différence absolue $\leq 2 \times \text{LDR}$)

Réc = Récupération



BUREAU
VERITAS

Dossier BV Labs: COV0616

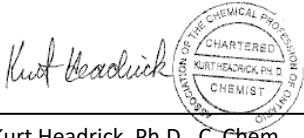
Date du rapport: 2020/12/07

Bureau Veritas Laboratories

Votre # du projet: C058434

PAGE DES SIGNATURES DE VALIDATION

Les résultats analytiques ainsi que les données de contrôle-qualité contenus dans ce rapport furent vérifiés et validés par les personnes suivantes:



Kurt Headrick, Ph.D., C. Chem.

Lab BV a mis en place des procédures qui protègent contre l'utilisation non autorisée de la signature électronique et emploie les <<signataires>> requis, conformément à l'ISO/CEI 17025. Veuillez vous référer à la page des signatures de validation pour obtenir les détails des validations pour chaque division.

SRC Group # 2020-13391

Nov 16, 2020

SGS
Lakefield Research Environmental Laboratory
185 Concession Street
Lakefield, ON K0L 2H0
Attn: Catharine Arnold

Date Samples Received: Nov-02-2020

Client P.O.: CA14755-OCT20

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 2 authorized by Keith Gipman, Supervisor
Results from Lab Section 4 authorized by Vicky Snook, Supervisor

-
- * Test methods and data are validated by the laboratory's Quality Assurance Program.
 - * Routine methods follow recognized procedures from sources such as
 - * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
 - * Environment Canada
 - * US EPA
 - * CANMET
 - * The results reported relate only to the test samples as provided by the client.
 - * Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.
 - * Additional information is available upon request.
 - * Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SRC Group # 2020-13391

Nov 16, 2020

SGS, Lakefield Research Environmental Laboratory

185 Concession Street
Lakefield, ON K0L 2H0
Attn: Catharine Arnold

Sample #: **2020057927**
Date Sampled:
Sample Matrix: **PULP**
Description: **J165925**

Client PO #: **CA14755-OCT20**
Date Received: **Nov 02, 2020**

Analyte	Units	Result	DL
Lab Section 2			
Thorium-232 calculated	Bq/g	0.014	0.001
Uranium-238 calculated	Bq/g	0.088	0.001
Lab Section 4			
Radium-228	Bq/g	<0.01	0.01
Thorium-228	Bq/g	0.02	0.005
Radium-226	Bq/g	0.08	0.07
Lead-210	Bq/g	0.09	0.05

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 19.8 °C upon receipt.

Results are reported on an as received basis.

Gamma spectroscopy detection limits are influenced by several factors.

"Less than" values reported above represent the lowest detection limits achievable for the sample.

SRC Group # 2020-13391

Nov 16, 2020

SGS, Lakefield Research Environmental Laboratory

Sample #: **2020057928**
Date Sampled:
Sample Matrix: **PULP**
Description: **J165926**

Client PO #: **CA14755-OCT20**
Date Received: **Nov 02, 2020**

Analyte	Units	Result	DL
Lab Section 2			
Thorium-232 calculated	Bq/g	0.010	0.001
Uranium-238 calculated	Bq/g	0.047	0.001
Lab Section 4			
Radium-228	Bq/g	0.03	0.01
Thorium-228	Bq/g	0.02	0.005
Radium-226	Bq/g	0.1	0.06
Lead-210	Bq/g	0.06	0.05

The temperature of the cooler was 19.8 °C upon receipt.

Results are reported on an as received basis.

Gamma spectroscopy detection limits are influenced by several factors.

"Less than" values reported above represent the lowest detection limits achievable for the sample.

SRC Group # 2020-13391

Nov 16, 2020

SGS, Lakefield Research Environmental Laboratory

Sample #: **2020057929**
Date Sampled:
Sample Matrix: **PULP**
Description: **J165928**

Client PO #: **CA14755-OCT20**
Date Received: **Nov 02, 2020**

Analyte	Units	Result	DL
Lab Section 2			
Thorium-232 calculated	Bq/g	0.014	0.001
Uranium-238 calculated	Bq/g	0.11	0.001
Lab Section 4			
Radium-228	Bq/g	<0.02	0.02
Thorium-228	Bq/g	0.02	0.005
Radium-226	Bq/g	0.1	0.09
Lead-210	Bq/g	0.2	0.06

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 19.8 °C upon receipt.

Results are reported on an as received basis.

Gamma spectroscopy detection limits are influenced by several factors.

"Less than" values reported above represent the lowest detection limits achievable for the sample.

SRC Group # 2020-13391

Nov 16, 2020

SGS, Lakefield Research Environmental Laboratory

Sample #: **2020057930**
Date Sampled:
Sample Matrix: **PULP**
Description: **J165929**

Client PO #: **CA14755-OCT20**
Date Received: **Nov 02, 2020**

Analyte	Units	Result	DL
Lab Section 2			
Thorium-232 calculated	Bq/g	0.013	0.001
Uranium-238 calculated	Bq/g	0.065	0.001
Lab Section 4			
Radium-228	Bq/g	0.04	0.01
Thorium-228	Bq/g	0.01	0.006
Radium-226	Bq/g	0.2	0.08
Lead-210	Bq/g	0.09	0.06

The temperature of the cooler was 19.8 °C upon receipt.

Results are reported on an as received basis.

Gamma spectroscopy detection limits are influenced by several factors.
"Less than" values reported above represent the lowest detection limits achievable for the sample.

SRC Group # 2020-13391

Nov 16, 2020

SGS, Lakefield Research Environmental Laboratory

Sample #: **2020057931**
Date Sampled:
Sample Matrix: **PULP**
Description: **J165930**

Client PO #: **CA14755-OCT20**
Date Received: **Nov 02, 2020**

Analyte	Units	Result	DL
Lab Section 2			
Thorium-232 calculated	Bq/g	0.007	0.001
Uranium-238 calculated	Bq/g	0.049	0.001
Lab Section 4			
Radium-228	Bq/g	0.02	0.009
Thorium-228	Bq/g	0.009	0.004
Radium-226	Bq/g	<0.06	0.06
Lead-210	Bq/g	0.05	0.05

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 19.8 °C upon receipt.

Results are reported on an as received basis.

Gamma spectroscopy detection limits are influenced by several factors.

"Less than" values reported above represent the lowest detection limits achievable for the sample.

SRC Group # 2020-13391

Nov 16, 2020

SGS, Lakefield Research Environmental Laboratory

Sample #: **2020057932**
Date Sampled:
Sample Matrix: **PULP**
Description: **J165931**

Client PO #: **CA14755-OCT20**
Date Received: **Nov 02, 2020**

Analyte	Units	Result	DL
Lab Section 2			
Thorium-232 calculated	Bq/g	<0.001	0.001
Uranium-238 calculated	Bq/g	<0.001	0.001
Lab Section 4			
Radium-228	Bq/g	<0.01	0.01
Thorium-228	Bq/g	<0.004	0.004
Radium-226	Bq/g	<0.06	0.06
Lead-210	Bq/g	<0.03	0.03

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 19.8 °C upon receipt.

Results are reported on an as received basis.

Gamma spectroscopy detection limits are influenced by several factors.

"Less than" values reported above represent the lowest detection limits achievable for the sample.

SRC Group # 2020-13391

Nov 16, 2020

SGS, Lakefield Research Environmental Laboratory

Sample #: **2020057933**
Date Sampled:
Sample Matrix: **PULP**
Description: **J165932**

Client PO #: **CA14755-OCT20**
Date Received: **Nov 02, 2020**

Analyte	Units	Result	DL
Lab Section 2			
Thorium-232 calculated	Bq/g	<0.001	0.001
Uranium-238 calculated	Bq/g	<0.001	0.001
Lab Section 4			
Radium-228	Bq/g	<0.008	0.008
Thorium-228	Bq/g	<0.004	0.004
Radium-226	Bq/g	0.05	0.05
Lead-210	Bq/g	<0.04	0.04

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 19.8 °C upon receipt.

Results are reported on an as received basis.

Gamma spectroscopy detection limits are influenced by several factors.

"Less than" values reported above represent the lowest detection limits achievable for the sample.

SRC Group # 2020-13391

Nov 16, 2020

SGS, Lakefield Research Environmental Laboratory

Sample #: **2020057934**
Date Sampled:
Sample Matrix: **PULP**
Description: **J165933**

Client PO #: **CA14755-OCT20**
Date Received: **Nov 02, 2020**

Analyte	Units	Result	DL
Lab Section 2			
Thorium-232 calculated	Bq/g	<0.001	0.001
Uranium-238 calculated	Bq/g	<0.001	0.001
Lab Section 4			
Radium-228	Bq/g	<0.01	0.01
Thorium-228	Bq/g	<0.004	0.004
Radium-226	Bq/g	<0.06	0.06
Lead-210	Bq/g	<0.04	0.04

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 19.8 °C upon receipt.

Results are reported on an as received basis.

Gamma spectroscopy detection limits are influenced by several factors.

"Less than" values reported above represent the lowest detection limits achievable for the sample.

SRC Group # 2020-13391

Nov 16, 2020

SGS, Lakefield Research Environmental Laboratory

Sample #: **2020057935**
Date Sampled:
Sample Matrix: **PULP**
Description: **J165934**

Client PO #: **CA14755-OCT20**
Date Received: **Nov 02, 2020**

Analyte	Units	Result	DL
Lab Section 2			
Thorium-232 calculated	Bq/g	<0.001	0.001
Uranium-238 calculated	Bq/g	<0.001	0.001
Lab Section 4			
Radium-228	Bq/g	<0.004	0.004
Thorium-228	Bq/g	<0.004	0.004
Radium-226	Bq/g	<0.05	0.05
Lead-210	Bq/g	<0.04	0.04

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 19.8 °C upon receipt.

Results are reported on an as received basis.

Gamma spectroscopy detection limits are influenced by several factors.

"Less than" values reported above represent the lowest detection limits achievable for the sample.

SRC Group # 2020-13391

Nov 16, 2020

SGS, Lakefield Research Environmental Laboratory

Sample #: **2020057936**
Date Sampled:
Sample Matrix: **PULP**
Description: **J165935**

Client PO #: **CA14755-OCT20**
Date Received: **Nov 02, 2020**

Analyte	Units	Result	DL
Lab Section 2			
Thorium-232 calculated	Bq/g	0.002	0.001
Uranium-238 calculated	Bq/g	0.002	0.001
Lab Section 4			
Radium-228	Bq/g	<0.01	0.01
Thorium-228	Bq/g	<0.004	0.004
Radium-226	Bq/g	<0.06	0.06
Lead-210	Bq/g	<0.04	0.04

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 19.8 °C upon receipt.

Results are reported on an as received basis.

Gamma spectroscopy detection limits are influenced by several factors.

"Less than" values reported above represent the lowest detection limits achievable for the sample.

SRC Group # 2020-13391

Nov 16, 2020

SGS, Lakefield Research Environmental Laboratory

Analyte Methods

Name	Units	Method
Thorium-232 calculated	Bq/g	PRP-034 / Chm-522
Uranium-238 calculated	Bq/g	PRP-034 / Chm-522
Lead-210	Bq/g	Rad-300
Radium-226	Bq/g	Rad-300
Radium-228	Bq/g	Rad-300
Thorium-228	Bq/g	Rad-300

RAPPORT DE LEVÉ SPECTROMÉTRIQUE
PROJET AUTHIER

PRÉSENTÉ À
M. YANICK PLOURDE, SAYONA QUÉBEC

PAR
OLIVIER LEMIEUX
SERVICES GFE INC.

24 SEPTEMBRE 2020

MANDAT

L'entreprise Sayona Québec possède un gisement de lithium dans la municipalité de La Motte (Abitibi-Témiscamingue) qu'elle désire mettre en production commerciale. Dans le cadre des études préliminaires requises pour obtenir les autorisations nécessaires à l'exploitation du gisement, l'entreprise a mandaté notre firme, Services GFE inc., pour effectuer un levé spectrométrique (rayons gamma) à divers endroits sur le site afin d'évaluer les taux de radiation naturelle et les concentrations en U et Th.

MÉTHODOLOGIE

Le 23 septembre 2020, M. Olivier Lemieux, œuvrant pour Services GFE inc. s'est rendu sur le site du projet Authier pour effectuer des lectures de rayons gamma à l'aide d'un appareil RS-125 de Radiation Solutions. Douze (12) points répartis de façon uniforme sur le site avaient été préalablement identifiés sur une carte. Une fois rendu sur l'endroit exact (localisation GPS), deux types de données étaient recueillies :

- Les radiations naturelles (lues en CPS, ou « coups par seconde »);
- Un échantillonnage des valeurs en Uranium (U) et Thorium (Th) (lues en PPM, ou « parties par million »)

Chaque lecture sur l'écran de l'appareil était photographiée à l'aide d'un téléphone portable Apple iPhone. Un GPS portable Garmin GPSMap 66i affichant la localisation du site était également disposé près du RS-125 pour être photographié.

Onze (11) des douze (12) stations identifiées ont été visitées. Une des station était difficilement accessible et a donc été abandonnée.

APPAREIL

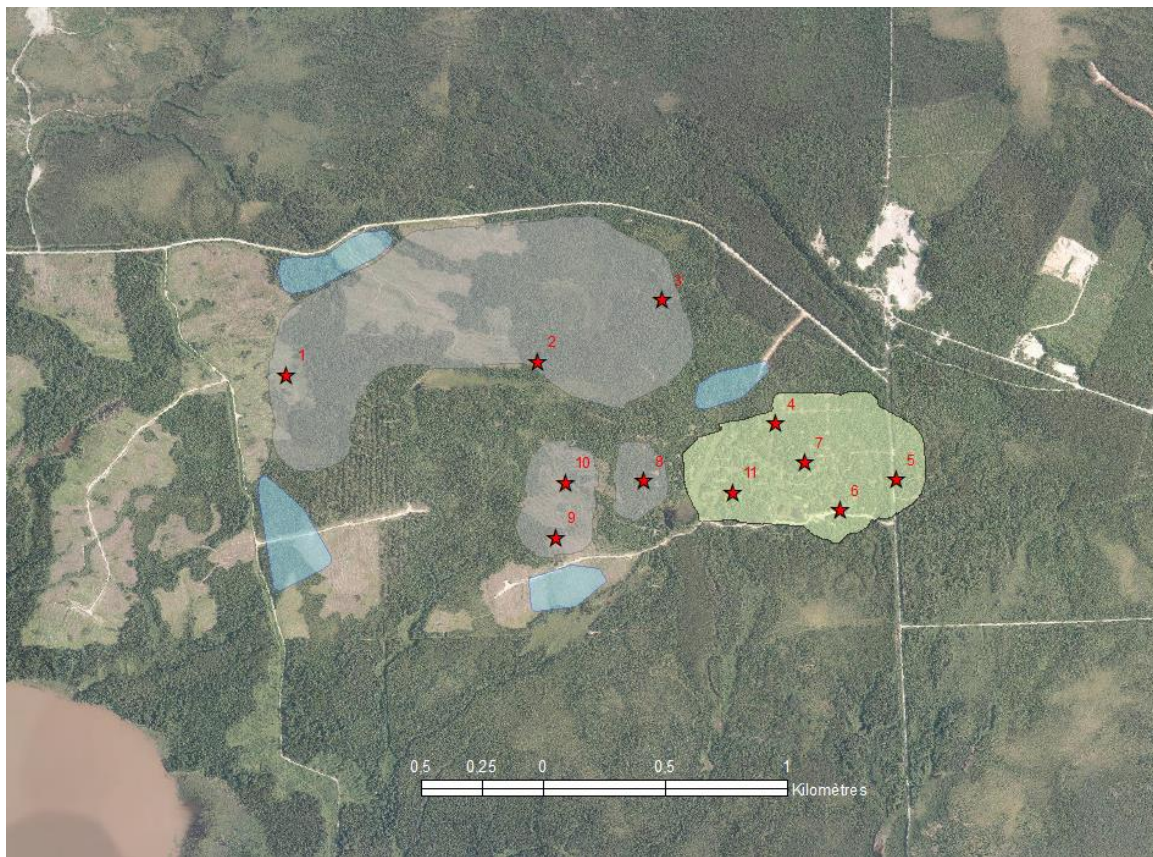
L'appareil utilisé est un spectromètre RS-125 fabriqué par Radiation solutions inc. de Mississauga (Ontario) et porte le numéro de série 2230. Le RS-125 s'auto-stabilise avec la radioactivité naturelle (K, U, Th) et ne nécessite aucun calibrage. Il possède un cristal de 103 cm³ et exécute un échantillonnage interne au taux de 20 par seconde. La gamme de lecture des radiations varie entre 0 et 65 535 CPS.

RÉSULTATS

Les résultats de ce levé sont consignés dans le tableau suivant :

Pt	X	Y	CPS	U (ppm)	Th (ppm)
1	705290	5360758	68	4,5	26
2	706319	5360814	41	5,6	9,8
3	706830	5361066	59	4,3	24,7
4	707295	5360560	30	2,2	5,8
5	707787	5360330	58	5,5	20,2
6	707558	5360205	62	4,4	31,3
7	707412	5360399	48	0,9	19,4
8	706755	5360325	85	9,2	37,8
9	706395	5360092	31	3,7	10,1
10	706432	5360317	81	4,8	35
11	707117	5360277	46	4,3	21,5

ANNEXE 1 - CARTE



ANNEXE 2 - DONNÉES TERRAIN





Pt 3



Pt 4



Pt 5



Olivier Lemieux, prés.

Pt 6



Pt 7



Pt 8



Pt 9



Pt 10



Pt 11

