GM 64735

PRELIMINARY TESTING OF KELSEY CENTRIFUGAL JIG FOR PRECONCENTRATION OF CREVIER ORE, FINAL REPORT OF PHASE 1

COREM

Les Minéraux Crévier inc.

Preliminary testing of Kelsey centrifugal jig for preconcentration of Crevier ore

FINAL REPORT OF PHASE 1

No: T981

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Date: December 3, 2008

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EXECUTIVE SUMMARY

Gravity separation tests were performed at COREM pilot plant facility on the sample received from Les Minéraux Crévier inc. using a Kelsey centrifugal jig model KCJ200. The aim of the test work was to evaluate the pre-concentration of niobium and tantalum minerals present in the Crevier sample, with grades of 0.2% Nb_2O_5 and 0,02% Ta_2O_5. Thirteen Kelsey jig tests were performed to generate a grade-recovery curve representing different operating and design conditions, as per the Roche MT testing protocol. The Kelsey jig test work and the metallurgical results are described and discussed. Test #04, with a mass pull of 10%, has been identified as optimal, where a niobium recovery of 79% with a concentrate grade of 1.43% Nb_2O_5 and a tantalum recovery of 79% with a concentrate grade of 0.22% Ta_2O_5 were achieved. Further work involving cleaner Kelsey jig test followed by a magnetic separation of the cleaner concentrate and magnetic separation followed by flotation of the magnetic separation tailings have been recommended for Phase 2 of this project.

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1 INTRODUCTION

Crevier minerals Inc. wants to develop the Crevier niobium-tantalum deposit. The first test work on Crevier (Concentration of pyrochlore from Crevier for SOQUEM) was run by CRM in 1985. Five more projects by CRM and COREM were conducted between 1985 and 2004. The last project, T453 aimed at developing a mineral processing flowsheet for the ore and included gravity separation and flotation test work. Gravity separation tests using spirals, Knelson and Falcon concentrators have shown that pyrochlore concentrates easily in the heavy fraction. However, the recovery did not reach a satisfactory level. Les Minéraux Crévier inc. now wants to evaluate gravity preconcentration by applying the Kelsey jig technology, which is efficient in recovering fine particles (down to 15 µm). COREM was mandated to evaluate this technology.

2 CONCLUSIONS

A series of thirteen preliminary gravity concentration tests were performed on the ore from the Crevier deposit. Following are the conclusions:

- Kelsey jig has efficiently preconcentrated niobium and tantalum minerals while rejecting the (66-99%) bulk of the gangue minerals (SiO_2, Al_2O_3, MgO and CaO).
- The mass pull to concentrate ranged from a low of 1.3 to 13% in the 12 tests.
- Nb_2O_5 content of 1.20 to 9.35% in concentrate was obtained with 61-80% niobium recovery from a head grade of 0.18-0.2% Nb_2O_5.
- Tantalum content was upgraded from head grade of 0.02-0.03% to 0.15-1.21% with recoveries ranging from 58 to 81%.
- Since the bulk of the gangue is rejected up to 95% and the mass recovery is low, the concentrate is suitable for leaching.

3 RECOMMANDATIONS

Since the preconcentration by Kelsey jig technology produced promising results, further testing is recommended:

1. Use the Kelsey Jig operating conditions yielding a mass pull of 5-10% for rougher stage in order to produce good recovery of Nb and Ta.

2. Perform a cleaner stage Kelsey jig test followed by magnetic separation on the rougher concentrate to determine if it is possible to improve the final grade while maintaining the recovery.
3. Perform a magnetic separation test followed by cleaner stage flotation of the magnetic separation tailings on the rougher concentrate to determine if it is possible to improve the final grade while maintaining recovery.

4 METHODOLOGY

Ore sample of 788 kg with a top size of 8 inches was received in three barrels at COREM. As-received sample was dried prior to size reduction. Size reduction was performed as per the schematic shown in Figure 1.The dried sample was crushed first in a jaw crusher to ½" size and the crushed sample was then homogenized to separate 150 kg for the Kelsey jig tests. The remaining sample (bulk) was stored for future testing. The split sample of 150 kg was further crushed to produce a product of 20M size which was screened to separate the –100 M product as shown in Figure 1 and coarser product was further ground wet in a laboratory ball mill as shown in Figure 2. The ground product was dried and mixed with the –100 M product obtained from crushing and homogenized as shown in Figure 2.

The size analysis and Microtrac analysis information is presented in Appendix A. Compared with the size distribution (P_{80} 125 µm) of T453 (Figure 3), the size distribution obtained in the present project is finer with a P80 of 106 µm from Microtrac (Figure 2) and 90.6 µm from sieve analysis (Table 1).

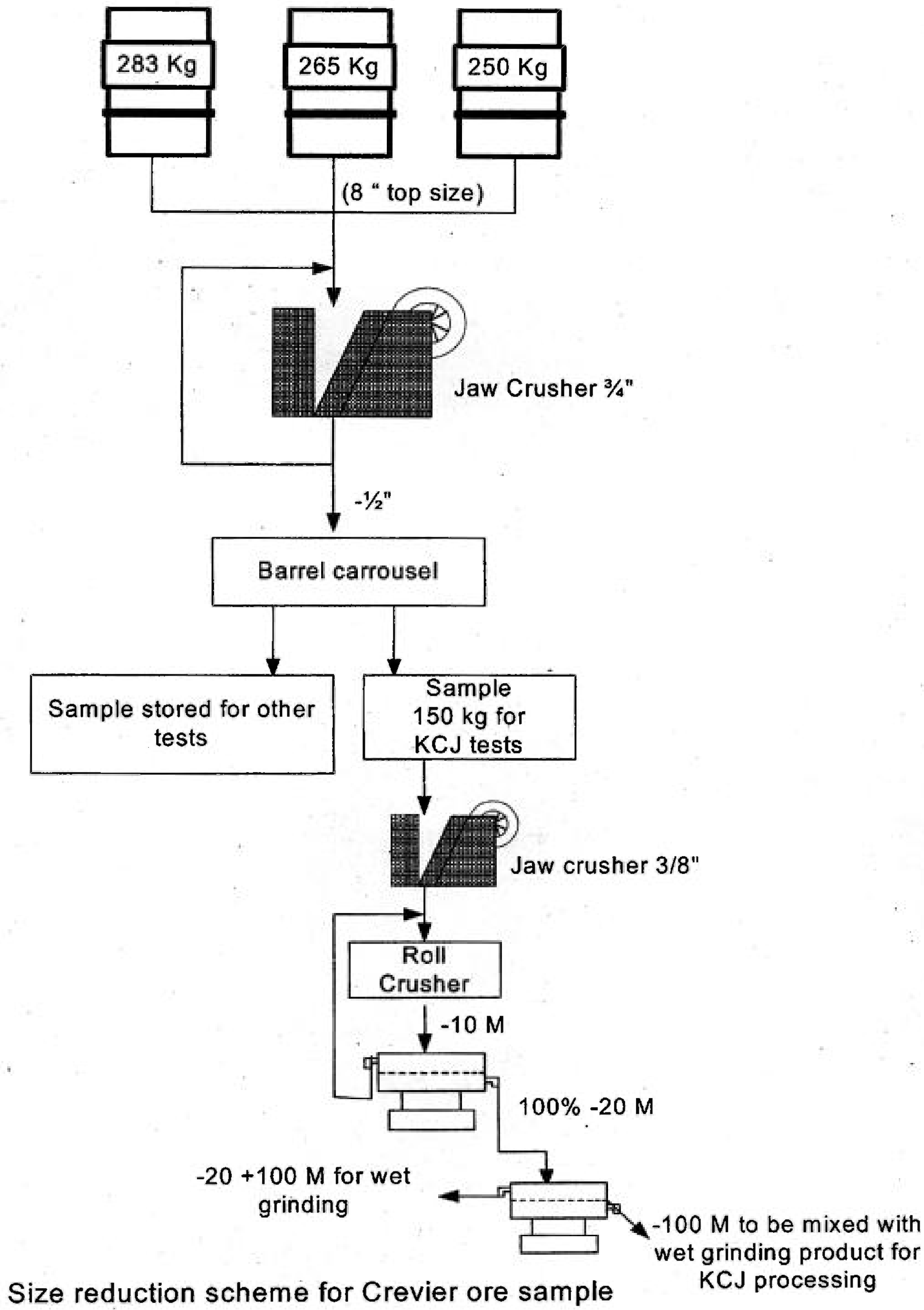

Figure 1: Crushing scheme

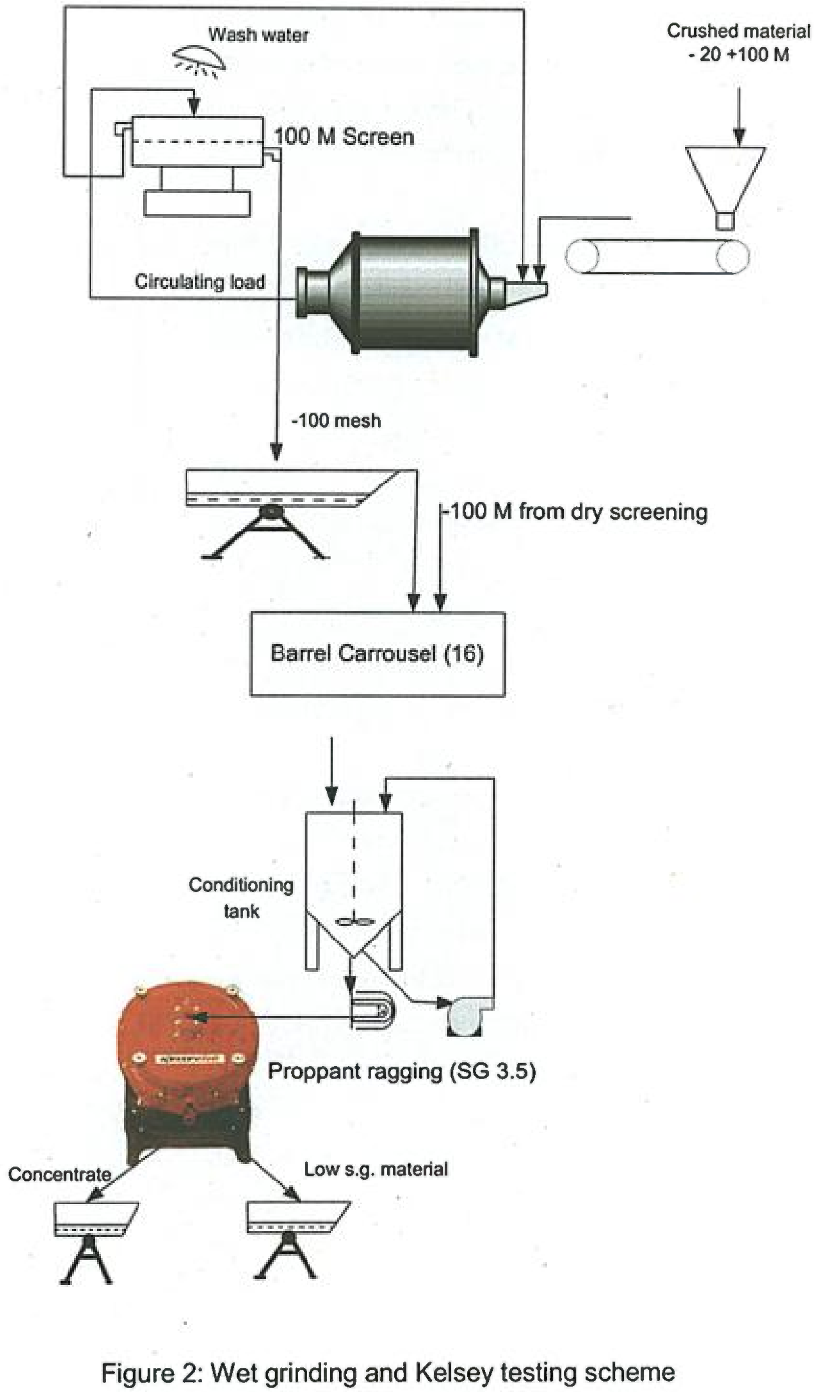

Figure 2: Wet grinding and Kelsey testing scheme

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5 RESULTS AND DISCUSSION

Analysis performed on the Kelsey jig feed samples are presented in Table 4 (Appendix B). The assay results were consistent among the tests with an average niobium content of 0.19% and 0.02% tantalum. However the head grade reported from T453 had lower niobium content at 0.12% but similar tantalum content of 0.02%.

Thirteen Kelsey jig tests were performed under different operating conditions as shown in Table 5 (Appendix C). Detailed metallurgical results of all the thirteen tests are also presented in Appendix C (Tables 6 to 16). The chemical analysis results of these tests are presented in Appendix D. Synthetic ragging (proppant; SG 3.5) was used in these tests to insure better separation performance.

Head, concentrate and tail samples generated from these tests were analyzed at the chemical laboratory, COREM by XRF methods (A21 and A31) for determining grades of oxide minerals and total sulfur was determined using LECO (B41) method. The chemical analyses of Kelsey jig tests are presented in Appendix D. A comparison of chemical analysis from A21 and A31 is presented in Table 1.

The methods used for XRF analysis of tantalum are A21 and A31.The precision of the A21 method is low for values of Ta_2O_3 below 100 ppm (0,01%), while A31 precision is low for values higher than 60 ppm (0,006%). As most of the tailing values are in the range 60 to 100 ppm, we can assume that the precision of the measurement of tantalum in tailing is not high. However, the recovery results are consistent with the one for Nb and the impact of tailing grade on the recovery calculation is low. Moreover, as shown in Table 2, results from both methods are consistent.

Mass balance calculation was performed on the assay results and flowrate measurement from testing. The results are presented in Table 2.

Table 1: Comparison of chemical analysis of A21 and A31 methods

		Nb_2O_5 (%)		Ta_2O_5 (%)	
		A21	A31	A21	A31
Tailing	1	0.055	0.052	0.007	0.0070
	2	0.101	0.103	0.012	0.0136
	3	0.049	0.049	0.006	0.0061
	4	0.047	0.048	0.006	0.0062
	5	0.051	0.051	0.007	0.0062
	6	0.05	0.049	0.004	0.0066
	7	0.05	0.048	0.006	0.0061
	8	0.051	0.053	0.007	0.0074
	9	0.056	0.058	0.006	0.0086
	10	0.059	0.063	0.008	0.0088
	12	0.082	0.080	0.009	0.0115
Feed	1	0.2	0.201	0.026	0.031
	2	0.21	0.206	0.02	0.033
	3	0.2	0.203	0.024	0.031
	4	0.18	0.181	0.025	0.028
	5	0.18	0.183	0.022	0.028
	6	0.19	0.185	0.025	0.028
	7	0.2	0.196	0.026	0.030
	8	0.2	0.194	0.026	0.031
	9	0.19	0.193	0.023	0.030
	10	0.19	0.187	0.024	0.029
	12	0.19	0.189	0.023	0.028

Table 2: Comparison of metallurgical performance of Crevier ore by KCJ testing

Test #	#12	# 11	# 10	# 9	#8	#7	#6	#5	#4	#3	#2	#1
Mass pull, %	1.32	1.07	1.60	3.09	5.45	9.49	3.83	4.47	11.6	17.0	13.6	15.0
Mass Pull from BILMAT	1.31		1.66	2.43	5.28	5.40	3.64	4.50	10.4	10.0	12.9	13.5
Nb_2O_5												
Nb_2O_5 grade %	**0.19**	**0.19**	**0.19**	**0.19**	**0.20**	**0.20**	**0.19**	**0.19**	**0.18**	**0.20**	**0.21**	**0.20**
Grades from BILMAT	0.20	-	0.19	0.19	0.20	0.20	0.20	0.19	0.19	0.20	0.21	0.20
Conc Grade %Nb_2O_5	**9.75**	**8.37**	**6.84**	**5.64**	**3.66**	**2.91**	**4.50**	**3.12**	**1.82**	**1.75**	**1.22**	**1.22**
Grades from BILMAT	9.35		6.97	5.63	2.96	2.84	4.25	3.13	1.43	1.53	1.21	1.20
Recovery%,	61.5	32.2	64.9	75.0	88.5	85.9	68.7	74.5	82.7	87.7	65.7	78.2
Recovery from BILMAT	60.9		61.5	71.8	77.6	76.6	76.6	74.3	78.8	76.2	74.6	79.5
Ta_2O_5												
Ta_2O_5 grade, %	**0.0283**	**0.02**	**0.0292**	**0.0299**	**0.0308**	**0.0303**	**0.0280**	**0.0279**	**0.0280**	**0.0300**	**0.0331**	**0.0307**
Grades from BILMAT	0.0273	-	0.0243	0.0265	0.0305	0.0267	0.0269	0.0243	0.0293	0.0287	0.0327	0.0285
Conc Grade % Ta_2O_5	**1.19**	**1.02**	**0.84**	**0.69**	**0.44**	**0.36**	**0.55**	**0.38**	**0.23**	**0.22**	**0.15**	**0.16**
Grades from BILMAT	1.21		0.91	0.73	0.45	0.39	0.56	0.41	0.22	0.23	0.15	0.17
Recovery%,	58.1	26.8	60.2	71.9	77.4	86.3	76.9	74.3	81.1	88.2	70.2	91.6
Recovery from BILMAT	58.0		61.8	67.3	77.0	78.3	76.2	75.8	78.8	80.9	59.7	78.8
Others												
Total S, Re, %	63.3	51.1	58.3	75.1	85.5	87.4	74.4	66.5	78.5	77.3	58.8	82.6
Fe_2O_3, Rec, %	27.3	15.4	25.2	44.4	57.0	46.6	38.7	27.3	50.1	62.5	30.3	47.8
% SiO_2 rejection	99.7	99.6	99.2	98.2	92.9	92.2	97.5	96.5	89.8	85.0	86.5	86.2
% Al_2O_3 rejection	99.8	99.6	99.3	98.3	93.2	92.6	97.6	96.7	90.4	85.5	87.5	86.8
% CaO rejection	95.3	95.9	94.0	90.7	75.6	76.4	87.1	86.2	73.7	66.2	78.9	72.1

The test results show that niobium recoveries of 61 to 80% (BILMAT) were achieved with concentrate grades of 1.20% to 9.35% Nb_2O_5. Test #12 produced highest niobium grade of 9.75% at a very low mass pull of 1.31%. In the case of tantalum, recoveries of 58% to 81% (BILMAT) were achieved with concentrate grades of 0.15% to 1.31% Ta_2O_5. It can be seen that bulk of the gangue minerals like silicates and alumina (Al_2O_3) minerals (more than 85%) have been effectively rejected by the Kelsey jig and the rejection of calcium-bearing minerals is between 66 to 95%. Testing has shown that more the 98% of the silica can be rejected with recoveries of Ta_2O_5 and Nb_2O_5 of more than 60%. Results from tailing analysis of Test #11 are problematic. The original assays produced unrealistic results, as presented in Appendix D. Thus no mass balance was performed on test 11. Moreover, in complete table result in Appendix C, the tailing results have been calculated from the mass balance between head and concentrate grades. Major corrections had to be done on mass pull of Tests 3 and 7 in BILMAT calculations.

Grade –recovery plots of Niobium and Tantalum from balance data using BILMAT software are presented in Figures 3 to 6.

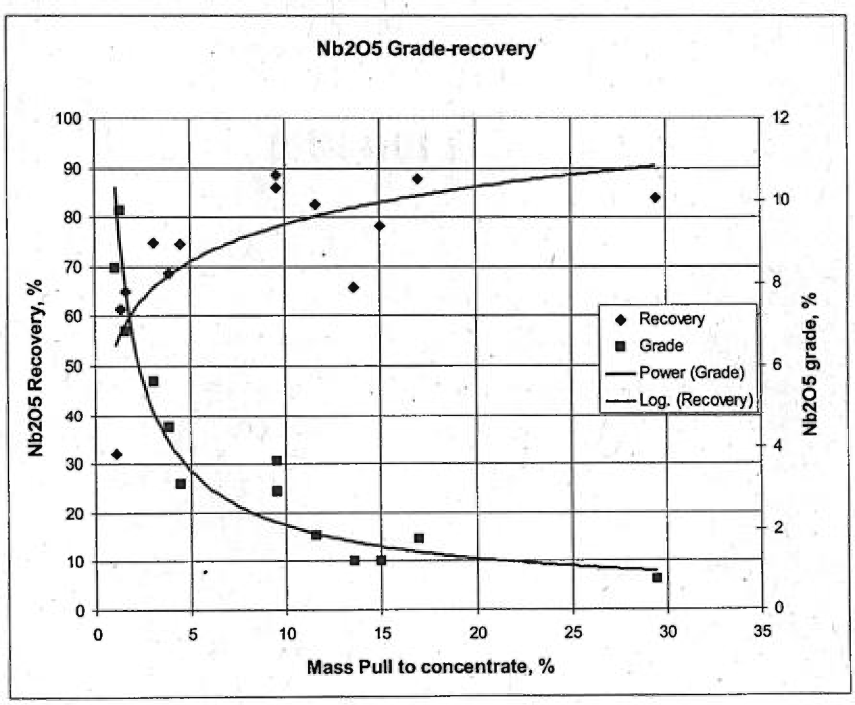

Figure 3: Grade-recovery of niobium as function of mass pull (balanced results)

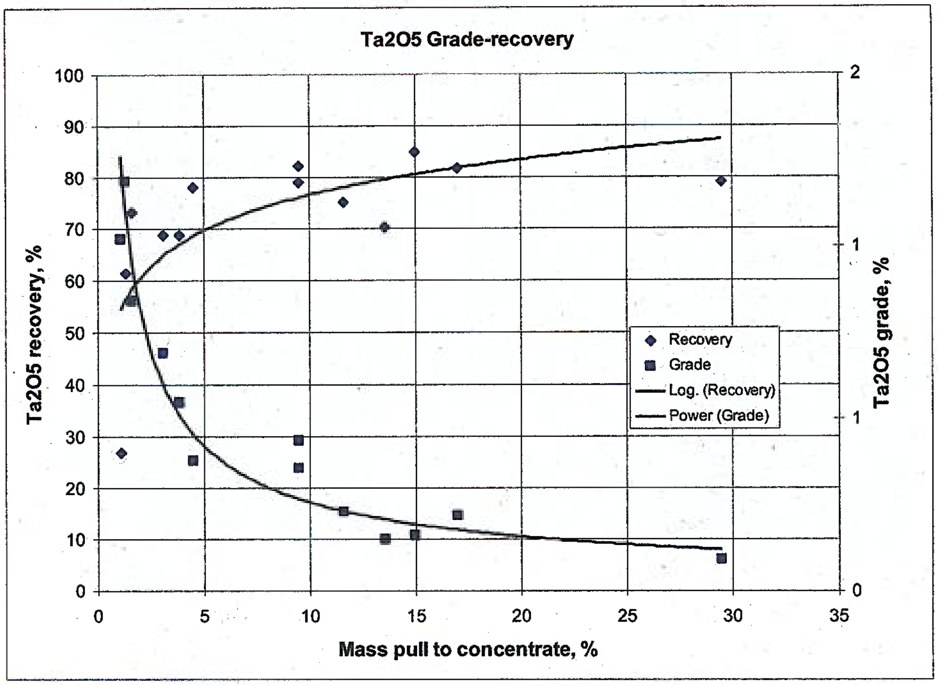

Figure 4: Grade-recovery of Tantalum as a function of mass pull (balanced results)

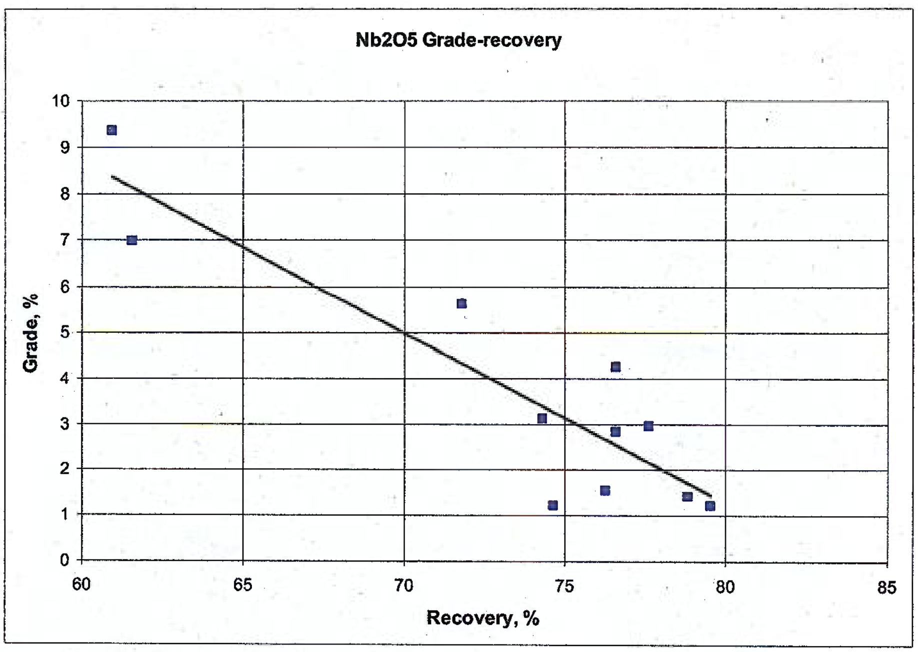

Figure 5: Grade-recovery for niobium (balanced data)

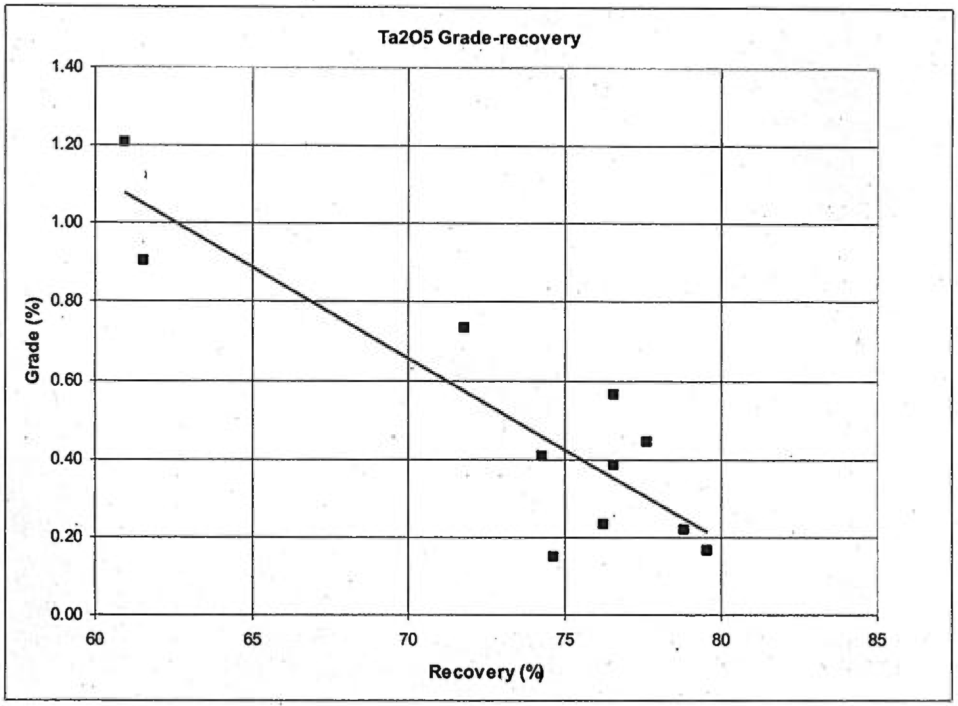

Figure 6 Grade-recovery for tantalum (balanced data)

6 ACKNOWLEDGEMENTS

The authors wish to thank the technical staff for performing the testing, Ahmed Bouajila, Assistant Director (Non-ferrous) COREM for his advice during the course of this work, and Pierre Pelletier, IAMGOLD, for his useful suggestions.

7 REFERENCES

Operating and service manual Model J200 Kelsey centrifugal jig. Roche MT (Revision A, August 2003)

Appendix A:

Size analysis and Microtrac analysis

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Table 3: Size analysis

Top size (micron)	COREM		SIEVE ANALYSIS		
149.91	PROJECT		T-981		
	TITLE		Crevier minerals		
	TEST OBJECTIVES		Size analysis		
	SAMPLE		Kelsey Jig feed		
	TECHNICIAN		Frédéric Bergeron		
	DATE		2008-08-08		
Weight (g) Initial	Fraction		Weight (%)	Cumulative retained (%)	Cumulative passing (%)
	µm	mesh			
227.40					
21.00	+106	150	9.23	9.23	90.77
50.90	+75	200	22.38	31.62	68.38
44.90	+53	270	19.74	51.36	48.64
35.00	+38	400	15.39	66.75	33.25
75.60	-38		33.25	100.00	0.00
	Total		100.00		

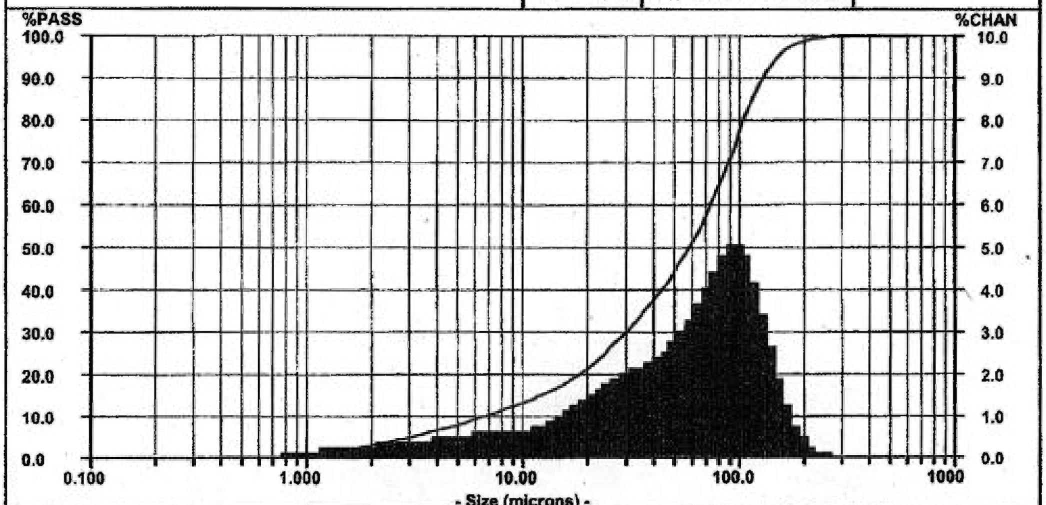
p_{80} (µm) = 90.6
d_{50} (µm) = 54.2

Serial Number: F2592 — **MICROTRAC - X100** — Ver:9.1.9 Meas : Original

T-981 — Alim KJ — Date: 08/14/08 Meas #:14683 Time: 08:19 Pres #: 1

COREM

Summary	Percentiles		Dia	Vol%	Width
mv = 65.29	10% = 6.744	60% = 74.47	59.42	100%	100.4
mn = 1.264	20% = 18.56	70% = 89.49			
ma = 15.06	30% = 30.18	80% = 106.2			
cs = 0.398	40% = 44.00	90% = 129.5			
sd = 50.22	50% = 59.42	95% = 151.0			



SIZE	%PASS	%CHAN	SIZE	%PASS	%CHAN	SIZE	%PASS	%CHAN	SIZE	%PASS	%CHAN
704.0	100.00	0.00	80.70	64.19	4.51	9.250	12.51	0.71	1.060	0.82	0.22
645.6	100.00	0.00	74.00	59.68	4.12	8.482	11.80	0.69	0.972	0.60	0.19
592.0	100.00	0.00	67.86	55.56	3.73	7.778	11.11	0.68	0.892	0.41	0.17
542.9	100.00	0.00	62.23	51.83	3.36	7.133	10.43	0.66	0.818	0.24	0.15
497.8	100.00	0.00	57.06	48.47	3.05	6.541	9.77	0.64	0.750	0.09	0.09
456.5	100.00	0.00	52.33	45.42	2.81	5.998	9.13	0.61	0.688	0.00	0.00
418.6	100.00	0.00	47.98	42.61	2.61	5.500	8.52	0.58	0.630	0.00	0.00
383.9	100.00	0.00	44.00	40.00	2.46	5.044	7.94	0.56	0.578	0.00	0.00
352.0	100.00	0.00	40.35	37.54	2.34	4.625	7.38	0.53	0.530	0.00	0.00
322.8	100.00	0.01	37.00	35.20	2.26	4.241	6.85	0.51	0.486	0.00	0.00
296.0	99.99	0.10	33.93	32.94	2.19	3.889	6.34	0.49	0.446	0.00	0.00
271.4	99.89	0.17	31.11	30.75	2.10	3.566	5.85	0.47	0.409	0.00	0.00
248.9	99.72	0.24	28.53	28.65	2.01	3.270	5.38	0.46	0.375	0.00	0.00
228.2	99.48	0.36	26.16	26.64	1.89	2.999	4.92	0.44	0.344	0.00	0.00
209.3	99.12	0.55	23.99	24.75	1.76	2.750	4.48	0.42	0.315	0.00	0.00
191.9	98.57	0.85	22.00	22.99	1.60	2.522	4.06	0.40	0.289	0.00	0.00
176.0	97.72	1.30	20.17	21.39	1.44	2.312	3.66	0.38	0.265	0.00	0.00
161.4	96.42	1.90	18.50	19.95	1.28	2.121	3.28	0.37	0.243	0.00	0.00
148.0	94.52	2.71	16.96	18.67	1.14	1.945	2.91	0.35	0.223	0.00	0.00
135.7	91.81	3.50	15.56	17.53	1.02	1.783	2.56	0.33	0.204	0.00	0.00
124.5	88.31	4.28	14.27	16.51	0.91	1.635	2.23	0.32	0.187	0.00	0.00
114.1	84.03	4.82	13.08	15.60	0.84	1.499	1.91	0.30	0.172	0.00	0.00
104.7	79.21	5.08	12.00	14.76	0.78	1.375	1.61	0.29	0.158	0.00	0.00
95.96	74.13	5.10	11.00	13.98	0.75	1.261	1.32	0.26	0.145	0.00	0.00
88.00	69.03	4.84	10.09	13.23	0.72	1.156	1.06	0.24	0.133	0.00	0.00

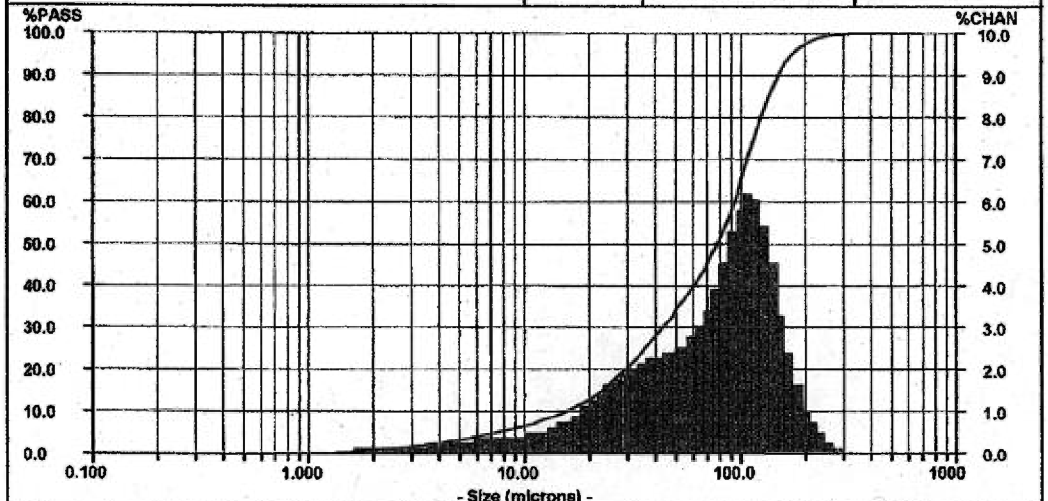
Distribution: Volume
Progression: Geometric Root8
Upper Edge: 704.0
Lower Edge: 0.122
Residuals: Disabled
Number Of Channels: 100
X100 Extended Range: No
Filter: Off

RunTime: 30 seconds
Run Number Avg of 3 runs
Particle: Diag. 159399
Particle Transparency: Absorb
Particle Refractive Index: N/A
Particle Shape: N/A
Database Path: C:\MTWIN919\MTWIN.DB

Fluid: Water
Fluid Refractive Index: N/A
Loading Factor: 0.0841
Transmission: 0.96
Above Residual: 0.00
Below Residual: 0.00

Figure 7: Microtrac analysis of the KCJ feed sample

Serial Number: F2592	MICROTRAC - X100		Ver:9.1.9 Meas : Original
COREM	T-453 tout venant -100m		Date: 11/25/03 Meas #: 2585 Time: 16:33 Pres #: 1
t 453	**Summary** mv = 81.46 mn = 2.186 ma = 28.67 cs = 0.209 sd = 54.66	**Percentiles** 10% = 15.80 60% = 94.23 20% = 29.65 70% = 109.0 30% = 43.89 80% = 125.4 40% = 61.32 90% = 149.6 50% = 78.76 95% = 173.3	**Dia Vol% Width** 78.76 100% 109.1



SIZE	%PASS	%CHAN	SIZE	%PASS	%CHAN	SIZE	%PASS	%CHAN	SIZE	%PASS	%CHAN
704.0	100.00	0.00	80.70	51.18	4.03	9.250	6.14	0.48	1.060	0.00	0.00
645.6	100.00	0.00	74.00	47.15	3.52	8.482	5.66	0.46	0.972	0.00	0.00
592.0	100.00	0.00	67.86	43.63	3.13	7.778	5.20	0.44	0.892	0.00	0.00
542.9	100.00	0.00	62.23	40.50	2.84	7.133	4.76	0.41	0.818	0.00	0.00
497.8	100.00	0.00	57.06	37.66	2.64	6.541	4.35	0.39	0.750	0.00	0.00
456.5	100.00	0.00	52.33	35.02	2.52	5.998	3.96	0.37	0.688	0.00	0.00
418.6	100.00	0.00	47.98	32.50	2.43	5.500	3.59	0.34	0.630	0.00	0.00
383.9	100.00	0.00	44.00	30.07	2.36	5.044	3.25	0.32	0.578	0.00	0.00
352.0	100.00	0.00	40.35	27.71	2.28	4.625	2.93	0.29	0.530	0.00	0.00
322.8	100.00	0.01	37.00	25.43	2.21	4.241	2.64	0.28	0.486	0.00	0.00
296.0	99.99	0.19	33.93	23.22	2.11	3.889	2.36	0.26	0.446	0.00	0.00
271.4	99.80	0.34	31.11	21.11	1.97	3.566	2.10	0.24	0.409	0.00	0.00
248.9	99.46	0.61	28.53	19.14	1.82	3.270	1.86	0.23	0.375	0.00	0.00
228.2	98.85	0.76	26.16	17.32	1.65	2.999	1.63	0.21	0.344	0.00	0.00
209.3	98.19	1.12	23.99	15.67	1.48	2.750	1.42	0.20	0.315	0.00	0.00
191.9	97.07	1.67	22.00	14.19	1.30	2.522	1.22	0.18	0.289	0.00	0.00
176.0	95.40	2.44	20.17	12.89	1.15	2.312	1.04	0.17	0.265	0.00	0.00
161.4	92.96	3.39	18.50	11.74	1.01	2.121	0.87	0.16	0.243	0.00	0.00
148.0	89.57	4.56	16.96	10.73	0.88	1.945	0.71	0.15	0.223	0.00	0.00
135.7	85.01	5.48	15.56	9.85	0.78	1.783	0.56	0.13	0.204	0.00	0.00
124.5	79.53	6.15	14.27	9.07	0.69	1.635	0.43	0.12	0.187	0.00	0.00
114.1	73.38	6.30	13.08	8.38	0.63	1.499	0.31	0.12	0.172	0.00	0.00
104.7	67.08	5.91	12.00	7.75	0.57	1.375	0.19	0.11	0.158	0.00	0.00
95.96	61.17	5.35	11.00	7.18	0.54	1.261	0.08	0.08	0.145	0.00	0.00
88.00	55.82	4.64	10.09	6.64	0.50	1.156	0.00	0.00	0.133	0.00	0.00

Distribution: Volume	RunTime: 30 seconds	Fluid: Water
Progression: Geometric Root8	Run Number Avg of 3 runs	Fluid Refractive Index: 1.33
Upper Edge: 704.0	Particle: default particle	Loading Factor: 0.1238
Lower Edge: 0.122	Particle Transparency: Trans	Transmission: 0.95
Residuals: Enabled	Particle Refractive Index: 1.54	Above Residual: 0.00
Number Of Channels: 100	Particle Shape: Irregular	Below Residual: 0.00
X100 Extended Range: Yes		
Filter: Off	Database Path: C:\MTWIN919\MTWIN.DB	

Figure 8: Microtrac analysis result from project T453

Appendix B:
Comparison of head grades (A 21) of Kelsey jig tests

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Table 4: Comparison of head grades (A 21) of Kelsey jig tests

Test #	SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	MnO	P2O5	Nb2O5	ZrO2	Ta2O5	BaO	SrO	ThO2	PAF	S
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
A	55.2	23.1	1.97	0.17	1.64	11.1	4.46	0.2	0.04	0.2	0.19	0.05	0.03	0.03	0.06	0.01	2.09	0.02
1	55.3	22.9	2.05	0.17	1.48	11.2	4.37	0.21	0.04	0.19	0.2	0.08	0.03	0.03	0.06	0.01	1.93	0.02
2	55.3	23.1	1.87	0.12	1.38	11	4.04	0.2	0.04	0.2	0.21	0.08	0.02	0.03	0.00	0.05	0.01	1.75
3	55.1	23	2.06	0.16	1.45	11.1	4.2	0.2	0.04	0.2	0.2	0.08	0.03	0.03	0.00	0.05	0.01	0.01
4	55.3	23.2	1.97	0.2	1.53	11.1	4.48	0.2	0.04	0.19	0.18	0.06	0.02	0.03	0.00	0.05	0.01	2.03
5	55.3	22.9	2.35	0.2	1.61	11	4.41	0.2	0.04	0.19	0.18	0.06	0.02	0.03	0.06	0.01	2.24	0.02
6	54	22.9	2	0.25	1.59	10.9	4.2	0.19	0.04	0.19	0.19	0.05	0.03	0.03	0.00	0.05	0.01	2.14
7	55.5	23.1	2.02	0.16	1.53	11.1	4.41	0.21	0.04	0.2	0.2	0.07	0.03	0.03	0.00	0.05	0.01	1.87
8	55.5	23.1	2.12	0.17	1.42	11.2	4.39	0.2	0.04	0.2	0.2	0.08	0.03	0.03	0.00	0.05	0.01	1.75
9	55.4	23.1	2.19	0.22	1.74	11	4.49	0.21	0.05	0.19	0.19	0.05	0.02	0.03	0.00	0.05	0.01	2.34
10	55.4	23.1	2.21	0.2	1.51	11.1	4.39	0.2	0.04	0.19	0.19	0.07	0.02	0.03	0.00	0.05	0.01	1.96
11	55.2	22.7	2.43	0.21	1.51	11	4.36	0.2	0.04	0.19	0.19	0.06	0.02	0.03	0.00	0.05	0.01	1.96
12	55.9	23	2.1	0.29	1.46	11	4.38	0.2	0.04	0.19	0.19	0.07	0.02	0.03	0.00	0.05	0.01	1.90
Avg. grade	**55.26**	**23.02**	**2.10**	**0.19**	**1.53**	**11.06**	**4.35**	**0.20**	**0.04**	**0.19**	**0.19**	**0.07**	**0.02**	**0.03**	**0.02**	**0.04**	**0.49**	**1.37**

Appendix C:
Kelsey jig Test conditions and test results

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Table 5: Kelsey jig test conditions

Test	Preset Kelsey jig parameters											Calculated Parameters		
#	Spin (Hz)	Pulse (Hz)	Ragging size (µm)	H_2O to tail (l/min)	Ragging Type	Ragging SG	Stroke (mm)	Screen size (µm)	Bed Depth (mm)	Feed Rate (Kg/hr)	% Solids	Mass Pull %	Feed Rate (Kg/hr)	% solids
A	42	50	300-425	6	Proppant	3.5	2.85	200	18	40	40	29.48	34.5	49.43
1	42	50	300-425	12	Proppant	3.5	2.85	200	18	40	40	14.98	41.8	57.15
2	42	50	300-425	14	Proppant	3.5	2.85	200	18	40	40	13.57	39.6	59.48
3	42	50	300-425	16	Proppant	3.5	2.85	200	18	40	40	16.97	38.9	58.41
4	35	50	300-425	12	Proppant	3.5	2.85	200	25	40	40	11.58	41.4	63.11
5	35	50	300-425	14	Proppant	3.5	2.85	200	25	40	40	4.47	41.4	56.48
6	35	50	300-425	16	Proppant	3.5	2.85	200	25	40	40	3.83	40.4	55.13
7	42	50	300-425	12	Proppant	3.5	2.85	200	18	40	40	9.49	37.5	55.08
8	42	50	300-425	14	Proppant	3.5	2.85	200	18	40	40	9.49	37.5	55.05
9	42	50	300-425	16	Proppant	3.5	2.85	200	18	40	40	3.09	40.4	59.09
10	35	50	300-425	12	Proppant	3.5	2.85	200	25	40	40	1.60	38.6	53.22
11	35	50	300-425	14	Proppant	3.5	2.85	200	25	40	40	1.07	42.2	58.41
12	35	50	300-425	16	Proppant	3.5	2.85	200	25	40	40	1.32	41.7	64.57

Table 6: Metallurgical balance of Test #A

COREM

T-981
Kelsey Jig
Test A
METALLURGICAL BALANCE

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	Analysis SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	Ta2O5 (%)	ZrO2 (%)	BaO (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
Reject	6.11	24.3	24.3	70.52	55.90	24.00	1.7	0.17	1.3	11.20	4.3	0.15	0.03	0.16	0.06	0.01	0.02	0.03	0.06	0.01	1.76	0.00
Concentrate	0.88	10.2	10.2	29.48	53.30	21.90	4.0	0.12	2.2	10.70	4.1	0.53	0.07	0.39	0.75	0.09	0.34	0.03	0.07	0.02	1.98	0.07
Calculated feed		34.53	34.5	100.00	55.1	23.4	2.4	0.16	1.6	11.05	4.2	0.26	0.04	0.23	0.26	0.03	0.11	0.03	0.06	0.01	1.82	0.02
Feed	49.43				55.20	23.10	1.97	0.17	1.64	11.10	4.46	0.20	0.04	0.20	0.19	0.03	0.05	0.03	0.06	0.01	2.09	0.02

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	Distribution (%) SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	MnO	P2O5	Nb2O5	Ta2O5	ZrO2	BaO	SrO	ThO2	PAF	S.
Reject	6.11	24.3	24.3	70.52	71.5	72.4	50.1	77.2	57.6	71.5	71.4	40.4	50.6	49.5	16.1	21.0	12.3	70.5	68.5	54.5	68.0	12.2
Concentrate	0.88	10.2	10.2	29.48	28.5	27.6	49.9	22.8	42.4	28.5	28.6	59.6	49.4	50.5	83.9	79.0	87.7	29.5	31.5	45.5	32.0	87.8
Calculated feed		34.5	34.5	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 7: Metallurgical balance of Test #1

COREM

T-981
Kelsey Jig
Test # 1
METALLURGICAL BALANCE

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	Analysis: SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	Ta2O5 (%)	ZrO2 (%)	BaO (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
Reject	4.65	35.7	35.7	85.02	56.70	24.20	1.1	0.26	1.2	11.40	4.4	0.13	0.03	0.16	0.06	0.01	0.01	0.03	0.06	0.01	1.41	0.00
Concentrate	0.54	6.3	6.3	14.98	51.30	20.90	5.6	0.23	2.6	10.40	3.9	0.81	0.08	0.56	1.22	0.16	0.56	0.03	0.06	0.02	1.87	0.11
Feed calculated		41.8	42.0	100.00	55.9	23.7	1.8	0.26	1.4	11.25	4.3	0.23	0.04	0.22	0.23	0.03	0.09	0.03	0.06	0.01	1.48	0.02
Feed	57.15				55.30	22.90	2.05	0.17	1.48	11.20	4.37	0.21	0.04	0.19	0.20	0.03	0.08	0.03	0.06	0.01	1.93	0.02

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	Distribution (%): SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	MnO	P2O5	Nb2O5	Ta2O5	ZrO2	BaO	SrO	ThO2	PAF	S
Reject	4.65	35.7	35.7	85.02	86.2	86.8	52.2	86.5	72.1	86.1	86.6	47.7	68.0	61.8	23.4	15.1	9.2	85.0	84.4	73.9	81.1	17.4
Concentrate	0.54	6.3	6.3	14.98	13.8	13.2	47.8	13.5	27.9	13.9	13.4	52.3	32.0	38.2	91.4	84.9	90.8	15.0	15.6	26.1	18.9	82.6
Feed calculated		41.8	42.0	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 8: Metallurgical balance of Test #2

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T-981
Kelsey Jig
Test # 2
METALLURGICAL BALANCE

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	Ta2O5 (%)	ZrO2 (%)	BaO (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
					Analysis																	
Reject	4.32	34.2	34.2	86.49	55.40	23.20	1.9	0.22	1.6	11.00	4.6	0.17	0.04	0.15	0.10	0.01	0.01	0.03	0.00	0.05	0.01	2.27
Concentrate	0.46	5.3	5.3	13.51	55.20	21.10	5.2	0.07	2.7	10.40	3.8	0.77	0.08	0.58	-1.22	0.15	0.54	0.03	0.00	0.05	0.03	1.88
Calculated feed		40.4	39.6	100.00	55.4	22.9	2.3	0.20	1.7	10.92	4.5	0.25	0.05	0.21	0.25	0.03	0.08	0.03	0.00	0.05	0.01	2.23
Feed	59.48				55.30	23.10	1.87	0.12	1.38	11.00	4.04	0.20	0.04	0.20	0.21	0.02	0.08	0.03	0.00	0.05	0.01	1.75

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	MnO	P2O5	Nb2O5	Ta2O5	ZrO2	BaO	SrO	ThO2	PAF	S
					Distribution (%)																	
Reject	4.32	34.2	34.2	86.49	86.5	87.6	69.8	95.3	79.0	87.1	88.4	58.6	76.2	62.3	41.2	29.9	10.6	86.5	86.5	86.5	51.6	88.0
Concentrate	0.46	5.3	5.3	13.51	13.5	12.4	30.2	4.7	21.0	12.9	11.6	41.4	23.8	37.7	78.5	70.1	89.4	13.5	13.5	13.5	48.4	12.0
Calculated feed		40.4	39.6	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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Table 9: Metallurgical balance of Test #3

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T-981
KCJ test
Test #3
METALLURGICAL BALANCE

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
					Analysis																		
Rejects	3.60	33.6	33.6	83.03	56.60	23.90	1.0	0.22	1.2	11.50	4.4	0.09	0.03	0.16	0.05	0.01	0.01	0.03	0.00	0.05	0.01	1.41	0.01
Concenrate	0.59	6.9	6.9	16.97	49.00	19.80	8.0	0.23	3.0	9.88	3.5	1.18	0.10	0.70	1.75	0.81	0.22	0.00	0.00	0.07	0.04	1.80	0.10
Feed calculated		38.98	40.4	100.00	55.3	23.2	2.2	0.22	1.5	11.23	4.2	0.27	0.04	0.25	0.34	0.15	0.05	0.03	0.00	0.05	0.01	1.48	0.02
Feed	56.41				55.10	23.00	2.1	0.16	1.5	11.10	4.2	0.20	0.04	0.20	0.20	0.08	0.03	0.03	0.00	0.05	0.01	0.01	0.01

	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
					Distribution (%)																		
Rejects	3.60	33.59	33.59	83.03	85.0	85.5	37.5	82.4	66.2	85.1	85.9	27.2	59.5	52.8	12.3	5.7	18.2	98.0	83.0	77.0	38.0	79.3	22.7
Concentrate	0.59	6.86	6.86	16.97	15.0	14.5	62.5	17.6	33.8	14.9	14.1	72.8	40.5	47.2	87.7	94.3	81.8	2.0	17.0	23.0	62.0	20.7	77.3
Feed		38.98	40.45	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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Table 10: Metallurgical balance of Test #4

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KCJ test
Test #4
METALLURGICAL BALANCE

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	Analysis SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
Rejects	5.27	33.2	33.2	88.42	55.20	24.30	1.1	0.26	1.2	11.20	4.3	0.15	0.03	0.14	0.05	0.00	0.00	0.03	0.00	0.05	0.01	1.42	0.01
Concenrate	0.36	4.4	4.4	11.58	48.10	19.70	8.4	0.23	3.2	9.79	3.5	1.24	0.11	0.76	1.82	0.85	0.23	0.03	0.00	0.07	0.03	1.77	0.17
Feed calculated		41.42	37.6	100.00	54.4	23.8	1.9	0.26	1.4	11.04	4.2	0.28	0.04	0.21	0.25	0.10	0.03	0.03	0.00	0.05	0.01	1.46	0.02
Feed	63.11				55.30	23.20	2.0	0.20	1.5	11.10	4.5	0.20	0.04	0.19	0.18	0.06	0.03	0.03	0.00	0.05	0.01	2.03	0.02
	Measured	Measured	Balanced	%	Distribution (%)																		
	% solids	Tonage	Tonage	weight	SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	MnO	P2O5	Nb2O5	ZrO2	Ta2O5	BaO	Y2O3	SrO	ThO2	PAF	S
		(Kg/hr)	(kg/h)		(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Tailings	5.27	33.25	33.25	88.42	89.8	90.4	49.9	89.6	73.7	89.7	90.3	48.0	67.6	58.4	16.5	0.0	0.0	88.4	88.4	84.1	56.0	86.0	21.5
Concentrate	0.36	4.36	4.36	11.58	10.2	9.6	50.1	10.4	26.3	10.3	9.7	52.0	32.4	41.6	83.5	100.0	100.0	11.6	11.6	15.9	44.0	14.0	78.5
Feed	63.11	41.42	37.60	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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Table 11: Metallurgical balance of Test #5

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T-981
Kelsey Jig
Test # 5
METALLURGICAL BALANCE

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	Analysis SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	Ta2O5 (%)	ZrO2 (%)	BaO (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
Reject	4.43	36.2	36.2	95.53	56.10	24.30	1.4	0.13	1.2	11.40	4.3	0.13	0.03	0.16	0.05	0.01	0.01	0.03	0.06	0.01	1.62	0.01
Concentrate	0.14	1.7	1.7	4.47	44.00	17.90	11.3	0.32	4.1	9.01	3.1	1.81	0.14	1.14	3.12	0.38	1.30	0.03	0.074	0.08	1.91	0.26
Feed calculated		41.41	37.9	100.00	55.6	24.0	1.9	0.14	1.3	11.29	4.3	0.21	0.03	0.20	0.19	0.02	0.07	0.03	0.06	0.01	1.63	0.02
Feed	56.48				55.30	22.90	2.35	0.20	1.61	11.00	4.41	0.20	0.04	0.19	0.18	0.02	0.06	0.03	0.061	0.013	2.24	0.02

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	Distribution (%) SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	MnO	P2O5	Nb2O5	Ta2O5	ZrO2	BaO	SrO	ThO2	PAF	S
Reject	4.43	36.2	36.2	95.53	96.5	96.7	72.7	89.7	86.2	96.4	96.7	60.5	82.1	75.0	25.5	21.9	14.1	95.5	94.5	72.8	94.8	33.5
Concentrate	0.14	1.7	1.7	4.47	3.5	3.3	27.3	10.3	13.8	3.6	3.3	39.5	17.9	25.0	74.5	78.1	85.9	4.5	5.5	27.2	5.2	66.5
Feed calculated		41.4	37.9	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 12: Metallurgical balance of Test #6

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T-981
KCJ test
Test #6
METALLURGICAL BALANCE

Product	Measured % Solids	Measured Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	Analysis: SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
Tailings	3.73	35.4	35.4	96.17	56.10	24.00	1.2	0.12	1.2	11.40	4.4	0.11	0.03	0.15	0.05	0.01	0.01	0.03	0.00	0.05	0.01	1.57	0.01
Concenrate	0.12	1.4	1.4	3.83	36.60	14.80	19.2	0.11	4.4	7.76	2.5	3.03	0.21	1.33	4.50	2.15	0.55	0.03	0.00	0.10	0.10	1.26	0.44
Feed calculated		40.42	36.8	100.00	55.4	23.6	1.9	0.12	1.3	11.26	4.3	0.22	0.04	0.20	0.22	0.09	0.03	0.03	0.00	0.05	0.01	1.56	0.02
Feed	55.13				54.00	22.90	2.0	0.25	1.6	10.90	4.2	0.19	0.04	0.19	0.19	0.05	0.03	0.03	0.00	0.05	0.01	2.14	0.02

	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	Distribution (%): SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
Tailings	3.73	35.38	35.38	96.17	97.5	97.6	61.3	96.5	87.1	97.4	97.7	47.7	78.2	73.9	21.8	10.4	31.3	96.2	95.0	92.8	56.9	96.9	25.6
Concentrate	0.12	1.41	1.41	3.83	2.5	2.4	38.7	3.5	12.9	2.6	2.3	52.3	21.8	26.1	78.2	89.6	68.7	3.8	5.0	7.2	43.1	3.1	74.4
Feed		40.42	36.79	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 13: Metallurgical balance of Test #7

COREM

T-981
KCJ test
Test # 7
METALLURGICAL BALANCE

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
					Analysis																		
Tailings	4.91	36.8	36.8	90.51	54.90	23.70	1.4	0.18	1.2	11.30	4.1	0.12	0.03	0.14	0.05	0.01	0.01	0.03	0.00	0.05	0.01	1.57	0.00
Concenrate	0.39	3.9	3.9	9.49	44.50	18.10	11.5	0.09	3.6	9.23	3.2	1.94	0.14	0.90	2.91	1.37	0.36	0.03	0.00	0.08	0.06	1.59	0.27
Feed calculated		37.5	40.6	100.00	53.9	23.2	2.3	0.17	1.4	11.10	4.0	0.29	0.04	0.21	0.32	0.14	0.04	0.03	0.00	0.05	0.01	1.57	0.03
Feed	55.08				55.50	23.10	2.0	0.16	1.5	11.10	4.4	0.21	0.04	0.20	0.20	0.07	0.03	0.03	0.00	0.05	0.01	1.87	0.02

	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
					Distribution (%)																		
Tailings	4.91	36.76	36.76	90.51	92.2	92.6	53.4	95.0	76.4	92.1	92.4	37.1	67.2	59.7	14.1	6.5	21.0	90.5	90.5	85.9	61.4	90.4	12.6
Concentrate	0.39	3.85	3.85	9.49	7.8	7.4	46.6	5.0	23.6	7.9	7.6	62.9	32.8	40.3	85.9	93.5	79.0	9.5	9.5	14.1	38.6	9.6	87.4
Feed		37.46	40.62	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 14: Metallurgical balance of Test #8

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KCJ test
Test #8
METALLURGICAL BALANCE

Product	Measured % Solids	Measured Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	MgO (%)	CaO (%)	Na_2O (%)	K_2O (%)	TiO_2 (%)	MnO (%)	P_2O_5 (%)	Nb_2O_5 (%)	ZrO_2 (%)	Ta_2O_5 (%)	BaO (%)	Y_2O_3 (%)	SrO (%)	ThO_2 (%)	PAF (%)	S (%)
					Analysis																		
Tailings	4.00	36.4	36.4	94.55	56.30	23.70	1.2	0.08	1.2	11.50	4.4	0.09	0.03	0.17	0.05	0.00	0.00	0.03	0.00	0.05	0.01	1.59	0.01
Concenrate	0.20	2.1	2.1	5.45	40.80	16.50	15.4	0.10	3.7	8.46	2.8	2.51	0.17	0.98	3.66	1.78	0.44	0.03	0.00	0.05	0.07	1.31	0.34
Feed calculated		40.2	38.5	100.00	55.5	23.3	2.0	0.08	1.3	11.33	4.3	0.22	0.04	0.21	0.25	0.10	0.02	0.03	0.00	0.05	0.01	1.57	0.02
Feed	58.82				55.50	23.10	2.1	0.17	1.4	11.20	4.4	0.20	0.04	0.20	0.20	0.08	0.03	0.03	0.00	0.05	0.01	1.75	0.02

	Measured % Solids	Measured Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	MgO (%)	CaO (%)	Na_2O (%)	K_2O (%)	TiO_2 (%)	MnO (%)	P_2O_5 (%)	Nb_2O_5 (%)	ZrO_2 (%)	Ta_2O_5 (%)	BaO (%)	Y_2O_3 (%)	SrO (%)	ThO_2 (%)	PAF (%)	S (%)
					Distribution (%)																		
Tailings	4.00	36.38	36.38	94.55	96.0	96.1	57.9	93.3	84.9	95.9	96.5	38.3	75.4	75.1	19.5	0.0	0.0	94.5	89.7	94.5	55.3	95.5	23.6
Concentrate	0.20	2.10	2.10	5.45	4.0	3.9	42.1	6.7	15.1	4.1	3.5	61.7	24.6	24.9	80.5	100.0	100.0	5.5	10.3	5.5	44.7	4.5	76.4
Feed		40.23	39.59	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 15: Metallurgical balance of Test #9

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KCJ test
Test # 9
METALLURGICAL BALANCE

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
					Analysis																		
Rejects	2.94	39.1	39.1	96.91	56.10	23.30	1.0	0.32	1.3	11.40	4.4	0.08	0.03	0.20	0.06	0.00	0.00	0.03	0.00	0.05	0.01	1.43	0.01
Concenrate	0.13	1.2	1.2	3.09	31.70	12.50	25.3	0.09	4.1	6.86	2.2	4.12	0.26	1.13	5.64	2.99	0.69	0.03	0.01	0.08	0.12	0.93	0.57
Feed calculated		40.4	40.4	100.00	55.3	23.0	1.8	0.31	1.3	11.26	4.3	0.20	0.04	0.23	0.23	0.09	0.02	0.03	0.00	0.05	0.01	1.41	0.02
Feed	59.09				55.40	23.10	2.2	0.22	1.7	11.00	4.5	0.21	0.05	0.19	0.19	0.05	0.03	0.03	0.00	0.05	0.01	2.34	0.02
	Measured	Measured	Balanced		Distribution (%)																		
	% Solids	Tonage	Tonage	%	SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	MnO	P2O5	Nb2O5	ZrO2	Ta2O5	BaO	Y2O3	SrO	ThO2	PAF	S
		(kg/h)	(kg/h)	weight	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Tailings	2.94	39.12	39.12	96.91	98.2	98.3	55.6	99.1	90.7	98.1	98.4	37.8	78.3	84.7	23.7	0.0	0.0	96.9	92.6	95.4	56.6	98.0	24.9
Concentrate	0.13	1.25	1.25	3.09	1.8	1.7	44.4	0.9	9.3	1.9	1.6	62.2	21.7	15.3	76.3	100.0	100.0	3.1	7.4	4.6	43.4	2.0	75.1
Feed		40.42	40.37	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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Table 16: Metallurgical balance of Test #10

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KCJ test
Test #10
METALLURGICAL BALANCE

Product	Measured % Solids	Measured Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	Analysis SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
Rejects	5.29	39.5	39.5	98.40	56.20	24.00	1.4	0.17	1.2	11.30	4.4	0.13	0.03	0.14	0.08	0.00	0.01	0.03	0.00	0.05	0.01	1.71	0.01
Concenrate	0.06	0.6	0.6	1.60	26.30	10.50	29.7	0.09	4.9	5.96	1.7	4.80	0.29	1.59	6.84	3.45	0.84	0.05	0.01	0.10	0.14	1.03	0.69
Feed calculated		38.6	40.1	100.00	55.7	23.8	1.9	0.17	1.3	11.21	4.4	0.20	0.03	0.16	0.17	0.08	0.02	0.03	0.00	0.05	0.01	1.70	0.02
Feed	53.22				55.40	23.10	2.2	0.20	1.5	11.10	4.4	0.20	0.04	0.19	0.19	0.07	0.03	0.03	0.00	0.05	0.01	1.96	0.02
	Measured % solids	Measured Tonage (Kg/hr)	Balanced Tonage (Kg/hr)	% Weight	Distribution (%) SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
Tailings	5.29	39.50	39.50	98.40	99.2	99.3	74.8	99.1	94.0	99.2	99.4	62.6	86.5	84.5	34.7	0.0	37.0	97.6	96.1	96.9	68.8	99.0	41.7
Concentrate	0.06	0.64	0.64	1.60	0.8	0.7	25.2	0.9	6.0	0.8	0.6	37.4	13.5	15.5	65.3	100.0	63.0	2.4	3.9	3.1	31.2	1.0	58.3
Feed		39.64	40.14	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 17: Metallurgical balance of Test #11

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T-981
KCJ test
Test # 11
METALLURGICAL BALANCE

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
					Analysis																		
Rejects	3.63	40.0	40.0	98.93	55.50	23.10	2.0	0.17	1.3	11.10	4.4	0.19	0.04	0.19	0.19	0.06	0.03	0.03	0.00	0.05	0.01	1.70	0.01
Concenrate	0.04	0.4	0.4	1.07	21.30	8.58	33.8	0.14	5.4	5.02	1.3	5.49	0.34	1.79	8.37	4.02	1.02	0.04	0.01	0.11	0.19	1.10	0.78
Feed calculated		42.2	40.4	100.00	55.1	22.9	2.3	0.17	1.4	11.04	4.3	0.25	0.04	0.21	0.28	0.10	0.04	0.03	0.00	0.05	0.01	1.69	0.02
Feed	58.41				55.20	22.70	2.4	0.21	1.5	11.00	4.4	0.20	0.04	0.19	0.19	0.06	0.02	0.03	0.00	0.05	0.01	1.96	0.02
Product	Measured % Solids	Measured Tonage (Kg/hr)	Balanced Tonage (kg/h)	% weight	Distribution (%)																		
					SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
Rejects	3.63	39.99	39.99	98.93	99.6	99.6	84.6	99.1	95.9	99.5	99.7	76.3	91.6	90.8	67.8	58.1	73.2	98.5	95.9	97.7	83.0	99.3	48.9
Concentrate	0.04	0.43	0.43	1.07	0.4	0.4	15.4	0.9	4.1	0.5	0.3	23.7	8.4	9.2	32.2	41.9	26.8	1.5	4.1	2.3	17.0	0.7	51.1
Feed		42.19	40.42	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 18: Metallurgical balance of Test #12

COREM

T-981
KCJ test
Test # 12
METALLURGICAL BALANCE

Product	Measured % Solids	Measure Tonage (kg/h)	Balanced Tonage (kg/h)	% Weight	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
					Analysis																		
Rejects	3.73	41.2	41.2	98.68	55.20	23.30	1.8	0.34	1.3	11.20	4.4	0.14	0.03	0.16	0.08	0.00	0.01	0.03	0.00	0.05	0.01	1.84	0.01
Concenrate	0.06	0.6	0.6	1.32	11.80	4.32	45.7	0.81	4.9	3.05	0.6	7.12	0.41	1.65	9.75	5.13	1.19	0.06	0.01	0.12	0.22	0.85	1.03
Feed calculated		41.7	41.7	100.00	54.6	23.0	2.2	0.35	1.4	11.09	4.3	0.23	0.04	0.18	0.21	0.07	0.02	0.03	0.00	0.05	0.01	1.83	0.02
Feed	64.57				55.90	23.00	2.1	0.29	1.5	11.00	4.4	0.20	0.04	0.19	0.19	0.07	0.03	0.03	0.00	0.05	0.01	1.90	0.02
					Distribution (%)																		
Product	Measured % Solids	Measured Tonage (Kg/hr)	Balanced Tonage (kg/h)	% weight	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	BaO (%)	Y2O3 (%)	SrO (%)	ThO2 (%)	PAF (%)	S (%)
Tailings	3.73	41.15	41.15	98.68	99.7	99.8	72.7	96.9	95.3	99.6	99.8	59.4	84.5	87.8	38.5	0.0	36.1	97.5	94.9	96.9	62.9	99.4	36.7
Concentrate	0.06	0.55	0.55	1.32	0.3	0.2	27.3	3.1	4.7	0.4	0.2	40.6	15.5	12.2	61.5	100.0	63.9	2.5	5.1	3.1	37.1	0.6	63.3
Feed		41.69	41.70	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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Appendix D:

Results of chemical analysis from chemical laboratory COREM

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COREM

RAPPORT D'ANALYSE version 4

Claude Gagnon
COREM

Votre référence ...: **T0000981**
Kelsey Jig
Date de réception : **2008-08-13**
Certificat émis le : **2008-08-29**

			23533- 1	23533- 2	23533- 3
Numéro COREM :			23533- 1	23533- 2	23533- 3
Nature :			SOLIDES	SOLIDES	SOLIDES
Désignation :			Test A Alim	Test A Conc	Test A Rejet
A21-	2	Analyse	2008-08-14	2008-08-14	2008-08-14
A21-	2	SiO2	55.2 %	53.3 %	55.9 %
A21-	2	Al2O3	23.1 %	21.9 %	24.0 %
A21-	2	Fe2O3	1.97 %	4.00 %	1.68 %
A21-	2	MgO	0.17 %	0.12 %	0.17 %
A21-	2	CaO	1.64 %	2.24 %	1.27 %
A21-	2	Na2O	11.1 %	10.7 %	11.2 %
A21-	2	K2O	4.46 %	4.12 %	4.30 %
A21-	2	TiO2	0.20 %	0.53 %	0.15 %
A21-	2	MnO	0.04 %	0.07 %	0.03 %
A21-	2	P2O5	0.20 %	0.39 %	0.16 %
A21-	2	Nb2O5	0.19 %	0.75 %	0.06 %
A21-	2	ZrO2	0.05 %	0.34 %	< 0.02 %
A21-	2	Ta2O5	0.03 %	0.09 %	< 0.01 %
A21-	2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21-	2	Y2O3	< 0.003 %	0.003 %	< 0.003 %
A21-	2	SrO	< 0.06 %	0.066 %	< 0.06 %
A21-	2	ThO2	< 0.01 %	0.01 %	< 0.01 %
A21-	2	Ce2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21-	2	PAF	2.09 %	1.98 %	1.76 %
A31-	1	Analyse	2008-08-25	2008-08-25	2008-08-25
A31-	1	Ga	33 ppm	40 ppm	35 ppm
A31-	1	Nb	> 1000 ppm	> 1000 ppm	416 ppm
A31-	1	Rb	111 ppm	105 ppm	103 ppm
A31-	1	Sr	331 ppm	445 ppm	242 ppm
A31-	1	Ta	> 50 ppm	> 50 ppm	> 50 ppm
A31-	1	Th	50 ppm	210 ppm	20 ppm
A31-	1	Y	9 ppm	19 ppm	4 ppm
A31-	1	Zr	426 ppm	> 800 ppm	74 ppm
B41-	1	Analyse	2008-08-29	2008-08-29	2008-08-29
B41-	1	S total	0.019 %	0.069 %	< 0.005 %

COREM

RAPPORT D'ANALYSE version 4

Claude Gagnon
COREM

Votre référence ...: **T0000981**
Kelsey Jig
Date de réception : **2008-08-13**
Certificat émis le : **2008-08-29**

			23533- 4	23533- 5	23533- 6
		Numéro COREM :	23533- 4	23533- 5	23533- 6
		Nature :	SOLIDES	SOLIDES	SOLIDES
		Désignation :	+ 150 Mesh	-150+200 Mesh	-200+270 Mesh
A21-	2	Analyse	2008-08-29	2008-08-29	2008-08-29
A21-	2	SiO2	56.5 %	56.2 %	56.1 %
A21-	2	Al2O3	23.4 %	23.4 %	23.1 %
A21-	2	Fe2O3	2.13 %	2.00 %	1.88 %
A21-	2	MgO	0.34 %	0.37 %	0.14 %
A21-	2	CaO	1.06 %	1.15 %	1.22 %
A21-	2	Na2O	11.4 %	11.4 %	11.2 %
A21-	2	K2O	4.30 %	4.28 %	4.28 %
A21-	2	TiO2	0.18 %	0.18 %	0.20 %
A21-	2	MnO	0.04 %	0.03 %	0.03 %
A21-	2	P2O5	0.17 %	0.19 %	0.18 %
A21-	2	Nb2O5	0.17 %	0.17 %	0.17 %
A21-	2	ZrO2	0.08 %	0.07 %	0.06 %
A21-	2	Ta2O5	0.02 %	0.02 %	0.02 %
A21-	2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21-	2	Y2O3	< 0.003 %	< 0.003 %	< 0.003 %
A21-	2	SrO	< 0.06 %	< 0.06 %	< 0.06 %
A21-	2	ThO2	< 0.01 %	< 0.01 %	< 0.01 %
A21-	2	Ce2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21-	2	PAF	1.59 %	1.60 %	1.62 %
B41-	1	Analyse	2008-08-29	2008-08-29	2008-08-29
B41-	1	S total	0.017 %	0.017 %	0.017 %

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RAPPORT D'ANALYSE version 4

Claude Gagnon
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Votre référence ...: T0000981
Kelsey Jig
Date de réception : 2008-08-13
Certificat émis le : 2008-08-29

		Numéro COREM :	23533- 7	23533- 8
		Nature :	SOLIDES	SOLIDES
		Désignation :	-270+400 Mesh	-400 Mesh
A21-	2	Analyse	2008-08-29	2008-08-29
A21-	2	SiO2	54.2 %	56.2 %
A21-	2	Al2O3	22.5 %	24.1 %
A21-	2	Fe2O3	2.48 %	1.23 %
A21-	2	MgO	0.42 %	0.13 %
A21-	2	CaO	1.86 %	1.20 %
A21-	2	Na2O	10.7 %	11.3 %
A21-	2	K2O	4.43 %	4.18 %
A21-	2	TiO2	0.19 %	0.11 %
A21-	2	MnO	0.05 %	0.03 %
A21-	2	P2O5	0.22 %	0.16 %
A21-	2	Nb2O5	0.22 %	0.04 %
A21-	2	ZrO2	0.06 %	< 0.02 %
A21-	2	Ta2O5	0.03 %	< 0.01 %
A21-	2	BaO	< 0.04 %	< 0.04 %
A21-	2	Y2O3	< 0.003 %	< 0.003 %
A21-	2	SrO	< 0.06 %	< 0.06 %
A21-	2	ThO2	< 0.01 %	< 0.01 %
A21-	2	Ce2O3	< 0.02 %	< 0.02 %
A21-	2	La2O3	< 0.02 %	< 0.02 %
A21-	2	Nd2O3	< 0.03 %	< 0.03 %
A21-	2	PAF	1.77 %	2.35 %
B41-	1	Analyse	2008-08-29	2008-08-29
B41-	1	S total	0.018 %	0.024 %

Responsable :

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Votre référence ...: T0000981
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Certificat émis le : 2008-08-29

COREM

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Numéro COREM :			23527- 1	23527- 2	23527- 3
Nature :			SOLIDES	SOLIDES	SOLIDES
Désignation :			Test # 1	Test # 2	Test # 3
A21-	2	Analyse	2008-08-14	2008-08-28	2008-08-28
A21-	2	SiO2	55.3 %	55.3 %	55.1 %
A21-	2	Al2O3	22.9 %	23.1 %	23.0 %
A21-	2	Fe2O3	2.05 %	1.87 %	2.06 %
A21-	2	MgO	0.17 %	0.12 %	0.16 %
A21-	2	CaO	1.49 %	1.38 %	1.45 %
A21-	2	Na2O	11.2 %	11.0 %	11.1 %
A21-	2	K2O	4.37 %	4.04 %	4.20 %
A21-	2	TiO2	0.21 %	0.20 %	0.20 %
A21-	2	MnO	0.04 %	0.04 %	0.04 %
A21-	2	P2O5	0.19 %	0.20 %	0.20 %
A21-	2	Nb2O5	0.20 %	0.21 %	0.20 %
A21-	2	ZrO2	0.08 %	0.08 %	0.08 %
A21-	2	Ta2O5	0.03 %	0.02 %	0.03 %
A21-	2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21-	2	Y2O3	< 0.003 %	< 0.003 %	< 0.003 %
A21-	2	SrO	< 0.06 %	< 0.06 %	< 0.06 %
A21-	2	ThO2	< 0.01 %	< 0.01 %	< 0.01 %
A21-	2	Ce2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21-	2	PAF	1.93 %	1.75 %	1.87 %
A31-	1	Analyse	2008-08-25		
A31-	1	Ga	35 ppm		
A31-	1	Nb	> 1000 ppm		
A31-	1	Rb	105 ppm		
A31-	1	Sr	300 ppm		
A31-	1	Ta	> 50 ppm		
A31-	1	Th	40 ppm		
A31-	1	Y	10 ppm		
A31-	1	Zr	526 ppm		
B41-	1	Analyse	2008-08-28	2008-08-28	2008-08-28
B41-	1	S total	0.020 %	0.019 %	0.018 %

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Votre référence ...: T0000981
Alim
Date de réception : 2008-08-13
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			23527- 4	23527- 5	23527- 6
Numéro COREM :			23527- 4	23527- 5	23527- 6
Nature :			SOLIDES	SOLIDES	SOLIDES
Désignation :			Test # 4	Test # 5	Test # 6
A21-	2	Analyse	2008-08-28	2008-08-14	2008-08-28
A21-	2	SiO2	55.3 %	55.3 %	54.0 %
A21-	2	Al2O3	23.2 %	22.9 %	22.9 %
A21-	2	Fe2O3	1.97 %	2.35 %	2.00 %
A21-	2	MgO	0.20 %	0.20 %	0.25 %
A21-	2	CaO	1.53 %	1.61 %	1.59 %
A21-	2	Na2O	11.1 %	11.0 %	10.9 %
A21-	2	K2O	4.48 %	4.41 %	4.20 %
A21-	2	TiO2	0.20 %	0.20 %	0.19 %
A21-	2	MnO	0.04 %	0.04 %	0.04 %
A21-	2	P2O5	0.19 %	0.19 %	0.19 %
A21-	2	Nb2O5	0.18 %	0.18 %	0.19 %
A21-	2	ZrO2	0.06 %	0.06 %	0.05 %
A21-	2	Ta2O5	0.02 %	0.02 %	0.03 %
A21-	2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21-	2	Y2O3	< 0.003 %	< 0.003 %	< 0.003 %
A21-	2	SrO	< 0.06 %	< 0.06 %	< 0.06 %
A21-	2	ThO2	< 0.01 %	< 0.01 %	< 0.01 %
A21-	2	Ce2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21-	2	PAF	2.03 %	2.24 %	2.14 %
A31-	1	Analyse		2008-08-25	
A31-	1	Ga		35 ppm	
A31-	1	Nb		> 1000 ppm	
A31-	1	Rb		110 ppm	
A31-	1	Sr		322 ppm	
A31-	1	Ta		> 50 ppm	
A31-	1	Th		50 ppm	
A31-	1	Y		8 ppm	
A31-	1	Zr		412 ppm	
B41-	1	Analyse	2008-08-28	2008-08-28	2008-08-28
B41-	1	S total	0.016 %	0.019 %	0.016 %

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RAPPORT D'ANALYSE version 4

Claude Gagnon
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Votre référence ...: T0000981
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Date de réception : 2008-08-13
Certificat émis le : 2008-08-29

		Numéro COREM :	23527- 7	23527- 8	23527- 9
		Nature :	SOLIDES	SOLIDES	SOLIDES
		Désignation :	Test # 7	Test # 8	Test # 9
A21-	2	Analyse	2008-08-29	2008-08-28	2008-08-28
A21-	2	SiO2	55.5 %	55.5 %	55.4 %
A21-	2	Al2O3	23.1 %	23.1 %	23.1 %
A21-	2	Fe2O3	2.02 %	2.12 %	2.19 %
A21-	2	MgO	0.16 %	0.17 %	0.22 %
A21-	2	CaO	1.53 %	1.42 %	1.74 %
A21-	2	Na2O	11.1 %	11.2 %	11.0 %
A21-	2	K2O	4.41 %	4.39 %	4.49 %
A21-	2	TiO2	0.21 %	0.20 %	0.21 %
A21-	2	MnO	0.04 %	0.04 %	0.05 %
A21-	2	P2O5	0.20 %	0.20 %	0.19 %
A21-	2	Nb2O5	0.20 %	0.20 %	0.19 %
A21-	2	ZrO2	0.07 %	0.08 %	0.05 %
A21-	2	Ta2O5	0.03 %	0.03 %	0.02 %
A21-	2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21-	2	Y2O3	< 0.003 %	< 0.003 %	< 0.003 %
A21-	2	SrO	< 0.06 %	< 0.06 %	< 0.06 %
A21-	2	ThO2	< 0.01 %	< 0.01 %	< 0.01 %
A21-	2	Ce2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21-	2	PAF	1.87 %	1.75 %	2.34 %
B41-	1	Analyse	2008-08-28	2008-08-28	2008-08-28
B41-	1	S total	0.018 %	0.021 %	0.020 %

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Votre référence ...: T0000981
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Date de réception : 2008-08-13
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		Numéro COREM :	23527- 10	23527- 11	23527- 12
		Nature :	SOLIDES	SOLIDES	SOLIDES
		Désignation :	Test # 10	Test # 11	Test # 12
A21-	2	Analyse	2008-08-28	2008-08-29	2008-08-29
A21-	2	SiO2	55.4 %	55.2 %	55.9 %
A21-	2	Al2O3	23.1 %	22.7 %	23.0 %
A21-	2	Fe2O3	2.21 %	2.43 %	2.10 %
A21-	2	MgO	0.20 %	0.21 %	0.29 %
A21-	2	CaO	1.51 %	1.51 %	1.46 %
A21-	2	Na2O	11.1 %	11.0 %	11.0 %
A21-	2	K2O	4.39 %	4.36 %	4.38 %
A21-	2	TiO2	0.20 %	0.20 %	0.20 %
A21-	2	MnO	0.04 %	0.04 %	0.04 %
A21-	2	P2O5	0.19 %	0.19 %	0.19 %
A21-	2	Nb2O5	0.19 %	0.19 %	0.19 %
A21-	2	ZrO2	0.07 %	0.06 %	0.07 %
A21-	2	Ta2O5	0.02 %	0.02 %	0.02 %
A21-	2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21-	2	Y2O3	< 0.003 %	< 0.003 %	< 0.003 %
A21-	2	SrO	< 0.06 %	< 0.06 %	< 0.06 %
A21-	2	ThO2	< 0.01 %	< 0.01 %	< 0.01 %
A21-	2	Ce2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21-	2	PAF	1.96 %	1.96 %	1.90 %
B41-	1	Analyse	2008-08-28	2008-08-28	2008-08-28
B41-	1	S total	0.019 %	0.019 %	0.018 %

Responsable : Bernard Montminy, chimiste, M.Sc.

Ce rapport contient des renseignements protégés et confidentiels à l'intention du destinataire. Les résultats ne se rapportent qu'aux échantillons soumis à l'analyse. Cette version remplace et annule toute version antérieure, le cas échéant. * Analyse faite par un sous-traitant.

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RAPPORT D'ANALYSE version 4

Claude Gagnon
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Votre référence ...: **T0000981**
Concentré
Date de réception : **2008-08-13**
Certificat émis le : **2008-08-29**

Numéro COREM :		23528- 1	23528- 2	23528- 3
Nature :		SOLIDES	SOLIDES	SOLIDES
Désignation :		Test # 1	Test # 2	Test # 3
A21- 2	Analyse	2008-08-14	2008-08-29	2008-08-29
A21- 2	SiO2	51.3 %	52.2 %	49.0 %
A21- 2	Al2O3	20.9 %	21.1 %	19.8 %
A21- 2	Fe2O3	5.61 %	5.16 %	8.01 %
A21- 2	MgO	0.23 %	0.07 %	0.23 %
A21- 2	CaO	2.57 %	2.70 %	2.98 %
A21- 2	Na2O	10.4 %	10.4 %	9.88 %
A21- 2	K2O	3.85 %	3.83 %	3.53 %
A21- 2	TiO2	0.81 %	0.77 %	1.18 %
A21- 2	MnO	0.08 %	0.08 %	0.10 %
A21- 2	P2O5	0.56 %	0.58 %	0.70 %
A21- 2	Nb2O5	1.22 %	1.22 %	1.75 %
A21- 2	ZrO2	0.56 %	0.54 %	0.81 %
A21- 2	Ta2O5	0.16 %	0.15 %	0.22 %
A21- 2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21- 2	Y2O3	< 0.003 %	< 0.003 %	< 0.003 %
A21- 2	SrO	0.063 %	< 0.06 %	0.073 %
A21- 2	ThO2	0.02 %	0.03 %	0.04 %
A21- 2	Ce2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21- 2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21- 2	Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21- 2	PAF	1.87 %	1.99 %	1.80 %
A31- 1	Analyse	2008-08-25		
A31- 1	Ga	47 ppm		
A31- 1	Nb	> 1000 ppm		
A31- 1	Rb	103 ppm		
A31- 1	Sr	569 ppm		
A31- 1	Ta	> 50 ppm		
A31- 1	Th	370 ppm		
A31- 1	Y	28 ppm		
A31- 1	Zr	> 800 ppm		
B41- 1	Analyse	2008-08-28	2008-08-28	2008-08-28
B41- 1	S total	0.108 %	0.100 %	0.159 %

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Votre référence ...: **T0000981**
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Date de réception : **2008-08-13**
Certificat émis le..: **2008-08-29**

			23528- 4	23528- 5	23528- 6
Numéro COREM :			23528- 4	23528- 5	23528- 6
Nature :			SOLIDES	SOLIDES	SOLIDES
Désignation :			Test # 4	Test # 5	Test # 6
A21-	2	Analyse	2008-08-29	2008-08-14	2008-08-29
A21-	2	SiO2	48.1 %	44.0 %	36.6 %
A21-	2	Al2O3	19.7 %	17.9 %	14.8 %
A21-	2	Fe2O3	8.35 %	11.3 %	19.2 %
A21-	2	MgO	0.23 %	0.32 %	0.11 %
A21-	2	CaO	3.19 %	4.06 %	4.41 %
A21-	2	Na2O	9.79 %	9.01 %	7.76 %
A21-	2	K2O	3.54 %	3.11 %	2.54 %
A21-	2	TiO2	1.24 %	1.81 %	3.03 %
A21-	2	MnO	0.11 %	0.14 %	0.21 %
A21-	2	P2O5	0.76 %	1.14 %	1.33 %
A21-	2	Nb2O5	1.82 %	3.12 %	4.50 %
A21-	2	ZrO2	0.85 %	1.30 %	2.15 %
A21-	2	Ta2O5	0.23 %	0.38 %	0.55 %
A21-	2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21-	2	Y2O3	< 0.003 %	0.004 %	0.004 %
A21-	2	SrO	0.072 %	0.074 %	0.098 %
A21-	2	ThO2	0.03 %	0.08 %	0.095 %
A21-	2	Ce2O3	< 0.02 %	0.02 %	0.02 %
A21-	2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21-	2	PAF	1.77 %	1.91 %	1.26 %
A31-	1	Analyse		2008-08-25	
A31-	1	Ga		61 ppm	
A31-	1	Nb		> 1000 ppm	
A31-	1	Rb		92 ppm	
A31-	1	Sr		1000 ppm	
A31-	1*	Ta		> 50 ppm	
A31-	1	Th		> 1000 ppm	
A31-	1	Y		64 ppm	
A31-	1	Zr		> 800 ppm	
B41-	1	Analyse	2008-08-28	2008-08-28	2008-08-28
B41-	1	S total	0.167 %	0.255 %	0.437 %

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Numéro COREM :			23528- 7	23528- 8	23528- 9
Nature :			SOLIDES	SOLIDES	SOLIDES
Désignation :			Test # 7	Test # 8	Test # 9
A21-	2	Analyse	2008-08-29	2008-08-29	2008-08-29
A21-	2	SiO2	44.5 %	40.8 %	31.7 %
A21-	2	Al2O3	18.1 %	16.5 %	12.5 %
A21-	2	Fe2O3	11.5 %	15.4 %	25.3 %
A21-	2	MgO	0.09 %	0.10 %	0.09 %
A21-	2	CaO	3.57 %	3.73 %	4.07 %
A21-	2	Na2O	9.23 %	8.46 %	6.86 %
A21-	2	K2O	3.23 %	2.77 %	2.17 %
A21-	2	TiO2	1.94 %	2.51 %	4.12 %
A21-	2	MnO	0.14 %	0.17 %	0.26 %
A21-	2	P2O5	0.90 %	0.98 %	1.13 %
A21-	2	Nb2O5	2.91 %	3.66 %	5.64 %
A21-	2	ZrO2	1.37 %	1.78 %	2.99 %
A21-	2	Ta2O5	0.36 %	0.44 %	0.69 %
A21-	2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21-	2	Y2O3	< 0.003 %	0.004 %	0.005 %
A21-	2	SrO	0.078 %	< 0.06 %	0.075 %
A21-	2	ThO2	0.06 %	0.07 %	0.12 %
A21-	2	Ce2O3	< 0.02 %	< 0.02 %	0.03 %
A21-	2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	Nd2O3	< 0.03 %	< 0.03 %	0.03 %
A21-	2	PAF	1.59 %	1.31 %	0.93 %
B41-	1	Analyse	2008-08-28	2008-08-28	2008-08-29
B41-	1	S total	0.265 %	0.337 %	0.569 %

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Numéro COREM :		23528- 10	23528- 11	23528- 12
Nature :		SOLIDES	SOLIDES	SOLIDES
Désignation :		Test # 10	Test # 11	Test # 12
A21- 2	Analyse	2008-08-29	2008-08-29	2008-08-29
A21- 2	SiO2	26.3 %	21.3 %	11.8 %
A21- 2	Al2O3	10.5 %	8.58 %	4.32 %
A21- 2	Fe2O3	29.7 %	33.8 %	45.7 %
A21- 2	MgO	0.09 %	0.14 %	0.81 %
A21- 2	CaO	4.88 %	5.37 %	4.85 %
A21- 2	Na2O	5.96 %	5.02 %	3.05 %
A21- 2	K2O	1.70 %	1.33 %	0.57 %
A21- 2	TiO2	4.80 %	5.49 %	7.12 %
A21- 2	MnO	0.29 %	0.34 %	0.41 %
A21- 2	P2O5	1.59 %	1.79 %	1.65 %
A21- 2	Nb2O5	6.84 %	8.37 %	9.75 % →
A21- 2	ZrO2	3.45 %	4.02 %	5.13 %
A21- 2	Ta2O5	0.84 %	1.02 %	1.19 %
A21- 2	BaO	0.045 %	0.041 %	0.058 %
A21- 2	Y2O3	0.005 %	0.008 %	0.008 %
A21- 2	SrO	0.10 %	0.11 %	0.12 %
A21- 2	ThO2	0.14 %	0.19 %	0.22 %
A21- 2	Ce2O3	0.04 %	0.04 %	0.04 %
A21- 2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21- 2	Nd2O3	< 0.03 %	0.04 %	0.05 %
A21- 2	PAF	1.03 %	1.10 %	0.85 %
B41- 1	Analyse	2008-08-29	2008-08-29	2008-08-29
B41- 1	S total	0.691 %	0.776 %	1.03 %

ZRSiO4.

Responsable : Bernard Montminy, chimiste, M.Sc.

Ce rapport contient des renseignements protégés et confidentiels à l'intention du destinataire. Les résultats ne se rapportent qu'aux échantillons soumis à l'analyse. Cette version remplace et annule toute version antérieure, le cas échéant. * Analyse faite par un sous-traitant.

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Numéro COREM :	23529- 1	23529- 2	23529- 3
Nature :	SOLIDES	SOLIDES	SOLIDES
Désignation :	Test # 1	Test # 2	Test # 3
A21- 2 Analyse	2008-08-14	2008-08-29	2008-08-29
A21- 2 SiO2	56.7 %	55.4 %	56.6 %
A21- 2 Al2O3	24.2 %	23.2 %	23.9 %
A21- 2 Fe2O3	1.08 %	1.86 %	0.98 %
A21- 2 MgO	0.26 %	0.22 %	0.22 %
A21- 2 CaO	1.17 %	1.59 %	1.19 %
A21- 2 Na2O	11.4 %	11.0 %	11.5 %
A21- 2 K2O	4.39 %	4.55 %	4.39 %
A21- 2 TiO2	0.13 %	0.17 %	0.09 %
A21- 2 MnO	0.03 %	0.04 %	0.03 %
A21- 2 P2O5	0.16 %	0.15 %	0.16 %
A21- 2 Nb2O5	0.06 %	0.10 %	0.05 %
A21- 2 ZrO2	< 0.02 %	< 0.02 %	< 0.02 %
A21- 2 Ta2O5	< 0.01 %	0.01 %	< 0.01 %
A21- 2 BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21- 2 Y2O3	< 0.003 %	< 0.003 %	< 0.003 %
A21- 2 SrO	< 0.06 %	< 0.06 %	< 0.06 %
A21- 2 ThO2	< 0.01 %	< 0.01 %	< 0.01 %
A21- 2 Ce2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21- 2 La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21- 2 Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21- 2 PAF	1.41 %	2.27 %	1.41 %
A31- 1 Analyse	2008-08-25		
A31- 1 Ga	33 ppm		
A31- 1 Nb	367 ppm		
A31- 1 Rb	101 ppm		
A31- 1 Sr	231 ppm		
A31- 1 Ta	> 50 ppm		
A31- 1 Th	10 ppm		
A31- 1 Y	5 ppm		
A31- 1 Zr	67 ppm		
B41- 1 Analyse	2008-08-29	2008-08-29	2008-08-29
B41- 1 S total	< 0.005 %	0.011 %	0.006 %

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Numéro COREM :			23529- 4	23529- 5	23529- 6
Nature :			SOLIDES	SOLIDES	SOLIDES
Désignation :			Test # 4	Test # 5	Test # 6
A21-	2	Analyse	2008-08-29	2008-08-14	2008-08-29
A21-	2	SiO2	55.2 %	56.1 %	56.1 %
A21-	2	Al2O3	24.3 %	24.3 %	24.0 %
A21-	2	Fe2O3	1.09 %	1.41 %	1.21 %
A21-	2	MgO	0.26 %	0.13 %	0.12 %
A21-	2	CaO	1.17 %	1.19 %	1.19 %
A21-	2	Na2O	11.2 %	11.4 %	11.4 %
A21-	2	K2O	4.34 %	4.32 %	4.35 %
A21-	2	TiO2	0.15 %	0.13 %	0.11 %
A21-	2	MnO	0.03 %	0.03 %	0.03 %
A21-	2	P2O5	0.14 %	0.16 %	0.15 %
A21-	2	Nb2O5	0.05 %	0.05 %	0.05 %
A21-	2	ZrO2	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	Ta2O5	< 0.01 %	< 0.01 %	< 0.01 %
A21-	2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21-	2	Y2O3	< 0.003 %	< 0.003 %	< 0.003 %
A21-	2	SrO	< 0.06 %	< 0.06 %	< 0.06 %
A21-	2	ThO2	< 0.01 %	< 0.01 %	< 0.01 %
A21-	2	Ce2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21-	2	PAF	1.42 %	1.62 %	1.57 %
A31-	1	Analyse		2008-08-25	
A31-	1	Ga		34 ppm	
A31-	1	Nb		353 ppm	
A31-	1	Rb		99 ppm	
A31-	1	Sr		236 ppm	
A31-	1	Ta		> 50 ppm	
A31-	1	Th		10 ppm	
A31-	1	Y		5 ppm	
A31-	1	Zr		70 ppm	
B41-	1	Analyse	2008-08-29	2008-08-29	2008-08-29
B41-	1	S total	0.006 %	0.006 %	0.006 %

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Numéro COREM :		23529- 7	23529- 8	23529- 9
Nature :		SOLIDES	SOLIDES	SOLIDES
Désignation :		Test # 7	Test # 8	Test # 9
A21- 2	Analyse	2008-08-29	2008-08-29	2008-08-29
A21- 2	SiO2	54.9 %	56.3 %	56.1 %
A21- 2	Al2O3	23.7 %	23.7 %	23.3 %
A21- 2	Fe2O3	1.38 %	1.22 %	1.01 %
A21- 2	MgO	0.18 %	0.08 %	0.32 %
A21- 2	CaO	1.21 %	1.21 %	1.26 %
A21- 2	Na2O	11.3 %	11.5 %	11.4 %
A21- 2	K2O	4.13 %	4.37 %	4.37 %
A21- 2	TiO2	0.12 %	0.09 %	0.08 %
A21- 2	MnO	0.03 %	0.03 %	0.03 %
A21- 2	P2O5	0.14 %	0.17 %	0.20 %
A21- 2	Nb2O5	0.05 %	0.05 %	0.06 %
A21- 2	ZrO2	< 0.02 %	< 0.02 %	< 0.02 %
A21- 2	Ta2O5	< 0.01 %	< 0.01 %	< 0.01 %
A21- 2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21- 2	Y2O3	< 0.003 %	< 0.003 %	< 0.003 %
A21- 2	SrO	< 0.06 %	< 0.06 %	< 0.06 %
A21- 2	ThO2	< 0.01 %	< 0.01 %	< 0.01 %
A21- 2	Ce2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21- 2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21- 2	Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21- 2	PAF	1.57 %	1.59 %	1.43 %
B41- 1	Analyse	2008-08-29	2008-08-29	2008-08-29
B41- 1	S total	< 0.005 %	0.006 %	0.006 %

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			23529- 10	23529- 11	23529- 12
Numéro COREM :			23529- 10	23529- 11	23529- 12
Nature :			SOLIDES	SOLIDES	SOLIDES
Désignation :			Test # 10	Test # 11	Test # 12
A21-	2	Analyse	2008-08-29	2008-08-29	2008-08-29
A21-	2	SiO2	56.2 %	55.5 %	55.2 %
A21-	2	Al2O3	24.0 %	23.1 %	23.3 %
A21-	2	Fe2O3	1.43 %	2.00 %	1.63 %
A21-	2	MgO	0.17 %	0.17 %	0.34 %
A21-	2	CaO	1.24 %	1.34 %	1.33 %
A21-	2	Na2O	11.3 %	11.1 %	11.2 %
A21-	2	K2O	4.41 %	4.37 %	4.36 %
A21-	2	TiO2	0.13 %	0.19 %	0.14 %
A21-	2	MnO	0.03 %	0.04 %	0.03 %
A21-	2	P2O5	0.14 %	0.19 %	0.16 %
A21-	2	Nb2O5	0.06 %	0.19 %	0.08 %
A21-	2	ZrO2	< 0.02 %	0.06 %	< 0.02 %
A21-	2	Ta2O5	< 0.01 %	0.03 %	< 0.01 %
A21-	2	BaO	< 0.04 %	< 0.04 %	< 0.04 %
A21-	2	Y2O3	< 0.003 %	< 0.003 %	< 0.003 %
A21-	2	SrO	< 0.06 %	< 0.06 %	< 0.06 %
A21-	2	ThO2	< 0.01 %	< 0.01 %	< 0.01 %
A21-	2	Ce2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	La2O3	< 0.02 %	< 0.02 %	< 0.02 %
A21-	2	Nd2O3	< 0.03 %	< 0.03 %	< 0.03 %
A21-	2	PAF	1.71 %	1.70 %	1.84 %
B41-	1	Analyse	2008-08-29	2008-08-29	2008-08-29
B41-	1	S total	0.008 %	0.008 %	0.008 %

Responsable : Bernard Montminy, chimiste, M.Sc.

LES MINÉRAUX CREVIER INC.

Preliminary testing of Kelsey jig for preconcentration of Crevier ore

FINAL REPORT OF PHASE 2

No: T981

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Date: July 3, 2009

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EXECUTIVE SUMMARY

Pre-concentration of an ore sample received from Les Minéraux Crevier Inc. was carried out applying the Kelsey Centrifugal Jig (KCJ) technology. The preliminary test work conducted during Phase 1 showed that the low-grade niobium-tantalum ore deposit with 0.2% Nb_2O_5 and 0.02% Ta_2O_5 has potential of pre-concentration by the KCJ.

In phase 2, the subject of this report, the processing of the ore with the Kelsey jig provided a niobium recovery of 69.7% with 1.2% Nb_2O_5 grade and tantalum recovery of 69.8% with 0.15% Ta_2O_5 grade. Two process routes were identified to carry out the upgrading of the concentrates:

1. Through a cleaning stage using the Kelsey jig and magnetic separation
2. Through flotation after the removal of the magnetic fraction by magnetic separation. Flotation tests were performed using the recipe developed at COREM in project T453 (2004).

Cleaning tests with the Kelsey jig have produced 86.6% recovery with Nb_2O_5 grade of 1.2% in one of the tests and high Nb_2O_5 grade of 5.9% with 42.5% recovery was achieved in a second test. Magnetic separation tests on the Kelsey jig cleaner concentrates were able to upgrade Nb_2O_5 content to 3.09%-8.11% with 59.6%-29% recovery.

Prior to flotation, the magnetic separation step was able to remove 66.5% of the iron contaminants with a loss of 4.1% Nb_2O_5 from the concentrates produced by the Kelsey jig unit. Moreover, flotation tests on the non-magnetic product have produced 17.9% to 20.6% Nb_2O_5 grade with recovery of 48% to 55%, representing overall recoveries of 32.5% to 40.4%.

CONTENTS

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TABLES

FIGURES

1 INTRODUCTION

The Crevier deposit, part of Crevier Minerals Inc., presents values of Nb_2O_5 (0,19 %) and Ta_2O_5 (0,02 %). Many tentatives to develop an economically acceptable flowsheet have been undertaken since 1985 (1). A previous study, performed by COREM (T453) evaluated gravity separation processes for developing a processing scheme for the Crevier ore. The tests confirmed that pyrochlore could effectively be pre-concentrated by gravity separation methods but recoveries achieved by these processes were not economically sufficient. Since that time, a new technology, the Kelsey centrifugal jig (KCJ), was commercialized. This technology provides better performance for the mineral beneficiation than standard gravity separation methods. Crevier Mineral has thus mandated COREM to conduct pre-concentration tests of the ore using this technology.

The project was executed in two phases. In Phase 1, a series of Kelsey jig tests were performed to evaluate the grade-recovery curve of niobium preconcentration. Phase 2, subject of this report was focused on confirming the best conditions and producing a pre-concentrate for further testing the concentration of niobium by gravity, flotation and magnetic separation.

2 CONCLUSIONS AND RECOMMENDATIONS

From the pre-concentration with the Kelsey jig (rougher) results, we can note that with a mass pull of 9.7% to concentrate:

- A niobium recovery of 69.7% was achieved with a grade of 1.2% Nb_2O_5
- The tantalum recovery was similar at 69.8% with a grade of 0.15% Ta_2O_5
- Major gangue minerals like silicates and Al_2O_3 were rejected up to 91%
- Rejection of CaO minerals was over 81%

Magnetic separation of this concentrate permitted the removal of 66.5% of the iron but with a loss of pyrochlore recovery of 4.1% from the Kelsey Jig concentrate.

Flotation tests have produced 17.9% to 20.6% Nb_2O_5 grade with recovery of 48% to 55% from the non-magnetic product of the magnetic separation. This represents overall recoveries of 32.5 and 40.4%. The low recovery could be caused by the presence of Ca and Mg ions in the water.

Finally, further cleaning of the Kelsey jig rougher concentrate by the Kelsey jig showed that the grade of niobium could be increased in the final concentrate.

Taking into account the above mentioned conclusions, we recommend that the already tested schemes be revisited by testing the following points :

1. Produce a washability curve of the Crevier ore to determine the potential of improvement of gravity separation and identify the liberation size of pyrochlore suitable for gravity separation.
2. Explore the pertinence of progressive liberation and processing of the material to improve overall grade and recovery of pre-concentrate.
3. Test a change of water in the flotation process after the carbonate flotation or pyrochlore rougher or removal of alkali ions to improve the recovery of Nb_2O_5, for instance, by the addition of oxalic acid.
4. Explore new flotation reagents to improve the flotation performance:
   - Depressants for alimino-silicates;
   - Collectors for pyrochlore, as the mixture used for the Niobec ore (with IAMGOLD authorization).
5. Optimize the flotation recipe, mostly after the second cleaner stage.
6. Evaluate the leaching of the obtained concentrate to improve Nb_2O_5 grade.

3 METHODOLOGY

The ore sample comminuted in Phase 1 was processed as illustrated in Figure 1. A pre-concentration in the Kelsey jig was first completed under selected conditions from Phase 1. During the Phase 2 testing, it was found that the Roche MT testing protocol was inconvenient for processing low-grade minerals. Thus, a new developed 8 kg sample testing protocol was proven robust for assessing the KCJ repeatability.

The concentrate generated by KCJ testing was divided in two samples. One was subjected to a magnetic separation before it was used for flotation testing. The other was used for cleaning tests in the Kelsey Jig. The cleaner concentrates were further concentrated with magnetic separation at 4000 Gauss.

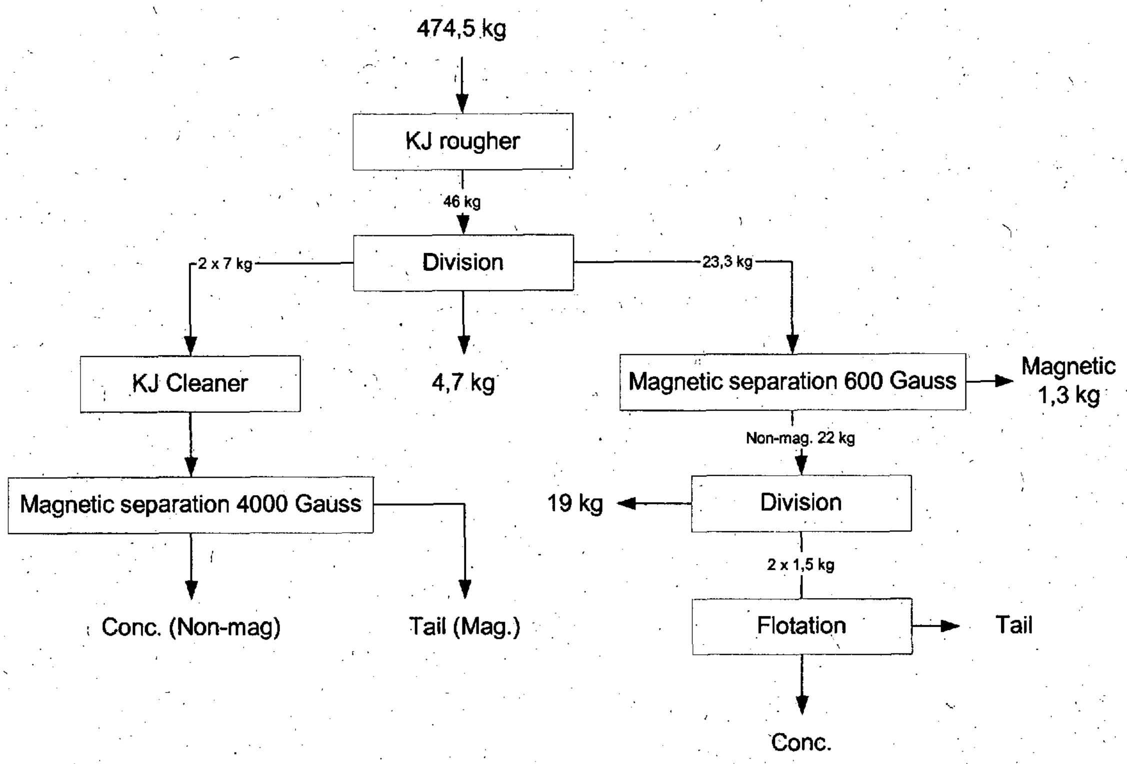

Figure 1: Testing scheme of the Crevier Ore

4 RESULTS AND DISCUSSION

4.1 PRECONCENTRATION BY THE KELSEY JIG

In Table 1, head analysis of the feedback calculated from the Kelsey jig test work is presented. An average of the head analysis collected on 8 kg sample tests is also shown. Phase 1 head analysis is presented for comparison. The complete results of the calculated head samples are shown in Table 13 in the appendix.

Table 1: Head analysis of Phase 2 test work compared with the calculated head from Phase 1 tests

	Grade (%)							
	SiO_2	Al_2O_3	Fe_2O_3	CaO	TiO_2	P_2O_5	Nb_2O_5	Ta_2O5
Phase 2 - Calculated	56.08	23.55	1.74	1.46	0.20	0.19	0.17	0.02
Phase 2- Analyzed	56.30	23.30	1.73	1.50	0.20	0.19	0.19	0.02
Phase 1 - Analyzed	55.26	23.02	2.1	1.53	0.2	0.19	0.19	0.02

Before the production test was conducted, five Kelsey jig repeat tests were performed using 8-kg samples to determine the variability of the Kelsey Jig results. The conditions maintained during testing are presented in Table 2.

Table 2: Operating conditions of the repeat tests

Jig ajustements	Rotations (Hz)	42
	Pulsations (Hz)	50
	Stroke (mm)	3.18
	Water to tail (l/min)	10
	Screen size (micron)	200
	Spigots	2.5
	Water nozzels	2.5
Ragging	Type	Proppant
	Dimension (mm)	300-425
	Specific density	3.29
	Bed thickness (mm)	18
Feed	% solids	40
	Feed rate (kg/hre)	20

Results of the repeat tests are presented in Table 3. Recoveries of Nb_2O_5 ranged from 65 to 67% with concentrate grades of 1.45 to 1.80%. Ta_2O_5 recoveries ranged from 61 to 77% with a tantalum content of 0.19 to 0.20%. Bulks of the gangue minerals were rejected effectively (84 to 94%). These results show that there is a good repeatability when the methodology is used with an 8-kg sample.

Table 3: Comparison of metallurgical results of the repeat tests

Test #	38	38A	38B	38C	38D
Nb2O5,head, %	0.19	0.19	0.18	0.17	0.19
Con.grade%	1.51	1.59	1.84	1.45	1.80
Rec,%	65.25	66.63	68.12	67.22	65.74
Mass pull,%	8.01	8.06	6.58	7.85	6.96
Ta2O5, head, %	0.02	0.02	0.02	0.02	0.025
Con.grade,%	0.19	0.20	0.23	0.19	0.23
Rec, %	62.00	77.36	61.71	61.09	62.84
Rejection					
SiO2, %	92.69	92.74	94.22	92.94	93.98
Al2O3, %	92.95	92.97	94.41	93.10	94.10
CaO, %	84.17	83.63	86.12	84.16	85.86

A production test was then performed on a 475 kg sample of the Crevier ore using operating conditions as shown in Table 2. However the water to tailings was decreased to 8 l/min. The results of the production test are presented in Table 4.

Table 4: Metallurgical results of the production test

Product	% Weight	Analysis								
		SiO_2 (%)	Al_2O_3 (%)	Fe_2O_3 (%)	CaO (%)	TiO_2 (%)	P_2O_5 (%)	Nb_2O_5 (%)	ZrO_2 (%)	Ta_2O_5 (%)
Concentrate	9.7	51.60	21.00	5.69	2.77	0.86	0.57	1.20	0.55	0.15
Tailings	90.3	56.70	23.50	1.07	1.33	0.12	0.16	0.06	0.00	0.01
Calculated Feed	100	56.21	23.26	1.52	1.47	0.19	0.20	0.17	0.06	0.02
Product	% Weight	Distribution								
		SiO_2 (%)	Al_2O_3 (%)	Fe2O3 (%)	CaO (%)	TiO_2 (%)	P_2O_5 (%)	Nb_2O_5 (%)	ZrO_2 (%)	Ta_2O_5 (%)
Concentrate	9.7	8.9	8.8	36.4	18.3	43.5	27.7	69.7	92.4	69.8
Tailings	90.3	91.1	91.2	63.6	81.7	56.5	72.3	30.3	7.6	30.2

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The complete results for all elements are also shown in Table 14. From these results we can note that with a mass pull of 9.7% to concentrate:

- A niobium recovery of 69.7% was achieved with a grade of 1.2%
- The tantalum recovery was similar at 69.8% with a grade of 0.15%
- Major gangue minerals like silicates and Al_2O_3 were rejected by 91%
- Rejection of CaO minerals was at 81%

Table 5 shows the size-by-size distribution of niobium and tantalum in the rougher tailings sample. From these results, it can be seen that 19% of the Nb_2O_5 is lost in the -38 µm fraction as fine particles. In the +75 µm fraction, some liberation problems seem to occur since the grade increases from 0.04% for the fraction -75 + 38 µm to 0.05%.

Table 5: Size-by-size distribution of niobium and tantalum in KJ rougher tailings

		Nb_2O_5		Ta_2O_5	
Size fraction	% Weight	Grade (%)	Recovery (%)	Grade (%)	Recovery (%)
+106 µm	17.3	0.051	16.0	0.0065	16.0
-106 + 75 µm	27.7	0.049	24.6	0.0060	23.7
-75 + 38 µm	36.2	0.039	25.5	0.0046	24.0
-38 µm	18.9	0.099	33.8	0.0134	36.3

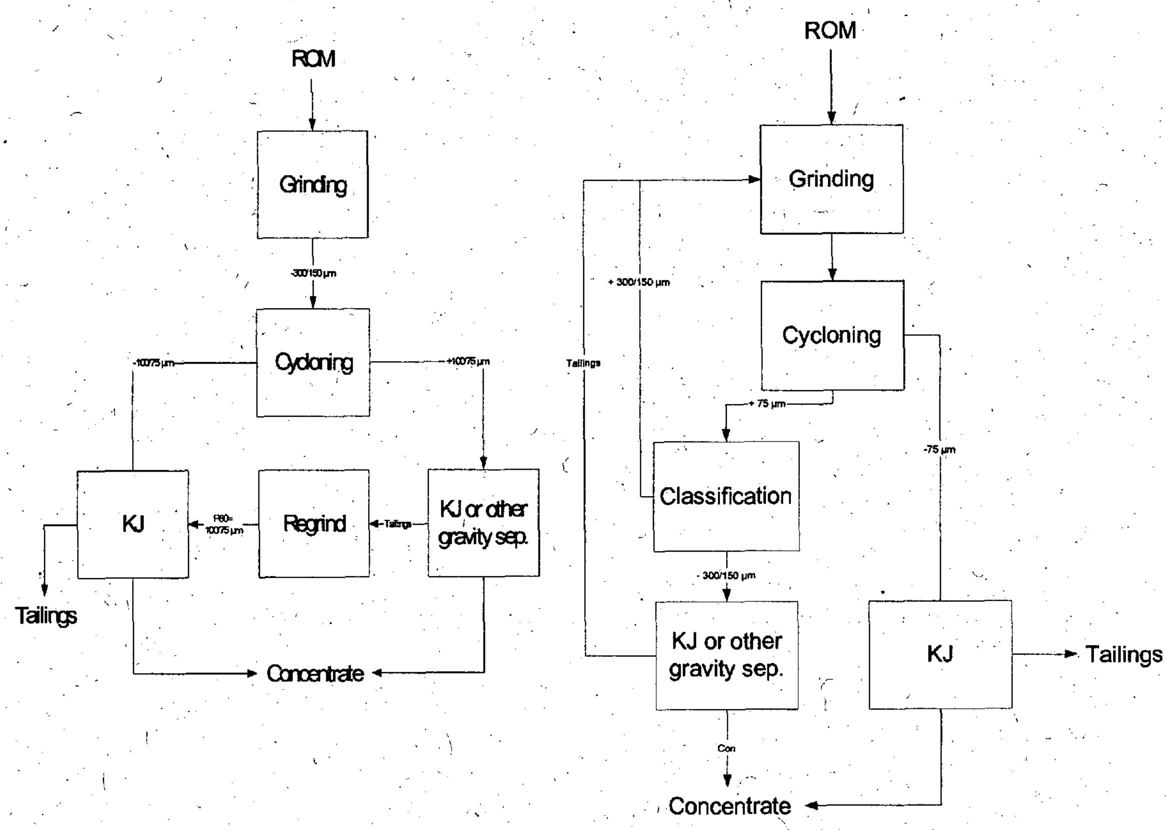

Figure 2: Suggested schemes for the pre-concentration of the Crevier ore

A gradual liberation of the pyrochlore, as the two processing schemes shown in Figure 2, could reduce loss in fines while improving overall grade. This flow sheet should be tested in future projects.

4.2 MAGNETIC SEPARATION OF THE PRECONCENTRATE

Wet magnetic separation test was performed at 600 Gauss on the concentrate from the production test in order to reject the magnetic gangue minerals. The results are shown in Table 6. Complete results are shown in Table 16 in the appendix. Surprisingly, a significant fraction of the Nb_2O_5 (4.1%) is reported to the magnetic product. This raises questions about the liberation of niobium. However, iron has been clearly concentrated in the magnetic concentrate with 66.5% recovery.

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Table 6: Magnetic separation results

Product	% Weight	Analysis								
		SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	Nb2O5 (%)	Ta2O5 (%)
Non-mag	94.37	53.60	22.00	1.92	0.16	2.84	10.80	4.12	1.19	0.15
Mag	5.63	18.20	7.48	64.00	0.19	1.21	3.83	1.34	0.85	0.10
Calculated feed	100.00	51.61	21.18	5.41	0.16	2.75	10.41	3.96	1.17	0.15
Product	% Weight	Distribution (%)								
		SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O (%)	K2O (%)	Nb2O5 (%)	Ta2O5 (%)
Non-mag	94.37	98.0	98.0	33.5	93.4	97.5	97.9	98.1	95.9	96.3
Mag	5.63	2.0	2.0	66.5	6.6	2.5	2.1	1.9	4.1	3.7

4.3 KELSEY JIG CLEANING TESTS

Two cleaning tests were performed on the KCJ rougher concentrate. Operating conditions of the Kelsey jig cleaner tests are presented in Table 15. Results of the two cleaning tests are presented in Table 7 and Table 8 with the following remarks:

- For cleaning test #1, a concentrate at 2.6% Nb_2O_5 with 86.5 % recovery is obtained.
- The cumulative recovery after rougher-cleaner test #1 is 60%. This value is comparable to the direct concentration obtained with the conditions of Test 32, reported previously in Phase 1, at 2.2 % Nb_2O_5 and 64% recovery.
- For the second cleaning test, a higher concentrate grade of 5.9% Nb_2O_5 with 42.5% recovery was obtained at a lower mass pull of 2.7%.
- The cumulative recovery after rougher-cleaner test #2 is 29.2%.
- Cleaning tests show that a high grade Nb_2O_5 product could be produced targeting low mass yield to the concentrates. However it is not clear if the performance of rougher cleaner is better than a single pass in the Kelsey Jig with lower mass pull.

Table 7: Kelsey jig cleaner test #1

Product	% Weight	Analysis												
		SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)
Concentrate	39.8	43.9	17.7	13.3	0.2	3.7	9.1	3.2	2.0	0.2	0.9	2.6	1.37	0.33
Tailings	60.2	55.0	23.7	1.7	0.2	2.3	11.1	4.3	0.2	0.1	0.5	0.3	0.04	0.03
Feed	100.00	50.6	21.3	6.3	0.18	2.9	10.30	3.8	0.90	0.10	0.63	1.22	0.57	0.15

Product	% Weight	Distribution (%)												
		SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	MnO	P2O5	Nb2O5	ZrO2	Ta2O5
Concentrate	39.8	34.6	33.1	83.5	46.4	52.0	35.3	33.3	86.7	63.2	55.6	86.5	95.6	87.6
Tailings	60.2	65.4	66.9	16.5	53.6	48.0	64.7	66.7	13.3	36.8	44.4	13.5	4.4	12.4

Table 8: Kelsey jig cleaner test #2

Product	% Weight	Analysis												
		SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)
Concentrate	2.7	31.7	12.6	24.4	0.2	4.7	6.9	2.2	4.0	0.3	1.3	5.9	2.86	0.73
Tailings	97.3	54.5	22.9	1.9	0.2	2.5	11.1	4.2	0.2	0.1	0.5	0.2	0.04	0.03
Feed	100.00	53.9	22.6	2.5	0.15	2.5	10.99	4.1	0.27	0.06	0.50	0.37	0.12	0.05

Product	% Weight	Distribution (%)												
		SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	MnO	P2O5	Nb2O5	ZrO2	Ta2O5
Concentrate	2.7	1.6	1.5	26.1	3.8	5.0	1.7	1.4	39.6	12.8	6.9	42.5	66.3	40.1
Tailings	97.3	98.4	98.5	73.9	96.2	95.0	98.3	98.6	60.4	87.2	93.1	57.5	33.7	59.9

4.4 MAGNETIC SEPARATION OF THE KELSEY JIG CLEANER CONCENTRATES

The cleaner concentrates produced were separately subjected to magnetic separation. Table 9 and Table 10 present the results. The overall results of the cleaner tests with magnetic separation are presented in Table 11. Magnetic separation on the two Kelsey cleaner jig tests have produced overall recoveries of 59.6% and 29% as shown in Table 11.

Table 9: Magnetic separation on Kelsey jig cleaner test #1

	% Weight	Analysis											
		SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)
Non-magnetic	90.2%	48.30	19.40	3.95	0.47	4.11	9.97	3.50	2.05	0.97	3.09	1.61	0.39
Mag 600 Gauss	7.5%	4.61	2.06	88.80	0.21	0.37	1.02	0.32	1.39	0.08	0.21	0.09	0.03
Mag 4000 Gauss	2.4%	20.50	8.70	54.20	0.40	1.57	4.30	1.58	5.03	0.31	0.80	0.33	0.09
Caluclated feed	100%	44.38	17.85	11.47	0.45	3.77	9.17	3.22	2.07	0.89	2.82	1.47	0.36
		Distribution											
	% Weight	SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	Nb2O5	ZrO2	Ta2O5
Non-magnetic	90.2%	98.1%	98.0%	31.0%	94.4%	98.3%	98.1%	98.1%	89.2%	98.5%	98.8%	99.0%	98.8%
Mag 600 Gauss	7.5%	0.8%	0.9%	57.7%	3.5%	0.7%	0.8%	0.7%	5.0%	0.7%	0.6%	0.5%	0.6%
Mag 4000 Gauss	2.4%	1.1%	1.2%	11.3%	2.1%	1.0%	1.1%	1.2%	5.8%	0.8%	0.7%	0.5%	0.6%

Table 10: Magnetic separation on Kelsey jig cleaner test #2

	% Weight	Analysis											
		SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)
Non-magnetic	77.6%	37.70	14.70	7.75	0.36	5.77	8.15	2.56	4.99	1.57	8.11	4.11	1.00
Mag 600 Gauss	17.5%	3.84	1.63	89.30	0.24	0.44	0.87	0.25	1.80	0.10	0.43	0.20	0.05
Mag 4000 Gauss	4.8%	8.48	3.57	74.50	0.32	1.11	1.88	0.61	5.03	0.25	1.15	0.52	0.13
Calculated feed	100%	30.35	11.87	25.27	0.34	4.61	6.57	2.06	4.43	1.25	6.43	3.25	0.79
		Distribution											
	% Weight	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)
Non-magnetic	77.6%	96.4%	96.1%	23.8%	82.9%	97.2%	96.3%	96.4%	87.4%	97.6%	98.0%	98.1%	98.1%
Mag 600 Gauss	17.5%	2.2%	2.4%	61.9%	12.5%	1.7%	2.3%	2.1%	7.1%	1.4%	1.2%	1.1%	1.1%
Mag 4000 Gauss	4.8%	1.4%	1.5%	14.3%	4.6%	1.2%	1.4%	1.4%	5.5%	1.0%	0.9%	0.8%	0.8%

Table 11: Cleaning of the concentrates from the Kelsey jig tests

Product	% Weight	Distribution from head sample of rougher (%)											
		SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	Nb2O5	ZrO2	Ta2O5
Cleaner 1	3.86	3.1	2.9	30.4	4.5	9.5	3.1	2.9	37.7	15.4	60.3	88.4	61.2
Cleaner 2	0.26	0.14	0.13	9.51	0.36	0.91	0.15	0.12	17.2	1.9	29.6	61.3	28

Product	% Weight	Distribution from head sample of rougher (%)											
		SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	P2O5	Nb2O5	ZrO2	Ta2O5
Non Mag – Cleaner 1	3.48	3.04	2.84	9.44	4.25	9.34	3.04	2.84	33.6	15.2	59.6	87.5	60.4
Non Mag – Cleaner 2	0.20	0.14	0.12	2.26	0.30	0.88	0.14	0.12	15.0	1.9	29.0	60.2	27.5

4.5 FLOTATION TESTS

Two flotation tests were performed as per the operating conditions and reagent scheme of test #105 (Project T453) on the non-magnetic product. Test conditions are given in the appendix in Tables 17 and 18 and Figures 7 and 8.

Results are shown in Table 12 and in Figure 3 to Figure 6. Table 19 and Table 21 in the appendix show the results with complete mass balance for these two tests. The following comments are to be noted:

- In test #1, an important loss of niobium recovery was encountered in sulfide flotation and in scavenger tailings.
- A second test was performed by removing the sulfide flotation step since assaying of the head showed that the non-magnetic product had a concentration of only 0.066% S. Modifications were also made to the conditioning and preparation of the fuel oil, which was emulsified instead of being added pure.
- Carbonate flotation was difficult in flotation test #1. A recovery of only 46% (including sulfide flotation) was obtained. It was improved for the second flotation, with a recovery of 74%. However, previous tests (T453) have shown that a higher recovery of CaO could be obtained from a gravity concentrate.

The results for both tests are plotted in Figure 3 and 4 in terms of Nb_2O_5 grade vs. recovery and Nb_2O_5 recovery vs flotation stage. It can be seen that:

- Selectivity and grade were improved for the first stage of test #2
- Recovery was lost in cleaner # 3 in the second test compared to test #1.

- Previous tests have shown that the flotation of the Crevier pyrochlore seems to be very sensitive when the pH is decreased causing a depression of the pyrochlore as shown in some tests after the second cleaner stage.
- The literature shows that Ca and Mg ions are detrimental to pyrochlore flotation [2, 3, 4]. These ions may be the cause of the loss of pyrochlore in the late stages of cleaning. It is thus suggested to either remove these ions, for instance with oxalic acid, or change the water after carbonate flotation or pyrochlore roughing in order to improve the overall recovery.

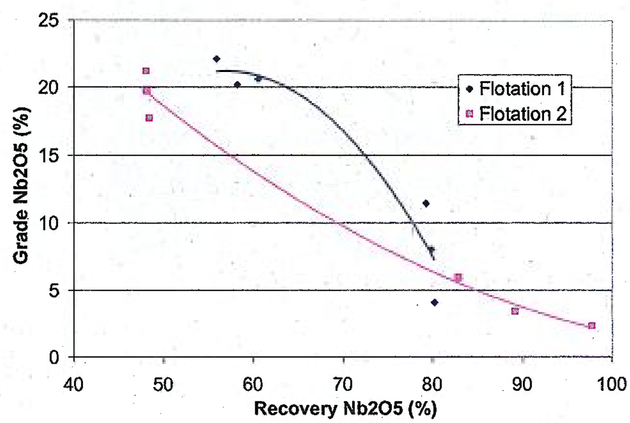

Figure 3: Grade vs. local recovery for each subsequent processing stage of the Crevier ore

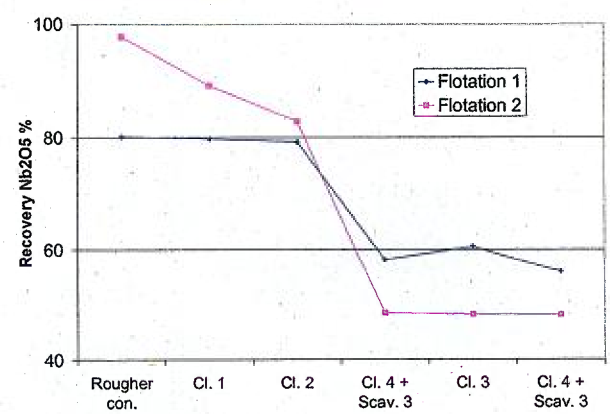

Figure 4: Local recovery for each processing stage of the Crevier ore

Finally, the grade and recoveries from the head sample for the complete process of test #105 from project T453 compared with the pre-concentration with the Kelsey jig and flotation 1 and 2 are shown in Figure 6 and Table 12. Both tests from the Kelsey jig pre-concentration show better overall selectivity compared to the results obtained in T453. It also seems that flotation 2 provides a better selectivity in the first stage, however the recovery is lost during cleaner 3. A final concentrate of 20% Nb_2O_5 has been obtained but with a recovery of only 38%.

Table 12: Comparison of flotation test results with those of test #105 of project T453

	Grade			Local recoveries			Cumulative recoveries		
	T453	Flot1	Flot2	T453	Flot1	Flot2	T453	Flot1	Flot2
Gravity	0.63	1.20	1.20	63.6	69.7	69.7	63.6	69.7	69.7
Non mag.	0.64	1.19	1.19	97.3	95.9	95.9	61.9	66.8	66.8
Pyro. Feed	0.68	1.23	1.34	92.9	94.4	98.1	57.5	63.1	65.6
Rougher con	3.10	4.10	2.33	83.4	80.2	97.7	51.6	53.6	65.3
Cleaner 1 con	5.11	8.04	3.42	83.0	79.8	89.1	51.4	53.3	59.6
Cleaner 2 con	5.98	11.4	5.94	82.9	79.2	82.8	51.3	52.9	55.3
Cleaner 3 con	10.3	19.9	20.0	48.3	62.8	48.3	29.9	42.0	32.3
Cleaner 4 con	3.34	22.1	21.2	3.62	55.9	48.0	2.2	37.4	32.1
Cleaner 4 + Con. Scav. Cleaner 3	-	20.6	17.9	-	60.5	48.6	-	40.4	32.5

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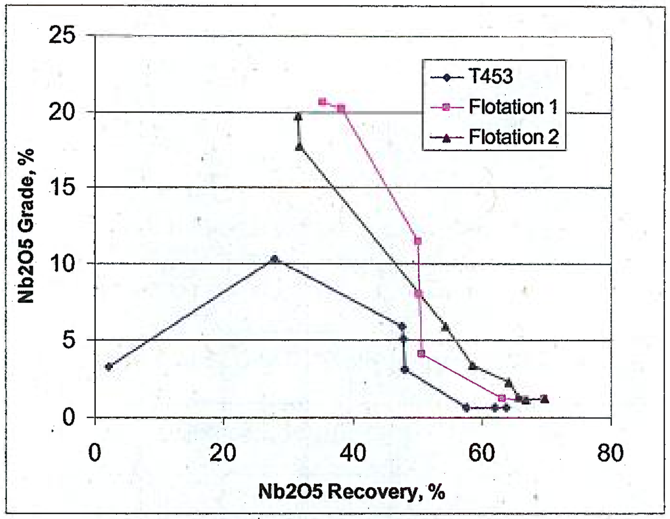

Figure 5: Grade-recovery curve for processing of the Crevier ore as obtained in the two flotation tests compared with T453 results

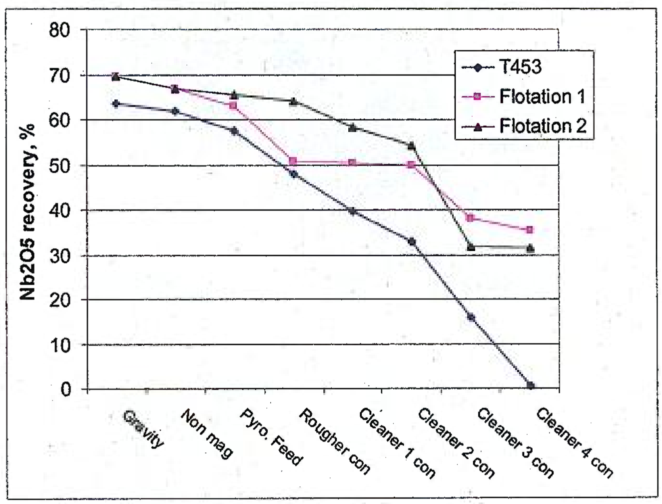

Figure 6: Recovery for each subsequent processing stages of the Crevier ore as obtained in the two flotation tests compared with T453 results

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APPENDIX

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Table 13: Complete results of the calculated head from Phase 2

Test #	SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O	K2O	TiO2	MnO	P2O5	Nb2O5	ZrO2	Ta2O5	BaO	Y2O3	SrO	ThO2
22	55.83	23.43	1.70	0.18	1.47	11.38	4.42	0.21	0.04	0.20	0.17	0.07	0.02	0.03	0.002	0.05	0.01
23	55.81	23.86	1.78	0.22	1.45	11.3	4.42	0.23	0.04	0.18	0.17	0.07	0.02	0.03	0.005	0.05	0.01
24	56.40	23.52	1.61	0.19	1.45	11.42	4.48	0.19	0.03	0.18	0.17	0.06	0.02	0.03	0.005	0.05	0.01
25	56.83	23.54	1.64	0.17	1.48	11.33	4.44	0.19	0.04	0.19	0.17	0.05	0.02	0.03	0.002	0.05	0.01
26	56.68	23.97	1.66	0.16	1.45	11.34	4.40	0.21	0.04	0.18	0.13	0.04	0.02	0.03	0.002	0.05	0.01
27	55.67	23.61	1.63	0.19	1.45	11.26	4.45	0.20	0.04	0.18	0.14	0.06	0.01	0.03	0.002	0.05	0.01
28	56.30	23.38	1.60	0.18	1.49	11.41	4.43	0.18	0.04	0.20	0.16	0.06	0.02	0.03	0.002	0.05	0.01
29	56.00	23.82	2.03	0.18	1.50	11.20	4.38	0.22	0.04	0.20	0.18	0.07	0.02	0.03	0.002	0.05	0.01
32	55.82	23.31	1.89	0.22	1.44	11.21	4.34	0.20	0.04	0.19	0.19	0.07	0.02	0.00	0.000	0.00	0.00
33	56.33	23.56	1.48	0.26	1.43	11.36	4.43	0.16	0.03	0.20	0.15	0.03	0.01	0.00	0.000	0.00	0.00
34	56.18	23.55	1.62	0.21	1.39	11.32	4.45	0.19	0.04	0.17	0.16	0.05	0.01	0.00	0.000	0.00	0.00
35	55.64	23.29	2.08	0.22	1.45	11.28	4.43	0.20	0.04	0.19	0.18	0.06	0.02	0.00	0.000	0.00	0.00
36	55.58	23.28	1.89	0.20	1.51	11.28	4.37	0.21	0.05	0.21	0.23	0.07	0.02	0.00	0.000	0.01	0.00
Ph2(Calc.)	56.08	23.55	1.74	0.20	1.46	11.31	4.42	0.20	0.04	0.19	0.17	0.06	0.02	0.02	0.002	0.03	0.01
Ph2 (analy)	56.30	23.30	1.73	0.21	1.50	11.30	4.42	0.20	0.04	0.19	0.19	0.07	0.02	0.03	0.002	0.05	0.01
Phase 1	55.26	23.02	2.1	0.19	1.53	11.06	4.35	0.2	0.04	0.19	0.19	0.07	0.02	0.03	0.002	0.04	0.01

Table 14: Results of the production test with the Kelsey Jig

Product	% Weight	SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	PAF (%)	Total (%)
		Analysis														
Concentrate	9.70	51.60	21.00	5.69	0.23	2.77	10.40	3.93	0.86	0.09	0.57	1.20	0.55	0.15	1.76	100.80
Tailings	90.30	56.70	23.50	1.07	0.23	1.33	11.50	4.50	0.12	0.03	0.16	0.06	0.00	0.01	1.52	100.73
Calculated Feed	100.00	56.21	23.26	1.52	0.23	1.47	11.39	4.44	0.19	0.04	0.20	0.17	0.06	0.02	1.54	100.73
		Distribution (%)														
Product	% Weight	SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	PAF (%)	Total
Concentrate	9.70	8.9	8.8	36.4	9.7	18.3	8.9	8.6	43.5	24.4	27.7	69.7	92.4	69.8	11.1	9.7
Tailings	90.30	91.1	91.2	63.6	90.3	81.7	91.1	91.4	56.5	75.6	72.3	30.3	7.6	30.2	88.9	90.3
Calculated Feed	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 15: Operating conditions of the Kelsey jig cleaner tests

	Jig ajustements							Ragging				Feed	
TEST #	Rotations (Hz)	Pulsations (Hz)	Stroke (mm)	Water to tail (l/min)	Screen size (micron)	Spigots	Water nozzels	Type	Dimension (mm)	Specific density	Bed thickness (mm)	Specific density	% solids
C1	42	50	3.18	8	200	2.5	2.5	Proppant	300-425	3.29	18	2.77	40
	Water to conc:				Water to tail:			Stroke:					
C2	35	50	3.18	10	200	2.5	2.5	Proppant	300-425	3.29	18	2.77	40
	Water to conc:				Water to tail:			Stroke:					

Table 16: Overall metallurgical results of the magnetic separation test

Product	% Weight	Analysis														
		SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	MgO (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	PAF (%)	Total (%)
Non-mag	94.37	53.60	22.00	1.92	0.16	2.84	10.80	4.12	0.79	0.08	0.59	1.19	0.56	0.15	2.09	100.89
Mag	5.63	18.20	7.48	64.00	0.19	1.21	3.83	1.34	1.49	0.22	0.27	0.85	0.46	0.10	0.00	99.64
Feed caculated	100.00	51.61	21.18	5.41	0.16	2.75	10.41	3.96	0.83	0.09	0.57	1.17	0.55	0.15	1.97	100.82
Product	% Weight	Distribution (%)														
		SiO2	Al2O3	Fe2O3	MgO	CaO	Na2O (%)	K2O (%)	TiO2 (%)	MnO (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)	PAF (%)	Total
Non-mag	94.37	98.0	98.0	33.5	93.4	97.5	97.9	98.1	89.9	85.9	97.3	95.9	95.3	96.3	100.0	94.4
Mag	5.63	2.0	2.0	66.5	6.6	2.5	2.1	1.9	10.1	14.1	2.7	4.1	4.7	3.7	0.0	5.6
Feed caculated	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 17: Conditions of flotation test 1

FEUILLE DE CONDITIONS : ESSAIS DE FLOTTATION						
PROJET	T-981					
Test number	Flotation 1					
Test objective	Repeat tests 105 et 106 of projets de 2004					
ÉCHANTILLON	Crevier, Non-Magnétique (équipement/intensité) et concentré de gravimétrie (Kelsey Jig / ragging)					
TECHNICIEN(NE)	A.béland					
DATE	22-Apr-09					
	Sulfures	Carbonates	Nb dég - épui	Nb Nett 1	Nb Nett 2	Nb Nett 3
Cellule (L)	2.5					
Vitesse (rpm)	1200					
Débit d'air (L/min)						
Densité, (% solide)	44.6%					
CONDITIONS SULFURES						
ÉTAPE	Ajout de réactifs en g/T			Temps		pH
	CuSO4	KAX	Dowfroth 250	Cond. (min)	Flot. (min)	Naturel
Conditionnement sulfures 1	750	750		5		6.90
Flotation des sulfures					6	6.90
Observations:						
CONDITIONS CARBONATES						
ÉTAPE	Ajout de réactifs en g/T			Temps		pH
	Amidon	Huile de Riz	Moussant	Cond. (min)	Flot. (min)	Naturel
Cond Carbonates 1	241			5		11.30
Cond Carbonates 2		670		10		11.30
Dégross des Carbonates					3.5	11.30
Cond Carbonates 4		134		2		11.30
Épuisage des Carbonates					3	11.30
Observations:						
CONDITIONS PYROCHLORE						
ÉTAPE	Ajout de réactifs en g/T			Temps		pH
	H_2SiF_6	Flotinor SM-15	Huile #1	Cond. (min)	Flot. (min)	Naturel
Conditionnement 1	4436	509	739	12		
Dégrossissage Pyrochlore					11	~6
Conditionnement 4		40	138	0.5		
Épuisage Pyrochlore					4	5.90
Conditionnement 5	193	60		2		
Nettoyage 1 du concentré combiné Dégros + Épuis					8	4.5-5.3
Conditionnement 6			46	5		5.80
Nettoyage 2					8	5.80
Conditionnement 7	379		56	5		3.7-5.3
Nettoyage 3					3	3.7-5.3
Conditionnement 8	333	67	33	5		3.00
Nettoyage 4					8	3.00
Conditionnement 9	667	67	33	5		3.50
Épuisage Nettoyage 3					3	3.50

Table 18: Conditions of flotation test 2

FEUILLE DE CONDITIONS : ESSAIS DE FLOTTATION						
PROJET	T-981					
NUMÉRO ESSAI	Flotation 2					
BUT DE L'ESSAI	vérifier effet : enlever flotation des sulfures, ajout huile émulsifié, augmenter dosages SM-15					
ÉCHANTILLON	Crevier, Non-Magnétique et concentré de gravimétrie (Kelsey Jig)					
TECHNICIEN(NE)	A.béland					
DATE	29-Apr-09					
	Carbonates	Nb dég - épui	Nb Nett 1	Nb Nett 2	Nb Nett 3	Nb Nett 4
Cellule (L)	2.5	2.5	1.25	1.25	1.25	1.25
Vitesse (rpm)	1200	1200	1000	1000	1000	1000
Débit d'air (L/min)	naturel	naturel	naturel	naturel	naturel	naturel
Densité, (% solide)						

CONDITIONS CARBONATES						
ÉTAPE	Ajout de réactifs en g/T			Temps		pH
	Amidon	Huile de Riz		Cond. (min)	Flot. (min)	Naturel
Cond Carbonates 1	241			5		11.30
Cond Carbonates 2		670		10		11.30
Dégross des Carbonates					3.5	11.30
Cond Carbonates 4		134		2		11.30
Épuisage des Carbonates					3	11.30
Observations:						

CONDITIONS PYROCHLORE						
ÉTAPE	Ajout de réactifs en g/T			Temps		pH
	H_2SiF_6	Flotinor SM-15	Huile #1	Cond. (min)	Flot. (min)	Naturel
Conditionnement 1				2		~6
Conditionnement 2		509		5		~6
Conditionnement 3			739	5		~6
Dégrossissage Pyrochlore					11	~6
Conditionnement 4		40	138	0.5		5.90
Épuisage Pyrochlore					4	5.90
Conditionnement 5		60		2		4.5-5.3
Nettoyage 1 du concentré combiné Dégros + Épuis					8	4.5-5.3
Conditionnement 6			46	5		5.80
Nettoyage 2					8	5.80
Conditionnement 7	379		56	5		3.7-5.3
Nettoyage 3					3	3.7-5.3
Conditionnement 8	0	67	33	5		3.00
Nettoyage 4					8	3.00

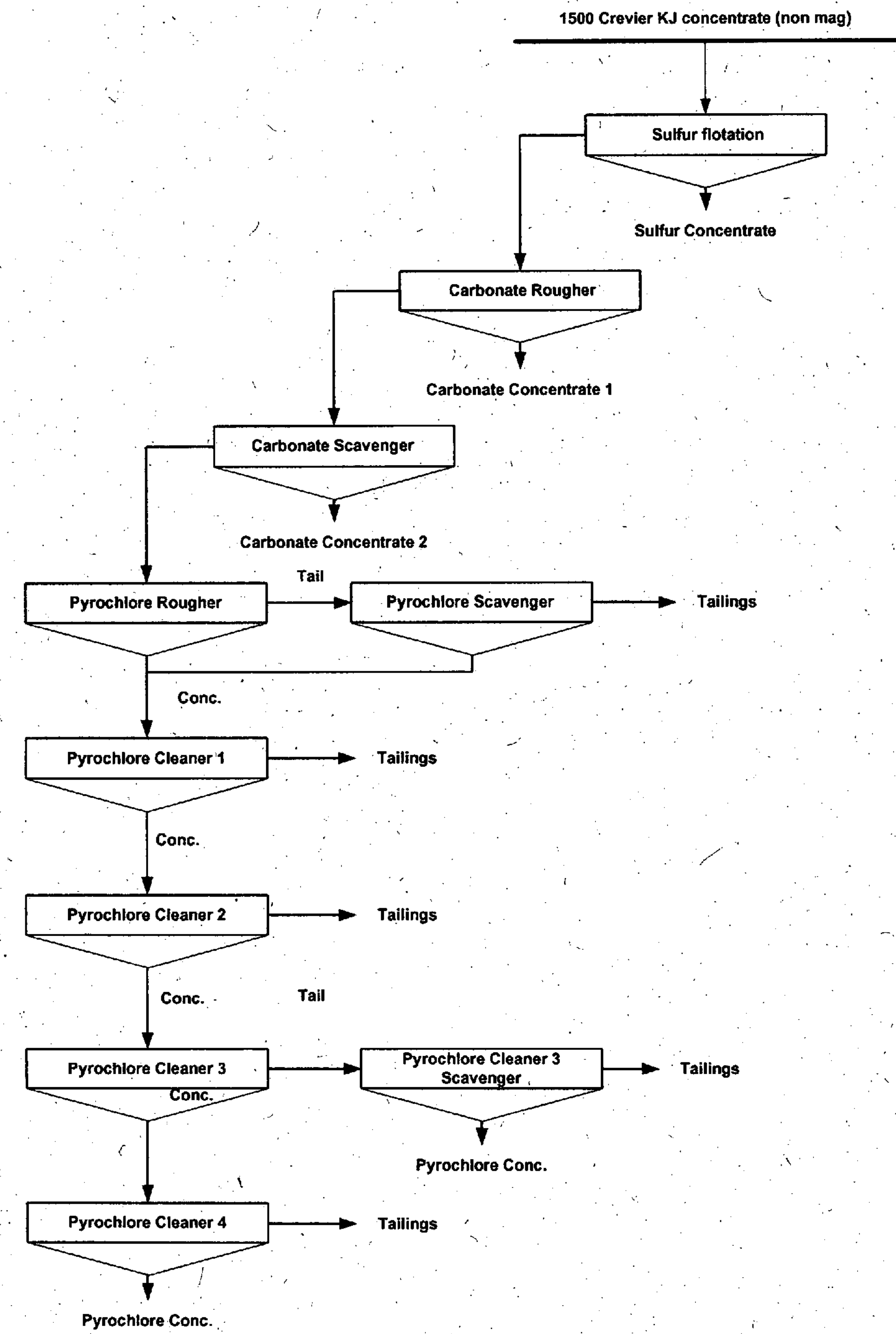

Figure 7: Flotation 1 test scheme

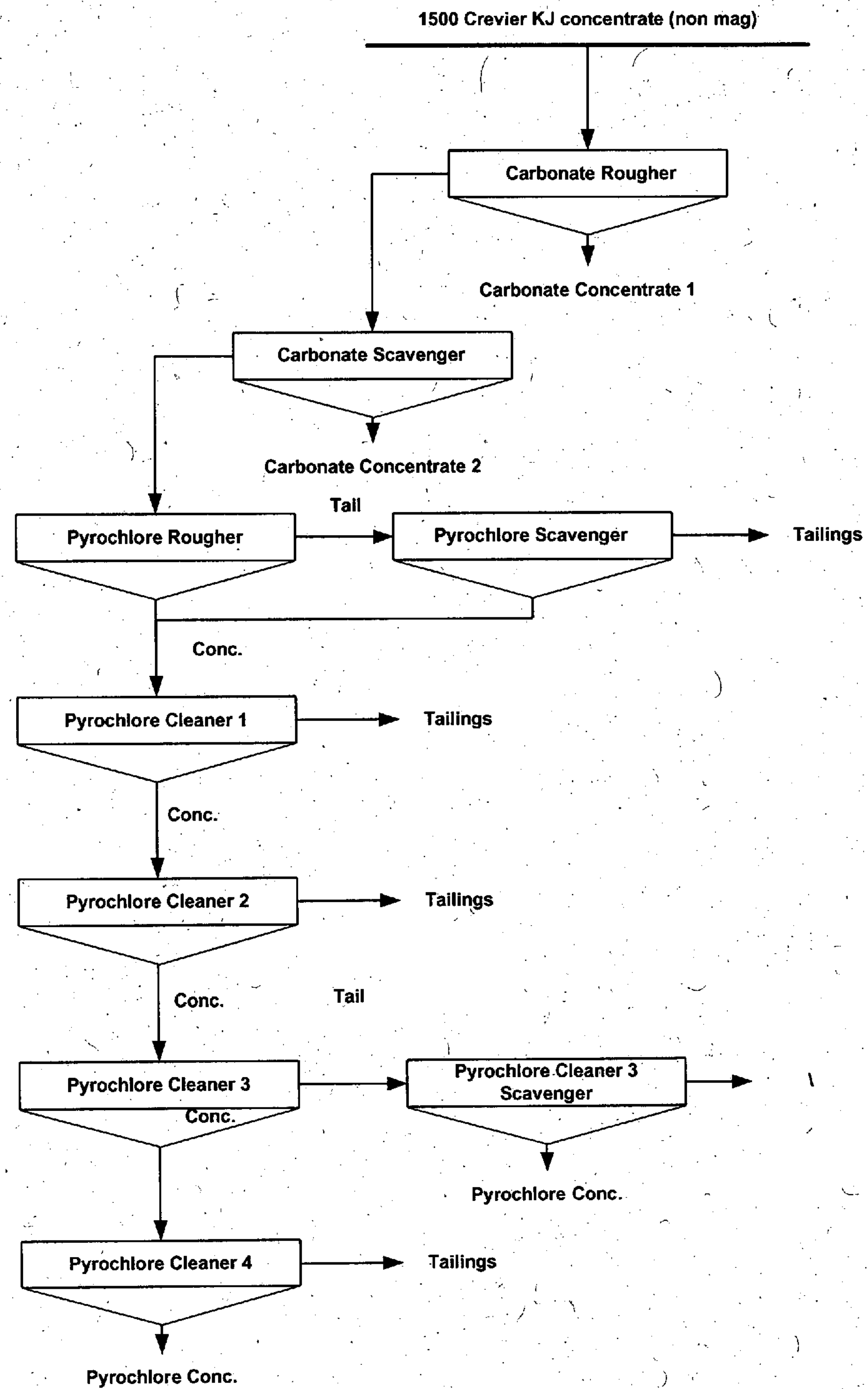

Figure 8: Flotation 2 test scheme

Table 19: Results of flotation test #1

Product	Weight (%)	Analysis (%)										
		SiO2	Al2O3	Fe2O3	CaO	Na2O	K2O	TiO2	P2O5	Nb2O5	ZrO2	Ta2O5
Sulfuide concentrate	7.25	43.30	18.20	5.64	9.17	7.92	3.82	0.87	4.03	0.79	0.59	0.09
Carbonates concentrate 1	1.18	37.80	15.10	2.15	17.40	7.29	2.87	0.33	2.00	0.38	0.19	0.05
Carbonates concentrate 2	1.32	35.60	14.10	2.00	20.00	6.68	2.57	0.26	2.33	0.31	0.16	0.04
Pyrochlore. Scav. tailings	67.21	58.50	24.10	0.20	0.36	11.90	4.51	0.04	0.09	0.25	0.28	0.02
Pyrochlore. cleaner 1 tailings	11.34	58.30	23.60	0.25	1.42	11.60	4.40	0.02	0.38	0.04	0.02	0.01
Pyrochlore. cleaner 2 tailings	3.53	56.50	22.40	0.78	2.77	10.90	3.95	0.16	0.43	0.19	0.08	0.03
Pyrochlore. cleaner 3 scavenger tailings	4.29	26.60	10.10	2.50	21.90	4.98	1.72	0.70	2.70	4.51	4.89	0.59
Pyrochlore. cleaner 3 scavenger concentrate	0.42	29.60	11.30	9.80	12.10	5.58	2.00	5.05	1.07	6.48	3.03	0.79
Pyrochlore. cleaner 4 tailings	0.48	30.20	10.40	10.20	10.10	6.02	1.82	5.29	0.91	11.40	1.34	1.43
Pyrochlore. cleaner 4 concentrate	2.98	10.10	1.93	26.70	5.72	3.47	0.35	19.50	0.23	22.10	2.54	2.65
Feed		**53.60**	**22.00**	**1.92**	**2.84**	**10.80**	**4.12**	**0.79**	**0.59**	**1.19**	**0.56**	**0.15**
Combined carbonates tailings	2.50	36.64	14.57	2.07	18.77	6.97	2.71	0.29	2.17	0.34	0.17	0.04
Combined sulfur and carbonates tailings	9.75	41.59	17.27	4.72	11.64	7.68	3.54	0.72	3.55	0.68	0.48	0.08
Pyrochlore rougher concentrate	23.04	44.78	17.60	4.55	6.37	8.98	3.21	2.89	0.82	4.10	1.34	0.51
Cleaner 1 concentrate	11.70	31.68	11.79	8.73	11.16	6.45	2.06	5.67	1.25	8.04	2.63	0.99
Cleaner 2 concentrate	8.16	20.94	7.20	12.16	14.80	4.52	1.24	8.06	1.61	11.44	3.73	1.40
Cleaner 3 concentrate	3.46	12.88	3.10	24.42	6.33	3.82	0.55	17.54	0.32	20.62	2.37	2.48
Combined cl. 4 + cl. 3 scanvenger conc.	3.40	12.50	3.08	24.62	6.51	3.73	0.55	17.72	0.33	20.18	2.60	2.42

Table 20: Results of flotation test #1 "Continued"

Product	Weight (%)	Distribution (%)									
		SiO2	Al2O3	Fe2O3	CaO	Na2O	K2O	TiO2	P2O5	Nb2O5	ZrO2	Ta2O5
Sulfide Conc.	7.25	5.8	6.0	24.9	23.4	5.3	6.7	8.3	49.0	4.9	7.8	4.7
Carb. Conc. 1	1.18	0.8	0.8	1.5	7.2	0.8	0.8	0.5	4.0	0.4	0.4	0.4
Carb. Conc. 2	1.32	0.9	0.8	1.6	9.3	0.8	0.8	0.5	5.2	0.3	0.4	0.4
Pyro. Scav. Tail.	67.21	73.2	73.8	8.2	8.5	73.9	73.7	3.5	10.1	14.3	34.5	10.1
Pyro. Cleaner 1 Tail.	11.34	12.3	12.2	1.7	5.7	12.2	12.1	0.3	7.2	0.4	0.4	0.8
Pyro. Cleaner 2 Tail.	3.53	3.7	3.6	1.7	3.4	3.6	3.4	0.7	2.5	0.6	0.5	0.7
Pyro. Cleaner 3 Scanvenger Tail.	4.29	2.1	2.0	6.5	33.0	2.0	1.8	3.9	19.4	16.4	38.5	18.3
Pyro. Cleaner 3 Scanvenger Conc.	0.42	0.2	0.2	2.5	1.8	0.2	0.2	2.8	0.8	2.3	2.3	2.4
Pyro. Cleaner 4 Tail.	0.48	0.3	0.2	3.0	1.7	0.3	0.2	3.3	0.7	4.6	1.2	5.0
Pyro. Cleaner 4 Conc.	2.98	0.6	0.3	48.4	6.0	1.0	0.3	76.2	1.1	55.9	13.9	57.2
Feed calculated	**100.00**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Combined carbonates tailings	2.50	1.7	1.7	3.2	16.5	1.6	1.6	1.0	9.1	0.7	0.8	0.8
Combined sulfur and carbonates tailings	9.75	7.6	7.7	28.0	39.9	6.9	8.4	9.2	58.1	5.6	8.6	5.5
Pyrochlore rougher concentrate	23.04	19.22	18.48	63.80	51.59	19.13	17.97	87.25	31.79	80.16	56.81	84.36
Cleaner 1 concentrate	11.70	6.90	6.28	62.08	45.92	6.97	5.85	86.95	24.57	79.80	56.39	83.54
Cleaner 2 concentrate	8.16	3.18	2.68	60.40	42.48	3.41	2.46	86.21	22.02	79.23	55.87	82.88
Cleaner 3 concentrate	3.46	0.83	0.49	51.39	7.70	1.22	0.47	79.51	1.88	60.53	15.08	62.18
Combined cl. 4 + cl. 3 scanvenger conc.	3.40	0.79	0.48	50.92	7.78	1.17	0.46	78.97	1.90	58.21	16.23	59.62

Table 21: Results of Flotation test #2

Product	Weight (%)	Analysis										
		SiO2 (%)	Al2O3 (%)	Fe2O3 (%)	CaO (%)	Na2O (%)	K2O (%)	TiO2 (%)	P2O5 (%)	Nb2O5 (%)	ZrO2 (%)	Ta2O5 (%)
Carbonates concentrate 1	5.32	24.70	10.50	3.15	27.80	4.75	2.17	0.37	6.89	0.24	0.21	0.03
Carbonates concentrate 2	3.32	34.90	14.70	3.31	18.70	6.73	2.94	0.47	4.57	0.35	0.33	0.04
Pyrochlore. Scav. tailings	39.10	61.10	23.60	0.20	0.15	11.60	4.33	0.02	0.01	0.01	0.02	0.01
Pyrochlore. cleaner 1 tailings	19.77	56.50	24.60	0.92	0.44	12.20	4.51	0.38	0.05	0.54	0.02	0.01
Pyrochlore. cleaner 2 tailings	15.13	55.10	25.60	0.83	0.46	12.50	4.68	0.28	0.04	0.52	0.17	0.07
Pyrochlore. cleaner 3 scavenger tailings	13.77	49.70	19.60	3.77	2.55	9.65	3.74	1.71	0.46	3.09	2.73	0.39
Pyrochlore. cleaner 3 scavenger concentrate	0.56	58.90	20.40	2.30	0.73	9.68	4.10	0.93	0.08	1.33	0.24	0.17
Pyrochlore. cleaner 4 tailings	0.19	59.50	18.90	3.70	0.53	9.09	3.95	1.76	0.07	1.79	0.43	0.23
Pyrochlore. cleaner 4 concentrate	2.84	16.70	4.81	21.30	5.51	4.61	0.92	13.90	0.37	21.20	3.75	2.59
Feed	**100.00**	**53.63**	**22.00**	**1.81**	**2.83**	**10.85**	**4.08**	**0.80**	**0.61**	**1.25**	**0.54**	**0.15**
Combined carbonates tailings		**53.60**	**22.00**	**1.92**	**2.84**	**10.80**	**4.12**	**0.79**	**0.59**	**1.19**	**0.56**	**0.15**
Pyrochlore rougher concentrate	8.64	28.62	12.12	3.21	24.30	5.51	2.47	0.41	6.00	0.28	0.26	0.03
Cleaner 1 concentrate	52.27	52.18	22.43	2.78	1.28	11.16	4.15	1.45	0.17	2.34	0.98	0.27
Cleaner 2 concentrate	32.49	49.55	21.11	3.91	1.79	10.53	3.94	2.10	0.25	3.44	1.57	0.43
Cleaner 3 concentrate	17.37	44.71	17.20	6.59	2.95	8.82	3.29	3.68	0.43	5.98	2.79	0.74
Combined cl. 4 + cl. 3 scanvenger conc.	3.04	19.43	5.71	20.18	5.19	4.90	1.11	13.12	0.35	19.96	3.54	2.44

Table 22: Results of Flotation test #2 "Continued"

Product	Weight (%)	Distribution (%)										
		SiO2	Al2O3	Fe2O3	CaO	Na2O	K2O	TiO2	P2O5	Nb2O5	ZrO2	Ta2O5
Carb. Conc. 1	5.32	2.4	2.5	9.3	52.3	2.3	2.8	2.5	59.8	1.0	2.1	1.1
Carb. Conc. 2	3.32	2.2	2.2	6.1	22.0	2.1	2.4	2.0	24.8	0.9	2.0	0.9
Pyro. Scav. Tail.	39.10	44.5	41.9	4.3	2.1	41.8	41.5	1.0	0.6	0.4	1.4	2.5
Pyro. Cleaner 1 Tail.	19.77	20.8	22.1	10.1	3.1	22.2	21.9	9.4	1.6	8.5	0.7	1.3
Pyro. Cleaner 2 Tail.	15.13	15.5	17.6	6.9	2.5	17.4	17.4	5.3	1.0	6.3	4.7	7.2
Pyro. Cleaner 3 Scanvenger Tail.	13.77	12.8	12.3	28.7	12.4	12.3	12.6	29.4	10.3	33.9	69.1	36.3
Pyro. Cleaner 3 Scanvenger Conc.	0.56	0.6	0.5	0.7	0.1	0.5	0.6	0.7	0.1	0.6	0.2	0.6
Pyro. Cleaner 4 Tail.	0.19	0.2	0.2	0.4	0.0	0.2	0.2	0.4	0.0	0.3	0.2	0.3
Pyro. Cleaner 4 Conc.	2.84	0.9	0.6	33.5	5.5	1.2	0.6	49.4	1.7	48.0	19.6	49.8
Feed calculated	**100.00**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Combined carbonates tailings	8.64	4.6	4.8	15.3	74.2	4.4	5.2	4.4	84.6	1.9	4.1	2.0
Pyrochlore rougher concentrate	8.64	4.6	4.8	15.3	74.2	4.4	5.2	4.4	84.6	1.9	4.1	2.0
Cleaner 1 concentrate	52.27	50.85	53.30	80.33	23.68	53.80	53.26	94.61	14.76	97.63	94.50	95.54
Cleaner 2 concentrate	32.49	30.02	31.18	70.26	20.60	31.56	31.39	85.21	13.15	89.11	93.77	94.20
Cleaner 3 concentrate	17.37	14.48	13.58	63.32	18.14	14.12	14.03	79.92	12.16	82.84	89.05	87.04
Combined cl. 4 + cl. 3 scanvenger conc.	3.04	1.10	0.79	33.88	5.57	1.37	0.83	49.82	1.74	48.31	19.73	50.07

Ordre des ingénieurs du Québec

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Retour à la Liste des résultats

Technical Report
Niobium and Tantalum resource estimation of the Crevier deposit
North of Lac St-Jean
Quebec Canada

Respectfully submitted to:
Crevier Minerals Inc.

Date: April 6th 2009

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FOREWORD

The objective of this study is to produce a NI 43-101 compliant mineral resources estimate of the Crevier Niobium & Tantalum property owned by Crevier Minerals Inc.

This study is done with the objective of bringing up to date the evaluation of the resources considering higher commodity market prices than in past studies done in the mid 1980's and new technologies to increase recovery in mineral processing.
It must be brought to the attention of the reader that significant effort has been put into an exhaustive compilation and review of previous metallurgical testing which was done by previous owners.

This study is done in accordance with a mandate given to SGS Geostat Ltd. - Systèmes Géostat International Inc. by the President of Crevier Minerals Inc., Mr. Serge Bureau.

1- Summary

Crevier Minerals Inc. ("Crevier") commissioned SGS-Geostat Ltd. ("Geostat") to carry out the estimation of the mineral resources of the Crevier Niobium and Tantalum deposit, north of Lac St-Jean, Quebec. This technical report is prepared in accordance with the Standards of Disclosure for Mineral Projects as defined by NI 43-101.

The Crevier Property is located in the Crevier and Lagorce Townships that are in the MRC of Maria-Chapdelaine in the Roberval County. The property is located North of Lac St-Jean area and the nearest city with all major services is Dolbeau-Mistassini about 85km to the south.

The property is centered on latitude 49° 30' North and longitude 76° 49' West. In the SNRC system, the map reference is 32H/07. The property covers 83 claims totalling an area of 4645.45 hectares. One claim generally covers 56 hectares.

On April 3rd 2008, Crevier has come to an agreement for the purchase of 100% interest in the property from IAMGOLD QUEBEC-MANAGEMENT INC. for 500,000 Canadian dollars and issued 2,000,000 shares of Crevier Minerals Inc. to IAMGOLD.

The Crevier ore body was discovered by SOQUEM in 1975. From 1975 to 1986, Soquem carried out different phases of exploration on the property. Soquem, in 1986, in the process of a partial privatization of his producing assets formed a new company named Cambior. The ownership of the Crevier Property was transferred to Cambior during the privatisation process. In 2006, Cambior was bought by IAMGOLD who became the owner of the Crevier property. In April 2008, Crevier bought the property from IAMGOLD.

The igneous alkaline Crevier complex, covering 25 km^2, is located inside a gneissic Grenville formation. The origin, according to some authors is associated with the major Saguenay Graben structures, which has given an alkaline metasomatic rim to the Grenville rocks.

The alkaline complex is divided into three main lithological units (units 1 to 3), the fourth unit being the Grenville rocks. These main units are composed of many specific distinct lithological units, defined by local mapping and diamond drilling.

- The first unit represents the major north-western part of the complex; its elongated shape is aligned along a North 320° axis. The composition is an alternating suite of bands of biotite-carbonate syenites, nepheline syenites, nepheline syenites with biotite and carbonatites with an orientation between North 300° and North 340°.
- The second unit mainly covers the south of the complex, but is also present in a 300 meters thick band surrounding the first unit. The composition is mainly nepheline syenite with nepheline-biotite syenite dykes crossing the formations along North 320°.
- The third unit is very small and is located in the south-western part of the complex, inside the second unit and is characterized by a large amount of syenite.

  The chronologic sequence of the deposition of this complex is the following:

- Alkaline metasomatism preceding the complex intrusion.
- Deposition of the nepheline-biotite syenites.
- Emplacement of carbonate-biotite melanosyenite.
- Carbonatite injection.
- Intrusion of nepheline syenite dykes and biotite syenites.

The mineralized tantalum-niobium zone is located in the southern part of the Crevier alkaline intrusive. Previous stripping, geological mapping, trench sampling and diamond drilling contributed to ascertain this mineralization over a length exceeding three kilometres. The niobium-tantalum mineralization type is associated with a porphyritic nepheline syenite dyke. The contacts with the host rocks are sharp and can easily be observed. The dyke is generally composed (95%) of nepheline syenite of pegmatitic texture containing large feldspar crystals and nepheline having variable grain size from few centimetres to close to one meter in certain areas. Many secondary minerals are observed, mainly: biotite, magnetite, pyrrhotite, pyrite, zirconium, sodalite, cancrinite, ilmenite, carbonates and pyrochlore. The main dyke also contains 5% of secondary dykes and host rocks. The thickness of the secondary units varies from centimetres to meters.

The dyke is oriented along North 320° and is 20 metres thick on average. It dips to the north at 80 to 85 degrees. Its thickness is regular, showing local swelling caused by the presence of large inclusions or parallel lenses. The dyke extends from the surface down to a depth of at least 300 metres. The overburden thickness is generally between two and three metres but can locally reach 12 metres. Large zones have been stripped and many rock trenches have been cut during 1980-1981 to fully map and to sample the mineralized zone. A large portion of the overburden has already been stripped for sampling purposes.

A total of 105 diamond drill holes were completed by previous owners, 72 by SOQUEM and 33 by Cambior. The hole spacing was approximately 50 meters on section with a spacing of 100 to 300 meters between sections. These holes were sampled generally at 1.5 meter intervals. Samples were assayed for oxides and especially Nb_2O_5 and Ta_2O_5 from pulverized half core samples. Results show that the Niobium grade varies along strike from south to north of the exploration grid, the grid being oriented 321°. The generally higher Nb grades are observed in the southern part and diminish toward the north direction but the dyke horizontal width increases in the same direction. SGS geostatistical analysis has highlighted a continuity axis striking north and dipping at 45°. This will need to be confirmed in the next phase of exploration work. Tantalum is found within the Niobium pyrochlore mineral grain in a ratio of 1 to 10.

Metallurgical test work completed by SOQUEM and CAMBIOR demonstrates that a Niobium (pyrochlore) concentrate can be produced by a combination of standard industrial processes or treatment.

The current expected metallurgical recovery from the Crevier Pegmatitic Nepheline Syenite dyke based on laboratory test work and bulk sample processing is 60%. The refining recovery is expected to be 96% from the concentrate.

During the site visit in July 2008, ten grab samples from blasted trenches were taken and the core shack located at Niobec Mine facilities in St-Honoré was visited. A total of 39 independent samples were taken from two witness holes drilled by SOQUEM and CAMBIOR: Hole 10-745-46 from 100 to 134.5 meters and hole CV-02-82 from 223.9 to 246.8 meters.

Independent sampling by SGS Geostat Ltd has lead to the resource estimation using the two different sources of historical data for the same sector. The results have shown a significant difference which has been investigated. In a conservative approach, SGS Geostat has capped the outliers in the standardized composites prior to estimation of resources. From studies done during this evaluation, SGS Geostat has reduced the Nb_2O_5 grades by 19% and the Ta_2O_5 grades by 13% for all the SOQUEM composites used in the estimation.

Within the first phase of independent sampling, two commercial laboratories; SGS Lakefield and ALS Chemex were used by SGS Geostat. Both reproduced the results from one mineralized intersection of a Cambior hole (assayed at Actlab in past). Also, they have shown a lower average grade for one of the SOQUEM mineralized intersection. A third laboratory at the IAMGOLD Niobec mine facility has shown results similar to the SOQUEM campaign and has shown higher average grades for the Cambior hole. A second phase of independent sampling from four old witness holes from SOQUEM and two holes from CAMBIOR has confirmed a bias in the SOQUEM assay data.

New gravity pre-concentration tests at COREM proved to be conclusive. Test #04, with a mass pull of 10%, has been identified as optimal, where a niobium recovery of 79% with a concentrate grade of 1.43% Nb_2O_5 and a tantalum recovery of 79% with a concentrate grade of 0.22% Ta_2O_5 were achieved. Further work involving cleaner gravity test followed by magnetic separation of the cleaner concentrate and magnetic separation tailings have been recommended for the Phase 2 of this project.

SGS Geostat completed a Mineral Resource estimate for the property using all the historical data with corrected SOQUEM diamond drill hole grades (Drill hole name series 10-745-xxx). The following table presents the new current 43-101 compliant mineral resource estimate:

CREVIER MINERALS INC.

Mineral resources

Crevier Niobium & Tantalum deposit in Quebec

Mineral resources within geological orebody without cut-off			
INDICATED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	30 940 000	0.168	183
INFERRED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	28 850 000	0.122	166
Mineral resources within geological orebody with cut-off at 0.1%Nb_2O_5			
INDICATED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	25 750 000	0.186	199
INFERRED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	16 880 000	0.162	204

Notes:
%Nb_2O_5 capped at 0.5%
Ta_2O_5 in ppm capped at 550
SG: 2.63
Soquem composites corrected

Recommendations are separated into two areas as follows:

Improvements

+ The database should be expanded to include surface channel samples and short blast holes from the bulk sample.

+ The database should also be expanded to include all the other elements that have been analyzed (Zr,U, etc).

+ Crevier should acquire the most recent high resolution satellite image available.

+ All geological, geographical, geophysical, property boundaries, access and surface analytical data should be integrated into a Geographical Information System.

Work Program to develop the project

Crevier has developed a program with a budget in conjunction with SGS Geostat to advance the project. The proposed program consists of:

A) In 2009, carry out a preliminary economic, assessment and prepare documentation for environmental permitting in order to reach the feasibility level in 2010.

B) A detailed topographical survey of the property with DGPS or equivalent method.

C) A diamond drilling program of 5,000 meters of NQ size. The program has 3 objectives:
   1) geotechnical characterization of the rock for open pit slope design and in-fill drilling between existing sections to increase confidence level.
   2) recover mineralized material for metallurgical testing.
   3) exploration to extend known mineralization and test targets.

D) A geotechnical assessment for mine design
E) A market study
F) Design the underground mine layout
G) Develop a mineral process flowsheet and carry out pilot plant tests
H) Environmental characterization
I) Site/ Tailings/ Waste dump characterization with progressive reclamation plan
J) Develop infrastructure plans (Engineering)
K) Review legal considerations & permitting
L) Prepare environmental management plan in accordance to progressive reclamation plan
M) Validate the economics and financing research

+ Crevier should prepare a technical report at the end of each phase of exploration providing full description of the program and results with recommendations

+ SGS Geostat Ltd. formally recommends continuing the development of the project

+ And finally, acquire additional claims located near the property. As we suspect highly magnetic mineralization to the east of the actual claim block and along the extension of the actual property.

The following table presents the proposed work program with cost estimates in Canadian dollars.

	Total
Scoping Study-Preleminary Economic Assessment	$250 000
Site topography	$100 000
Geotechnic and resources validation drilling	$800 000
Mine Geotechnical Assesment	$100 000
Design mining Open Pit	$200 000
Market Study	$100 000
Design underground mining	$200 000
Processing Eng Flowsheet development Pilot Plant	$1 700 000
Environmental charaterization	$500 000
Site /taliling/waste Dump Charaterization	$500 000
Infrastructure (Engineering)	$1 000 000
Legal consideration/Permitting	$250 000
Environmental management	$200 000
Economics Financing	$200 000
Sub Total	$6 100 000
Contengency 10%	$610 000
Total	$6 710 000

2- Introduction

Crevier Minerals Inc. (Crevier) has acquired 100% of the Crevier property in 2008 from IAMGOLD which in turn had acquired it from Cambior. As part of its development strategy, the company required the preparation of a NI 43-101 compliant technical report on the Crevier property resources. The report was prepared under the supervision of the Qualified Persons Claude Duplessis Eng. Geological engineer with co-author, François Verret Eng. Metallurgist. Claude Duplessis visited the Crevier property site on July 2nd 2008 and also the core shack at the Niobec mine on July 3rd 2008. Independent sampling of in-situ rock in the blasted trenches and in witness core was done by Claude Duplessis. The results are included in this report. This report will be submitted to regulatory. The results are based on drilling and exploration data from past owners of the property (SOQUEM & CAMBIOR) and the July 2008 validation program carried out by SGS Geostat Ltd.

2.1 Terms and units used

SGS Geostat Ltd. was retained by Crevier Minerals Inc. to carry out NI43-101 compliant resource estimate of the Crevier Nb_2O_5 & Ta_2O_5 property located to the north of Lac St-Jean in the province of Quebec, Canada.

This report presents a technical review of the geology and the mineralization. It includes a review of previous works with emphasis on metallurgical testing, a field and core shack visit, independent check samples, an estimation of mineral resources and a proposed program of work in phases.

The information herein is derived from a review of the documents listed in the References and from information provided by representatives of Crevier Minerals Inc.

All measurements in this report are presented in metric system. Monetary units are in Canadian dollars (CA$) unless when specified in United States dollars (US$).

A table showing abbreviations used in this report is provided below.

tonnes or mt	Metric tones
tpd	Tonnes per day
Ton corr	Tonnage corrected according to the zone dip
t, st, ST, ton	Short tons (0.907185 tonnes)
kg	Kilograms
g	Grams
oz	Troy ounce (31.1035 grams)
oz/t	Troy ounce per short ton
g/t	Grams/tonne or ppm
NSR	Net Smelter Return
ppm, ppb	Parts per million, parts per billion
ha	Hectares
ft	Feet
in	Inches
m	Metres
km	Kilometres
m^3	Cubic metres

Table 1: List of abbreviations

2.2 Reliance on Other Experts

The authors have not relied on other experts during the course of this study.

3- Property Description and Location

On April 3rd 2008 Crevier Minerals inc. has come to an agreement for the purchase of 100% interest of the property from IAMGOLD QUEBEC-MANAGEMENT INC. for 500,000 Canadian dollars and issued 2,000,000 shares of Crevier Minerals Inc. to IAMGOLD. The agreement is private and confidential and has been reviewed by Claude Duplessis Eng. QP, the confirmation of the payment to Iamgold is also confirmed. Shareholders are:

Iamgold: 50 %, Dresden Capital: 15%, Camet Metallurgy: 10 %, MinQuest: 5% the balance being owened by 2 individuals having 10% each.

Total shares: 4,000,000, Iamgold has two representatives on the board on a total of six.

3.1 Location

The Crevier Property is located in the Crevier and Lagorce Townships which are in the MRC of Maria-Chapdelaine in Roberval County. The property is located North of Lac St-Jean area and the nearest city with all major services is Dolbeau-Mistassini about 85km to the south.

Crevier Property - Saguenay - Lac Saint-Jean Location Map

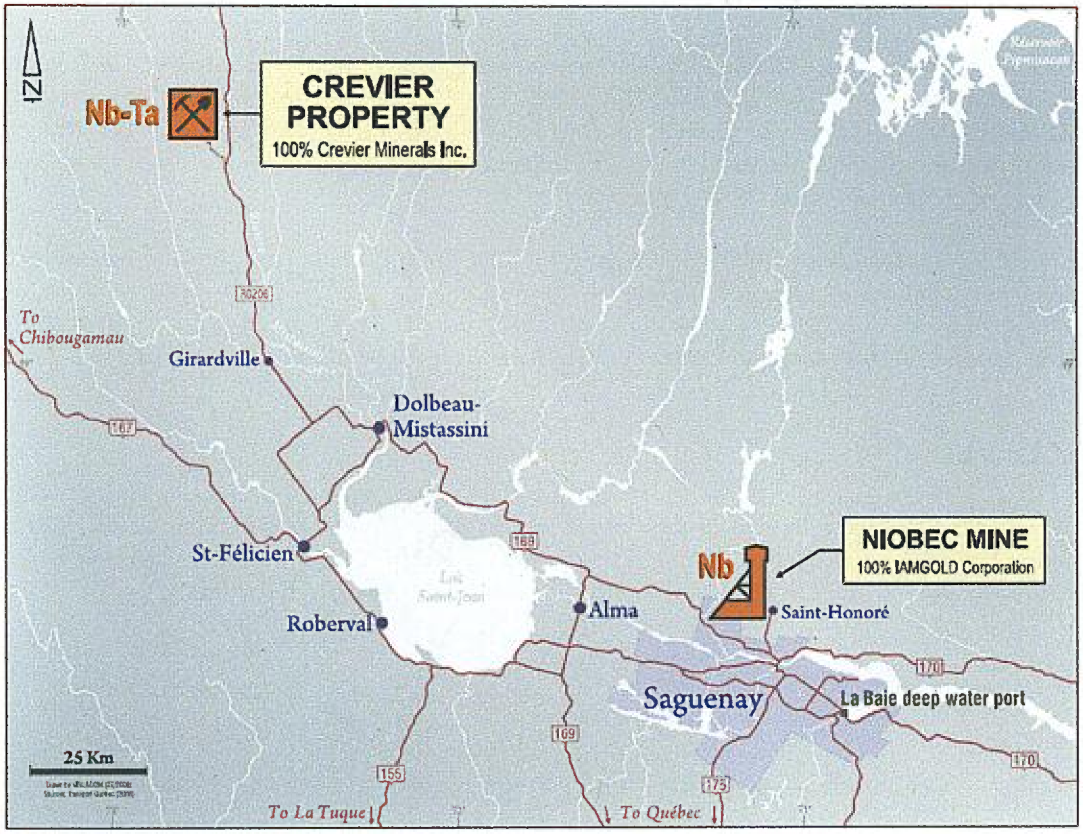


Figure 1: Location of the Property in the province of Quebec

The property is centered on latitude 49° 30' North and longitude 76° 49' West, SNRC map reference 32H/07.

3.2 Property description

The property includes 83 claims covering an area of 4645.45 hectares. One claim generally covers 56 hectares.

The claims are registered in the Province of Quebec electronic system and boundaries in the field may be located with a differential global positioning system (DGPS).
The claims are in good standing at the moment of writing this report. There are no environmental liabilities which we are aware of.

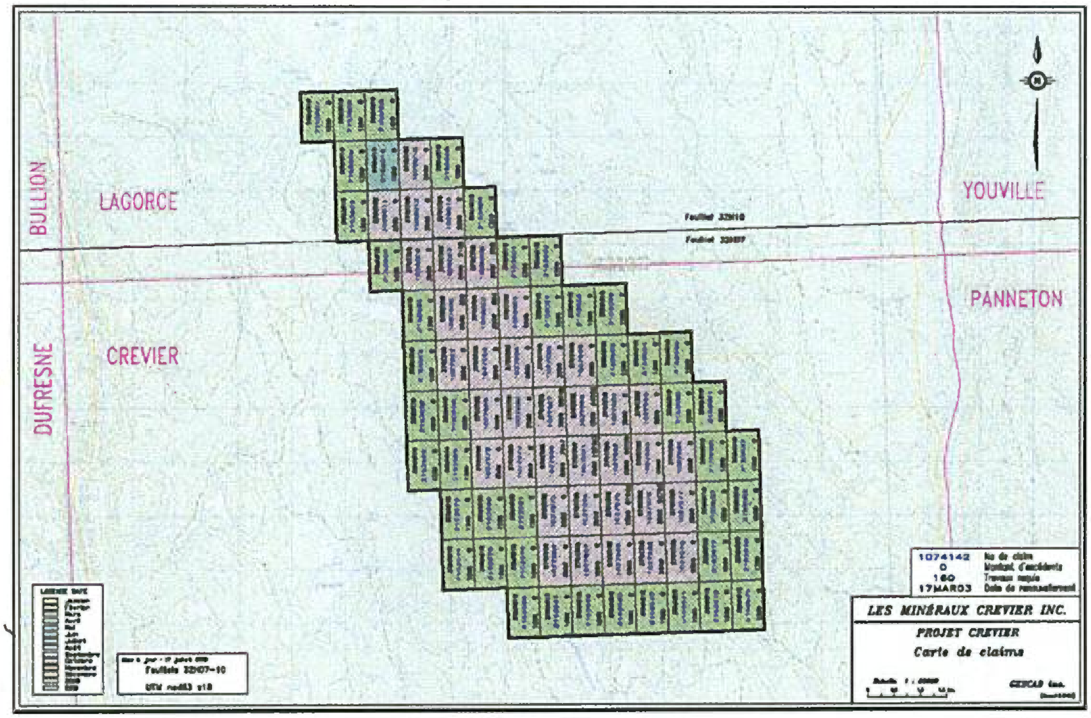


Figure 2: Location of the claims with property perimeter.

The Claims of Crevier Minerals have been validated on the MNR Quebec GESTIM website.

Crevier Property Map

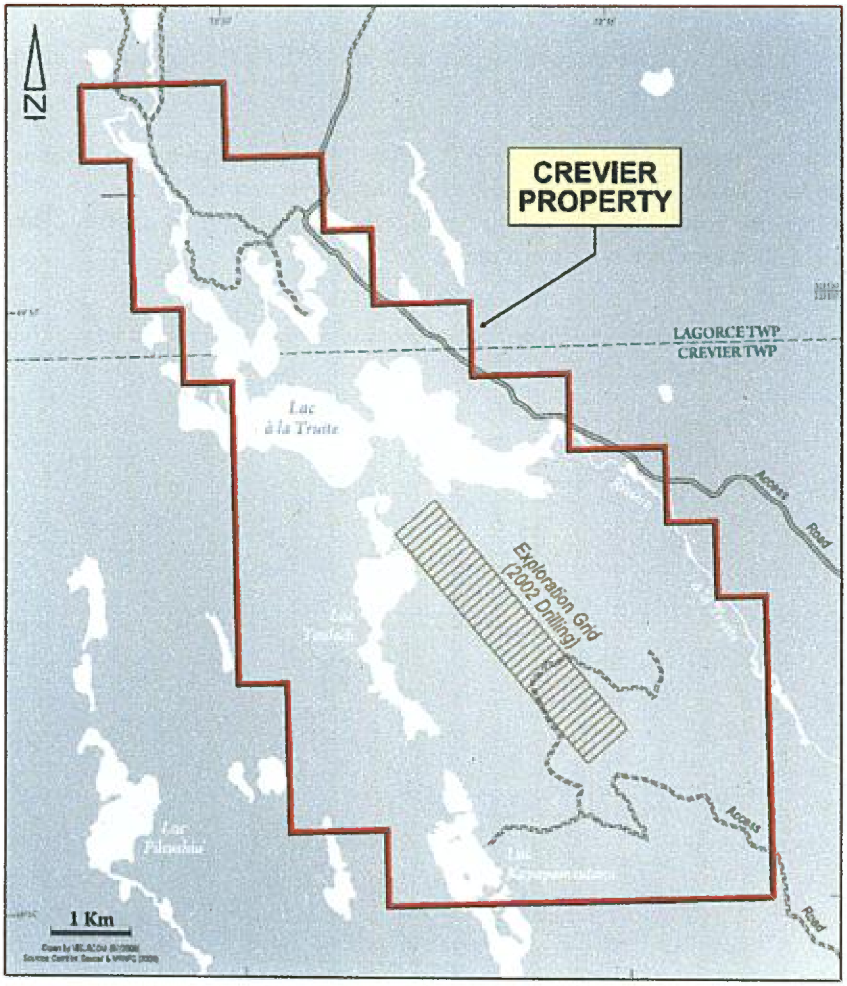


Figure 3: Crevier Minerals property boundary with 2002 exploration grid

Feuillet	Type de titre	No titre	Statut du titre	Date d'inscription	Date d'expiration	Superficie	Détenteur(s) (Nom, Numéro et Pourcentage)
SNRC 32H07	CDC	1027966	Actif	2001-11-19 00:00	2010-12-27 23:59	56,00	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027967	Actif	2001-11-19 00:00	2010-12-27 23:59	56,00	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027968	Actif	2001-11-19 00:00	2010-12-27 23:59	56,00	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027969	Actif	2001-11-19 00:00	2010-12-27 23:59	56,00	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027970	Actif	2001-11-19 00:00	2010-12-27 23:59	56,00	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027973	Actif	2001-11-19 00:00	2010-12-27 23:59	55,99	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027974	Actif	2001-11-19 00:00	2010-12-27 23:59	55,99	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027975	Actif	2001-11-19 00:00	2010-12-27 23:59	55,99	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027976	Actif	2001-11-19 00:00	2010-12-27 23:59	55,99	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027977	Actif	2001-11-19 00:00	2010-12-27 23:59	55,99	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027978	Actif	2001-11-19 00:00	2010-12-27 23:59	55,98	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027979	Actif	2001-11-19 00:00	2010-12-27 23:59	55,98	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027980	Actif	2001-11-19 00:00	2010-12-27 23:59	55,98	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027981	Actif	2001-11-19 00:00	2010-12-27 23:59	55,98	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027982	Actif	2001-11-19 00:00	2010-12-27 23:59	55,98	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027983	Actif	2001-11-19 00:00	2010-12-27 23:59	55,98	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027984	Actif	2001-11-19 00:00	2010-12-27 23:59	55,98	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027985	Actif	2001-11-19 00:00	2010-12-27 23:59	55,97	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027986	Actif	2001-11-19 00:00	2010-12-27 23:59	55,97	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027987	Actif	2001-11-19 00:00	2010-12-27 23:59	55,97	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027988	Actif	2001-11-19 00:00	2010-12-27 23:59	55,97	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027989	Actif	2001-11-19 00:00	2010-12-27 23:59	55,97	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027990	Actif	2001-11-19 00:00	2010-12-27 23:59	55,97	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027992	Actif	2001-11-19 00:00	2010-12-27 23:59	55,96	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027993	Actif	2001-11-19 00:00	2010-12-27 23:59	55,96	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027994	Actif	2001-11-19 00:00	2010-12-27 23:59	55,96	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027995	Actif	2001-11-19 00:00	2010-12-27 23:59	55,96	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027996	Actif	2001-11-19 00:00	2010-12-27 23:59	55,96	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1027999	Actif	2001-11-19 00:00	2010-12-27 23:59	55,95	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1028000	Actif	2001-11-19 00:00	2010-12-27 23:59	55,95	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1028001	Actif	2001-11-19 00:00	2010-12-27 23:59	55,95	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1028006	Actif	2001-11-19 00:00	2010-12-27 23:59	55,94	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1028007	Actif	2001-11-19 00:00	2010-12-27 23:59	55,94	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	1028008	Actif	2001-11-19 00:00	2010-12-27 23:59	55,94	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H10	CDC	1028011	Actif	2001-11-19 00:00	2010-12-27 23:59	55,93	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H10	CDC	1028012	Actif	2001-11-19 00:00	2010-12-27 23:59	55,93	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H10	CDC	1028013	Actif	2001-11-19 00:00	2010-12-27 23:59	55,93	Les Mineraux Crevier Inc (82056) 100 % (responsable)
SNRC 32H10	CDC	1028019	Actif	2001-11-19 00:00	2010-12-27 23:59	55,92	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153566	Actif	2008-05-21 00:00	2010-05-20 23:59	56,01	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153567	Actif	2008-05-21 00:00	2010-05-20 23:59	56,01	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153568	Actif	2008-05-21 00:00	2010-05-20 23:59	56,01	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153569	Actif	2008-05-21 00:00	2010-05-20 23:59	56,01	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153570	Actif	2008-05-21 00:00	2010-05-20 23:59	56,01	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153571	Actif	2008-05-21 00:00	2010-05-20 23:59	56,01	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153572	Actif	2008-05-21 00:00	2010-05-20 23:59	56,01	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153573	Actif	2008-05-21 00:00	2010-05-20 23:59	56,01	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153574	Actif	2008-05-21 00:00	2010-05-20 23:59	56,00	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153575	Actif	2008-05-21 00:00	2010-05-20 23:59	56,00	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153576	Actif	2008-05-21 00:00	2010-05-20 23:59	56,00	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153577	Actif	2008-05-21 00:00	2010-05-20 23:59	56,00	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153578	Actif	2008-05-21 00:00	2010-05-20 23:59	56,00	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153579	Actif	2008-05-21 00:00	2010-05-20 23:59	55,99	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153580	Actif	2008-05-21 00:00	2010-05-20 23:59	55,99	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153581	Actif	2008-05-21 00:00	2010-05-20 23:59	55,99	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153582	Actif	2008-05-21 00:00	2010-05-20 23:59	55,99	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153583	Actif	2008-05-21 00:00	2010-05-20 23:59	55,99	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153584	Actif	2008-05-21 00:00	2010-05-20 23:59	55,98	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153585	Actif	2008-05-21 00:00	2010-05-20 23:59	55,98	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153586	Actif	2008-05-21 00:00	2010-05-20 23:59	55,98	Les Mineraux Crevier Inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153587	Actif	2008-05-21 00:00	2010-05-20 23:59	55,98	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153588	Actif	2008-05-21 00:00	2010-05-20 23:59	55,97	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153589	Actif	2008-05-21 00:00	2010-05-20 23:59	55,97	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153590	Actif	2008-05-21 00:00	2010-05-20 23:59	55,97	Les Mineraux Crevier Inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153591	Actif	2008-05-21 00:00	2010-05-20 23:59	55,97	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153592	Actif	2008-05-21 00:00	2010-05-20 23:59	55,96	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153593	Actif	2008-05-21 00:00	2010-05-20 23:59	55,96	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153594	Actif	2008-05-21 00:00	2010-05-20 23:59	55,96	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153595	Actif	2008-05-21 00:00	2010-05-20 23:59	55,96	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153596	Actif	2008-05-21 00:00	2010-05-20 23:59	55,95	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153597	Actif	2008-05-21 00:00	2010-05-20 23:59	55,95	Les Mineraux Crevier Inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153598	Actif	2008-05-21 00:00	2010-05-20 23:59	55,95	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153599	Actif	2008-05-21 00:00	2010-05-20 23:59	55,95	Les Mineraux Crevier inc (82056) 100 % (responsable)
SNRC 32H07	CDC	2153600	Actif	2008-05-21 00:00	2010-05-20 23:59	55,94	Les Mineraux Crevier inc (82056) 100 % (responsable)

Table 2: Mining titles list from MRNQ GESTIM mining title management system.

Figure 4: Window on validation of Status of owners of the titles on line from GESTIM.

3.3 Royalties

There are no royalties attached to the property.

However the sector is under aboriginal agreement with the Mashtiushtewash Tribe. Crevier Minerals President has already met with band authorities in July 2008 (conseil des Montagnais de Lac Saint Jean) in Roberval for preliminary project information. The contacts are:

Fabien Paul: External Affairs (Chargé des affaires extérieures)
Carl Cleary: Coordinator External Affairs (Coordonnateur aux affaires extérieures, Négociation territoriale et globale)

4- Accessibility, Climate, Local Resources, Infrastructure and Physiography

4.1 Accessibility

A gravel road from Girardville gives access to the property. It is approximately 70 km north of the village. The main road follows the upstream of the Mistassini River. The road open year round is numbered RO206.

The north portion of the property can be accessed via a small gravel road connecting to RO206 at kilometre 42; this road is used to access the neighbourhood of Lac à la Truite cabins and fishing camps. The south portion of the property is accessed from kilometre 33 on the RO206 by following a series of secondary gravel roads. These small access roads are only used in summer time.

Figure 5: Property location with regional road network

Figure 6: Access road at km 33 to the left of the RO206, July 2nd 2008

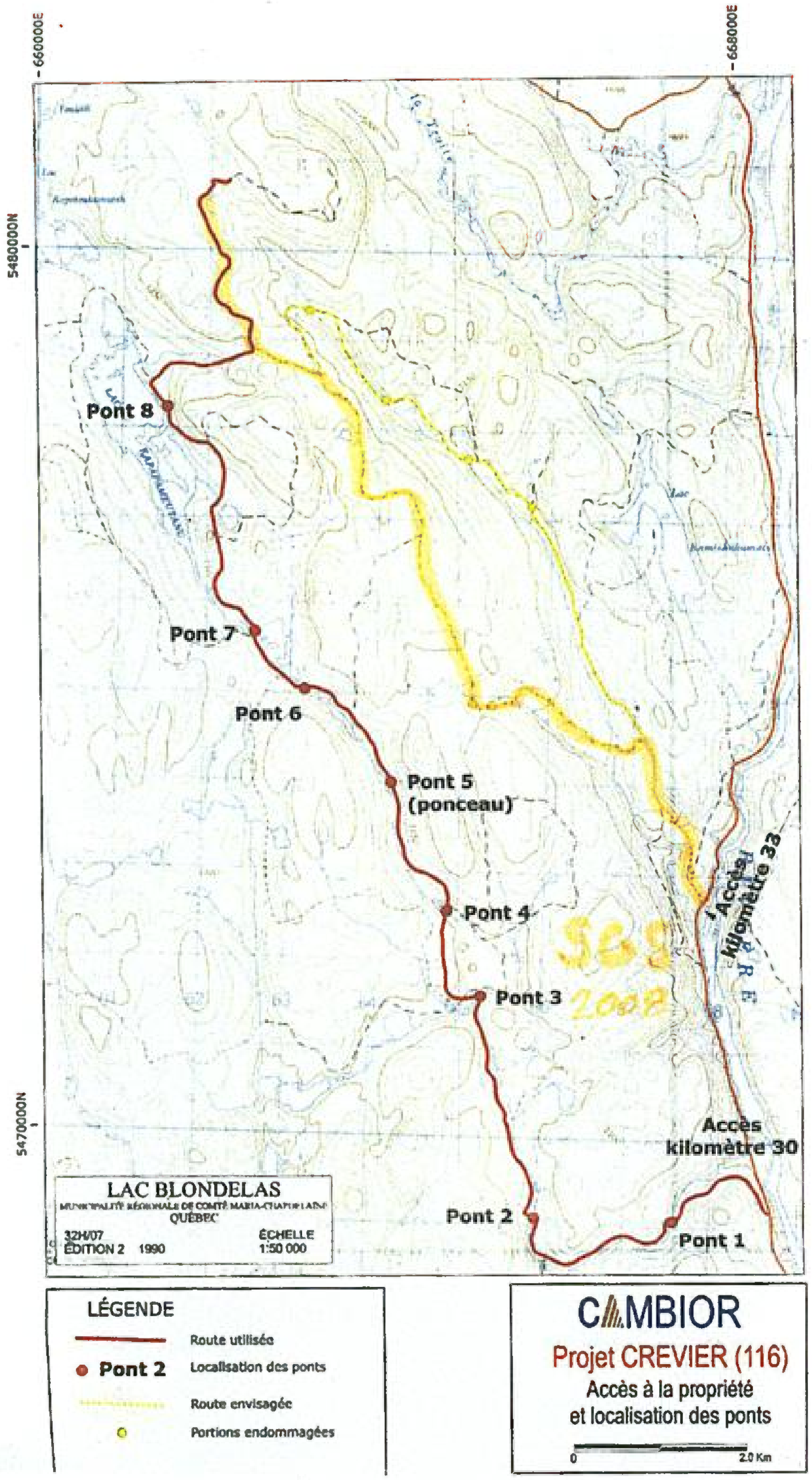


Figure 7: Road access used by SGS Geostat Ltd in orange on Cambior Map

4.2 Climate

Statistics from Bagotville, Saguenay nearest official meteorological station from Météomedia web site as per Friday, October31st 2008

Latitude: 48.20N Longitude: 071.00W **Altitude:** 159m

Temperature °C

	J	F	M	A	M	J	J	A	S	O	N	D
Maximum	-9	-7	0	8	16	22	24	22	17	10	1	-6
Minimum	-21	-19	-11	-2	3	9	12	11	5	0	-5	-16
Average	-15	-13	-5	2	9	15	18	16	11	5	-1	-11

Precipitations

	J	F	M	A	M	J	J	A	S	O	N	D
Rain (mm)	4	4	12	31	77	89	114	100	99	67	35	8
Snow (cm)	67	56	48	23	4	0	0	0	1	11	49	86
Total (mm)	59	49	52	52	81	89	114	100	99	78	78	77
Snow on ground (cm)	48	55	26	1	0	0	0	0	0	1	13	41

Other parameters

	J	F	M	A	M	J	J	A	S	O	N	D
Hum. rel. (%)	80	77	74	68	65	67	71	74	77	78	82	81
Wind speed (km/h)	16	16	18	17	16	14	12	12	14	15	16	16
Wind direction	270	270	270	270	90	270	270	270	270	270	270	270

Number of days where

	J	F	M	A	M	J	J	A	S	O	N	D
Temp.<=0°C	31	28	30	23	9	0	0	0	4	15	26	31
Rain >=0.2 mm	2	1	3	8	14	15	15	16	17	14	8	2
Rain >=5 mm	0	0	0	2	5	6	7	7	6	5	2	0
Rain >=10 mm	0	0	0	0	2	3	4	3	3	2	1	0
Rain >=25 mm	0	0	0	0	0	0	0	0	0	0	0	0
Snow >=0.2 cm	20	16	13	7	2	0	0	0	0	4	14	20
Snow >=5 cm	4	4	3	2	0	0	0	0	0	0	4	6
Snow >=10 cm	1	1	1	0	0	0	0	0	0	0	1	2
Snow >=25 cm	0	0	0	0	0	0	0	0	0	0	0	0

	J	F	M	A	M	J	J	A	S	O	N	D
Pcpn total>=0.2 mm	20	16	14	13	15	15	15	16	17	16	19	20
Pcpn total>=5 mm	4	4	3	4	6	6	7	7	7	5	5	5
Pcpn total>=10 mm	1	0	1	1	3	3	4	3	3	2	2	2
Pcpn totale>=25 mm	0	0	0	0	0	0	0	0	0	0	0	0
Snow Cover>=1cm	31	28	31	17	0	0	0	0	0	1	17	30
Snow Cover>=5cm	31	28	29	13	0	0	0	0	0	0	13	28
Snow Cover>=10cm	30	28	29	11	0	0	0	0	0	0	9	25
Snow Cover>=20cm	26	27	26	7	0	0	0	0	0	0	3	17
Snow Cover>=50cm	10	14	11	2	0	0	0	0	0	0	0	4

The above statistics represent average values of the meteorological parameters for each month of the year. Sampling represents 30 years from 1961 to 1991.

4.3 Local resources

The region of north Lac St-Jean has an extensive agricultural and forestry industry, it also has a significant hydro-power dam system to supply electricity to the aluminum production and transformation industry. The mining operations are mainly quarries for aggregates and dimensional stone. However Niobec, a niobium mine, is located in the area. The mine is owned and operated by Iamgold. 250 km separate Niobec and the Crevier Minerals property.

Even if the region is not a mining area, qualified personel may be found in the region. The University of Quebec in Chicoutimi has a well developed geological department. The Chibougamau area not far from the Crevier project offers also mining facilities. The village of Girardville can provide basic needs such as food and limited accommodation, Dolbeau-Mistassini can provide more services. Several surrounding cities with their distinct services may also provide extensive contractor services and supplies within 200km.

4.4 Infrastructures

The only infrastructure at the site is the access road which is generally in good condition but will need some repairs and culvert replacements due to beaver activities. The property area is large enough to support mining operations, infrastructures, processing facilities, waste dump and tailings. The nearest power line is the major transmission line from Chute-des-Passes. Another power line which Crevier project could connect to is at the former wollastonite project (Orleans Resources) near Saint-Ludger-de-Milot. Otherwise the Crevier project will need to build its own power line to connect to the Normandin Hydro Quebec main sub-sation located 80 kilometers from the project.

4.5 Physiography

The property lies within the Lac à la Truite Basin in the valley of the Rivière à la Truite. The lake is approximately 330 meters above sea level. The lake of shallow depth covers the central part of the Crevier igneous complex (see previous claim figure for illustration). The hills are about 20 meters higher than the lake in the northern part while the south hills are about 100 meters above lake elevation.

The area has been logged in the 1980's; there is actually little mature commercial wood in the area of interest. There is no major difference in erosion pattern between the ore and the surrounding rocks and the surface is relatively smooth. One remarkable aspect of small scale erosion pattern was observed on surface where the porphyry texture is observed with the matrix protruding while the nepheline crystals are lightly carved in.

Figure 8: Topography near old blasted trenches, lens #1

In the picture above taken by Claude Duplessis during last July 2008 site visit, we can see Serge Bureau, President of Crevier Minerals walking on the mineralized dyke with relatively recently grown vegetation.

Figure 9: Typical surface texture enhanced by surface weathering, lens #2

5- History

The Crevier ore body has been discovered by SOQUEM in 1975. From 1975 to 1986, Soquem carried out different phases of exploration on the property. Soquem in 1986, in the process of a partial privatization of his producing assets formed a new company named Cambior. The ownership of the Crevier Property was transferred to Cambior during that privatization process. In 2006, Cambior was bought by IAMGOLD who became the owner of the Crevier property. In April 2008, CREVIER MINERALS INC. bought the property from IAMGOLD.

Summary of past Exploration Works

SOQUEM		
1975	Airborne radiometric survey Land claiming: 322 claims for 5 152 hectares (ha) Line cutting	Identified targets of interest
1976	Line cutting: 222 km including 1975 Geological mapping Trenches Radiometric, induced polarization, magnetometric surveys and mineralogical studies Diamond drilling campaign: 6 holes for 1 156 metres	First hit by DDH
1977	Mapping and geological exploration (1" = 1 000 feet) Diamond drilling campaign: 6 holes for 981 metres	Extension of mineralization
1978	Geological mapping (1" = 1 000 ft ; 1" = 200 ft) Diamond drilling campaign: 20 holes for 2 930 metres	Extension of mineralization
1979	Mineralogical studies Radiometric exploration on the boundary limits Diamond drilling campaign: 7 holes for 1 126 metres Overburden stripping and blasting of the niobium-tantalum zone Metallurgical tests in laboratory	Extension of mineralization and metallurgical testing
1980	Diamond drilling campaign: 27 holes for 3 426 metres Additional overburden stripping, mapping and surface sampling Surveyed line cutting (12.4 km) Bulk sampling of 100 tonnes Metallurgical testing (100 tonnes)	Understanding of the Nb zone, into the Syenite Porphyry dyke (SNp)

1981	Diamond drilling campaign: 5 holes 81-67 to 81-71 (10-745 project) Additional overburden stripping, mapping and surface sampling Line cutting (15 km) Bulk sampling of 1 000 tonnes Mineralogical studies Metallurgical testing (various laboratories)	More comprehensive understanding of the Nb zone, into the Syenite Porphyry dyke (SNp)
1982	Metallurgical testing in laboratory Preliminary assessment (scoping) study Aerial and topographic surveys General survey Radiometric and geological exploration Geochemical survey of creeks sediments Overburden stripping and sampling of east and south showings	Results good enough to continue
1983	Overburden stripping of mineralized showings and sampling Radiometric surveys Mapping Preliminary assessment (scoping) study Mineralogical study Total drilling by SOQUEM 72 holes(13A & 13B) numbered 10-745-1 to 10-745-71	Results good enough to continue
	CAMBIOR	
1986	Complete property acquisition by Cambior Feasibility study: Nb – Ta deposit	Results shows not enough robust economics due to metal price at the time
1997	Soquem takes an option on the property	Back in the hands of SOQUEM
1997-98	Claims staking, and exploration for apatite, sampling, geochemistry and mineralogy	Looking for phosphate
2000	Soquem drops the option on the property Cambior now holds 100% of the property	Back in the hands of Cambior
2002	Diamond drilling campaign by Cambior: 33 holes for 6 062 metres	Resource validation of SOQUEM works

5.1 Exploration and historical mineral resources (not 43-101 compliant)

5.1.1 1975

Discovery by SOQUEM of the Crevier alkaline complex during an airborne spectrometer survey with E-W lines at every kilometre. Two additional surveys were conducted with lines at 0.5 km and at 1 000 feet spacing.
Reconnaissance mapping was done and 19 trenches were excavated, sampled and assayed for U_3O_8, Nb_2O_5, Ta_2O_5; ZrO_2 and P_2O_5.

5.1.2 1976

Following its development policy SOQUEM prepared a public tender for a participation of 33% in the property, based mainly on 23 surface samples taken from radioactive bands three feet or less in width averaging 1.5 lb per ton of U_3O_8 ; 0.22% of $Nb_2O_5Nb_2O_5$, 0.09% of Ta_2O_5 and 0.14% ZrO_2. The tender document, which is still available, contained all information gathered by September 1976: list of claims, surface mapping, diamond drill holes logs, assayed results, etc.

5.1.3 1978

A summary report prepared by Mr. Jacques Bonneau shows the numerous discrepancies in the analytical results of U_3O_8, Nb_2O_5 and Ta_2O_5. At the time of this report many laboratories were involved in the assaying procedures, mainly: Bondarr-Clegg in Ottawa, École Polytechnique of Montreal, Chimitec Ltd of Quebec City, X-Ray Assay Lab in Don Mills Ontario, Metriclab in Ste-Marthe sur le Lac, QC and Ledoux & Company in Teaneck New Jersey USA.

5.1.4 1980

In an exploration summary report prepared by Jacques Bonneau in February 1980, one can read that two main economic sectors have been identified.
The first one is located in the central portion of the lithologic unit #2 where pyrochlore (Nb – Ta) is associated to dykes or to layers of nepheline syenites with a porphyritic texture. The grades vary from 3.0 to 5.0 lb/t for Nb_2O_5, from 0.6 to 0.9 lb/t for Ta_2O_5 and from 0.012 to 0.02 lb/t for U_3O_8.
The second sector of economic interest is located in the central portion of lithologic unit #1. The mineralization (U –Nb –Ta) is inside uranopyrochlore distributed in all different rock types but mainly inside the nepheline syenite and inside the carbonatites. The grades vary from 0.16 to 0.25 lb/t for Nb_2O_5 and from 0.05 to 0.25 lb/t for Ta_2O_5. At that date, $ 700,000 were spent on the property.
During the fall 1980, a 100-tonnes sample was sent to Lakefield for metallurgical testing.
A first reserve summary showed a total of 15 838 000 metric tonnes (not 43-101 compliant), with Nb_2O_5 grading 0.204% and Ta_2O_5 grading 212 ppm. The reserves were qualified as semi-measured, indicated and semi-indicated categories (not NI 43-101 compliant).
Due to discrepancies between assay results of Nb_2O_5 and Ta_2O_5 in the samples mainly due to the low content of metal, it was decided to re-assay a portion of the samples taken from the surface and drill holes drilled between 1976 and 1980.

5.1.5 1981

A second preliminary reserves estimation between the surface and level -300 metres showed 32 178 000 tonnes of ore at 0.188% Nb_2O_5 and 203 ppm of Ta_2O_5. These reserves were classified as semi-measured, indicated and semi-indicated. An extra 28 500 000 tonnes was added in the potential category, but no grade was attributed to them.
The apatite content of the complex was estimated as a tonnage (metric tonnes) of apatite per vertical metre in 4 areas. The estimation established a minimum of 343 682 t/vertical metre and a maximum of 461 130 t/vertical metre. The global apatite content was not published but more than 60% of the tonnage had a grade varying from 4.10 % to 6.30 % in apatite.
A study on the petrography and the geochemistry was done by Robert Harrison.

Réserves Géologiques (Soquem 1981)				
Catégorie	**Niveau**	**Tonnage**	**Nb_2O_5 (%)**	**Ta_2O_5 (ppm)**
Semi-Mesuré + Indiqué	-50 m	11 983 171	0,177	203
Semi-Mesuré + Indiqué	-100 m	3 207 357	0,23	216
Semi-Indiqué	-200 m	4 115 024	0,197	207
Semi-Indiqué	-300 m	13 649 636	0,186	197
Total		**32 955 188**	**0,187**	**201**

Table 3: Historical resources by SOQUEM in 1981 (not 43-101 compliant)

5.1.6 1982

A research program was established in collaboration with Laval University of Quebec to explore the possibilities to concentrate the pyrochlore using flotation and testing different new chemical reagents.
An exploitation study was prepared to compare the advantages of beginning the operation by open pit or by underground mining methods. This study was done on the south-eastern area where reserves were in the order of 100 000 tonnes per vertical metre. The proposed production was 1 000 000 tonnes per year. The open pit operation was more attractive for the first three years. The deposit could be put in operation within 8 months compared to 36 months for the underground option, and all open pit costs were much lower.

5.1.7 1983

The pyrochlore concentration results from the research tests at Laval University, that lasted 15 months, were in general deceptive, and there was no follow-up to these tests. It is important to mention that these tests were done by students without expertise in pyrochlore treatment.

5.18 1986

A feasibility study using the 1981 resources concluded that the commodity prices used and a poor processing recovery were responsible for marginal project economics.

5.1.9 2002

A large drilling campaign was conducted by Cambior on the known mineralized zone. The objectives were to verify the previous geological interpretation, to confirm the historical assaying and to prepare a new resource estimation. The campaign took place in the fall of 2002 and was carried out on lenses #1 and #2 of the main zone of the Crevier complex. A total of 6 082.4 metres were drilled on 33 holes. 1 212 samples were collected and assayed for tantalum and niobium content, and also for uranium, thorium, zirconium and the more frequent rare earths.
This campaign has reduced the spacing of the drilling grid and has confirmed the previous results. The campaign has also given a better understanding of the geological behaviour of the mineralized zone.

+ The reader is invited to look into the metallurgical testing section 15 for an extensive review of the past work of the mineralization of the Crevier nepheline syenite porphyry dyke.

+ The historical geophysical works are not presented in this document (FUGRO & LAMBERT), the computer file format available being from an older software, the data will need processing for visualization and it was not part of the mandate of SGS Geostat Ltd. to carry such works. The geophysical survey works apparently assisted in the discovery and delineation of the mineralized zone and surrounding showings.

+ From the Fugro survey, we know that total magnetic field with gradient, electromagnetic in addition to the radiometric surveys were measured. The helicopter survey was done in October with a DIGHEMv-dsp electromagnetic probe and Fugro AM102 magnetometer with Geometrics G822 sensor and base station with multiple channels including Exploranium model GR820. Flight lines were controlled by radar altimeter and double GPS with video. The barometric pressure and temperatures were also measured.

The following figure from Lambert's report shows the total field magnetic survey. Anomalies are very impressive and indicate additional high potential of discovery in the untested areas of the property. The axial anomaly related to the dyke seems to extend further south of the old exploration grid., It extends to the north but seems to get split in two. One more important point is the presence of a similar anomaly parallel to the existing known structure to the south in the center zone.

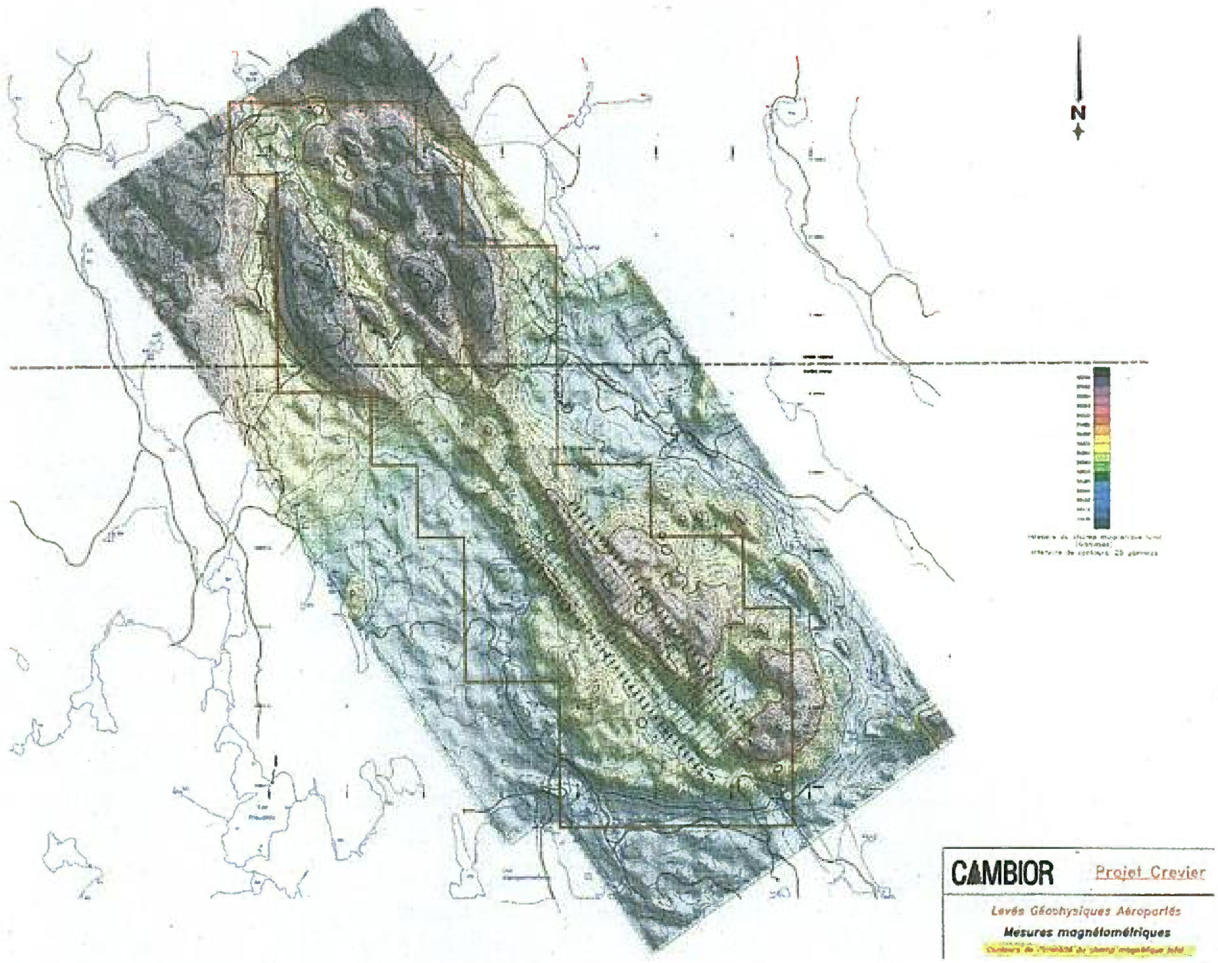


Figure 10: Geophysical Total field survey map

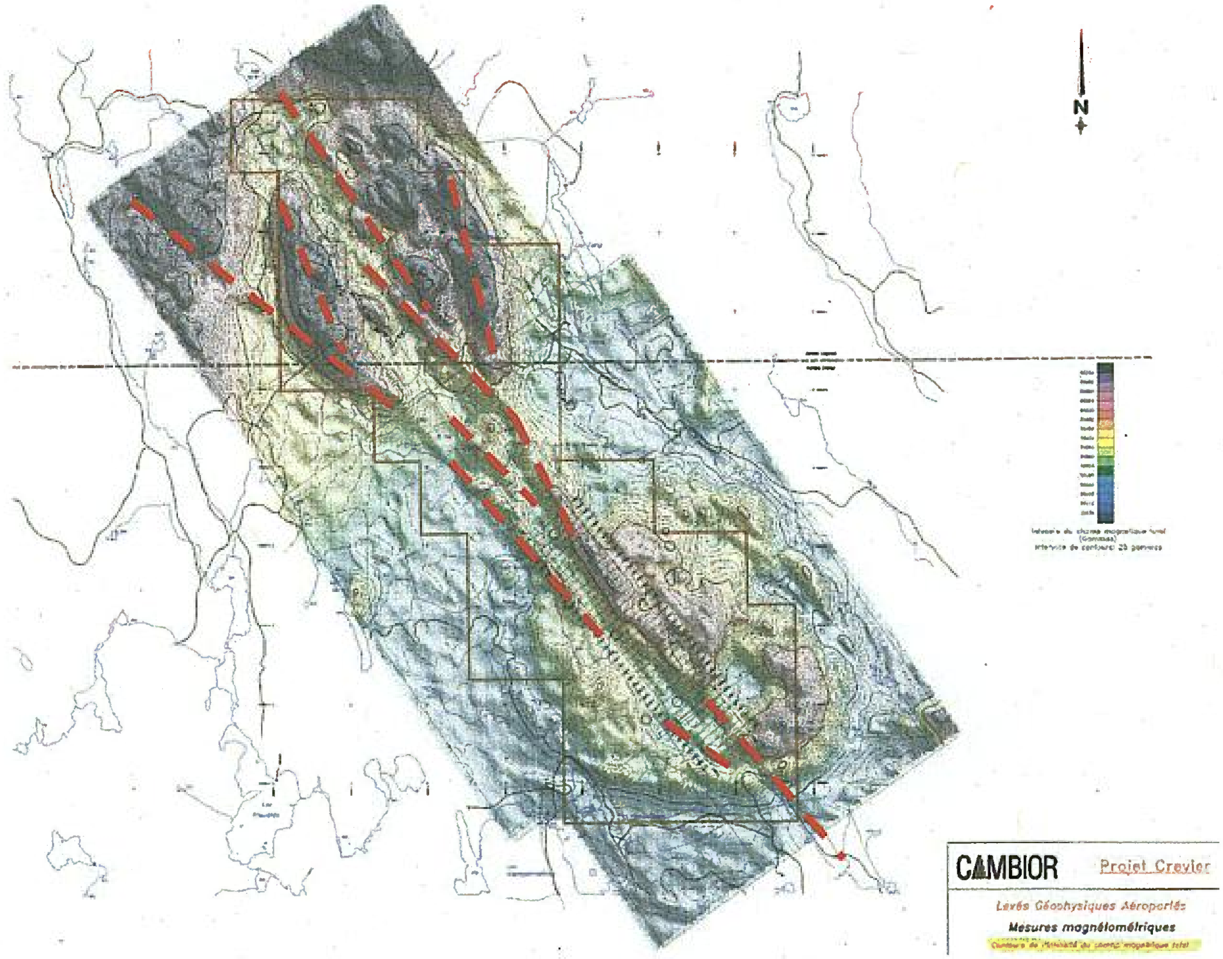


Figure 11: Exploration targets to be tested

5.2 Present cost (2008) of past exploration works

An estimation of the costs, at today's value, was done for all previous exploration works, excluding metallurgical tests. The estimation includes a total of 17,124m of diamond drill in 105 holes plus all the exploration works such as: line cuttings, geophysics, mapping, drilling, surveying and engineering studies. The cost estimate would be between 4.5 and 5.0 million Canadian dollars. + The property has never been in production.

6- Geological Setting

This section is extracted from previous reports; the most relevant information has been translated from French to English language mainly from Antoine Fournier report.

6.1 Regional geology

The Crevier intrusive complex was put in place inside the gneisses of the *Granulites Centrales* (CGT) of the Grenville province (Wynne-Edwards, 1972). More recently, these formations were regrouped inside the fault zone *de "l'allochtone"*, ABT (Rivers et al., 1989). This zone contains mainly quartzo-feldspathic gneisses with biotite and hornblende, and also gneisses with garnets and sillimanite, forming a band parallel to the Grenville Front. Even if their origin is unknown, they are generally considered as the metamorphic equivalent of granitic rocks. In smaller areas, some narrow quartzite bands (debris), marbles and paragneisses cut across the orthogneisses and could be the remaining of the Helikien weathering period (1700 to 1200 Ma).
It is generally admitted that the complex was injected along the Wasnanipi-Saguenay couloirs, a major lineament going north from the St.Lawrence River towards the Superior and extending to the south limit of James Bay (Moorhead et al, 1999). Many alkaline injections are located along this axis, mainly St-Honoré, Crevier, the Dolbeau carbonatites dykes, the Montviel, Shortt Lake and Grevet carbonatites. Fi nally, there is also a series of kimberlites, such as the Desmaraisville dyke which appear to be linked to this lineament.

The following figure shows the regional geology from the Quebec Ministry of Mines. The location of the property is shown by a black square.

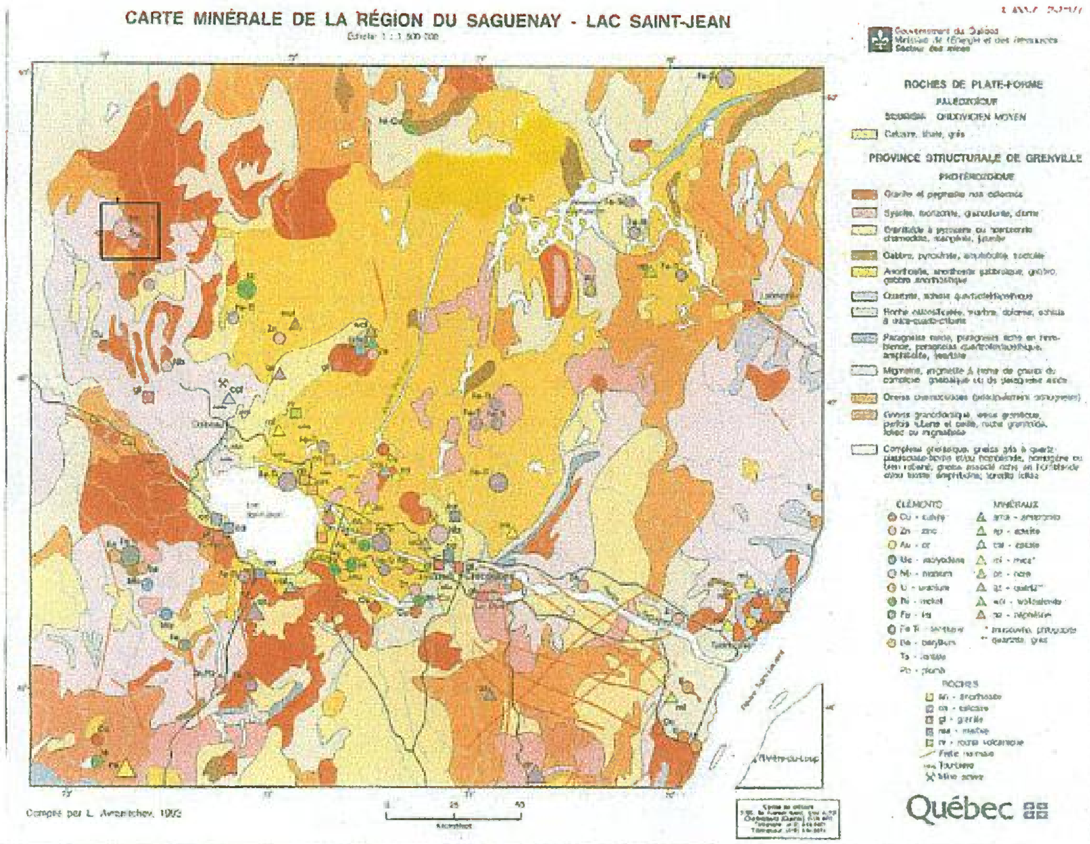


Figure 12: Regional geology from Quebec Ministry of Mines (Property location: Black Square)

6.2 Property Geology

Geology of the Crevier alkaline complex

The geology of the complex was studied with various mapping and drilling campaigns as well as by university research projects (Aubertin, 1976; Bonneau, 1977; Bergeron and Laplante, 1983). All these works have defined the numerous facies and their relations.

The Crevier complex most likely contains four (4) separate units. Firstly there is, on the south-eastern part, a near circular injection of nepheline syenite with variable biotite content going from traces to some percentages (Unit #2). A petrologic separation was established between the phase without biotite (SN) and the one showing biotite up to 10% (SNb).

This unit is cut by a second phase having an oblong shape with the main axis parallel to the Wasnanipi-Saguenay corridor, from north-west toward south-east (320° az). The silicate bands are mainly composed of plagioclases having a more calcitic and biotite content (An20), and higher calcite content (SBc). The carbonatite phases have a medium to large grain size and are showing inclusions of rhomboidal calcite crystals. The secondary phases are inside the interstices of the calcite crystals and include apatite and dolomite having as accessories biotite, plagioclases and pyrochlore. Bergeron (1980) believes that the carbonatites are of a hydrothermal origin while Birkett (1998) believes that the origin is intrusive followed by intense alteration involving an important transfer of elements toward the host rock (1998).

In the south-west part of the intrusive there is a smaller mass of syenite with almost no nepheline. This mass, even though identified by two (2) drill holes, was isolated from the remaining of the complex and was extrapolated by geophysics which describes its contour, therefore giving what is defined as Unit #3.

There is also a period of alkaline metasomatism that has affected the host gneisses (Unit #4). The aegirine, a sodic pyroxene seems to be the main witness of this event which has happened before the intrusion of the complex (Bergeron, 1980).

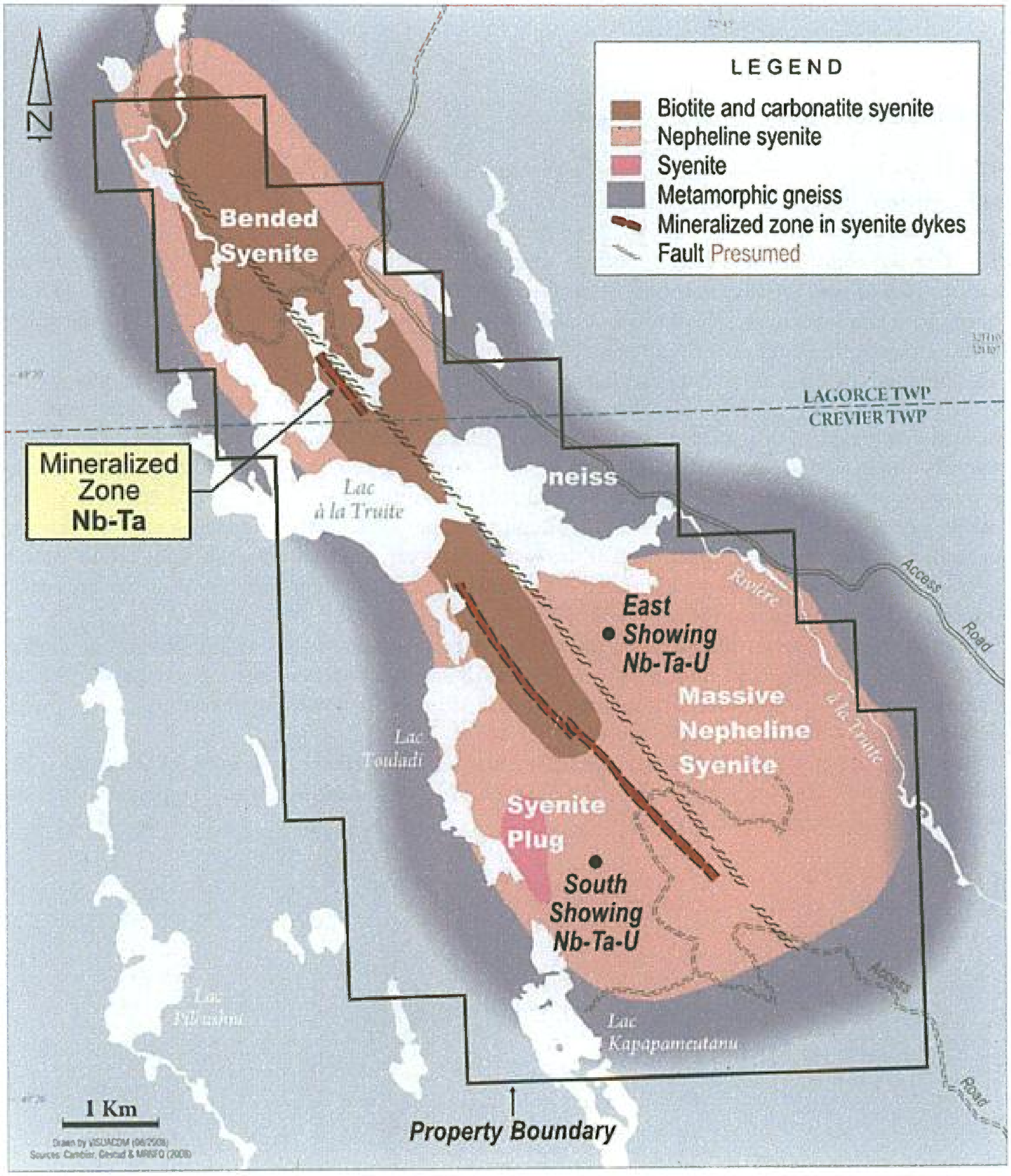


Figure 13: Simplified property geology as per Cambior, 2002

The following figure shows magnetic field with Crevier and neighbour claim boundaries from MRNQ Gestim website.

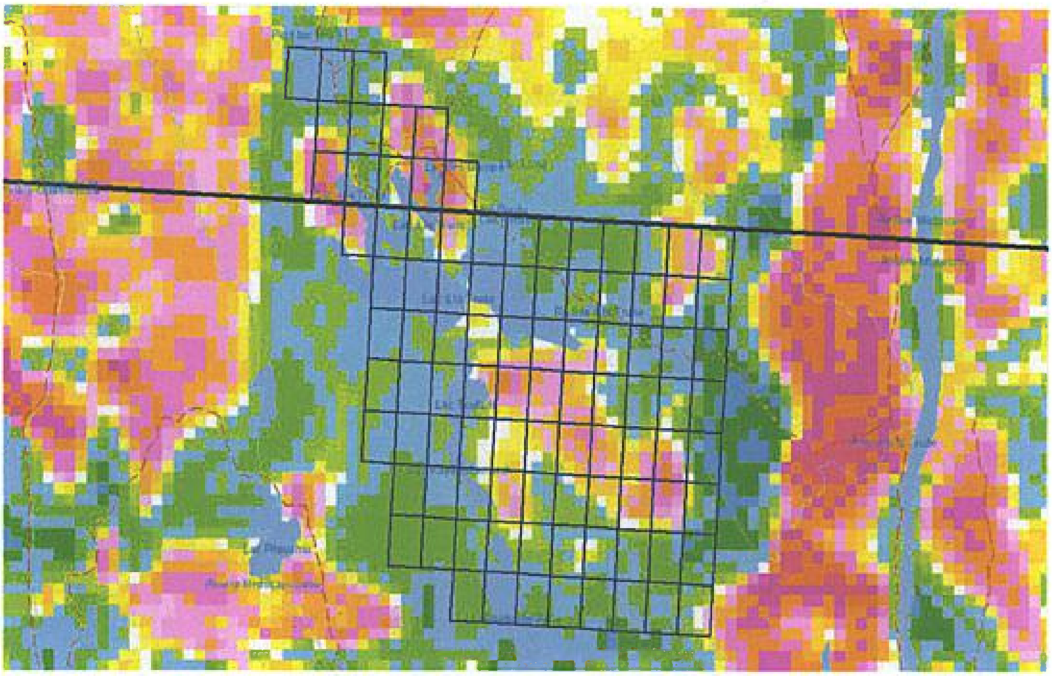


Figure 14: Regional Magnetic field screen shot from GESTIM in 2008

The anomaly in the southern portion fits with the previous property geology figure, however in the northern part, the above figure shows two separate anomalies within Crevier Minerals property north of Lac à la Truite that will need additional investigation.

Mineralization summary

Two mineralization types have been identified on the property. The first one is associated to a horizon 1 000 metres long and 30 to 80 metres wide contained inside the nepheline syenite and in the carbonatites. The presence in small quantities of uranopyrochlore in these rocks could explain the high values of Nb, Ta and U obtained during the first drilling program in 1976. The best intercept of this zone was 135 ppm U_3O_8, 425 ppm Nb_2O_5 and 125 ppm Ta_2O_5 over 24.4 m in hole 10-745-14.

The second type was first drilled in 1978 and represents the most interesting zone. The tantalum and niobium mineralization is contained inside the pyrochlore associated with a late pegmatite injection cutting across the host nepheline syenite of No 2 Unit located in the south-west part of the alkaline complex. This mineralization type (also called nepheline pegmatitic syenite dyke) was tested by 35 drill holes by Cambior and is extending over 3 kilometres with an average width between 15 and 20 metres and down to a depth of 400 metres. Many areas were stripped, mapped, sampled and a bulk sample of 873 tonnes was collected by Cambior for metallurgical tests.

7- Deposit Types

The igneous alkaline Crevier complex, covering 25 km^2, is located inside a gneissic Grenville formation. The origin, according to some authors is associated to the major Saguenay Graben structures, which has given an alkaline metasomatic rim to the Grenville rocks.

The alkaline complex is divided in three main lithologic units (units 1 to 3), the 4th unit being the Grenville rocks. These main units are composed of many specific distinct lithological units, defined by local mapping and diamond drill holes.
The first unit represents the major north-western part of the complex; his elongated shape is aligned along a North 320° axis. The composition is an alternation between bands of biotite-carbonate syenites, nepheline syenites, nepheline syenites with biotite and carbonatites with an orientation between North 300° and North 340°.
The second unit mainly covers the south of the complex, but is also present in a 300 meters thick band surrounding the first unit. The composition is mainly of nepheline syenite with nepheline-biotite syenite dykes cutting across the formations at North 320°.
The third unit is very small and is located in the south-western part of the complex, inside the second unit and is characterized by large amounts of syenite.
The chronologic sequence of the deposition of this complex is as follows:

1. Alkaline metasomatism preceding the complex intrusion.
2. Deposition of the nepheline-biotite syenites.
3. Emplacement of carbonate-biotite melanosyenite.
4. Carbonatite injection.
5. Intrusion of nepheline syenite dykes and biotite syenites.

Two main mineralisation types with economic interest are present inside the Crevier complex. The first type of uranium-niobium mineralisation is mainly located inside the first unit inside an uranopyrochlore unit. This mineral consists of idiomorphic grains of millimetric size disseminated inside the rock, and less frequently along the fractures.

The second mineralization type is one of niobium-tantalum and is associated with a pegmatite-nepheline syenite dyke located inside the second unit and also inside the first unit. The mineralization is encountered in millimetric size grains of pyrochlore. The typical pyrochlore composition is: Nb_2O_5 60.8%, Ta_2O_5 6.5% and U_3O_8 0.1%. When compared to Niobec, the pyrochlore is of larger size and does contain fewer inclusions.
Apatite is found in few spots inside the complex but is mainly located in the center part. The apatite rich zones are along the contacts inside the carbonatite dykes and inside the nepheline syenites. The highest diamond drill concentrations show 5% to 8% P_2O_5 over sections of some twelve meters long. The presence of a lake, recreational installations combined to the rather low grade are diminishing its economic potential.

The dyke separated in four lenses stretches over 4 km and has an average thickness of 20 meters. It has been recognized down to 300 meters below surface. Exploration works aimed at defining the exact position and grade of the nephyline syenite porphyry dyke.

8- Mineralization

The mineralized tantalum-niobium zone is located in the southern part of the Crevier alkaline intrusive. Previous workings of stripping, geological mapping, trench sampling and diamond drilling have contributed to ascertain this mineralization over more than three kilometres long.
The mineralization of the niobium-tantalum type is associated with a porphyritic nepheline syenite dyke. As shown in the figure below this dyke is composed of a minimum of four sections or distinct lenses. The contacts with the host rocks are clean and can be easily seen. The dyke is generally composed (95%) of nepheline syenite of pegmatitic texture containing large feldspar crystals and nepheline having variable grain sizes from a few centimetres to close to one meter in specific areas. Many secondary minerals are observed, mainly: biotite, magnetite, pyrrhotite, pyrite, zirconium, sodalite, cancrinite, ilmenite, carbonates and pyrochlore.
The main dyke also contains 5% of secondary dykes and host rocks. The thickness of the secondary units varies from centimetres to meters.
The dyke is oriented North 320 ° and is 20 metres thick on average. It dips to the north at 80° to 85° . The thickness is regular, showing some enlargements locally caused by the presence of large inclusions or by parallel lenses. The dyke extends from the surface down to at least 300 metres below surface. The overburden thickness varies from two to three metres and can reach 12 metres locally. Large zones have been stripped and numerous rock trenches have been cut during 1980-1981 to fully map and to sample this mineralized zone.

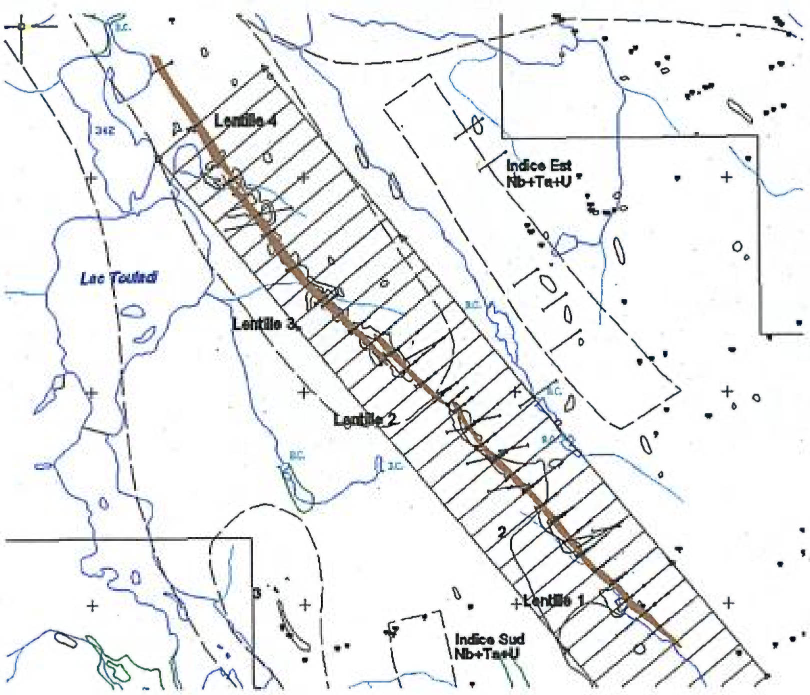


Figure 15: Compilation map from Cambior with the location of the lenses

Following are the lens definitions as per Cambior which we agree to keep for geological purposes:

8.1 Lens #1

This lens is the most southern one and is located between sections 9700N and 11200N.
This is the best known of all lenses, having been diamond drilled with 24 holes and geologically mapped over more than 600 metres. Moreover, two bulk samples of 100 tonnes (1980) and 876 tonnes (1981) have been processed for metallurgical testing. The thickness varies from 3 to 25 metres, the average being 19 metres.

8.2 Lens #2

This relative small size lens (400 metres long) is located to the north of the #1 lens and appears as having been relocated. The average thickness is 25 metres, and has been intersected by four diamond drill holes, one of them at a depth of 372 metres. On the northern part, there has been stripping and trench sampling done.

8.3 Lens #3

This lens is around 1 200 meters long and has been drilled on a grid varying from 200 to 300 metres spacing horizontally. Seven drill holes have intersected it at a maximum depth of 70 metres. The lens is 20 metres thick and is showing an "interdigitation" relation with the #2 lens.

8.4 Lens #4

Three drill holes 300 metres apart and four exploratory trenches have delineated this lens which is more than 900 metres long. Its thickness varies from 8 to 36 metres (average 29 metres) and is still open to the north.

8.5 General

The separation of the mineralization in the four lenses is sometimes very sharp while it may be relatively subjective since the separation between the identified lenses is diffuse inter-digitation.
Detailed mapping presented in the next figure shows inclusions inside the dyke that are taken into account in the analysis. The mapping shows Nephyline Syenite Porphyry(SNp) in grey with Nephyline Syenite (SN) inside with cover of overburden in white.

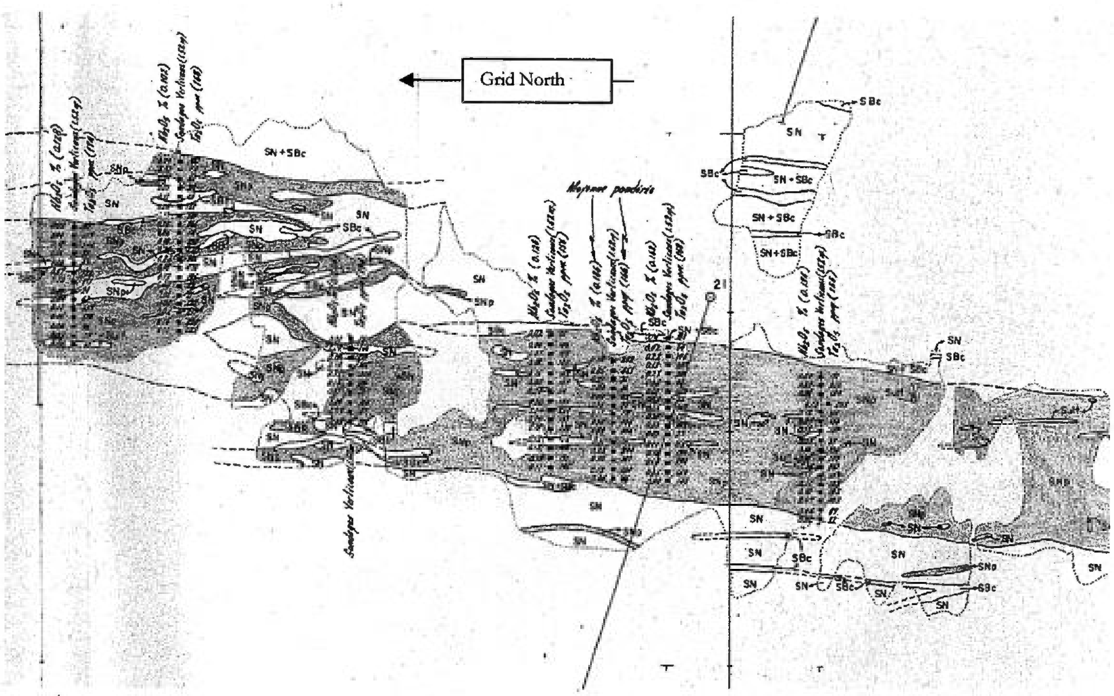


Figure 16: Historical detailed mapping of mineralized lenses (dyke) between 11200N and 11100N

In general all identified mineralized portions in core have been analyzed for Ta and Nb content. The sample length for assaying varied from 1.0 to 1.8 metres with an average of 1.5 metres. The assayed results do not show important variations and the dyke appears to contain even mineralization from side to side without any apparent cross-section zoning. However the average niobium content of the mineralized intersections diminishes progressively from south to the north. However, the content of Ta_2O_5 is quite regular and does not seem to vary from south to north or vertically.

8.6 Petrology

The observations on the rocks show the same major phases already known in the alkaline complex; therefore the previous references are the result of mineralogical variations inside the rocks. In order to keep a consistency, the reference terms used by SOQUEM during previous works was retained, and considered acceptable. Cambior added only one lithological unit over SOQUEM which was the coarse nepheline syenite in order to describe one large unit which has been cut by numerous lithologies. The use of this added unit to define an assembly of units has simplified the core logging.

The nepheline syenite is a medium grain size rock and is composed of 2 parts of albite to one part of nepheline and less than 5% biotite. It generally contains small amounts of magnetite or other mineral phases. It is by far the most homogeneous unit.

The coarse nepheline syenite, when compared to the previous one, is certainly the most heterogeneous unit. The difference was established to describe a unit slightly coarser than the previous one but invaded or including many injections of various compositions, some parts richer in biotite, more carbonated and also a unit called micropegmatite. All these units have no clean contacts and are not parallel to the host rock. The micropegmatite is composed of albite and

nepheline crystals (in 2:1 proportions) sometimes up to 3 to 4 centimetres and forming horizons some metres thick. This unit contains small quantities of pyrochlore as shown from the assay results. The nepheline and biotite syenite is the retained term describing a nepheline syenite having more than 10% biotite. The added biotite inside the syenite appears to diminish the nepheline content. At the limit conditions, the rock is then a biotite syenite that often contains a certain amount of interstitial calcite. The biotite content can reach 50%. This rock is generally strongly magnetic resulting from large quantities of magnetite and pyrrhotite disseminated in small grains.
Only the rocks having calcite content over 50% and showing greenish apatite crystals, disseminated or forming incomplete bands quite often along the contacts were identified as carbonatites. When there is no apatite, we used the term calcite veins and when the calcite content was lower than 50%, according to the convention, the retained term was silicocarbonatite.
The pegmatite (or dyke of pegmatitic nepheline syenite) was the target of the Cambior campaign in 1992. The composition is mainly albite and nepheline with very large crystals (several cm in size), also in proportions close to 2:1. The other minerals are biotite, zirconium, pyrochlore, magnetite, pyrrhotite and less frequently sodalite and cancrinite.

Figure 17: Mineralization observed in core prior to core splitting by Cambior CV-02-91

Figure 18: Detailed aspect of the mineralization in CV02-92 with blue Sodalite at a depth of 122m

Pyrochlore grains are disseminated between the Porphyric Nephiline crytals and are observed within sodalite. When sodalite is observed, pyrochlore grains are observed in visible percentage. Ore grains of size between 0 and 3mm with an average around 1mm were frequently observed during core review at Niobec in July 2008.

8.7 Other mineralization

Uranium Niobium – Tantalum mineralization is present on the property. One is labelled East U-Nb-Ta showing which is north of the main dyke in the southern part of the property while the other is labelled South U-Nb-Ta showing which lays South West of the main dyke lens #1.

No significant Apatite mineralization was observed or highlighted from work by SOQUEM near Lac à la Truite.

Other parameters of interest like Zr and Ce were analysed in Cambior exploration campaign, but these are not considered in the current commodity assessment. Crevier Minerals will have to look at these values that could bring additional value to the project. Actlabs assay certificates should be reviewed by a specialized commodity analyst in order to evaluate the potential of the other mineralized components within this rock.

9- Exploration

At the moment, Crevier Minerals Inc. has not carried out extensive exploration works on the property. A site visit with independent sampling by SGS Geostat Ltd. was done in July 2008 in addition to preliminary gravimetric concentration tests at COREM with blasted material stored in barrels from previous owner Cambior. This material is from the blasted trenches.

Crevier has carried a due diligence including a resource estimation update by SGS Geostat Ltd. and the preparation of a NI43-101 Technical report with compliant resource estimation and classification.

9.1 Grab sampling of old blasted trenches

During the site visit on July 2nd 2008, a total of 10 grab samples were taken from specific blasted areas in order to have corroboration of average grade of the sector.

The pieces of rock where randomly selected along the axis of the trench from muck on the ground. The trenches were approximately 5 to 24 meters in length perpendicular to the direction of the dyke (lens).

Sampled trenches were identified by painting in the field. A hand held GPS device was used to locate the center point of the trenches. A photocopy of an aerial topography of the trenches was available for exact location of the samples from the bulk sample report.

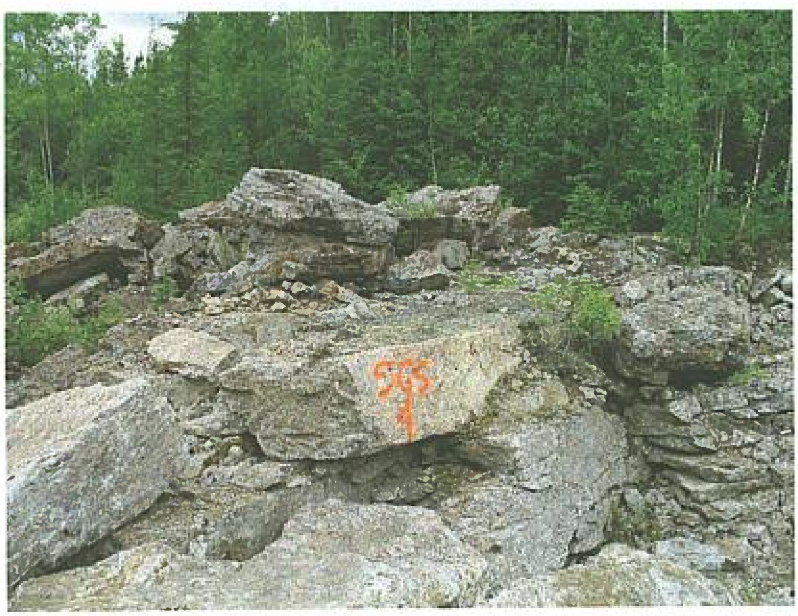


Figure 19: Location of trench grab sample #4 at Crevier in July 2008

During that field work, two workers from SGS Geostat Ltd. were assisting Claude Duplessis in the sampling and also the cutting of some small trees to facilitate exposure of the area to be sampled. The figure below shows where samples were taken by SGS Geostat Ltd QP Claude Duplessis Eng.

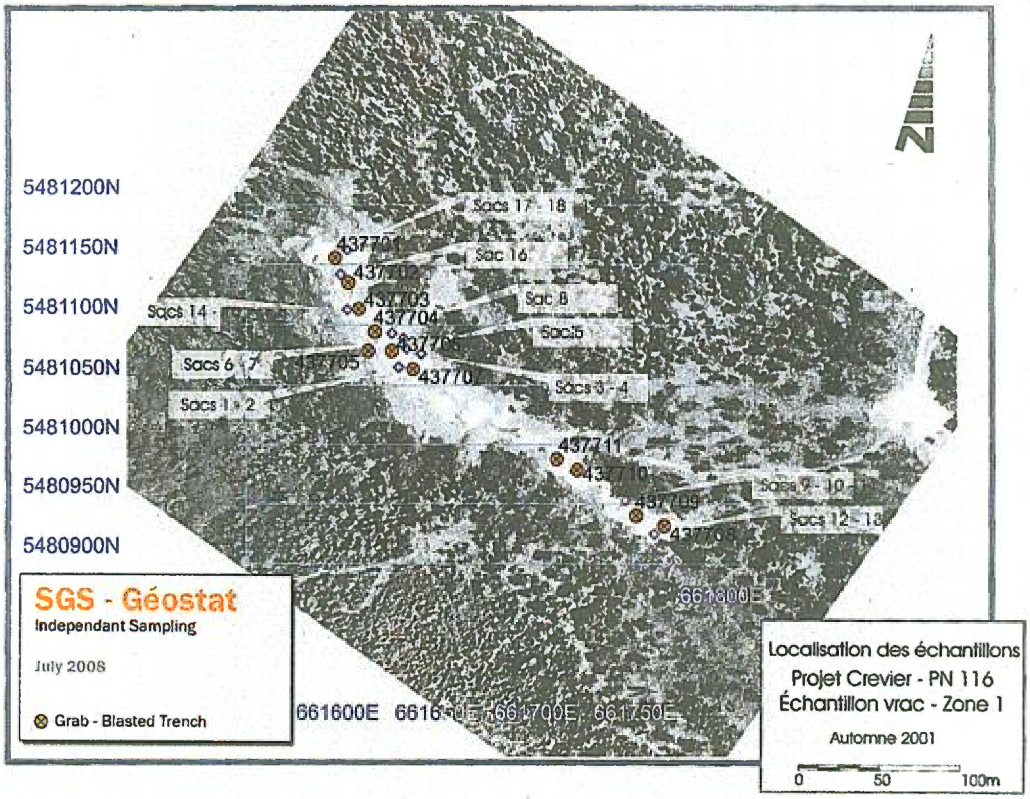


Figure 20: SGS Geostat independent grab samples location

The sample 437705 is not shown here because it is a limestone blank from St-Honoré aggregate Quarry for QC.

The assay results confirm the presence and average grade of the mineralization in Niobium and Tantalum obtained in the bulk sample taken in that sector. Details are presented in the data verification section of this report.

10- Drilling

Crevier Minerals Inc. has not yet started a drilling program on the property. A drilling program is recommended for 2009 and will need to be reviewed to meet all the highlighted goals.

10.1 Historical Drilling

Historical drilling on the property has consisted of BQ diamond drill hole. There has been some small percussion holes used to blast material near surface for the bulk sample tests.

The exploration holes from SOQUEM are prefixed with 10-745 while CAMBIOR diamond drill holes are prefixed CV-02. They were obviously drilled primarily for geological purposes (testing targets and mapping stratigraphy) and to initially outline the distribution of the mineralized dyke. In the SOQUEM drill holes, the first set of holes was not exactly perpendicular to the mineralization while the rest of the drilling campaign was mainly drilled perpendicular to mineralization.

Seventy-two of these holes of a cumulated length of 11km where drilled by SOQUEM from mid 1970's to mid 1980's. Coordinates and logs with assays for most of these holes are available on maps.

Thirty three holes totalling 6 km were drilled by CAMBIOR in 2002. Coordinates and logs with assays for most of these holes are available on digital format.
Most of the holes were drilled south-west and almost perpendicular to the true thickness near surface while apparent thicknesses were measured at depth due to the sub-vertical attitude of the mineralized dyke. The general orientation of the mineralized structure is well known. True thickness varies from 5 to 35 meters with an average of 20 meters. Core samples were generally 1.5 meters in length.

Old maps also present the location of the shallow (1.5m to 2m) percussion holes used for blasting with associated average grade by row. These holes could be computerized to increase samples near surface in order to bring the resources in this sector to the measured category.

Witness core from both campaigns are stored at the Niobec mine owned by IAMGOLD in St-Honoré. SGS Geostat Ltd. has visited the storage facility and has taken independent samples for data verification.

Figure 21: Core racks at Niobec Core Shack at the exterior storage facility of the mine

The drilling pattern is generally done with 100m hole spacing on sections perpendicular to the dyke and with 50 to 75m hole spacing on sections in lenses 1 & 2. Drill hole spacing further north is 200 to 300m in lenses 3 and 4. Drill hole depth varied from 50 to 350m. Additional information is provided in the historical data section and Section 16 - Mineral Resources.

11- Sampling Method and Approach

This section describes the method and approach used by previous owners since Crevier Minerals Inc. has not carried exploration works in 2008.

The Crevier deposit has been sampled by BQ diamond drill hole. The drill hole spacing varied from 50 to 300 meters. The cross section spacing varies from 100 meters to 300 meters. On section, the hole spacing is generally 50 meters while in sections intersecting mineralization at depth (i.e. 300m below surface) the distance from the top last intersection is about 100 meters.

Sampling of the half core was done with a core splitter, the sample length is generally 1.5 meter. The deposit is recognized over a length of 4km and the tabular structure has an average true thickness of about 20 meters.

The rock is competent and core recovery is extremely good. The samples are of good quality and are representative of the intersected rock.
The mineralized rock being of porphyry texture, the bigger the samples are, the better the reliability. SGS Geostat does not recommend to drill smaller than BQ diameter due to porphyry texture and the mineralization being relatively coarse with pyrochlore grains of millimetric size.

The mineralisation with grade of interest is within the syenite porphyry dyke or nepheline syenite pegmatitic dyke. This dyke has some inclusions of finer grain syenite that has some mineralisation of lower grade. The decision to sample must have been based on sample near the contacts and within the porphyry structure.

High-grade mineralization is sometimes associated with sodalite that is a noticeable nice blue mineral within the pinkish dyke. The samples were taken continuously across the whole mineralized dyke, sampling both high grade and low grade portions.

The maximum Ta_2O_5 grade analysed is 2715 ppm on a 1.5 meter sample, the Nb_2O_5 grade is 0.33% for this sample in hole S10-745-18. The maximum Nb_2O_5 grade analysed is 1.05% on a 0.5 meter sample and the Ta_2O_5 grade is 1045 ppm for this sample in hole CV02-72.

12- Sample Preparation, Analyses and Security

Since Crevier Minerals has not carried exploration works yet, this section refers to historical works from past project owners SOQUEM and Cambior.

12.1 Sample preparation and analysis

The historical work records by previous owners SOQUEM and CAMBIOR include descriptions of numerous samples collected from the property. These samples in the archive records consist of:

- + Surface grab samples
- + Channel samples
- + Pit samples and bulk samples
- + Test drill hole cutting samples
- + Diamond drill core samples

It has not been possible to find complete descriptions of sampling methods and approach for all these sample types, however some information exists and are summarized in this section.

In the report of SOQUEM's summer 1978 first drilling campaign, surface grab sample weight where in the range of one half to one pound each of fresh rock randomly selected on outcrops. Standards and duplicate were inserted and a list is provided.

The BQ core was separated in two with a core splitter, witness core was preserved.

For Cambior, the core was also separated in two with a core splitter, witness core was preserved and pictures were taken prior to splitting. Pictures of core are available in the Crevier Minerals archives from IAMGOLD.

At the beginning of the exploration program, emphasis was on U_3O_8, Nb_2O_5 and Ta_2O_5. The additional works mainly aimed at defining a mineral resource of Nb_2O_5 and Ta_2O_5.

12.1.1 Sample preparation at the laboratory

Detailed information about laboratory preparation for 1976 to 1978 data is not available, we assume that standard commercial methods of the time were used.

Cambior has used standard commercial preparation procedures as stated in their internal work report.

12.1.2 Analyses at the laboratory

The laboratories used initially were: Bondar-Cleg, Ecole Polytechnique, X-Ray Lab, Metriclab and C.E.A.C. .Cambior has mainly use Actlab for Nb_2O_5 and Ta_2O_5.

The following table presents the source of the analytical results validated with certificate of analysis on paper against data in the database. SGS Geostat has carried out a formal review of the assay certificates. Certificates where not found where a blank line appears in the following table.

Hole Name	Laboratory	NB205_ %	TA_205_ PP	Lab	NB205 _%	TA_205_ PP
CV02-100	Actlabs	yes	yes			
CV02-101	Actlabs	yes	yes			
CV02-102	Actlabs	yes	yes			
CV02-103	Actlabs	yes	yes			
CV02-104	Actlabs	yes	yes			
CV02-72	Actlabs	yes	yes			
CV02-73	Actlabs	yes	yes			
CV02-74	Actlabs	yes	yes			
CV02-75	Actlabs	yes	yes			
CV02-76	Actlabs	yes	yes			
CV02-77						
CV02-78	Actlabs	yes	yes			
CV02-79	Actlabs	yes	yes			
CV02-80	Actlabs	yes	yes			
CV02-81	Actlabs	yes	yes			
CV02-82						
CV02-83	Actlabs	yes	yes			
CV02-84	Actlabs	yes	yes			
CV02-85	Actlabs	yes	yes			
CV02-86	Actlabs	yes	yes			
CV02-87	Actlabs	yes	yes			
CV02-88	Actlabs	yes	yes			
CV02-89	Actlabs	yes	yes			
CV02-90	Actlabs	yes	yes			
CV02-91	Actlabs	yes	yes			
CV02-92	Actlabs	yes	yes			
CV02-93	Actlabs	yes	yes			
CV02-94	Actlabs	yes	yes			
CV02-95	Actlabs	yes	yes			
CV02-96	Actlabs	yes	yes			
CV02-97	Actlabs	yes	yes			
CV02-98						
CV02-99	Actlabs	yes	yes			
S10-745-01						

S10-745-02						
S10-745-03						
S10-745-04						
S10-745-05						
S10-745-06						
S10-745-07	Chimitec		yes			
S10-745-08	Bondage-Clegg Company		yes			
S10-745-09	Bondage-Clegg Company		yes	Chimitec		yes
S10-745-10	Chimitec		yes			
S10-745-11	Chimitec		yes			
S10-745-12	Chimitec		yes			
S10-745-13A						
S10-745-13B	Chimitec		yes			
S10-745-14	Chimitec		yes			
S10-745-15	Chimitec		yes			
S10-745-16	Chimitec		yes			
S10-745-17						
S10-745-18	Chimitec		yes			
S10-745-19	Chimitec		yes			
S10-745-20	Chimitec		yes			
S10-745-21	Chimitec		yes			
S10-745-22	Chimitec		yes			
S10-745-23	Chimitec		yes			
S10-745-24	Chimitec		yes			
S10-745-25	Chimitec		yes			
S10-745-26	Chimitec		yes			
S10-745-27	Chimitec		yes			
S10-745-28	Chimitec		yes			
S10-745-29	Chimitec		yes			
S10-745-30	Chimitec		yes			
S10-745-31	Chimitec		yes			
S10-745-32	Chimitec		yes			
S10-745-33	Metriclab					
S10-745-34	Metriclab					
S10-745-35	Metriclab	yes	yes	Soquem	yes	yes
S10-745-36	Metriclab	yes	yes	Soquem	yes	yes
S10-745-37	Metriclab	yes	yes	Soquem	yes	yes
S10-745-38	Metriclab	yes	yes	Soquem	yes	yes
S10-745-39	Metriclab	yes	yes	Soquem	yes	yes
S10-745-40						
S10-745-41						
S10-745-42	Metriclab	yes				
S10-745-43						
S10-745-44						
S10-745-45	Metriclab	yes				

S10-745-46	Metriclab	yes				
S10-745-47	Metriclab	yes				
S10-745-48	Metriclab	yes				
S10-745-49	Metriclab	yes				
S10-745-50	Metriclab	yes				
S10-745-51	Metriclab	yes				
S10-745-52	Metriclab	yes				
S10-745-53	Metriclab	yes				
S10-745-54	Metriclab	yes				
S10-745-55	Metriclab	yes				
S10-745-56	Metriclab	yes				
S10-745-57	Metriclab	yes				
S10-745-58	Metriclab	yes				
S10-745-59	Metriclab	yes				
S10-745-60	Metriclab	yes				
S10-745-61	Metriclab	yes				
S10-745-62	Metriclab	yes				
S10-745-63	Metriclab	yes				
S10-745-64	Metriclab	yes				
S10-745-65	Metriclab	yes				
S10-745-66	Metriclab	yes				
S81-745-67	Niobec/Services TMG	yes		Soquem	yes	yes
S81-745-68	Niobec/Services TMG	yes		Soquem	yes	yes
S81-745-69	Niobec/Services TMG	yes				
S81-745-70						
S81-745-71	Niobec/Services TMG	yes		Soquem	yes	yes

Table 4: Database assay results labororatory list

The summary table above has allowed us to conclude that Cambior has relied on Actlab has its main laboratory for Niobium and Tantalum. The SOQUEM data source is from various labs and we can state that most of the Niobium values in the database are from Metriclab and most of the Tantalum values are from Chimitec. An extensive search in the archive boxes would be required to locate the missing certificates. SGS Geostat does not believe that this influences the quality of the information. It is assumed that the analytical results were from the same laboratory batch.

Some analytical results were presented in oxides while some were expressed by element, in percent or ppm.

12.2 Quality control program

In the early stages of the project, previous owners started quality control programs, there have been important issues on results of the same sample from different laboratories. The table below presents the kind of variations encountered at that time early in the project. Since the analysis of these metals was not common in the seventies many labs were put to contribution. However SGS Geostat has not found a specific report presenting all the investigations with a general compilation. The information is presented under various analyses from various sources.

TABLEAU DES RESULTATS
DES STANDARDS D'ANALYSE 1977

Standard (S1)				Standard (S2)			
Laboratoires	U_3O_8 ppm	Ta_2O_5 ppm	Nb_2O_5 ppm	Laboratoires	U_3O_8 ppm	Ta_2O_5 ppm	Nb_2O_5 ppm
Bondard-Clegg (FRX) (moyenne)	61.1	244.1	181.1	Bondard-Clegg (FRX) (moyenne)	212	267.4	242.2
Ecole Polytechnique (FRX)	90	52	430	Ecole Polytechnique (FRX)	320	60	740
X-Ray Lab (FRX)	100	Nil	400	X-Ray Lab (FRX)	300	Nil	500
Metriclab (FRX)	40	<100	450	Metriclab (FRX)	140	<100	550
C.E.A.C. (act. neutron.)	82.5			C.E.A.C. (act. neutron.)	319		
Ecole Poly. (act. neutron.)	86			Ecole Poly. (act. neutron.)	268		
Ledoux (échange ionique)	100	2800	600	Ledoux (échange ionique)	200	2000	800
C.E.A.C. (act. neutron.)	80			C.E.A.C. (act. neutron.)	309		

Cf.: rapport "Etat des faits en date du 15 mars 1978".
Projet Crevier 10-745
par: M. Jacques Bonneau

suite standard S3, S4 page suivante

Table 5: Example of first QA/QC between laboratories with standards of 1977

12.3 Security

There are no reasons to believe that the assays or samples were tampered with. In SGS Geostat opinion, the work has been done in a professional way. SOQUEM and Cambior geologists and team of professionals had a good reputation for their standard work of the time as shown in the previous table, where they identified and addressed their concerns quickly about the high variations between laboratories for standards.

13- Data Verification

The author has verified the database assay table against the original paper logs on a random basis and did not find major errors. Extensive verification by colleagues of the author took place.
The collar location, azimuth, dip, hole length, assay values, and assay length were checked. Available historical cross sections on paper were reviewed and compared with on screen equivalent cross sections.

Independent samples were taken from witness core holes and on site blasted trenches by the author, Claude Duplessis QP who executed the preparation and sampling protocol, where the sample bags were sealed and sent personally to the SGS laboratory facilities at Lakefield.

13.1 Independent sampling

During the site visit of the property in July 2008, ten grab samples from blasted trenches were taken. The core shack located at Niobec Mine facilities in St-Honoré was visited the following day. 39 independent samples were taken from two witness holes drilled by SOQUEM and CAMBIOR. Hole 10-745-46 from 100 to 134.5 meters and hole CV-02-82 from 223.9 to 246.8 meters were controlled.

Decision was made to take the whole half core, the reason being the pyrochlore grain size effect which the QP Claude Duplessis did not want to have (i.e. possible nugget effect caused by coarse mineralization). Since there is still a good amount of witness core at the core shack, this decision was considered reasonable by the client who was witnessing the sampling at the site and also at Niobec core shack sampling preparation facilities.

Samples were put in plastic bags with sample tag identification and sealed with a tie-wrap. The samples were then put into rice bags with sample numbers on it. The rice bags were sealed with tie-wraps and put into SGS Geostat vehicle. The samples were later transported to the SGS Geostat warehouse. The samples were wrapped on a wooden crate and shipped to SGS Lakefield by a commercial carrier.

The following figures show witness core being sampled and bagged, the field independent sample #3 and the map of independent sample location by SGS Geostat Ltd.

Figure 22: Independent sampling at Niobec core shack

Figure 23: Blasted trench sampling site #3

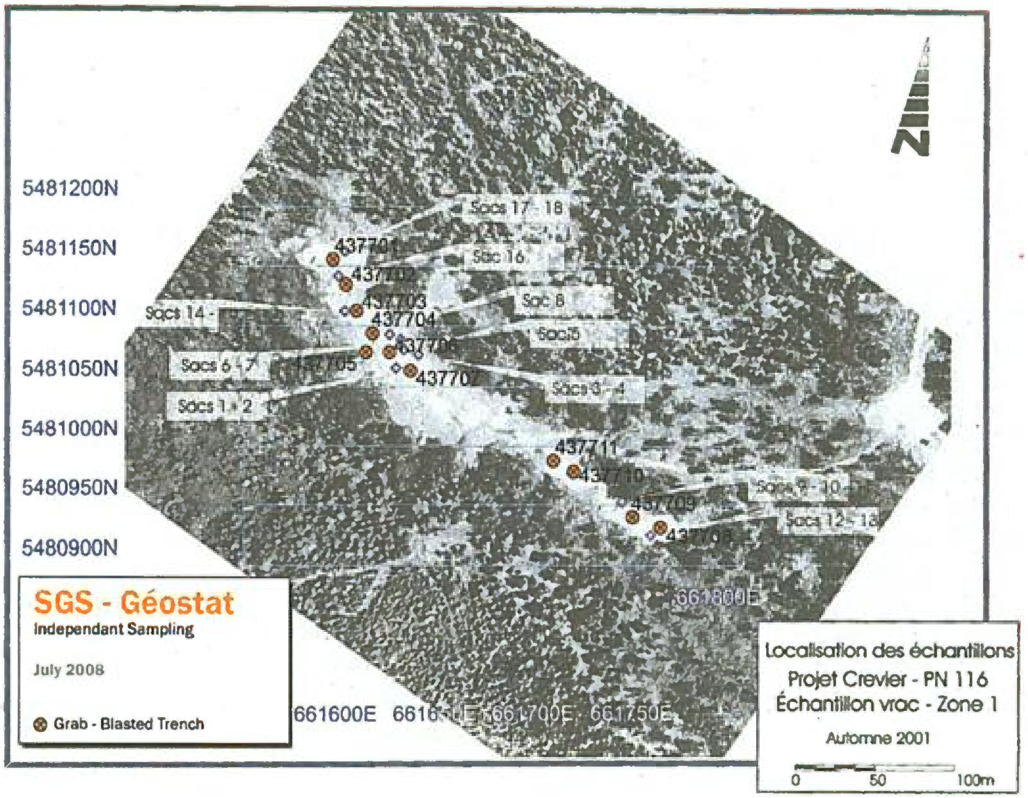


Figure 24: Independent sample location by SGS Geostat Ltd July 2008

13.2 Sample preparation at the laboratory

SGS Geostat has requested a standard preparation of samples by SGS Lakefield mineral services. The protocol is presented in appendix.

13.3 Analyses at the laboratory & Quality control program

The rock samples were first assayed at SGS Lakefield while pulp samples were also sent to ALS Chemex of Val d'Or for laboratory verification.

With the first control, differences were noticed in the database between SOQUEM results versus 2008 commercial laboratory check values. The remaining pulps were sent to Niobec mine laboratory facility (IAMGOLD) and a second preparation took place at SGS Lakefield from the rejects.
In addition to regular XRF analysis, SGS Lakefield has also been requested by SGS Geostat Ltd. to test another analytical method with acid attack and ICP to have additional data and compare analytical technique results.

As presented in the following tables, the control assays do not show a bias from the sign test between the core halves and between the controls used. Even if average grades are slightly different, bias is not detected or observed. However the average grade of the whole mineralized intersection from Cambior campaign has been reproduced while the average from the SOQUEM hole could not be reproduced.

It is important to mention that first analytical control at SGS did not had the required precision on the Tantalum value, however the average has been reproduced even with a two digit precision on Ta. The following tables are calculated oxide values from metal analytical values.

The conversion factors used are:

1.431 for Nb to Nb_2O_5

and

1.221 for Ta to Ta_2O_5

						ALS CHEMEX	Database	Niobec	SGS 1 XRF	SGS 2 XRF	SGS 3 ICP
Type	Sample ID	Sample ID	From(bd)	To(bd)	Description	Nb2O5	NB2O5 %	Nb2O5	Nb2O5	Nb2O5	Nb2O5
rock	SGS Geostat	(bd)	m	m		%					
SMP	437701	n/a			site 1	0.128	n/a	0.16	0.157	n/a	n/a
SMP	437702	n/a			site 2	0.172	n/a	0.22	0.172	n/a	n/a
SMP	437703	n/a			Limestone	0.000	n/a	0.01	0.014	n/a	n/a
SMP	437704	n/a			site 3	0.092	n/a	0.12	0.100	n/a	n/a
SMP	437705	n/a			site 4	0.114	n/a	0.14	0.143	n/a	n/a
SMP	437706	n/a			site 5	0.133	n/a	0.17	0.172	n/a	n/a
SMP	437707	n/a			site 6	0.175	n/a	0.20	0.186	n/a	n/a
SMP	437708	n/a			site 7	0.234	n/a	0.27	0.243	n/a	n/a
SMP	437709	n/a			site 8	0.254	n/a	0.48	0.272	n/a	n/a
SMP	437710	n/a			site 9	0.270	n/a	0.31	0.286	n/a	n/a
SMP	437711	n/a			site 10	0.222	n/a	0.26	0.229	n/a	n/a
	Average					0.16		0.21	0.18	n/a	n/a
SMP	437712	236673	223.9	225.4	CV-02-82	0.156	0.1926	0.18	0.143	0.143	0.143
SMP	437713	236674	225.4	226.9	CV-02-82	0.197	0.2321	0.23	0.200	0.200	0.200
SMP	437714	236675	226.9	228.4	CV-02-82	0.132	0.1135	0.16	0.129	0.134	0.126
SMP	437715	236676	228.4	229.9	CV-02-82	0.131	0.1649	0.16	0.143	0.126	0.114
SMP	437716	236677	229.9	231.4	CV-02-82	0.154	0.1479	0.19	0.172	0.157	0.143
SMP	437717	236678	231.4	232.9	CV-02-82	0.246	0.2381	0.28	0.272	0.257	0.243
SMP	437718	236679	232.9	234.4	CV-02-82	0.105	0.1034	0.13	0.114	0.102	0.097
SMP	437719	236680	234.4	235.9	CV-02-82	0.154	0.2079	0.19	0.157	0.157	0.134
SMP	437720	236681	235.9	237.4	CV-02-82	0.180	0.2461	0.21	0.200	0.172	0.172
SMP	437721	236682	237.4	238.9	CV-02-82	0.124	0.0982	0.15	0.143	0.123	0.117
SMP	437722	236683	238.9	240.4	CV-02-82	0.208	0.2257	0.25	0.229	0.215	0.200
SMP	437723	236684	240.4	241.9	CV-02-82	0.369	0.1962	0.42	0.343	0.386	0.343
SMP	437724	236685	241.9	242.4	CV-02-82	0.069	0.0636	0.12	0.057	0.057	0.051
SMP	437725	236686	242.4	243.9	CV-02-82	0.077	0.0734	0.07	0.072	0.079	0.079
SMP	437726	236687	243.9	245.8	CV-02-82	0.047	0.0469	0.09	0.057	0.044	0.041
SMP	437727	236688	245.8	246.9	CV-02-82	0.029	0.0273	0.20	0.043	0.029	0.026
	Average					0.149	0.149	0.189	0.155	0.149	0.139
SMP	437728	119788	99.96	100.92	10-745-46	0.121	0.154	0.05	0.114	0.120	0.104
SMP	437729		100.92	102.00	10-745-46	0.190	0.286	0.22	0.186	0.172	0.172
SMP	437730		102.00	102.76	10-745-46	0.037	0.164	0.06	0.043	0.039	0.036
SMP	437731		102.76	104.28	10-745-46	0.131	0.041	0.17	0.143	0.130	0.122
SMP	437732		104.28	106.06	10-745-46	0.227	0.159	0.26	0.229	0.215	0.215
SMP	437733		106.06	107.86	10-745-46	0.260	0.341	0.30	0.272	0.257	0.229
SMP	437734		107.86	109.70	10-745-46	0.181	0.286	0.21	0.200	0.172	0.143
SMP	437735		109.70	110.21	10-745-46	0.075	0.37	0.09	0.072	0.074	0.070
SMP	437736		110.21	111.71	10-745-46	0.129	0.082	0.15	0.114	0.116	0.106
SMP	437737		111.71	113.07	10-745-46	0.189	0.133	0.22	0.200	0.186	0.172
SMP	437738		113.07	114.57	10-745-46	0.144	0.164	0.17	0.143	0.142	0.157
SMP	437739		114.57	116.07	10-745-46	0.296	0.157	0.34	0.315	0.286	0.243
SMP	437740		116.07	117.67	10-745-46	0.286	0.356	0.33	0.315	0.300	0.286
SMP	437741		117.67	118.62	10-745-46	0.352	0.264	0.41	0.372	0.372	0.300
SMP	437742		118.62	119.76	10-745-46	0.363	0.316	0.43	0.401	0.401	0.372
SMP	437743		119.76	120.56	10-745-46	0.114	0.467	0.14	0.114	0.107	0.099
SMP	437744		120.56	122.46	10-745-46	0.170	0.566	0.20	0.172	0.157	0.143
SMP	437745		122.46	124.40	10-745-46	0.165	0.135	0.21	0.172	0.186	0.172
SMP	437746		124.40	125.20	10-745-46	0.112	0.247	0.13	0.114	0.106	0.100
SMP	437747		125.20	126.90	10-745-46	0.053	0.282	0.07	0.072	0.051	0.054
SMP	437748		126.90	127.67	10-745-46	0.028	0.237	0.04	0.043	0.027	0.029
SMP	437749		127.67	129.27	10-745-46	0.054	0.098	0.07	0.057	0.051	0.049
SMP	437750		129.27	130.87	10-745-46	0.014	0.045	0.03	0.029	0.013	0.013
	Average					0.16	0.23	0.19	0.17	0.16	0.15

Table 6: Independent sample comparison of control assays for %Nb_2O_5

In addition to normal laboratory standards and duplicates, SGS Geostat has included blank made of limestone from Falardeau within the sampling sequence and the samples showed no major signs of contamination within the detection limits.(values lower than the detection limit has been changed by the detection limit in the tables).

						Database	ALS CHEMEX	SGS XRF 1	SGS XRF 2	SGS ICP 3
Type	Sample ID	Sample ID	From(bd)	To(bd)	Description	TA2O5 ppm	Ta2O5	Ta2O5 ppm	Ta2O5 ppm	Ta2O5 ppm
rock	SGS Geostat	(bd)	m	m		Ori	ppm calc			
SMP	437701	n/a			site 1	n/a	256	244	n/a	n/a
SMP	437702	n/a			site 2	n/a	220	122	n/a	n/a
SMP	437703	n/a			Limestone	n/a	0	122	n/a	n/a
SMP	437704	n/a			site 3	n/a	122	122	n/a	n/a
SMP	437705	n/a			site 4	n/a	159	244	n/a	n/a
SMP	437706	n/a			site 5	n/a	147	122	n/a	n/a
SMP	437707	n/a			site 6	n/a	195	244	n/a	n/a
SMP	437708	n/a			site 7	n/a	256	244	n/a	n/a
SMP	437709	n/a			site 8	n/a	305	244	n/a	n/a
SMP	437710	n/a			site 9	n/a	293	244	n/a	n/a
SMP	437711	n/a			site 10	n/a	256	244	n/a	n/a
	Average						201	200		
SMP	437712	236673	223.9	225.4	CV-02-82	181	171	244	183	183
SMP	437713	236674	225.4	226.9	CV-02-82	242	232	122	305	269
SMP	437714	236675	226.9	228.4	CV-02-82	103	134	122	171	159
SMP	437715	236676	228.4	229.9	CV-02-82	145	122	244	159	134
SMP	437716	236677	229.9	231.4	CV-02-82	123	147	122	183	159
SMP	437717	236678	231.4	232.9	CV-02-82	229	244	366	305	269
SMP	437718	236679	232.9	234.4	CV-02-82	218	208	244	244	232
SMP	437719	236680	234.4	235.9	CV-02-82	242	171	122	220	183
SMP	437720	236681	235.9	237.4	CV-02-82	209	159	122	208	183
SMP	437721	236682	237.4	238.9	CV-02-82	143	171	122	232	208
SMP	437722	236683	238.9	240.4	CV-02-82	301	281	244	342	293
SMP	437723	236684	240.4	241.9	CV-02-82	265	562	611	635	549
SMP	437724	236685	241.9	242.4	CV-02-82	108	122	244	122	98
SMP	437725	236686	242.4	243.9	CV-02-82	145	147	244	220	195
SMP	437726	236687	243.9	245.8	CV-02-82	78	73	122	98	73
SMP	437727	236688	245.8	246.9	CV-02-82	26	24	122	49	24
	Average					172	192	214	230	201
SMP	437728	119788	99.96	100.92	10-745-46	305	244	122	281	244
SMP	437729		100.92	102.00	10-745-46	378	403	366	476	440
SMP	437730		102.00	102.76	10-745-46	366	61	122	85	73
SMP	437731		102.76	104.28	10-745-46	51	256	244	317	281
SMP	437732		104.28	106.06	10-745-46	281	232	366	281	244
SMP	437733		106.06	107.86	10-745-46	305	269	244	317	256
SMP	437734		107.86	109.70	10-745-46	220	208	244	232	195
SMP	437735		109.70	110.21	10-745-46	317	73	122	98	85
SMP	437736		110.21	111.71	10-745-46	73	122	122	147	122
SMP	437737		111.71	113.07	10-745-46	107	183	244	195	183
SMP	437738		113.07	114.57	10-745-46	120	147	244	183	183
SMP	437739		114.57	116.07	10-745-46	122	317	244	366	293
SMP	437740		116.07	117.67	10-745-46	293	281	244	342	317
SMP	437741		117.67	118.62	10-745-46	195	391	366	464	366
SMP	437742		118.62	119.76	10-745-46	268	391	488	501	452
SMP	437743		119.76	120.56	10-745-46	354	122	122	159	134
SMP	437744		120.56	122.46	10-745-46	488	232	244	244	220
SMP	437745		122.46	124.40	10-745-46	134	269	366	366	317
SMP	437746		124.40	125.20	10-745-46	256	159	244	183	171
SMP	437747		125.20	126.90	10-745-46	403	85	122	122	110
SMP	437748		126.90	127.67	10-745-46	403	24	122	37	24
SMP	437749		127.67	129.27	10-745-46	122	61	122	98	73
SMP	437750		129.27	130.87	10-745-46	48	12	122	24	12
	Average					244	197	228	240	209

Table 7: Independent sample comparison of control assays for Ta_2O_5 in ppm

It is important to mention that sample tags and exact from-to in the core boxes for exact sampling match could not be achieved perfectly due to the age of the core boxes and length markers (wooden blocks). Sample numbers were sometimes identified while most of the time the metal tags on the core box was used as main reference in core intervals.

13.4 Additional independent sampling- phase 2

Following non conclusive reproduction of results between SGS Geostat new analytical data and old SOQUEM data in the Phase 1 independent sampling program, the decision was made to carry out a more extensive sampling program on existing witness core. A new sampling program was designed to verify the bias between the assays.

During the second visit in October 2008 at the core shack located at Niobec Mine facilities in St-Honoré, independent samples were taken from four witness holes drilled by SOQUEM and two witness holes drilled by CAMBIOR. The holes 10-745-53, 10-745-56, 10-745-57, 10-745-63 from SOQUEM and holes CV-02-85 and CV-02-91 were controlled.

Again the decision was made to take the whole half core. The reason: the possible nugget effect caused by coarse mineralization. There is still a good quantity of witness core at the core shack; this decision was still found reasonable by the client. Jr. Engineer Aliou Sene from SGS Geostat was assisting Claude Duplessis Eng. during this second phase of sampling.

Samples were put into a plastic bag with sample tag identification and sealed with a tie-wrap. The samples plastic bags were then put into rice bags with sample number on them. The rice bags were sealed with tie-wraps and put into SGS Geostat vehicle. The samples were later transported to SGS Geostat warehouse. The rice bags were wrapped in plastic on a wooden crate and shipped to SGS Lakefield by commercial carrier. The procedures were the same as described in section 13.2 and 13.3.

The following figures show witness core being sampled and bagged at Niobec by Aliou Sene under QP supervision.

Figure 25: Second phase independent sampling by Mr. Sene

	Length		Nb2O5			Ta2O5	
Hole number	Length	Data Base	SGS	Variation	Data base	SGS	Variation
S10-745-53	32	.21536	.19870	- 7.74	.026	.0215	- 17.3
S10-745-63	41	.18942	.17000	- 10.25	.0240	.0251	+ 5.58
S10-745-57	35	.24596	.18559	- 24.54	.0258	.0260	- 6.98
S10-745-56	33	.26218	.18389	-29.86	.0229	.0240	- 4.8
S10-745-46	30	.23121	.16917	-26.83	.0244	.0243	- 0.40
Average		.2272	.18092	- 20.4	.0236	.0243	+ 2.96
CV02-85	38	.15999	.15956	- .27	.0160	.0213	+33.1
CV02-91	31	.30573	.27303	-10.69	.0309	.300	- 2.90
CV0282	23	.14873	.15467	+ 3.99	.0214	.0172	- 19.62
Average		.20722	.19682	- 5.02	.02225	.0232	+ 3.11

Table 8: Independent sample comparison of control assays for %Nb_2O_5 and Ta_2O_5 in ppm

There has been comparison on individual sample basis, but each from–to in core boxes were not possible to match perfectly. Moreover SGS Geostat has sampled on a regular 1.5m interval basis. The decision was made to compare between same total mineralized lengths instead of individual sample basis. The above table presents the results and confirms the bias of the SOQUEM data. The new SGS Lakefield data shows lower grade compared to the original SOQUEM data for the Niobium. The Cambior holes show acceptable variations between both dataset. Tantalum is in the acceptable range of variations for both companies dataset.

An additional statistical analysis on 1.5m composites on the original data of each family i.e. SOQUEM vs Cambior data was done.

The following histograms present the distribution of individual 1.5m composites within the ore zone for each company. The third presents the superposition of both histograms. A difference in the 0.3 to 0.4 %Nb_2O_5 range is observed.

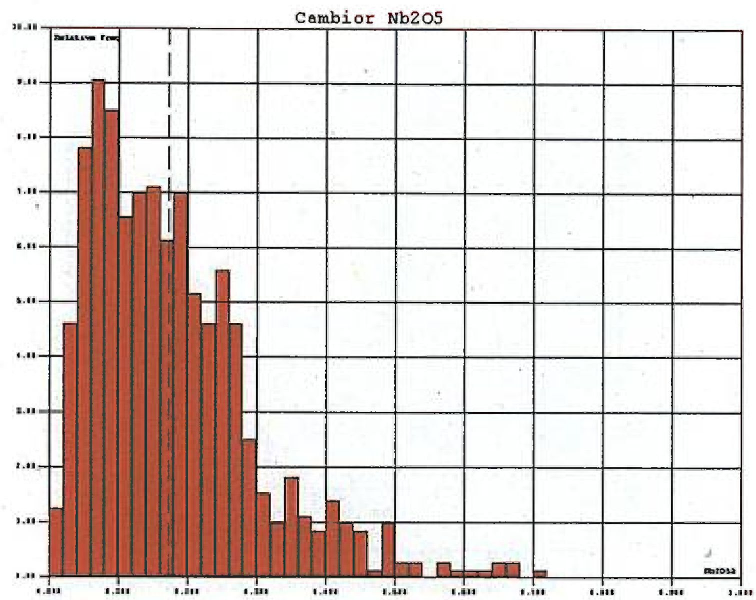


Figure 26: Histogram of 1.5m composite Cambior data %Nb_2O_5

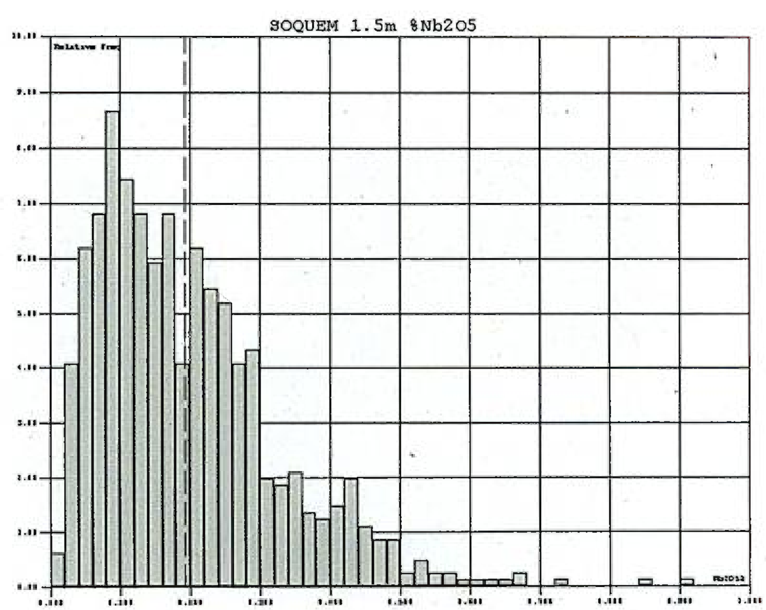


Figure 27: Histogram of 1.5m composite SOQUEM data %Nb_2O_5

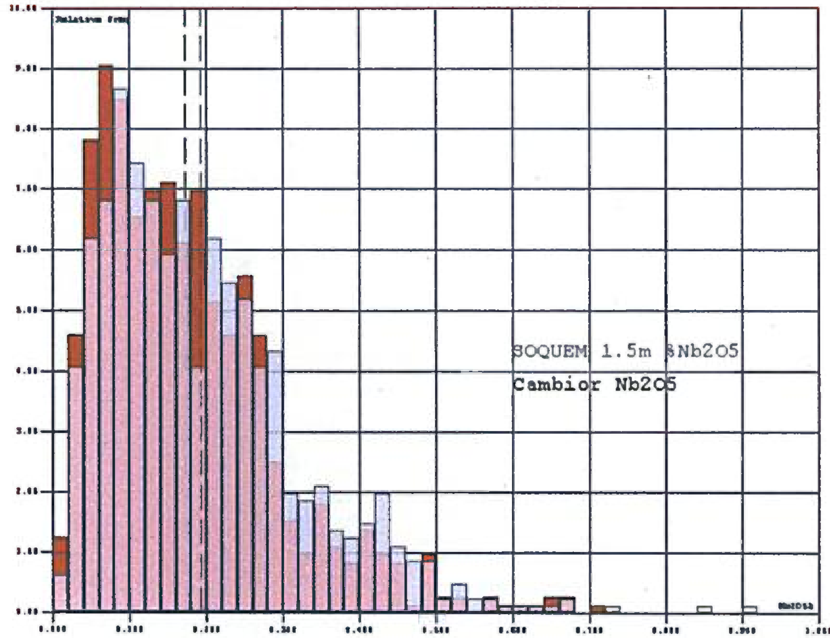


Figure 28: Superposition of histograms %Nb_2O_5

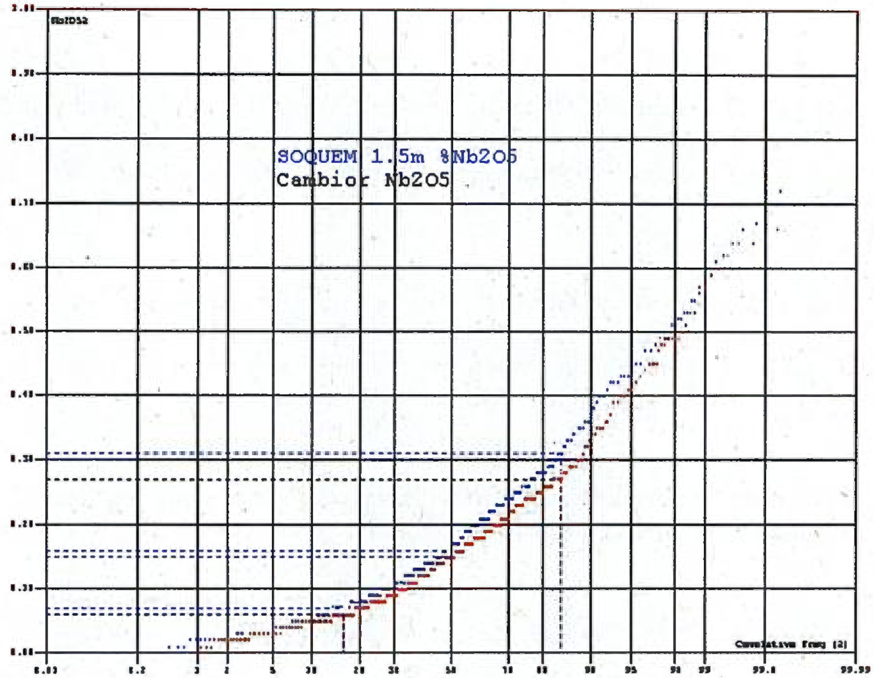


Figure 29: Cumulative frequency diagram SOQUEM vs Cambior

The additional statistical analyses confirm we have a bias between both populations. The above graphic clearly identify SOQUEM population being slightly higher.

It is also important to mention that a certified pulp standard of 0.20% Nb_2O_5 from Germany was used and inserted in the control samples of the Phase 2 sampling program. SGS laboratory in Lakefield has reproduced the standard giving confidence to the validation. It confirms and justifies the correction of the old SOQUEM data.

13.5 Conclusions of verification

Following the discrepancy between SOQUEM data and new SGS Lakefield assay results: a resource model was built with SOQUEM data only and another with CAMBIOR data only. The resource models were built on a sector where both campaigns were overlapping. Both models were showing a 19% difference in Nb_2O_5 and 13% in Ta_2O_5 content, the Cambior resource being the lower grade model.

This has justified the use a conservative approach in the final resource estimation. A negative correction of 19% for the Nb_2O_5 and 13% for Ta_2O_5 in ppm for all the SOQUEM data has been applied to the composites. This correction factor is based on the comparative resource estimation model and was supported by the independent SGS sampling programs.

In conclusion, we consider that the drill hole database data is adequate to support a Mineral Resources estimate using the corrected SOQUEM composites (refer to mineral resource section of this report).

14- Adjacent Properties

According to MRNQ Gestim claim management system, Mr. Senechal holds the adjacent claims North East of Crevier Minerals property. No public information of these claims is available.

Neither the author nor employees of SGS Geostat's staff have direct or indirect mining interest in the sector.

15- Mineral Processing and Metallurgical Testing

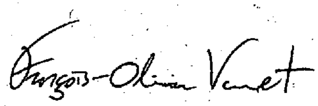
15.1 Introduction

Mr. Serge Bureau, President of Crevier Minerals Inc., requested that SGS Minerals Services (SGS-Lakefield) review all historical metallurgical testing on material of the Crevier Minerals Nb_2O_5, Ta_2O_5 deposit in northern Lac St-Jean province of Quebec in order to propose a complete program in phases for the completion of a flowsheet for the concentration and extraction of pyrochlore, which contains the metals of interest.

This section presents a review of each available document followed by specific conclusions on each specific topic.

SGS Minerals Services

Prepared by:



Francois-Olivier Verret
Project Metallurgist

15.2 Analysis

15.2.1 Mineralogy and Petrography

Only a limited amount of mineralogical analysis was carried out on the Crevier ore. All reports are between 1980 and 1983.

The most comprehensive mineralogical analysis was carried out by SOQUEM in 1983. Several drill core samples from different zones in the deposit were analyzed. No correlation between grade and location within the deposit could be identified. Pyrochlore was the main niobium-bearing mineral. The average pyrochlore grain size for all analyzed samples was 55 microns and ranged between 33 and 90 microns for the various zones. 95% of the pyrochlore was contained in less than 20% of the pyrochlore grains, which were coarser than 150 microns. Illmenite and ilmenorutile were the two primary inclusions in the pyrochlore. Pyrochlore was mainly associated with feldspar and nepheline.

Pyrochlore grain sizes of up to 250 microns were measured, but pyrochlore also occurred as inclusions within feldspar. 75% of the pyrochlore particles were liberated at 100 mesh (1.9). Two different analyses estimated that pyrochlore was liberated at 50 microns and 100 microns, respectively (1.1 and 7.2). This range agrees with the results obtained by SOQUEM.

Two types of pyrochlore were identified based on their uranium content. The first species contains approximately 0.1% U_3O_8, while the uranium content in the second species was above 2% U_3O_8.

Recommendations

A detailed QEMSCAN analysis should be carried out on each ore type that can be identified within the Crevier deposit. Deliverables of the mineralogical work would include modal analysis and grain size distribution, Nb and Ta occurrence, liberation of Nb and Ta minerals, mineral release curves, and theoretical Nb_2O_5 and Ta_2O_5 grade-recovery curves.

15.2.2 Grinding Tests

Operating work indices of 13.9 and 11.4 kWh/t (metric) were measured in pilot plant operations (see items 1.8 and 2.2 respectively). The lower specific power requirement for the Lakefield pilot-plant was a result of a pre-screening step. The rod mill work index was 13.2 kWh/t, as measured in previous test.

Recommendations:
The crushing/grinding circuit should be designed to minimize the production of fines (-325 mesh particles). The crusher circuit product should be screened prior to milling, and milling should be done with a rod mill, with a relatively high circulating load.
The Crevier ore should be submitted to the Bond grindability test series, which includes the Bond low-energy impact test, the Bond rod mill and ball mill grindability tests, as well as the Bond abrasion test.

15.2.3 Gravity Tests

Several gravity separation methods were investigated, such as the Wilfley and Mozley tables, spirals, as well as Heavy Liquid Separation (HLS).

The HLS and Wilfley table methods showed good separation, but relatively low Nb_2O_5 recoveries (~50%). The coarse material was easier to separate, but the fines, which account for about 18% of the total Nb_2O_5, were significantly more difficult to recover. A pilot plant was performed using spirals and a Wilfley table, with the global Nb_2O_5 recovery of about 52%

Recommendation:
Even though the weight rejection was high, the Nb_2O_5 recovery was also low and gravity separation (Wilfley table or spirals) alone is not recommended. A gravity circuit for the Crevier ore would require parallel lines, each processing a specific size fraction in order to maximize recovery.

15.2.4 Magnetic Separation Tests (Stand-alone)

Wet High Intensity Magnetic Separation (WHIMS), Light Intensity Magnetic Separation (LIMS), or electrostatic separation alone showed no or little upgrade in Nb_2O_5 content. Although, LIMS was proven very efficient when applied on a flotation of gravity concentrate (metal recoveries close to 100% with good weight rejection).

Recommendation:
LIMS should be considered for the Crevier beneficiation circuit. When to use LIMS is yet to be determined, but good results have been shown when used as a cleaning stage.

15.2.5 Metallurgical Results

Based on the information provided in the reviewed reports, at least six different composites were tested between 1980 and 2004. A summary of the different samples is provided below.

Table 8: Metallurgical Composites from the Crevier Deposit

Composite	Head Assay, %		Mass	Reference
	Nb_2O_5	Ta_2O_5		
1	0.20	0.028	9 t	1.3, 2.1, 2.2, 2.3
2	0.20	N/A	N/A	1.8, 1.11
3	0.20	0.031	N/A	1.9
4	0.23	0.029	N/A	2.1
5	0.171	0.020	100 t	2.2
6	0.19	N/A	14 t	3.1

Although a significant amount of laboratory and pilot scale work was conducted between 1980 and 2004, only two flowsheet options produced good metallurgical results. These two flowsheet options are presented below.

In 1985, CRM carried out a flotation pilot plant campaign and produced an average concentrate grade of 7.5% Nb_2O_5 at 67.2% Nb_2O_5 recovery. The primary grind size was 98% passing 150 microns and the mill discharge was subjected to a desliming stage, which rejected 19% of the mass with approximately 20% of the contained Nb_2O_5. The reagents that were used in the rougher and cleaner stages were ~9 kg/t fluorosilic acid, 1 kg/t heating oil, and 0.55 kg/t Flotinor SM-15 (phosphoric acid ester). The primary benefit of the heating oil was an increased selectivity, which increased concentrate grades and reduced the number of required cleaning stages. The fluorosilic acid was used to depress silicates and for pH control. The average mass pull into the 4th cleaner concentrate was 1.61% (1.11). The fact that a significant amount of Nb_2O_5 reported to the slimes emphasizes the need to minimize slimes generation in the comminution circuit.

The 4th cleaner concentrate of a pilot plant run yielding a concentrate grade of 9.3% Nb_2O_5 at 66.5% Nb_2O_5 recovery was subjected to a magnetic separation stage, which improved the concentrate grade to 15.3% Nb_2O_5. A leach circuit further increased the concentrate grade to 20.2% Nb_2O_5 (1.11).

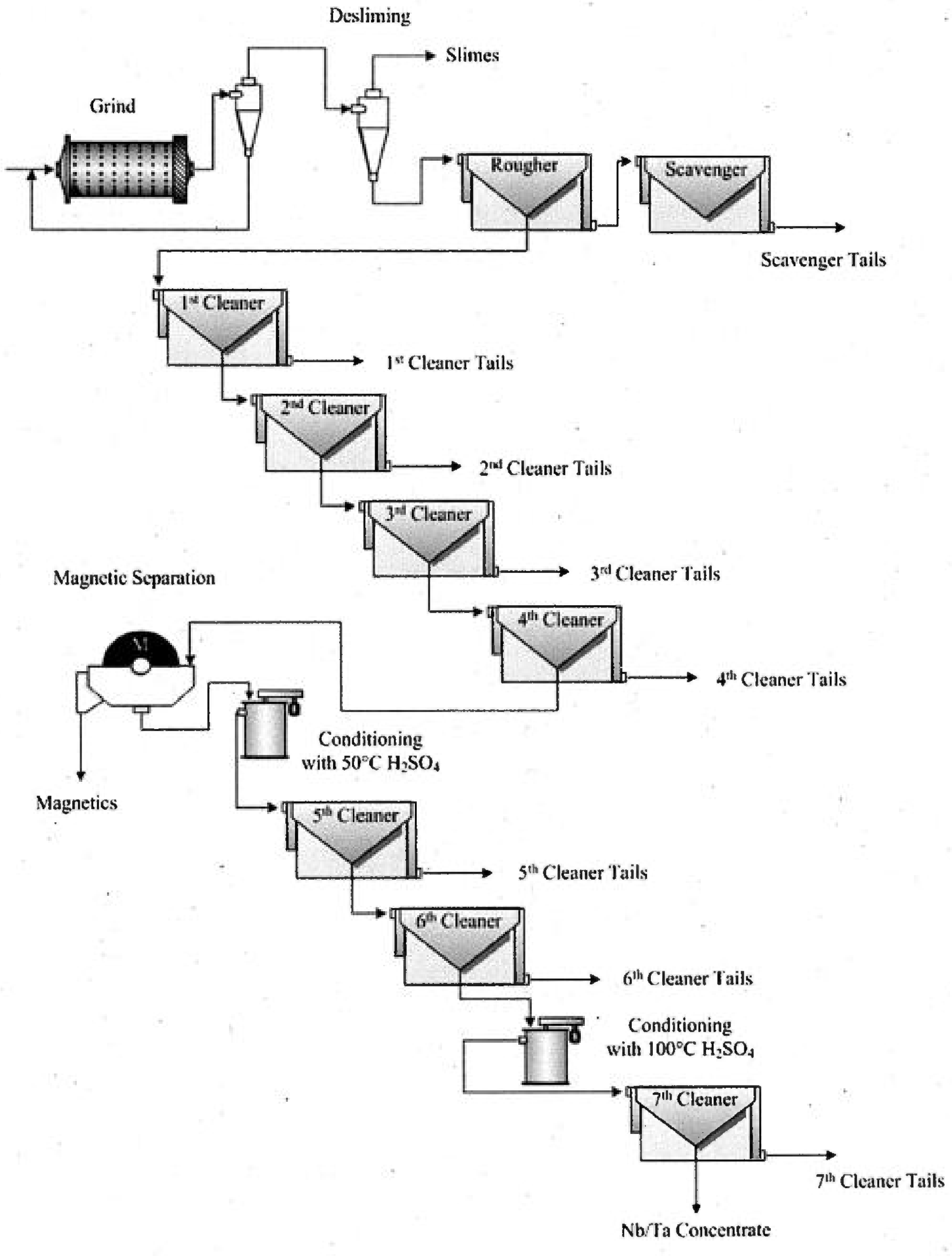
A laboratory scale program evaluated upgrading options for the concentrate that was produced in the 1985 pilot plant campaign. The flowsheet of the entire process including pilot plant and laboratory scale work is presented in Figure 30. A sample of the pilot plant concentrate was subjected to low intensity magnetic separation (LIMS), which rejected approximately 30% of the mass at moderate Nb_2O_5 losses of 1.4%

Carbonates and apatites that reported to the non-mags were leached with sulphuric acid, which proved to be more selective than HCl. Feldspars, ilmenite, hematite, goethite and zircon were rejected in a 5th and 6th flotation cleaning stage using sulphuric acid. In a final flotation stage, the sulphuric acid was heated to 100 degrees Celsius to render the Flotinor SM-15 collector ineffective before floating pyrite.

The final concentrate that was produced with these upgrading stages contained 48.1% Nb_2O_5 at a global recovery of 58.2%y. Further, the concentrate contained 5.81% Ta_2O_5 at 62.2 % recovery. It was postulated that the concentrate could be further upgraded with fluoridic acid followed by liquid-liquid extraction with an organic solvent. This concept was not tested at that time.

A second bulk sample program carried out by COREM in 2002 produced a final concentrate of 50.3% Nb_2O_5 at 25.4% recovery. Nb_2O_5 losses to the slimes and to solution during leach accounted for 26% and 14%, respectively. The performance of the rougher and cleaner flotation of the COREM and the CRM pilot plant were similar and ranged between 60 to 65% Nb_2O_5 recovery.

Figure 30: Flowsheet Option for Crevier Ore

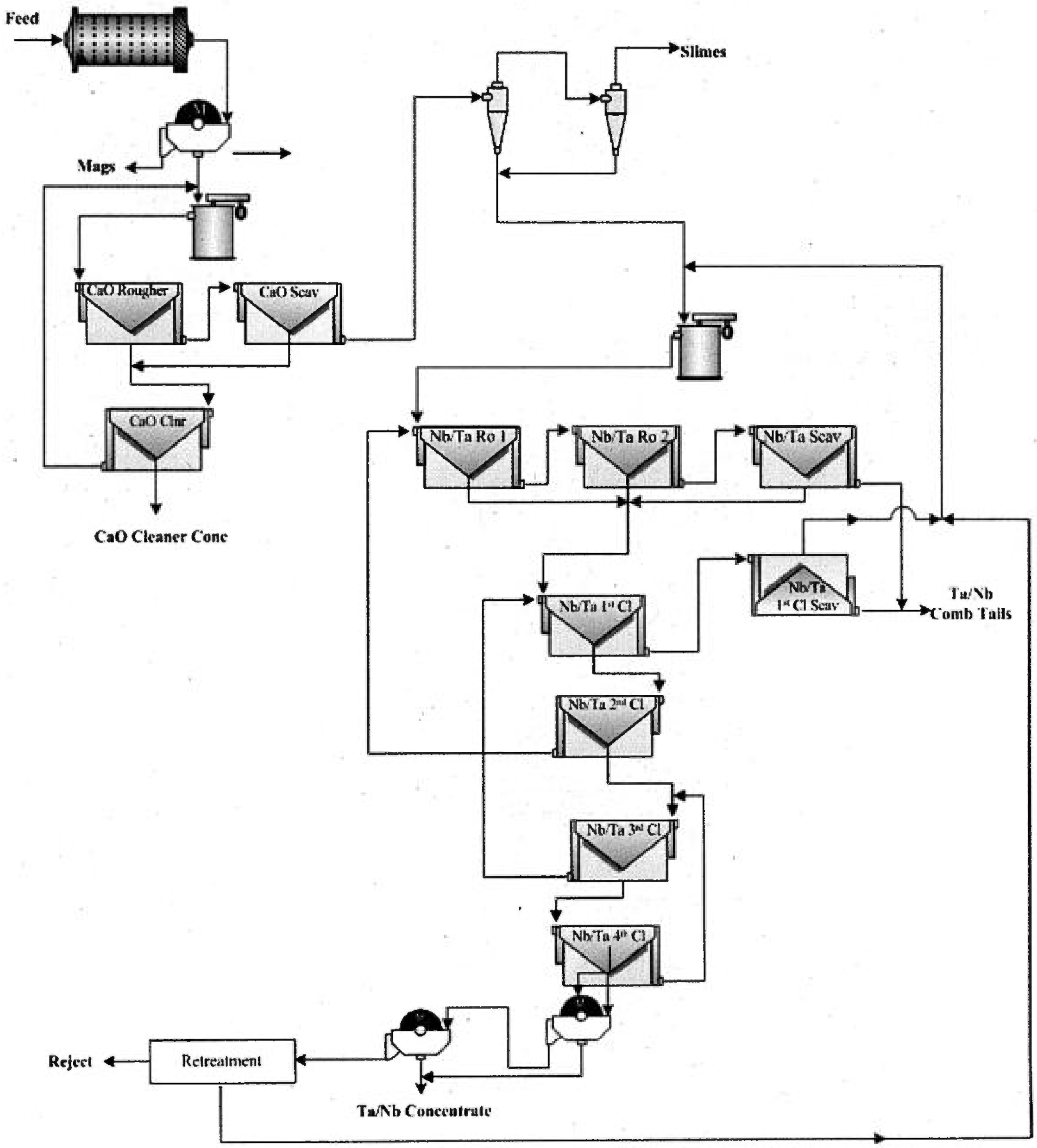


A series of four batch leach tests were carried out on the concentrate produced by COREM using HF and H2SO4 with extraction recoveries of >90% for Nb and Ta. Due to the environmental issues associated with HF, a number of alternative leaching methods were evaluated including acid cracking, caustic cracking, and sulphation. Acid cracking produced similar Nb recoveries than HF, bit the Ta extraction decreased to only 78%. All other tested methods were significantly inferior.

The reagent MIBK was used in the solvent extraction process and produced good extraction of Na and Ta. The stripping from the loaded MIBK was successful and a good separation of Na and Ta was achieved. However, the precipitation from the respective liquids proved difficult.

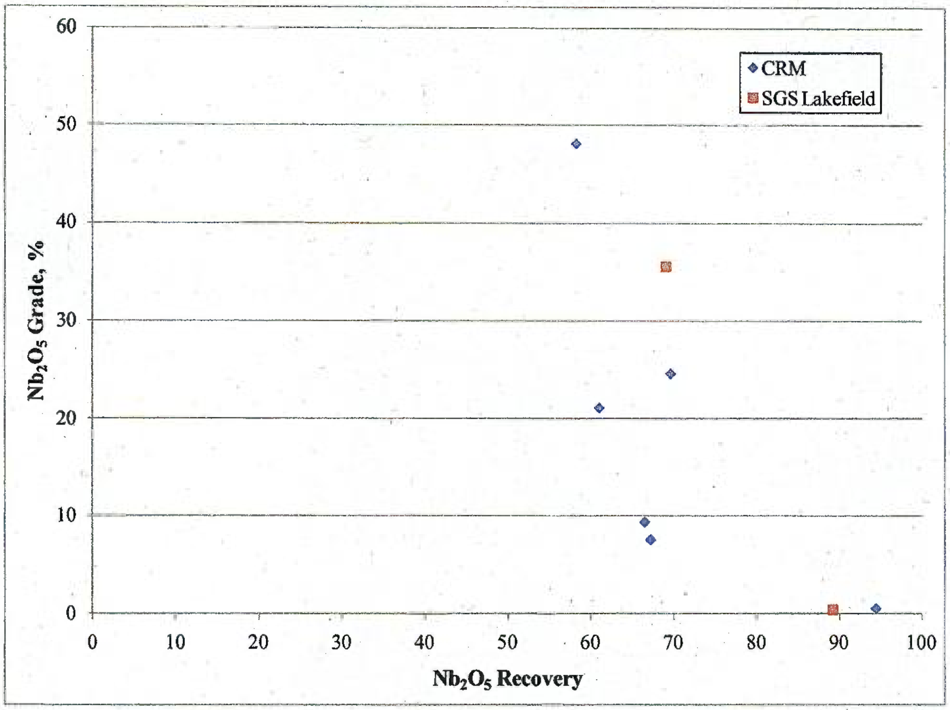
An alternative flowsheet that was developed at SGS Lakefield in 2003 is shown in 8. The major difference of this flowsheet variant was the addition low-intensity magnetic separation stage and a calcite flotation circuit prior to desliming. The recovery of Nb and Ta into the Ta/Nb rougher concentrate was 89.2% and 87.7%, respectively. The final concentrate after 4 stages of cleaning and high-intensity magnetic separation graded 35.5% Nb_2O_5 and 4.64% Ta_2O_5 at a recovery of 69.1% and 67.6%, respectively. No further upgrading of the Nb/Ta concentrate was carried out as part of the 2003 program.

Figure 31: Alternative Flowsheet for Crevier Ore



In order to illustrate the upgrading performance of the two flowsheet concepts, Nb_2O_5 grade recovery points of tests performed at CRM, Corem, and SGS Lakefield have been plotted on the chart shown in Figure 32. Note that these results were achieved with different composites and cannot be directly compared. Instead, the results should be treated as baseline data that can help in establishing targets for future metallurgical tests.

Figure 32: Nb_2O_5 Grade-Recovery



A number of key observations that were made during the various laboratory and pilot scale test programs are summarised below:

- Pre-flotation of pyrites (sulfur) and/or carbonates was proven useful
- The flotation reagent used at the Niobec mine was tested on the Crevier ore, but produced poor results.
- Reverse flotation was evaluated in the cleaning stages and produced a concentrate of 11.8% Nb_2O_5 at 61% recovery. The concentrate was increased to 21.1% Nb_2O_5 after leaching. However, reverse flotation only worked with DI water, which reduced the practicality of this flotation strategy.
- A system using acidic reagents (Oxalic Acid, H_2SiF_6, Acidified silicate) and anionic collector (Flotinor SM-15) and amine-based collector (PL777) was proven efficient;
- Flotinor dosages in excess of 0.6 kg/t has a detrimental impact on concentrate grade;

- Sulfonates, phosphoric acid, and hydroxamates were tested in the rougher stage and produced poor results with a maximum Nb_2O_5 recovery into the rougher concentrate of only 80% ;
- The addition of sodium carbonate as a dispersant prior to the desliming stage proved beneficial , but also inhibited pyrochlore flotation.
- pH control is critical as it changes over time with the dissolution of nepheline;
- Reverse flotation at a pilot scale using petroleum sulfonate produced poor results;
- Gangue inhibitors NaF-HF were most selective, but sodium silicate and barium nitrate was also effective in depressing gangue minerals.

Conclusions and Recommendations

Two promising flowsheet variants have been developed for the Crevier ore. Both of these flowsheets have not been optimised and the results cannot be compared since different composites and products were used in the tests. Hence, a future metallurgical test program should compare both flowsheets using the same composite.

In order to minimise Nb_2O_5 losses to the slimes, the flowsheet optimization program should include the comminution circuit design. Initial test results suggest that the Nb_2O_5 losses can be reduced if the slimes generation is minimized.

An optimisation program of the flotation circuit should be carried out to maximise the Nb_2O_5 recovery into the final flotation concentrate prior to leaching and solvent extraction. Only preliminary tests were carried out on leaching and solvent extraction and a comprehensive test program should be initiated once the flotation circuit has been optimized.

15.3 Value of Historic Metallurgical Test Programs

A request was made to estimate the value of all historic test programs on the Crevier ore if they were repeated today. Based on the information contained in the reports, a budget of 3.0 +/- 0.5 million dollars has been estimated. Note that this estimate was derived by comparing the scope of the various programs with similar programs carried out by SGS for other clients. A more accurate estimate would require a significant amount of time and labour as each test item would have to be listed separately.

A detailed proposal for a test program that includes the recommendations for future tests that were made in this report is appended.

15.4 - Literature Review Summary

Each report is classified by company names and then sorted by report issuance date. A brief description of each report is presented and the main findings are summarized in bullet points and the report recommendations are listed with arrows.

15.4.1 Centre de Recherche Minérale (CRM)

Concentration préliminaire du pyrochlore de Crevier

March 20, 1980. Interim Report

Three crushed drill core samples (each weighing ~10 kg) were used for the upgrading program of Nb_2O_5. The test details and conclusions are:

- Heavy Liquid Separation (HLS) was investigated at Specific Gravity (SG) of 2.93 g/cm^3. Concentration by gravity gave the most promising results.
- Wet High Intensity Magnetic Separation (WHIMS) at 18 KGauss and electrostatic separation were performed, but in both cases there was no concentration of Nb_2O_5 or Ta_2O_5.
- Mineralogy studies indicated that the pyrochlore grains were mostly liberated at 53 microns and that the non-liberated pyrochlore particles were mainly attached to feldspar particles.
- Flotation separation was approached and showed promising results, especially when desliming prior to flotation. More testing should be performed.

Essais de concentration du pyrochlore de Crevier

September 15, 1980. Interim Report

- Gravity separation was investigated using the Wilfley table for coarse material (+270 mesh) and showed good separation using several stages of separation, while the fines (-270 mesh) were processed through the 'superpanner' or Wilfley table. Global recoveries of 62.4% Nb_2O_5 and 2.1% of the weight were achieved.
- Magnetic separation after gravity separation showed good Nb_2O_5 and Ta_2O_5 upgrades, while recovering almost 100% of the metals.
- The final uranium grade was low at 16 ppm.
- Stage-grinding would be required to avoid over-grinding and production of fines.

Concassage et échantillonnage du minerai de Crevier

April and August 1982.

More than 7 tons of Crevier material was received from Lakefield Research and corresponded to the material used in items 0, 0 and 0. The material was composited, crushed and riffled to produce representative samples to be shipped to Laval University, Ecole Polytechnique, Niobec, CRM and SOQUEM's pilot- plant for further metallurgical testing.

- The sample assayed: 0.20% Nb_2O_5 and 0.028% Ta_2O_5
- The global average Nb_2O_5 grade, considering all the labs, was 0.192±0.013% Nb_2O_5 and confirmed that the assays reported by CRM were fine.

Evaluation du potentiel en apatite du complexe alcalin de Crevier

October 1981.

Not related.

Traitement gravimétrique et magnétique d'un minerai de niobium et tantalum.

August 30, 1982. Interim Report

300 lb of representative material was shipped to CRM by SOQUEM (300 of a 1500 lb sample) for gravity and magnetic separation using the Bartley belt, Wilfley table and Davis tube apparatus. The sample graded ~0.17% Nb_2O_5 and 0.026% Ta_2O_5. Thirteen tests were performed.

- Gravity testing on narrow size fractions gave slightly better grades and recoveries.
- A pyrochlore concentrate grading 13.4% Nb_2O_5 with a recovery of 38.7%, and 0.29% weight was produced (test 13).
- It was relatively easy to recover ~55% of the Nb_2O_5 for ~5% of the weight (tests 6 and 8).
- There is a significant advantage in doing magnetic separation on a gravity concentrate.
- Global recovery is a function of the head grade. For example, a feed of 0.17% Nb_2O_5 gives a max Rec of ~50%. Feed at 0.19% Nb_2O_5 (Rec: 55%) and 0.25% (Rec: 66 %).

Étude de concentration du pyroclore Crevier avec liquides lourds de la fraction granulométrique -65/+100 mesh.

October 25, 1982. Final Report

HLS was performed at 2.93, 3.30, 3.93 and 4.19 g/cm3 on material in the -65/+100 mesh fraction. This study was based on the results obtained in item 0. Mineralogy was performed on the HLS test products.

- Pyrochlore density varied from 3.3 to 4.2 g/cm^3, with very few particles lighter than 3.3 g/cm^3.
- The best results achieved were obtained using a liquid density between 3.93 and 4.19 g/cm^3, which produced a concentrate grading 42% Nb_2O_5. The weight recovery was 0.1%, but the Nb_2O_5 losses were around 75%.

Travaux de laboratoire durant le pilotage

February 2, 1984.

Petrosul 545, with a molecular weight of 473 (if molecular weight lighter than 472, sulphuric acid can be added), was used as collector. The samples for the bench-scale comparison work were gathered at the pilot-plant cyclone underflow.

- Best performance was 94.5% recovery of the pyrochlore grading 0.47% Nb_2O_5. The weight rejection was 57.7% and the reject graded 0.02% Nb_2O_5.
- The sodium carbonate inhibited the pyrochlore
- Strong agitation breaks the collector link and reduces performance; the cell impeller speed has to be reduced.
- The impeller used for conditioning should be reduced as well, and conditioning time set at the minimum.
- The feed should be 100% passing 200 mesh.
- Primary flotation at pilot-scale was demonstrated as efficient.

Pilotage du minerai Crevier

June 27, 1984.

A 343.9-t pilot plant sample was sub-sampled from a 1000-t lot stored in Saint-Honoré from which 277 t were processed in the pilot plant. The material was crushed and ground with a rod mill to 98% passing 100 mesh. The fines were deslimed and the flotation feed was 55-60% passing 200 mesh and ~28% passing 325 mesh. The feed grade was 0.20% Nb_2O_5.

- Petrosul 545 was used as collector and selectivity depended on the molecular weight, 475±3 was good.
- pH was adjusted to 11 with NaOH because Na_2CO_3 negatively affected pyrochlore flotation.
- Long conditioning time (70 min) with low agitation is required to obtain a low Nb_2O_5 grade reject. It was recommended reducing the conditioning time without increasing the reject grade.
- Reverse flotation could be possible, but no good results were obtained at pilot-scale. pH control is believed to be critical.
- Work index of operation (pilot plant) was 13.9 kWh/t (metric) and 13.2 measured at lab-scale.

Concentration du pyroclore de Crevier à l aide d'un sulfonate de pétrole

December 14, 1984.
Same samples used since 1980 containing 0.20% Nb_2O_5 and 310 ppm Ta_2O_5. The flotation tests were performed with Hallimond tube.

- Crevier pyrochlore doesn't float with the reagents used at Niobec.
- At lab scale, the petroleum sulfonate seemed to be selective.
- Reverse flotation at the cleaner stage produced a concentrate of 11.8% Nb_2O_5, or 21.1% after leaching for a global Nb_2O_5 recovery of 61.0%
- Demineralised water is required for reverse flotation. Tap water is fine for standard flotation.
- pH of 11.0 or higher is good using petroleum sulfonate.
- Pyrochlore grains measured up to 250 microns, but some feldspar grains of 52 microns were noticed with pyrochlore inclusions
- HLS was performed at a density of 2.93 g/cm^3 and liberation degrees were studied by size using a microscope. Primary grinding should be 100% passing 100 mesh

  -28/+35 mesh → 35% liberated
  -48/+65 mesh → 45%
  -100/+150 mesh → 75%
  -200/+270 mesh → 100%

Concentration du pyroclore de Crevier

March 28, 1985. Final Report
A flotation concentrate, produced using a phosphoric acid ester (Flotinor SM-15) combined with oil (to increase the collector efficiency) and fluosilicic acid (inhibits silicates and control pH) was leached with HCl and the final concentrate graded 24.6% Nb_2O_5 with a recovery of 69.6%. The ore was ground to ~70% passing 200 mesh and deslimed prior to flotation. The main impurities in the lixiviate were feldspar (18%), ilmenite (18%), zircon (10%) and pyrite (8%).

- Grinding circuit followed by a desliming step, then flotation, magnetic separation and then HCl leaching
- Heating oil increased selectivity, reduced the number of cleaning stages and increased the grade.
- Heated (80°C) and diluted HCl dissolved the apatite, carbonates and some feldspar.
- Pyrochlore, zircon, ilmenite and pyrite were not dissolved by HCl.

Pilotage du minerai de Crevier.

September 20, 1985. Final Report

Additional runs with the same material used. Flotation feed was 98% passing 100 mesh and 31.5% passing 325 mesh.

- 11 hours of continuous flotation operation and production of a concentrate grading 9.3% Nb_2O_5 at 66.5% Nb_2O_5 and 1.45% weight recoveries.
- Magnetic separation increased the Nb_2O_5 content to 15.3% and 20.2% after leaching.
- High pulp density was beneficial, especially at the rougher stage (50% solids), improved separation.
- About 19% of the material was discarded as slimes at about 0.17% Nb_2O_5. About 20% of the Nb_2O_5 was lost in the slimes.
- The averaged results were feed and global rejects 0.18% and 0.06% Nb_2O_5, respectively. 4th cleaner concentrate recovered 1.61% of the weight and 67.2% of the Nb_2O_5. The concentrate grade was 7.5% Nb_2O_5.

Flottation inverse du pyroclore de Crevier

October 1, 1985.

Reverse flotation at pilot-scale using petroleum sulfonate did not work, and the results obtained at lab-scale were not reproduced. The circuit consisted of 2 conditioning tanks, a rougher bank, the first cleaner stage had a conditioning tank, as well as a cyclone upfront and an additional hydrocyclone treating the concentrate. The cyclone underflow was feeding 3 cleaner stages. The 3rd and 4th cleaner rejects were recirculated to the rougher concentrate and the 1st and 2nd cleaner rejects were discarded.

- pH must be above 11.7 in order to get a concentrate of 5.5 to 6.3% Nb_2O_5.
- Maximum Nb_2O_5 recovery was 56.5%

- Activated carbon, used for the desorption of the sulfonate, and NaOH conditioning had almost no effect on the flotation results.
- Stop investigating petroleum sulfonate.

Complément d information pilotage du minerai Crevier

October 30, 1985. Bench-scale testwork

Too much Flotinor SM-15 (~0.6 kg/t) lowered the concentrate grade. Collector must be added at the conditioning step. A pulp density of 45-50% was optimum.

Minerai Nb – Ta de Crevier enrichissement du concentré de flottation de 7.5% à 40% Nb_2O_5

December 17, 1985. Interim Report

This is an interim report. The idea was to recover pyrochlore by removing the other minerals one at the time. The tests were performed on a float concentrate grading 7.5% Nb_2O_5, produced at pilot-scale.

- By removing the magnetic minerals using LIMS, and by dissolving the carbonates and apatite with HCl, the concentrate can be upgraded to 14.2% Nb_2O_5 with 98.6% recovery, or 66.2% global recovery.
- Magnetic separation rejected 30% of the weight with only 1.4% of the Nb_2O_5. From Davis tube results, the magnetic separation can be improved.
- The non-mags were leached with diluted HCl (34.5%), requiring 6.7 kg HCl/t.
- Feldspar, ilmenite, hematite, goethite and zircon can be inhibited with a 5th flotation cleaning stage using sulphuric acid.
- Heated sulphuric acid (100°C) cancelled the collector, Flotinor SM-15, properties and then the pyrite can be floated with a 6th cleaner stage
- Overall, they have produced a 41.5% Nb_2O_5 concentrate with a global recovery of 61.9%.

Minerai Nb-Ta de Crevier enrichissement du concentré de flottation de 7.5% à 40% Nb_2O_5

June 2, 1986. Final Report.

The preliminary work initiated in item 0 was continued, but the use of HCl was discontinued and replaced by sulphuric acid.

- Use of sulphuric acid to selectively inhibit the various minerals present in the flotation concentrate. Various acid concentrations and temperatures were tested.

- Carbonates and other soluble minerals did not affect the process and product quality even though they precipitated in sulfates.
- The final concentrate assayed 48.1% Nb_2O_5 and 5.81% Ta_2O_5, but still contained feldspar and rutile (8%). The final concentrate also included >1% Thorium, >100 ppm uranium and 100 ppm of gallium.
- Preliminary testing showed that it might be possible to obtain pure niobium and tantalum oxides with fluroridric acid followed by liquid-liquid extraction with an organic solvent.
- Rutile consumed a significant amount of fluoridric acid.
- From a flotation mag sep concentrate grading 7.5% Nb_2O_5, it was possible to produce a concentrate at 48.1 % Nb_2O_5 with 5.81 % Ta_2O_5 for global recoveries of 58.2% and 62.2%, respectively.

➢ Investigate the liquid reject for the sulphuric acid treatment.

15.4.2 Lakefield Research

The recovery of niobium and tantalum

July 7, 1980.

Seven freshly blasted trench samples were sent to Lakefield and composited into a single sample. A mineralogy study performed by IREM-MERI (Item 0) was discussed. A sample was roll-crushed to 20 mesh, screened and the size fractions were submitted to HLS at SG 2.96 g/cm^3. The HLS study indicated that the liberation of Nb_2O_5 was very good, below 300 microns. Two gravity and magnetic flowsheets were also tested.

- Head grade of the composite: 0.23% Nb_2O_5, 0.029 % Ta_2O_5, 0.05 % ZrO_2
- Two types of pyrochlore were determined based on the content of uranium: Type A 0.1% U_3O_8 and Type B +2% U_3O_8
- HLS showed that 68% of the Nb_2O_5 can be recovered with 2.6% of the weight, excluding the fines (-200 mesh), which accounted for 18% of the weight and carried 27.5% of the Nb_2O_5.
- Flowsheet 1 consisted of a Wilfley table and the heavy material was processed through a Davis tube. The final concentrate (non-mag) recovered 48% of the Nb_2O_5. The light fraction was ground and processed through the Wilfley table recovering another 3% Nb_2O_5. For a total weight recovery of 1.4%.
- A second, more complicated, flowsheet was developed involving pre-screening (the -48 mesh fraction was treated separately), regrinding, as well as gravity (HLS, Wilfley and Mozley) and magnetic (Jeffrey) separations. The overall metallurgical balance indicated a final concentrate grading 35.2% Nb_2O_5 for a recovery of 43%. The weight recovery was very low at 0.3%. The tailings were at 0.075% Nb_2O_5.

- Good response of the ore to gravity separation. Magnetic separation works well for ilmenite and magnetite (Fe_3O_4) removal.
- Over-grinding resulted in fine Nb_2O_5 particles (<20 microns), which would be very difficult to recover.

➢ A bigger sample should be submitted to continuous operation.

The recovery of niobium and tantalum (pilot plant)

March 1981. Progress Report No. 1

A 100-ton sample grading 0.171% Nb_2O_5, 0.020% Ta_2O_5 and 0.049% Zr was treated by gravity in a pilot plant to produce a pyroclore – zircon concentrate. The beneficiation circuits (sand and slimes) used several gravity separation units (Wilfley, Deister and Mozley tables, spirals and cyclones) processing specific size fractions. This report covered the first step of the beneficiation, using gravity separation only.

- The flowsheet was divided into sands and slime circuits, which were operated separately because of equipment limitation.
- The ore was crushed to 10 mm, screened at 20 mesh, the oversize and the cyclone underflow were ground through a rod mill. The circuit specific power requirement was 11.4 kWh/t.
- The overall pilot-plant performance was a final concentrate (slime + sand) grading 3.95% to 4.87% Nb_2O_5. The Nb_2O_5 and weight recoveries were ~52% and ~2.3%, respectively.
- The sand products were combined at the end of the pilot plant and the product graded 5.6% Nb_2O_5 and 4.1% ZrO_2.

The recovery of niobium and tantalum from a gravity concentrate

July 24, 1981. Progress Report No. 2

The pyrochlore-zircon sand concentrate produced by gravity (item 0) was processed through a cleaner circuit using magnetic (Jeffrey) and gravity (Wilfley) separation.

- The feed was ground to minus 35 mesh before magnetic separation to remove strong gangue minerals, magnetite and pyrrhotite.
- There were 3 to 5% losses of Nb_2O_5 and ZrO_2 in the magnetic fraction.
- Gravity beneficiation of the non-magnetic concentrate was unsatisfactory. The pyrochlore did not tend to concentrate on the Wilfley table (distinct visible bands did not develop).
- The cleaning circuit produced a low-grade concentrate assaying only 13.4% Nb_2O_5 and 13.4% ZrO_2 from a feed assay of 5.6 % Nb_2O_5 and 4.1 % ZrO_2.
- A considerable amount of apatite (SG 3.2) followed the pyrochlore (SG 4.4) in the Wilfley table. This was attributed to particle shape characteristics.

- Gravity separation of the pyrochlore and zircon minerals appeared unfeasible.

➢ Selective flotation from a rougher gravity concentrate

The recovery of niobium and tantalum

July 24, 1981. Progress Report No. 3

The objective was to upgrade the rougher concentrate produced by gravity separation (item 2.2) through WHIMS, LIMS, electrostatic and gravity separations, HLS and flotation.

- 30-35% of the weight was removed through LIMS (Jeffrey) producing a mag fraction grading less than 0.5% Nb_2O_5 and mainly consisting of magnetite.
- Attempts to remove ilmenite by magnetic separation were unsuccessful due to pyrochlore inclusions of exsolution of ilmenite, which increases the magnetic susceptibility of the pyrochlore grains.
- HLS at SG 3.3 g/cm^3 recovered 88.8% of the Nb_2O_5, but the performance decreased to 77.6% recovery when using a Wilfley table due to contamination of apatite, which suggested that a shape factor was involved in the table performance.
- Electrostatic separation was not efficient and would not apply for -200 mesh feed material. Note that all the particles were conductors 18 kV, but none at 26 kV.
- About 90% of the apatite could be removed by fatty acid flotation using sodium silicate.
- Mineralogy was performed on a product from test # L10. Pyrochlore forms grains of 100 microns and bigger. About 50% of the pyrochlore grains contained inclusions of ilmenite. Most of the inclusions were in the form of lamellae, a few of 50 microns.

A review of the extractive metallurgy of tantalum

November 13, 2001.

No testwork, only literature review for Ta and Nb metal recoveries.

- Preferred route: dissolution in HF + H_2SO_4.
- Tantalum and Niobium extractions greater than 95 % are normally obtained.
- Dissolution with HF + H_2SO_4, MIBK is used for solvent extraction and Nb-Ta is then possible.
- From the purified tantalum strip two products can be produced: Ta_2O_5 or K_2TaF_7 and are the starting point for the production of saleable tantalum products.
- Final product qualities need to meet the market specifications, not only chemical but particle size, morphology etc.

The recovery of Ta_2O_5 and Nb_2O_5 from a Crevier deposit concentrate sample

July 26, 2002.

A 45-kg concentrate sample was sent to Lakefield by COREM. The sample contained 49.3% Nb_2O_5 and 7.05% Ta_2O_5.

- Four leaching tests using HF and H_2SO_4 gave extraction recoveries higher than 90% (Nb, Ta). HF concentration >750 kg/t gave the best extraction results and lower residue content.
- Because of the cost and environmental implication of using HF, alternative leaching methods were investigated: H_2SO_4 Cracking, Caustic Cracking, H_2SO_4 acid sulphation:
    - Acid cracking: 96.5 % of the Nb was extracted, but only 78 % of the Ta
    - Caustic cracking: low recoveries: 2.2% Ta and 20% Nb
    - Sulphation: slightly higher recoveries: 17.5% Ta and 70.6% Nb
- Ta and Nb recoveries from leach solutions produced using the conventional HF–H_2SO_4 were promising (>99% Nb and Ta recoveries). Extraction was performed using MIBK and H_2SO_4.
- Two routes are practiced to recover Ta and Nb from strip solution:
    - Hydroxide precipitation: more work is needed, but results seem promising
    - K-salts precipitation: no precipitate was form
- Conclusion: good respond to HF –H_2SO_4 leach process
- Alternative routes not positive.
- MIBK confirmed as a good extractant for both Ta and NB. MIBK very sensitive to solution composition
- Stripping from loaded MIBK, as per industry practice, proceeded relatively well. Separation between Ta and Nb was good.
- The precipitation of Ta and Nb from respective liquors was not fully successive. More work required for K-salt precipitation and calcinations steps.

➢ Optimization of the leaching step

➢ Optimization of the solvent extraction step

➢ Optimization of the K-salt precipitation and precipitation/calcination steps

The recovery of tantalum and niobium from Crevier Ta/Nb ore

July 31, 2003.

Two composites were provided for the program: Comp 1 Nb_2O_5 and Ta_2O_5 contents were 0.13% and 0.02%, respectively. Comp 2 Nb_2O_5 and Ta_2O_5 contents were 0.22% and 0.027%, respectively.

- The circuit consisted of a LIMS, grinding with pre-screening, CaO flotation circuit followed by a desliming stage. The fines were rejected and the coarse fraction was processed through flotation. The 4th cleaner concentrate was submitted to WHMIS.
- Even though the calcite prefloat recovered >85% of the CaO, the pH was difficult to maintain. Collectors PL777 and PL544 gave reasonably good results and improved selectivity
- Acidified silicate appeared to be a good depressant for nepheline and other Na+K-bearing minerals.
- The flotation rate of the pyrochlore was low, especially when using amine-based collectors.
- Selectivity improved when using acidified silicate as a depressant.
- The Crevier ore contains acid-soluble gangue minerals, and therefore, flotation below 5 was difficult.
- The primary circuit included grinding at 65, 100 and 150 mesh. About 18% of the Nb_2O_5 was lost in the slimes when grinding at 150 mesh, while the losses decreased to 6-7% when using a coarser primary screen. The Ta_2O_5 losses were slightly less.
- Over 80% of the Ta_2O_5 and Nb_2O_5 were recovered in the rougher concentrate using collector PL519B (mixture of succinamate and phosphoric acid ester modified with alkyl phosphate). The fineness of grind tested (K_{80} from 63 to 99 microns) had no effect on the metal recovery.
- The WHIMS results are negotiable, as about 6% of the Nb_2O_5 and Ta_2O_5 was rejected for only 0.11% of the global weight. This would require improvement.
- The final concentrate Nb_2O_5 content was 22.4% with global recoveries of 68% and 0.66% of the weight. Without the WHMIS, the global Nb_2O_5 recovery was 74% grading 21.2% Nb_2O_5.

15.4.3 COREM

Concentration du minerai Crevier

May 27, 2002.

A concentrate weighing 4.59 kg at 50.3% Nb_2O_5 was produced from a 14t bulk sample at 0.19% Nb_2O_5 (see item 9.1). The process used, was the one developed by CRM in 1985 and 1986.

- The process consisted of:
    - Pyrochlore flotation producing a 5% pyrochlore concentrate
    - A 3-stage magnetic separation step was performed at 1150 Gauss to remove the iron and titanium
    - The non-mag fraction was then conditioned with sulphuric acid at 50°C before being submitted to a second flotation step.
    - The flotation concentrate was then leached with sulphuric acid at 100°C in order to break the collector (Flotinor SM-15)

  - The pyrite was then removed by reverse flotation, the pyrochlore concentrate Nb_2O_5 content was 50% for a global Nb_2O_5 recovery of 25.4%

- About 26% of the Nb_2O_5 was lost in the slimes (cyclones #2 and #3)
- About 14% of the pyrochlore was lost in solution during leaching

Production de 50 kg de concentré de tantale à partir du minerai de Crevier à l'échelle du laboratoire.

March 4, 2004.

The proposed threat of a low-grade nepheline ore (0.12% de Nb_2O_5 and 0.02% Ta_2O_5) included a grinding circuit minimizing the fines and closed with a 100 mesh screen. LIMS and WHIMS rejected the ilmenite, iron oxide and mag particles. The flotation involved selective flotation of pyrite, then carbonate and apatite, and finally pyrochlore. Final upgrading was performed as described in item 3.1. 25 flotation tests were performed.

- Sequential flotation of the gangue minerals prior to floating the pyrochlore showed promising results. Sulfur flotation recovered about 70% of the sulphur, while rejecting only 5% of the pyrochlore.
- Magnetic separations at 1000 and 4000 Gauss were beneficial rejecting iron and ilmenite, where both float with pyrochlore when using Flotinor SM-15.
- The production of fines was minimized by stage-crushing and grinding the ore, thus a desliming step was not required and no pyrochlore units were lost in the slimes. Pyrite flotation doesn't require a desliming step and almost no Nb_2O_5 is lost at that stage.
- The report mentioned that gravity separation still showed great potential for pre-concentration, but the highest Nb_2O_5 recovery achieved with the Knelson, spiral or Wilfley table units was less than 64%. Although fine metal particles seem to be recoverable by gravity separation (spiral), but no proof is available.
- Oil rice selectively floats the pyrite, while reducing the Nb_2O_5 losses (~8%)
- During carbonate flotation, another 7% of the sulfur was rejected.
- LIMS generally rejects most of the iron oxides regardless of where this stage is applied in the circuit.
- Acidification of the pyrochlore concentrate deactivated ilmenite and improved pyrochlore concentration.
- WHMIS rejects ilmenite, which consumes collector (Flotinor SM-15), and should be performed prior the pyrochlore flotation rougher stage.

15.4.4 SOQUEM

Examen minéralogique des échantillons S2329 et W2329

September 4, 1981.

Two sub-samples were received from Lakefield Research and consisted of a Wilfley concentrate (W2329) performed on the pilot plant slime circuit, while sample S2329 represented the final sand concentrate.

- Both concentrates had low pyrochlore content, but high gangue (~50%) content.
- Pyrochlore grains have high Nb_2O_5 (47-68%) and Ta_2O_5 (3-13%) content variations.
- Thorium and uranium were present in both concentrates.
- About 40% of the pyrochlore grains have ilmenite exsolution or sometime apatite inclusions.

➢ Better representation of the deposit by a more detailed mineralogical study to evaluate the homogeneity of the pyrochlore.

➢ Leaching of the concentrate to remove the gangue minerals and evaluate the ilmenite exsolution content more accurately.

Rapport de vérifications d'analyses

November 1981.

This report concluded the work initiated in 1978, which compared the assay results from different techniques.

- Neutronic activation was the most accurate technique to assay Ta_2O_5.
- CRM underestimated the grades
- No notable difference when using pressed or borax melted fusible beads.

Travaux de 1977 a 1982 compilation des étalonnages et vérifications des analyses Ta_2O_5 et Nb_2O_5

November 1982.

Final report of the assay analyses on standards and test product assays:

- Nb_2O_5 and Ta_2O_5 head assays were more reproducible when starting from a -20 mesh 100g sub-sample that was pulverized prior to assay.
- High variations due to low grades.

Etude minéralogique

December 1982. Interim Report

Two sub-samples were received from Lakefield Research and consisted of a Wilfley concentrate (W2329) performed on the pilot plant slime circuit, while sample S2329 represented the final sand concentrate.

- Both concentrates had low pyrochlore content, but high gangue (~50%) content.

Etude minéralogique

October, 1983. Final Report

A progress report was issued in December of 1982. The main objectives were: pyrochlore liberation and particle size determination; identify and quantify the pyrochlore inclusions; determine gangue surrounding the prychlore grains; study pyrochlore composition with microprobes. Several drill core samples coming from different zones of the deposit were used in this program.

- Pyrochlore distribution within the deposit was erratic (Poisson distribution), which is typical of heavy and rare minerals. No correlation between grade and localization.
- Average pyrochlore grain size was 55 microns. The average grain size by zone was 45, 97, 90 and 33 microns for zones 1, 2, 3 and 4, respectively.
- More than 95% of the pyrochlore was represented by less than 20% of the pyrochlore grains, these grains were coarser than 150 microns.
- Ilmenite and ilmenorutile were the 2 main inclusions of the pyrochlore. The Nb_2O_5 content in the ilmenite exsolution was ~2%, while it was ~11% for the ilmenorutile exsolution. These analyses were done by micro-probe.
- Pyrochlore was mainly associated with feldspar and nepheline.
- Pyrochlore was the main carrier of niobium

15.4.5 IREM-MERI

Etude de la minéralisation

June 25, 1979.

- The nepheline syenite of the Crevier deposit can measure up to 0.45% Nb_2O_5 and 0.047% Ta_2O_5.
- The pyrochlore composition was 60.8% Nb_2O_5, 6.5% Ta_2O_5, and 0.1% U_3O_8.

15.4.6 Laval University

Recherche pour le développement d'une méthode de flottation du pyrochlore de Crevier

March 17, 1982. Preliminary Report No.1.
This report reported the milestones of the program. No results.

Résultats des essais de flottation sur le minerai avec les esters phosphoriques

April 1983. Final Report
Fifteen flotation programs were performed on 1-kg charges obtained from a 150-kg sample received at Laval University in September 1982. Nb_2O_5 head grade was 0.24%.

- A zero charge point of 4 was measured by a Zeta-Meter on one gram of pure pyrochlore.
- Sulfonates, phosphoric acid and hydroxamates gave deceiving results producing a concentrate grading 0.59% Nb_2O_5 at the most.
- Sample preparation: 1-kg charges crushed to 1 mm and then wet ground at 80% passing 150 microns, followed by desliming and by decantation using a sodium carbonate dispersant.

pH control is critical. A pH of 5.7 was optimum when floating pyrochlore with fluosilicic acid and F1415 reagent, which was the best combination and produced the lower reject at 0.04 % Nb_2O_5

- The phosphoric ester was the most efficient of the reagents tested (especially reagent F1415)
- pH control is critical because pH varies over time with the dissolution of the nepheline
- Test details not completed: no weights, and the recoveries were doubtful

➢ Run test with pH control using oxalic acid only, or mixed with fluosilicic acid.

➢ Should consider using a silicate depressant

Recherche pour le développement d'une méthode de flottation du pyroclore de Crevier. Essais de micro-flottation sur néphéline et concentré de Pyroclore

September 1983. Interim Report 83-18
Additional research and flotation work performed over the summer of 1983 geared toward the separation of pyrochlore-nepheline using the pH, collector strength, etc.

- Main gangue components of a float concentrate (52.4% pyrochlore): nepheline (16.4%), feldspar (15%), biotite (8.9%), pyrite (6.3%), others (<1%).
- Flotation under atmosphere zero. Bubbles created from the liquid itself.
- Very academic

15.4.7 Ecole Polytechnique

Recherche expérimentale sur la flottation du pyrochlore du gisement Crevier

April 23, 1982. First Report

A 150-kg sample was received from CRM . The flotation feed charges mainly consisted of material in the -65/+150 mesh size fraction. The head assay of this size fraction measured 0.20% Nb_2O_5. The fines were floated separately.

- Sodium oleate (0.9 kg/t) at pH 5.5, selectively floats the pyrochlore making a 0.6% Nb_2O_5 concentrate, at a recovery of 75%.
- Alkaline pH would also work, but lead nitrate is required and optimum at pH 9.5.
- 7 cleaner stages upgraded the concentrate at 5.67% Nb_2O_5, but the recovery was not mentioned.
- Petroleum sulphonate at acid pH showed low selectivity.

Recherche expérimentale sur la flottation du pyrochlore du gisement Crevier

December 22, 1982. Final Report

Final report of program initiated in previous CRM tests

- Head grade was 0.20% Nb_2O_5
- Primary float gave 89% recovery and graded 0.54% Nb_2O_5
- Conditioning time longer than 10 to 20 min lowered Nb_2O_5 recovery
- Barium nitrate inhibited gangue on primary float and was linked with conditioning time
- Gangue inhibitors NaF-HF were the most selective
- Sodium silicate also inhibited the gangue
- Cleaning rejects are no good for recycling
- Mineralogical study showed that grains at 100% <100 microns were liberated and they contained 5% of inclusions too small to be liberated

15.4.8 Scintrex Limited

Low temperature fluxes in metallurgy

April 1984.

This project considered the feasibility of using an acid flux containing sodium chloride (halide component) and potassium persulphate (strong oxidizing agent) for the decomposition of pyrochlore, chalcopyrite and ilmenite concentrates. Dissolution of the cooled melt in a weak oxalic acid would be required.

- Potassium persulphate is very expensive and the process was not economical in 1984.

Over 20% of the sodium chloride in the flux significantly reduced the solubility of the copper, titanium and pyrochlore, but decreased the melting point of the flux.

15.4.9 Nievex Geoconseil Inc.

Prélèvement d'un échantillon en vrac de 15 tonnes

Fall 2001.

Sampling performed on the reachable portions of Zone 1. No explosives were required as the blocks left by SOQUEM in 1982 were broken and sampled. Fifteen 1-t super-sacks were delivered to COREM.

15.4.10 Other Reports

La flottation du rutile

August 27, 1973

Rutile-ilmenite gathered from St-Urbain's ilmenite deposit. Samples provided by SOQUEM, no details on sample representativity. Head assay indicated 40.7 TiO2, and 21.5% soluble Fe.

Ilmenite recovery by high intensity magnetic separation, the non-magnetic fraction carried the rutile. The rutile was concentrated by flotation using hydrofluoric acid after desliming (-14 microns). The collectors used were a sulphonate type, at pH of 3.5. The cleaner concentrate measured 92.8% TiO2 and the recovery was >98%.

Etude Pétrographique

January, 1976

Mineralization study and head assay determinations (U, Nb_2O_5, Zr, Ta, P_2O_5) on trench samples from the Crevier deposit.

15.5 Crevier Minerals testing at COREM in 2008

Preliminary metallurgical testing using gravimetric method was initiated in 2008 using material from the bulk sample sector. The source of this section is COREM report of Phase 1 testing of December 3rd 2008.

Gravity separation tests were performed at COREM pilot plant facility on a sample received from (Les Minéraux Crevier Inc.) crevier Minerals Inc. using new technology and approach. The aim of the test work was to evaluate the pre-concentration of niobium and tantalum minerals present in the Crevier sample, with grades of 0.2% Nb_2O_5 and 0,02% Ta_2O_5. Thirteen gravity tests were performed to generate a grade-recovery curve representing different operating and design conditions.

Test #04, with a mass pull of 10%, has been identified as optimal, where a niobium recovery of 79% with a concentrate grade of 1.43% Nb_2O_5 and a tantalum recovery of 79% with a concentrate grade of 0.22% Ta_2O_5 were achieved. Further work involving cleaner gravity test followed by magnetic separation of the cleaner concentrate and magnetic separation tailings have been recommended for the Phase 2 of this project.

16- Mineral Resource and Mineral Reserve Estimates

There are no mineral reserves 43-101 compliant at this stage on this project.

16.1 Resources

16.1.1 Data used

The final drill hole database used for the resource estimation of the Crevier project is in *file Crevier.mdb* dated November 5th, 2008. That database has information for 105 drill holes from the entire Crevier project.

The trench and surface samples are not integrated into the database at the moment. The plotting of this data on maps is in 2D i.e. no elevation.

A database in Gemcom format has been transferred to SGS Geostat from the client which has received it from IAMGOLD (Cambior). An exhaustive review of the database took place in August leading to some corrections from original logs. The following section describes the modifications.

16.1.1.1 Verification, validation and correction of computerized database provided (GEMS)

Visual Differences

Drill holes azimuth orientations in Gems differ from Cambior compilation map. Difference is about 10 degrees.

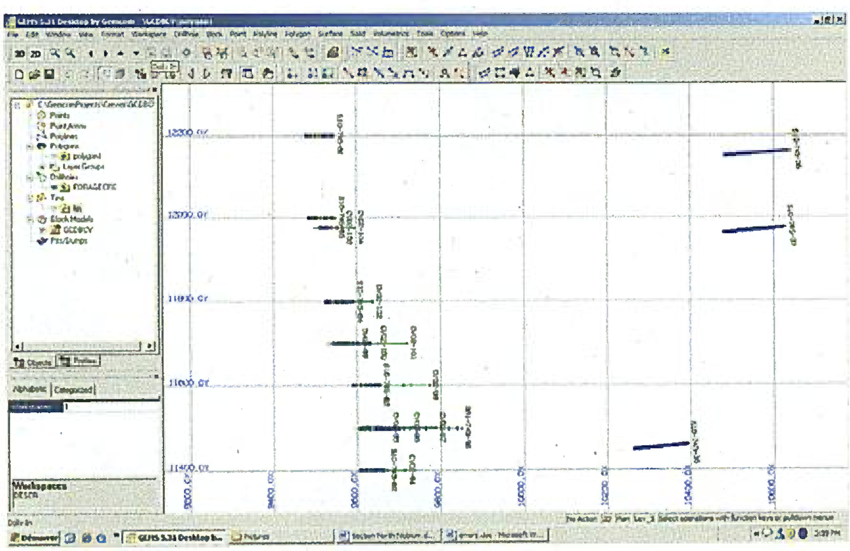


Figure 33: Plan view

Drill holes from second exploration campaign S10-745 have a duplicate record in Survey table 13A and 13 B
13A is empty
13B contains survey information

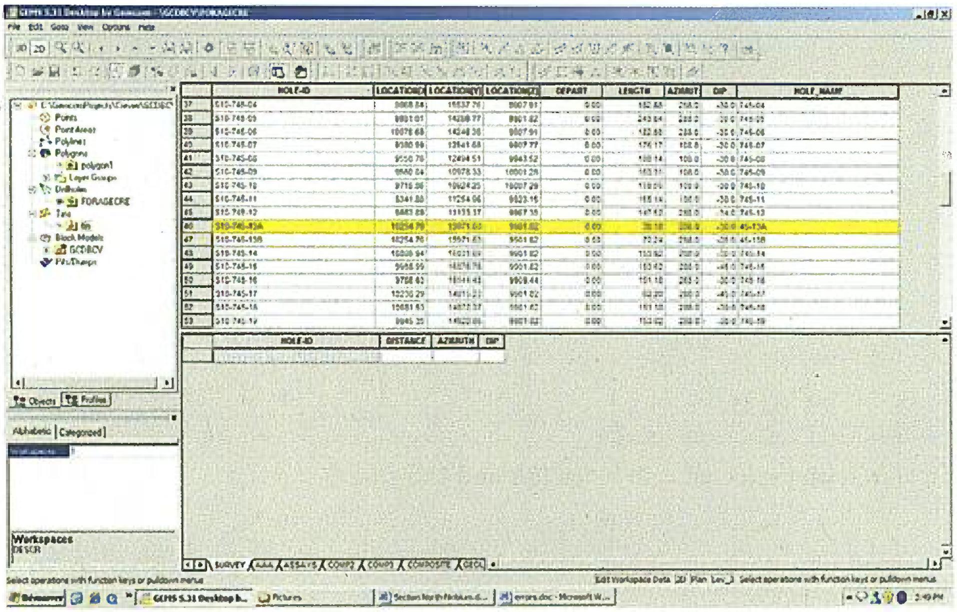


Figure 34: Data base survey table, drill hole S10-745-13A

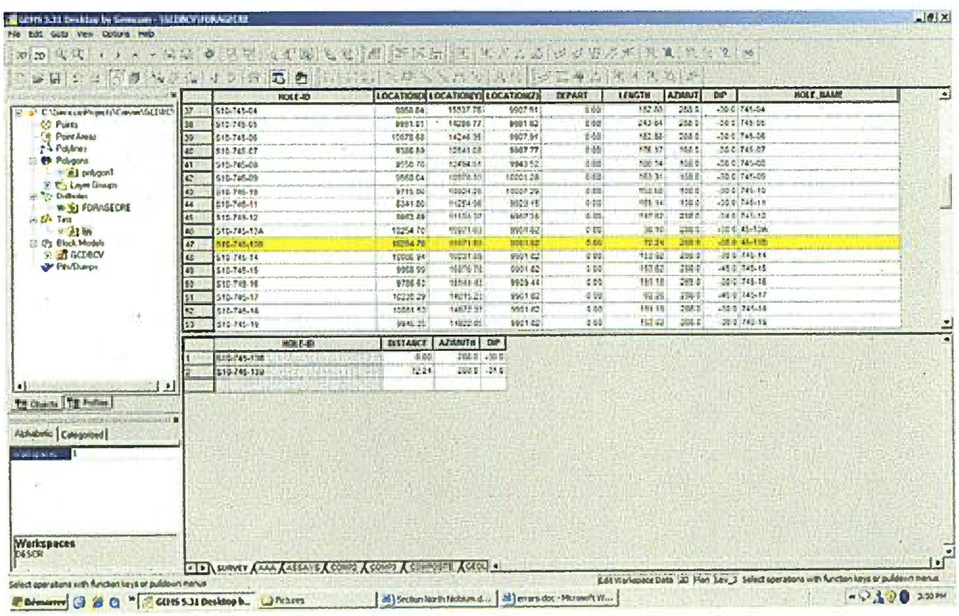


Figure 35: Data base survey table, drill hole S10-745-13B

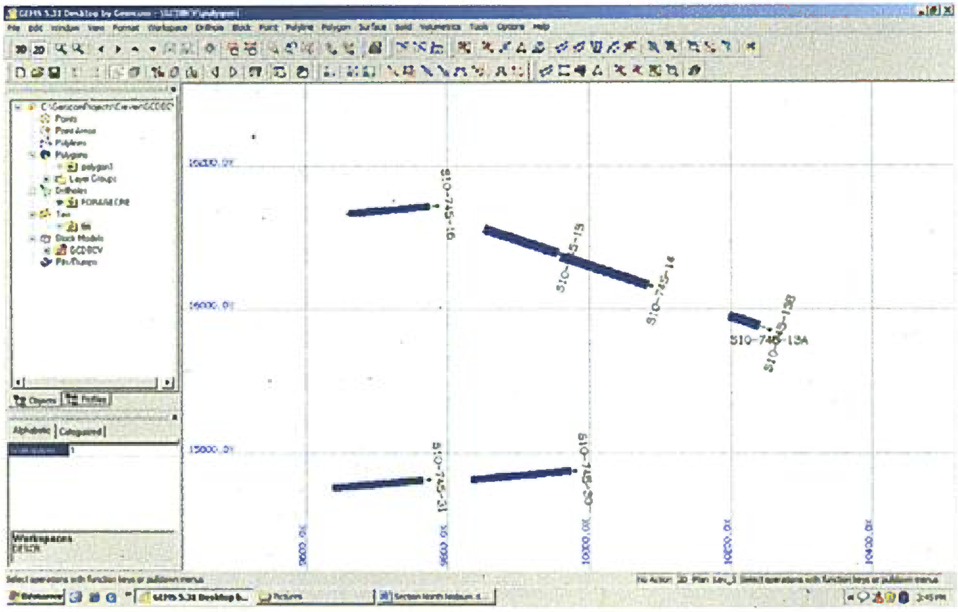


Figure 36: Plan view with projected drill holes 13A and 13B

Drill holes from second exploration campaign S10-745 do not appear in Cambior compilation map: 11, 12 and 55

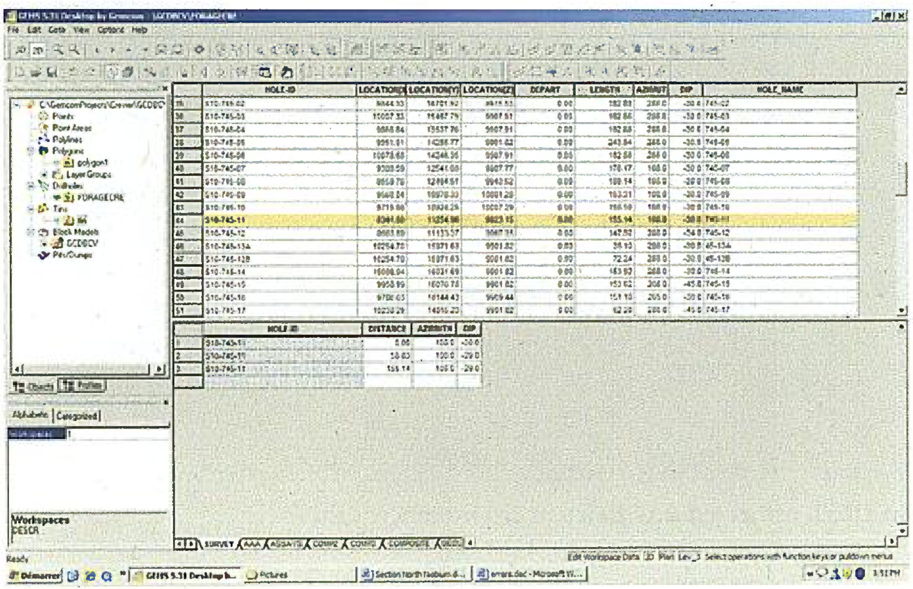


Figure 37 : Data base survey table, drill hole S10-745-11

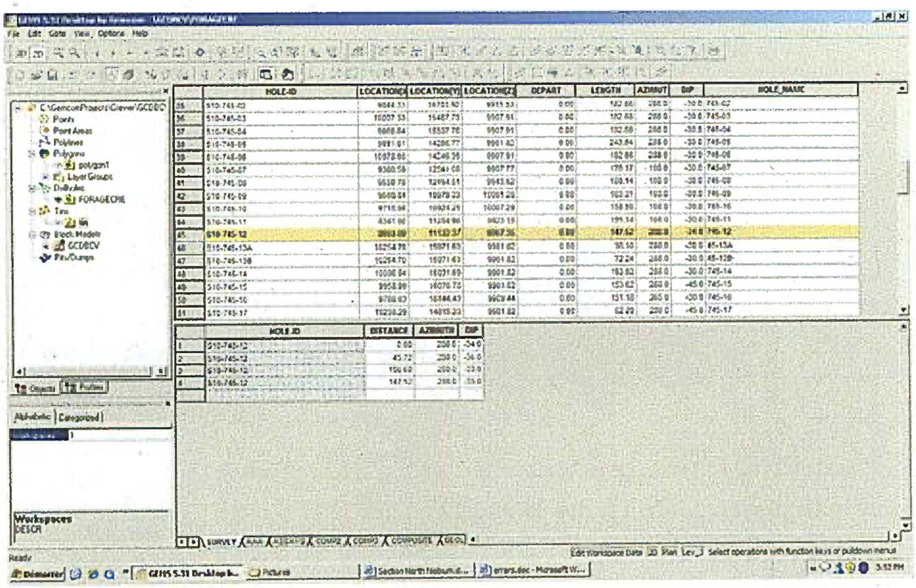


Figure 38 : Data base survey table, drill hole S10-745-12

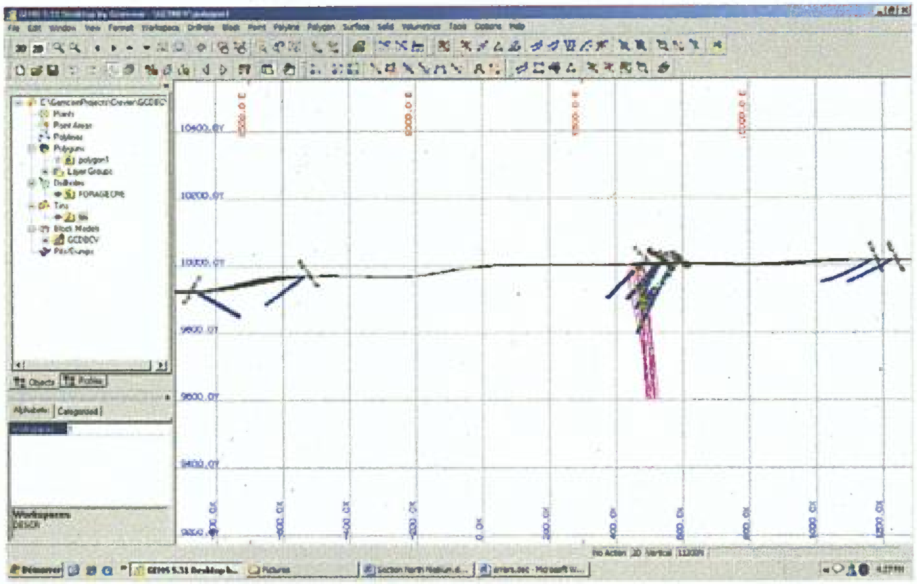


Figure 39 : Section 11250, projected drill holes in 200 meters width.

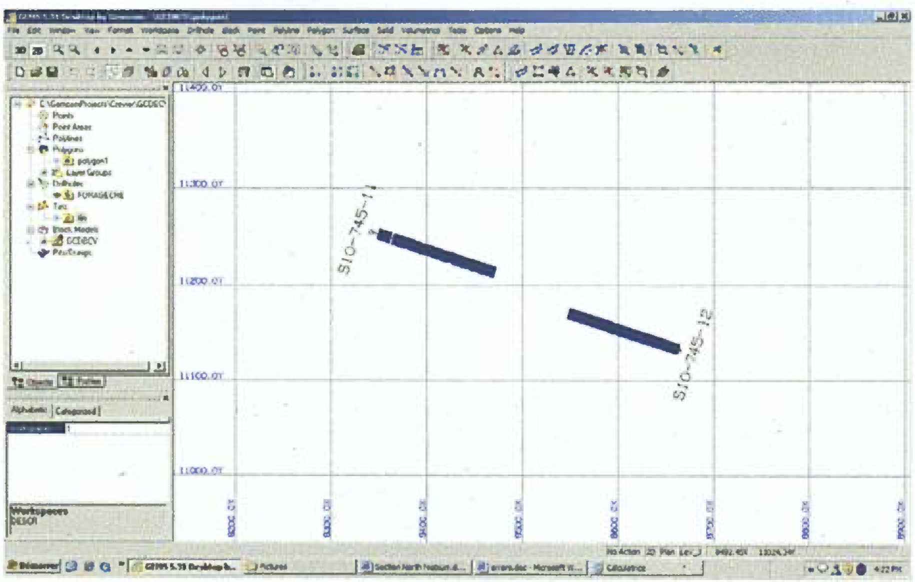


Figure 40 : Plan view with projected drill holes 11 and 12

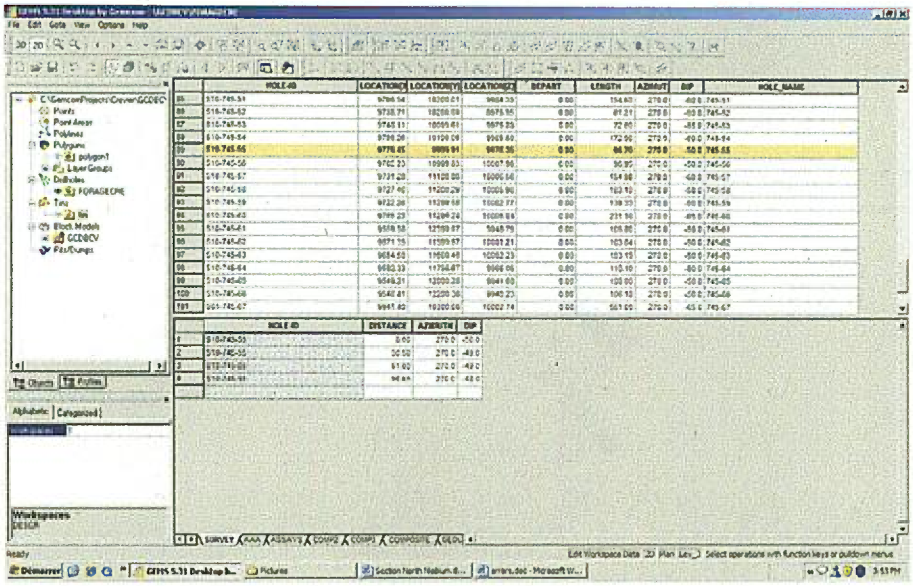


Figure 41: Data base survey table, drill hole S10-745-55

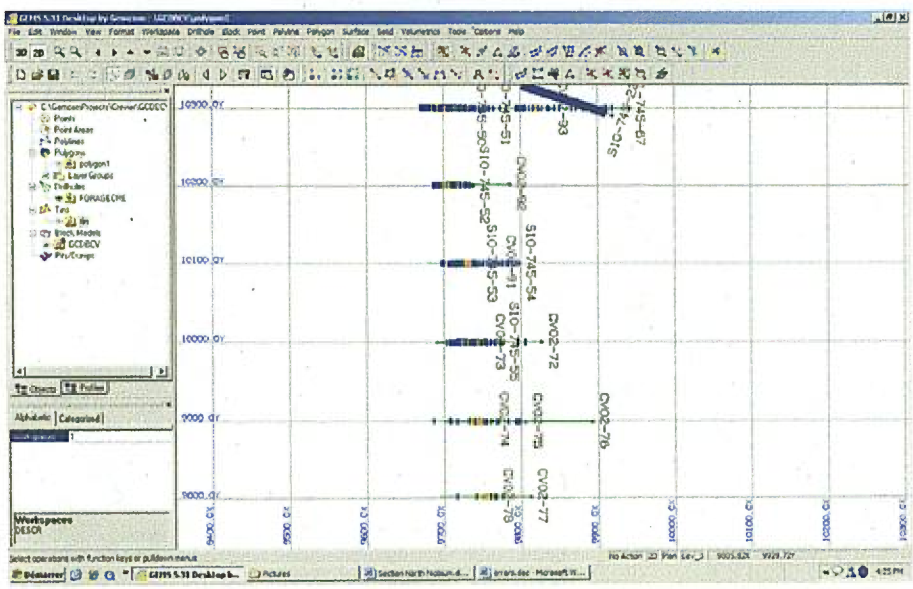


Figure 42: Plan view with projected drill hole 55

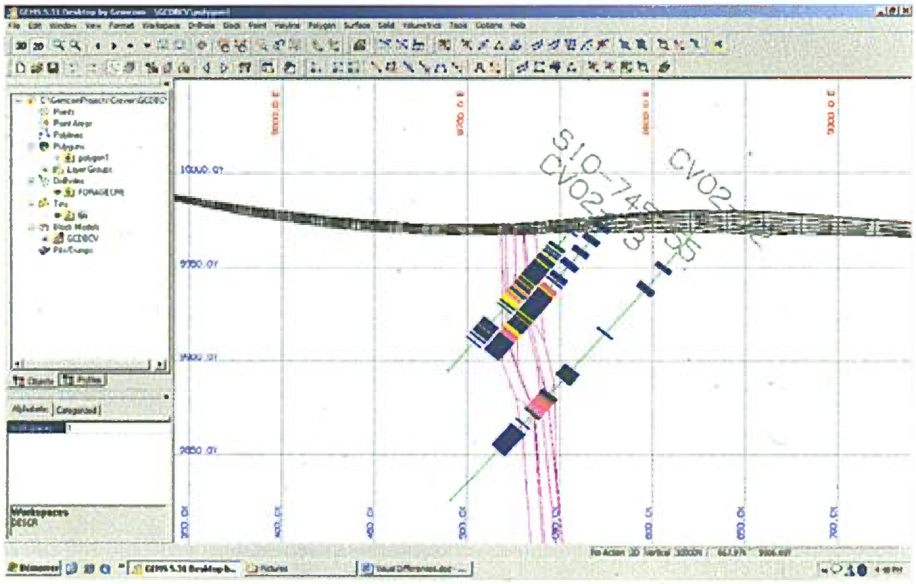


Figure 43: Section 10000, projected drill holes in 100 meters width.

Drill hole from second exploration campaign hole #S10-745-17 do not have the same length as in Cambior compilation map: 745-17

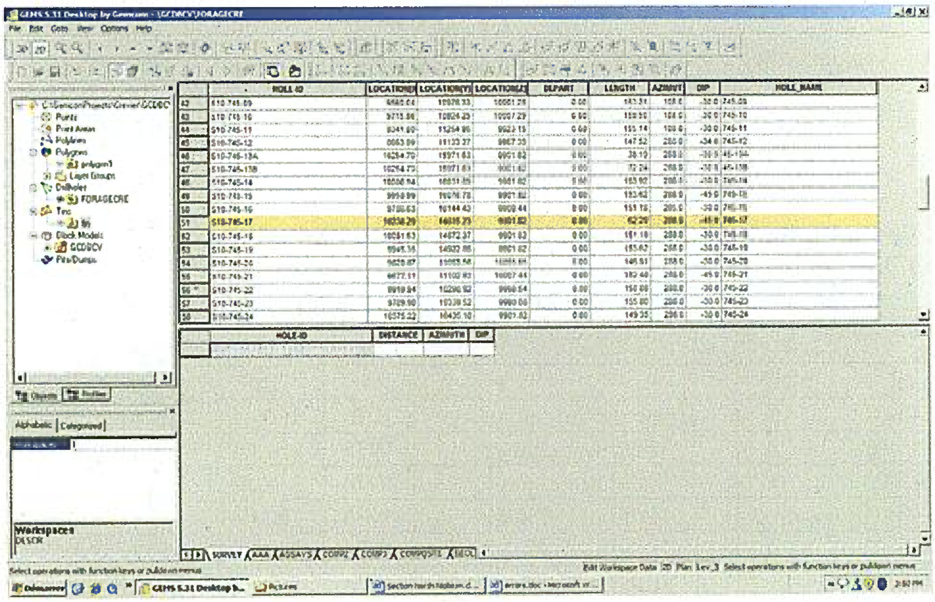


Figure 44: Data base survey table, drill hole S10-745-17

Validation and characterisation of original received data

This section contains the validation of the database for the Crevier's project. The following table contains the main changes done to the drill hole information contained in the Gems database of the Crevier project. The main change has been done to the drill hole S81-745-67, given that the addition of dip information change the position of the ore zone, and may change the geological model of the intruding dyke.

Table 9: Drill hole name, state of modification, year drilled, total length of drill hole and total length of drilling on that year.

Revised drill holes	Modification	Year	Length	Total length
[units]			[m]	[m]
S10-745-01	Erase dip information	1976	180.44	
S10-745-02	It did not change	1976	182.88	
S10-745-03	It did not change	1976	182.88	
S10-745-04	It did not change	1976	182.88	
S10-745-05	It did not change	1976	243.84	
S10-745-06	It did not change	1976	182.88	1155.80
S10-745-07	It did not change	1977	176.17	
S10-745-08	It did not change	1977	180.14	
S10-745-09	It did not change	1977	163.31	
S10-745-10	It did not change	1977	158.50	
S10-745-11	It did not change	1977	155.14	
S10-745-12	It did not change	1977	147.52	980.85
S10-745-13A	Add dip information	1978	38.10	
S10-745-13B	It did not change	1978	72.24	
S10-745-14	It did not change	1978	153.92	
S10-745-15	It did not change	1978	153.62	
S10-745-16	It did not change	1978	151.18	
S10-745-17	Add dip information	1978	62.18	
S10-745-18	It did not change	1978	151.18	
S10-745-19	It did not change	1978	153.62	
S10-745-20	It did not change	1978	146.91	
S10-745-21	It did not change	1978	152.40	
S10-745-22	It did not change	1978	150.88	
S10-745-23	It did not change	1978	155.75	
S10-745-24	It did not change	1978	149.35	
S10-745-25	It did not change	1978	143.16	
S10-745-26	It did not change	1978	196.60	
S10-745-27	It did not change	1978	145.54	
S10-745-28	It did not change	1978	117.35	
S10-745-29	It did not change	1978	165.20	
S10-745-30	It did not change	1978	168.86	

S10-745-31	It did not change	1978	156.67	
S10-745-32	It did not change	1978	144.02	2928.82
S10-745-33	It did not change	1979	147.22	
S10-745-34	It did not change	1979	182.88	
S10-745-35	It did not change	1979	147.83	
S10-745-36	It did not change	1979	149.96	
S10-745-37	It did not change	1979	167.64	
S10-745-38	It did not change	1979	179.83	
S10-745-39	It did not change	1979	179.83	1155.19
S10-745-40	It did not change	1980	96.60	
S10-745-41	It did not change	1980	145.43	
S10-745-42	It did not change	1980	264.63	
S10-745-43	Erase dip information	1980	100.00	
S10-745-44	It did not change	1980	93.60	
S10-745-45	It did not change	1980	75.61	
S10-745-46	It did not change	1980	148.78	
S10-745-47	It did not change	1980	90.55	
S10-745-48	It did not change	1980	139.32	
S10-745-49	It did not change	1980	240.24	
S10-745-50	It did not change	1980	99.70	
S10-745-51	It did not change	1980	154.57	
S10-745-52	It did not change	1980	81.21	
S10-745-53	It did not change	1980	72.56	
S10-745-54	It did not change	1980	172.87	
S10-745-55	It did not change	1980	96.65	
S10-745-56	It did not change	1980	96.95	
S10-745-57	It did not change	1980	154.88	
S10-745-58	It did not change	1980	103.05	
S10-745-59	It did not change	1980	139.33	
S10-745-60	It did not change	1980	231.10	
S10-745-61	It did not change	1980	105.79	
S10-745-62	It did not change	1980	103.04	
S10-745-63	It did not change	1980	103.05	
S10-745-64	It did not change	1980	110.06	
S10-745-65	It did not change	1980	100.00	
S10-745-66	It did not change	1980	106.10	3425.67
S81-745-67	Add dip information	1981	561.00	
S81-745-68	Add dip information	1981	518.00	
S81-745-69	It did not change	1981	102.56	
S81-745-70	It did not change	1981	98.78	
S81-745-71	It did not change	1981	143.90	1424.24
CV02-72	It did not change	2002	202.90	
CV02-73	It did not change	2002	103.80	
CV02-74	It did not change	2002	128.00	
CV02-75	It did not change	2002	167.00	
CV02-76	It did not change	2002	295.40	

CV02-77	It did not change	2002	152.10	
CV02-78	It did not change	2002	113.00	
CV02-79	It did not change	2002	231.30	
CV02-80	It did not change	2002	137.80	
CV02-81	It did not change	2002	194.80	
CV02-82	It did not change	2002	302.80	
CV02-83	It did not change	2002	194.90	
CV02-84	It did not change	2002	194.90	
CV02-85	It did not change	2002	108.80	
CV02-86	It did not change	2002	278.00	
CV02-87	It did not change	2002	167.00	
CV02-88	It did not change	2002	102.80	
CV02-89	Length change	2002	200.80	
CV02-90	It did not change	2002	84.00	
CV02-91	It did not change	2002	182.00	
CV02-92	It did not change	2002	140.00	
CV02-93	It did not change	2002	275.00	
CV02-94	It did not change	2002	154.80	
CV02-95	It did not change	2002	135.50	
CV02-96	It did not change	2002	200.00	
CV02-97	It did not change	2002	311.40	
CV02-98	It did not change	2002	284.00	
CV02-99	It did not change	2002	112.40	
CV02-100	It did not change	2002	190.00	
CV02-101	It did not change	2002	278.30	
CV02-102	It did not change	2002	175.80	
CV02-103	It did not change	2002	104.10	
CV02-104	It did not change	2002	179.00	6082.40
Total length of drilling campaigns			17153	

Statistics

Assays statistics

Table 10: Summary statistics for assays table.

Assays	Length	Tantalum	Niobium
[units]	[m]	[Ta_2O_5 ppm]	[Nb_2O_5 %]
Number Samples	4789	4742	4785
Minimum	0.1	0	0
Maximum	7.62	2715	1.053
Mean	2.12	103.05	0.083
Std. Dev.	0.90	136.27	0.117
Variance	0.81	18568.6	0.014
Coef. Of Variation	0.42	1.32	1.42

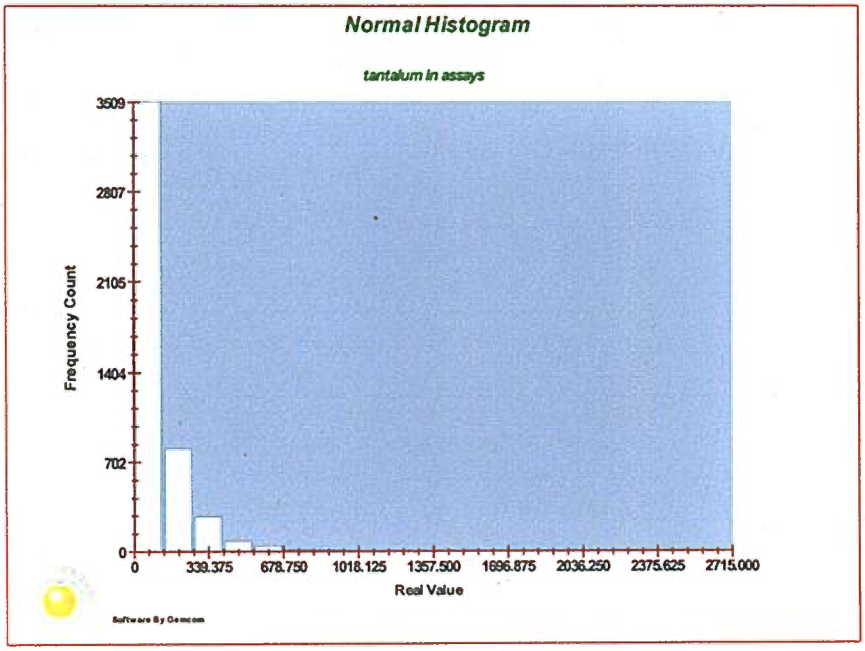


Figure 45: Tantalum grades Ta_2O_5 in ppm.

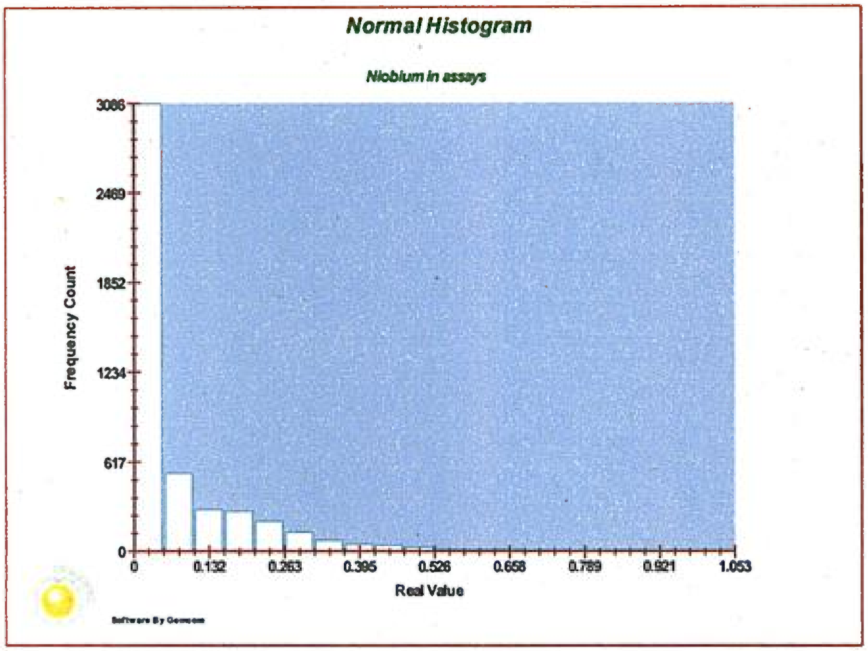


Figure 46: Niobium grades Nb_2O_5 in percent.

Composites

A set of 3m composites was created from available ore limits in GEMS, the statistics summary are presented in the following tables.

Table 11: Summary statistics for 3 meters composites table.

Composites 3[m]	Tantalum	Tantalum Cut Off 400[ppm]	Niobium	Niobium Cut Off 0.5[%]
[units]	[Ta_2O_5 ppm]	[Ta_2O_5 ppm]	[Nb_2O_5 %]	[Nb_2O_5 %]
Number Samples	520	521	520	521
Minimum	11.12	0	0.005	0
Maximum	778.1	400.0	0.808	0.5
Mean	192.2	188.7	0.187	0.185
Std. Dev.	107.4	98.9	0.123	0.118
Variance	11536.8	9779.7	0.015	0.014
Coef. Of Variation	0.56	0.52	0.655	0.636

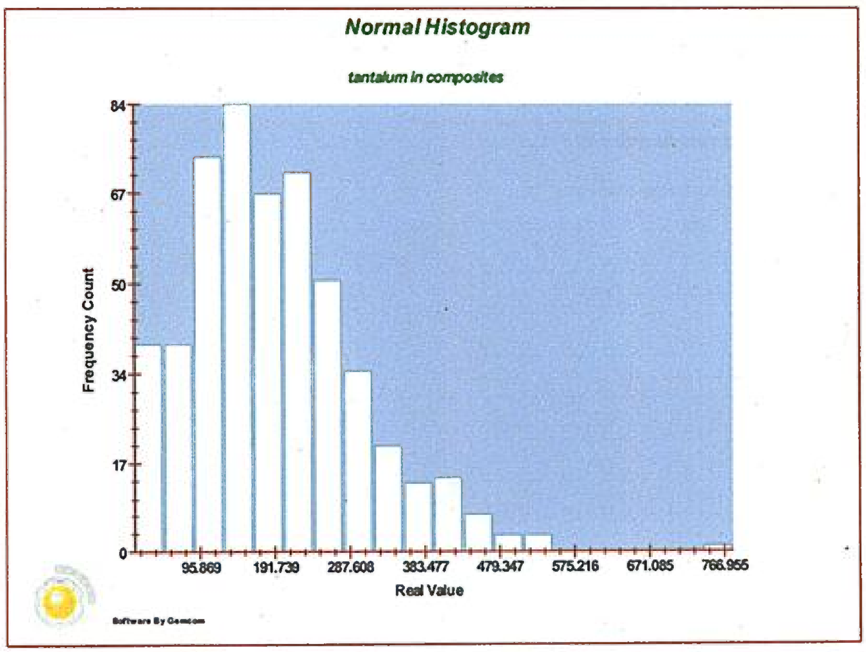


Figure 47: Tantalum Ta_2O_5 composite grades in ppm.

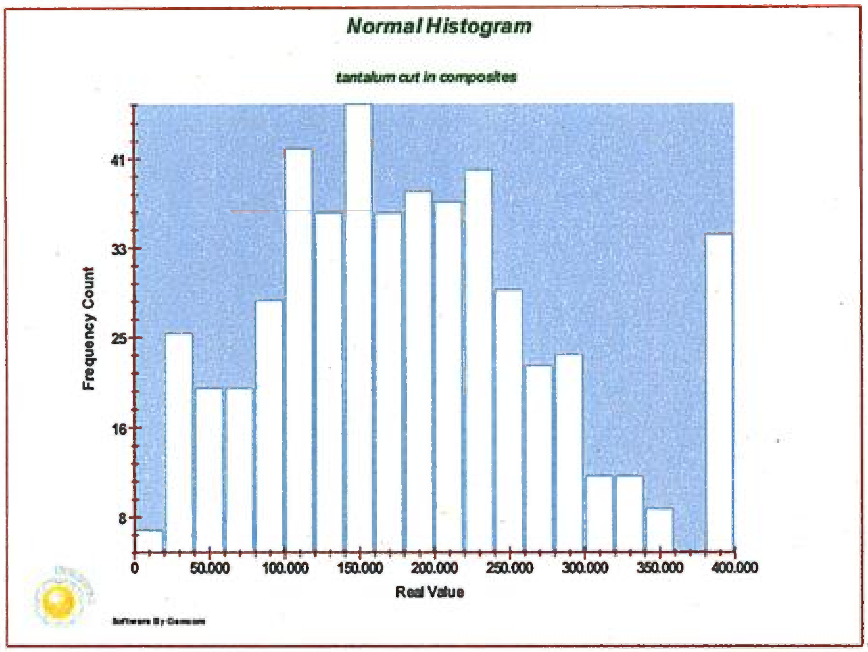


Figure 48: Tantalum after a cut-off of 400 [ppm]

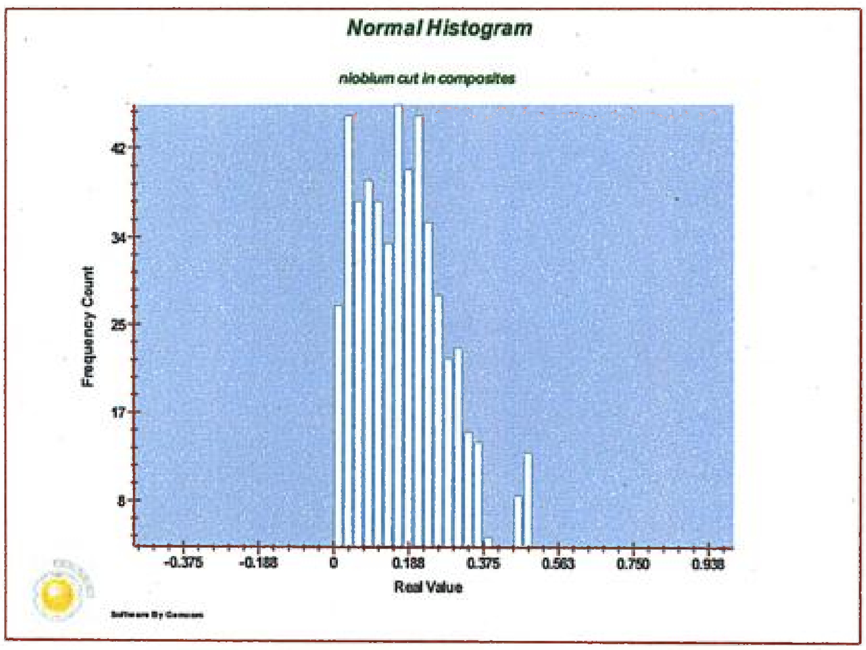


Figure 49: Niobium Nb_2O_5 composite grades in percent.

Thickness of Ore Body

A quick analysis on the ore zone definition provided was done. Statistics are presented below.

Table 12: Extension of mineralized zone along composites.

Mineralization Thickness	
[units]	[m]
Number Samples(intercepts)	54
Minimum	10.4
Maximum	59
Mean	27.43
Std. Dev.	9.48
Variance	89.89
Coef. Of Variation	0.346

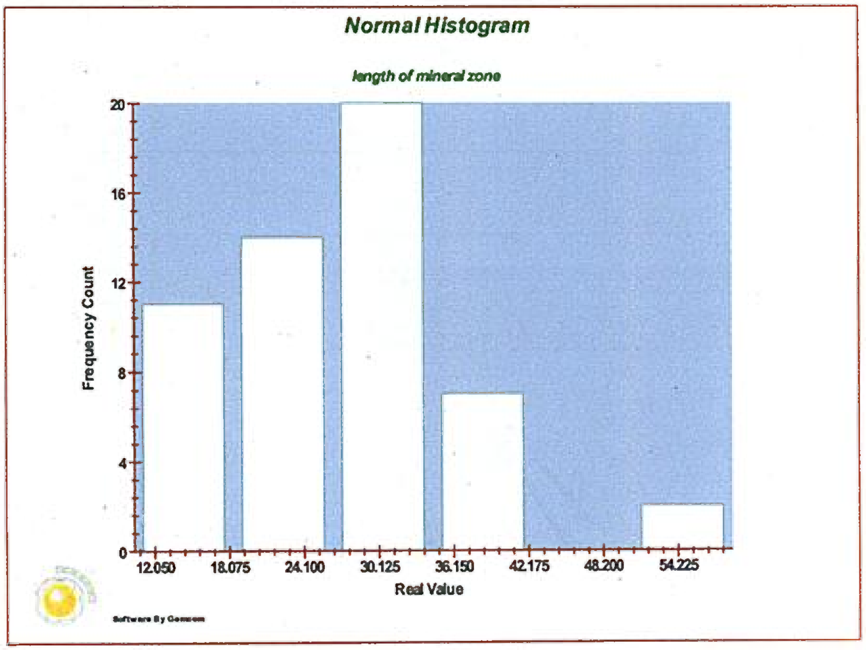


Figure 50: Histogram of original ore zone thickness in meters

Geology

Statistics on geological codes in the database have also been calculated and reviewed.

Table 13: Geological codes.

Rock Type	Rock Code	Number of Samples	Comment
MT (Overburden)	10	104	Near surface
SBc (Biotite-nepheline syenite, carbonate)	100	13	Waste
SN mix	200	310	Waste surrounding mineralization
SN p (Syenite pegmatite)	300	380	Mineralization, Ore zone
SN (Nepheline syenite)	400	127	Waste
Total		934	

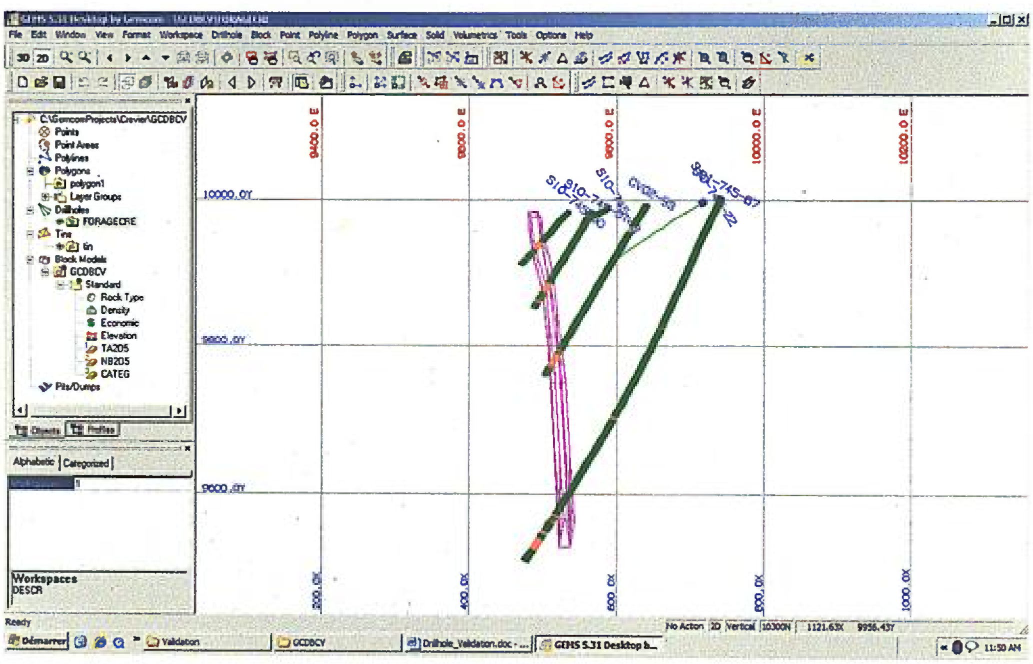


Figure 51: Drill holes with attached rock codes

Geotechnical

Statistics on geological codes in the database have also been calculated and reviewed.

Table 14: Geotechnical information.

Geotechnical	RQD
[units]	[%]
Number Samples	1961
Minimum	67
Maximum	100
Mean	90.40
Std. Dev.	9.28
Variance	86.21
Coef. of Variation	0.103

Database GEMS parameters Color bars

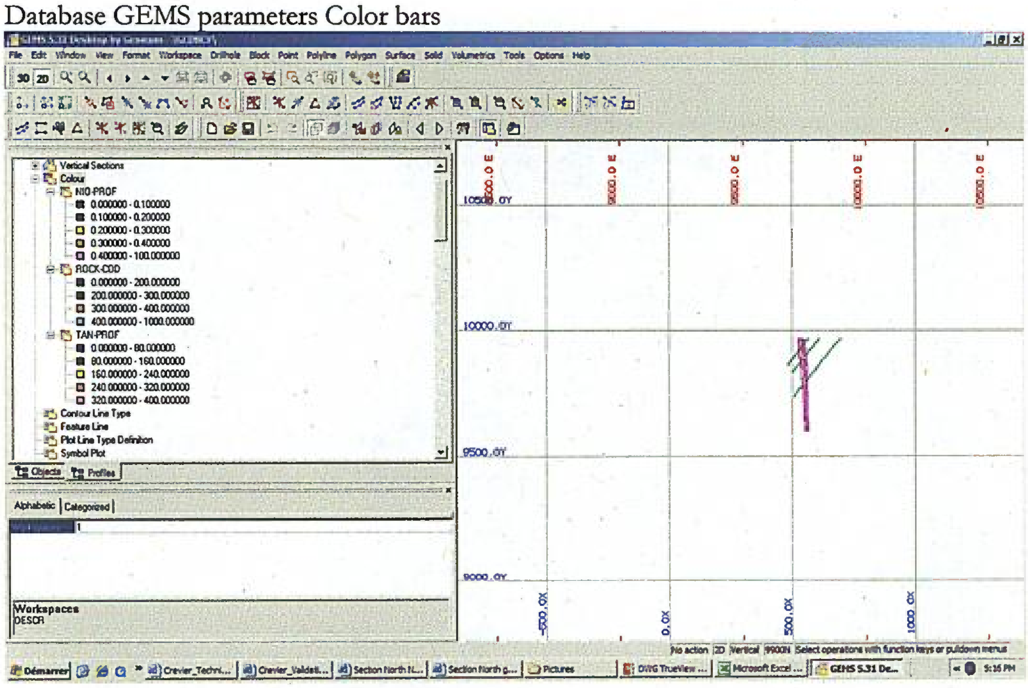


Figure 52: Legend for geological code, niobium and tantalum content.

Absence of geological codes

The zone marked in the plot does not have geological codes. The drill holes contained in this area are shown on the list.

Table 15: drill holes that do not contain geological information

Drill hole name	Drill hole name	Drill hole name	Drill hole name
	S10-745-10	S10-745-20	S10-745-30
S10-745-01	S10-745-11		S10-745-31
S10-745-02	S10-745-12	S10-745-22	S10-745-32
S10-745-03	S10-745-13 A, B		S10-745-33
S10-745-04	S10-745-14	S10-745-24	S10-745-34
S10-745-05	S10-745-15	S10-745-25	S10-745-35
S10-745-06	S10-745-16	S10-745-26	S10-745-36
S10-745-07	S10-745-17	S10-745-27	S10-745-37
S10-745-08	S10-745-18	S10-745-28	S10-745-38
	S10-745-19	S10-745-29	S10-745-39

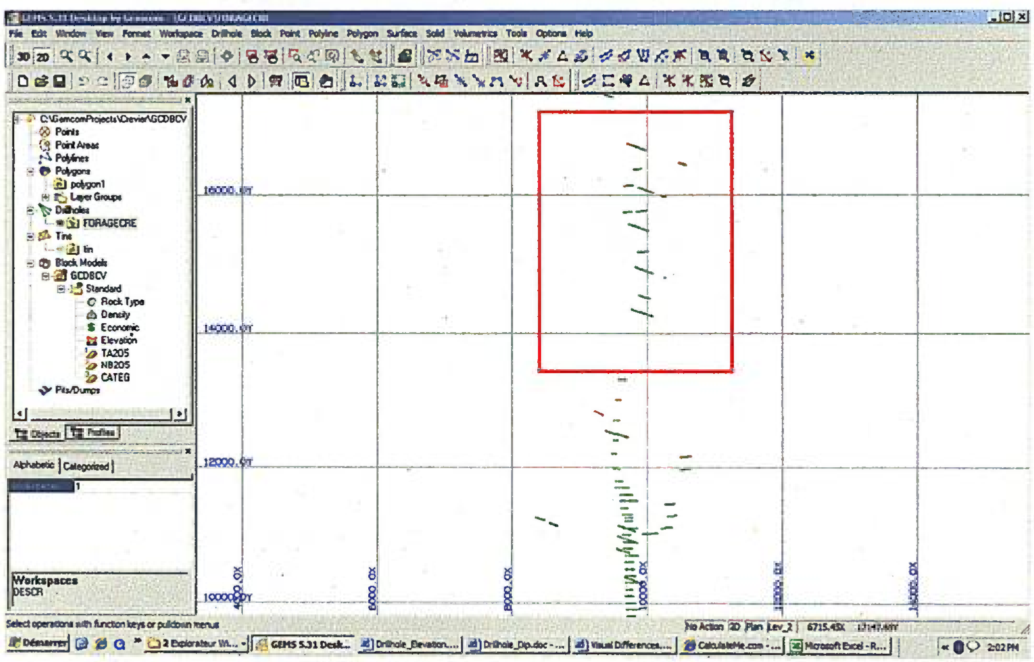


Figure 53: plan view projection of holes without lithology in database.

S81-745-67(10-754-67)

Crevier geological report, (January 1982, volume 2 of 4) has additional information about dipping angles than the Gems project and the elevation differs by 2 meters.

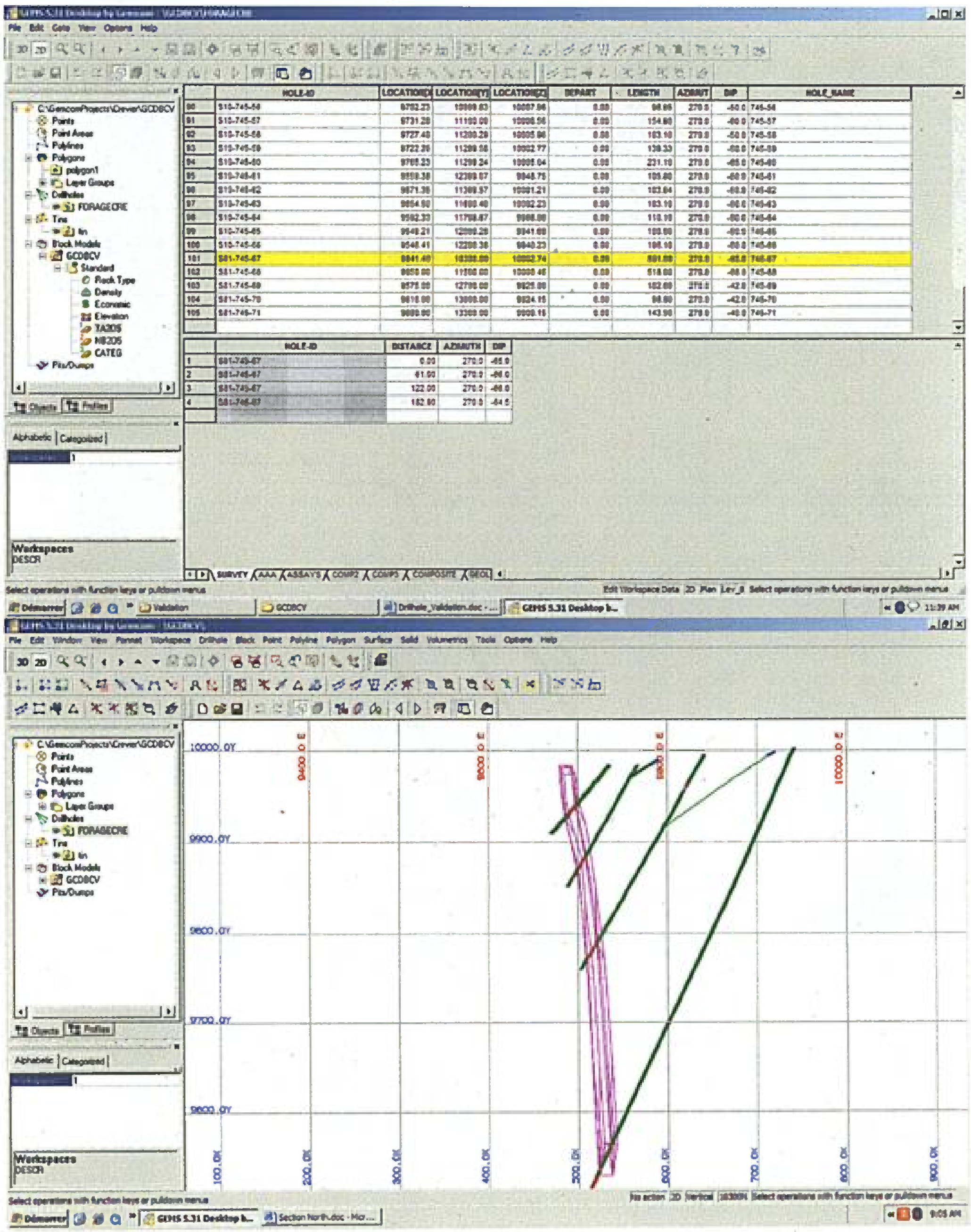


Figure 54: Section 10300N before change

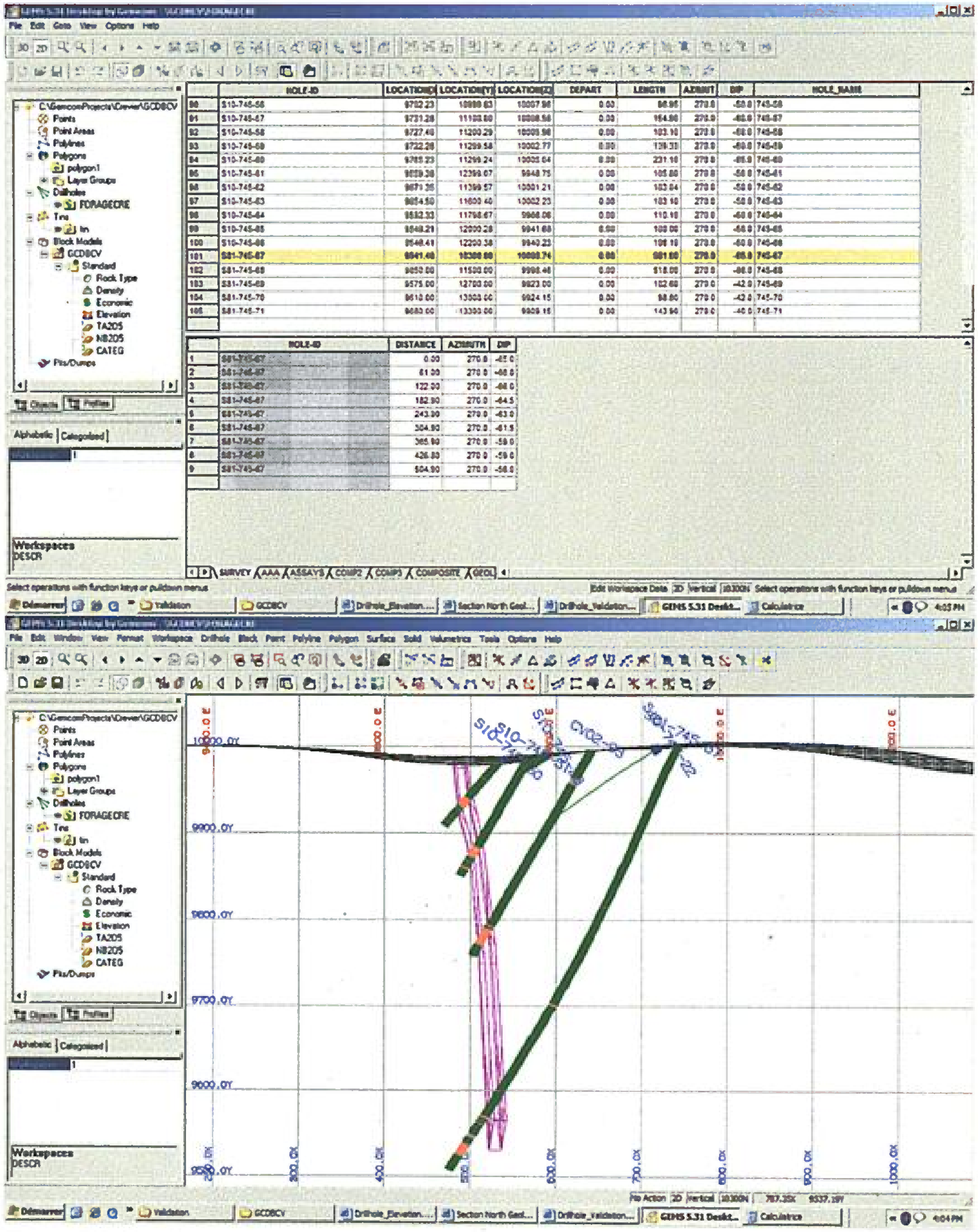


Figure 55: Section 10300N after inclusion of deviation in hole 10-745-67

S81-745-68(10-745-68)

Crevier geological report, (January 1982, volume 2 of 4) has more information about dipping angles, than the Gems project.

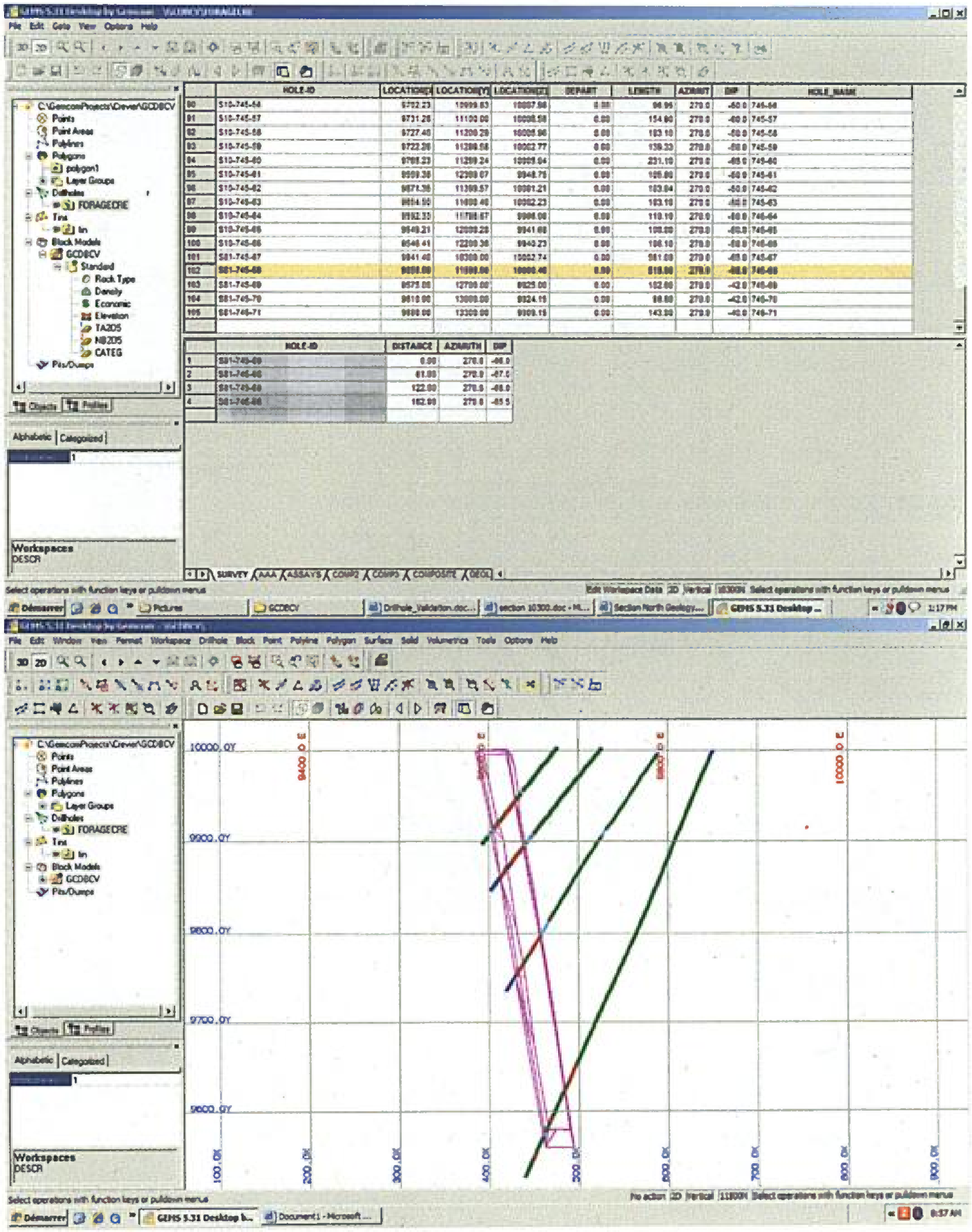


Figure 56: section 11500N hole 10-745-68 before change

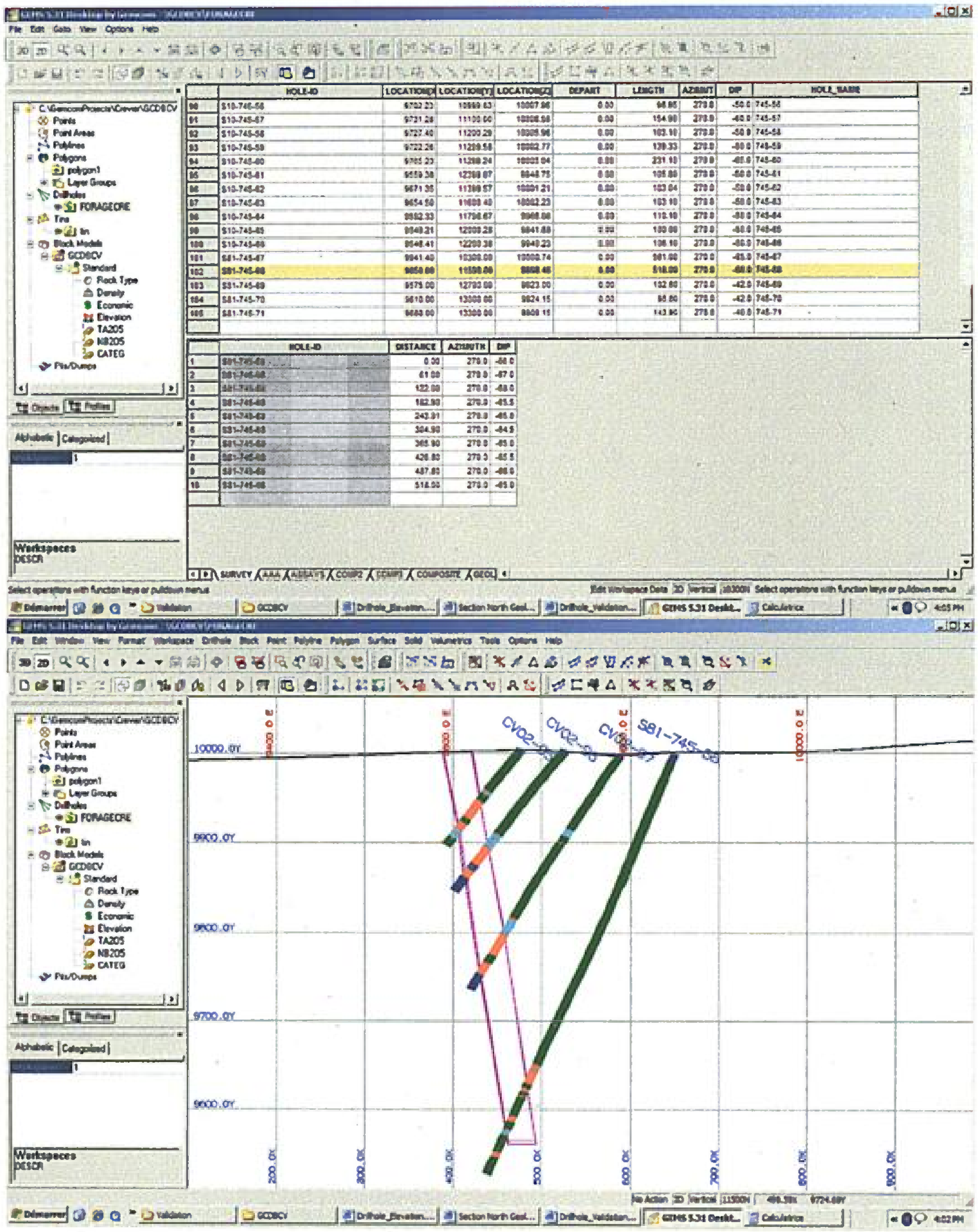


Figure 57: section 11500N hole 10-745-68 after change

S10-745-02

Drill hole logs from Soquem, S10-745-01 to S10-745-06, in 1976, contains less information about dipping angles than the Gems project. One extra record appears in GEMS database.

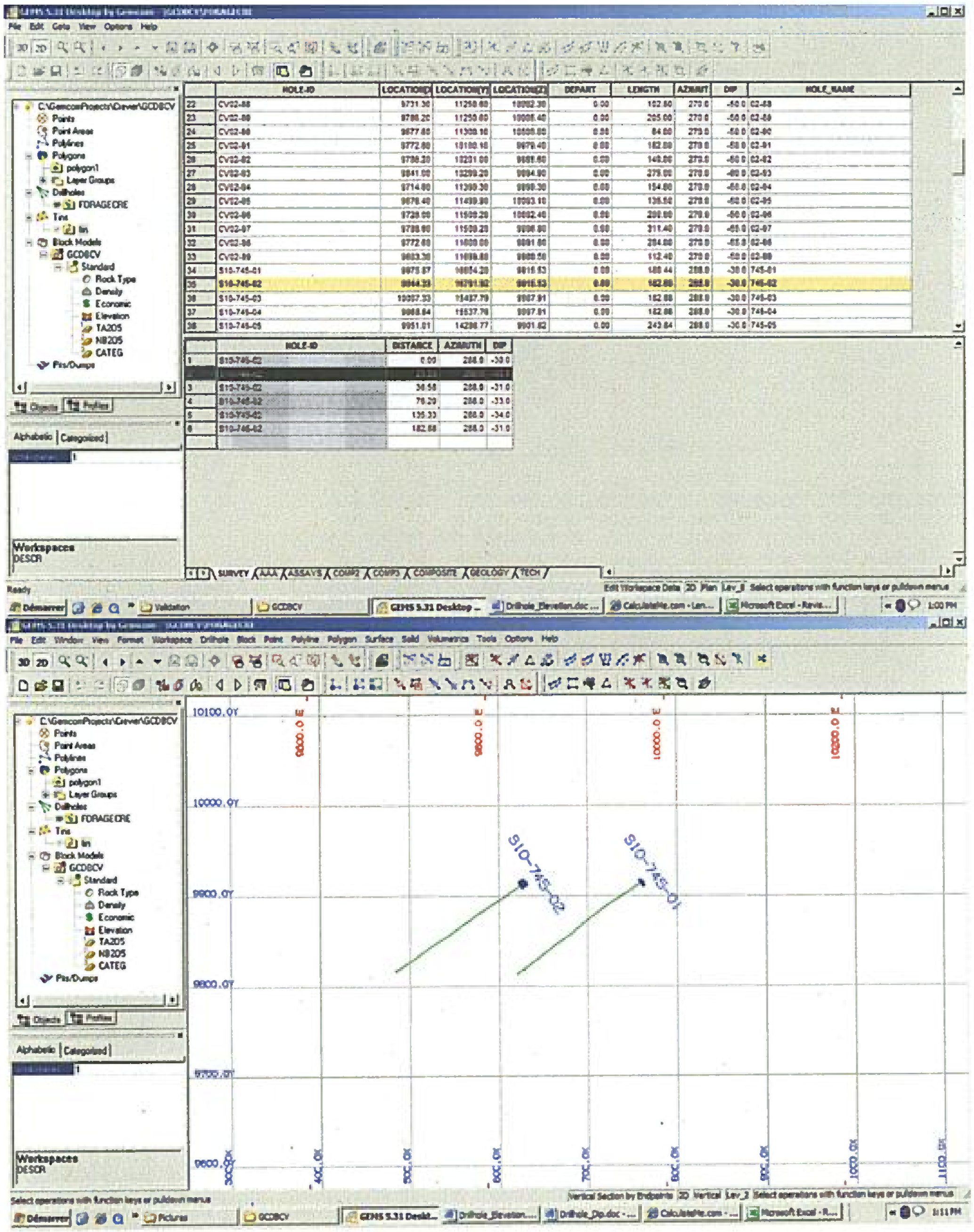


Figure 58: before change

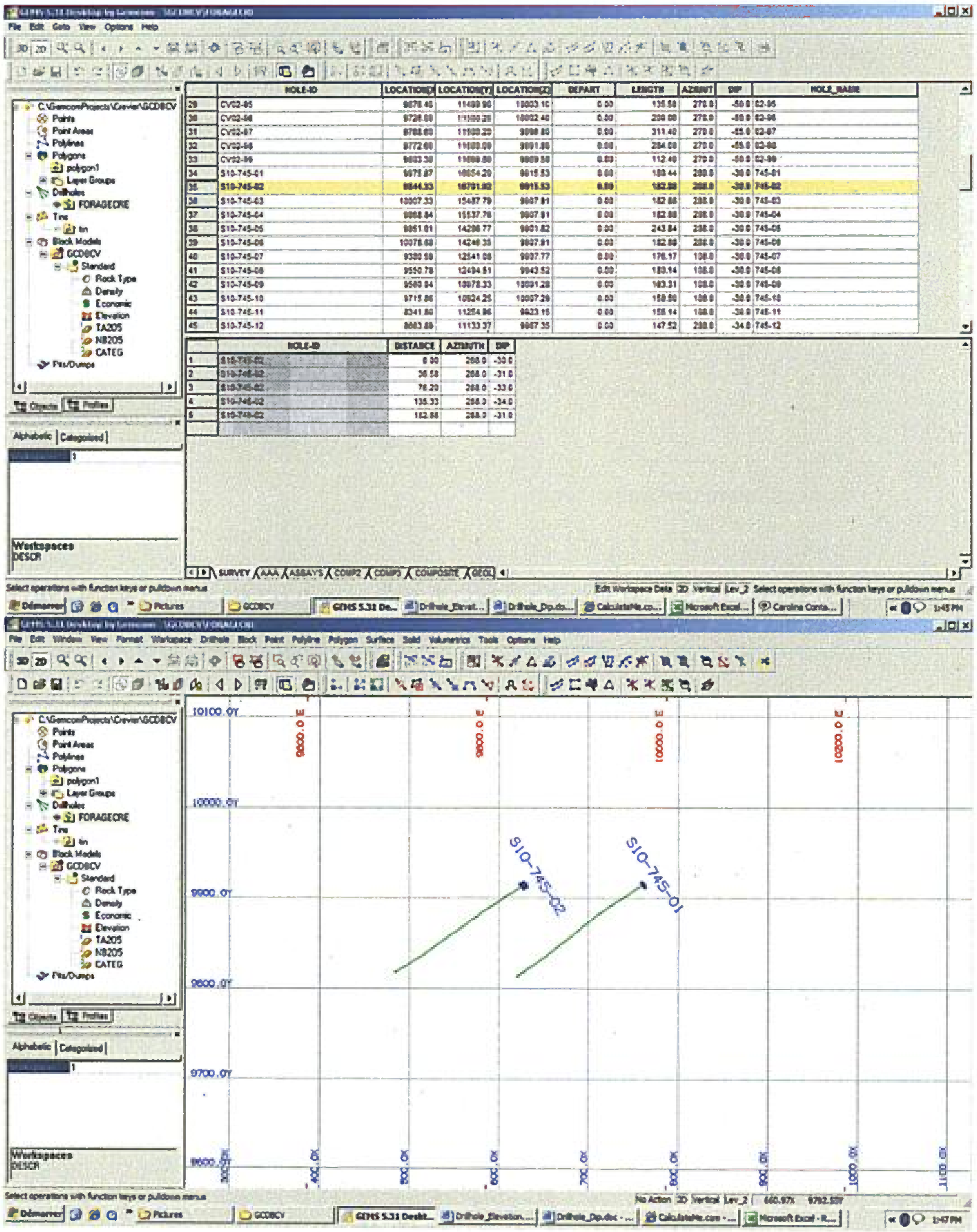
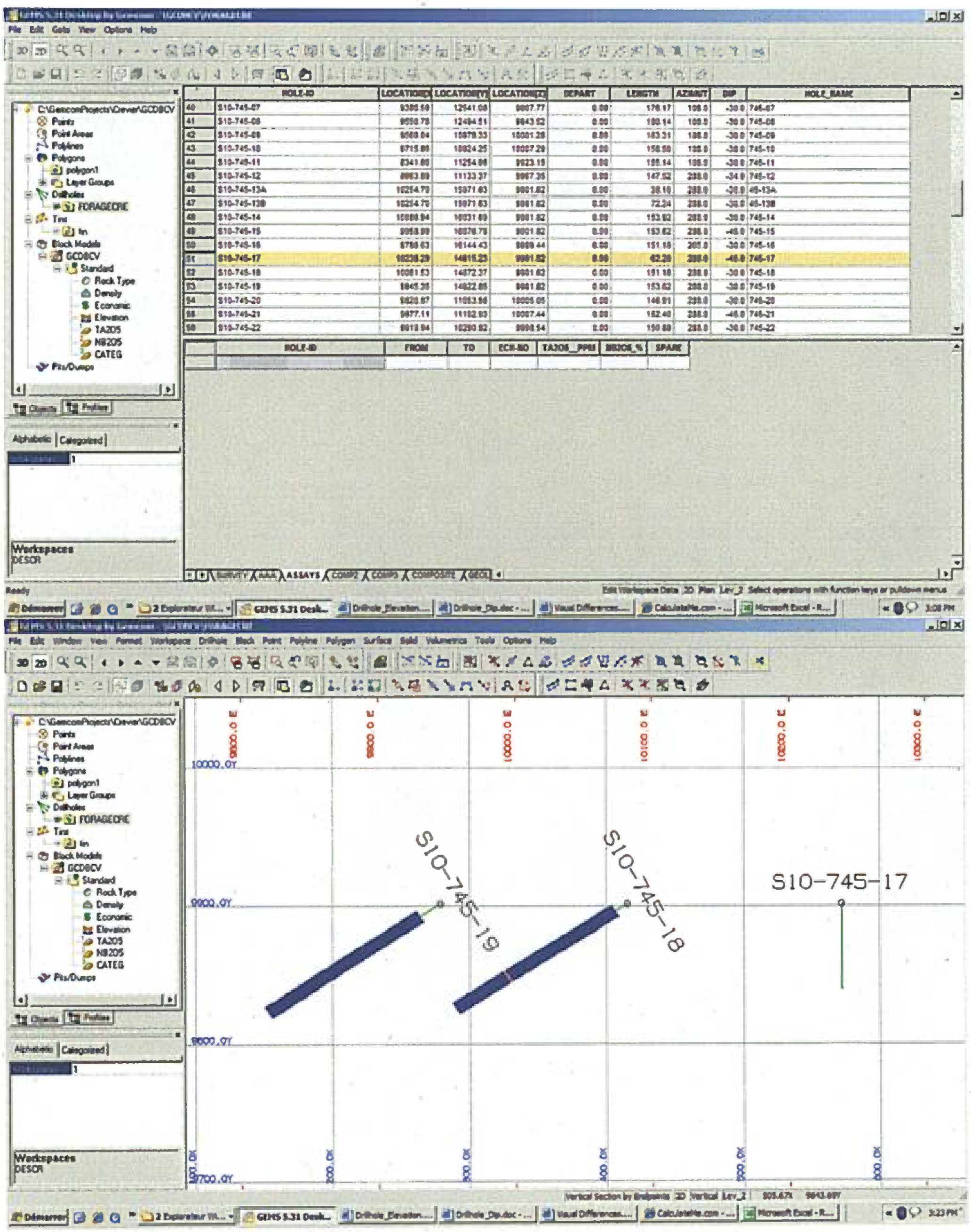


Figure 59: after change

S10-745-17

Drill hole logs from Soquem, North Part, (drill holes 17, 18, 19, 24, 26, 29, 30, 31, 32), year 1978, contains more information about dipping angles than the Gems project.



.Figure 60: Azimuth before change

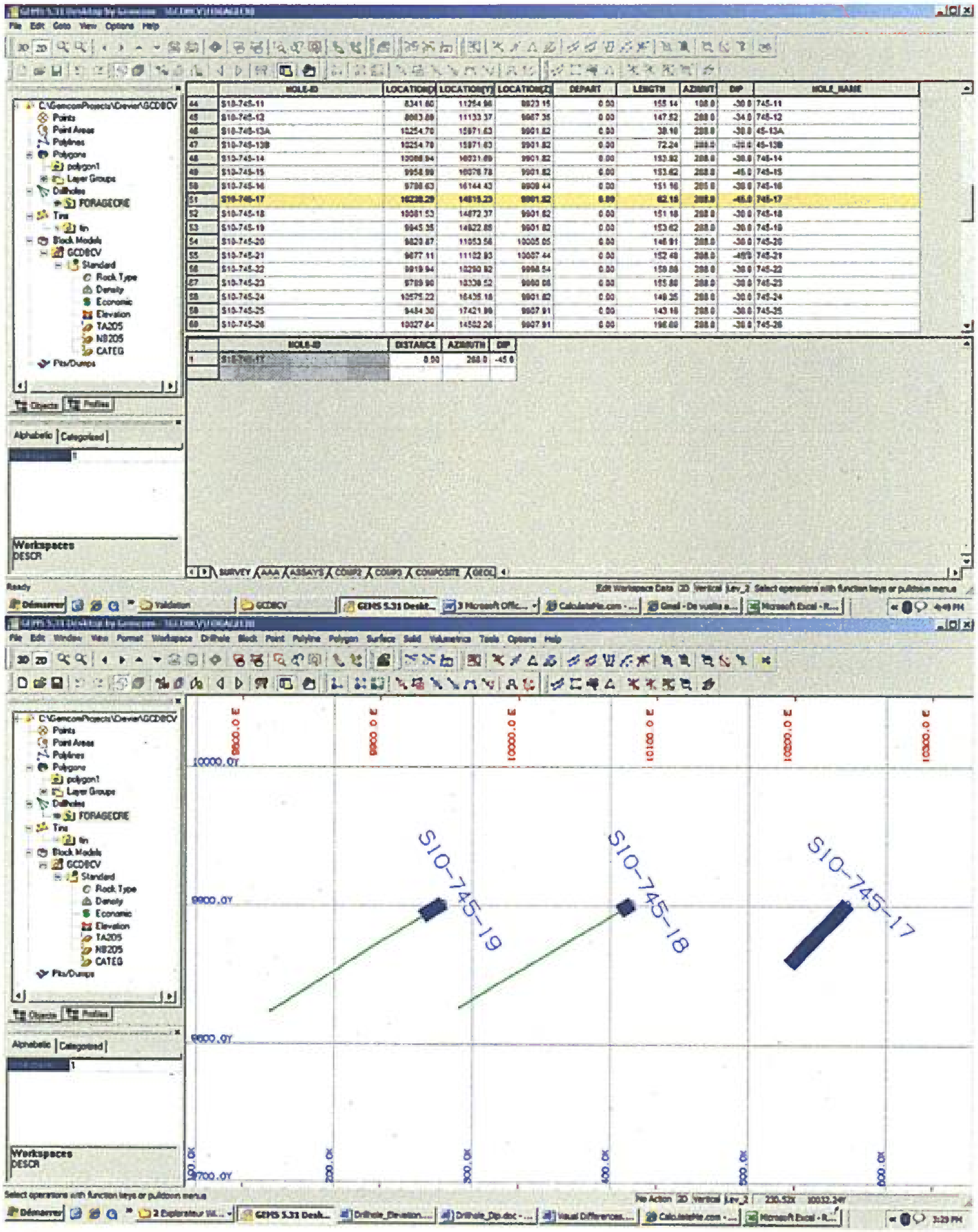


Figure 61: Azimuth after change

S10-745-13A

Drill hole logs from Soquem, North Part, (drill holes 1, 2, 3, 4, 5, 6, 13a, 13b, 14, 15, 16), year 1978, contains more information about azimuth angles than the Gems project.

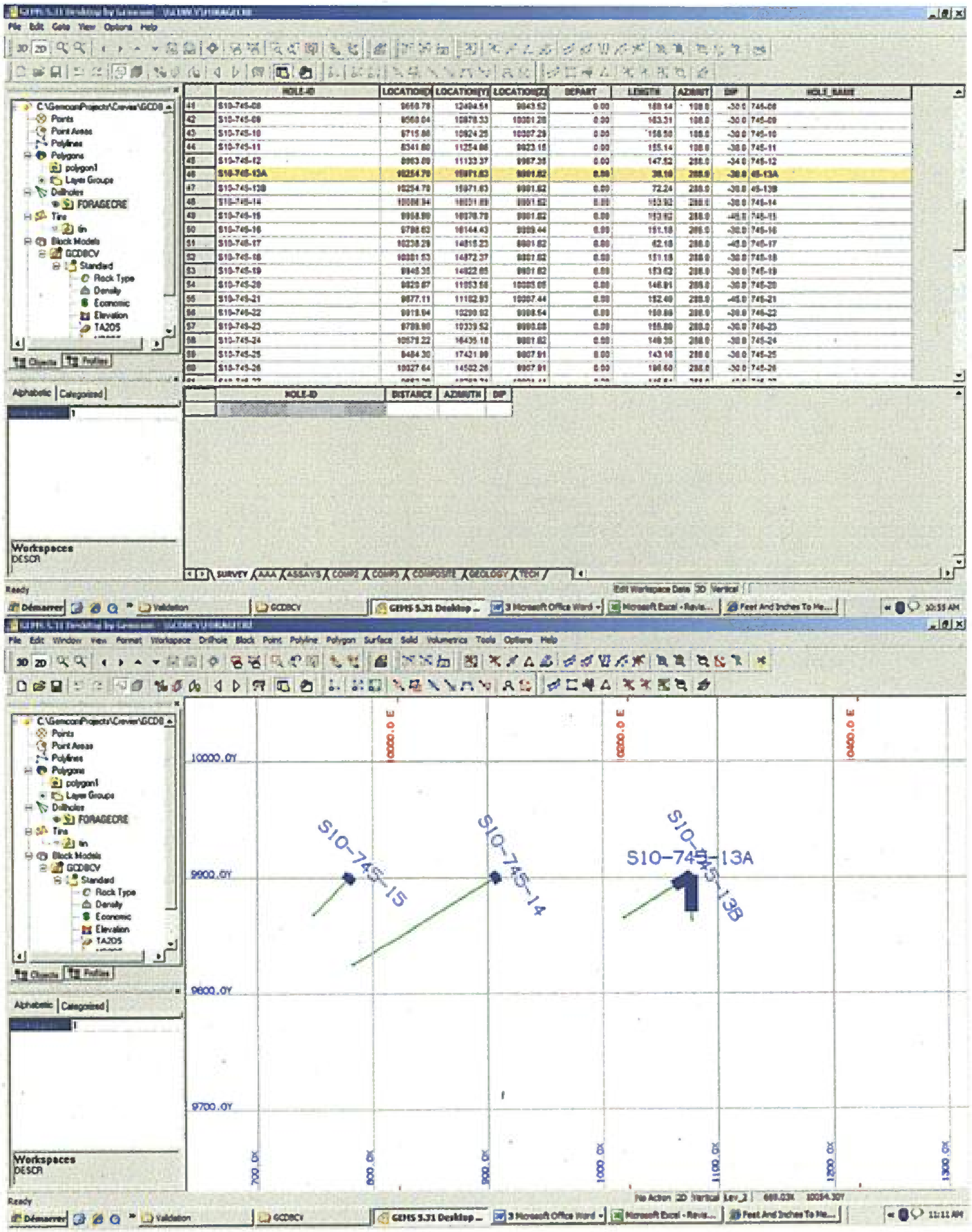


Figure 62: 10-745-13B before change

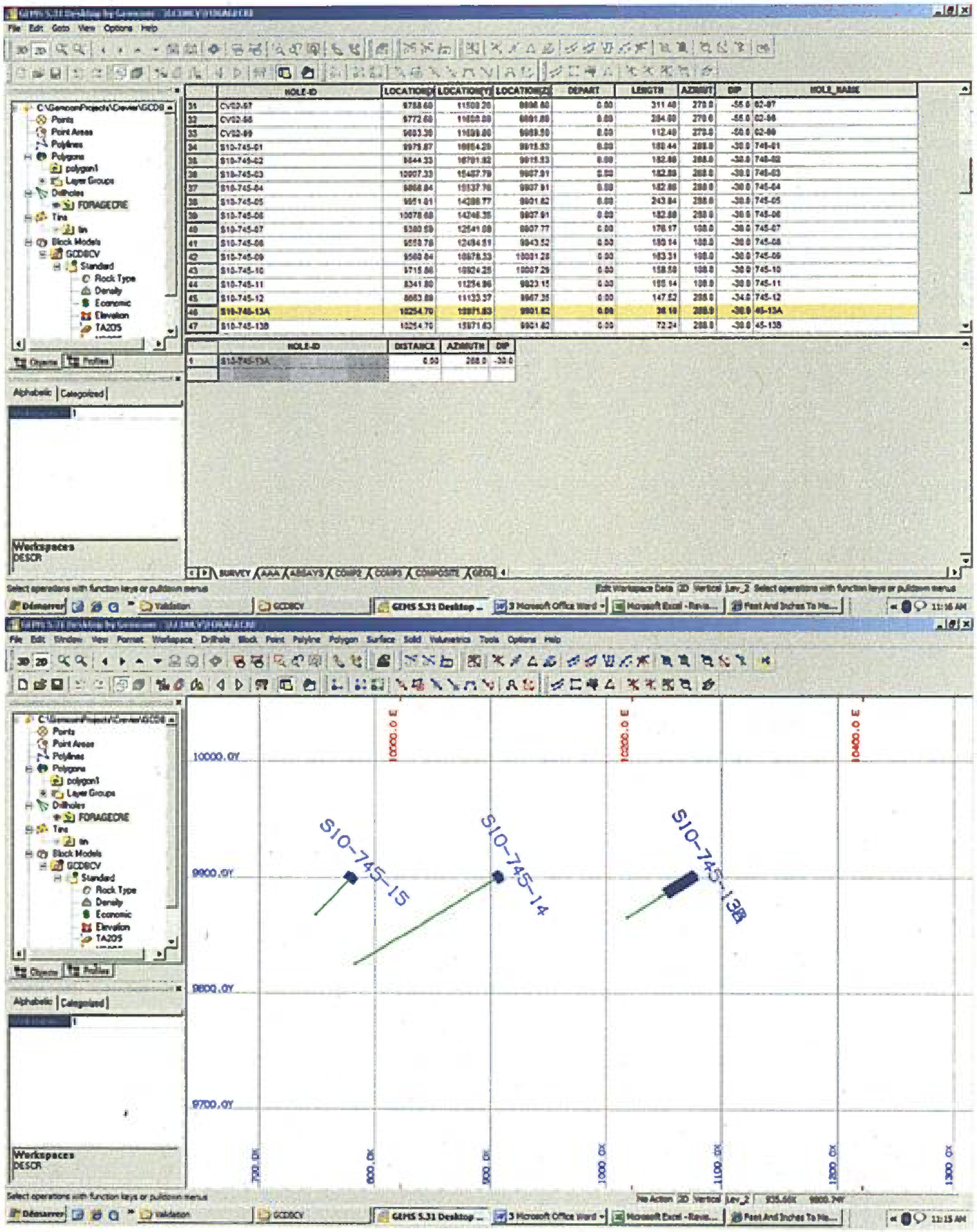


Figure 63: 10-745-13B after change

CV02-89

Drill hole logs from Cambior year 2002 contains different length than the Gems project. Gems length is 205 and report is 200.8.

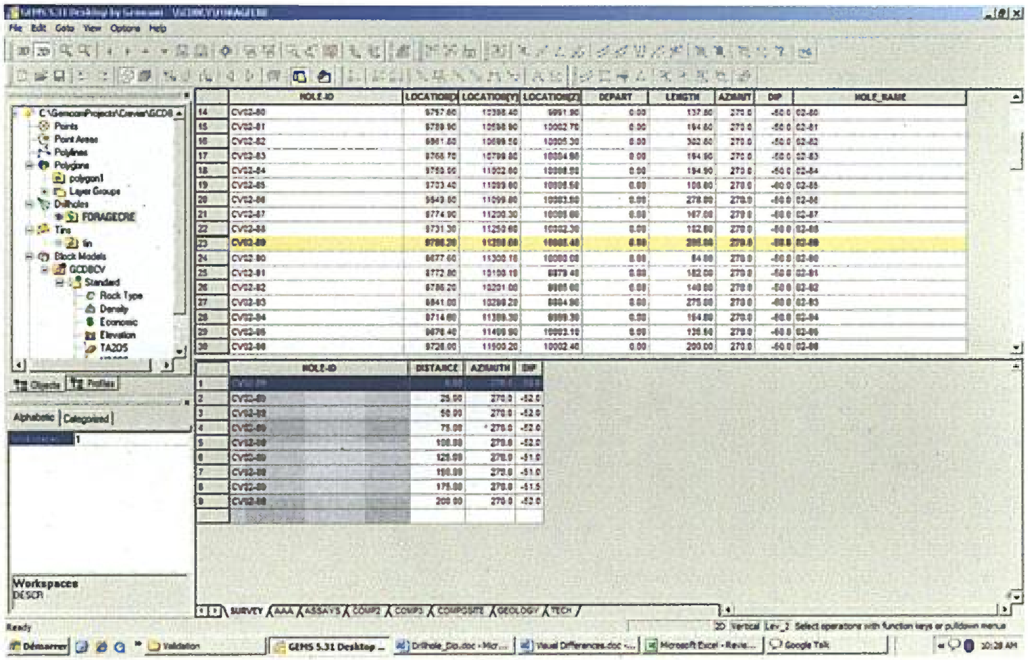


Figure 64: CV02-89 before change

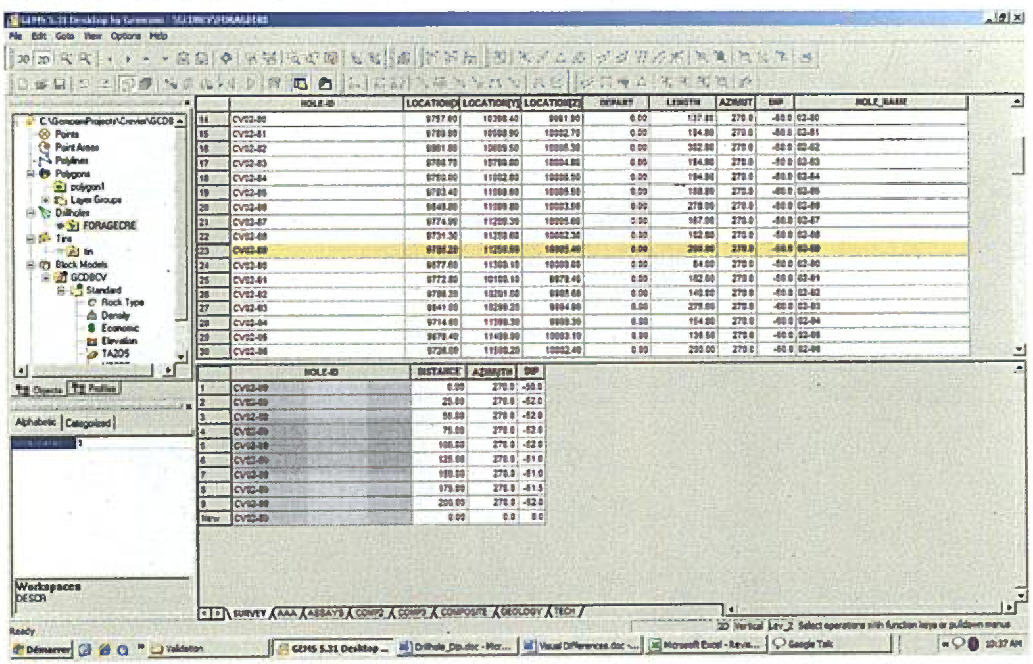


Figure 65: CV02-89 after change

S10-745-43

Drill hole logs from Cambior year 1980 contains different dip information than the Gems project.

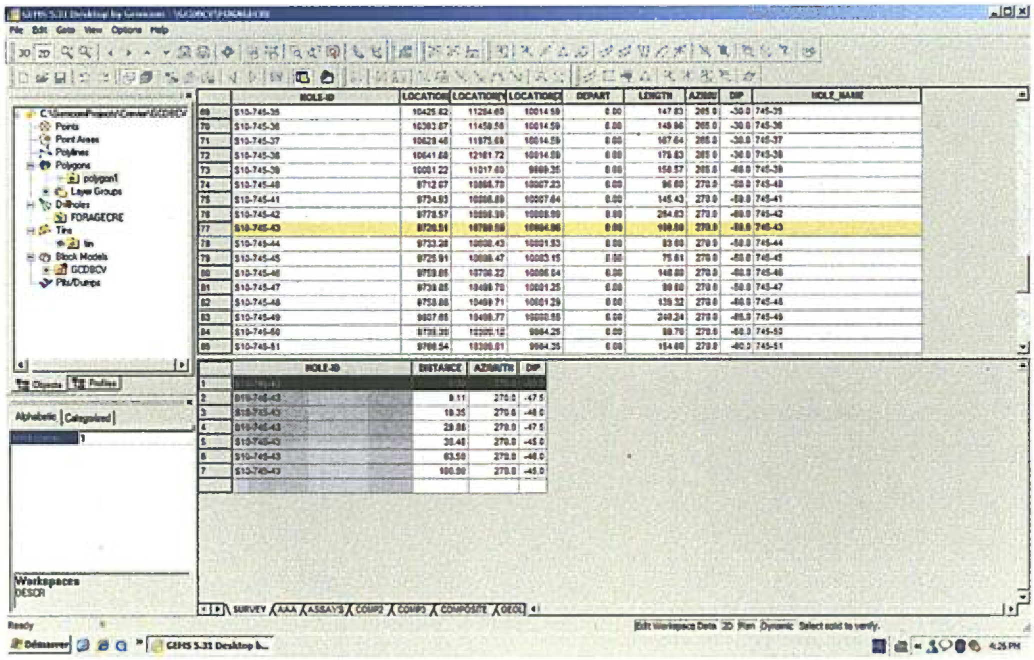


Figure 66: 10-745-43 before change

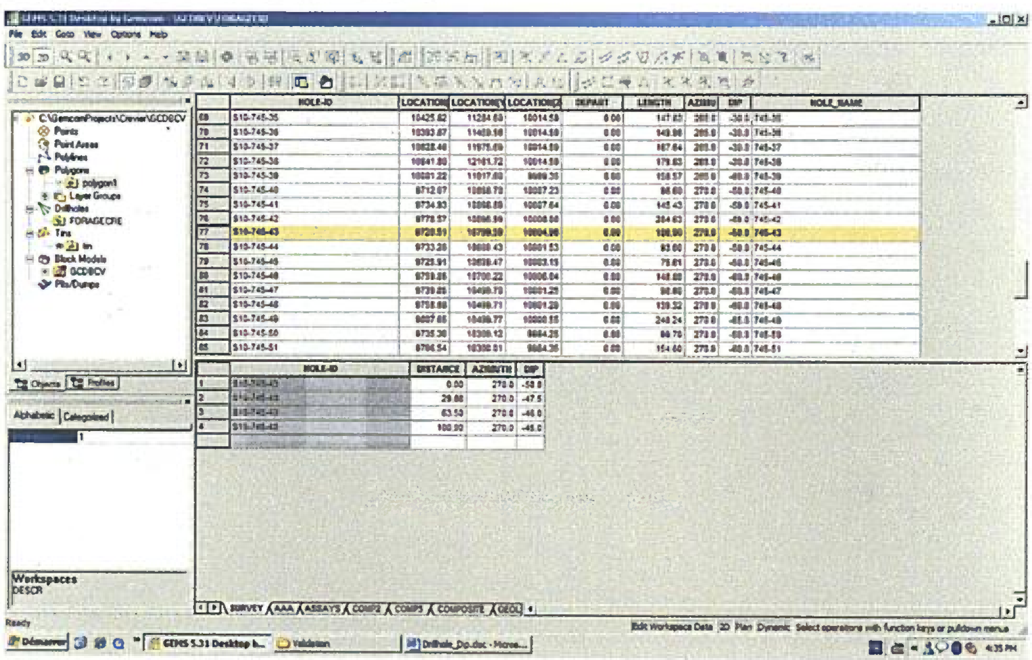


Figure 67: 10-745-43 after change

Assay results from random validation

The assay results in the database were first randomly verified against the certificates of analysis. The results were the same in the assay certificate reports and the database provided. However an extensive verification took place in order to define the source of the final results in the database according to the different campaigns. (see previous section 13 of this report)

16.1.1.2 Computerized drill hole database used for resources

Following the changes described in the previous sections a decision was made by QP Claude Duplessis eng. to carry out a complete modelling of the ore zones in the perspective of actual economic conditions using of course the existing interpretation as the base, instead of modifying the existing Cambior's model.

Once corrected, the data has been exported from GEMS database to Geostat's GEOBASE MS-ACCESS base drill hole data management software. The final drill hole named is Crevier.mdb dated November 5th, 2008.

The raw data in GEMS database had azimuth angles in radian which were transferred in degrees within Geobase and this is the reason why some numbers are not rounded.

+ That database has information for 105 drill holes from the entire Crevier property.
+ After corrections total drill holes length in database is 17,124 meters.
+ There are 4,789 assay records for %Nb_2O_5 and Ta_2O_5 in ppm
+ There are 555 deviation records
+There are 935 lithology records
+ There are 1961 RDQ records

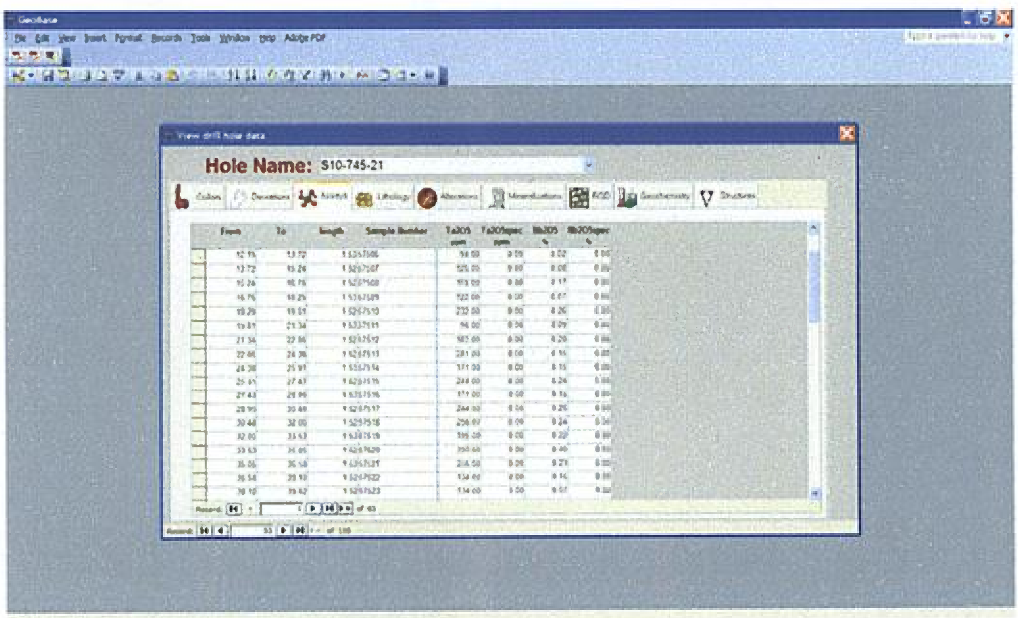


Figure 68: Hole 10-745-21, typical assay view in Geobase

16.1.2 Grids used on the property- survey

At the beginning of exploration works a layout of cut lines was prepared to cover the property. Afterward a surveyed local grid system was put in place using total station. The north of the local grid is oriented Northwest along 321°.

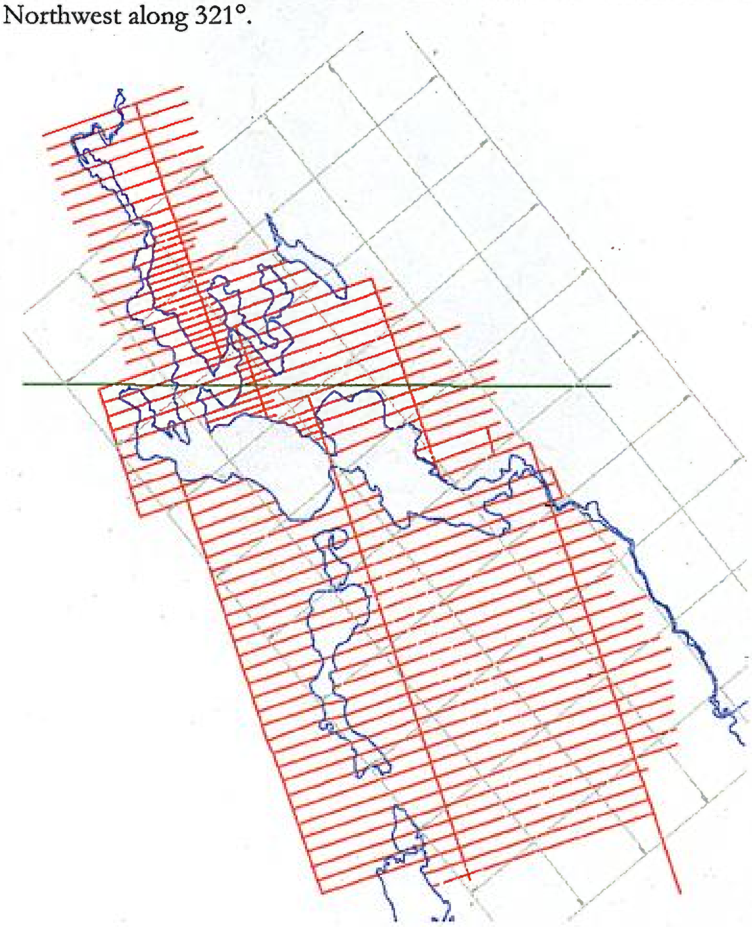


Figure 69: Layout of old line cuttings and local grid

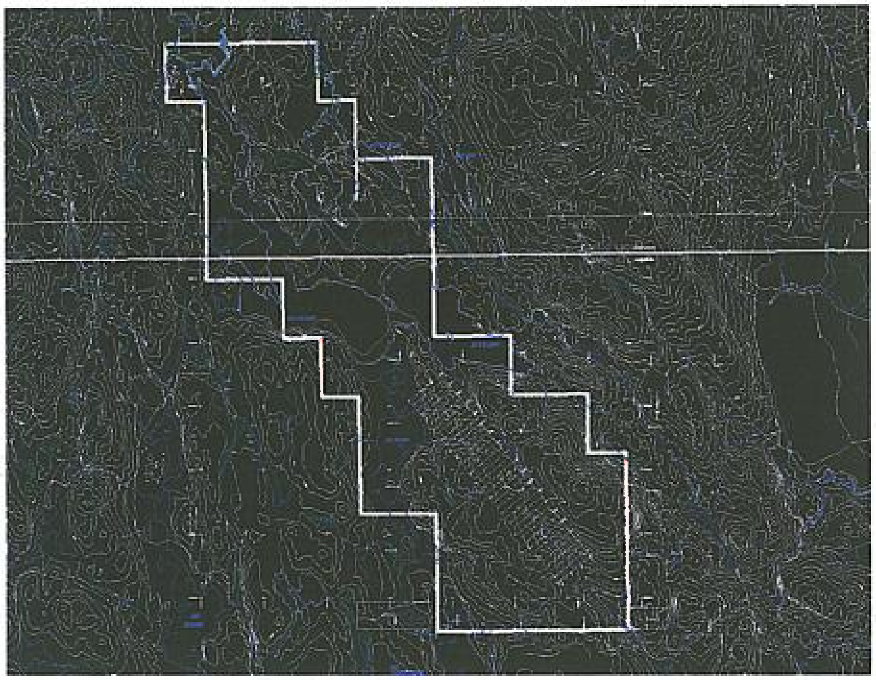


Figure 70: Topographical map with local grid, property boundary at time of survey by JLC

In 2002 Jean-Luc Corriveau (JLC) legal surveyor has surveyed the lines, drill holes casings in UTM and local grid, these values are used in the database.

The following tables present JLC reports in UTM NAD 83, SCOPQ and local grid which is very important to locate information in the field using hand held GPS from one system to another.

The resource model uses the local grid system and the surveyed topography model.

Table 16: Survey report in UTM NAD 83 from JLC

CAMBIOR

PROJET CREVIER

COORDONNÉES UTM NAD83
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 18, méridien central -75°00'00'')

NOUVEAUX TOUS DE FORAGE (SANS "CASING")

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
1372	5480580.1	662502.3	415.7	CV02-72 SOL
1373	5480534.8	662450.3	413.0	CV02-73 SOL
1374	5480546.1	662617.6	418.0	CV02-74 SOL
1375	5480490.0	662551.9	403.9	CV02-75 SOL
1376	5480462.9	662518.3	405.5	CV02-76 SOL
1377	5480420.0	662620.0	399.1	CV02-77 SOL
1378	5480390.9	662585.5	394.6	CV02-78 SOL
1379	5480884.7	662248.1	436.2	CV02-79 SOL
1380	5480836.9	662189.9	432.2	CV02-80 SOL
1381	5481010.1	662083.9	443.0	CV02-81 SOL
1382	5481133.1	662072.8	445.6	CV02-82 SOL
1383	5481147.3	661935.4	445.2	CV02-83 SOL
1384	5481290.3	661790.6	446.8	CV02-84 SOL
1385	5481333.4	661692.1	445.8	CV02-85 SOL
1386	5481429.1	661803.0	443.8	CV02-86 SOL
1387	5481456.5	661680.7	445.9	CV02-87 SOL
1388	5481466.2	661614.8	442.6	CV02-88 SOL
1389	5481502.0	661656.5	445.7	CV02-89 SOL
1390	5481468.8	661541.9	440.3	CV02-90 SOL
1391	5480620.5	662395.8	419.7	CV02-91 SOL
1392	5480705.8	662340.2	425.9	CV02-92 SOL
1393	5480816.0	662317.8	435.2	CV02-93 SOL
1394	5481568.1	661505.4	439.6	CV02-94 SOL
1395	5481619.6	661410.8	443.4	CV02-95 SOL
1396	5481652.1	661448.2	442.7	CV02-96 SOL
1397	5481692.9	661495.7	437.1	CV02-97 SOL
1398	5481758.1	661418.6	432.1	CV02-98 SOL
1399	5481723.5	661225.2	429.8	CV02-99 SOL
1400	5481753.3	661259.3	433.0	CV02-100 SOL
1401	5481799.2	661314.2	428.3	CV02-101 SOL
1402	5481821.3	661187.1	407.3	CV02-102 SOL
1403	5481909.5	661018.5	381.2	CV02-103 SOL
1404	5481928.0	661038.9	383.7	CV02-104 SOL

FORAGE EXISTANT (AVEC "CASING")

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
1413	5481426.1	661644.9	444.5	VCASING SOL
1414	5481426.3	661645.1	444.8	VCASING TOP

CAMBIOR
PROJET CREVIER

COORDONNÉES UTM NAD83
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 18, méridien central -75°00'00'')

BAGUETTES

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
1014	5481662.4	661306.8	438.5	L116N96+25E
1022	5481864.8	660967.2	388.3	L119N95+00E
1033	5481760.9	661269.0	433.7	L117N96+50E
1056	5481241.0	661734.7	444.7	L110N96+75E
1060	5481142.1	662083.3	444.4	L107N98+75E
1062	5480875.4	662079.3	435.7	L105N97+00E
1067	5480746.8	662388.7	434.9	L102N98+50E
1068	5480714.1	662350.5	429.3	L102N98+00E
1070	5480654.7	662435.4	426.6	L101N98+25E
1111	5480117.8	662270.5	443.6	L98NBL93+50E
1113	5480529.1	661983.1	440.5	L103N94+00E

REPÈRES EXISTANTS (POINTS DE BASE)

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
1410	5480269.3	662140.2	438.8	VBMAGENDRON
1411	5480692.6	662633.3	440.3	VBMAGENDRON
1412	5481767.5	660853.7	392.6	VBMAGENDRON

REPÈRES GÉODÉSIQUES D'APPUI

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
999	5486710.542	658388.400	340.2	90K0009 THEORIQUE
1209	5486710.542	658388.400	340.16	90K0009 TERRAIN
991	5438817.343	675468.527	183.5	95KA201 THEORIQUE
1201	5438817.107	675468.192	183.5	95KA201 TERRAIN

CAMBIOR
PROJET CREVIER

COORDONNÉES UTM NAD83
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 18, méridien central -75°00'00'')

DÉTAILS TOPOGRAPHIQUES

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
1	5481344.5	661638.7	442.4	CCH
2	5481336.7	661631.0	442.1	CCH
3	5481326.8	661626.3	441.3	CCH
4	5481316.7	661629.8	442.0	CCH
5	5481303.7	661637.0	443.0	CCH
6	5481294.1	661642.3	443.2	CCH
7	5481272.3	661672.3	443.3	CCH
8	5481266.3	661680.9	443.4	CCH
9	5481259.3	661688.8	443.8	CCH
10	5481251.7	661695.5	443.4	CCH
11	5481244.6	661702.7	442.8	CCH
12	5481237.0	661710.0	442.9	CCH
13	5481230.0	661717.5	442.4	CCH
14	5481212.6	661746.4	443.1	CCH
15	5481209.1	661767.3	444.8	CCH
16	5481204.2	661786.9	445.6	CCH
17	5481192.3	661805.0	444.7	CCH
18	5481180.2	661820.9	444.9	CCH
19	5481170.3	661838.4	445.5	CCH
20	5481161.2	661856.9	445.2	CCH
21	5481152.3	661875.0	444.9	CCH
22	5481148.0	661900.0	444.7	CCH
23	5481141.2	661933.4	445.2	CCH
24	5481135.8	661952.8	445.6	CCH
25	5481136.9	661973.8	445.8	CCH
26	5481141.8	661994.5	446.2	CCH
27	5481149.8	662012.9	446.1	CCH
28	5481151.6	662029.6	446.4	CCH
29	5481132.1	662036.7	446.6	CCH
30	5481120.4	662038.4	446.2	CCH
31	5481100.2	662041.7	446.2	CCH
32	5481080.2	662044.7	446.0	CCH
33	5481059.9	662048.3	445.9	CCH
34	5481040.4	662053.6	445.3	CCH
35	5481020.1	662055.9	444.4	CCH
36	5480999.0	662054.7	443.5	CCH
37	5480979.2	662049.4	441.5	CCH
38	5480979.2	662050.1	441.4	CCH
39	5480961.5	662039.2	439.7	CCH
40	5480945.1	662025.9	439.3	CCH
41	5480937.2	662019.1	439.0	CCH
42	5480922.0	662005.6	438.5	CCH
43	5480906.6	661992.6	438.3	CCH
44	5480891.1	661979.5	437.7	CCH

CAMBIOR
PROJET CREVIER

COORDONNÉES UTM NAD83
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 18, méridien central -75°00'00'')

DÉTAILS TOPOGRAPHIQUES (suite)

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
45	5480876.5	661965.5	437.1	CCH
46	5480862.3	661950.9	437.4	CCH
47	5480849.7	661934.3	438.1	CCH
48	5480835.8	661919.3	438.8	CCH
49	5480818.9	661907.8	439.4	CCH
50	5480801.1	661898.3	440.0	CCH
51	5480782.4	661889.2	440.6	CCH
52	5480761.7	661885.6	441.1	CCH
53	5480741.9	661890.5	441.0	CCH
54	5480723.5	661900.6	440.7	CCH
55	5480703.6	661909.3	440.1	CCH
56	5480684.2	661917.5	440.0	CCH
57	5480665.0	661926.7	440.1	CCH
58	5480646.9	661936.0	440.2	CCH
59	5480628.0	661945.3	440.2	CCH
60	5480609.2	661953.7	440.3	CCH
61	5480588.8	661962.6	440.5	CCH
62	5480569.8	661970.3	440.6	CCH
63	5480550.1	661978.4	440.3	CCH
64	5480531.5	661985.8	440.1	CCH
65	5480511.4	661993.4	439.8	CCH
66	5480491.3	662001.9	440.0	CCH
67	5480471.9	662011.5	440.1	CCH
68	5480454.4	662021.4	440.1	CCH
69	5480435.3	662031.9	440.6	CCH
70	5480416.3	662042.7	440.8	CCH
71	5480399.3	662053.8	440.7	CCH
72	5480383.0	662065.6	440.5	CCH
73	5480365.8	662077.1	440.5	CCH
74	5480346.8	662088.7	440.5	CCH
75	5480327.6	662099.6	440.4	CCH
76	5480308.5	662109.9	440.4	CCH
77	5480289.1	662118.2	440.2	CCH
78	5480267.4	662126.9	440.0	CCH
79	5480247.7	662133.5	439.7	CCH
80	5480227.3	662141.3	439.5	CCH
81	5480209.9	662151.6	439.5	CCH
82	5480196.5	662167.5	439.0	CCH
83	5480186.5	662186.5	440.1	CCH
84	5480177.3	662204.3	441.9	CCH
85	5480166.5	662223.2	443.5	CCH
86	5480153.5	662239.4	444.6	CCH
87	5480137.3	662252.8	444.8	CCH
88	5480124.8	662259.5	444.7	CCH

CAMBIOR
PROJET CREVIER

COORDONNÉES UTM NAD83
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 18, méridien central -75°00'00'')

DÉTAILS TOPOGRAPHIQUES (suite)

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
89	5480103.0	662262.2	444.0	CCH
90	5480081.7	662261.1	442.9	CCH
91	5480061.2	662255.6	441.4	CCH
92	5480043.5	662245.0	439.7	CCH
93	5480028.4	662231.6	438.6	CCH
94	5480012.6	662217.4	438.4	CCH
95	5479995.4	662203.7	438.1	CCH
96	5479975.6	662192.6	437.5	CCH
97	5479956.2	662185.2	435.8	CCH
98	5479937.4	662176.9	433.7	CCH
100	5479919.6	662166.0	431.4	CCH
101	5479903.1	662154.1	430.3	CCH
102	5479886.9	662140.2	431.2	CCH
103	5479870.4	662125.3	432.1	CCH
104	5479852.3	662114.6	432.5	CCH
105	5479831.6	662107.7	432.0	CCH
106	5479811.2	662102.3	430.5	CCH
107	5479789.5	662096.7	430.0	CCH

LÉGENDE:

CCH	:	Centre de chemin
VBMAGENDRONM	:	Vieux repère-médaillon de A. Gendron

Table 17: Survey report by JLC SCOPQ NAD 83

CAMBIOR

PROJET CREVIER

COORDONNÉES SCOPQ NAD83
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 8, méridien central -73°30'00'')

NOUVEAUX TROUS DE FORAGE (SANS "CASING")

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
1372	5480072.2	358616.1	415.7	CV02-72 SOL
1373	5480027.9	358563.3	413.0	CV02-73 SOL
1374	5480035.8	358730.8	418.0	CV02-74 SOL
1375	5479981.1	358663.9	403.9	CV02-75 SOL
1376	5479954.7	358629.8	405.5	CV02-76 SOL
1377	5479909.8	358730.6	399.1	CV02-77 SOL
1378	5479881.3	358695.6	394.6	CV02-78 SOL
1379	5480381.7	358368.0	436.2	CV02-79 SOL
1380	5480335.1	358309.0	432.2	CV02-80 SOL
1381	5480510.4	358206.4	443.0	CV02-81 SOL
1382	5480633.6	358197.8	445.6	CV02-82 SOL
1383	5480650.5	358060.7	445.2	CV02-83 SOL
1384	5480796.4	357918.8	446.8	CV02-84 SOL
1385	5480841.5	357821.1	445.8	CV02-85 SOL
1386	5480934.9	357933.9	443.8	CV02-86 SOL
1387	5480964.7	357812.2	445.9	CV02-87 SOL
1388	5480975.8	357746.5	442.6	CV02-88 SOL
1389	5481010.7	357788.9	445.7	CV02-89 SOL
1390	5480979.8	357673.6	440.3	CV02-90 SOL
1391	5480114.7	358510.5	419.7	CV02-91 SOL
1392	5480201.1	358456.6	425.9	CV02-92 SOL
1393	5480311.7	358436.4	435.2	CV02-93 SOL
1394	5481079.8	357639.1	439.6	CV02-94 SOL
1395	5481133.2	357545.6	443.4	CV02-95 SOL
1396	5481164.9	357583.6	442.7	CV02-96 SOL
1397	5481204.8	357631.9	437.1	CV02-97 SOL
1398	5481271.5	357556.2	432.1	CV02-98 SOL
1399	5481240.8	357362.1	429.8	CV02-99 SOL
1400	5481269.9	357396.7	433.0	CV02-100 SOL
1401	5481314.7	357452.6	428.3	CV02-101 SOL
1402	5481339.3	357325.9	407.3	CV02-102 SOL
1403	5481430.8	357159.1	381.2	CV02-103 SOL
1404	5481449.0	357179.9	383.7	CV02-104 SOL

FORAGE EXISTANT (AVEC "CASING")

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
1413	5480935.0	357775.8	444.5	VCASING SOL
1414	5480935.2	357776.0	444.8	VCASING TOP

CAMBIOR
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COORDONNÉES SCOPQ NAD83
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 8, méridien central -73°30'00'')

BAGUETTES

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
1014	5481178.0	357442.5	438.5	L116N96+25E
1022	5481387.2	357106.9	388.3	L119N95+00E
1033	5481277.3	357406.6	433.7	L117N96+50E
1056	5480748.2	357861.8	444.7	L110N96+75E
1060	5480642.4	358208.4	444.4	L107N98+75E
1062	5480375.9	358199.1	435.7	L105N97+00E
1067	5480241.1	358505.9	434.9	L102N98+50E
1068	5480209.2	358467.1	429.3	L102N98+00E
1070	5480148.1	358550.7	426.6	L101N98+25E
1111	5479614.5	358375.2	443.6	L98NBL93+50E
1113	5480031.5	358096.0	440.5	L103N94+00E

REPÈRES EXISTANTS (POINTS DE BASE)

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
1410	5479768.6	358248.0	438.8	VBMAGENDRON
1411	5480182.0	358749.4	440.3	VBMAGENDRON
1412	5481292.1	356991.5	392.6	VBMAGENDRON

REPÈRES GÉODÉSIQUES D'APPUI

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
999	5486283.380	354625.048	340.2	90K0009 THEORIQUE
1209	5486283.380	354625.048	340.16	90K0009 TERRAIN
991	5438060.606	370751.029	183.5	95KA201 THEORIQUE
1201	5438060.377	370750.690	183.5	95KA201 TERRAIN

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COORDONNÉES SCOPQ NAD83
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 8, méridien central -73°30'00'')

DÉTAILS TOPOGRAPHIQUES

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
1	5480853.6	357768.0	442.4	CCH
2	5480846.0	357760.1	442.1	CCH
3	5480836.2	357755.2	441.3	CCH
4	5480826.0	357758.5	442.0	CCH
5	5480812.9	357765.5	443.0	CCH
6	5480803.1	357770.5	443.2	CCH
7	5480780.7	357800.0	443.3	CCH
8	5480774.5	357808.6	443.4	CCH
9	5480767.4	357816.3	443.8	CCH
10	5480759.7	357822.9	443.4	CCH
11	5480752.5	357829.9	442.8	CCH
12	5480744.7	357837.0	442.9	CCH
13	5480737.5	357844.4	442.4	CCH
14	5480719.6	357873.0	443.1	CCH
15	5480715.7	357893.8	444.8	CCH
16	5480710.4	357913.4	445.6	CCH
17	5480698.1	357931.1	444.7	CCH
18	5480685.7	357946.9	444.9	CCH
19	5480675.4	357964.2	445.5	CCH
20	5480666.0	357982.4	445.2	CCH
21	5480656.7	358000.4	444.9	CCH
22	5480651.9	358025.2	444.7	CCH
23	5480644.5	358058.6	445.2	CCH
24	5480638.7	358077.8	445.6	CCH
25	5480639.3	358098.9	445.8	CCH
26	5480643.8	358119.6	446.2	CCH
27	5480651.5	358138.2	446.1	CCH
28	5480652.9	358155.0	446.4	CCH
29	5480633.3	358161.6	446.6	CCH
30	5480621.6	358163.1	446.2	CCH
31	5480601.3	358166.0	446.2	CCH
32	5480581.2	358168.6	446.0	CCH
33	5480560.9	358171.8	445.9	CCH
34	5480541.3	358176.7	445.3	CCH
35	5480521.0	358178.6	444.4	CCH
36	5480499.9	358177.0	443.5	CCH
37	5480480.1	358171.2	441.5	CCH
38	5480480.1	358171.9	441.4	CCH
39	5480462.7	358160.7	439.7	CCH
40	5480446.6	358147.1	439.3	CCH
41	5480438.8	358140.2	439.0	CCH

42	5480423.8	358126.4	438.5	CCH
43	5480408.8	358113.0	438.3	CCH
44	5480393.5	358099.6	437.7	CCH

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PROJET CREVIER

COORDONNÉES SCOPQ NAD83
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 8, méridien central -73°30'00'')

DÉTAILS TOPOGRAPHIQUES (suite)

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
45	5480379.2	358085.4	437.1	CCH
46	5480365.3	358070.5	437.4	CCH
47	5480353.0	358053.6	438.1	CCH
48	5480339.4	358038.3	438.8	CCH
49	5480322.8	358026.6	439.4	CCH
50	5480305.2	358016.7	440.0	CCH
51	5480286.6	358007.2	440.6	CCH
52	5480266.0	358003.2	441.1	CCH
53	5480246.1	358007.7	441.0	CCH
54	5480227.5	358017.4	440.7	CCH
55	5480207.4	358025.7	440.1	CCH
56	5480187.9	358033.5	440.0	CCH
57	5480168.4	358042.4	440.1	CCH
58	5480150.2	358051.3	440.2	CCH
59	5480131.1	358060.2	440.2	CCH
60	5480112.1	358068.2	440.3	CCH
61	5480091.6	358076.7	440.5	CCH
62	5480072.4	358084.1	440.6	CCH
63	5480052.6	358091.8	440.3	CCH
64	5480033.8	358098.8	440.1	CCH
65	5480013.6	358106.0	439.8	CCH
66	5479993.3	358114.1	440.0	CCH
67	5479973.8	358123.3	440.1	CCH
68	5479956.0	358132.8	440.1	CCH
69	5479936.7	358143.0	440.6	CCH
70	5479917.6	358153.3	440.8	CCH
71	5479900.3	358164.2	440.7	CCH
72	5479883.8	358175.7	440.5	CCH
73	5479866.4	358186.8	440.5	CCH
74	5479847.1	358198.0	440.5	CCH
75	5479827.7	358208.5	440.4	CCH
76	5479808.4	358218.4	440.4	CCH
77	5479788.9	358226.4	440.2	CCH
78	5479767.0	358234.6	440.0	CCH
79	5479747.2	358240.8	439.7	CCH
80	5479726.6	358248.2	439.5	CCH
81	5479709.0	358258.2	439.5	CCH
82	5479695.3	358273.8	439.0	CCH
83	5479684.9	358292.6	440.1	CCH
84	5479675.3	358310.2	441.9	CCH
85	5479664.1	358328.9	443.5	CCH

86	5479650.8	358344.8	444.6	CCH
87	5479634.4	358357.9	444.8	CCH
88	5479621.8	358364.3	444.7	CCH

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COORDONNÉES SCOPQ NAD83
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 8, méridien central -73°30'00'')

DÉTAILS TOPOGRAPHIQUES (suite)

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
89	5479599.9	358366.6	444.0	CCH
90	5479578.7	358365.1	442.9	CCH
91	5479558.2	358359.2	441.4	CCH
92	5479540.7	358348.2	439.7	CCH
93	5479526.0	358334.6	438.6	CCH
94	5479510.4	358320.0	438.4	CCH
95	5479493.5	358305.9	438.1	CCH
96	5479473.9	358294.5	437.5	CCH
97	5479454.7	358286.7	435.8	CCH
98	5479436.0	358278.0	433.7	CCH
100	5479418.4	358266.8	431.4	CCH
101	5479402.2	358254.5	430.3	CCH
102	5479386.3	358240.4	431.2	CCH
103	5479370.1	358225.2	432.1	CCH
104	5479352.2	358214.0	432.5	CCH
105	5479331.6	358206.7	432.0	CCH
106	5479311.3	358201.0	430.5	CCH
107	5479289.8	358194.9	430.0	CCH

LÉGENDE:

CCH : Centre de chemin
VBMAGENDRON : Vieux repère-médaillon de A. Gendron

Table 18: Survey report by JLC with local grid

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COORDONNÉES SYSTÈME LOCAL
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 8, méridien central -73°30'00'')

NOUVEAUX TROUS DE FORAGE (SANS "CASING")

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
1372	10000.1	9827.3	415.7	CV02-72 SOL
1373	9999.5	9758.3	413.0	CV02-73 SOL
1374	9899.1	9892.6	418.0	CV02-74 SOL
1375	9899.4	9806.2	403.9	CV02-75 SOL
1376	9900.7	9763.0	405.5	CV02-76 SOL
1377	9801.9	9812.3	399.1	CV02-77 SOL
1378	9802.2	9767.1	394.6	CV02-78 SOL
1379	10396.8	9832.8	436.2	CV02-79 SOL
1380	10398.4	9757.6	432.2	CV02-80 SOL
1381	10598.9	9789.9	443.0	CV02-81 SOL
1382	10699.5	9861.8	445.6	CV02-82 SOL
1383	10799.8	9766.7	445.2	CV02-83 SOL
1384	11002.6	9750.0	446.8	CV02-84 SOL
1385	11099.6	9703.4	445.8	CV02-85 SOL
1386	11099.8	9849.8	443.8	CV02-86 SOL
1387	11200.3	9774.9	445.9	CV02-87 SOL
1388	11250.6	9731.3	442.6	CV02-88 SOL
1389	11250.6	9786.2	445.7	CV02-89 SOL
1390	11300.1	9677.6	440.3	CV02-90 SOL
1391	10100.1	9772.8	419.7	CV02-91 SOL
1392	10201.0	9786.2	425.9	CV02-92 SOL
1393	10299.2	9841.0	435.2	CV02-93 SOL
1394	11399.3	9714.6	439.6	CV02-94 SOL
1395	11499.9	9676.4	443.4	CV02-95 SOL
1396	11500.2	9726.0	442.7	CV02-96 SOL
1397	11500.2	9788.6	437.1	CV02-97 SOL
1398	11600.0	9772.6	432.1	CV02-98 SOL
1399	11699.8	9603.3	429.8	CV02-99 SOL
1400	11700.1	9648.5	433.0	CV02-100 SOL
1401	11699.2	9720.1	428.3	CV02-101 SOL
1402	11798.8	9638.1	407.3	CV02-102 SOL
1403	11975.5	9567.6	381.2	CV02-103 SOL
1404	11976.3	9595.2	383.7	CV02-104 SOL

FORAGE EXISTANT (AVEC "CASING")

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
1413	11200.6	9727.9	444.5	VCASING SOL
1414	11200.6	9728.2	444.8	VCASING TOP

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COORDONNÉES SYSTÈME LOCAL
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 8, méridien central -73°30'00'')

BAGUETTES

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
1014	11600.2	9625.4	438.5	L116N96+25E
1022	11975.1	9499.5	388.3	L119N95+00E
1033	11699.6	9660.9	433.7	L117N96+50E
1056	11001.7	9675.4	444.7	L110N96+75E
1060	10699.5	9875.5	444.4	L107N98+75E
1062	10499.7	9698.8	435.7	L105N97+00E
1067	10200.5	9849.7	434.9	L102N98+50E
1068	10200.6	9799.4	429.3	L102N98+00E
1070	10100.2	9825.1	426.6	L101N98+25E
1111	9800.3	9350.1	443.6	L98NBL93+50E
1113	10299.6	9400.1	440.5	L103N94+00E

REPÈRES EXISTANTS (POINTS DE BASE)

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
1410	10000.1	9350.0	438.8	VBMAGENDRON
1411	10000.0	10000.0	440.3	VBMAGENDRON
1412	11975.2	9350.0	392.6	VBMAGENDRON

REPÈRES GÉODÉSIQUES D'APPUI

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
999	17332.2	10700.2	340.2	90K0009 THEORIQUE
1209	17332.2	10700.2	340.16	90K0009 TERRAIN
991	-30136.2	-7542.4	183.5	95KA201 THEORIQUE
1201	-30136.2	-7542.8	183.5	95KA201 TERRAIN

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COORDONNÉES SYSTÈME LOCAL
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 8, méridien central -73°30'00'')

DÉTAILS TOPOGRAPHIQUES

PNT#	NORTH (Y)	EAST (X)	ELEVATION	DESCRIPTION
1	11142.7	9670.1	442.4	CCH
2	11141.8	9659.2	442.1	CCH
3	11137.4	9649.1	441.3	CCH
4	11127.4	9645.2	442.0	CCH
5	11112.9	9642.2	443.0	CCH
6	11102.1	9639.9	443.2	CCH
7	11066.1	9648.5	443.3	CCH
8	11055.9	9651.1	443.4	CCH
9	11045.5	9652.6	443.8	CCH
10	11035.3	9652.7	443.4	CCH
11	11025.3	9653.5	442.8	CCH
12	11014.7	9654.1	442.9	CCH
13	11004.5	9655.2	442.4	CCH
14	10972.5	9665.8	443.1	CCH
15	10956.2	9679.4	444.8	CCH
16	10939.7	9691.1	445.6	CCH
17	10918.9	9697.1	444.7	CCH
18	10899.3	9701.3	444.9	CCH
19	10880.4	9708.1	445.5	CCH
20	10861.5	9716.2	445.2	CCH
21	10842.9	9724.1	444.9	CCH
22	10823.4	9740.2	444.7	CCH
23	10796.5	9761.3	445.2	CCH
24	10779.8	9772.4	445.6	CCH
25	10766.8	9789.0	445.8	CCH
26	10757.1	9808.0	446.2	CCH
27	10751.2	9827.1	446.1	CCH
28	10741.6	9841.0	446.4	CCH
29	10722.2	9833.6	446.6	CCH
30	10712.2	9827.3	446.2	CCH
31	10694.8	9816.7	446.2	CCH
32	10677.6	9805.9	446.0	CCH
33	10659.9	9795.4	445.9	CCH
34	10641.7	9786.8	445.3	CCH
35	10624.8	9775.2	444.4	CCH
36	10609.5	9760.6	443.5	CCH
37	10597.9	9743.6	441.5	CCH
38	10597.5	9744.1	441.4	CCH
39	10591.2	9724.4	439.7	CCH

40	10587.4	9703.6	439.3	CCH
41	10585.9	9693.3	439.0	CCH
42	10583.0	9673.2	438.5	CCH
43	10579.9	9653.3	438.3	CCH
44	10576.7	9633.2	437.7	CCH

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COORDONNÉES SYSTÈME LOCAL
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 8, méridien central -73°30'00'')

DÉTAILS TOPOGRAPHIQUES (suite)

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
45	10574.7	9613.1	437.1	CCH
46	10573.4	9592.8	437.4	CCH
47	10574.7	9572.0	438.1	CCH
48	10574.0	9551.5	438.8	CCH
49	10568.6	9531.8	439.4	CCH
50	10561.3	9513.0	440.0	CCH
51	10553.0	9493.9	440.6	CCH
52	10539.6	9477.7	441.1	CCH
53	10521.4	9468.5	441.0	CCH
54	10500.9	9464.2	440.7	CCH
55	10480.1	9457.8	440.1	CCH
56	10460.1	9451.3	440.0	CCH
57	10439.5	9445.8	440.1	CCH
58	10419.7	9441.1	440.2	CCH
59	10399.3	9435.8	440.2	CCH
60	10379.5	9430.0	440.3	CCH
61	10358.3	9423.4	440.5	CCH
62	10338.8	9416.9	440.6	CCH
63	10318.6	9410.2	440.3	CCH
64	10299.7	9403.7	440.1	CCH
65	10279.5	9396.4	439.8	CCH
66	10258.7	9389.7	440.0	CCH
67	10237.7	9384.4	440.1	CCH
68	10218.0	9380.4	440.1	CCH
69	10196.7	9376.0	440.6	CCH
70	10175.2	9371.8	440.8	CCH
71	10155.1	9369.2	440.7	CCH
72	10135.0	9367.5	440.5	CCH
73	10114.5	9365.1	440.5	CCH
74	10092.5	9361.4	440.5	CCH
75	10070.8	9357.2	440.4	CCH
76	10049.6	9352.5	440.4	CCH
77	10029.5	9346.3	440.2	CCH
78	10007.4	9338.7	440.0	CCH
79	9988.1	9330.8	439.7	CCH
80	9967.6	9323.5	439.5	CCH
81	9947.6	9320.0	439.5	CCH
82	9927.1	9323.3	439.0	CCH
83	9907.1	9331.2	440.1	CCH

84	9888.5	9338.7	441.9	CCH
85	9868.0	9346.0	443.5	CCH
86	9847.6	9349.8	444.6	CCH
87	9826.6	9349.4	444.8	CCH
88	9812.8	9346.4	444.7	CCH

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COORDONNÉES SYSTÈME LOCAL
ALTITUDES SELON NIVEAU MOYEN DES MERS (NMM)
COORDONNÉES MÉTRIQUES
(Fuseau 8, méridien central -73°30'00'')

DÉTAILS TOPOGRAPHIQUES (suite)

PNT#	NORTH(Y)	EAST(X)	ELEVATION	DESCRIPTION
89	9794.4	9334.3	444.0	CCH
90	9779.0	9319.5	442.9	CCH
91	9767.0	9302.0	441.4	CCH
92	9760.5	9282.4	439.7	CCH
93	9757.8	9262.5	438.6	CCH
94	9755.1	9241.3	438.4	CCH
95	9750.9	9219.7	438.1	CCH
96	9743.1	9198.4	437.5	CCH
97	9733.3	9180.2	435.8	CCH
98	9724.3	9161.6	433.7	CCH
100	9717.9	9141.8	431.4	CCH
101	9713.2	9121.9	430.3	CCH
102	9710.0	9100.9	431.2	CCH
103	9707.1	9078.8	432.1	CCH
104	9700.4	9058.9	432.5	CCH
105	9689.2	9040.1	432.0	CCH
106	9677.2	9022.8	430.5	CCH
107	9664.4	9004.4	430.0	CCH

LÉGENDE:

CCH	:	Centre de chemin
VBMAGENDRON	:	Vieux repère-médaillon de A. Gendron

16.1.3 Mineralized envelope

In order to adequately define the mineralized envelopes, a mineralized solid is defined using geological description and grade information along the drill hole core.

The mineralized envelopes are built on sections and are subsequently connected and sliced on levels.

The interpretation of the mineralized structures (Lens / Porphyry Syenite dykes) started from well documented cross sections and interpretation from Cambior.

Survey topography and overburden thickness are taken into account in the creation of the solids.

In SGS Geostat Ltd. mineralized envelope interpretation there are 3 lenses instead of 4. Cambior Lenses #1 & #2 are together since they merge and are relatively continuous while the lenses #2 and #3 correspond to Cambior 3 & 4 respectively.

+ South lens #1 from 9975mN to 11750mN local grid (in BLKCAD label PART2)
+ Center lens #2 from 11663mN to 12785mN local grid (in BLKCAD label PART1)
+ North lens #3 from 12625mN to 13395mN local grid (in BLKCAD label PART0)

The following figures present the interpretation on sections which has been meshed afterward in SECTCAD and then loaded in BLKCAD for regular block model resource estimation purposes.

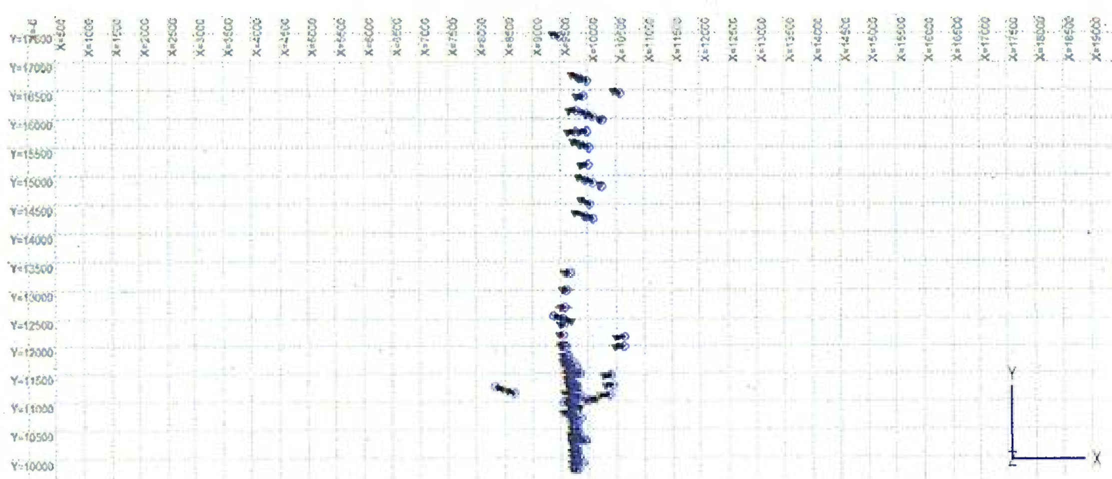
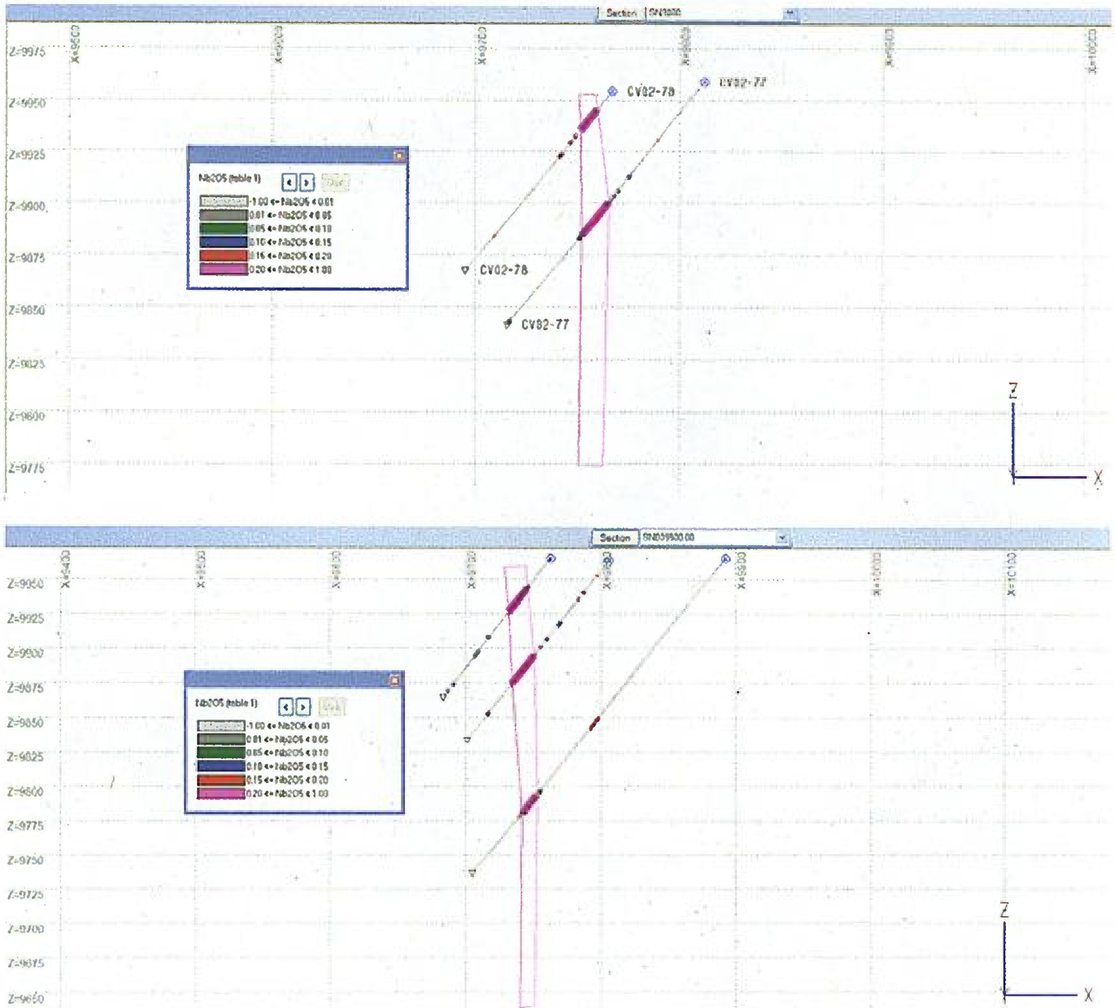
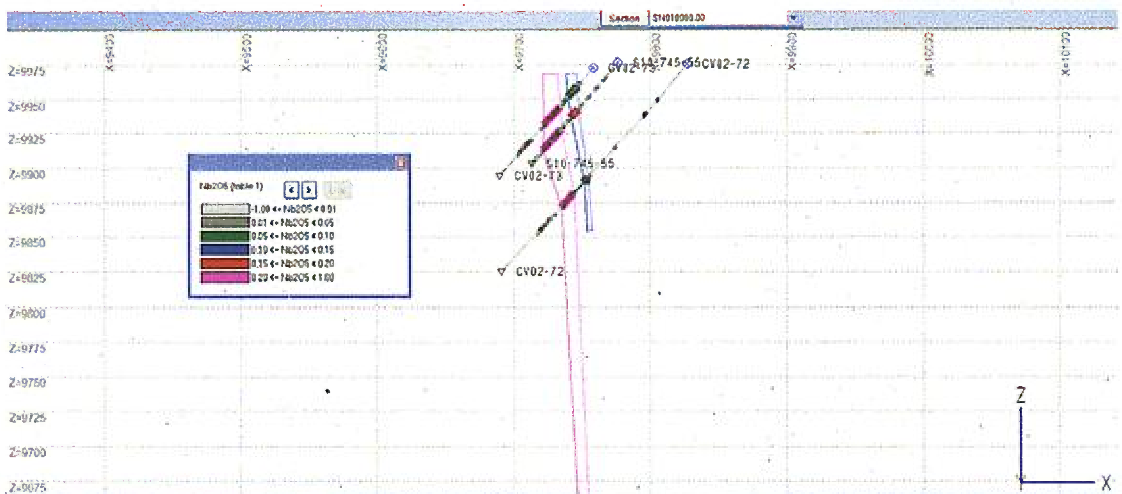
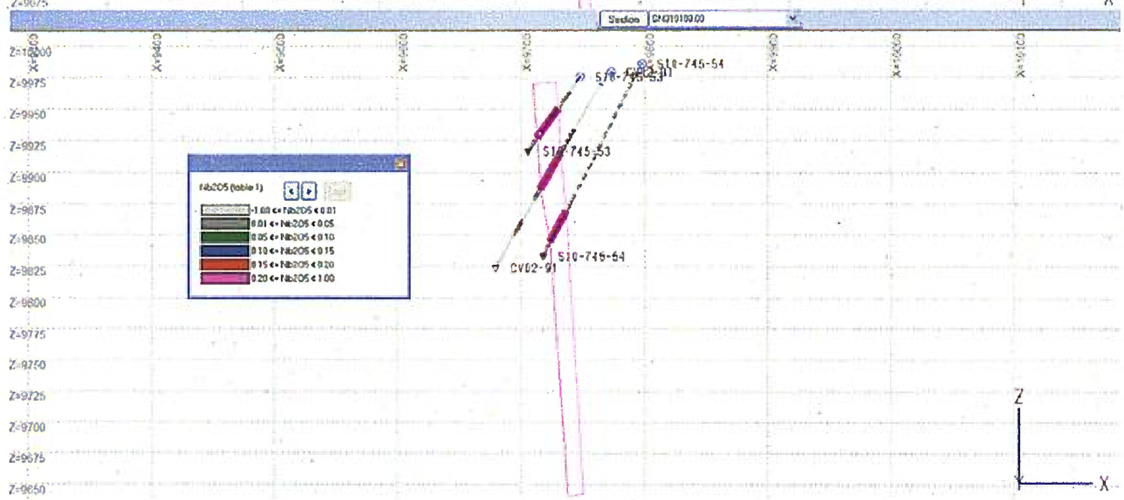


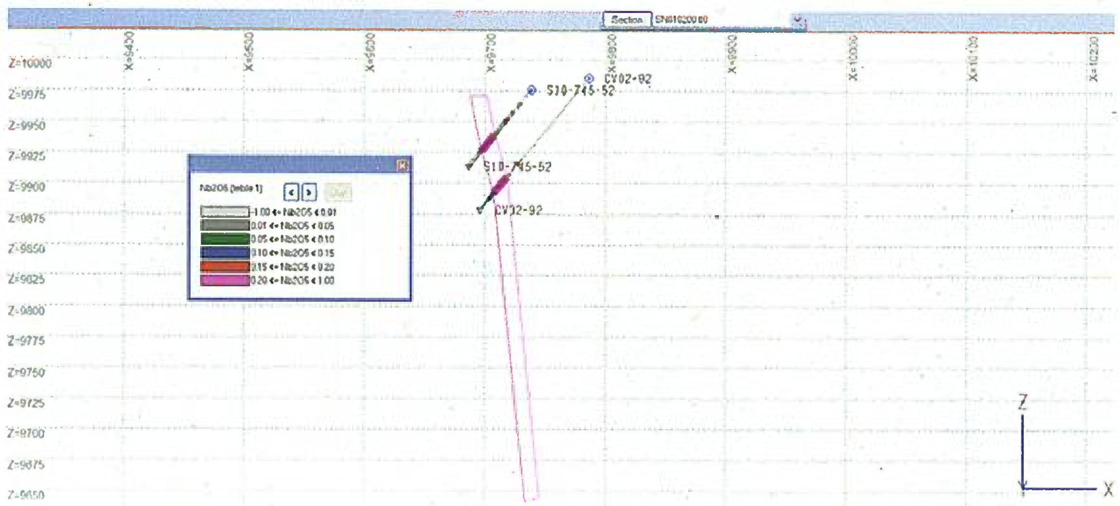
Figure 71: Drill hole layout in plan view local coordinates (Y being north of local grid 321° North)

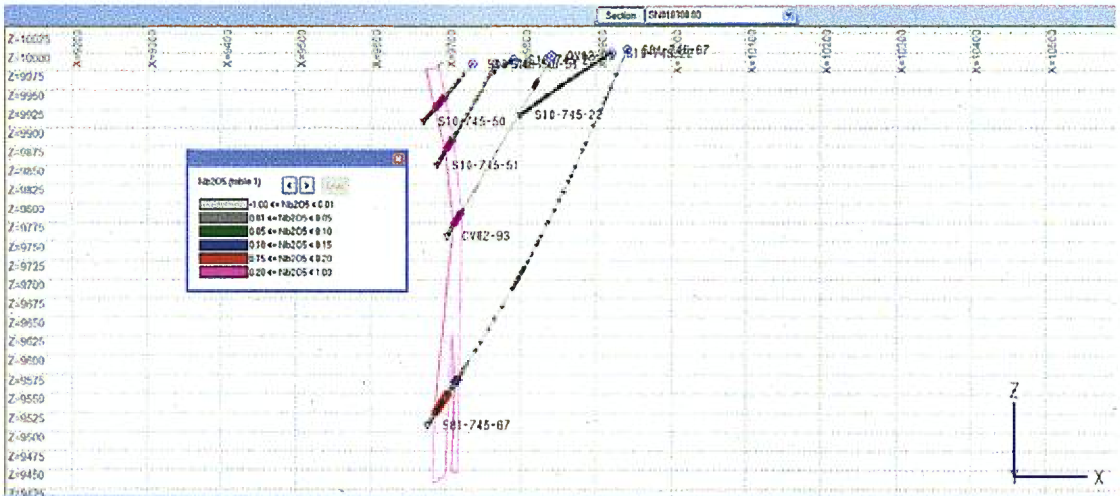
Figure 72: Cross sections from 9800N to 13300N

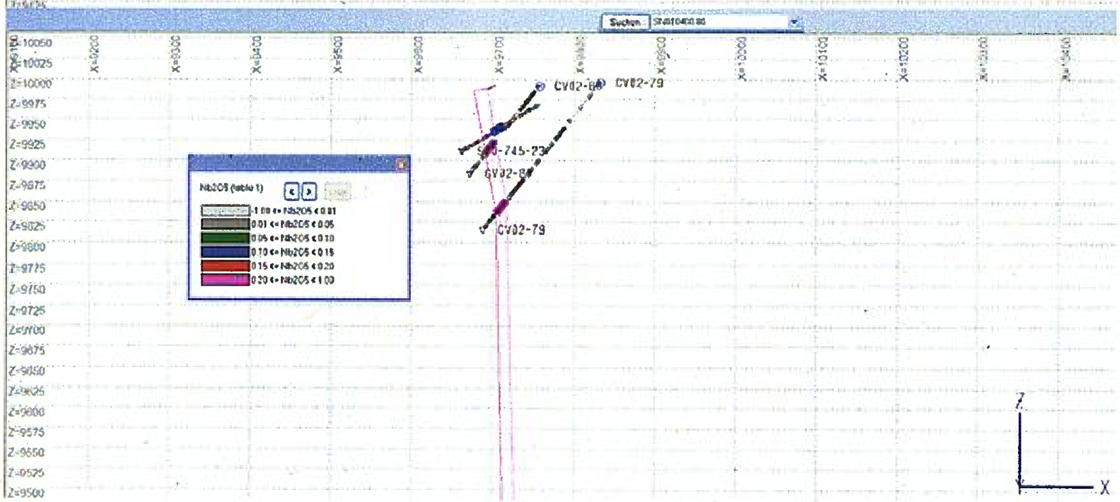


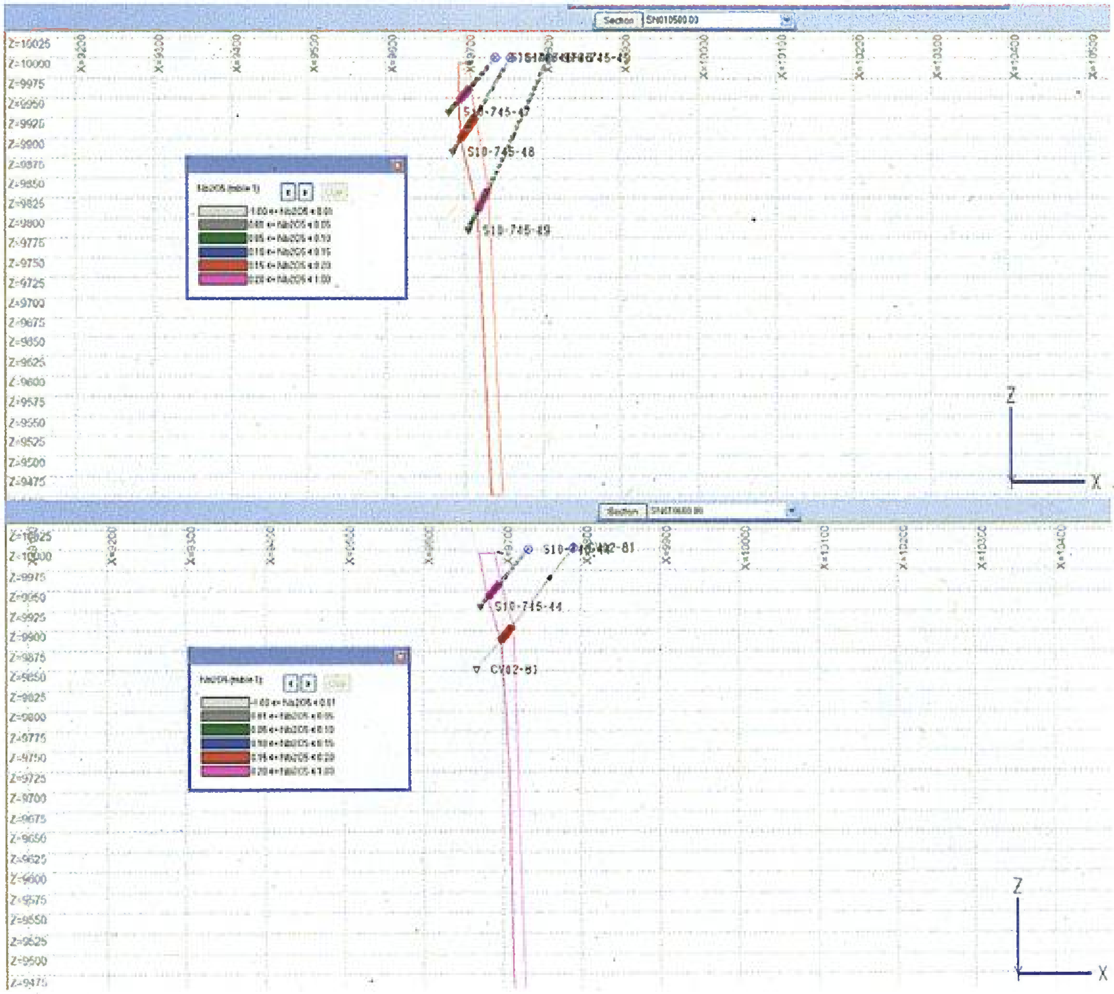

Section
CV02-72
CV02-73
S10-745-55
Z
X

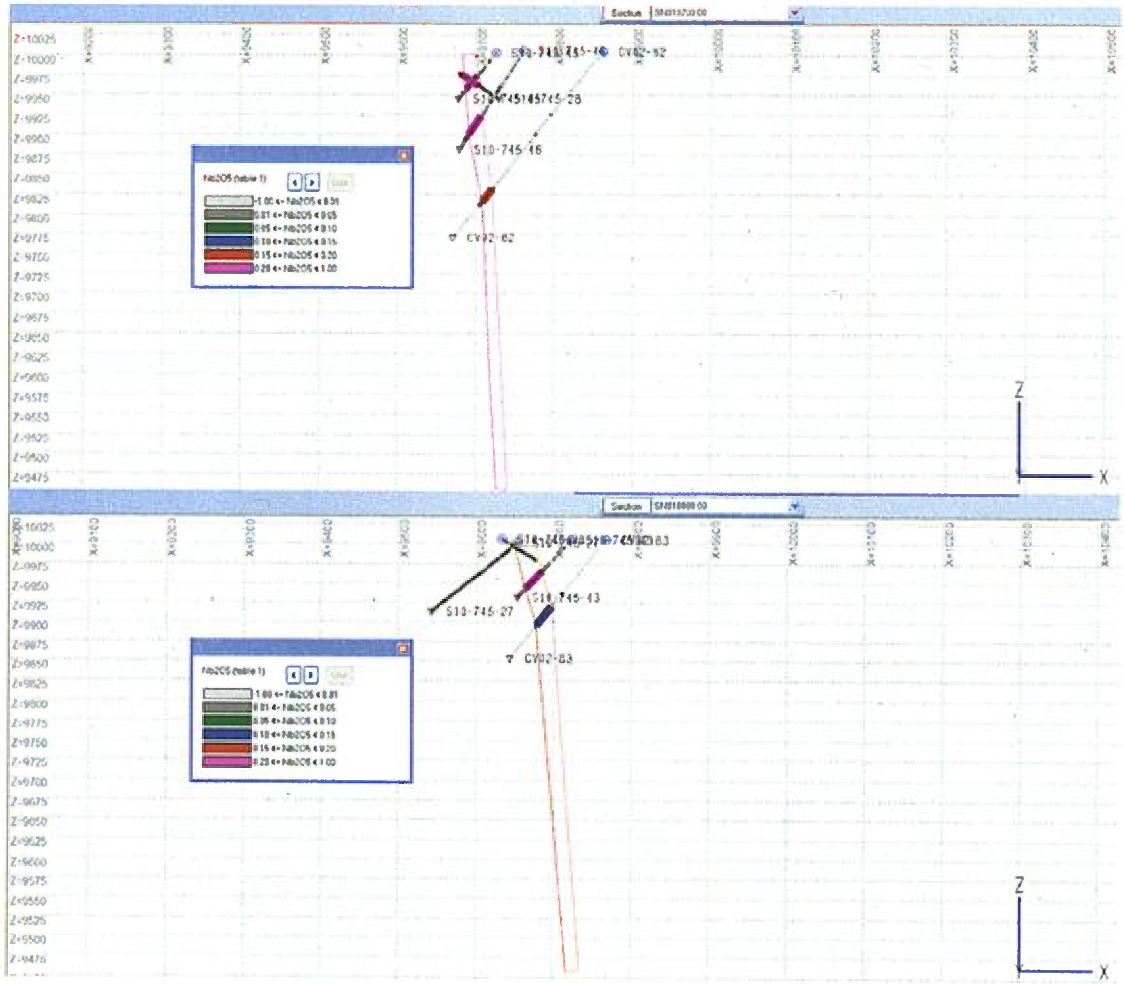

Section
S10-745-54
S10-745-53
CV02-91
Z
X

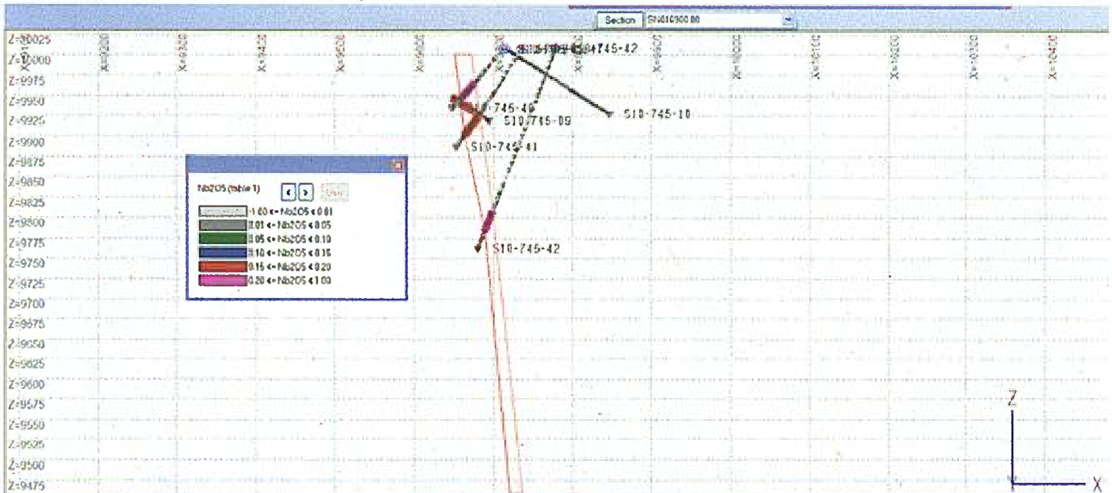

Section
Z=10000
Z=9975
Z=9950
Z=9925
Z=9900
Z=9875
Z=9850
Z=9825
Z=9800
Z=9775
Z=9750
Z=9725
Z=9700
Z=9675
Z=9650
CV02-92
S10-745-52
S10-745-52
CV02-92
-1.00 <= Nb2O5 < 0.01
0.01 <= Nb2O5 < 0.05
0.05 <= Nb2O5 < 0.10
0.10 <= Nb2O5 < 0.15
0.15 <= Nb2O5 < 0.20
0.20 <= Nb2O5 < 1.00
Z
X

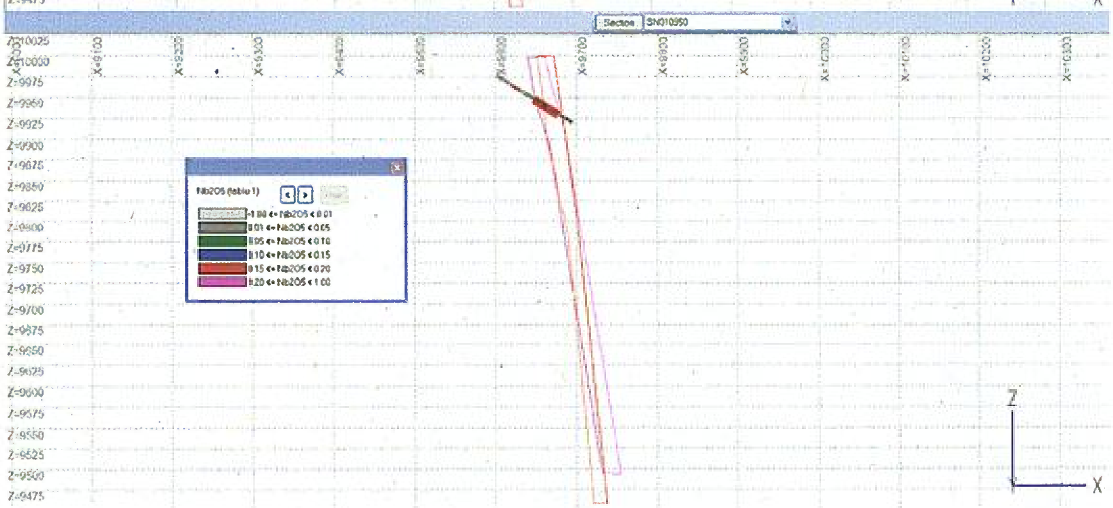

S10-745-22
S10-745-51
CV02-93
Z
X

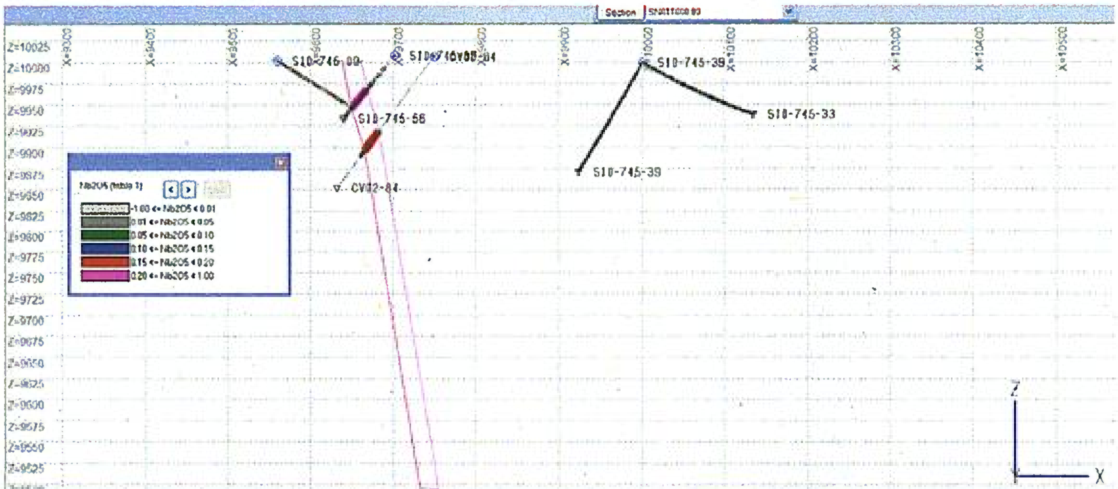

CV02-79
Z
X

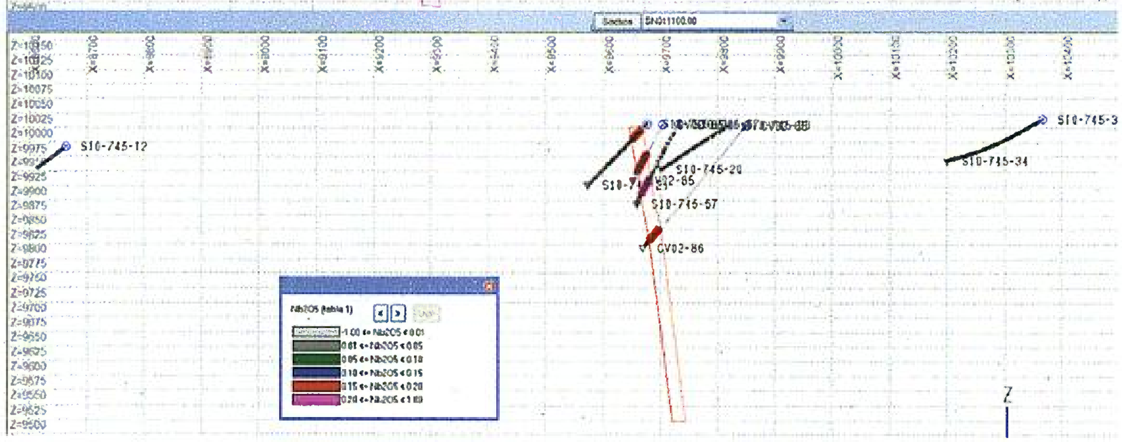

S10-745-48
S10-745-49
S10-745-44
CV02-81
Z
X

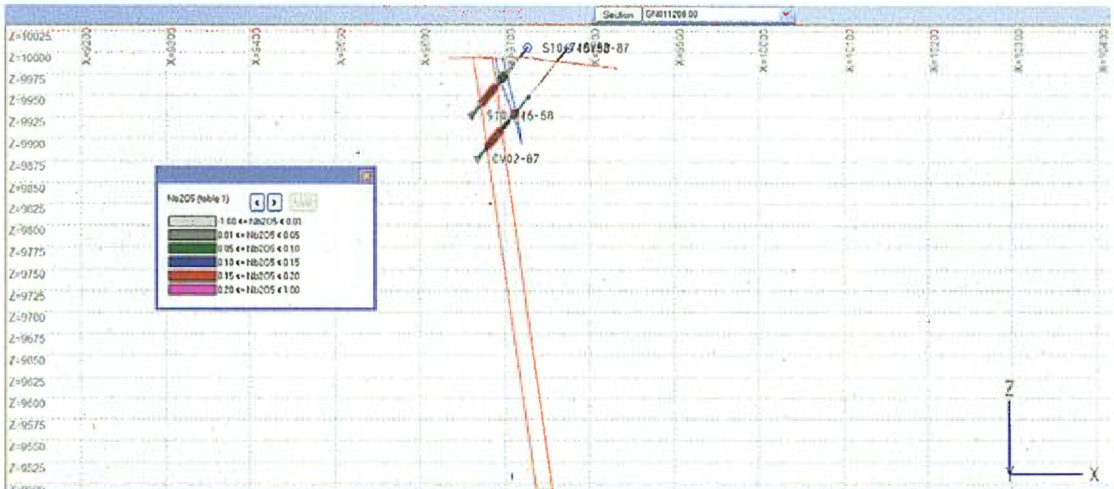

Section
CV02-82
S10-745-16
CV02-82
S10-745-43
S10-745-27
CV02-83
Z
X

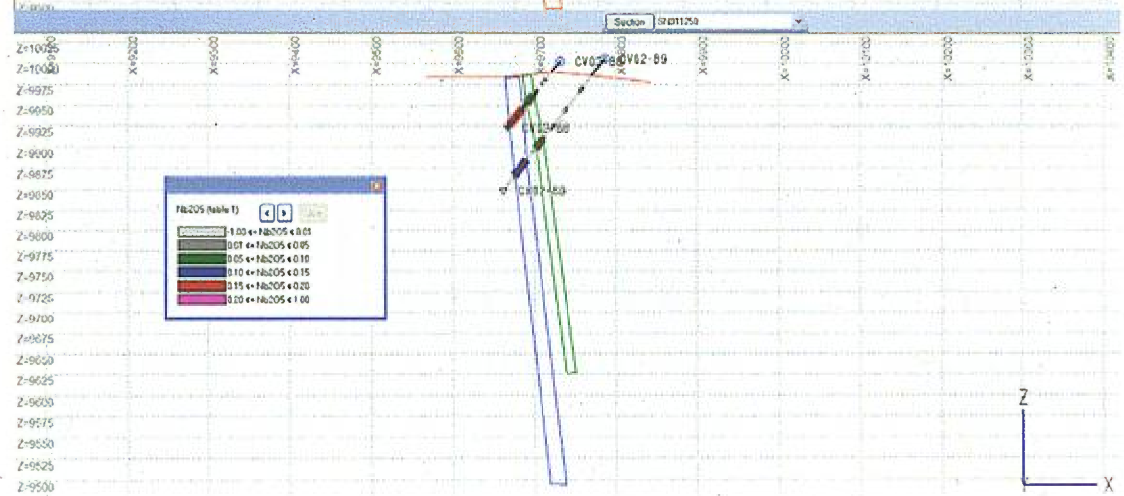

Section
S10-745-10
S10-745-09
S10-745-42
Z
X

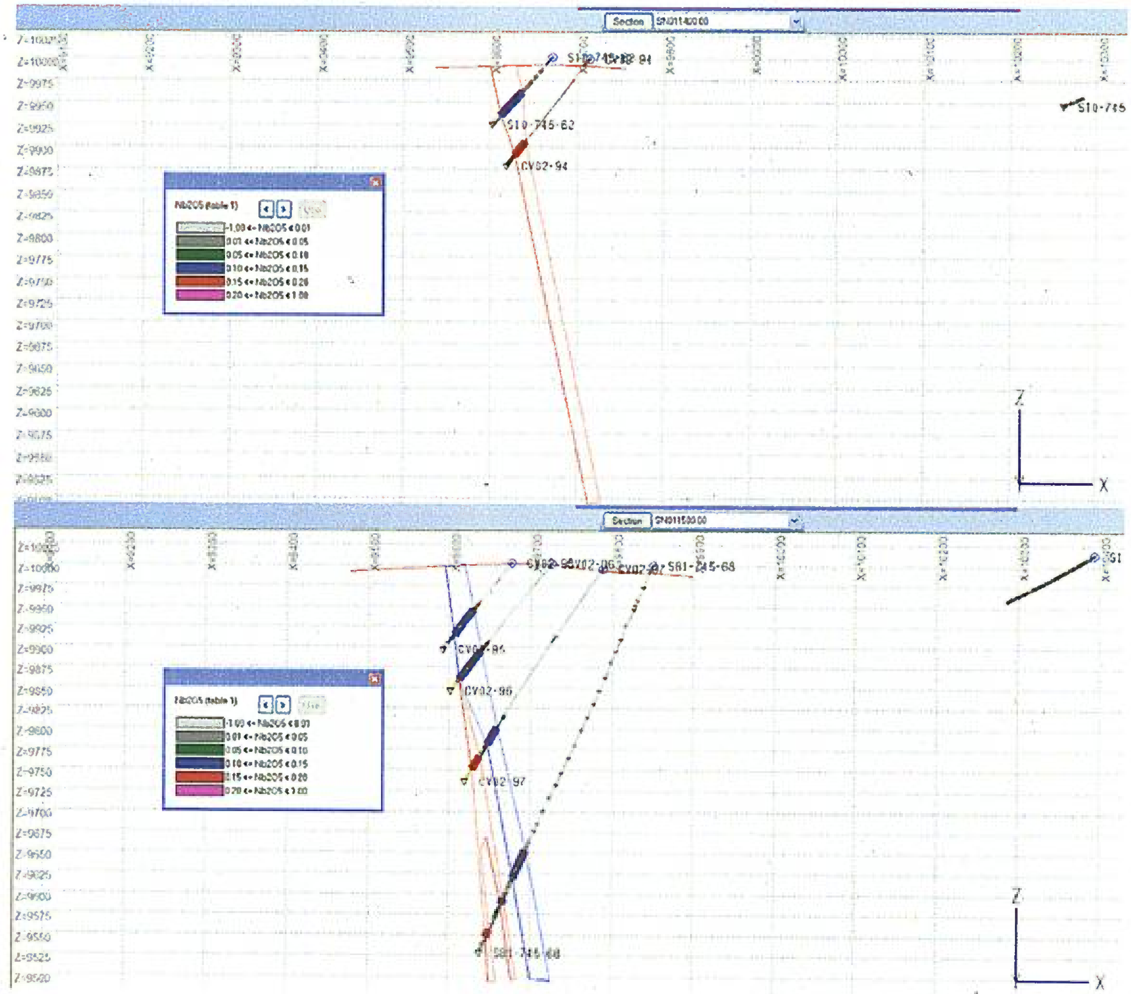

Section
Z
X

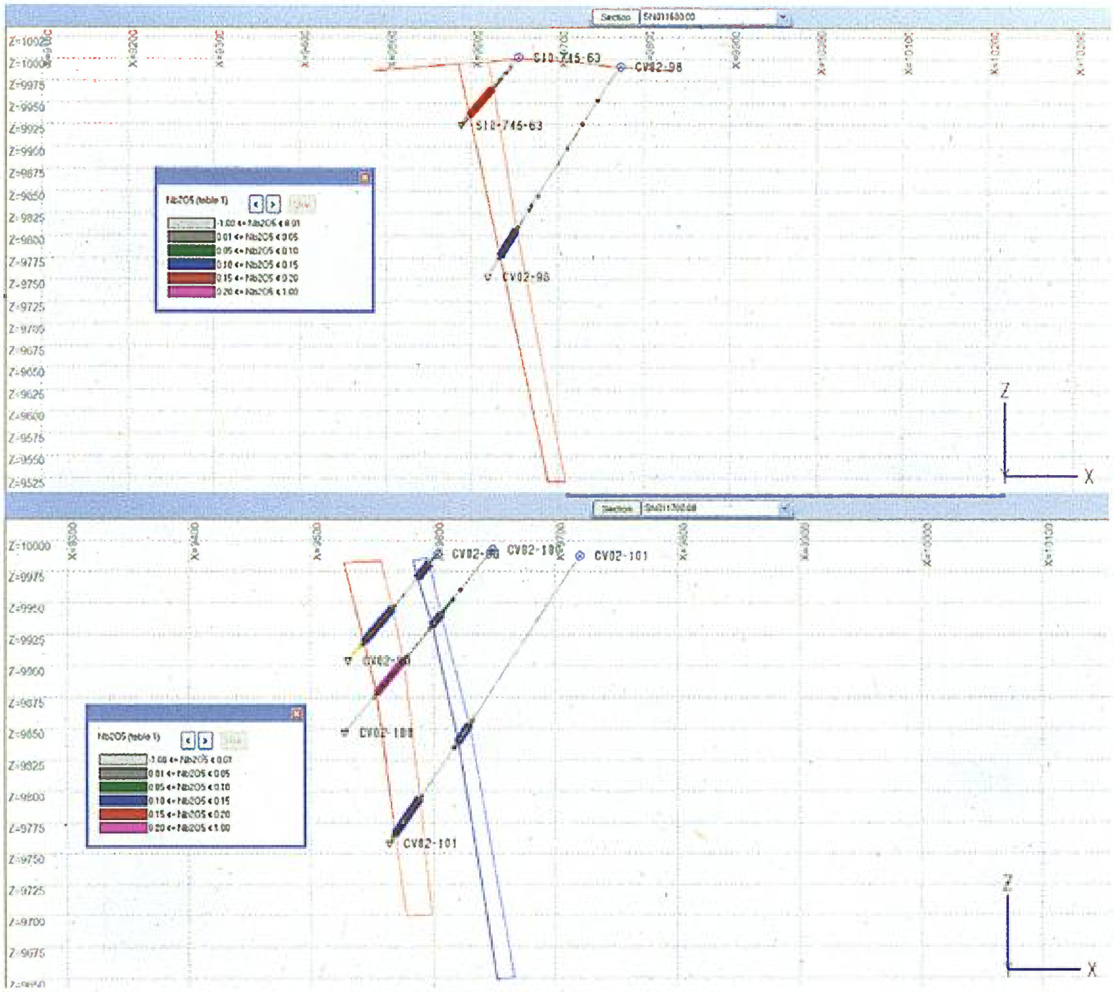

S10-745-56
S10-745-33
S10-745-39
CV02-84

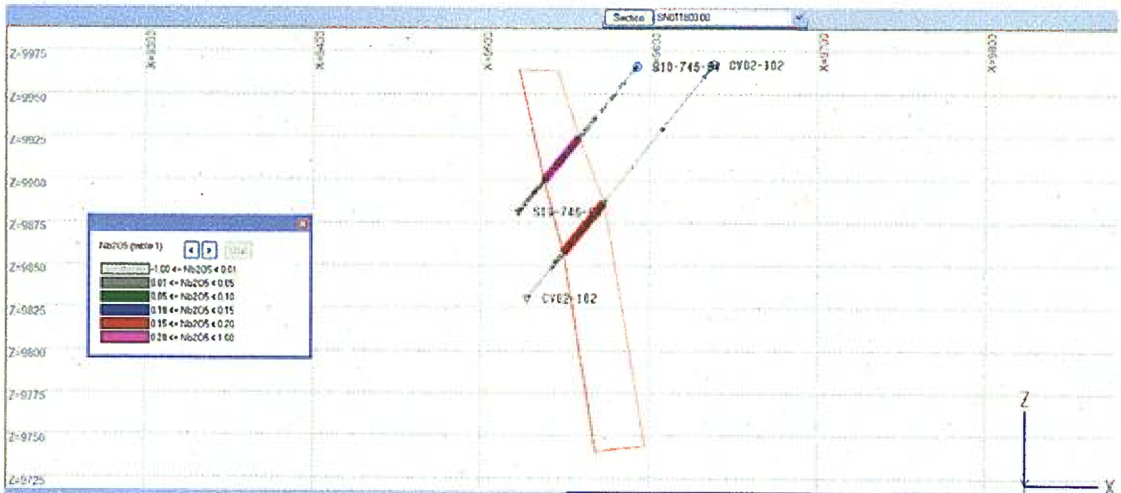

S10-745-12
S10-745-20
S10-745-57
CV02-86
S10-745-34

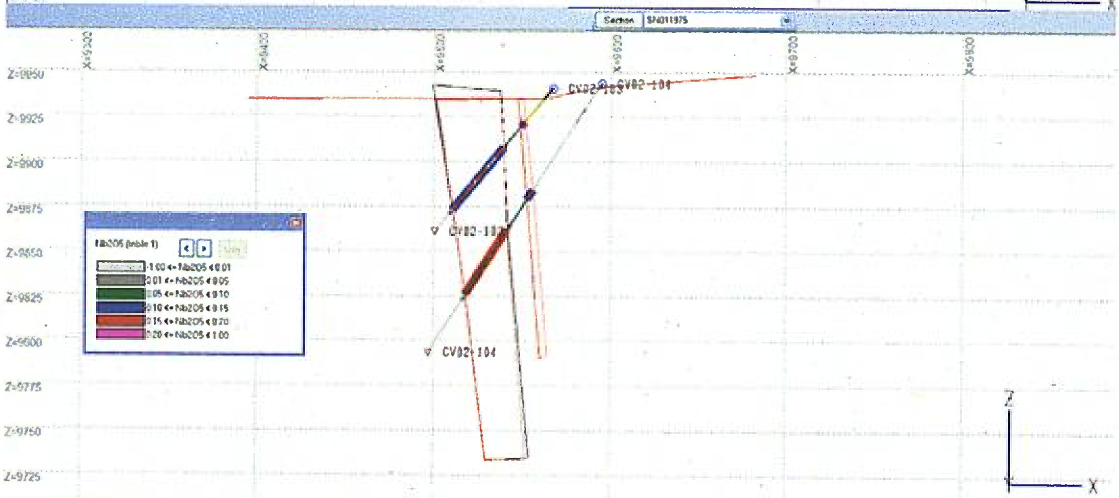

Section
CV02-87
Z
X

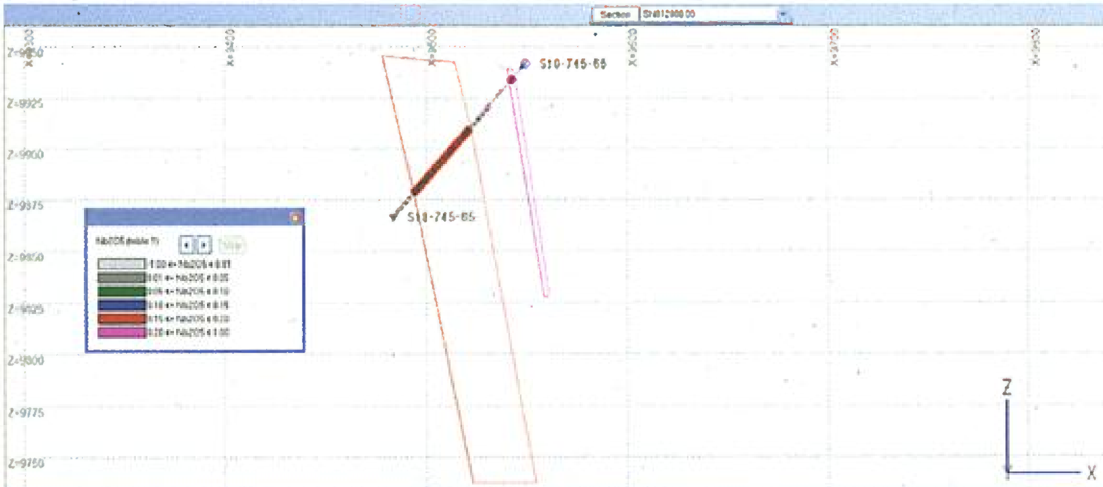

Section
Z
X

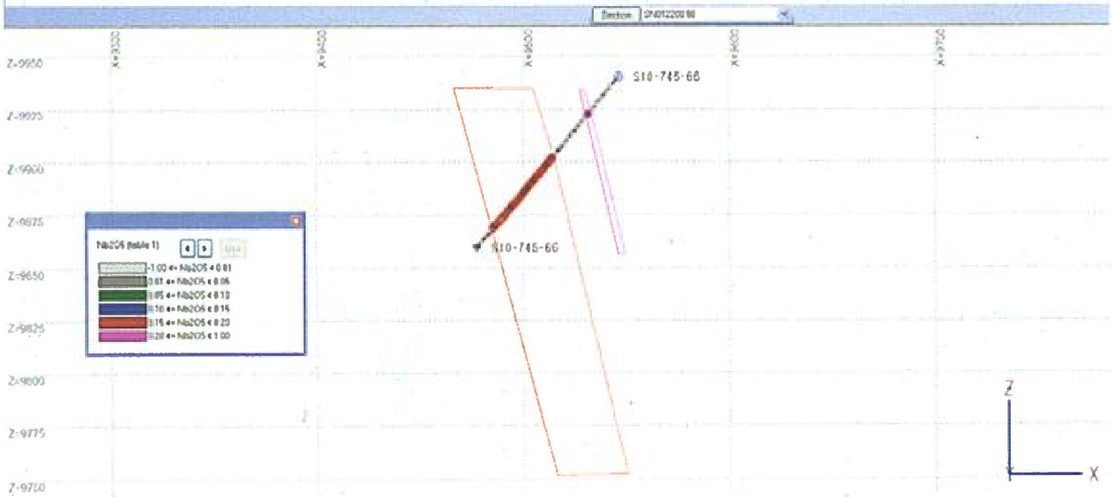

S10-745-62
CV02-94
S10-745
CV02-95
CV02-96
CV02-97
S81-745-68
Z
X

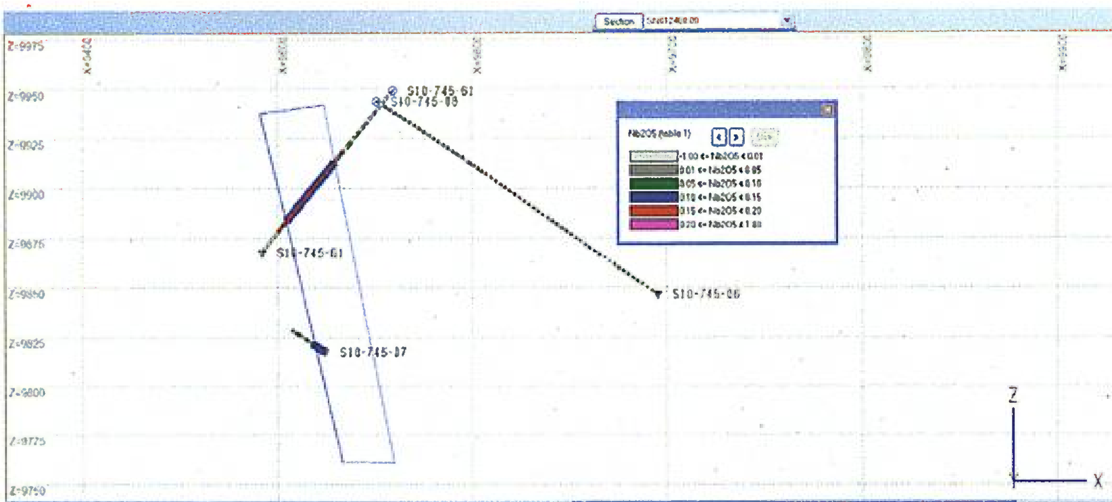

S10-745-63
CV02-98
CV02-101
Z
X

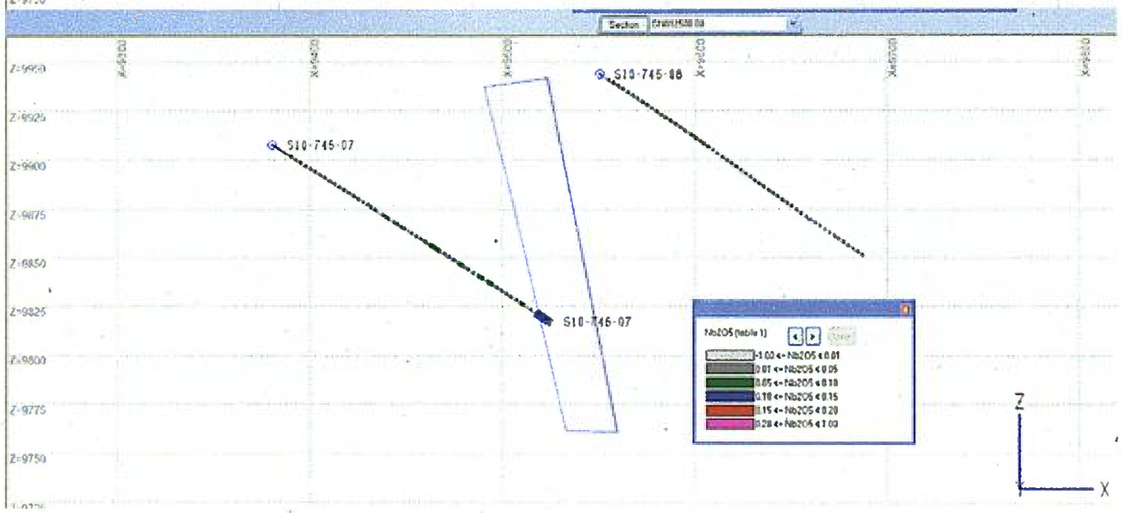

CV02-102
CV02-102

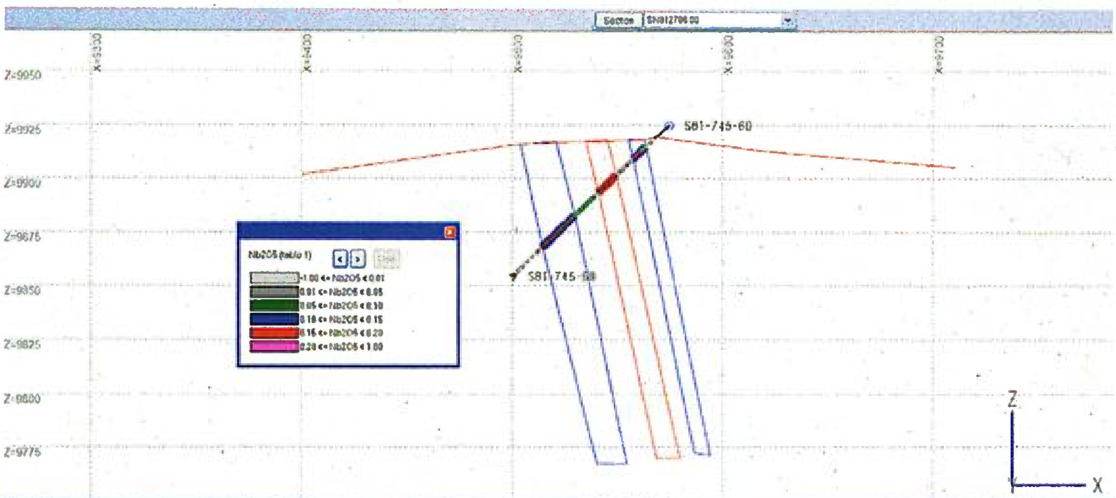

CV02-104

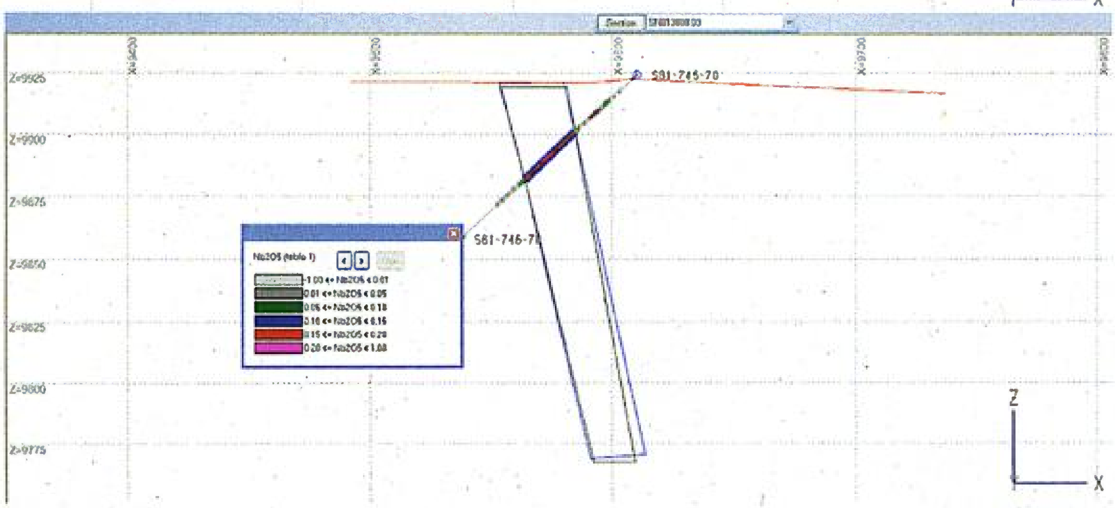

S10-745-65
S10-745-66
Z
X

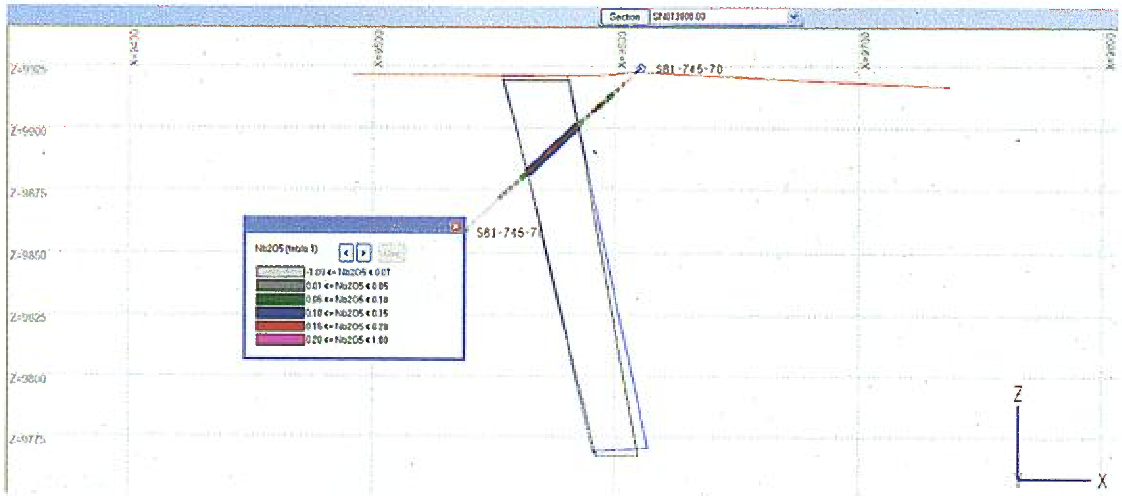

S10-745-66
S10-745-66
Z
X


S10-745-61
S10-745-08
S10-745-07
Z
X


S10-745-08
S10-745-07
Z
X


S81-745-60
S81-745-60
Z
X


S81-745-70
Z
X



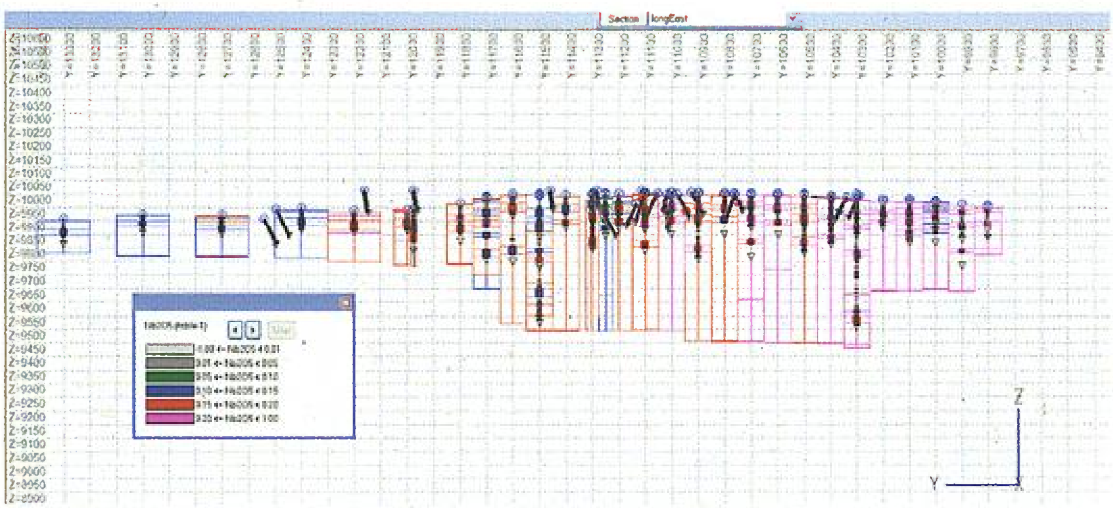


Figure 73: Longitudinal view of sectional interpretation footprint

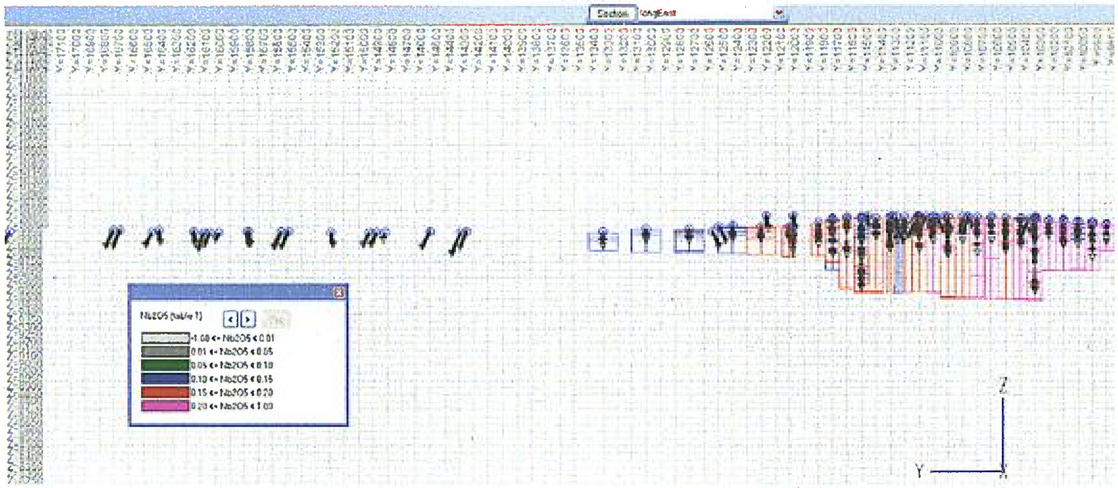


Figure 74: Longitudinal view of all holes looking East

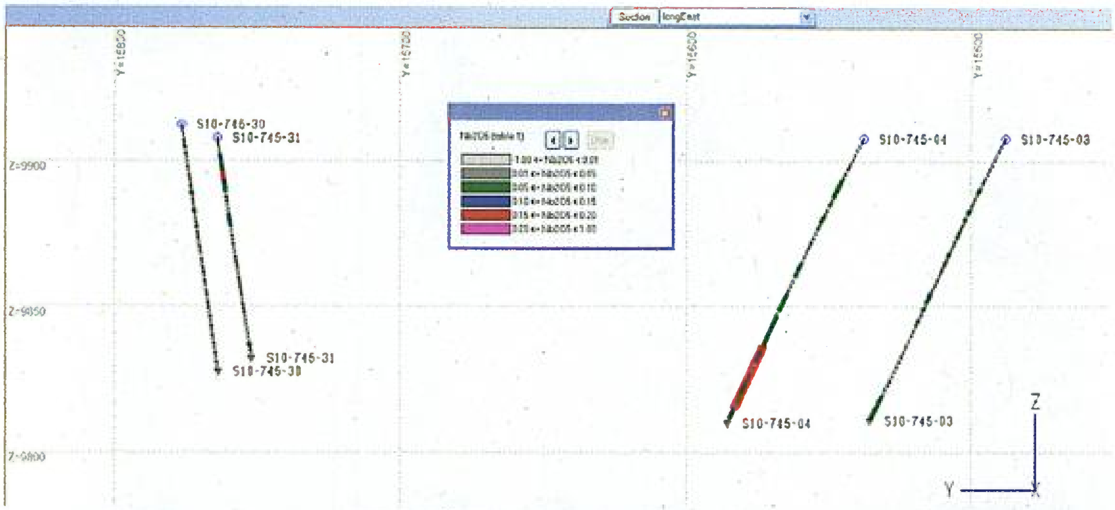


Figure 75: Dyke recognized at 15550mN high grade zone target in hole 10-745-04 long view.

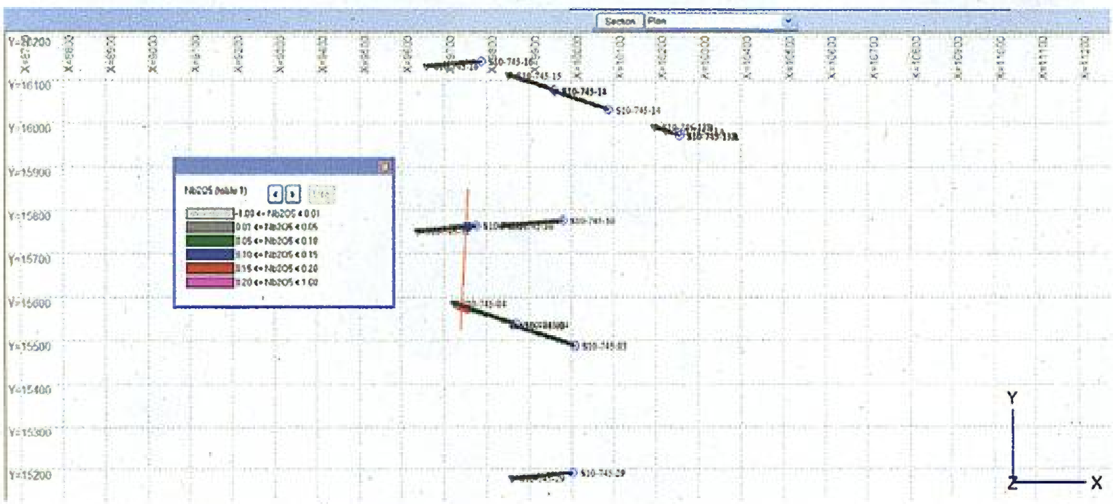


Figure 76: Exploration target, dyke sector 15600mN plan view

The structure having an average horizontal thickness about 20m, it is easy to miss it, as shown here from the old exploration data. This sector is a high priority for development of resources.

Moreover it is important to mention that satellite lenses are not taken in account in the resource estimation, they may be defined on sections as shown in previous figures but if they do not connect to the main lenses, then the tonnage is not taken in account in the resource statement.

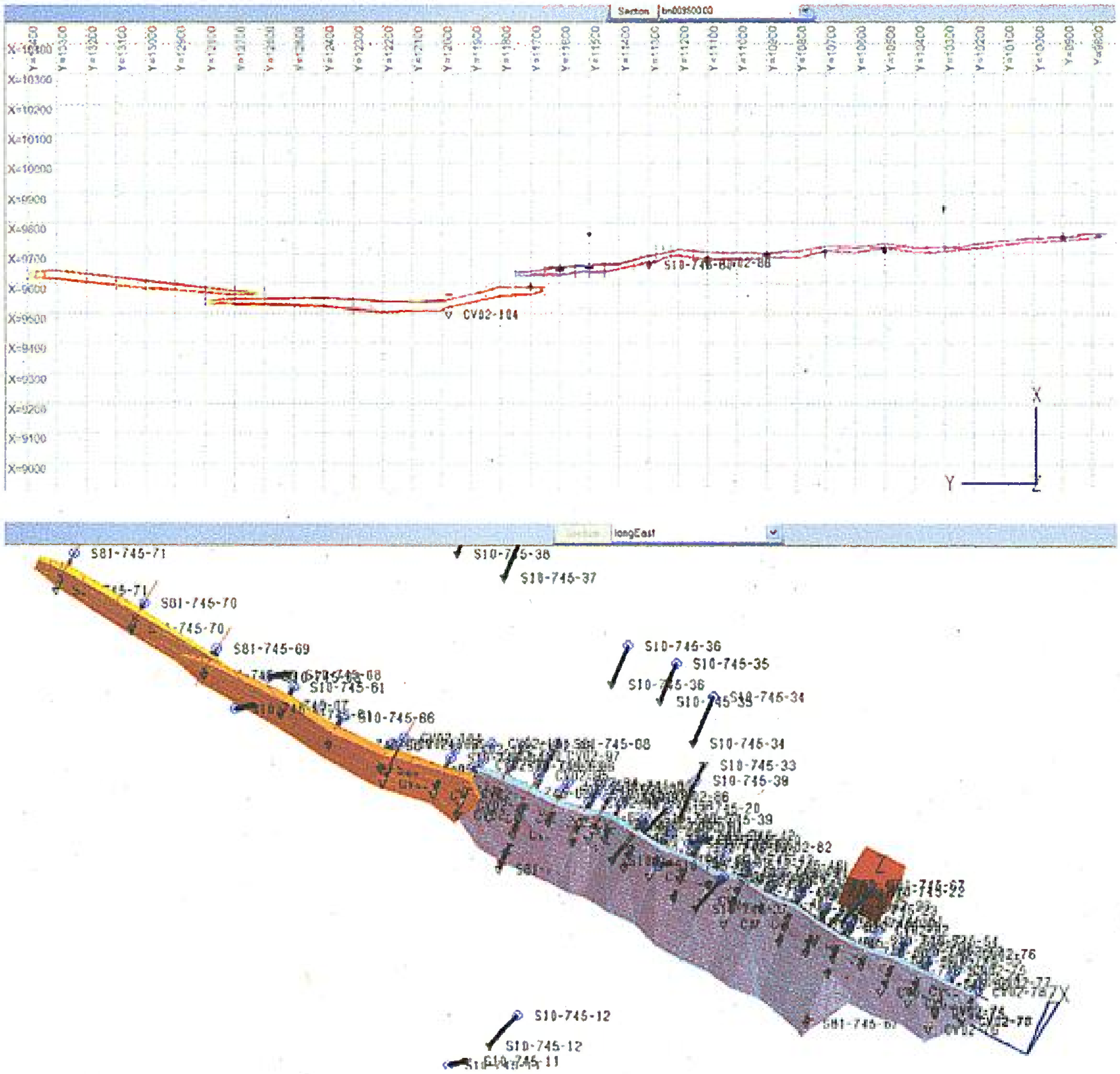


Figure 77: The 3 mineralized zones at elevation 9800 and isometric view

The above figure presents the 3 zones as modelled by SGS Geostat Ltd. The following figure shows the lens looking East as a longitudinal projection.

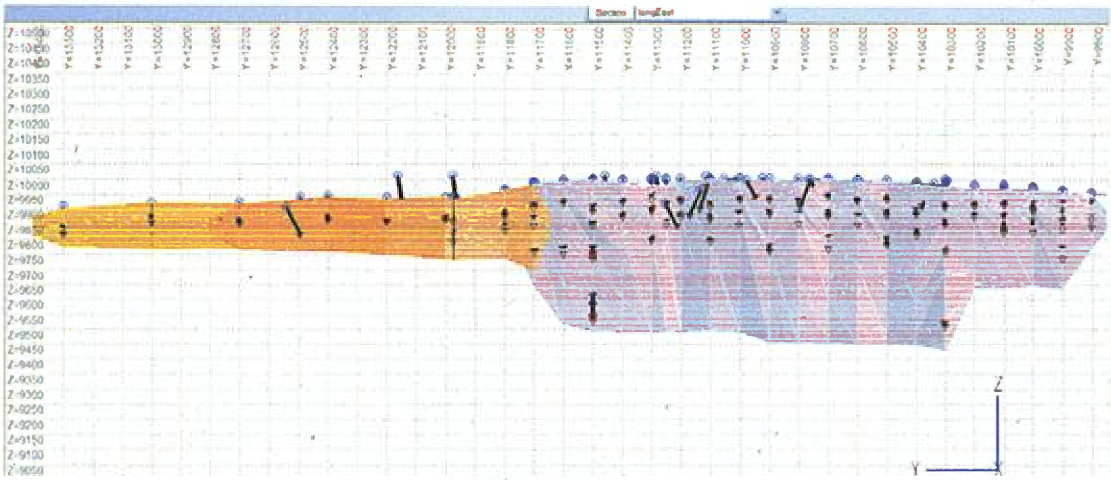


Figure 78: Longitudinal view of the mineralized lenses as per SGS Geostat Ltd

The Nb-Ta mineralization is recognized along a 3.5 km strike length and down to 500m below surface, it is open in both directions and at depth.

16.1.4 Mineralized intersections

Mineralized intersections are that part of drill holes or channel samples inside the interpreted limits of mineralized zones. Most intersections in drill holes are complete (start and end points at zone limits).

A total of 90 intersections have been defined from the 105 holes, some holes having intersected more than one zone.

The following table is the list of the intersection limit file used for the creation of standard length composites.

Hole name	From(m)	To(m)	Type	Ta_2O_5(ppm)	Nb_2O_5(%)	Length(m)
CV02-100	66.10	78.30	ore	150	0.13	12.20
CV02-100	114.20	148.80	ore	292	0.22	34.60
CV02-101	162.90	179.50	ore	123	0.12	16.60
CV02-101	234.10	269.20	ore	206	0.13	35.10
CV02-102	103.40	141.50	ore	180	0.16	38.10
CV02-103	24.90	28.70	ore	312	0.31	3.80
CV02-103	43.20	88.40	ore	141	0.14	45.20
CV02-104	70.60	76.90	ore	103	0.11	6.30
CV02-104	97.50	140.70	ore	174	0.17	43.20
CV02-72	125.40	139.20	Ore	368	0.40	13.80
CV02-72	109.70	114.30	Ore	107	0.10	4.60
CV02-73	37.30	55.70	Ore	216	0.25	18.40
CV02-73	17.70	28.10	Ore	58	0.08	10.40
CV02-74	27.50	49.50	Ore	201	0.24	22.00
CV02-75	88.00	114.20	Ore	198	0.22	26.20
CV02-76	221.30	238.30	Ore	270	0.30	17.00
CV02-77	74.80	96.00	Ore	165	0.21	21.20
CV02-78	11.60	24.60	Ore	167	0.25	13.00
CV02-79	185.60	205.80	ore	236	0.24	20.20
CV02-80	87.80	107.80	ore	185	0.20	20.00
CV02-81	122.80	147.00	ore	207	0.20	24.20
CV02-82	223.90	243.90	ore	194	0.17	20.00
CV02-83	110.70	142.00	ore	147	0.13	31.30
CV02-84	110.30	139.30	ore	174	0.16	29.00
CV02-85	55.80	92.60	ore	161	0.16	36.80
CV02-86	231.70	261.50	ore	207	0.18	29.80
CV02-87	122.80	149.60	ore	200	0.16	26.80
CV02-87	96.30	101.20	ore	174	0.15	4.90
CV02-88	71.60	98.10	ore	176	0.15	26.50
CV02-88	51.20	64.20	ore	131	0.10	13.00
CV02-89	121.80	136.20	ore	107	0.09	14.40
CV02-89	153.70	177.80	ore	151	0.14	24.10
CV02-90	29.80	62.50	ore	194	0.14	32.70
CV02-91	76.20	109.50	Ore	290	0.29	33.30
CV02-92	105.10	122.20	ore	215	0.24	17.10
CV02-93	237.90	260.10	ore	245	0.27	22.20

CV02-94	119.50	139.10	ore	159	0.16	19.60
CV02-95	73.70	112.70	ore	146	0.13	39.00
CV02-96	138.40	182.50	ore	124	0.12	44.10
CV02-97	235.30	258.90	ore	165	0.14	23.60
CV02-97	275.40	294.50	ore	276	0.18	19.10
CV02-98	221.10	256.80	ore	154	0.12	35.70
CV02-99	57.10	92.50	ore	195	0.15	35.40
CV02-99	10.10	25.40	ore	179	0.13	15.30
S10-745-07	167.94	176.17	ore	371	0.14	8.23
S10-745-09	106.68	143.26	ore	194	0.18	36.58
S10-745-21	13.72	41.15	ore	200	0.18	27.43
S10-745-23	92.96	111.25	ore	153	0.14	18.29
S10-745-28	57.91	86.87	ore	237	0.23	28.96
S10-745-40	54.50	81.62	ore	208	0.21	27.12
S10-745-41	96.05	128.29	ore	213	0.20	32.24
S10-745-42	214.18	242.16	ore	197	0.20	27.98
S10-745-43	53.95	85.88	ore	206	0.26	31.93
S10-745-44	53.75	78.95	ore	212	0.25	25.20
S10-745-45	36.63	60.82	ore	224	0.25	24.19
S10-745-46	97.98	127.67	ore	236	0.23	29.69
S10-745-47	49.06	72.01	ore	193	0.22	22.95
S10-745-48	85.73	121.17	ore	168	0.18	35.44
S10-745-49	181.90	211.91	ore	208	0.20	30.01
S10-745-50	55.65	78.20	ore	215	0.24	22.55
S10-745-51	112.75	132.63	ore	289	0.33	19.88
S10-745-52	47.41	64.72	ore	168	0.26	17.31
S10-745-53	30.62	59.73	Ore	197	0.20	29.11
S10-745-54	132.00	160.06	Ore	292	0.31	28.06
S10-745-55	63.74	83.93	Ore	171	0.21	20.19
S10-745-55	44.67	52.54	Ore	137	0.16	7.87
S10-745-56	52.27	82.31	ore	233	0.27	30.04
S10-745-57	104.55	139.53	ore	261	0.25	34.98
S10-745-58	57.03	85.91	ore	166	0.18	28.88
S10-745-58	39.97	50.66	ore	111	0.09	10.69
S10-745-59	91.20	122.64	ore	182	0.17	31.44
S10-745-60	183.62	219.80	ore	240	0.19	36.18
S10-745-61	46.68	85.65	ore	179	0.14	38.97
S10-745-62	52.25	88.87	ore	181	0.15	36.62
S10-745-63	46.10	88.17	ore	243	0.20	42.07
S10-745-64	54.02	86.13	ore	251	0.21	32.11
S10-745-65	41.67	84.55	ore	209	0.17	42.88
S10-745-65	8.30	11.98	ore	316	0.21	3.68
S10-745-66	48.77	94.78	ore	181	0.17	46.01
S10-745-66	21.10	24.30	ore	334	0.41	3.20
S81-745-67	486.30	498.04	ore	188	0.12	11.74
S81-745-67	510.88	544.77	ore	156	0.17	33.89
S81-745-68	381.04	418.19	ore	114	0.10	37.15
S81-745-68	444.97	452.74	ore	192	0.13	7.77
S81-745-68	486.92	497.10	ore	209	0.17	10.18

S81-745-69	34.15	46.04	ore	255	0.17	11.89
S81-745-69	14.94	23.48	ore	195	0.13	8.54
S81-745-69	61.59	83.20	ore	135	0.10	21.61
S81-745-70	34.45	62.80	ore	213	0.14	28.35
S81-745-71	65.20	97.60	ore	200	0.11	32.40

Table 19: List of mineralized intersections for ore zone definition

Average core length mineralization is 24.58m.

16.1.5 Compositing of assay intervals within mineralized intercepts

Since original assay intervals do not have the same length, and higher assays tend to apply to rather short intervals, it is necessary to standardize the length of the grade "support" through numerical compositing before assigning grades to dimensionless "points" in the 3D space (the composite centers) in the block grade interpolation.

The majority of assay intervals have a length of 1.5m. The selectivity of 1.5m is not commonly achievable in bulk tonnage mining, therefore a 2.5m standard length has been elected. This also allows for internal smoothing and internal dilution, since it could be difficult and unrealistic in the Crevier context to exclude Syenite Nepheline inclusions of smaller dimension within a blast.

The capping analysis has been done after compositing in 2.5m length.

Compositing is done down hole from the start of mineralized intercepts. Missing assays are assumed to be zero grade. At the end of the mineralized intercepts, the last composite kept is the one with at least a 1.5 meter length. A total of 928 valid 2.5 meter composites are defined in this manner for all zones. It is important to mention that only composites within the envelope and its vicinity have been used to estimate the mineralized zones. The composites are calculated from original uncapped samples.

Based on the following cumulative frequency diagrams, the %Nb_2O_5 were capped at 0.5% and 550 ppm for Ta_2O_5.
The following graphs and statistics are generated from uncapped composites.

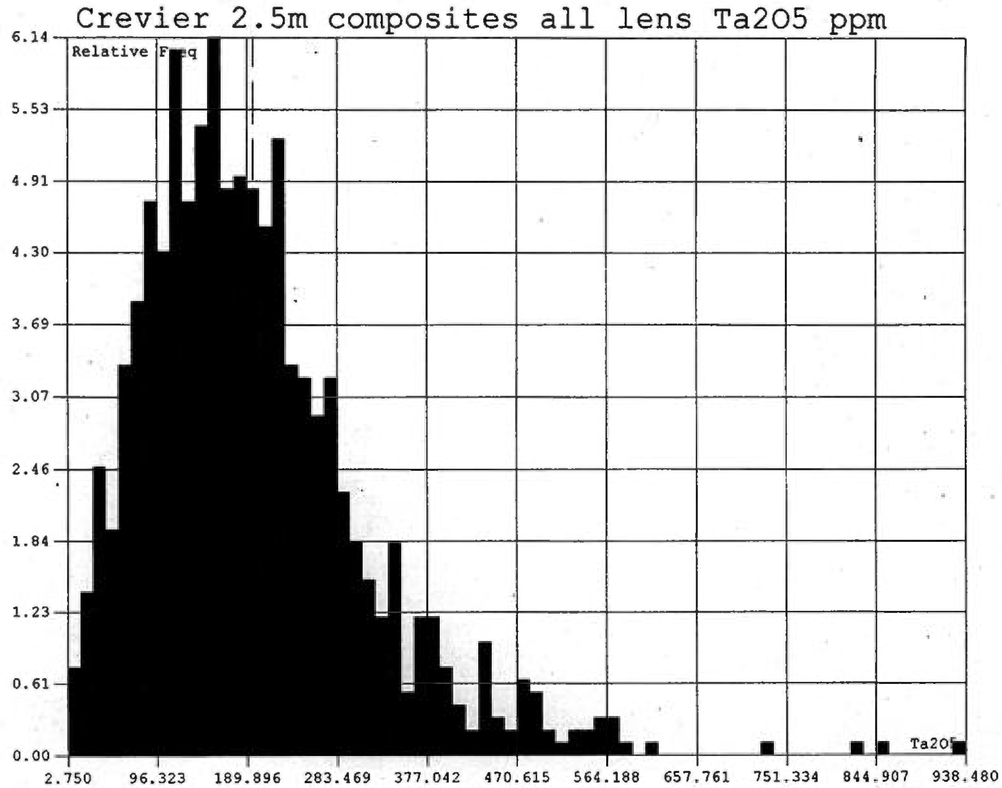


Figure 79: Histogram of Ta_2O_5 in ppm

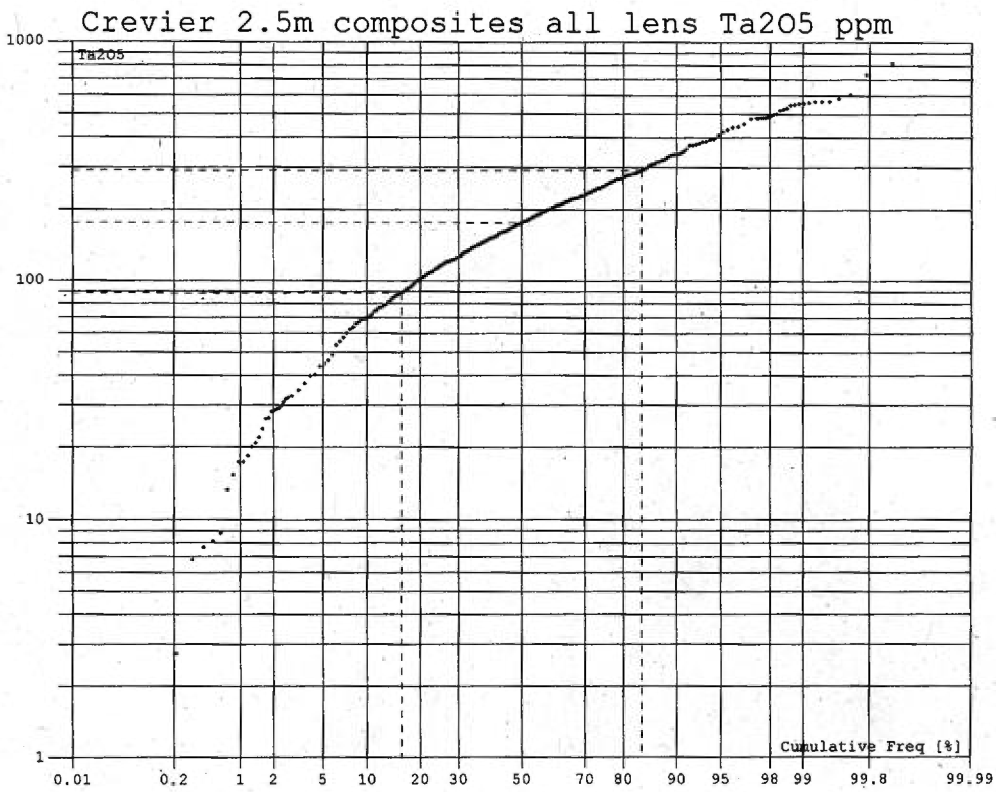


Figure 80: Cumulative frequency diagram of Ta_2O_5 in ppm

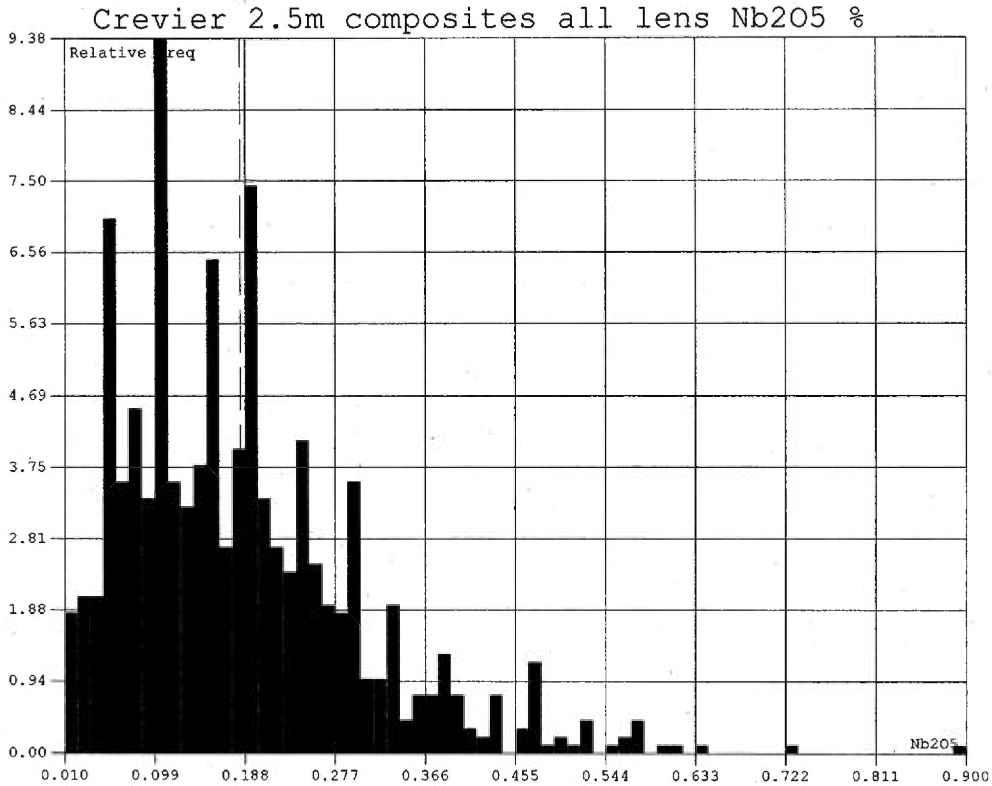


Figure 81: Histogram of %Nb_2O_5

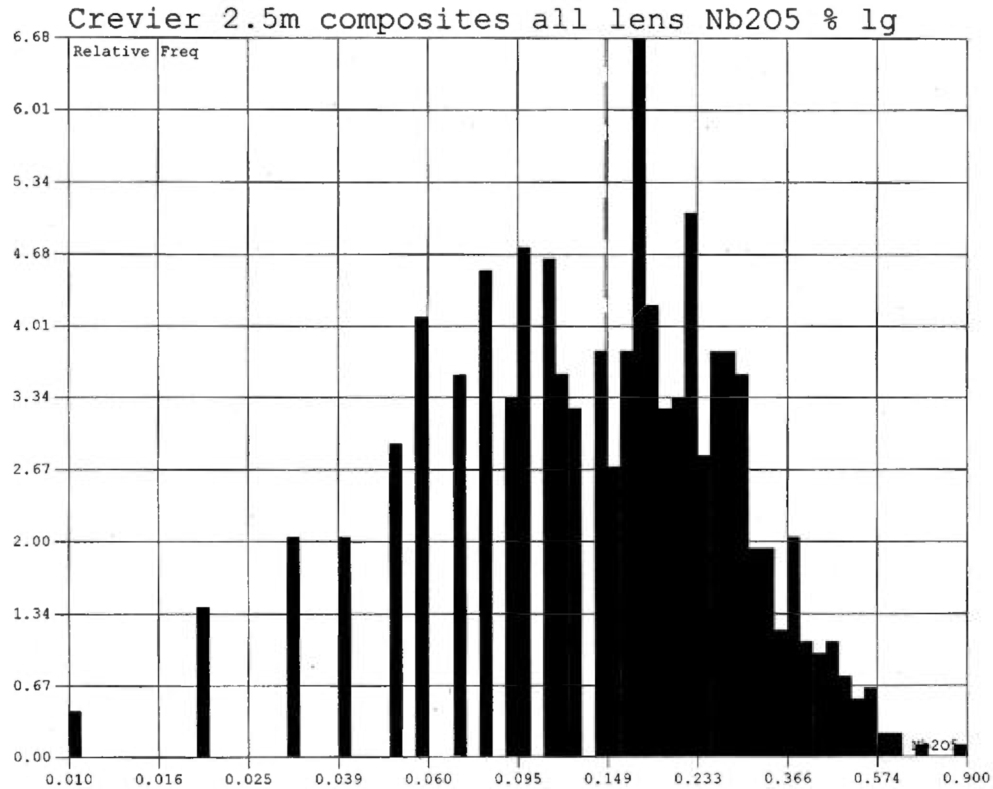


Figure 82: Histogram of logs of %Nb_2O_5

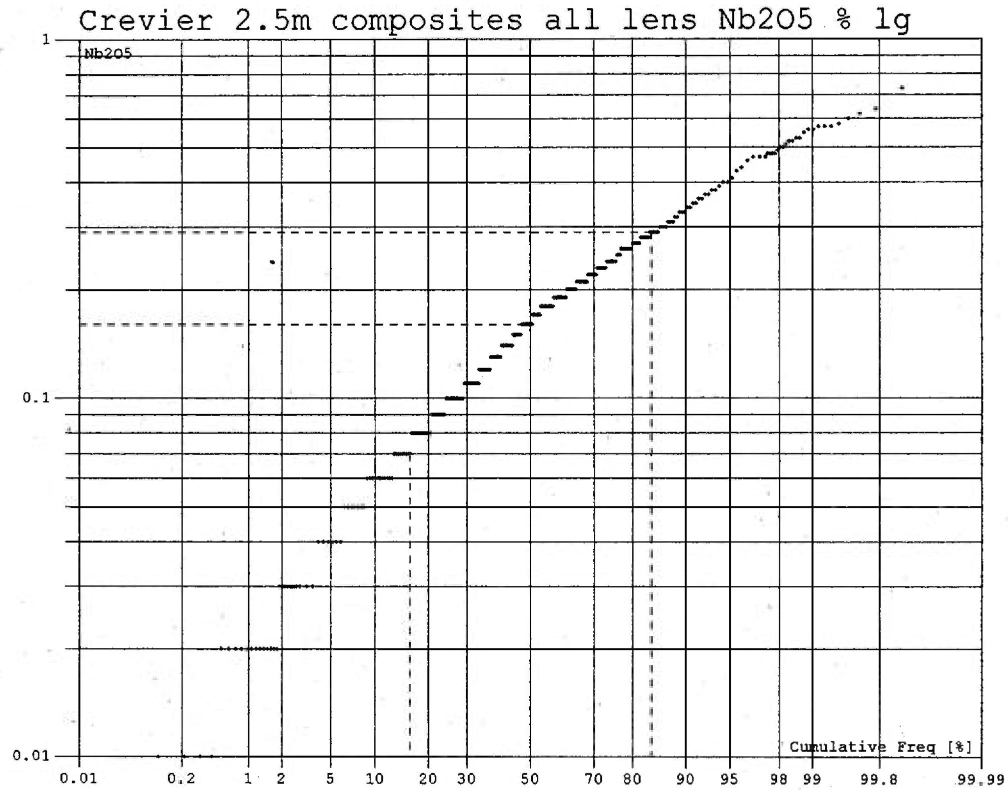


Figure 83: Cumulative frequency diagram of logs of %Nb_2O_5

Table 20: Statistics of 2.5m composites for %Nb_2O_5 and Ta_2O_5 in ppm

STATISTICS FOR Ta_2O_5

	Regular	Log
Minimum Value	2.7500	1.0116
Percentile 5%	44.7500	3.8011
16%	88.6400	4.4846
50%	176.2000	5.1716
84%	291.8200	5.6761
95%	413.8000	6.0254
Maximum Value	938.4800	6.8443
#Samples	928	
Average	196.0283	
Variance	13722.3039	
Std. Dev.	117.1422	
Coef of Var.	0.5976	
Skewness	1.4459	
Kurtosis	7.1183	
#Log Samples	928	
Log Average	5.0848	
Log Variance	0.4682	
Log Std. Dev.	0.6843	
Log Mean	204.1597	
Log Skewness	-1.1124	
Log Kurtosis	5.9815	

STATISTICS FOR Nb_2O_5

	Regular	Log
Minimum Value	0.0100	-4.6052
Percentile 5%	0.0400	-3.2189
16%	0.0700	-2.6593
50%	0.1600	-1.8326
84%	0.2900	-1.2379
95%	0.4000	-0.9163
Maximum Value	0.9000	0.0000
#Samples	928	
Average	0.1830	
Variance	0.0137	
Std. Dev.	0.1172	
Coef of Var.	0.6405	
Skewness	1.2973	
Kurtosis	5.6707	
#Log Samples	928	
Log Average	-1.9174	
Log Variance	0.5050	
Log Std. Dev.	0.7107	
Log Mean	0.1892	
Log Skewness	-0.6529	
Log Kurtosis	3.5849	

16.1.6 Spatial continuity of composite grades

In order to evaluate the continuity of grade in space, a semi variogram calculation was done. The figure below presents the results of variogram analysis of $\%Nb_2O_5$, the graph clearly shows a good continuity along the north direction along the strike of the Syenite Porphyry Nepheline dykes (SNp), the black line. One interesting aspect that shows up from this analysis is the mathematical evidence of a grade continuity within the dyke plunging about 45 degrees to the north within the structure, the green line.

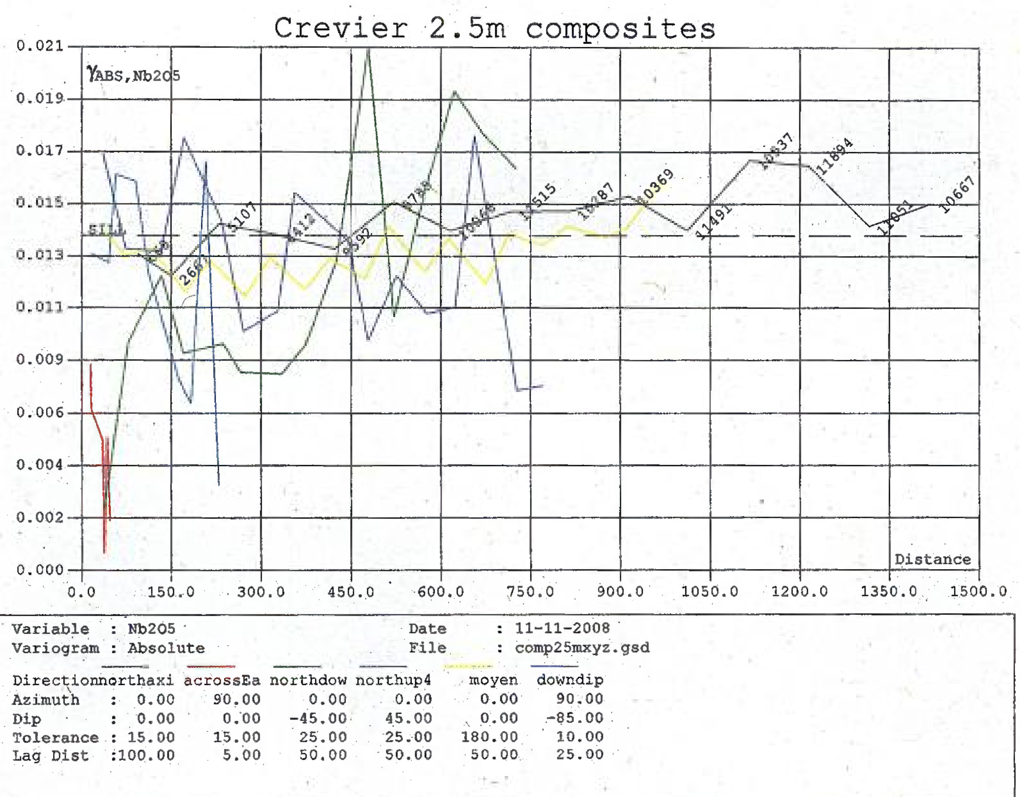


Figure 84: Variogram of $\%Nb_2O_5$ 2.5m composites all zones

The above spatial analysis gives us a good level of confidence with the drilling spacing we have at the moment at Crevier in the upper part of lenses #1 & #2. Along the north axis going at 200m to use samples to estimate a block is reasonable while estimation within a 100m radius should have a very good level of confidence.

16.1.7 Specific gravity data

In previous studies, specific gravity to convert volumes into tonnes was a fixed value of 2.6 t/m3. From the field visit we brought around 2.5 kg of mineralized rock pieces of 2 to 4 inches long. These samples were taken within all the blasted trenches. Our repeated measurements with the dry weight and water volume displacement gave 2.63t/m3. The property site has only hard fresh rock; there are no weathering zones which could affect the specific gravity.

In this report a specific gravity of 2.63 is used.

16.1.8 Resource block grade interpolation

The grades are estimated in each 2.5 m (EW) x 25 m (NS) x 10 m (Z) block of a regular matrix of 201 columns (EW), 150 rows (NS) and 54 benches (Z) with its center within the limits of the mineralized zones. Altogether, we have estimated 36,652 blocks within the envelope (final block model grade corrected). The block model is cut by the topography.

The average %Nb_2O_5 and Ta_2O_5 in ppm grade of each block is interpolated by inverse of the square distance from the grades of nearby 2.5 m composites.

We have used interpolation parameters based on drill spacing, variogram, envelope extension and orientation.

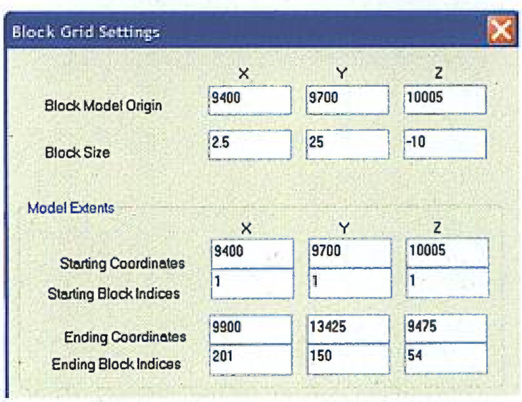


Figure 85: Block model origin and extent

In this study four block models have been generated:

1) All composites(SOQUEM+CAMBIOR) all the lenses LABELLED 1
2) Using SOQUEM composites only Lens #1 &#2 partial versus LABELLED 2
3) Using CAMBIOR composites only Lens #1 &#2 partial LABELLED 2
4) All composites with corrected SOQUEM data LABELLED 3

A first resource model was generated prior to the reception of the control assay data. This model used all the composites.

In this section, all directions are relative to North of the local grid.

In each pass the interpolation estimation was made with three runs:

1) First with a search ellipse of 150m, 75m, 5m maximum composite 10, minimum of 2, maximum from same hole 4.
2) Second with a search ellipsoid of 250m, 150m, 10m maximum composite 10, minimum of 2 maximum from same hole 4.
3) Third with a search ellipsoid of 300m, 200m, 15m maximum composite 10, minimum of 2 maximum from same hole 2.

Lens #1 long axis along 357 degrees with medium axis plunging 80 degrees to the East
Lens #2 long axis along 360 degrees with medium axis plunging 80 degrees to the East
Lens #3 long axis along 005 degrees with medium axis plunging 80 degrees to the East

All estimations are done with SGS Geostat Ltd. BLKCAD block modelling and resource estimation software.

16.1.8.1 Model 1

The following resources model is based on original data from both SOQUEM and Cambior. No corrections were applied on the SOQUEM data. **This model is shown as an indication and not as a final resource statement.**

CREVIER MINERALS INC.			
Mineral resources			
Crevier Niobium & Tantalum deposit in Quebec			
Mineral resources within geological orebody without cut-off			
INDICATED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	30 938 000	0.186	196
INFERRED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	28 847 000	0.142	183
Mineral resources within geological orebody with cut-off at 0.1%Nb_2O_5			
INDICATED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	27 099 000	0.201	209
INFERRED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	20 145 000	0.174	216
%Nb_2O_5 capped at 0.5%			
Ta_2O_5 in ppm capped at 550			
SG: 2.63		C.Duplessis	23-09-2008

Table 21: Resource model 1

16.1.8.2 Comparison Model

After reception of independent sampling results from both campaigns, the check on the Cambior hole was reproduced, while the check on the SOQUEM hole was slightly lower. The Sign test could not identify a bias, however average grade of SOQUEM data was relatively higher. It was decided to estimate a resource block model using SOQUEM data only and a resource block model using Cambior data only.
For a similar volume and tonnage we found Cambior data for Nb_2O_5 to be 19% lower (i.e. 0.81 SOQUEM=Cambior) while data for Ta_2O_5 to be 13% lower ((i.e. 0.87 SOQUEM=Cambior).

The table below shows the results of the comparison models, they are not 43-101 compliant, unclassified, comparison block models of Main lens only, capped outliers, lens resource no cut-off applied.

	Tonnage	Volume	Spec Grav	Ta_2O_5 ppm	Nb_2O_5 %
CAMBIOR	22,033,911	8,377,913	2.63	183	0.17
SOQUEM	21,963,230	8,351,038	2.63	211	0.21

Table 22: Block model comparison (Not 43-101 compliant i.e. unclassified)

Following this comparison model, a decision was made to lower SOQUEM composites by 19% Nb_2O_5 and by 13% Ta_2O_5 expressed in ppm. A new final block model was then estimated leading to the model 3 in the following section.

The flowing figures present a longitudinal view of block models generated by SGS Geostat with Cambior and SOQUEM data separately. Red blocks are above 0.1 %Nb_2O_5. There is also a visual difference where there are more red blocks on the west side of the block model in the SOQUEM model.

The files are in model2Cambi.bcd and model2soqm.bcd BLKCAD Block model files.

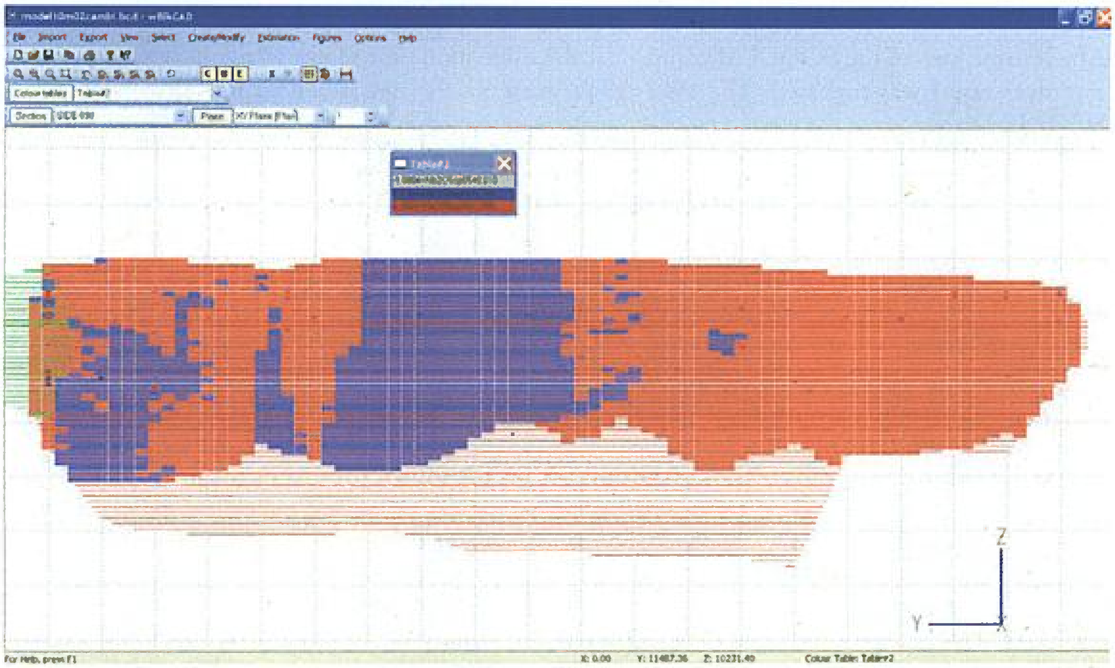


Figure 86: Longitudinal view looking East, local grid Cambior data model

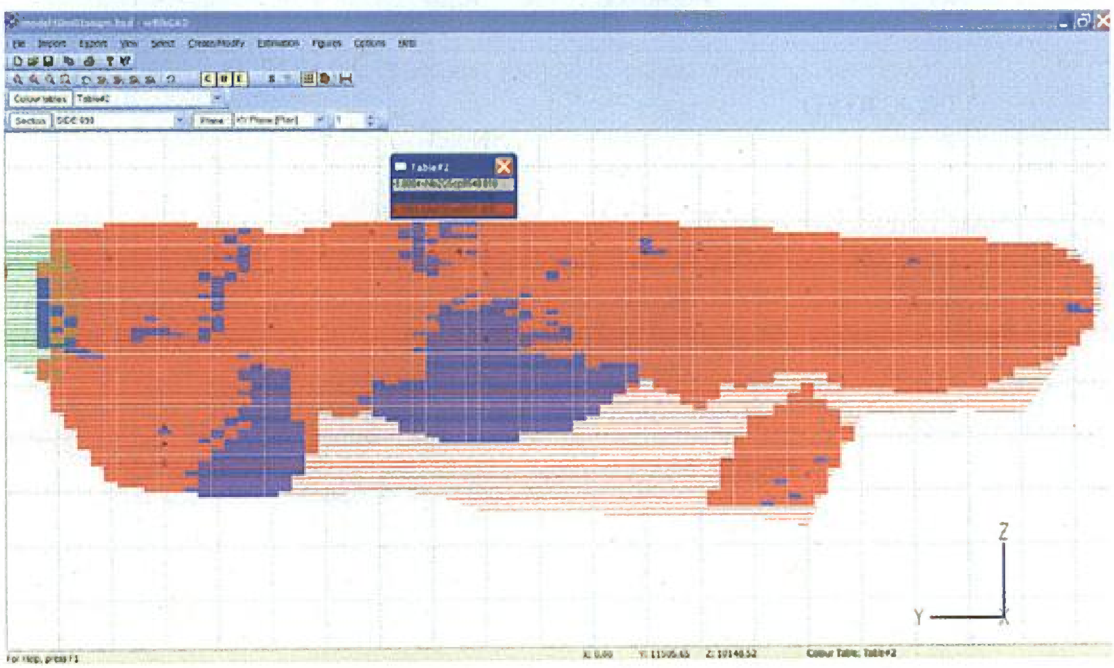


Figure 87: Longitudinal view looking East, local grid SOQUEM data model

16.1.8.3 Model 3 final model 43-101 compliant

After corrections of the SOQUEM composites the estimation procedures were run again and a final resource model was prepared. The table below presents the new resource model with corrected SOQUEM data.

CREVIER MINERALS INC.

Mineral resources
Crevier Niobium & Tantalum deposit in Quebec

Mineral resources within geological orebody without cut-off

INDICATED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	30 940 000	0.168	183
INFERRED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	28 850 000	0.122	166

Mineral resources within geological orebody with cut-off at 0.1%Nb_2O_5

INDICATED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	25 750 000	0.186	199
INFERRED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	16 880 000	0.162	204

%Nb_2O_5 capped at 0.5%
Ta_2O_5 in ppm capped at 550
SG: 2.63 C.Duplessis 8-10-2008
Soquem composites corrected

Table 23: Resource model 3 final model 43-101 compliant

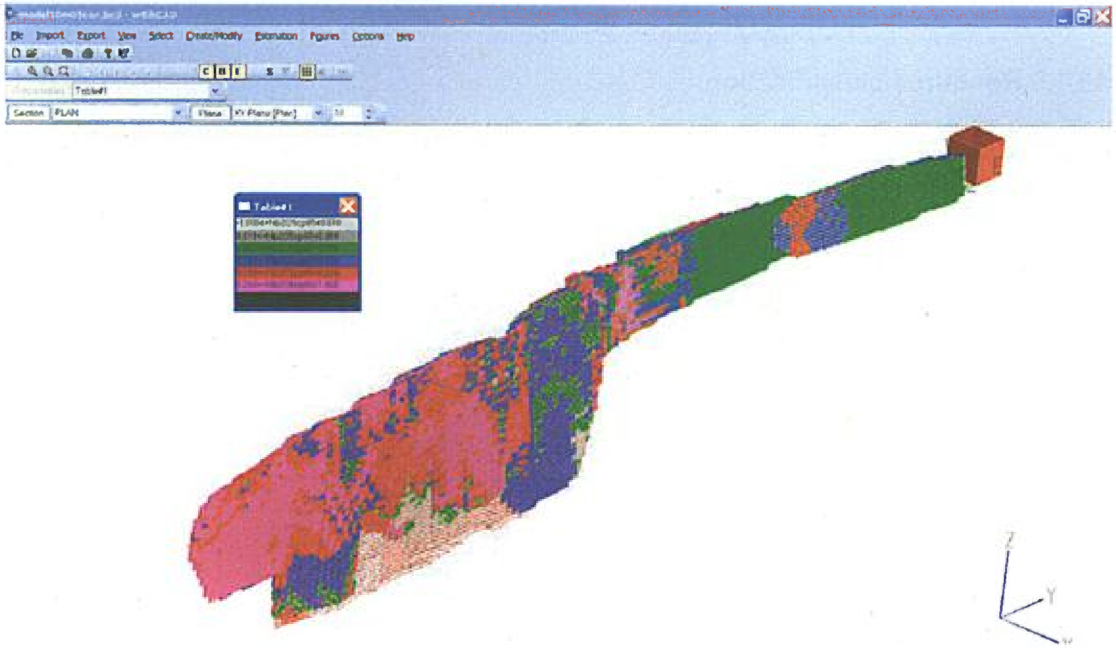


Figure 88: Isometric view of block model with color codes on %Nb_2O_5

The image above allows us to see the higher grade of the south lens. It is important to note that not all the blocks within the envelope have been estimated at depth of lens #1.
This sector represents potential for additional drilling. The file is Model10m03cor.BCD.

16.1.9 Resource classification

The classification method is the simple search ellipsoid technique, where classification is done by the amount of composites within a specific search radius of the block. In general for the project and drilling density, it shows reliable classification.

A this stage not having the trench data computerized, we are not presenting measured resources. With the computerization of the trenches and detailed DGPS survey of the contours of the lenses on surface, it would possible to classify resources as measured near surface. Additional drilling would also help in defining measured resources.

For indicated resource classification, a search ellipsoid of 175m North, 125m down dip 80 degrees, 15m across dip (East down 10 degrees)is used with a minimum of 4 composites with maximum of 2 from the same hole.

The remaining blocks are classified as inferred.

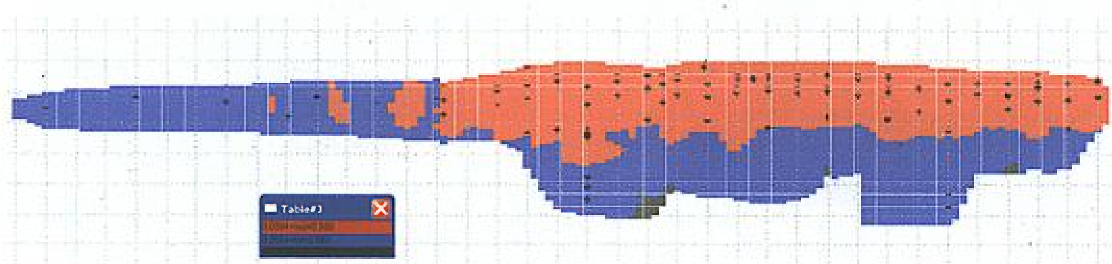


Figure 89: Longitudinal view looking East with color coded blocks according to classification

The above figure shows that most of the indicated material in red lies in lenses #1 & #2 from 0 to 250m depth while the inferred resources are located at depth and in the northern part of the resource model.

16.1.11 Final resources

SGS Geostat Ltd. presents the corrected model in which SOQUEM grades have been lowered by 19% for Nb_2O_5 and by 13% for Ta_2O_5 in ppm. The following table is the resource statement of Model 3 which is for now the new current resource statement for Crevier until additional drilling is performed.

Table 24: Official final classified resource statement 3 zones

CREVIER MINERALS INC.

Mineral resources
Crevier Niobium & Tantalum deposit in Quebec

Mineral resources within geological orebody without cut-off

INDICATED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	30 940 000	0.168	183

INFERRED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	28 850 000	0.122	166

Mineral resources within geological orebody with cut-off at 0.1%Nb_2O_5

INDICATED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	25 750 000	0.186	199

INFERRED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	16 880 000	0.162	204

%Nb_2O_5 capped at 0.5%
Ta_2O_5 in ppm capped at 550
SG: 2.63 C.Duplessis 8-10-2008
Soquem composites corrected

CREVIER MINERALS INC.

Mineral resources Main sector
Crevier Niobium & Tantalum deposit in Quebec
From surface to 9900Z elevation i.e. first 100m
From 9765N to 12055N

Mineral resources within geological orebody without cut-off

INDICATED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
1 & 2	10 860 000	0.171	181

INFERRED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
1 & 2	48 000	0.117	167

Mineral resources within geological orebody with cut-off at 0.1%Nb_2O_5

INDICATED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
1 & 2	9 235 000	0.187	193

INFERRED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
1 & 2	33 400	0.134	190

%Nb_2O_5 capped at 0.5%
Ta_2O_5 in ppm capped at 550
SG: 2.63 C.Duplessis 8-10-2008
Soquem composites corrected

Table 25: Official final classified resource statement from surface to a depth of 100 meters Zones 1&2

CREVIER MINERALS INC.

Mineral resources Main sector

Crevier Niobium & Tantalum deposit in Quebec
From 9900Z to 9755 elevation i.e. from 100m to 250m
From 9765N to 12055N

Mineral resources within geological orebody without cut-off

INDICATED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
1 & 2	16 260 000	0.174	190

INFERRED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
1 & 2	1 710 000	0.172	199

Mineral resources within geological orebody with cut-off at 0.1%Nb_2O_5

INDICATED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
1 & 2	13 650 000	0.193	206

INFERRED

Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
1 & 2	1 430 000	0.192	215

%Nb_2O_5 capped at 0.5%
Ta_2O_5 in ppm capped at 550
SG: 2.63 C.Duplessis 8-10-2008
Soquem composites corrected

Table 26: Official final classified resource statement from elevation 100m to 250m, zones 1&2

17- Other Relevant Data and Information

There are other anomalies on the property that need to be drilled. The property has significant potential and could double the actual resource statement with additional drilling. The reader should refer to historical work section with the Lambert's geophysical map for drilling targets identified by SGS Geostat Ltd.

Outside the property limits, while reviewing geophysical data and claim information on the MRNQ Gestim system, Claude Duplessis noted an area which may have mineralization of interest. We recommend to claim this sector and to put a diamond drill hole as soon as possible.
The figure below shows the anomaly in magenta. This is the highest mag anomaly in the region which coincides with a wetland in the region. It is probably not the same mineralization as Crevier, however since Crevier is working in this area this target should be tested.

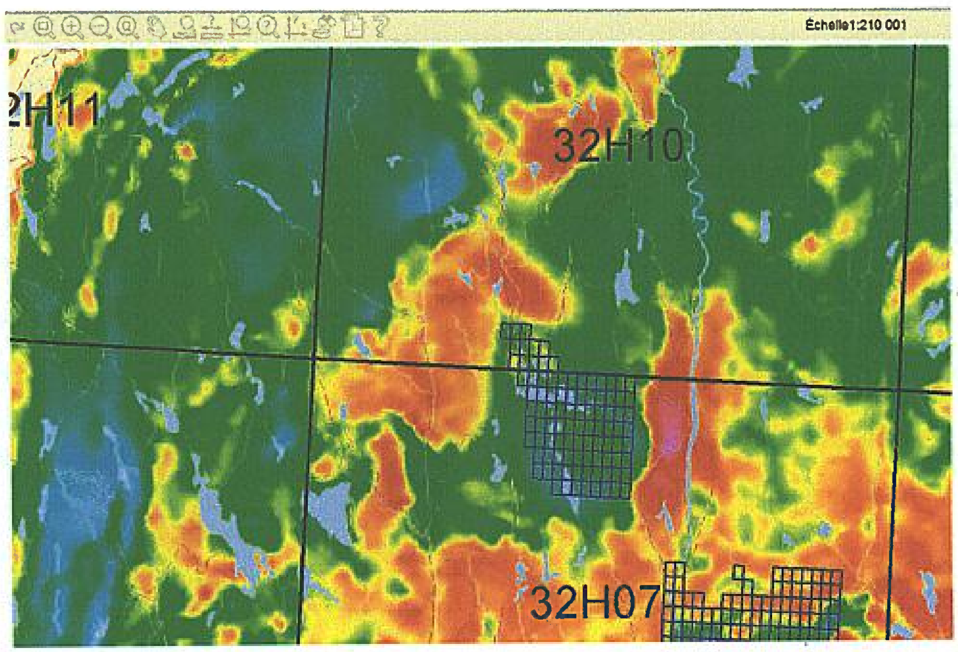


Figure 90: Magnetic anomaly target East of the property - free ground

17.1 Market for the commodities

The actual public value of Tantalum may be obtained from the Northern Miner and other specialized metals web sites. However the Niobium market is mainly controlled by CBMM of Brazil. From contacts within IAMGOLD, actual producer of Niobium, the following price ranges were provided by Crevier Minerals:

Nb_2O_5: between 40 & 50 US$ per kg.
Ta_2O_5 : between 110 & 140 US$ per kg.

Also, the Metal Pages website indicates that as per November 6th 2008, i.e. after October worldwide aftershock, Tantalum Pentoxyde is US$47 per pound in a minimum 30% concentrate.
This translates into a metal value of 103.4US$ per kilo and Can$124.08 per kilo using an exchange rate of 1US$ to 1.2CAN$.

The Ferro Niobium (Nb metal) at 66% sells for 210500 Rmb/mt. which converts with an exchange rate 1US$ to 6.83 CNY to 30,818.58 US$ per metric tonne, approximately US$30/kg at 66%. This converts to US$42.9/kg at 100% Nb_2O_5.


METAL - PAGES

Titanium Asia 2008 METAL - PAGES conferences
Xi'an, China : 29 to 31 October

PRICES REPORT for Mr. Claude Dufresne 06 November 2008

News | Metal Prices | Charts | Marketplace | Duties & Taxes | Industry Jobs

Metal Prices for 06 November 2008

Minor and specialty metals

Tantalite basis 30% Ta2O5	46 - 48 $/lb Ta2O5

Ferro Alloys

Ferro-niobium Nb 66% Brazilian Imports	210000 - 220000 Rmb/mt

Figure 91: Commodity prices report of November 6th 2008

Hence the average value of in situ mineralization at Crevier at 0.1%Nb_2O_5 cut-off indicated resources for one tonne of mineralized material can be converted as:

0.186% per metric tonne Nb_2O_5 * 1000kg * 45US$/kg= US$83.70
199 ppm or 0.0199% per metric tonne Ta_2O_5 * 1000kg * US124/kg= US$24.68
Total in situ value average grade using these parameters is 108.38$US/tonne or 130.06$Can /tonne using a conversion factor of 1.2$Can for 1$US. Using 60% metallurgical recovery and a 96% refining recovery, this present a potential recovered average in situ value of 74.91$Can/tonne.

The Nb_2O_5 to Ta_2O_5 ratio is around 10 to 1 in general.

0.1% per metric tonne Nb_2O_5 * 1000kg * 45US$/kg= US$45.00
99 ppm or 0.0099% per metric tonne Ta_2O_5 * 1000kg * US124/kg= US$12.28
Total in situ value average grade using these parameters is 57.28$US/tonne or 68.74$Can /tonne using a conversion factor of 1.2$Can for 1$US.

17.2 Fact about commodities under study

(source IAMGOLD Internal document)

17.2.1 About Niobium

The primary mineral from which niobium is obtained is known as pyrochlore. The world's largest deposit is located in Araxá, Brazil and is owned by Companhia Brasileira de Metalurgia e Mineração (CBMM). The reserves are enough to supply current world demand for about 500 years, about 460 million tons. The mining of weathered ore, running between 2.5 and 3.0% Nb_2O_5, is conducted by simple open pit mining without the need for drilling and explosives. Approximately 85 to 90% of the niobium industry obtains its niobium ores from sources other than those associated with the mining of tantalum-containing ores.
Another pyrochlore mine in Brazil is owned and operated by Mineração Catalão de Goiás Ltda. and contains 14 million tonnes at 1.34% niobium oxide. The third major deposit of pyrochlore being actively mined is the Niobec Mine in Quebec, Canada, owned by Iamgold Corp., with reserves of about 20 million tonnes.
In all three facilities, the pyrochlore mineral is processed by primarily physical processing technology to give a concentrate ranging from 55 to about 60% niobium oxide.These three companies produce about 85% of the world's demand for niobium products, with most of that product being in the form of high-strength, low-alloy ferroniobium containing a nominal 60% niobium oxide content.
Columbite, a mineral with a 10:1 to 13:1 ratio of Nb_2O_5:Ta_2O_5, occurs in Brazil, Nigeria, and Australia, also other countries in central Africa. Niobium is recovered when the ores are processed for tantalum.
The largest columbite mine in production is the Pitinga Mine operated by Paranapanema (Mamoré Mineração e Metalurgia) in Brazil. Reserves are estimated at 201 Mt at 0.223% Nb_2O_5. Here, columbite concentrates are converted into a ferro-niobium-tantalum product containing about 45% Nb_2O_5 and 4.3% Ta_2O_5.
Niobium is also found in the tin slags produced from the smelting of cassiterite ores. Digging of old dump areas combined with some new production continues to provide nominal quantities of niobium units.
Extraction/refining Niobium
There are two separate processing schemes utilized for niobium production. Those companies that mine pyrochlore convert the niobium oxide units into HSLA ferro-niobium through the aluminothermic reduction process or by the reduction in an electric arc furnace. CBMM has installed capacity for the production of a high purity oxide that can be used to produce vacuum grade ferro- and nickel-niobium as well as niobium metal ingots via electron beam refining.

The use of columbite and tantalum-bearing ores (as Crevier), such as tantalite, as feedstocks results in the necessity to process these materials chemically as described in the tantalum section below. The purified niobium-containing process stream is generally converted to niobium hydroxide by the introduction of ammonia, followed by washing, filtration, and calcining to the oxide. Purities exceeding 99.99% can be achieved.
Niobium oxide (Nb_2O_5) is generally the starting chemical for the production of other compounds, such as niobium chloride (NbCl5), niobium carbide (NbC), or lithium niobate (LiNbO3). Niobium metal is produced by the aluminothermic reduction of the oxide followed by electron beam refining. Niobium powders can be produced by the reduction of potassium niobium heptafluoride (K2NbF7) with sodium, or by the reduction of niobium oxide with magnesium.
The various metallurgical products are generally produced from electron beam or vacuum arc melted niobium ingot. Double and triple melt ingots achieve a very high level of purification with respect to metallics and interstitial elements. Ingots are used to produceniobium alloys such as niobium-1% zirconium, niobium-titanium, C-103, Inconels, and others.

17.2.2 About Tantalum

Tantalum ores are found primarily in Australia, Canada, Brazil, and central Africa, with some additional quantities originating in southeast Asia. The average yearly growth rate of about 8 to 12% in tantalum demand since about 1995 has caused a significant increase in exploration for this element. Tantalum minerals with over 70 different chemical compositions have been identified. Those of greatest economic importance are tantalite, microlite, and wodginite; however, it is common practice to name any tantalum-containing mineral concentrate as 'tantalite' primarily because it will be processed for the tantalum values and is sold on that basis. Tantalum mineral concentrates may contain from two to more than five different tantalum-bearing minerals from the same mining area. The sale of tantalum mineral concentrates is based on a certified analysis for the tantalum oxide they contain, with a range from 10 or 15 to over 60% depending on the mine source.
The single largest source of tantalum mineral concentrates is the production by Sons of Gwalia Ltd. from its Greenbushes and Wodgina mines in Western Australia. These two mines combined produce between 25 and 35% of the world's supply, with production in 2001 reported at approximately 1.8 million pounds. Additional operating mines are the Tanco Mine (Cabot) in Manitoba, Canada, the Kenticha Mine (Ethiopia Minerals Development Authority) in Ethiopia, the Yichun Mine in China, and the Pitinga Mine (Paranapanema) and Mibra Mine (Metallurg) in Brazil. Additional quantities are available from Brazil through the processing of small alluvial deposits by prospectors and in numerous countries in Africa, such as Rwanda, Namibia, Uganda, DRC-Kinshasa, Zaire, Gabon, Nigeria, South Africa, and Burundi. Mining investment in Africa has been curtailed due to political instability and associated risk.
The central African countries of Democratic Republic of the Congo (DRC-Kinshasa) and Rwanda and their neighbours used to be the source of significant tonnages. But civil war, plundering of national parks and exporting of minerals, diamonds and other natural resources to provide funding of militias has caused the Tantalum-Niobium International Study Center to call on its members to take care to obtain their raw materials from lawful sources. Members should refrain from purchasing materials from regions where either

human welfare or wildlife are threatened.
The downsizing of the tin industry in southeast Asia and elsewhere over the period of 1980 through about 1990 has led to the reduction of tantalum oxide units available from tin slags, a by-product of the smelting of cassiterite ore concentrates for tin production. Although some tin slags are available from new tin production, the primary source today is from the digging up of old dump areas containing 1.5 to about 4.0% tantalum oxide. It should be noted that struverite concentrates have been available from this general area containing 9-12% tantalum oxide.
Scrap recycling generated within the various segments of the tantalum industry accounts for about 20 to 25% of the total input each year.

17.2.3 Extraction Refining Processing/Tantalum Processors

The extraction and refining of tantalum, including the separation from niobium in these various tantalum-containing mineral concentrates, is generally accomplished by reacting the ores with a mixture of hydrofluoric and sulfuric acids at elevated temperatures. This causes the tantalum and niobium values to dissolve as complex fluorides, and numerous impurities that were present also dissolve. Other elements such as silicon, iron, manganese, titanium, zirconium, uranium, thorium, rare earths, etc. are generally present. The filtration of the digestion slurry, and further processing via solvent extraction using methyl isobutyl ketone (MIBK) or liquid ion exchange using an amine extractant in kerosene, will produce highly purified solutions of tantalum and niobium. Generally, the tantalum values in solution are converted into potassium tantalum fluoride (K2TaF7) or tantalum oxide (Ta_2O_5). The niobium is recovered as niobium oxide (Nb_2O_5) via neutralization of the niobium fluoride complex with ammonia, forming the hydroxide, followed by calcination to the oxide. These are the end-products expected to be generated from the Crevier deposit.
The primary tantalum chemicals of industrial significance, in addition to K2TaF7 and Ta_2O_5 are tantalum carbide (TaC), tantalum chloride (TaCl5), and lithium tantalate (LiTaO3).
Tantalum metal powder is generally produced by the sodium reduction of the potassium tantalum fluoride in a molten salt system at high temperature. The metal can also be produced by the carbon or aluminum reduction of the oxide or the hydrogen or alkaline earth reduction of tantalum chloride. Capacitor grade powder is produced by the sodium reduction of potassium tantalum fluoride. The choice of process is based on the specific application and whether the resultant tantalum will be further consolidated by processing into ingot, sheet, rod, tubing, wire, and other fabricated articles.
Capacitor grade tantalum powder provides about 60% of the market use of all tantalum shipments. Additional quantities are consumed by tantalum wire for the anode lead as well as for heating elements, shielding, and sintering tray assemblies in anode sintering furnaces. The consolidation of metal powder for ingot and processing into various metallurgical products begins with either vacuum arc melting or electron beam melting of metal feedstocks, comprised of powder or high purity scrap where the elements with boiling points greater than tantalum are not present. Double and triple melt ingots achieve a very high level of purification with regard to metallics and interstitials. Ingots are used to produce the various metallurgical products named earlier. Ingot stock is also used for the production of such alloys as tantalum-10% tungsten. Ingot and pure scrap are used in the production of land and air-based turbine alloys.

17.3 Comparison with other projects and producers

Crevier Minerals was provided with comparison analysis by IAMGOLD, the documents can be reviewed at Crevier office if needed, document show tables and graphs of exiting mines and prospects under development. Since the document was not up to date, SGS Geostat Ltd. took decision not to include this information in the report.

SGS Geostat Ltd. is in the opinion that a new updated market study be included into the next working phase of the project in addition to exploration and metallurgical works.

17.4 Comparison with a gold project

In order to set a reference for comparison value, we are comparing this with Agnico Eagle Meadowbank gold project in Nunavut which is remote with seriously more adverse weather conditions and access than the Crevier Project.

CIM November 2008 page 25 by Marlene Eisner

Meadowbank has a probable gold reserves of almost 3.5 million ounces – 29.3 million tonnes of ore at a grade of 3.67 grams per tonne, Total cash costs are estimated to average $350 per ounce. Stated by Martin Bergeron Agnico-Eagle general Manager of Western Canada & Nunavut.

From our example, if we use a US700$/ounce price, the 3.67 g/t average grade gives in-situ value of $US82.59 / tonne. One gram being 22.50US$.

Average grade value of indicated resources (25 750 000 tonnes above 0.1%Nb_2O_5) at Crevier undiluted are calculated at 108.38US$/tonne, hence it is like Crevier would have an average gold grade of 4.82g/t equivalent (Nb_2O_5+Ta_2O_5) or a total of 3.9 million ounces for comparison.

18- Interpretation and Conclusions

+ The property contains the Crevier Pegmatitic Nepheline Syenite deposits explored and evaluated by SOQUEM and Cambior in a very professional manner from 1976 to 2002. The property is located north of Lac St-Jean. The Crevier Carbonatite intrusive complex was put in place inside the gneisses of the Granulites Centrales (CGT) of the Grenville province.

+ Previous owners SOQUEM and CAMBIOR(now IAMGOLD) conducted various work programs including: geophysics, prospecting, mapping, grab and channel surface sampling, diamond drilling, bulk sampling, metallurgical testing, resource estimation and feasibility studies on the Syenite Porphyry Pegmatitic Dyke bearing Niobium and Tantalum on the property up to 2002 before selling it to Crevier Minerals in 2008.

+ A total of 105 diamond drill holes were completed by previous owners respectively 72 by SOQUEM and 33 by Cambior. The holes were spaced approximately 50 meters apart on section with 100 to 300 meters between sections. These holes were sampled generally on 1.5 meter intervals. Assays were completed for oxides and especially Nb_2O_5 and Ta_2O_5 from pulverized rock samples from half drill core. Results show that Niobium grade varies along strike from south to north of the exploration grid, the grid North being oriented North 321 degrees. The generally higher Nb grades are observed in the southern part and lowering in the northern direction but with increasing dyke horizontal width. SGS geostatistical analysis has highlighted a continuity axis striking north and dipping 45 degrees that will need to be confirmed in the next phase of work. The Tantalum is within Niobium pyrochlore mineral grain in a ratio of 1 to 10.

+Metallurgical testwork completed by SOQUEM and CAMBIOR demonstrates that a Niobium (pyrochlore) concentrate can be produced by a combination of standard industrial processes or treatment;

+ The current expected metallurgical recovery from the Crevier Pegmatitic Nepheline Syenite dyke based on laboratory testwork and bulk sample process is 60%. The refining recovery is expected to be 96% from the concentrate.

+Independent sampling by SGS Geostat Ltd has lead to the resource estimation with the two different sources of historical data for the same sector, the results have shown a significant difference that needs to be further investigated by new drilling should the client want to use the SOQUEM data without corrections. In a conservative approach, SGS Geostat has capped the outliers in the original database. From studies done during this evaluation SGS Geostat has reduced the Nb_2O_5 grades by 19% and the Ta_2O_5 grades by 13% for all the SOQUEM composites used for the estimation.

+It is important to mention that two commercial laboratories, SGS Lakefield and ALS Chemex were used and they both reproduced the result from one Cambior hole mineralized intersection data(mainly Actlab) while they have shown a lower average grade for one of the SOQUEM mineralized intersection data. A third laboratory, IAMGOLD Niobec mine facility laboratory, has shown similar results as the SOQUEM campaign and has shown higher average grade for the Cambior hole. According to those results a second phase of independent sampling of old witness core was done and results confirm the bias of SOQUEM data.

+ SGS Geostat completed a Mineral Resource estimate for the property using all the historical data with corrected SOQUEM diamond drill hole grades (Drill hole name series 10-745-xxx). The following table presents the new current 43-101 compliant estimate:

CREVIER MINERALS INC.

Mineral resources

Crevier Niobium & Tantalum deposit in Quebec

Mineral resources within geological orebody without cut-off

INDICATED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	30 940 000	0.168	183
INFERRED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	28 850 000	0.122	166

Mineral resources within geological orebody with cut-off at 0.1%Nb_2O_5

INDICATED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	25 750 000	0.186	199
INFERRED			
Zone	Tonnage metric tons	Nb_2O_5 %	Ta_2O_5 ppm
All (3)	16 880 000	0.162	204

%Nb_2O_5 capped at 0.5%
Ta_2O_5 in ppm capped at 550
SG: 2.63 C.Duplessis 8-10-2008
Soquem composites corrected

Table 27: Official final classified resource statement 3 zones

COREM phase 1 gravity pre-concentration tests proved to be conclusive. Test #04, with a mass pull of 10%, has been identified as optimal, where a niobium recovery of 79% with a concentrate grade of 1.43% Nb_2O_5 and a tantalum recovery of 79% with a concentrate grade of 0.22% Ta_2O_5 were achieved. Further work involving cleaner gravity test followed by magnetic separation of the cleaner concentrate and magnetic separation tailings have been recommended for the Phase 2 of this project.

19- Recommendations

SGS Geostat makes the following recommendations that focus on two aspects: The improvement of the available data and the working plan for the development of the property.

19.1 Improvements

+ The database should be expanded to include surface channel samples and short blast holes of the bulk sample.

+ The database should also be expanded to include all the other elements which have been analyzed (Zr,U, etc)

+ Crevier should acquire the most recent high resolution satellite image

+ All geological, geographical, geophysical, property boundaries, access and surface analytical data should be integrated into a Geographical Information System.

19.2 Work Program to develop the project

Crevier Minerals has developed a program with a budget in conjunction with SGS Geostat to advance the project. The proposed Phase 1 program consists of:

A) In 2009, prepare a preliminary economic assessment to prepare documentation for environmental permitting and in order to proceed to the feasibility level in 2010.

B) A detailed topographical survey of the property with DGPS or equivalent method.

C) A diamond drilling program of 5,000 m of NQ drilling. The program has 3 goals:
  1) geotechnical characterization of the rock for open pit slope design and drilling between existing sections to increase the confidence level.
  2) recover mineralized material for metallurgical tests.
  3) exploration to extend known mineralization and test targets

D) A geotechnical assessment for mine design
E) A market study
F) Design the underground mine

G) Develop Process engineering Flowsheet and Pilot plant tests
H) Environmental characterization
I) Site/ Tailing/ Waste dump characterization with progressive reclamation plan
J) Develop infrastructure plans (Engineering)
K) Review legal considerations & permitting
L) Prepare environmental management plan in accordance with the progressive reclamation plan
M) Validate the economics and financing research

+ Crevier Minerals should prepare a technical report at the end of each phase of exploration providing full description of the program and results with recommendations

+ SGS Geostat Ltd. formally recommends continuing the development of the project

+ And finally acquire additional claims located near the property, we suspect highly magnetic mineralization on the East of actual claim block and in the extension of the actual property.

The following table presents the work program Phase 1 budget to be done with associated costs in Canadian dollars.

	Total
Scoping Study-Preleminary Economic Assessment	$250 000
Site topography	$100 000
Geotechnic and resources validation drilling	$800 000
Mine Geotechnical Assesment	$100 000
Design mining Open Pit	$200 000
Market Study	$100 000
Design underground mining	$200 000
Processing Eng Flowsheet development Pilot Plant	$1 700 000
Environmental charaterization	$500 000
Site /taliling/waste Dump Charaterization	$500 000
Infrastructure (Engineering)	$1 000 000
Legal consideration/Permitting	$250 000
Environmental management	$200 000
Economics Financing	$200 000
Sub Total	$6 100 000
Contengency 10%	$610 000
Total	$6 710 000

Table 28: Proposed work program and associated cost

20- References

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1 de 20	CREVIER (CAMBIOR) Formulaire inspection environnemnet (Forages 2002)
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2 de 20	CREVIER (ACTLABS LTD) Réanalyses Forage 2002 (2003)
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2 de 20	CREVIER (X-RAY ASSAY LAB.) Analyses quantitatives (1976-1983)
2 de 20	CREVIER (M.R.N.) Analyses quantitatives (1977-1982)
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2 de 20	CREVIER (LAKEFIELD RESEARCH) Analyses quantitatives (1980-1981)
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	SOQUEM Plan No. 51-15, Projet 10-745 Tranchée Scie à roches Nb, Ta, Analyses, Campagne 1981, Bloc B-8
	SOQUEM Plan No. 51-16, Projet 10-745 Tranchée Scie à roches Nb, Ta, Analyses, Campagne 1981, Bloc B-9
	SOQUEM Plan No. 51-17, Projet 10-745 Tranchée Scie à roches Nb, Ta, Analyses, Campagne 1981, Bloc B-14
	SOQUEM Plan No. 51-18, Projet 10-745 Tranchée Scie à roches Nb, Ta, Analyses, Campagne 1981, Bloc B-16
	SOQUEM Plan No. 51-19, Projet 10-745 Tranchée Scie à roches Nb, Ta, Analyses, Campagne 1981, Bloc B-17
	SOQUEM Plan No. 51-20, Projet 10-745 Tranchée Scie à roches Nb, Ta, Analyses, Campagne 1981, Bloc B-18
	SOQUEM Plan No. 51-21, Projet 10-745 Tranchée Scie à roches Nb, Ta, Analyses, Campagne 1981, Bloc B-19
	SOQUEM Plan No. 51-22, Projet 10-745 Tranchée Scie à roches Nb, Ta, Analyses, Campagne 1981, Bloc B-20
	SOQUEM Plan No. 51-23, Projet 10-745 Tranchée Scie à roches Nb, Ta, Analyses, Campagne 1981, Bloc B-21
	SOQUEM Plan No. 51-24, Projet 10-745 Tranchée Scie à roches Nb, Ta, Analyses, Campagne 1981, Bloc C-7
	SOQUEM Plan No. 51-25, Projet 10-745 Tranchée Scie à roches Nb, Ta, Analyses, Campagne 1981, Bloc C-9
	SOQUEM Plan No. 52-1, Projet 10-745 Géologie de détail, Échantillonnage éléments majeurs

Box#	DOCUMENT TITLE IN FOLDER
1 de 20	116-155.00 (Mars 1986) Synthèse des travaux d'exploration Projet Crevier, Mars 1986, Denis Simoneau
1 de 20	Documents
1 de 20	Documents
1 de 20	Documents
1 de 20	Documents
1 de 20	Documents
1 de 20	Crevier 1:15000, Crevier 1:40000
1 de 20	Documents
1 de 20	Documents
1 de 20	Documents
1 de 20	Documents
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1 de 20	Documents
1 de 20	Documents
1 de 20	Dighem Survey for Cambior Inc. Crevier Project Quebec, NTS 32H/7,10, CD Final Archive and VHS, November 4, 2002, Paul A. Smith
1 de 20	Tendering document Crevier Project 10-745, Block B - South Half, September 1976
2 de 20	Rapport Lab Geochimie
2 de 20	Certificat d'analyse Ta
2 de 20	Certificate of analysis
2 de 20	Rapport Lab Geochimie
2 de 20	Certificat d'analyse
2 de 20	Certificate of analysis Nb_2O_5
2 de 20	Résultats d'analyses Ta205 ppm, Nb205 %
2 de 20	Mémorandum, Résultats d'analyse Nb205 %, 2 juin 1982, Jean Kaiser
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2 de 20	Résultats d'analyses Cb205 %, Ta ppm, Échantillons No. 161051 à 161113
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2 de 20	Résultats d'analyses Zr ppm et Ta ppm
2 de 20	Résultats d'analyses Cb205 %, Ta ppm et Zr ppm
2 de 20	Résultats d'analyses Ta205 ppm, Cb205 % et U ppm
2 de 20	Résultats d'analyses Cb205 %, Ta205 %
2 de 20	SOQUEM Certificat, U ppm, Nb205 %, Ta205 %, P205 % et Ce %
2 de 20	Rapport de laboratoire géochimique, extraction Nb205, Ta205
2 de 20	Rapport de laboratoire géochimique, extraction U308, Nb205, Ta205
2 de 20	Rapport de laboratoire géochimique, extraction U308, Nb205, Ta205, Cu, Zn, Au-HN03-HCL
2 de 20	Geochemical Lab Report, extraction P205, U308, Nb205, Ta205, Cu-HN03-HCL, Zn, Au-HN03-HCL and Semi-quantitative analysis major elements Si02, Al203, Fe203, Mg0, Ca0, Na20, K20, Ti02 and Trace elements %
2 de 20	Semi-quantitative analysis major elements Si02, Al203, Fe203, Mg0, Ca0, Na20, K20, Ti02 and Trace elements %, and Geochemical Lab Report U308, Th02, Nb205, Ta205
2 de 20	Geochemical Lab Report, extraction U, Ta, Nb205, Zr, P205 and Semi-quantitative analysis major elements Si02, Al203, Fe203, Mg0, Ca0, Na20, K20, Ti02 and Trace elements %

2 de 20	Résultats d'analyse ppm Ta et ppm Ta205
2 de 20	Levé de trous de forage Canton de Crevier, 15 Novembre 2002, Corriveau J.L. & Ass. Inc
2 de 20	Levé de trous de forage Canton de Crevier, 15 Novembre 2002, Corriveau J.L. & Ass. Inc
2 de 20	Crevier 10-745 Liste des coordonnées des points de contrôle photogrammétriques
2 de 20	Rapport mensuel, Crevier (#116) , 17 Septembre 2003, Marie-France Bugnon
2 de 20	Rapport mensuel, Crevier (#116) 16 janvier 2003, Marie-France Bugnon
2 de 20	Documents
2 de 20	Échantillonnage en vrac Projet Crevier (116) Automne 2002, 19 février 2003, Antoine Fournier
2 de 20	Test de séparation magnétique d'un échantillon de syénite à néphéline provenant du dyke pegmatitique de Crevier
2 de 20	Compilation des intrusions alcalines et des projets de niobium-tantale au Canada, 30 avril 2002, Antoine Fournier
2 de 20	Prélèvement d'un échantillon en vrac de 15 tonnes Cambior Inc., propriété Crevier, PN 116, Automne 2001, 6 février 2002, Antoine Fournier
3 de 20	Documents
3 de 20	Documents
3 de 20	Choix de claims à conserver Projet Crevier et Lagorce, 28 octobre 1987, Magloire Bérubé
3 de 20	FILIÈRE VIDE
3 de 20	Documents
3 de 20	Projet Crevier 10-745, Document de tarvail pour réunion de coordination, 17 décembre 1981, 16 décembre 1981, Bernard Gaboury et Gilles Gagnon
3 de 20	Description de la propriété
3 de 20	Plans
3 de 20	Géochronologie, pétrographie et géochimie d'une section du complexe igné alcalin de Crevier 10-745, No.23, Avril 1981, Robert Harrison
3 de 20	Pétrographie et géochimie du complexe igné alcalin de Crevier et de son encaissant métasomatisé, Automne 1980, Alain Bergeron
3 de 20	Échantillonnage de tranchées Projet Crevier 10-745, Octobre 1979, Roger Guévremont
3 de 20	Opération lithogéochimie, Mai 1979, Jacques Bonneau
3 de 20	Projet Crevier (S.N.R.C. 32H/07), Région du Lac St-Jean, Sommaire, Juillet 2002, Cambior Inc.
3 de 20	Travaux d'échantillonnage et d'interprétation géologiques, Propriété Crevier, PN 116, Automne 2001, Antoine Fournier
3 de 20	Travaux de vérifications géologiques, Automne 2001, Antoine Fournier
3 de 20	Carte Projet Crevier (116), Localisation des échantillons, 1:10000, 17 janvier 2002, Yves Allaire
3 de 20	Cambior Mise à jour Projet Crevier (# 116), 17 mai 2001, Robert Crépeau
3 de 20	Projet Crevier (1224) Travaux de terrain 1998, Janvier 2000, Tyson Birkett et Yves Caron
3 de 20	Projet Crevier (1224) Travaux de terrain, Géochimie et minéralogie 1997, Avril 1998 , Tyson C. Birkett
3 de 20	Rapport de la campagne d'exploration 1983, Projet Crevier (100745-02), Décembre 1983, Pierre Lamontagne
3 de 20	Gisement de niobium-tantale de Crevier, étude de faisabilité, Avril 1986, Paul Gauvreau
3 de 20	Gisement Crevier Scénario d'exploitation ciel ouvert et sous terre, No.42, décembre 1982, Révision Février 1983, R.Gosselin
3 de 20	FILIÈRE VIDE
3 de 20	Campagne d'exploration 1982, Projet Crevier 100745-02, No.43, Février 1983, Alain P.Boudreault
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4 de 20	Rapport de la campagne de travaux 1981, Projet Crevier (10-745), Vol. II/IV, Janvier 1982, Bernard Gaboury

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4 de 20	Sommaire des travaux d'exploration en date du 01/02/80 Projet Crevier 10-745, Février 1980, Jacques Bonneau
4 de 20	Travaux de décapage Projet 10-745, Septembre 1979, Roger Guèvremont
4 de 20	Jallonnement et cartographie Projet Crevier (10-745), Octobre 1978, Marie-Josée Girard
4 de 20	Géologie de reconnaissance de la région du Lac à la Truite (Cantons Lagorce-Crevier) Projet 10-745, Avril 1976, Roger Aubertin
4 de 20	Rapport de la campagne de forage Automne 2002-Projet Crevier (#116), ANNEXE !, Journaux de sondage CV02-74 @ CV02-104
4 de 20	Calcul du RQD CV02-73 à CV02-104
4 de 20	Projet Crevier (#116) Exploration + Service techniques, archivé le 12/06/2008
4 de 20	Échantillonnage en vrac Projet Crevier (116), Automne 2002, Antoine Fournier
5 de 20	Projet Crevier (10-745) Campagne de forage 1976, avril 1976, Roger Aubertin
5 de 20	Projet Crevier (10-745) Campagne de sondage et de cartograhie (1977) No.6, janvier 1978, Jacques Bonneau
5 de 20	Journaux de sondages 1981 SOQUEM 10-745
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5 de 20	Journaux de sondages CREVIER (SOQUEM) 10-745-33 à 10-745-39 (1979)
5 de 20	Journaux de sondages CREVIER (SOQUEM) 10-745-13A à 10-745-32 (1978)
5 de 20	Journaux de sondages CREVIER (SOQUEM) 10-745-07 à 10-745-12 (1977)
5 de 20	Double original, Journal des sondages
5 de 20	116-116.07 Ex.2, Document d'appel d'offres Projet Crevier (10-745) Bloc B- Demie Sud
5 de 20	IREM-MERI, Échantillons CR-270 et CR-278, Analyses No. 82-2499 et 82-2500, Montréal, 23 novembre 1982, Lao Kheang et Guy Perrault
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5 de 20	116-155.00 (mars 1978) Ex.2, Projet Crevier (10-745), États des faits en date du 15 mars 1978, mars 1978, Jacques Bonneau
5 de 20	Étude sur le traitement de minerais de Crevier (10-745), avril 1982, A.James McCann
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5 de 20	Rapport intérimaire, Recherche sur la flottation du pyrochlore de Crevier, 10 mars 1982, Raymond Dallaire
5 de 20	Choix de Claims à conserver Crevier Octobre 1987, Pour Cambior Inc. Choix de claims à conserver projet Crevier (116) Canton Crevier et Lagorce, 28 octobre 1987, Magloire Bérubé
5 de 20	Gisement de niobium-tantale de Crevier, étude de faisabilité, Avril 1986, Paul Gauvreau
5 de 20	Projet 2011-2-3 SOQUEM No.38, Enrichissement du minerai de Crevier par lixiviation acide, Rapport d'étape, 30 août 1982, George Gabra
5 de 20	SOQUEM projet 157, Pilotage du minerai Crevier, rapport préliminaire, 2 février 1984, Silien Dessureaux et Robert Vachon
5 de 20	Commandite de recherches pour le développement d'une méthode de séparation par flottation d'un pyrochlore tantaleux contenu dans une syénite à néphéline, octobre 1981, Université Laval Québec
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5 de 20	Boîte 19, Journal des sondages
5 de 20	Annexe 5B Journaux de sondage (#1 à 6)
5 de 20	Journal des sondages 10-745-11, 12, 33, 34, 35, 36, 37, 38, 39
5 de 20	Journal des sondages 10-745-17, 18, 19, 24, 25, 26, 29, 30, 31, 32
6 de 20	Plan No. 51-17, Projet 10-745 Crevier, N.T.S. 32 H/07-10, Échelle 1:400
6 de 20	Campagne de sondage et de prospection (1980), Projet Crevier (10-745) Cahier 5/5, no.20, Février 1981, Denis Landry
6 de 20	Campagne de sondage et de prospection (1980), Projet Crevier (10-745), no.13, Septembre 1979, A. Bergeron et J.Bonneau
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7 de 20	Mémorandum Levés géophysiques aéroportés, Projet Crevier (P.N. 116), 8 novembre 2002, Gérard Lambert
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7 de 20	Photos
7 de 20	FILIÈRE VIDE
7 de 20	FILIÈRE VIDE
7 de 20	Campagne de sondage et de prospection (1980) Projet Crevier (10-745) cahier 4/5, No.20, Février 1981, Denis Landry
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	Échelle 1: 400, B. Gaboury, D.Landry, D.Labrecque, C.Lamontagne, décembre 1981
	Échelle 1: 400, B. Gaboury, D.Landry, D.Labrecque, C.Lamontagne, décembre 1981
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	Échelle 1: 400, B. Gaboury, D.Landry, D.Labrecque, C.Lamontagne, décembre 1981
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	Échelle 1: 400, P. Lamontagne, B. Gaboury, D.Labrecque, C.Lamontagne, décembre 1981
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	Échelle 1: 20, Géodès, Avril 1981
Other	Phase 1 work program report COREM December 2008

21- Certificate of qualification

Certificate of Claude Duplessis, Eng.

To Accompany the Report entitled: Technical report – Niobium and Tantalum resource estimation of the Crevier deposit North of Lac St-Jean, Quebec, Canada. Dated April 6th 2009.

I, Claude Duplessis, eng., do hereby certify that:

I reside at 3 du Carabinier, Blainville, Quebec, Canada, J7C 5B8.

I am a graduate from the University of Quebec in Chicoutimi, Quebec in 1988 with a B.Sc.A in geological engineering and I have practised my profession continuously since that time.

I am a registered member of the Ordre des ingénieurs du Québec (Registration Number 45523). I am also a registered engineer in the province of Alberta. I am a Member of the Canadian Institute of Mining, Metallurgy and Petroleum and member of the Prospector and Developers Association of Canada. I am a Senior Engineer and Manager of SGS Geostat Ltd.

I have worked as an engineer for a total of 20 years since my graduation. My relevant experience for the purpose of the Technical Report is: Over 16 years of consulting in the field of Mineral Resource estimation, orebody modelling, mineral resource auditing and geotechnical engineering.

I have read the definition of "qualified person" set out in the National Instrument 43-101 and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfil the requirements to be an independent qualified person for the purposes of NI 43-101.

I have prepared and written the technical report (exception of the section on metallurgy) to which this certificate is attached. I have personally visited the site on July 2th of 2008 for one day and I have personally taken independent samples at Niobec Mine core shack facilities on July 3rd of 2008.

I have no personal knowledge as of the date of this certificate of any material fact or material change, which is not reflected in this report.

I am independent of Crevier Minerals Inc. applying all of the tests set forth in section 1.4 of NI 43-101 and section 3.5 of NI 43-101 Companion Policy.

I have read NI 43-101 and Form 43-101F1 and have prepared the technical report in compliance with NI 43-101 and Form 43-101F1; and have prepared the report in conformity with generally accepted Canadian mining industry practice, and as of the date of this certificate, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Signed at Blainville, Quebec this 6th of April, 2009
Claude Duplessis, Eng.

Certificate of Qualified Person
April 6th, 2009

Francois-Olivier Verret, M. Sc.
Project Metallurgist
P.O. Box 4300, 185 Concession Street, Lakefield, Ontario, Canada, K0L 2H0

This certificate applies to:

- Report title: Technical report – Niobium and Tantalum resource estimation of the Crevier deposit North of Lac St-Jean, Quebec, Canada
- Issuance date: Dated April 6th 2009

Brief Summary of Relevant Experience:

- Supervision and project management of projects related to grinding and gravity beneficiation as well as other metallurgical processes.
- Experiences with small to large scale projects, as well as pilot-plant operations.

The following items were under my supervision:
Historical Review of Metallurgical Testing

I hereby state that I am independent from the issuer.

I hereby state that prior to preparing this report I had no involvement or knowledge of the Crevier project.

I hereby state that I have read and understood the Rules and Policies of the NI 43-101 document (version December 23, 2005) and that to the best of my knowledge, the report contains all scientific and technical information that is required to be disclosed to make the report not misleading.

Date: April 6th 2009

Francois-Olivier Verret

Francois-Olivier Verret, M. Sc.
Project Metallurgist

Appendix 1: Certificate of analysis of the independent sampling

SGS

SGS Lakefield Research Limited
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Systems Geostat Inc.
Attn : Claude Duplessis

10 Boul. de la Seigneurie Est, Suite 203
Blainville, Quebec
J7C 3V5, Canada

Phone: 450-433-1050
Fax:450-433-1048
e-mail: cduplessis@geostat.com

Tuesday, August 26, 2008

Date Rec. : 29 July 2008
LR Report : **CA03301-JUL08**
Client Ref : 437701 to 437750

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %	TiO2 %	P2O5 %
1: 437701	55.3	22.5	2.01	0.29	1.04	11.2	3.98	0.26	0.26
2: 437702	54.6	22.3	2.20	0.42	2.40	9.95	5.45	0.30	0.52
3: 437703	4.05	1.40	0.71	0.71	51.4	0.17	0.32	0.06	0.04
4: 437704	55.9	22.6	1.59	0.23	2.31	11.0	4.10	0.18	0.22
5: 437705	56.1	22.6	1.58	0.21	1.99	11.1	4.23	0.18	0.33
6: 437706	56.3	22.5	2.02	0.27	1.80	10.5	4.62	0.22	0.29
7: 437707	56.7	21.7	1.79	0.26	2.33	10.3	4.44	0.22	0.31
8: 437708	55.8	23.1	1.77	0.07	0.42	10.6	5.75	0.13	0.10
9: 437709	57.8	22.4	1.41	0.13	1.31	10.1	5.52	0.14	0.38
10: 437710	56.7	22.5	3.82	0.27	0.64	10.5	4.62	0.32	0.19
11: 437711	54.8	23.3	2.33	0.16	0.91	12.0	3.64	0.20	0.14
12: 437712	55.2	21.4	1.93	0.40	3.30	8.90	5.37	0.25	0.34

Sample ID	MnO %	Cr2O3 %	V2O5 %	LOI %	Sum %	Ta %	Nb %	U %	Zr %	S %
1: 437701	0.03	< 0.01	< 0.01	1.85	98.7	0.02	0.11	< 0.01	0.06	0.05
2: 437702	0.04	0.01	< 0.01	2.21	100.4	0.01	0.12	< 0.01	0.03	0.01
3: 437703	0.09	< 0.01	< 0.01	40.7	99.7	< 0.01	< 0.01	< 0.01	< 0.01	0.25
4: 437704	0.04	< 0.01	< 0.01	2.43	100.6	< 0.01	0.07	< 0.01	0.03	0.01
5: 437705	0.04	< 0.01	< 0.01	2.02	100.4	0.02	0.10	< 0.01	0.05	< 0.01
6: 437706	0.03	0.01	< 0.01	2.07	100.7	< 0.01	0.12	< 0.01	0.06	0.01
7: 437707	0.04	0.01	< 0.01	2.26	100.3	0.02	0.13	< 0.01	0.05	< 0.01
8: 437708	0.02	< 0.01	< 0.01	1.12	99.0	0.02	0.17	< 0.01	< 0.01	< 0.01
9: 437709	0.04	< 0.01	< 0.01	1.59	100.7	0.02	0.19	< 0.01	0.05	0.02
10: 437710	0.02	< 0.01	< 0.01	1.20	100.8	0.02	0.20	< 0.01	0.01	< 0.01
11: 437711	0.03	0.01	< 0.01	1.28	98.8	0.02	0.16	< 0.01	0.04	0.05
12: 437712	0.04	< 0.01	< 0.01	3.18	100.4	0.02	0.10	< 0.01	0.04	0.15

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LR Report : CA03301-JUL08

Sample ID	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %	TiO2 %	P2O5 %
13: 437713	55.5	20.6	2.06	0.68	3.36	8.48	4.81	0.27	0.44
14: 437714	54.5	22.1	2.03	0.39	2.59	9.62	4.82	0.47	0.26
15: 437715	56.6	22.9	2.06	0.22	0.83	9.67	5.68	0.24	0.11
16: 437716	54.8	22.1	1.88	0.46	2.37	9.74	4.63	0.14	0.20
17: 437717	49.8	19.5	3.88	0.60	5.89	8.70	3.51	0.42	0.69
18: 437718	54.2	21.4	2.06	0.77	3.08	9.01	4.70	0.25	0.68
19: 437719	53.8	22.7	1.68	0.76	1.91	9.62	4.60	0.16	0.35
20: 437720	55.5	22.2	1.78	0.37	1.61	9.75	5.18	0.20	0.24
21: 437721	52.6	22.1	1.97	0.61	2.26	10.2	4.34	0.25	0.28
22: 437722	55.6	22.4	1.71	0.17	1.86	10.9	4.06	0.16	0.19
23: 437723	56.9	23.1	1.24	0.20	0.69	11.3	4.04	0.17	0.13
24: 437724	56.1	22.9	1.14	0.19	1.65	10.2	5.55	0.12	0.14
25: 437725	55.7	23.0	1.18	0.71	1.57	9.83	3.51	0.15	0.18
26: 437726	56.2	23.8	1.26	0.41	0.90	11.6	3.11	0.15	0.07
27: 437727	55.2	22.6	1.63	0.31	1.84	9.86	4.36	0.10	0.32
28: 437728	55.2	22.7	2.15	0.26	1.82	11.6	3.52	0.23	0.54
29: 437729	54.6	23.6	1.40	0.24	1.76	12.3	3.52	0.18	0.63
30: 437730	56.9	22.8	2.26	0.17	0.70	11.1	4.76	0.17	0.13
31: 437731	54.5	20.4	2.02	0.42	4.28	9.41	4.83	0.26	0.93
32: 437732	54.0	20.5	1.89	0.38	4.37	10.1	4.13	0.26	1.05

Sample ID	MnO %	Cr2O3 %	V2O5 %	LOI %	Sum %	Ta %	Nb %	U %	Zr %	S %
13: 437713	0.05	< 0.01	< 0.01	4.23	100.5	0.01	0.14	< 0.01	0.06	0.04
14: 437714	0.05	< 0.01	< 0.01	3.59	100.4	< 0.01	0.09	< 0.01	0.01	0.01
15: 437715	0.03	0.02	< 0.01	2.28	100.6	0.02	0.10	< 0.01	0.03	0.05
16: 437716	0.03	< 0.01	< 0.01	3.90	100.3	0.01	0.12	< 0.01	0.03	0.22
17: 437717	0.07	0.01	< 0.01	5.33	98.3	0.03	0.19	< 0.01	0.12	1.14
18: 437718	0.05	< 0.01	< 0.01	3.91	100.0	0.02	0.08	< 0.01	0.07	0.08
19: 437719	0.03	< 0.01	< 0.01	4.67	100.2	0.01	0.11	< 0.01	0.05	0.08
20: 437720	0.03	< 0.01	< 0.01	2.67	99.5	0.01	0.14	< 0.01	0.02	0.21
21: 437721	0.04	< 0.01	< 0.01	3.47	98.1	< 0.01	0.10	< 0.01	0.03	0.09
22: 437722	0.03	< 0.01	< 0.01	2.56	99.6	0.02	0.16	< 0.01	0.18	0.27
23: 437723	0.01	< 0.01	< 0.01	1.33	99.2	0.05	0.24	< 0.01	0.38	0.04
24: 437724	0.04	< 0.01	0.01	2.52	100.6	0.02	0.04	< 0.01	0.02	0.08
25: 437725	0.03	< 0.01	< 0.01	4.91	100.8	0.02	0.05	< 0.01	0.05	0.07
26: 437726	0.03	< 0.01	< 0.01	3.05	100.5	< 0.01	0.04	< 0.01	0.03	0.06
27: 437727	0.03	< 0.01	< 0.01	3.16	99.4	< 0.01	0.03	< 0.01	0.04	0.36
28: 437728	0.04	< 0.01	0.01	1.55	99.5	0.01	0.08	< 0.01	0.20	0.35
29: 437729	0.03	< 0.01	< 0.01	1.69	100.0	0.03	0.13	< 0.01	0.09	0.09
30: 437730	0.03	< 0.01	< 0.01	1.21	100.2	< 0.01	0.03	< 0.01	0.02	0.44
31: 437731	0.05	< 0.01	< 0.01	3.31	100.3	0.02	0.10	< 0.01	0.08	0.03
32: 437732	0.06	< 0.01	< 0.01	3.16	99.9	0.03	0.16	< 0.01	0.09	0.09

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LR Report : CA03301-JUL08

Sample ID	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %	TiO2 %	P2O5 %
33: 437733	56.6	23.7	1.41	0.13	0.48	11.3	5.07	0.14	0.09
34: 437734	57.0	23.9	1.03	0.03	0.50	11.2	5.26	0.11	0.06
35: 437735	57.7	23.4	1.46	0.06	0.40	10.4	6.22	0.14	0.10
36: 437736	57.8	23.0	1.70	0.11	0.56	10.4	5.74	0.14	0.13
37: 437737	57.6	23.0	1.71	0.14	0.85	11.0	4.95	0.16	0.16
38: 437738	57.6	23.3	1.81	0.08	0.43	10.6	5.55	0.17	0.11
39: 437739	55.4	24.1	1.89	0.09	0.73	12.6	3.46	0.14	0.15
40: 437740	56.6	23.2	1.34	0.27	1.18	12.7	3.83	0.14	0.10
41: 437741	54.8	24.1	1.39	0.26	1.68	12.6	2.69	0.14	0.25
42: 437742	54.4	22.7	1.70	0.26	1.35	11.1	4.88	0.23	0.18
43: 437743	55.4	23.7	1.67	0.21	1.20	11.4	4.97	0.18	0.16
44: 437744	53.2	22.5	2.20	0.45	2.53	11.4	3.89	0.31	0.53
45: 437745	55.0	22.6	1.67	0.17	1.97	10.8	4.88	0.16	0.21
46: 437746	56.0	22.4	1.48	0.23	1.97	10.5	5.20	0.15	0.20
47: 437747	56.7	23.1	1.74	0.32	1.19	11.1	4.79	0.22	0.16
48: 437748	57.5	23.5	1.74	0.09	0.54	11.0	4.96	0.18	0.12
49: 437749	56.0	23.0	2.16	0.26	1.48	10.7	4.24	0.17	0.21
50: 437750	52.4	18.8	2.83	0.78	6.03	7.86	4.49	0.43	0.55
51-DUP: 437720	56.2	22.4	1.74	0.38	1.62	9.81	5.19	0.21	0.23
52-DUP: 437740	56.3	23.1	1.32	0.27	1.17	12.7	3.83	0.14	0.11

Sample ID	MnO %	Cr2O3 %	V2O5 %	LOI %	Sum %	Ta %	Nb %	U %	Zr %	S %
33: 437733	0.03	< 0.01	< 0.01	1.02	100.0	0.02	0.19	< 0.01	0.02	0.05
34: 437734	0.03	< 0.01	< 0.01	1.19	100.3	0.02	0.14	< 0.01	0.04	0.01
35: 437735	0.03	< 0.01	< 0.01	0.79	100.7	< 0.01	0.05	< 0.01	< 0.01	0.01
36: 437736	0.04	< 0.01	< 0.01	0.96	100.6	< 0.01	0.08	< 0.01	0.03	0.03
37: 437737	0.03	< 0.01	< 0.01	1.19	100.7	0.02	0.14	< 0.01	0.03	0.02
38: 437738	0.03	< 0.01	< 0.01	0.84	100.5	0.02	0.10	< 0.01	< 0.01	0.03
39: 437739	0.04	0.01	< 0.01	1.28	100.0	0.02	0.22	< 0.01	0.03	0.20
40: 437740	0.03	< 0.01	< 0.01	1.87	101.2	0.02	0.22	< 0.01	0.04	0.01
41: 437741	0.03	0.01	< 0.01	2.28	100.2	0.03	0.26	< 0.01	0.12	0.01
42: 437742	0.04	< 0.01	< 0.01	1.69	98.5	0.04	0.28	< 0.01	0.04	0.02
43: 437743	0.03	< 0.01	< 0.01	1.36	100.2	0.01	0.08	< 0.01	0.04	0.07
44: 437744	0.05	< 0.01	< 0.01	2.27	99.3	0.02	0.12	< 0.01	0.15	0.03
45: 437745	0.04	< 0.01	< 0.01	1.79	99.4	0.03	0.12	< 0.01	0.09	0.21
46: 437746	0.03	0.01	< 0.01	1.99	100.1	0.02	0.08	< 0.01	0.18	0.09
47: 437747	0.04	< 0.01	< 0.01	1.33	100.7	< 0.01	0.05	< 0.01	0.04	0.15
48: 437748	0.01	< 0.01	< 0.01	0.71	100.3	< 0.01	0.03	< 0.01	< 0.01	0.25
49: 437749	0.03	< 0.01	< 0.01	1.80	100.1	< 0.01	0.04	< 0.01	0.06	0.21
50: 437750	0.08	< 0.01	< 0.01	5.38	99.7	< 0.01	0.02	< 0.01	0.17	0.04
51-DUP: 437720	0.03	< 0.01	< 0.01	2.66	100.5	0.02	0.14	< 0.01	0.01	0.20
52-DUP: 437740	0.03	< 0.01	< 0.01	1.87	100.8	0.02	0.22	< 0.01	0.07	0.01

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LR Report : CA03301-JUL08

Control quality assays

D. Charlton

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SGS Geostat
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10 Boul. de la Seigneurie Est, Suite 203
Blainville, Quebec
J7C 3V5, Canada

Phone: 450-433-1050
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Wednesday, December 24, 2008

Date Rec. : 03 December 2008
LR Report : **CA02142-DEC08**
Client Ref : Crevier Niobec Coreshack

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Ta %	Nb %
1: 10-745-53 Samples 102	0.019	0.17
2: 10-745-53 Samples 103	0.027	0.21
3: 10-745-53 Samples 104	0.024	0.19
4: 10-745-53 Samples 105	< 0.002	0.012
5: 10-745-53 Samples 106	0.013	0.10
6: 10-745-53 Samples 107	0.009	0.085
7: 10-745-53 Samples 108	0.011	0.082
8: 10-745-53 Samples 109	0.015	0.20
9: 10-745-53 Samples 110	0.018	0.17
10: 10-745-53 Samples 111	0.024	0.18
11: 10-745-53 Samples 112	0.015	0.12
12: 10-745-53 Samples 113	0.020	0.16
13: 10-745-53 Samples 114	0.039	0.29
14: 10-745-53 Samples 115	0.043	0.33
15: 10-745-53 Samples 116	0.021	0.15
16: 10-745-53 Samples 117	0.017	0.13
17: 10-745-53 Samples 118	0.013	0.068
18: 10-745-53 Samples 119	< 0.002	0.012
19: 10-745-53 Samples 120	0.008	0.061
20: 10-745-53 Samples 121	0.012	0.058
21: 10-745-56 Samples 156	0.015	0.13
22: 10-745-56 Samples 157	0.020	0.15
23: 10-745-56 Samples 158	0.023	0.16
24: 10-745-56 Samples 159	0.016	0.083
25: 10-745-56 Samples 160	0.021	0.15
26: 10-745-56 Samples 161	0.022	0.13
27: 10-745-56 Samples 162	0.064	0.46

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LR Report : **CA02142-DEC08**

Sample ID	Ta %	Nb %
28: 10-745-56 Samples 163	0.020	0.10
29: 10-745-56 Samples 164	0.046	0.21
30: 10-745-56 Samples 165	0.017	0.066
31: 10-745-56 Samples 166	0.008	0.027
32: 10-745-56 Samples 167	0.017	0.074
33: 10-745-56 Samples 168	0.016	0.10
34: 10-745-56 Samples 169	0.023	0.17
35: 10-745-56 Samples 170	0.018	0.11
36: 10-745-56 Samples 171	0.011	0.092
37: 10-745-56 Samples 172	0.032	0.24
38: 10-745-56 Samples 173	0.009	0.071
39: 10-745-56 Samples 174	0.049	0.37
40: 10-745-56 Samples 175	0.049	0.35
41: 10-745-56 Samples 176	0.045	0.34
42: 10-745-56 Samples 177	0.021	0.15
43: 10-745-56 Samples 178	0.034	0.15
44: 10-745-56 Samples 179	0.017	0.10
45: 10-745-56 Samples 180	0.004	0.031
46: 10-745-56 Samples 181	0.011	0.042
47: 10-745-56 Samples 182	0.006	0.032
48: 10-745-56 Samples 183	0.009	0.049
49: 10-745-56 Samples 184	0.003	0.027
50: 10-745-56 Samples 185	0.007	0.032
51: 10-745-56 Samples 186	0.010	0.056
52: 10-745-56 Samples 187	0.019	0.059
53: 10-745-63 Samples 77	0.016	0.13
54: 10-745-63 Samples 78	0.006	0.046
55: 10-745-63 Samples 79	0.009	0.076
56: 10-745-63 Samples 80	0.004	0.026
57: 10-745-63 Samples 81	0.008	0.034
58: 10-745-63 Samples 82	0.004	0.020
59: 10-745-63 Samples 83	0.010	0.050
60: 10-745-63 Samples 84	0.006	0.074
61: 10-745-63 Samples 85	0.014	0.10
62: 10-745-63 Samples 86	0.025	0.19
63: 10-745-63 Samples 87	0.027	0.21
64: 10-745-63 Samples 88	0.030	0.21
65: 10-745-63 Samples 89	0.030	0.18
66-DUP: 10-745-53 Samples 121	0.012	0.058
67-DUP: 10-745-56 Samples 175	0.049	0.35
68-DUP: 10-745-63 Samples 84	0.006	0.074

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LR Report : **CA02142-DEC08**

Control quality assays

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Wednesday, December 24, 2008

Date Rec. : 03 December 2008
LR Report : **CA02143-DEC08**
Client Ref : Crevier Niobec Coreshack

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Ta %	Nb %
1: 10-745-63 Samples 90	0.022	0.075
2: 10-745-63 Samples 91	0.010	0.040
3: 10-745-63 Samples 92	0.012	0.039
4: 10-745-63 Samples 93	0.018	0.058
5: 10-745-63 Samples 94	0.062	0.27
6: 10-745-63 Samples 95	0.023	0.14
7: 10-745-63 Samples 96	0.036	0.23
8: 10-745-63 Samples 97	0.016	0.066
9: 10-745-63 Samples 98	0.015	0.062
10: 10-745-63 Samples 99	0.009	0.065
11: 10-745-63 Samples 100	0.043	0.30
12: 10-745-63 Samples 101	0.058	0.28
13: CV02-85 Samples 63	0.015	0.10
14: CV02-85 Samples 64	0.023	0.16
15: CV02-85 Samples 65	0.004	0.034
16: CV02-85 Samples 66	0.015	0.10
17: CV02-85 Samples 67	0.026	0.18
18: CV02-85 Samples 68	0.023	0.15
19: CV02-85 Samples 69	0.034	0.24
20: CV02-85 Samples 70	0.056	0.39
21: CV02-85 Samples 71	0.011	0.067
22: CV02-85 Samples 72	0.005	0.026
23: CV02-85 Samples 73	0.014	0.064
24: CV02-85 Samples 74	0.017	0.098
25: CV02-85 Samples 75	0.006	0.034
26: CV02-85 Samples 76	0.006	0.046
27: CV02-85 Samples 51	0.013	0.045

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LR Report : **CA02143-DEC08**

Sample ID	Ta %	Nb %
28: CV02-85 Samples 52	0.018	0.16
29: CV02-85 Samples 53	0.017	0.095
30: CV02-85 Samples 54	0.027	0.19
31: CV02-85 Samples 55	0.025	0.099
32: CV02-85 Samples 56	0.015	0.10
33: CV02-85 Samples 57	0.013	0.098
34: CV02-85 Samples 58	0.022	0.11
35: CV02-85 Samples 59	0.010	0.075
36: CV02-85 Samples 60	0.009	0.063
37: CV02-85 Samples 61	0.005	0.026
38: CV02-85 Samples 62	0.024	0.15
39: CV02-91 Samples 122	0.018	0.090
40: CV02-91 Samples 123	0.040	0.27
41: CV02-91 Samples 124	0.018	0.13
42: CV02-91 Samples 125	0.020	0.13
43: CV02-91 Samples 126	0.009	0.085
44: CV02-91 Samples 127	0.012	0.10
45: CV02-91 Samples 128	0.008	0.097
46: CV02-91 Samples 129	0.008	0.085
47: CV02-91 Samples 130	0.013	0.15
48: CV02-91 Samples 131	0.023	0.18
49: CV02-91 Samples 132	0.036	0.29
50: CV02-91 Samples 133	0.039	0.29
51: CV02-91 Samples 134	0.026	0.20
52: CV02-91 Samples 135	0.033	0.24
53: CV02-91 Samples 136	0.026	0.20
54: CV02-91 Samples 137	0.010	0.092
55: CV02-91 Samples 138	0.026	0.20
56: CV02-91 Samples 139	0.039	0.28
57: CV02-91 Samples 140	0.026	0.20
58: CV02-91 Samples 141	0.037	0.32
59: CV02-91 Samples 142	0.026	0.21
60: CV02-91 Samples 143	0.048	0.36
61: CV02-91 Samples 144	0.003	0.039
62: CV02-08 Samples 70	---	---
63-DUP: CV02-91 Samples 123	0.040	0.27
64-DUP: CV02-91 Samples 143	0.055	0.37

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LR Report : CA02143-DEC08

Control quality assays

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Tuesday, December 30, 2008

Date Rec. : 11 December 2008
LR Report : **CA02452-DEC08**
Client Ref : Crevier Niobec Coreshack

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Ta %	Nb %
1: 10-745-57 145	< 0.002	0.087
2: 10-745-57 146	< 0.002	0.027
3: 10-745-57 147	0.009	0.028
4: 10-745-57 148	0.010	0.058
5: 10-745-57 149	0.011	0.034
6: 10-745-57 150	0.044	0.22
7: 10-745-57 151	0.016	0.11
8: 10-745-57 152	0.042	0.20
9: 10-745-57 153	0.025	0.21
10: 10-745-57 154	0.024	0.16
11: 10-745-57 155	0.015	0.11

Control quality assays

N. Mozola

Nicole Mozola, B.Sc. (Eng)
Project Coordinator
Mineral Services, Analytical

OnLine LIMS

SGS Lakefield Research Limited
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

SGS Geostat
Attn : Yann Camus

10 Boul. de la Seigneurie Est, Suite 203, Blainville
Canada, J7C 3V5
Phone: 450-433-1050, Fax:450-433-1048

Wednesday, January 07, 2009

Date Rec. : 17 December 2008
LR Report : **CA02726-DEC08**
Client Ref : Crevier Minerals

CERTIFICATE OF ANALYSIS

Final Report - reissued

Sample ID	Ta %	Nb %
1: Niobium Ore Tailings X1802201095-1 1/3	< 0.002	0.14
2: Niobium Ore Tailings X1802201095-1 2/3	< 0.002	0.14

Control quality assays

N. Mozola

Nicole Mozola, B.Sc. (Eng)
Project Coordinator
Mineral Services, Analytical

OnLine LIMS

SGS Lakefield Research Limited
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Systems Geostat Inc.
Attn : Robert de l'Etoile

Monday, November 10, 2008

Date Rec. : 10 October 2008
LR Report : **CA03085-OCT08**

10 Boul. de la Seigneurie Est, Suite 203
Blainville, Quebec
J7C 3V5, Canada

Phone: 450-433-1050
Fax:450-433-1048

CERTIFICATE OF ANALYSIS

Final Report

Sample ID	Ta XRF %	Ta IMS95a %	Nb XRF %	Nb IMS95a %
1: 437712	0.015	0.015	0.10	0.10
2: 437713	0.025	0.022	0.14	0.14
3: 437714	0.014	0.013	0.094	0.088
4: 437715	0.013	0.011	0.088	0.080
5: 437716	0.015	0.013	0.11	0.10
6: 437717	0.025	0.022	0.18	0.17
7: 437718	0.020	0.019	0.071	0.068
8: 437719	0.018	0.015	0.11	0.094
9: 437720	0.017	0.015	0.12	0.12
10: 437721	0.019	0.017	0.086	0.082
11: 437722	0.028	0.024	0.15	0.14
12: 437723	0.052	0.045	0.27	0.24
13: 437724	0.010	0.008	0.040	0.036
14: 437725	0.018	0.016	0.055	0.055
15: 437726	0.008	0.006	0.031	0.029
16: 437727	0.004	0.002	0.020	0.018
17: 437728	0.023	0.020	0.084	0.073
18: 437729	0.039	0.036	0.12	0.12
19: 437730	0.007	0.006	0.027	0.025
20: 437731	0.026	0.023	0.091	0.085
21: 437732	0.023	0.020	0.15	0.15
22: 437733	0.026	0.021	0.18	0.16
23: 437734	0.019	0.016	0.12	0.10
24: 437735	0.008	0.007	0.052	0.049
25: 437736	0.012	0.010	0.081	0.074
26: 437737	0.016	0.015	0.13	0.12
27: 437738	0.015	0.015	0.099	0.11
28: 437739	0.030	0.024	0.20	0.17
29: 437740	0.028	0.026	0.21	0.20
30: 437741	0.038	0.030	0.26	0.21
31: 437742	0.041	0.037	0.28	0.26
32: 437743	0.013	0.011	0.075	0.069
33: 437744	0.020	0.018	0.11	0.10

OnLine LIMS

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Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : CA03085-OCT08

Sample ID	Ta XRF %	Ta IMS95a %	Nb XRF %	Nb IMS95a %
34: 437745	0.030	0.026	0.13	0.12
35: 437746	0.015	0.014	0.074	0.070
36: 437747	0.010	0.009	0.036	0.038
37: 437748	0.003	0.002	0.019	0.020
38: 437749	0.008	0.006	0.036	0.034
39: 437750	0.002	0.001	0.009	0.009
40-DUP: 437731	0.026	---	0.092	---
41-STD: SARM3 XRF	---	0.002	---	0.096
42-DUP: 437712	---	0.014	---	0.10
43-DUP: 437724	---	0.009	---	0.038
44-DUP: 437736	---	0.009	---	0.070
45-DUP: 437748	---	0.003	---	0.020

Control quality assays

New pulps prepared from reject material
Original LIMS report CA03301-JUL08

XRF assays

IMS95a Ta and Nb by lithium metaborate fusion - ICP-MS finish subcontracted to SGS Minerals (Toronto)

Ken Maley, B.Sc., C. Chem
Operation Manager, Minerals

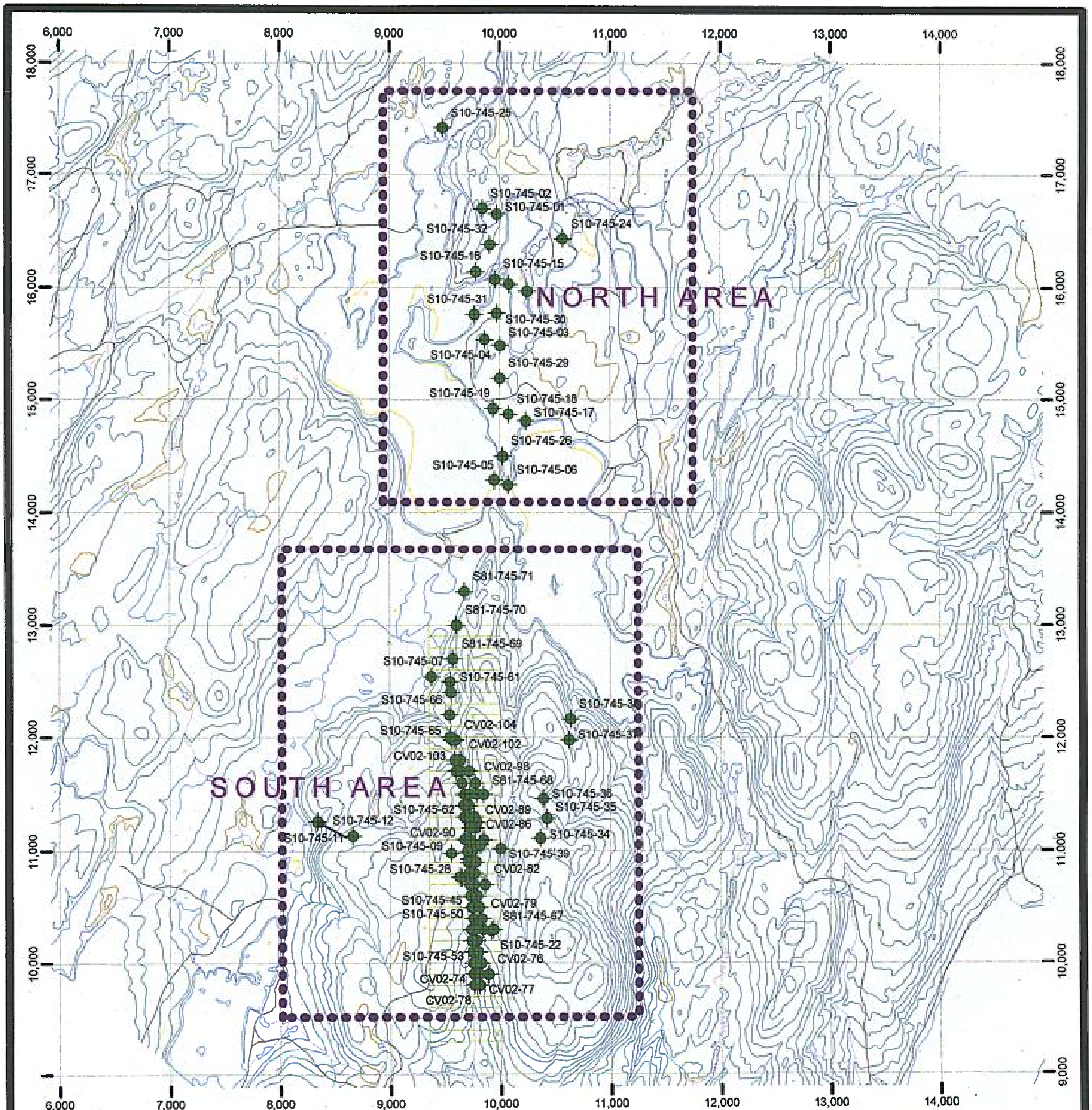
OnLine LIMS

VO08131039 - Finalized
CLIENT : SYSGEO - Systeme Geostat International Inc.
# of SAMPLES : 50
DATE RECEIVED : 2008-09-15
PROJECT : CREVIER MINERALS
CERTIFICATE COMMENTS :
PO NUMBER :

SAMPLE DESCRIPT	ME-XRF05 Nb ppm	ME-XRF05 Ta ppm
437701	892	210
437702	1205	180
437703	3	-10
437704	644	100
437705	800	130
437706	927	120
437707	1225	160
437708	1635	210
437709	1775	250
437710	1890	240
437711	1550	210
437712	1090	140
437713	1380	190
437714	921	110
437715	914	100
437716	1075	120
437717	1720	200
437718	736	170
437719	1080	140
437720	1255	130
437721	870	140
437722	1455	230
437723	2580	460
437724	479	100
437725	540	120
437726	327	60
437727	204	20
437728	847	200
437729	1325	330
437730	262	50
437731	915	210
437732	1590	190
437733	1815	220
437734	1265	170
437735	525	60
437736	902	100
437737	1320	150
437738	1010	120
437739	2070	260
437740	2000	230
437741	2460	320
437742	2540	320

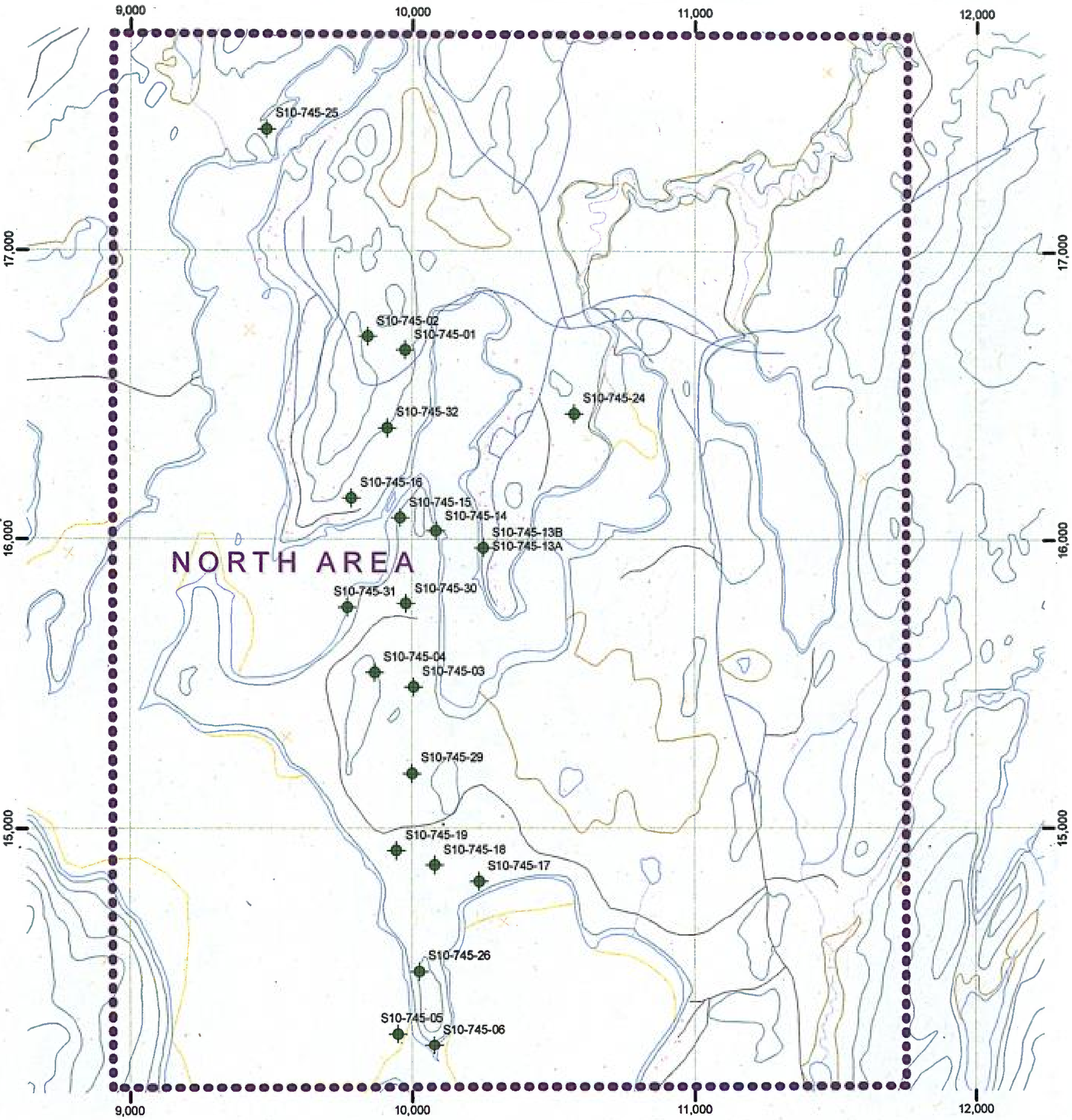
437743	797	100
437744	1190	190
437745	1155	220
437746	784	130
437747	370	70
437748	196	20
437749	379	50
437750	95	10

Appendix 2: General location plan



Niobium and Tantalum Resource Estimation of the Crevier Desposit North of Lac St-Jean, Québec, Canada

TITLE: **Drill Holes Location Map**	
DATE: April 2009	**Appendix 2-1**
PROJECT No: P2008-54	FILE No: p2008-54z1.mxd
APPROVED BY: C. Duplessis	SGS
PROJECTION / DATUM: Local Grid	

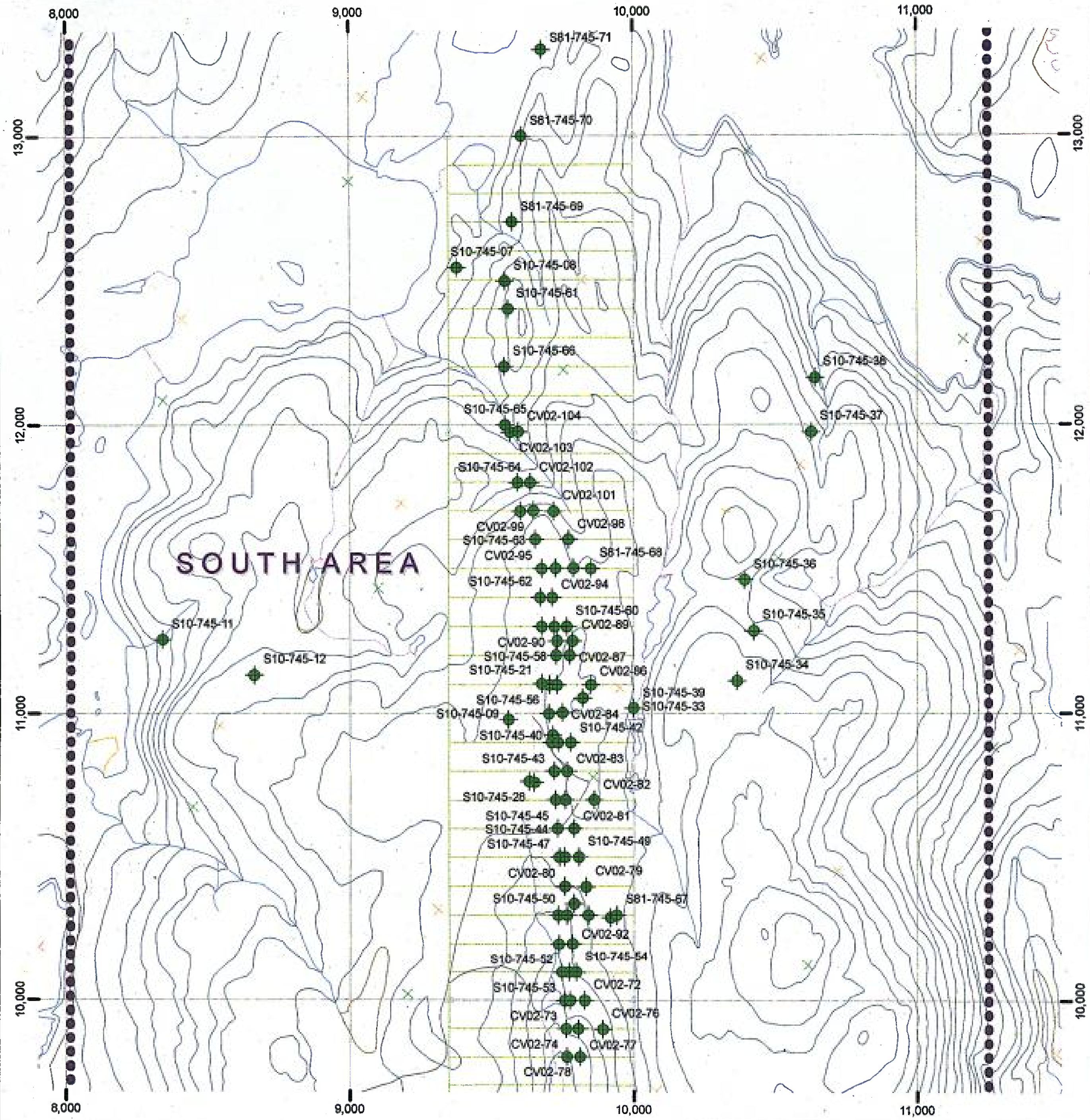


Niobium and Tantalum Resource Estimation of the Crevier Desposit North of Lac St-Jean, Québec, Canada

TITLE:

Drill Holes Location Map North Area

DATE: April 2009	**Appendix 2-2**
PROJECT No: P2008-54	FILE No: p2008-54z2.mxd
APPROVED BY: C. Duplessis	SGS
PROJECTION / DATUM: Local Grid	



Niobium and Tantalum Resource Estimation of the Crevier Desposit North of Lac St-Jean, Québec, Canada

TITLE:

Drill Holes Location Map South Area

DATE: April 2009	**Appendix 2-3**
PROJECT No: P2008-54	FILE No: p2008-54z3.mxd
APPROVED BY: C. Duplessis	SGS
PROJECTION / DATUM: Local Grid	

Appendix 3: SGS Lakefield preparation and analytical protocol

METHOD 9-6-2 Determination of As, Sb, Th, U, Sn and Ta by XRF using Internal Standard Addition

1. **Parameter(s) measured, unit(s):**
arsenic, antimony, thorium, uranium, tin, tantalum; (%)

2. **Typical sample size:**
6 g

3. **Type of sample applicable (media):**
Rocks, soils, ores and concentrates

4. **Sample preparation technique used:**
This method is used as an alternative to fusion for analytical contexts where the analyte is volatile or if levels of detection below that attainable by fusion are required. The internal standard preparation technique forms a powder pellet specimen consisting of sample thoroughly mixed with a known amount of a reference compound and a binding agent. The compound is chosen to provide reference intensity as close to the analyte line wavelength as possible while avoiding interposing major element lines or absorption edges. Within an emission line series, this is usually the adjacent element in terms of atomic number.

5. **Method of analysis used:**
Xray fluorescence spectrometry

6. **Data reduction by:**
The results are exported via computer, on line, data fed to the Laboratory Information Management System with secure audit trail.

7. **Figures of Merit:**

element	Limit of Quantification (LOQ) %
As	0.003
Sn	0.002
Sb	0.003
Ta	0.003
ThO2	0.001
U3O8	0.002

8. **Quality control:**
One blank, one duplicate and a matrix-suitable certified or in-house reference material per batch of 20 samples.

SGS Minerals Services – Lakefield Laboratory
P.O.Box 4300, 185 Concession Street, Lakefield, Ontario, Canada K0L 2H0
www.met.sgs.com
Member of SGS Group (Société Générale de Surveillance)

9. Accreditation Status:
Standards Council of Canada to ISO/IEC 17025.