GM 66463

NI 43-101 TECHNICAL REPORT ON THE PRE-FEASIBILITY STUDY, LAC A PAUL APATITE PROJECT

Ressources d'ARIANNE

Ressources d'Arianne Inc.

NI 43-101 TECHNICAL REPORT ON THE PRE-FEASIBILITY STUDY LAC À PAUL APATITE PROJECT

QUEBEC – CANADA

Prepared for
Ressources d'Arianne Inc.

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Effective Date: November 8, 2011
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Project Number: 2010-052

MET-CHEM

IMPORTANT NOTICE

This Report was prepared as a National Instrument 43-101Technical Report for Ressources d'Arianne ("Arianne") by Met-Chem Canada Inc. ("Met-Chem"). The quality of information, conclusions and estimates contained herein is consistent with the level of effort involved in Met-Chem's services, based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this Report. This Report is intended for use by Arianne subject to the terms and conditions of its contract with Met-Chem. This Report can be filed as a Technical Report with Canadian Securities Regulatory Authorities pursuant to National Instrument 43-101, *Standards of Disclosure for Mineral Projects*. Except for the purposes legislated under Canadian securities laws, any other uses of this Report by any third party are at that party's sole risk.

DATE AND SIGNATURE PAGE - CERTIFICATES

Effective Date: November 8, 2011

Issue Date: December 22, 2011

Certificate of Claude Duplessis, Eng.

SGS Canada Inc. 10 boul. de la Seigneurie Est #203, Blainville, Qc Canada J7C 3V5

To Accompany the Report entitled: "NI 43-101 Technical Report on the Pre-Feasibility Study Lac à Paul Apatite Project, Québec-Canada" dated December 22th, 2011 with effective date of November 8th ,2011.

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

I am a graduate from the University of Quebec in Chicoutimi, Quebec in 1988 with a B.Sc. 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. I am a Senior Engineer and consultant of SGS Canada Inc.;

I have worked as an engineer for a total of 23 years since my graduation. My relevant experience for the purpose of the Technical Report is: Over 18 years of consulting in the field of Mineral Resource estimation, orebody modelling, mineral resource auditing and geotechnical engineering;

I have prepared and written the technical report, I am responsible of sections: 4,5,6,7,8,9,10,11,12,14, 23 and 26.1 in full while co-author on section 25. I have personally visited the site on August 22nd and 23rd, on November 12th to 14th 2008 and on February 1st to 4th of 2009 and on February 14th to 17th 2011 and I have personally taken independent samples at Arianne Resources Inc. core shack facilities on November 2008 and February 2009 and February 2011;

I am independent of the issuer as defined in section 1.5 of NI 43-101;

I have been involved with Ressources d'Arianne and its Lac à Paul Apatite Project and property by preparing sections of previous technical reports that is the subject of the present Technical Report, the site visits dates are identified in the previous paragraph;

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 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.

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.

This 22 day of December 2011.

Original signed and sealed

(Signed) "Claude Duplessis"

Claude Duplessis Eng. Senior Engineer

SGS Canada Inc.

Jeffrey Cassoff, Eng.
Met-Chem Canada Inc.
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CERTIFICATE OF AUTHOR

To Accompany the Report entitled:

"NI 43-101 Technical Report on the Pre-Feasibility Study Lac à Paul Apatite Project, Québec-Canada" dated December 22nd, 2011 with effective date of November 8th ,2011.

I, Jeffrey Cassoff, Eng, do hereby certify that:

1) I am the Lead Mining Engineer presently with Met-Chem Canada Inc. with an office situated at Suite 300, 555 René-Lévesque Blvd West, Montréal, Canada;
2) I am a graduate of McGill University in Montréal with a Bachelor's in Mining Engineering obtained in 1999;
3) I am a member in good standing of the Ordre des Ingénieurs du Québec (Reg. 5002252);
4) I have worked as a mining engineer continuously since graduation from university in 1999;
5) I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined by NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101;
6) I have participated in the preparation of the report entitled **"NI 43-101 Technical Report on the Pre-Feasibility Study Lac à Paul Apatite Project, Québec, Canada"** dated December 22nd, 2011, under Met-Chem consultation company as Senior Mining Engineer. I have participated, and I am responsible for sections 15 and 16 and part of sections 1, 25 and 26;
7) I have visited the site on June 22nd and 23rd, 2011;
8) I have not had prior involvement with Ressources d'Arianne and its Lac à Paul Apatite Project and property that is the subject of the Technical Report;
9) I state that, as the date of the certificate, to the best of my qualified 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;

9) I state that, as the date of the certificate, to the best of my qualified 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;

10) 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 Technical Report;

11) I am independent of the issuer as defined in section 1.5 of NI 43-101;

12) I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form;

This 22nd day of December, 2011.

Jeffrey Cassoff, Eng.
Lead Mining Engineer
Met-Chem Canada Inc.

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CERTIFICATE OF AUTHOR

To Accompany the Report entitled:

"NI 43-101 Technical Report on the Pre-Feasibility Study Lac à Paul Apatite Project, Québec-Canada dated December 22nd, 2011 with effective date of November 8th ,2011.

I, Stephane Rivard, Eng. do hereby certify that:

1) I am Director General Mineral Processing department and a Senior Metallurgical Engineer with Met-Chem Canada Inc. (Met-Chem) with an office situated at Suite 300, 555 René-Lévesque Blvd. West, Montréal, Canada;

2) I am a graduate of Université LAVAL, Québec withd a B.Sc Eng. in Metallurgical and Material Science Engineering in 1994;

3) I am a member in good standing of the "Ordre des Ingénieurs du Québec" (118538);

4) I have practiced my profession for the mining industry continuously since my graduation from university;

5) I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined by NI 43-101) and past relevant work experience that includes more than 12 years in concentrators and operating plants and more than 5 years in consulting practice related to mineral processing, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101;

6) I have participated in the preparation of the report entitled " **NI 43-101 Technical Report on the Pre-Feasibility Study Lac à Paul Apatite Project, Québec-Canada** " dated December 23nd, 2011 and am responsible for Sections 13, 17 and part of Section 1, 25 and 26;

7) I have not visited the site;

8) I have not had prior involvement with Ressources d'Arianne and its Lac à Paul Apatite Project and property that is the subject of the Technical Report;

9) I state that, 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.

10) 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 Technical Report;

11) I am independent of the issuer as defined in section 1.5 of NI 43-101;

12) I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form;

This 22nd day of December 2011.

Stéphane Rivard, Eng.
Director General Mineral Processing
Met-Chem Canada Inc.

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CERTIFICATE OF AUTHOR

To Accompany the Report entitled:

"NI 43-101 Technical Report on the Pre-Feasibility Study Lac à Paul Apatite Project, Québec-Canada" dated December 22nd, 2011 with effective date of November 8th ,2011.

I, Michel L. Bilodeau, Eng., do hereby certify that:

1) I am a retired (June 2009) Associate Professor from the Department of Mining and Materials Engineering of McGill University, 3450 University St., Montréal, QC, Canada H3A 2A7, and still teach on a contract basis the mineral economics course of the mining engineering program;
2) I am a graduate of École Polytechnique de Montréal with a B.Eng. in Geological Engineering (1970), and of McGill University with a M.Sc(App.) in mineral exploration (1972) and a Ph.D. in mineral economics (1975);
3) I am a member in good standing of the "Ordre des ingénieurs du Québec" (23799);
4) I have taught continuously in the areas of engineering economy, mineral economics and mining project feasibility studies in the mining engineering program dispensed by McGill University since my graduation from university, and have carried out in the capacity of independent consultant several assignments related to the economic/financial analysis of mining projects;
5) I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined by NI 43-101) and past relevant work experience in the mineral industry that includes teaching for more than 30 years and consulting activities over the past 20 years, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101;
6) I have participated in the preparation of the report entitled "**NI 43-101 Technical Report on the Pre-Feasibility Study Lac à Paul Apatite Project, Québec-Canada**" dated December 22, 2011, as an Economic/Financial Analyst Consultant. I am responsible for Section 22, part of Section 1 and part of Section 26;
7) I have not visited the site;

8) I have not had prior involvement with Ressources d'Arianne and its Lac à Paul Apatite Project and property that is the subject of the Technical Report;

9) I state that, 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.

10) 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 Technical Report;

11) I am independent of the issuer as defined in section 1.5 of NI 43-101;

12) I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form;

This 22nd day of December, 2011.

Michel Bilodeau, Eng.

Michel L Bilodeau, Eng., M.Sc. (App.), Ph.D.
Economic/Financial Analyst
Consultant for Met-Chem Canada Inc.

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CERTIFICATE OF AUTHOR

To Accompany the Report entitled:

"NI 43-101 Technical Report on the Pre-Feasibility Study Lac à Paul Apatite Project, Québec-Canada " dated December 22nd, 2011 with effective date of November 8th ,2011.

I, Mary Jean Buchanan, Eng., M.Env. do hereby certify that:

1) I am a Senior Project Manager and Senior Environmental Engineer with Met-Chem Canada Inc. (Met-Chem) with an office situated at Suite 300, 555 René-Lévesque Blvd. West, Montréal, Canada;

2) I am a graduate of Université du Québec à Chicoutimi with B.Eng. in Geological Engineering in 1983 and of the Université de Sherbrooke with a M.Env. (Master degree in Environment) in 1997;

3) I am a member in good standing of the "Ordre des Ingénieurs du Québec" (38671);

4) I have practiced my profession for the mining industry continuously since my graduation from university;

5) I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined by NI 43-101) and past relevant work experience that includes 27 years in consulting practice related to resource estimates, mine engineering and environmental assessment, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101;

6) I have supervised and participated in the preparation of the report entitled " NI 43-101 Technical Report on the Pre-Feasibility Study Lac à Paul Apatite Project, Québec-Canada " dated December 22, 2011 and am responsible for Sections 1, 2, 3, 18, 19, 20, 21, 24, 25, 26 and 27;

7) I have visited the site on June 22nd and 23rd, 2011;

8) I have not had prior involvement with Ressources d'Arianne and its Lac à Paul Apatite Project and property that is the subject of the Technical Report;

9) I state that, 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.

10) 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 Technical Report;

11) I am independent of the issuer as defined in section 1.5 of NI 43-101;

12) I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form;

This 22nd day of December 2011.

Mary Jean Buchanan, Eng., M.Env.
Senior Project Manager
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CERTIFICATE OF AUTHOR

To Accompany the Report entitled:

"NI 43-101 Technical Report on the Pre-Feasibility Study Lac à Paul Apatite Project, Québec-Canada" dated December 22nd, 2011 with effective date of November 8th ,2011.

I, Nicolas Skiadas, Eng., M.Eng. do hereby certify that:

1) I am a Senior Project Manager and Senior Geotechnical Engineer with Journeaux Assoc, Division of Lab Journeaux Inc. with an office situated at 801 Bancroft, Pointe-Claire, Quebec, Canada;
2) I am a graduate of McGill University with B.Eng. in Civil Engineering and Applied Mechanics in 1977 and Master of Engineering in Civil Engineering and Applied Mechanics (Geotechnical) in 1982;
3) I am a member in good standing of the "Ordre des Ingénieurs du Québec" (117881);
4) I have practiced my profession for the mining industry for more than 20 years since my graduation from university;
5) I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined by NI 43-101) and past relevant work experience that includes more than 20 years in consulting practice related to geotechnical engineering, tailings deposition and materials quantities and cost estimates, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101;
6) I have participated in the preparation of the report entitled "**NI 43-101 Technical Report on the Pre-Feasibility Study Lac à Paul Apatite Project, Québec-Canada**" dated December 22, 2011, as a Tailings Consultant. I am responsible for Section 18.2.1 and part of Sections 1 and 26;
7) I have visited the site on June 22nd and 23rd, 2011;
8) I have not had prior involvement with Ressources d'Arianne and its Lac à Paul Apatite Project and property that is the subject of the Technical Report;

9) I state that, 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.

10) 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 Technical Report;

11) I am independent of the issuer as defined in section 1.5 of NI 43-101;

12) I have read National Instrument 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form;

This 22nd day of December 2011.

Nicolas Skiadas, Eng., M Eng.
Tailings Specialist
Journeaux Assoc., Division of Lab Journeaux Inc.

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1.0 SUMMARY

1.1 Introduction

This NI 43-101 Technical Report («Report») on the Lac à Paul Project has been prepared at the request of Ressources d'Arianne (Arianne) to present the Pre-Feasibility Study (PFS) major findings.

The Lac à Paul Property is located in North of Saguenay Lac St-Jean area, the nearest village is St-Ludger-de-Millot approximately 175 km south of the property. The property is 30 km east of the Chute-des-Passes Hydro-electrical complex of Rio Tinto ALCAN. The property is approximately 190 km north of the seaport of Grande-Anse (Saguenay) which is a good connection to Saint Laurent River.

Met-Chem Canada Inc. (Met-Chem) was requested by Arianne to provide a Pre-Feasibility Study Report for the exploitation of the Lac à Paul deposits. Met-Chem was to provide leadership for the mining, process design, tailings, infrastructure, environmental aspects, compilation of capital and operating cost estimates at a confidence level of ± 25%, economic analysis and report preparation integrating geology, mineral resources and, metallurgical testing for which information is to be provided by other consultants.

Process flowsheets were developed from a recent metallurgical testing program performed by COREM. The capital cost and the operating cost estimates have been developed for a milling rate of 33,000 t/d.

1.2 Geology and Exploration

The geology and exploration data are a summary of the "Partial Technical Report Phosphate and Titanium resource estimation of the Lac à Paul property deposit, Saguenay-Lac-St-Jean, Quebec Canada, dated December 19th 2011, prepared by SGS Canada Inc.-Geostat.

At the beginning of the sixty's, geological mapping and geochemistry studies have been done in the area. Mineral exploration in the Lac à Paul area was initiated by the Mining Funds of Saguenay-Lac-St-Jean in 1994. After 1994, Virginia Gold Mines and later on Soquem have carried out exploration work on the anorthosite complex of Lac Saint-Jean.

In 1998, a Phosphorus & Titanium showing that was found in the area of the Lac à Paul have been upgraded during prospection campaign conducted by the Mining Funds of Saguenay-Lac-Saint-Jean.

On May 1999, a petrographic description of the mineralized zone was done by IOS Services Géoscientifiques Inc. and on December 1999, Arianne Resources Inc. took an option on the property.

The Lac-Saint-Jean anorthosite is the largest anorthositic complex in the world, occupying an area of nearly 20, 000 km^2. The property lithology consists mainly of intrusive rocks subsequently associated with anorthositic rocks of Lac St-Jean. The rocks are displayed in the form of coalescing lobes of leuconorites, anorthosite, norite, gabbronorite, gabbro with olivine, and gabbro. The lower pyroxenite contains dunites, peridotites, Fe-Ti oxides, apatite, jotunites and mangerites.

Mineralization at the Lac à Paul project originated from magmatic sedimentation and segregation within the anorthositic complex. The main geological unit of interest is a Nelsonite consisting of apatite and ilmenite-rich layers. Nine apatite mineralized zones are reported within Arianne's Lac à Paul project. Zones No 1, No 2 and No 4 are low-grade apatite-ilmenite bearing gabbros. Only Zone No 2 has been explored significantly with diamond drilling. The six other zones, Zone Manouane, Zone Paul, Zone Nicole, Zone Lucie, Zone Lise, Zone Intersection and Zone Castor are considered nelsonites and are most promising. The Paul and Manouane Zones are the main interest of this report.

Prior to 2009, a total of 57 diamond drill holes were completed by previous owners and Arianne Resources Inc. on the property.

Arianne's exploration program of 2010/2011 included a sampling campaign performed on specific claims of the property and a diamond drilling program. A total of seventeen (17) drill holes totaling 4,125 m were carried out on Paul Zone by the company Nordic Drilling of Val d'Or. A total of 1418 samples were sent to ALS Chemex laboratory in Val d'Or. A total of 35 holes totaling 6548 m were drilled on Manouane Zone by Forage Nordic de Val d'Or (QC). A total of 2,072 samples were sent to the ALS Chemex Laboratory.

1.3 Mineral Processing and Metallurgical Testing

Samples from the Paul deposit were sent to COREM for metallurgical test work. Testing was performed at a bench scale, a lock-cycle scale and a pilot plant scale. The goal was to optimize the separation conditions. Conditions investigated were feed grind size, reagent type and dosage amount, flotation circuit and the use of magnetic separation prior to flotation. As results from the batch tests and the locked cycle tests indicate, a circuit with 1 rougher, 1 scavenger and 2 stages of cleaning was efficient to concentrate the Paul Zone apatite to a grade of 38.3% and a recovery of 90.7%.

Table 1.1 – Summary of COREM Pilot Testing Results

Test	P_2O_5 grade (%)	P_2O_5 recovery (%)
Batch Test (Test 7.1)	38.3	90.7
Lock Cycle	38.5	94.2
Pilot Plant	32.4	78.2

The pilot plant results did not reproduce the batch or lock cycle results in a satisfactory manner and results are poor due to two factors: over grinding of the feed and over-dosage of Na_2SiO_3. Over-grinding of the feed has resulted in a poor oxide flotation selectivity. Hence, the over-dosage of Na_2SiO_3 required due to over-grinding has suppressed both the intended silicates but also the apatite.

However, it is expected that with a suitable grind and proper depressant dosages, flotation performance of both the batch test (Test 7.1) and the lock cycle test (see above in Table 1.1) will be obtained.

Additional grinding and flotation testing was performed on samples from Paul and Manouane zones. Although all three samples had lower head grades than pilot plant feed, the rougher & scavenger concentrates showed similar recoveries.

The following are conclusions and recommendations:

- Over-grinding the apatite mineral results in poor selectivity and therefore poor grade and recovery.
- Liberation analysis of the samples from the Paul and Manouane deposits needs to be completed.
- Grind times need to be completed to achieve the size determined in the liberation study.
- Reagent dosages need to be adjusted, especially for the depressant sodium silicate, for optimized recovery and grade.
- Closed circuits are difficult to control for reagent dosages, as they did make it difficult to control for the pilot plant.

1.4 Mineral Resource Estimates

Mineral resources for Paul Zone of Lac à Paul project were estimated using a 2.43% P_2O_5 cut-off grade. At this base case cut-off, the Paul Zone hosts a Measured Mineral Resource of 22.1 million tonnes grading 6.82% P_2O_5, an Indicated Mineral Resource of 161.8 million tonnes grading 7.10% P_2O_5 and an additional Inferred Mineral Resource of 50.3 million tonnes grading 6.61% P_2O_5. The mineral resource estimates are outlined in the Table 1.2.

Table 1.2 – Mineral resource estimates

Ressources d'Arianne			**For Public disclosure**	
cut-off >=2.43% P2O5			Rounded numbers	
Lac à Paul	Resources	07-Nov-11		
OFFICIAL RESOURCES	**PAUL**			
	FixedDensity	P2O5_Pct	TiO2_Pct	Million tons
inferred	3.42	6.61	8.25	50,300,000
indicated	3.42	7.10	8.21	161,800,000
measured	3.42	6.82	7.89	22,100,000
Meas+Ind	3.42	7.06	8.17	183,900,000

Mineral resources for Manouane Zone of Lac à Paul Project were estimated using a 2.43% P_2O_5 cut-off grade. At this base case cut-off, the Manouane Zone hosts a Measured Mineral Resource of 136.9 million tonnes grading 5.93% P_2O_5 and an Indicated Mineral Resource of 26.9 million tonnes grading 5.64% P_2O_5. The mineral resource estimates are outlined in the Table 1.3.

Table 1.3 – Mineral resource estimates – Manouane

Ressources d'Arianne			**For Public disclosure**	
cut-off >=2.43% P2O5			Rounded numbers	
Lac à Paul	Resources	07-Nov-11		
OFFICIAL RESOURCES	**MANOUANE**			
	FixedDensity	P2O5_Pct	TiO2_Pct	Tons
indicated	3.42	5.64	8.46	26,900,000
measured	3.42	5.93	8.77	136,900,000
Meas+Ind	3.42	5.88	8.72	163,800,000

Mineral resources for Zone 2 of Lac à Paul Project were estimated using the same cut-off grade that was used in for Paul and Manouane, 2.43% P_2O_5. At this base case cut-off, the Zone 2 hosts an Inferred Mineral Resource of 64.0 million tonnes grading 4.55% P_2O_5. The mineral resource estimates are outlined in Table 1.4.

Table 1.4 – Mineral resource estimates – Zone 2

Ressources d'Arianne			**For Public disclosure**	
cut-off >=2.43% P2O5			Rounded numbers	
Lac à Paul	Resources	07-Nov-11		
OFFICIAL RESOURCES	**ZONE 2**			
	FixedDensity	P2O5_Pct	TiO2_Pct	Tons
inferred	3.23	4.55	4.57	64,000,000

It is to be noted that Zone 2 inferred mineral resources was not part of the Pre-Feasibility Study.

The following mineral resources models are presented for each zone and total for the 3 zones.

Table 1.5 – Mineral resource estimates – 3 Deposits

Ressources d'Arianne			**For Public disclosure**	
cut-off >=2.43% P2O5			Rounded numbers	
Lac à Paul	Resources	07-Nov-11		
OFFICIAL RESOURCES	**PAUL**			
	FixedDensity	P2O5_Pct	TiO2_Pct	Million tons
inferred	3.42	6.61	8.25	50,300,000
indicated	3.42	7.10	8.21	161,800,000
measured	3.42	6.82	7.89	22,100,000
Meas+Ind	3.42	7.06	8.17	183,900,000
OFFICIAL RESOURCES	**MANOUANE**			
	FixedDensity	P2O5_Pct	TiO2_Pct	Tons
indicated	3.42	5.64	8.46	26,900,000
measured	3.42	5.93	8.77	136,900,000
Meas+Ind	3.42	5.88	8.72	163,800,000
OFFICIAL RESOURCES	**ZONE 2**			
	FixedDensity	P2O5_Pct	TiO2_Pct	Tons
inferred	3.23	4.55	4.57	64,000,000
All 3 deposits				
Measured	3.42	6.05	8.65	159,000,000
Indicated	3.42	6.89	8.24	188,700,000
Inferred	3.31	5.46	6.19	114,400,000
Total M+I	3.42	6.51	8.43	347,700,000

The reader is advised that Arianne Resources Inc. has announced partial results of the 2011 Fall Drilling Campaign on December 12, 2011 that are not included in the estimation of resources presented in this Technical Report with effective date of November 8, 2011.

In author's opinion these results increase the lateral extension of Paul Zone near surface. The new Nicole zone with its drilling results show potential for a new future mineral resource calculation estimate.

The author cautions that mineral resources that are not mineral reserves have not demonstrated economic viability.

1.5 Mineral Reserve Estimates

Table 1.6 summarizes the proven and probable mineral reserves that resulted from the pit designs for the Paul and Manouane deposits. These mineral reserves which account for ore loss form the basis of the mine plan. It is to be noted that Zone 2 was not evaluated by Met-Chem and is not included in this report.

Table 1.6 – Proven and Probable Mineral Reserves

Category	Ore (Mt)	P_2O_5 (%)	TiO_2 (%)	Waste (Mt)	Strip Ratio
Paul					
Proven	21.4	6.85	7.94		
Probable	140.3	7.21	8.29		
Sub-Total	**161.7**	**7.16**	**8.25**	**170.8**	**1.1**
Manouane					
Proven	123.3	5.99	8.84		
Probable	22.1	5.72	8.54		
Sub-Total	**145.4**	**5.95**	**8.79**	**85.0**	**0.6**
Total Reserves					
Proven	144.7	6.12	8.71		
Probable	162.4	7.01	8.33		
Grand-Total	**307.1**	**6.59**	**8.51**	**255.8**	**0.8**

1.6 Mining Methods

The mining method selected for the Project is conventional truck and shovel. The size of the deposit and the production rate favor a 10 m bench height.

Vegetation and topsoil will be cleared by dozers ahead of the mining operation. Overburden will be stripped with front end hydraulic shovels and loaded into rigid frame mining trucks which will haul it to the waste dump. The ore and waste rock will be drilled and blasted then loaded and hauled with the same fleet of trucks and shovels. The ore will be hauled roughly 2 km to the primary crusher and the waste rock will be hauled to the dump.

To properly manage water infiltration into the pit, a sump will be established at the lowest point on the pit floor. Water collected in this sump will be pumped to a collection point at surface.

The production target for the mine is to supply the maximum ore feed that the plant can handle. The target for Year 1 is 8.9 Mt of run of mine ore. This target is a function of the plant's ramp up before obtaining full operating capacity. The plant's availability is expected to increase from 93% in Year 2 to 95% in Year 4. At 95% plant availability, the mine is expected to supply 12.304 Mt of run of mine ore per year (33,710 t/d).

The mine plan will attempt to supply a constant head grade close to the deposit's average although due to the grade variability in the deposits, the grade in the mine plan ranges from 6.7% to 7.3% for Paul and from 5.5% to 6.3% for Manouane. The amount of concentrate produced is a function of head grade and plant recovery and thus varies from an average of 2.1 Mt per year for Paul to an average of 1.7 Mt per year for Manouane.

The Paul deposit has been selected to be the first deposit to be mined. When its reserves are depleted in Year 14, production will begin at the Manouane deposit. The reserves at Manouane are depleted in Year 26.

The haul truck selected for the Project is the 143 tonne Caterpillar 785. A fleet of five (5) trucks is required during pre-production. This number increases to six (6) in Year 1, twelve (12) in Year 2 and reaches a peak of 22 in Year six (6). The number of trucks begins to diminish in Year 12 and reaches 16 by the end of the life of mine.

The main loading machine selected for the Project is the CAT 6030FS (formerly known as the RH120) hydraulic excavator. The CAT 6030FS is an electric driven shovel that will be suitable to handle the production requirements as well as the face heights expected. A Komatsu WA900-3 wheel loader equipped with a 28 tonne capacity bucket has been included in the fleet to be used as an alternate loading machine.

The fleet of support and service equipment will include up to three (3) Komatsu D275-AX (449 kW) track dozers, one (1) Komatsu WD600-3 (362 kW) wheel dozer, two (2) Caterpillar 320D excavators, two (2) Caterpillar 16M (221 kW) graders, one (1) Komatsu HD785-7 water/sand truck and one (1) Caterpillar 242B3 skid steer.

1.7 Recovery Methods

The processing plant is designed to process an average of 33,000 t/d of ore to produce approximately 5,500 t/d of phosphate concentrate grading at about 38.0% P_2O_5 based on a concentrate recovery of 90% P_2O_5.

The ore is trucked from the open pit to the gyratory crusher and the crushed product is then sent to a 33,000 tonnes stock pile providing one day of storage for the processing plant. The ore is then reclaimed and conveyed to the processing plant to feed the grinding circuit. The grinding circuit is made of one 7,500 kW SAG Mill and of a secondary grinding stage using two 8,000 kW ball mills operating in a closed loop with stack sizers. A magnetic separation process is used to eliminate magnetite prior to flotation.

The flotation circuit will produce a phosphate concentrate grading over 38.0% P_2O_5 and the tailing is thickened and pumped to the main tailings dam. The flotation concentrate is also thickened, filtered and dried to obtain a moisture below 2.0%.

The dried concentrate is then stored in an enclosed building before being trucked to Dolbeau area located about 200 km from the process plant site.

1.8 Infrastructure

1.8.1 Off Site Infrastructure

Mining equipment, tailings storage facility, concentrate transportation and load-out facilities as well as infrastructure and services have been added to complete the investment cost of the project.

The Lac à Paul mine and processing plant will be fed through a 161 kV overhead electrical power line supplied and installed by Hydro-Québec from the existing distribution point at the Péribonka power generation substation.

Provision has been made for the upgrade of the Chemin-des-Passes on a distance of approximately 100 km to allow year-round transportation.

1.8.2 Site Infrastructure

Tailings

Tailings storage design is based on two distinct periods: Year 1 to 14, corresponding to the processing of Paul pit ore and Years 15 to 25 for the processing of Manouane pit ore. A traditional tailings storage facility is designed for Paul mill tailings while it is assumed that the Manouane mill tailings will be stored within Paul's depleted pit.

The first phase, corresponding to the processing of Paul ore, is planned for a 14 year continuous operation. The scheme of operation proposes transfer of free water from the tailings pond to a polishing pond to allow for sedimentation of fine particles and other minerals. Water will be then transferred from the polishing pond to the plant to be used in processing. The tailings park includes a potential acid generating (PAG) tailings storage pond for magnetite tails (about 10% of the total production) while the remaining production is considered non-PAG. The water from this pond will be treated before re-used or released to the environment.

Once the operation will reach the Manouane deposit after year 14, mill tailings will be sent to the depleted Paul pit. The pit is relatively close to the process plant, thereby minimizing capital and operating costs for the tailings handling and process water feed systems.

Ancillary Buildings and Facilities

Provision has been made for ancillary buildings and facilities such as maintenance garage and storage, office complex, change house and canteen and permanent camp.

1.9 Market Studies and Contracts

An independent market study is expected to be carried out as the project will proceed to Feasibility Studies, but no independent analysis of the market for phosphate concentrate or price survey have been conducted to date for the Lac à Paul Apatite project.

Similarly, no sales contract has been secure at this early stage of the project.

The 175$/tonne sale price that has been suggested by Ressources d'Arianne and which was used for the project economic analysis is based on the 85% BPL Russian prices over recent years with consideration of the September 2011 CRU 10-year outlook report on the phosphate rock market.

1.10 Environment Studies Permitting and Social or Community Impact

Preliminary environment considerations have been addressed and legislative framework, environmental sensitive areas, issues and project stakeholders have been identified.

The Project Notice was filed with the MDDEP by Ressources d'Arianne in May 2011 and the EIA guidelines were issued to Arianne in June. Public consultations are being held on the project.

Geochemical testing was conducted on mine rock and tailings samples to give a preliminary assessment of the metal leaching (ML) and acid rock drainage (ARD) as well as radioactivity potential of the tailings generated by the project. Results indicate that radioactivity will not be an issue for the project and preliminary environmental characterization shows that only the magnetic fraction of the tailings can be considered potentially acid generating. Mine closure and rehabilitation cost have been estimated at US$ 27.5 M.

1.11 Capital and Operating Costs

1.11.1 Capital Cost

The capital cost estimate of Ressources d'Arianne's Lac à Paul Project for apatite concentrate production is based on Met-Chem's standard methods applicable for a pre-feasibility study to achieve an accuracy level of ± 25%.

The total capital cost for the project life is estimated at US$ 953.4 M where the pre-production initial capital cost is evaluated at US$ 649.2 M while the sustaining capital requirement is US$ 304.2 M as shown in Table 1.7.The sustaining capital covers for mining and concentrate trucks replacement over time as well as costs related to the construction of the tailings storage facility to its final design elevation.

Table 1.7 – Summary of Capital Cost Estimate

Item Description		Total Initial Capital US$ M	Total Sustaining Capital US$ M	Total Capital US$ M
0	**Total Direct Cost**	**454.0**	**304.2**	**758.2**
10	Open Pit Mine	46.9	135.7	182.6
20	Ore Process	217.5		217.5
30	Tailings and water Management facilities	12.1	103.7	115.8
40	General Services (Fuel, Water Dam, etc.)	10.8		10.8
50	Infrastructures	28.5		28.5
60	Power and Communication	51.9		51.9
70	Off-Site Concentrate Stockpile and Load-Out	52.7	64.8	117.5
80	Service Vehicle and Equipment (Allowance)	5.0		5.0
90	Contractor's Indirect Costs	28.6		28.6
I	**Indirect Cost (including financial costs)**	**121.7**	**0.0**	**121.7**
C	Contingency	73.5	0.0	73.5
T	**Total Capital Cost**	**649.2**	**304.2**	**953.4**

1.11.2 Operating Costs

Operating costs have been developed for Mining, Ore Processing, Tailings Management, Concentrate Transportation, Site Services and Administration.

The life of mine average operating cost estimate is evaluated at 97.54 $/tonne of concentrate (see Table 1.8). This manpower level accounts for duplication of staff employees on rotation.

Table 1.8 – Summary of Life of Mine Average Operating Cost Estimate

Area	Average Operating Cost ($/tonne of concentrate)
Mining	26.63
Ore Processing	54.16
Tailings Management	Included in Ore Processing Costs
Concentrate Transportation	10.90
Plant Administration, Infrastructure & Tech. Serv.	5.85
Total Operating Costs	**97.54**

Table 1.9 presents the estimated personnel requirements for the Lac à Paul operation by area.

Table 1.9 – Total Personnel Requirement

Area	Number
Management	6
Mine	227
Ore Processing	77
Environment	2
Administration and Technical Services	24
Human Resources	4
Total Manpower	**340**

1.12 Economic Analysis

The main macro-economic assumptions used in the base case are given in Table 1.10.

Table 1.10 – Macro-Economic Assumptions

Item	Unit	Base Case Value
Phosphate Concentrate Price	US$/tonne	175
Exchange Rate	CAD$/US$	1.00
Life of Mine (Paul zone and Manouane zone)	years	25 ¼
Discount Rate 1	% per year	8.0%
Discount Rate 2	% per year	10.0%

The main technical assumptions used in the base case are given in Table 1.11.

Table 1.11 – Technical Assumptions

Total Ore Mined (Life Of Mine)	M tonnes	307.1
Average Ore Grade to Mill	% P_2O_5	6.57
Concentrate Grade	% P_2O_5	38
Total Tonnes of Concentrate Produced	M tonnes	47.2
Processing Design Rate	Tonnes/day	33,000
Average Process Recovery over Mine Life	%	88.7
Average Mining Operating Cost	($ / tonne mined)	2.24
Average Process Operating Cost	($ / tonne milled)	8.33
Average General & Administration Cost	($ / tonne concentrate)	5.85
Average Concentrate Transport Operating Cost	($ / tonne concentrate)	10.90

The economic analysis of the project has demonstrated positive results at an estimated sale price of phosphate concentrate of $175/tonne. The financial results indicate a before-tax Net Present Values (NPV) of US$ 475.6 M and US$ 683.7 M at discount rates of 10% and 8% per year, respectively. The before-tax Internal Rate of Return is 19.2% and the payback period is 4.70 years.

The after-tax Net Present Values are US$ 222.8 M and US$ 362.2 M at discount rates of 10% and 8%, respectively. The after-tax Internal Rate of Return is 15.2% and the payback period is 5.18 years.

1.13 Other Relevant Data and Information

Considering an environmental authorization to proceed with construction expected in March 2014, the full production start-up date will be end of 2015 providing an order is placed with suppliers for long lead items by end of 2013. The construction period should be approximately 18 months. The detailed engineering is expected to last 12 months.

Engineering for open pit mining should start November-2013 in order to have the pre-stripping completed by end of 3rd quarter 2015.

1.14 Conclusions and Recommendations

Geology and Mineral Resources

SGS Geostat makes the following recommendations to focus on two aspects: the improvement of the available data and a working plan to further develop the property.

- Improvement to Available Data

  In the next round of diamond drilling, the author suggests that specific gravity be measured for each sample interval in order to develop a correlation between specific gravity and main components (iron, titanium, silica and phosphate). Unfortunately, actual SG measurements do not allow the use of a variable SG. The

SG that was used in this mineral resource update is conservative 3.42 fixed SG value.

All geological, geographical, geophysical, property boundaries, access and surface analytical data should be integrated into a single Geographical Information System with the satellite imagery.

- Work Program to Further Develop the Project

The author is aware that Arianne has continued the drilling in the fall of 2011. The results of the latest drilling were not available in time for the preparation of this report. Arianne Resources Inc. has recently released the results in a Press Release, however, this data is not part of the updated mineral resources of the Lac à Paul project that is disclosed in the present 43-101 Technical Report. The author is assisting from time to time the management and exploration team in the drill hole location at Paul and Manouane zones.

The author proposes that extensive drilling takes place on the Paul zone in 2012 as a priority. Again, it is the Author's opinion that drilling should focus on the Paul zone which has better grade and low overburden.

A diamond drilling program for 20,000 m of NQ drilling is proposed. This program will serve the following three goals:

- Increase the quantity and quality of resources in Paul and Manouane Zones;
- Define variability within the zones to allow a better mine sequence forecast;
- Test other anomalies on the property and develop additional resources near surface.

RQD should be done on all core as well as SG measurements.

This first phase program is estimated at four million dollars (4,000,000$) out of which 75% should be dedicated to Paul (infill drilling, lateral extensions and infill drilling for lateral extensions) and 25% for the other zones.

Mining

Met-Chem has identified the following opportunities that should be studied as the Project advances to the Feasibility stage:

- The sequencing of the Paul and Manouane deposits should be revisited with the intent of maximizing the project NPV (Net Present Value). The solution may be to mine both deposits concurrently;
- Assessment and testing regarding pit slope analysis, hydrogeology, and waste rock dump stability will need to be performed to further validate open pit mining technical parameters.

Process

Additional metallurgical testing will be required as the project proceeds to Feasibility stage:

- Additional testwork to firm up design basis of both Paul and Manouane deposits;
- Identification of potential by-products to the phosphate recovery.

a) Additional Testwork

- Work indices: Crusher, Ball Mill and Rod Mill (CWi, BWi, RWi). To better define rock hardness and rock variability for each of the deposit;
- Slime removal using cyclones instead of thickeners;
- Delivery of 60 t from Paul deposit to the selected Laboratory;
- Batch bench scale test work to make sure that this sample is responding well to the developed flowsheet;
- Continuous Pilot Plant runs;
- Prepare samples for vendors testwork (Stack Sizers, thickeners, filters, magnetic separations);
- Specific Gravity determination, Ore and Product bulk densities, Ore and product angle of repose, and other design parameters.

b) Potential By-Products

- Liberation analysis of the samples from the Paul and Manouane deposits needs to be completed;
- Grind size determination for both Paul and Manouane deposits;
- Batch bench scale test work for flowsheet development of apatite, ilmenite and magnetite production of Paul deposit;
- Lock cycle test (2) to confirm flowsheet for Paul deposit (cycles to be done until circulating loads are constant and/or equilibrium is reached);
- Batch bench scale test work for flowsheet development of apatite, ilmenite and magnetite production of Manouane deposit;
- Lock cycle test (2) to confirm flowsheet for Manouane deposit (cycles to be done until circulating loads are constant and/or equilibrium is reached).

Tailings Storage Facility and Water Management

- Geotechnical work such as geotechnical drilling, seismic analysis, stability analysis is recommended in the Feasibility Stage to confirm assumptions used for the tailings storage facility design and waste piles in the Pre-feasibility assessment as well as to permit preliminary foundations evaluation for the plant facilities.
- Rock mechanics as well as hydrogeological studies will be required to further confirm rock slopes, rock permeability, ground and underground water flows and water balance.

- Testing of the tailings geochemical and physical/mechanical properties and behaviour is recommended, such as:
  - Geochemical properties testing: ABA (for acid generation), humidity tests (coarse and fine fractions), fresh and aged supernatant analysis (coarse and fine fractions);
  - Physical/mechanical properties testing: size distribution, specific gravity, Atterberg limits, proctor maximum dry density and optimum water content, maximum density by vibrator and by drying, minimum density, settling, low and overburden stress consolidation settlement.
- Investigation for borrow banks for suitable materials for construction of the various dykes, pads and roads as well as concrete aggregates should be undertaken during the Feasibility Study to determine quantities available and distance from the various facilities.
- Condemnation drilling will be required in the area of the Paul's mill tailings storage facility.
- More detailed topographic survey of the site during the Feasibility Phase will enhance accuracy of the estimates and associated cost analysis.

Infrastructure

Condemnation drilling will be required for Lac à Paul mine site and infrastructure location such as waste rock dump, primary crusher, process plant, buildings, etc.

Manouane River, Lac à Paul and groundwater hydraulics should be verified at Feasibility stage to determine available flow rates for plant make-up water.

As the project progresses to Feasibility Studies more information regarding potential siting of the Dolbeau-Mistassini concentrate handling site and railcar loading station, regional development projects and municipal zoning should be gathered in order to reach the required level of detail for Cost estimate. Discussions should also be held regarding the proposed trestle bridge across the Mistassini River.

Environment Considerations

Meetings with Project Stakeholders should continue as the project progresses to Feasibility Studies.

A summary table of Issues/Potential Impacts identified by Stakeholders should be maintained closely.

A detailed schedule of environmental permitting requirement will need to be prepared. This schedule should be integrated in the Master Schedule of the project.

Based on the preliminary characterization results obtained, it is recommended that at the Feasibility Study stage of the project the following be analyzed:

- Increase the number of samples per type of material that requires environmental characterization;

- Add the environmental characterisation of overburden material type to the database of results;
- Add Manouane zone to the environmental characterisation of waste rock, ore, and process tailings;
- Include Guideline 019 toxicity tests on process tailings decant water for both Paul and Manouane deposits.

2.0 INTRODUCTION

Ressources d'Arianne (Arianne), is a Saguenay based company contemplating a project for the construction, installation and operation of an apatite processing facility (the Lac à Paul Project) to be located approximately 200 km North of Dolbeau-Mistassini, Quebec.

Arianne has recently received (May 2010) a Preliminary Economic Assessment on the Lac à Paul Apatite-Ilmenite Project prepared by IOS Services Géoscientifiques Inc. (IOS) and SGS Canada Inc. The report reviewed the work completed by Arianne to date and recommended further actions by Arianne to take the project to the pre-feasibility stage.

Mineral resources were updated based on additional drilling conducted on the Lac à Paul property in 2010 and 2011 and these results allowed to advance the Project to Preliminary Feasibility Study.

This NI 43-101 Technical Report («Report») on the Lac à Paul Project has been prepared at the request of Ressources d'Arianne (Arianne) to present the Pre-Feasibility Study (PFS) major findings.

The PFS Report was prepared by Met-Chem and was completed on December 19th, 2011.

The effective date of the Technical Report is November 8, 2011.

2.1 Terms of Reference – Scope of Work

Met-Chem Canada Inc. (Met-Chem) was requested by Arianne to provide a Pre-Feasibility Study Report for the exploitation of the Lac à Paul deposits. Met-Chem was to provide leadership for the mining, process design, tailings, infrastructure, environmental aspects, compilation of capital and operating cost estimates at a confidence level of ± 25%, economic analysis and report preparation integrating geology, mineral resources and, metallurgical testing for which information is to be provided by other consultants.

Process flowsheets were developed from a recent metallurgical testing program performed by COREM. The capital cost and the operating cost estimates have been developed for a 33,000 tpd milling rate.

Efforts have also been made to identify additional scenarios to improve the economics of the project. Additional scenarios to the Base Case were added to analyze the effect of using a mining contractor for the mining activities and a subcontractor for transportation of the concentrate.

With the addition of the Manouane deposit to the Study, a preliminary evaluation of increasing the production rate has also been addressed briefly. It is expected that this be further developed as the project progresses into Feasibility Study.

The Pre-Feasibility is intended to establish the viability of the Project at a production rate of about 2 million tonnes of phosphate concentrate in order to justify proceeding with other phases of project development.

Services from specialized firms were retained in the execution of the scope of work.

Table 2.1 provides a list of qualified persons and their respective sections of responsibility. The certificates for people listed as Qualified Persons can be found at the beginning of the Report under Date and Signature – Certificates.

Table 2.1 – Qualified Persons and their Respective Sections of Responsibility

Section	Title of Section	Qualified Persons
1.0	Summary	Mary Jean Buchanan, Met-Chem
2.0	Introduction	Mary Jean Buchanan, Met-Chem
3.0	Reliance on Other Experts	Mary Jean Buchanan, Met-Chem
4.0	Property Description and Location	Claude Duplessis, SGS Geostat
5.0	Accessibility, Climate, Local Resources, Infrastructure and Physiography	Claude Duplessis, SGS Geostat
6.0	History	Claude Duplessis, SGS Geostat
7.0	Geological Setting and Mineralization	Claude Duplessis, SGS Geostat
8.0	Deposit Types	Claude Duplessis, SGS Geostat
9.0	Exploration	Claude Duplessis, SGS Geostat
10.0	Drilling	Claude Duplessis, SGS Geostat
11.0	Sample Preparation, Analyses and Security	Claude Duplessis, SGS Geostat
12.0	Data Verification	Claude Duplessis, SGS Geostat
13.0	Mineral Processing and Metallurgical Testing	Stéphane Rivard, Met-Chem
14.0	Mineral Resource Estimates	Claude Duplessis, SGS Geostat
15.0	Mineral Reserve Estimates	Jeffrey Cassoff, Met-Chem
16.0	Mining Methods	Jeffrey Cassoff, Met-Chem
17.0	Recovery Methods	Stéphane Rivard, Met-Chem
18.0	Project Infrastructure (with the exception of 18.2.1)	Mary Jean Buchanan, Met-Chem
18.2.1	Tailings Storage Facility	Nicolas Skiadas, Journeaux Assoc.
19.0	Market Studies and Contracts	Mary Jean Buchanan, Met-Chem
20.0	Environment Studies Permitting and Social or Community Impact	Mary Jean Buchanan, Met-Chem
21.0	Capital and Operating Costs	Mary Jean Buchanan, Met-Chem
22.0	Economic Analysis	Michel Bilodeau, for Met-Chem
23.0	Adjacent Properties	Claude Duplessis, SGS Geostat
24.0	Other Relevant Data and Information	Mary Jean Buchanan, Met-Chem
25.0	Interpretation and Conclusions	Mary Jean Buchanan, Met-Chem
26.0	Recommendations	Mary Jean Buchanan, Met-Chem
27.0	References	Mary Jean Buchanan, Met-Chem

Capital and Operating Cost estimates as well as Conclusions and Recommendations were provided by those consultants involved in relevant areas of the Study.

2.2 Sources of Information

The information presented in this Technical Report has been derived from the Pre-Feasibility Study Report titled: "Pre-Feasibility Study of the Lac à Paul Apatite Project, Quebec, Canada, December 19, 2011". The Pre-Feasibility Study summarizes various studies and fieldwork done by Ressources d'Arianne and Consultants for the development of the project. The reports are listed in Section 27.

2.3 Personal inspection on the property by each Qualified Person

The following Qualified Persons visited the site in relation with this work:

- Mary Jean Buchanan, Eng. M. Env. Met-Chem visited the site on June 22 and 23, 2011.
- Jeff Cassoff, Eng. Met-Chem visited the site on June 22 and 23, 2011.
- Nicolas Skiadas Eng. M. Eng. Journeaux Assoc. visited the site on June 22 and 23, 2011.
- Claude Duplessis, Eng. SGS Geostat visited on four times the Lac à Paul property site: on August 22 and 23, 2008; on November 12 to 14, 2008; on February 1 to 4, 2009 and on February 14 to 17, 2011.

2.4 Units and Currency

In this report, all prices and costs are expressed in US Dollars (US$). Quantities are generally stated in *Système International d'Unités* (SI) metric units, the standard Canadian and international practice, including metric tonnes (tonnes, t) for weight, and kilometer (km) or meters (m) for distance.

Abbreviations used in this report are listed in Table 2.2.

Table 2.2 – List of Abbreviations

Description	Abbreviation
Acid Rock Drainage	ARD
Bureau d'Audience Publique sur l'Environnement	BAPE
Canadian dollar	CAD$
Canadian Environmental Assessment Act	CEAA
Canadian Environmental Protection Act	CEPA
Certificate of Authorization	CofA
Cubic meter	m^3
Cubic meter per hour	m^3/h
Environmental Impact Assessment	EIA
Environmental Impact Statement	EIS
Environmental Quality Act	EQA
Feet	ft
Grams	g
General and Administration	G & A

Description	Abbreviation
Gross Combined Weight	GCW
Government of Québec	GQ
Gram per liter	g/L
Grams	g
Grams/tonne or parts per million	g/t
Hectare	ha
Horsepower	hp
Inches	in
Kilogram per liter	kg/L
Kilograms	kg
Kilometers	km
Kilovolt	kV
Kilowatt	kW
Kilowatt per hour per tonne	kWh/t
SGS Lakefield Research Limited of Canada	SGS Lakefield
Liter per hour	L/h
Megawatt	MW
Megawatt per hour per day	MWh/d
Metal Leaching	ML
Metal Mining Effluent Regulation	MMER
Meters	m
Metric tonnes	Tonnes or t
Microns	µm
Milligram per liter	mg/L
Million of cubic meter	Mm^3
Millions of metric tonnes	Mt
Millions of metric tonnes per year	Mtpy
Ministère Développement Durable, Environnement et Parcs	MDDEP
Ministry of Natural Resources and Wildlife	MNRW
Ministère des Ressources naturelles et de la Faune, Service du développement et du milieu miniers	MRNF
Ministry of Sustainable Development, Environment and Parks	MSDEP
National Instrument 43-101	NI 43-101
Net Smelter Return	NSR
Parts per million, parts per billion	ppm, ppb
Preliminary Economic Assessment	PEA
Regional County Municipality	RCM
Ressources d'Arianne	Arianne
Run of Mine	ROM
Short tons (0.907185 tonnes)	t, st, ST, ton

Description	Abbreviation
Specific gravity	s. g.
Square meter	m^2
Tonnes Metric	tonnes or mt
Tonnes per cubic meter	t/m^3
Tonnes per day	tpd
Tonnes per hour	tph
Tonnes per month	tpm
Tonnes per year	tpy
Troy ounce (31.1035 grams)	oz
Troy ounce per short ton	0z/t
US dollar	$USD
Volt	V

3.0 RELIANCE ON OTHER EXPERTS

This Report has been prepared by Met-Chem for Ressources d'Arianne. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to Met-Chem at the time of the preparation of this Report with an effective date of November 8th 2011;
- Assumptions, conditions and qualifications as set forth in this Report; and
- Data, reports, and opinions supplied by Ressources d'Arianne and other third party sources.

The Reports supplied and forming the basis of this Technical Report are listed in Section 27.

Met-Chem believes that information supplied to be reliable but does not guarantee the accuracy of conclusions, opinions, or estimates that rely on third party sources for information that is outside the area of technical expertise of Met-Chem. As such, responsibilities for the various components of the Summary, Conclusions and Recommendations are dependent on the associated sections of the Report from which those components were developed.

Met-Chem relied on the following reports and opinions for information that is outside the area of technical expertise of Met-Chem:

- Information on Metallurgical Testing was provided by COREM;
- Information relative to Environment Studies, Permitting and Social or Community Impact was provided by Dany Thériault, geographer and environmental professional from DESSAU;
- Information on Market Study and Contracts was provided by Ressources d'Arianne;
- Qualified Person Claude Duplessis (SGS Geostat) also relied on the independent survey company for the differential GPS topographic survey and the positioning of the holes in the field in addition to the exploration field works carried out by IOS Services Géoscientifiques Inc. and other geological subcontractors of Arianne. Hand held GPS spot checks for diamond drill hole position and azimuth verification were done during site visits and have proved to be adequate in relation to drill hole database position and drill hole orientation.

This Report is intended to be used by Ressources d'Arianne as a Technical Report with Canadian Securities Regulatory Authorities pursuant to provincial securities legislation. Except for the purposes contemplated under provincial securities laws, any other use of this Report by any third party is at the party's sole risk.

Permission is given to use portions of this Report to prepare advertising, press releases and publicity material, provided such advertising, press release and publicity material does not impose any additional obligations upon, or create liability for Met-Chem.

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 Location and Access

The Lac à Paul Property is located in the north of Lac St-Jean area and the nearest city with all major services is the city of Alma about 190 km south (Figure 4.1 and Figure 4.2). The village of Saint-Ludger-de-Milot is around 175 km south. The property is also located at 190 km North from the seaport of Grande-Anse which is a good connection to the open sea via Saguenay and the Saint Laurent River.

Figure 4.1 – Location of the Lac à Paul property in the province of Quebec

The property sits at latitude 49° 47' North and longitude 70° 50' west approximately. In the SNRC system, the references maps are 22E/10 and 22E/15.

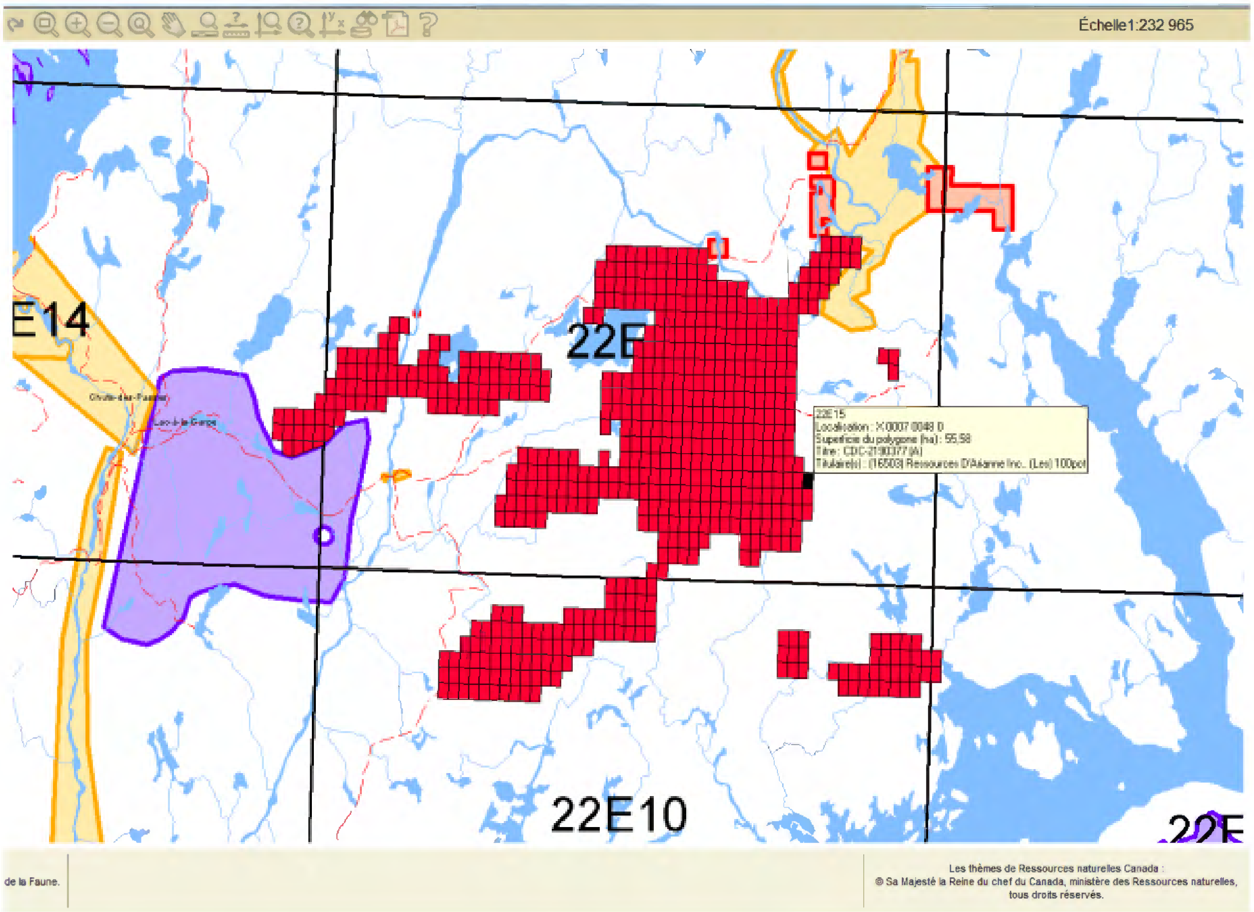
4.2 Property Description

The Lac à Paul is located in a mining property and contains 609 designated claims (CDC) with 33,770.15 hectares north of Lac St-Jean, about 190 km north from the city of Saguenay. The actual property as per December 7, 2011 is made of five blocks of claims (see Figure 4.2). The official Lac à Paul property is the main central claim block within 22E15 extending down in 22E10.

The western block shown in Figure 4.2 is named Lac Duhamel block and extents from 22E15 to 22E14. The south-west part (2 small blocks) in 22E10 extending in 22E09 is named Pipmuacan. The small eastern block in 22E15 is named Zone 4.

The main Lac à Paul claim block has received all the works and attention and is the purpose of this report.

Figure 4.2 – Location of the Lac à Paul property claims December 2011

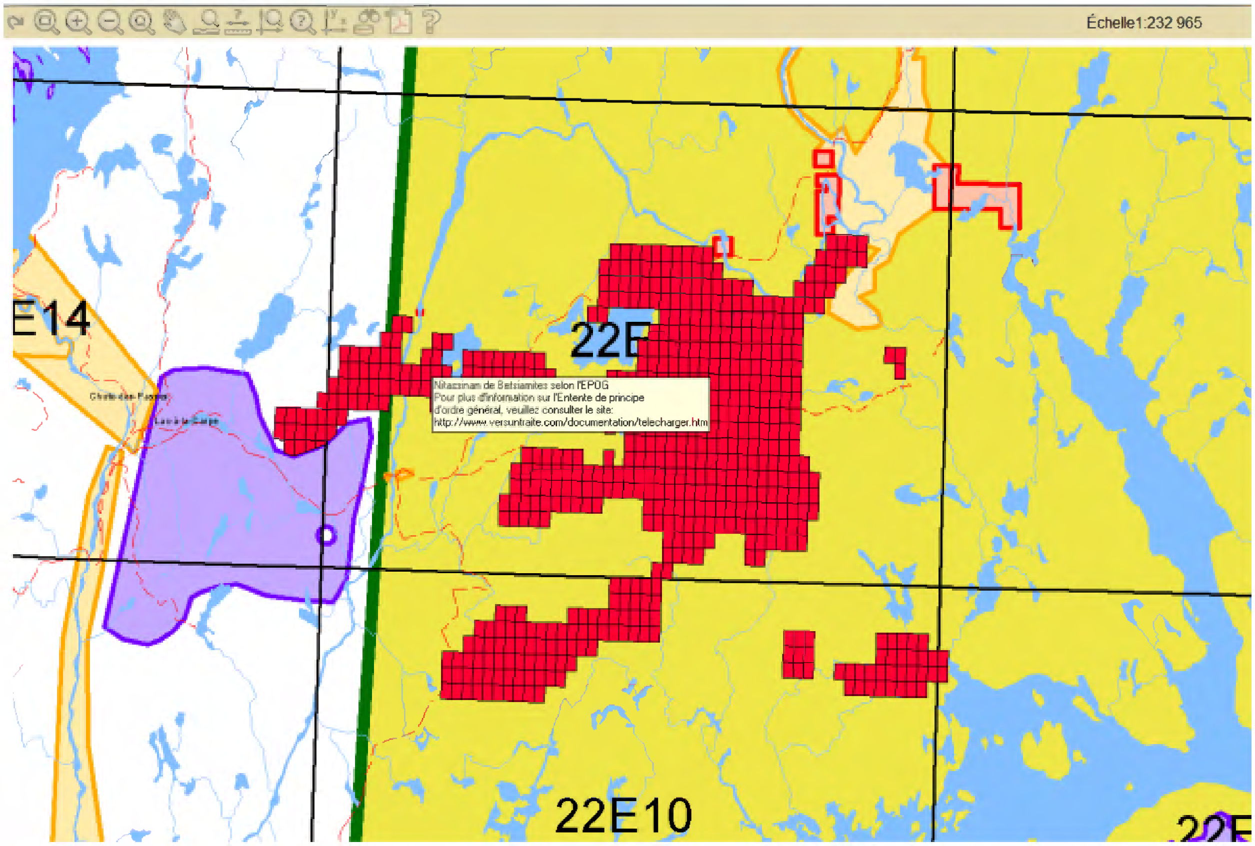


The claims are registered in the Province of Quebec electronic system (GESTIM) and boundaries in the field may be located with a differential global positioning system (DGPS).

The claims are in good standing at the moment of writing this report. There are no environmental liabilities that we are aware of.

All the claims are under the EPOG, the claims of interest for this study are under the EPOG (General Agreement of Principles) with the Nistassinan of Betsiamites native group as shown in figure 4.3.

Figure 4.3 – Lac à Paul property claims December 2011 with "EPOG" from GESTIM



4.2.1 Mineral Rights

Map designated cells, which define mineral titles according to the Québec mining law, are pre-established parcels of land, half a minute of arc by half a minute of arc on the NAD-83 projection, the limits of which are predefined by their longitude and latitude. These titles are almost irrevocable by the government, and unchallengeable by a third party. Their limits being defined by law, they do not need land surveying to be officialised. The map designated mineral titles confers exclusive rights to the owner to carry out mineral exploration, and to acquire the mining lease in the eventuality of exploitation. However, mineral rights do not include surface rights, nor does it include rights over resources other than mineral, such as forestry, surface and groundwater, cynegetic, halieutic, or hydroelectric. However such surface rights are included within the mining lease if the project is located on Crown land.

Claims have to be renewed every two years. Renewal date is dictated by the anniversary dates of individual claims. Claims are considered in good standing.

The Claims of Arianne Resources Inc. have been validated on the MNR Quebec GESTIM website and are listed in Table 4.1 to Table 4.11.

Table 4.1 – Mining titles list (1) from MRNQ GESTIM mining title management system

num	Feuillet	Type de titre	No titre	Statut du titre	Date d'expiration	Superficie (Ha)	Détenteur(s) (Nom, Numéro et Pourcentage)
1	SNRC 22E15	CDC	1004635	Actif	20/03/2013 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
2	SNRC 22E15	CDC	1004636	Actif	20/03/2013 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
3	SNRC 22E15	CDC	1004637	Actif	20/03/2013 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
4	SNRC 22E15	CDC	1024230	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
5	SNRC 22E15	CDC	1024231	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
6	SNRC 22E15	CDC	1024232	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
7	SNRC 22E15	CDC	1024233	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
8	SNRC 22E15	CDC	1024234	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
9	SNRC 22E15	CDC	1024235	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
10	SNRC 22E15	CDC	1024236	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
11	SNRC 22E15	CDC	1024237	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
12	SNRC 22E15	CDC	1024238	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
13	SNRC 22E15	CDC	1024239	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
14	SNRC 22E15	CDC	1025896	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
15	SNRC 22E15	CDC	1025897	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
16	SNRC 22E15	CDC	1038320	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
17	SNRC 22E15	CDC	1038321	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
18	SNRC 22E15	CDC	1038322	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
19	SNRC 22E15	CDC	2121340	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
20	SNRC 22E15	CDC	2121341	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
21	SNRC 22E15	CDC	2125492	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
22	SNRC 22E15	CDC	2125493	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
23	SNRC 22E15	CDC	2125494	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
24	SNRC 22E15	CDC	2125495	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
25	SNRC 22E15	CDC	2125496	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
26	SNRC 22E15	CDC	2125497	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
27	SNRC 22E15	CDC	2125498	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
28	SNRC 22E15	CDC	2125499	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
29	SNRC 22E15	CDC	2125500	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
30	SNRC 22E15	CDC	2125501	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
31	SNRC 22E15	CDC	2125502	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
32	SNRC 22E15	CDC	2125503	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
33	SNRC 22E15	CDC	2125504	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
34	SNRC 22E15	CDC	2125505	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
35	SNRC 22E15	CDC	2125506	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
36	SNRC 22E15	CDC	2125507	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
37	SNRC 22E15	CDC	2125508	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
38	SNRC 22E15	CDC	2125509	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
39	SNRC 22E15	CDC	2125510	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
40	SNRC 22E15	CDC	2125511	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
41	SNRC 22E15	CDC	2125512	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
42	SNRC 22E15	CDC	2125513	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
43	SNRC 22E15	CDC	2125514	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
44	SNRC 22E15	CDC	2125515	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
45	SNRC 22E15	CDC	2125516	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
46	SNRC 22E15	CDC	2125517	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
47	SNRC 22E15	CDC	2125518	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
48	SNRC 22E15	CDC	2125519	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
49	SNRC 22E15	CDC	2125520	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
50	SNRC 22E15	CDC	2125521	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
51	SNRC 22E15	CDC	2125522	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
52	SNRC 22E15	CDC	2125523	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
53	SNRC 22E15	CDC	2129818	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
54	SNRC 22E15	CDC	2129819	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
55	SNRC 22E15	CDC	2167400	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
56	SNRC 22E15	CDC	2167401	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
57	SNRC 22E15	CDC	2167402	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
58	SNRC 22E15	CDC	2167403	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
59	SNRC 22E15	CDC	2167404	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
60	SNRC 22E15	CDC	2167451	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)

Table 4.2 – Mining titles list (2) from MRNQ GESTIM mining title management system

61	SNRC 22E15	CDC	2167452	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
62	SNRC 22E15	CDC	2167453	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
63	SNRC 22E15	CDC	2167454	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
64	SNRC 22E15	CDC	2167455	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
65	SNRC 22E15	CDC	2167456	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
66	SNRC 22E15	CDC	2167457	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
67	SNRC 22E15	CDC	2167458	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
68	SNRC 22E15	CDC	2167459	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
69	SNRC 22E15	CDC	2167460	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
70	SNRC 22E15	CDC	2167461	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
71	SNRC 22E15	CDC	2167462	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
72	SNRC 22E15	CDC	2167463	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
73	SNRC 22E15	CDC	2167464	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
74	SNRC 22E15	CDC	2167465	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
75	SNRC 22E15	CDC	2167466	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
76	SNRC 22E15	CDC	2167467	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
77	SNRC 22E15	CDC	2167468	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
78	SNRC 22E15	CDC	2167469	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
79	SNRC 22E15	CDC	2167470	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
80	SNRC 22E15	CDC	2167471	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
81	SNRC 22E15	CDC	2167472	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
82	SNRC 22E15	CDC	2167473	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
83	SNRC 22E15	CDC	2167474	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
84	SNRC 22E15	CDC	2167475	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
85	SNRC 22E15	CDC	2167476	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
86	SNRC 22E15	CDC	2167477	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
87	SNRC 22E15	CDC	2167478	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
88	SNRC 22E15	CDC	2167817	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
89	SNRC 22E15	CDC	2167818	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
90	SNRC 22E15	CDC	2167819	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
91	SNRC 22E15	CDC	2167820	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
92	SNRC 22E15	CDC	2167822	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
93	SNRC 22E15	CDC	2167823	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
94	SNRC 22E15	CDC	2167824	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
95	SNRC 22E15	CDC	2167825	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
96	SNRC 22E15	CDC	2169733	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
97	SNRC 22E15	CDC	2169734	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
98	SNRC 22E15	CDC	2169735	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
99	SNRC 22E15	CDC	2169736	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
100	SNRC 22E15	CDC	2169737	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
101	SNRC 22E15	CDC	2169738	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
102	SNRC 22E15	CDC	2169739	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
103	SNRC 22E15	CDC	2169740	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
104	SNRC 22E15	CDC	2169741	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
105	SNRC 22E15	CDC	2169746	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
106	SNRC 22E15	CDC	2169747	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
107	SNRC 22E15	CDC	2169748	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
108	SNRC 22E15	CDC	2169749	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
109	SNRC 22E15	CDC	2169750	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
110	SNRC 22E15	CDC	2169751	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
111	SNRC 22E15	CDC	2169752	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
112	SNRC 22E15	CDC	2169753	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
113	SNRC 22E15	CDC	2169754	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
114	SNRC 22E15	CDC	2169755	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
115	SNRC 22E15	CDC	2169756	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
116	SNRC 22E15	CDC	2169757	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
117	SNRC 22E15	CDC	2169758	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
118	SNRC 22E15	CDC	2169759	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
119	SNRC 22E15	CDC	2169760	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
120	SNRC 22E15	CDC	2169761	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)

Table 4.3 – Mining titles list (3) from MRNQ GESTIM mining title management system

121	SNRC 22E15	CDC	2169762	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
122	SNRC 22E15	CDC	2169763	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
123	SNRC 22E15	CDC	2169764	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
124	SNRC 22E15	CDC	2169765	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
125	SNRC 22E15	CDC	2169766	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
126	SNRC 22E15	CDC	2169767	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
127	SNRC 22E15	CDC	2169768	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
128	SNRC 22E15	CDC	2170444	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
129	SNRC 22E15	CDC	2170445	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
130	SNRC 22E15	CDC	2170446	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
131	SNRC 22E15	CDC	2170447	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
132	SNRC 22E15	CDC	2170448	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
133	SNRC 22E15	CDC	2170449	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
134	SNRC 22E15	CDC	2170450	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
135	SNRC 22E15	CDC	2170451	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
136	SNRC 22E15	CDC	2170452	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
137	SNRC 22E15	CDC	2170453	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
138	SNRC 22E15	CDC	2170454	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
139	SNRC 22E15	CDC	2170455	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
140	SNRC 22E15	CDC	2170456	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
141	SNRC 22E15	CDC	2170457	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
142	SNRC 22E15	CDC	2170458	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
143	SNRC 22E15	CDC	2170459	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
144	SNRC 22E15	CDC	2170460	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
145	SNRC 22E15	CDC	2170461	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
146	SNRC 22E15	CDC	2170462	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
147	SNRC 22E15	CDC	2170463	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
148	SNRC 22E15	CDC	2170464	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
149	SNRC 22E15	CDC	2170465	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
150	SNRC 22E15	CDC	2170467	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
151	SNRC 22E15	CDC	2170468	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
152	SNRC 22E15	CDC	2170469	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
153	SNRC 22E15	CDC	2170470	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
154	SNRC 22E15	CDC	2170471	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
155	SNRC 22E15	CDC	2170472	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
156	SNRC 22E15	CDC	2170473	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
157	SNRC 22E15	CDC	2170474	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
158	SNRC 22E15	CDC	2170475	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
159	SNRC 22E15	CDC	2170476	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
160	SNRC 22E15	CDC	2170477	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
161	SNRC 22E15	CDC	2183184	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
162	SNRC 22E15	CDC	2183185	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
163	SNRC 22E15	CDC	2183186	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
164	SNRC 22E15	CDC	2183188	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
165	SNRC 22E15	CDC	2183189	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
166	SNRC 22E15	CDC	2183190	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
167	SNRC 22E15	CDC	2183191	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
168	SNRC 22E15	CDC	2183192	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
169	SNRC 22E15	CDC	2183193	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
170	SNRC 22E15	CDC	2183404	Actif	01/05/2012 23:59	55.62	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
171	SNRC 22E15	CDC	2183405	Actif	01/05/2012 23:59	55.62	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
172	SNRC 22E15	CDC	2183406	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
173	SNRC 22E15	CDC	2183407	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
174	SNRC 22E15	CDC	2183408	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
175	SNRC 22E15	CDC	2183409	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
176	SNRC 22E15	CDC	2183411	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
177	SNRC 22E15	CDC	2190169	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
178	SNRC 22E15	CDC	2190170	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
179	SNRC 22E15	CDC	2190171	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
180	SNRC 22E15	CDC	2190172	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)

Table 4.4 – Mining titles list (4) from MRNQ GESTIM mining title management system

181	SNRC 22E15	CDC	2190173	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
182	SNRC 22E10	CDC	2190361	Actif	01/05/2012 23:59	55.65	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
183	SNRC 22E10	CDC	2190362	Actif	01/05/2012 23:59	55.65	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
184	SNRC 22E15	CDC	2190363	Actif	01/05/2012 23:59	55.64	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
185	SNRC 22E15	CDC	2190364	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
186	SNRC 22E15	CDC	2190365	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
187	SNRC 22E15	CDC	2190366	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
188	SNRC 22E15	CDC	2190367	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
189	SNRC 22E15	CDC	2190368	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
190	SNRC 22E15	CDC	2190369	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
191	SNRC 22E15	CDC	2190370	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
192	SNRC 22E15	CDC	2190371	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
193	SNRC 22E15	CDC	2190372	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
194	SNRC 22E15	CDC	2190373	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
195	SNRC 22E15	CDC	2190374	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
196	SNRC 22E15	CDC	2190375	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
197	SNRC 22E15	CDC	2190376	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
198	SNRC 22E15	CDC	2190377	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
199	SNRC 22E15	CDC	2190378	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
200	SNRC 22E15	CDC	2190379	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
201	SNRC 22E15	CDC	2190380	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
202	SNRC 22E15	CDC	2190738	Actif	01/05/2012 23:59	55.64	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
203	SNRC 22E15	CDC	2190739	Actif	01/05/2012 23:59	55.63	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
204	SNRC 22E15	CDC	2190740	Actif	01/05/2012 23:59	55.63	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
205	SNRC 22E15	CDC	2190741	Actif	01/05/2012 23:59	55.63	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
206	SNRC 22E15	CDC	2190742	Actif	01/05/2012 23:59	55.63	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
207	SNRC 22E15	CDC	2190743	Actif	01/05/2012 23:59	55.62	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
208	SNRC 22E15	CDC	2190744	Actif	01/05/2012 23:59	55.62	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
209	SNRC 22E15	CDC	2190745	Actif	01/05/2012 23:59	55.62	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
210	SNRC 22E15	CDC	2190746	Actif	01/05/2012 23:59	55.62	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
211	SNRC 22E15	CDC	2190747	Actif	01/05/2012 23:59	55.62	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
212	SNRC 22E15	CDC	2190748	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
213	SNRC 22E15	CDC	2190749	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
214	SNRC 22E15	CDC	2190750	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
215	SNRC 22E15	CDC	2190751	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
216	SNRC 22E15	CDC	2190752	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
217	SNRC 22E15	CDC	2190753	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
218	SNRC 22E15	CDC	2190754	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
219	SNRC 22E15	CDC	2190755	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
220	SNRC 22E15	CDC	2190756	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
221	SNRC 22E15	CDC	2190757	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
222	SNRC 22E15	CDC	2190758	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
223	SNRC 22E15	CDC	2190759	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
224	SNRC 22E15	CDC	2190760	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
225	SNRC 22E15	CDC	2190761	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
226	SNRC 22E15	CDC	2190762	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
227	SNRC 22E15	CDC	2190763	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
228	SNRC 22E15	CDC	2190764	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
229	SNRC 22E15	CDC	2190765	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
230	SNRC 22E15	CDC	2190766	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
231	SNRC 22E15	CDC	2190767	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
232	SNRC 22E15	CDC	2190768	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
233	SNRC 22E15	CDC	2190769	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
234	SNRC 22E15	CDC	2190770	Actif	01/05/2012 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
235	SNRC 22E15	CDC	2190771	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
236	SNRC 22E15	CDC	2190772	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
237	SNRC 22E15	CDC	2190773	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
238	SNRC 22E15	CDC	2190774	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
239	SNRC 22E15	CDC	2190775	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
240	SNRC 22E15	CDC	2190776	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)

Table 4.5 – Mining titles list (5) from MRNQ GESTIM mining title management system

241	SNRC 22E15	CDC	2190777	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
242	SNRC 22E15	CDC	2205947	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
243	SNRC 22E15	CDC	2205948	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
244	SNRC 22E15	CDC	2205949	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
245	SNRC 22E15	CDC	2205950	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
246	SNRC 22E15	CDC	2205951	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
247	SNRC 22E15	CDC	2205952	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
248	SNRC 22E15	CDC	2205953	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
249	SNRC 22E15	CDC	2205954	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
250	SNRC 22E15	CDC	2205955	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
251	SNRC 22E15	CDC	2205956	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
252	SNRC 22E15	CDC	2205957	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
253	SNRC 22E15	CDC	2205958	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
254	SNRC 22E15	CDC	2205959	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
255	SNRC 22E15	CDC	2205960	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
256	SNRC 22E15	CDC	2205961	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
257	SNRC 22E15	CDC	2205962	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
258	SNRC 22E15	CDC	2205963	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
259	SNRC 22E15	CDC	2205964	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
260	SNRC 22E15	CDC	2205965	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
261	SNRC 22E15	CDC	2205966	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
262	SNRC 22E15	CDC	2205967	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
263	SNRC 22E15	CDC	2205968	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
264	SNRC 22E15	CDC	2208073	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
265	SNRC 22E15	CDC	2208074	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
266	SNRC 22E15	CDC	2208075	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
267	SNRC 22E15	CDC	2208076	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
268	SNRC 22E15	CDC	2215082	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
269	SNRC 22E15	CDC	2215083	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
270	SNRC 22E15	CDC	2246474	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
271	SNRC 22E15	CDC	2246475	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
272	SNRC 22E15	CDC	2246476	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
273	SNRC 22E15	CDC	2246477	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
274	SNRC 22E15	CDC	2246478	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
275	SNRC 22E15	CDC	2246479	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
276	SNRC 22E15	CDC	2246480	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
277	SNRC 22E15	CDC	2246481	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
278	SNRC 22E15	CDC	2246482	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
279	SNRC 22E15	CDC	2246483	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
280	SNRC 22E15	CDC	2246484	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
281	SNRC 22E15	CDC	2246485	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
282	SNRC 22E15	CDC	2246486	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
283	SNRC 22E15	CDC	2246487	Actif	01/05/2012 23:59	55.59	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
284	SNRC 22E15	CDC	2246488	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
285	SNRC 22E15	CDC	2246489	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
286	SNRC 22E15	CDC	2246490	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
287	SNRC 22E15	CDC	2273982	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
288	SNRC 22E15	CDC	2273983	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
289	SNRC 22E15	CDC	2273984	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
290	SNRC 22E15	CDC	2273985	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
291	SNRC 22E15	CDC	2273986	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
292	SNRC 22E15	CDC	2273987	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
293	SNRC 22E15	CDC	2273988	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
294	SNRC 22E15	CDC	2273989	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
295	SNRC 22E15	CDC	2273990	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
296	SNRC 22E15	CDC	2273991	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
297	SNRC 22E15	CDC	2273992	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
298	SNRC 22E15	CDC	2273993	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
299	SNRC 22E15	CDC	2273994	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
300	SNRC 22E15	CDC	2273995	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)

Table 4.6 – Mining titles list (6) from MRNQ GESTIM mining title management system

301	SNRC 22E15	CDC	2273996	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
302	SNRC 22E15	CDC	2273997	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
303	SNRC 22E15	CDC	2273998	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
304	SNRC 22E15	CDC	2273999	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
305	SNRC 22E15	CDC	2274000	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
306	SNRC 22E15	CDC	2274001	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
307	SNRC 22E15	CDC	2274002	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
308	SNRC 22E15	CDC	2274003	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
309	SNRC 22E15	CDC	2274004	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
310	SNRC 22E15	CDC	2274005	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
311	SNRC 22E15	CDC	2274006	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
312	SNRC 22E15	CDC	2274007	Actif	01/05/2012 23:59	55.48	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
313	SNRC 22E15	CDC	2274008	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
314	SNRC 22E15	CDC	2274009	Actif	01/05/2012 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
315	SNRC 22E15	CDC	2274010	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
316	SNRC 22E15	CDC	2274011	Actif	01/05/2012 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
317	SNRC 22E15	CDC	2274012	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
318	SNRC 22E15	CDC	2274013	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
319	SNRC 22E15	CDC	2274014	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
320	SNRC 22E15	CDC	2274015	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
321	SNRC 22E15	CDC	2274016	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
322	SNRC 22E15	CDC	2274017	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
323	SNRC 22E15	CDC	2274018	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
324	SNRC 22E15	CDC	2274019	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
325	SNRC 22E15	CDC	2274020	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
326	SNRC 22E15	CDC	2274021	Actif	01/05/2012 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
327	SNRC 22E10	CDC	2274276	Actif	01/05/2012 23:59	55.66	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
328	SNRC 22E10	CDC	2274277	Actif	01/05/2012 23:59	55.66	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
329	SNRC 22E10	CDC	2274278	Actif	01/05/2012 23:59	55.66	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
330	SNRC 22E10	CDC	2274279	Actif	01/05/2012 23:59	55.65	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
331	SNRC 22E10	CDC	2274280	Actif	01/05/2012 23:59	55.65	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
332	SNRC 22E10	CDC	2274281	Actif	01/05/2012 23:59	55.65	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
333	SNRC 22E15	CDC	2274282	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
334	SNRC 22E15	CDC	2274283	Actif	01/05/2012 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
335	SNRC 22E15	CDC	2274284	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
336	SNRC 22E15	CDC	2274285	Actif	01/05/2012 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
337	SNRC 22E15	CDC	2274286	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
338	SNRC 22E15	CDC	2274287	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
339	SNRC 22E15	CDC	2274288	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
340	SNRC 22E15	CDC	2274289	Actif	01/05/2012 23:59	55.58	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
341	SNRC 22E15	CDC	2274290	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
342	SNRC 22E15	CDC	2274291	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
343	SNRC 22E15	CDC	2274292	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
344	SNRC 22E15	CDC	2274293	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
345	SNRC 22E15	CDC	2274294	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
346	SNRC 22E15	CDC	2274295	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
347	SNRC 22E15	CDC	2274296	Actif	01/05/2012 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
348	SNRC 22E15	CDC	2274297	Actif	01/05/2012 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
349	SNRC 22E15	CDC	2274298	Actif	01/05/2012 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
350	SNRC 22E15	CDC	2274299	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
351	SNRC 22E15	CDC	2274300	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
352	SNRC 22E15	CDC	2274301	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
353	SNRC 22E15	CDC	2274302	Actif	01/05/2012 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
354	SNRC 22E15	CDC	2274303	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
355	SNRC 22E15	CDC	2274304	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
356	SNRC 22E15	CDC	2274305	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
357	SNRC 22E15	CDC	2274306	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
358	SNRC 22E15	CDC	2274307	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
359	SNRC 22E15	CDC	2274308	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
360	SNRC 22E15	CDC	2274309	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)

Table 4.7 – Mining titles list (7) from MRNQ GESTIM mining title management system

361	SNRC 22E15	CDC	2274310	Actif	01/05/2012 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
362	SNRC 22E15	CDC	2274311	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
363	SNRC 22E15	CDC	2274312	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
364	SNRC 22E15	CDC	2274313	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
365	SNRC 22E15	CDC	2274314	Actif	01/05/2012 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
366	SNRC 22E15	CDC	2274315	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
367	SNRC 22E15	CDC	2274316	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
368	SNRC 22E15	CDC	2274317	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
369	SNRC 22E15	CDC	2274318	Actif	01/05/2012 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
370	SNRC 22E15	CDC	2274319	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
371	SNRC 22E15	CDC	2274320	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
372	SNRC 22E15	CDC	2274321	Actif	01/05/2012 23:59	55.49	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
373	SNRC 22E10	CDC	2275077	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
374	SNRC 22E10	CDC	2275078	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
375	SNRC 22E10	CDC	2275079	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
376	SNRC 22E10	CDC	2275080	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
377	SNRC 22E10	CDC	2275081	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
378	SNRC 22E10	CDC	2275082	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
379	SNRC 22E10	CDC	2275083	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
380	SNRC 22E10	CDC	2275084	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
381	SNRC 22E10	CDC	2275085	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
382	SNRC 22E10	CDC	2275086	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
383	SNRC 22E10	CDC	2275087	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
384	SNRC 22E10	CDC	2275088	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
385	SNRC 22E10	CDC	2275089	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
386	SNRC 22E10	CDC	2275090	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
387	SNRC 22E10	CDC	2275091	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
388	SNRC 22E10	CDC	2275092	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
389	SNRC 22E10	CDC	2275093	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
390	SNRC 22E10	CDC	2275094	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
391	SNRC 22E10	CDC	2275095	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
392	SNRC 22E10	CDC	2275096	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
393	SNRC 22E10	CDC	2275097	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
394	SNRC 22E10	CDC	2275098	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
395	SNRC 22E10	CDC	2275099	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
396	SNRC 22E10	CDC	2275100	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
397	SNRC 22E10	CDC	2275101	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
398	SNRC 22E10	CDC	2275102	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
399	SNRC 22E10	CDC	2275103	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
400	SNRC 22E10	CDC	2275104	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
401	SNRC 22E10	CDC	2275105	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
402	SNRC 22E10	CDC	2275106	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
403	SNRC 22E10	CDC	2275107	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
404	SNRC 22E10	CDC	2275108	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
405	SNRC 22E10	CDC	2275109	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
406	SNRC 22E10	CDC	2275110	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
407	SNRC 22E10	CDC	2275111	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
408	SNRC 22E10	CDC	2275112	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
409	SNRC 22E10	CDC	2275113	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
410	SNRC 22E10	CDC	2275114	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
411	SNRC 22E10	CDC	2275115	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
412	SNRC 22E10	CDC	2275116	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
413	SNRC 22E14	CDC	2275117	Actif	23/02/2013 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
414	SNRC 22E14	CDC	2275118	Actif	23/02/2013 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
415	SNRC 22E14	CDC	2275119	Actif	23/02/2013 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
416	SNRC 22E14	CDC	2275120	Actif	23/02/2013 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
417	SNRC 22E14	CDC	2275121	Actif	23/02/2013 23:59	55.57	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
418	SNRC 22E14	CDC	2275122	Actif	23/02/2013 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
419	SNRC 22E14	CDC	2275123	Actif	23/02/2013 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
420	SNRC 22E14	CDC	2275124	Actif	23/02/2013 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)

Table 4.8 – Mining titles list (8) from MRNQ GESTIM mining title management system

421	SNRC 22E14	CDC	2275125	Actif	23/02/2013 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
422	SNRC 22E14	CDC	2275126	Actif	23/02/2013 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
423	SNRC 22E14	CDC	2275127	Actif	23/02/2013 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
424	SNRC 22E15	CDC	2275128	Actif	23/02/2013 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
425	SNRC 22E15	CDC	2275129	Actif	23/02/2013 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
426	SNRC 22E15	CDC	2275130	Actif	23/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
427	SNRC 22E15	CDC	2275131	Actif	23/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
428	SNRC 22E15	CDC	2275132	Actif	23/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
429	SNRC 22E15	CDC	2275133	Actif	23/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
430	SNRC 22E15	CDC	2275134	Actif	23/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
431	SNRC 22E15	CDC	2275135	Actif	23/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
432	SNRC 22E15	CDC	2275136	Actif	23/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
433	SNRC 22E15	CDC	2275137	Actif	23/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
434	SNRC 22E15	CDC	2275138	Actif	23/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
435	SNRC 22E15	CDC	2275139	Actif	23/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
436	SNRC 22E15	CDC	2275140	Actif	23/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
437	SNRC 22E15	CDC	2275141	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
438	SNRC 22E15	CDC	2275142	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
439	SNRC 22E15	CDC	2275143	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
440	SNRC 22E15	CDC	2275144	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
441	SNRC 22E15	CDC	2275145	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
442	SNRC 22E15	CDC	2275146	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
443	SNRC 22E15	CDC	2275147	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
444	SNRC 22E15	CDC	2275148	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
445	SNRC 22E15	CDC	2275149	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
446	SNRC 22E15	CDC	2275150	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
447	SNRC 22E15	CDC	2275151	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
448	SNRC 22E15	CDC	2275152	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
449	SNRC 22E15	CDC	2275153	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
450	SNRC 22E15	CDC	2275154	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
451	SNRC 22E15	CDC	2275155	Actif	23/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
452	SNRC 22E15	CDC	2275156	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
453	SNRC 22E15	CDC	2275157	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
454	SNRC 22E15	CDC	2275158	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
455	SNRC 22E15	CDC	2275159	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
456	SNRC 22E15	CDC	2275160	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
457	SNRC 22E15	CDC	2275161	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
458	SNRC 22E15	CDC	2275162	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
459	SNRC 22E15	CDC	2275163	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
460	SNRC 22E15	CDC	2275164	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
461	SNRC 22E15	CDC	2275165	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
462	SNRC 22E15	CDC	2275166	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
463	SNRC 22E15	CDC	2275167	Actif	23/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
464	SNRC 22E10	CDC	2275348	Actif	01/05/2012 23:59	55.72	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
465	SNRC 22E10	CDC	2275349	Actif	01/05/2012 23:59	55.72	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
466	SNRC 22E10	CDC	2275350	Actif	01/05/2012 23:59	55.72	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
467	SNRC 22E10	CDC	2275351	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
468	SNRC 22E10	CDC	2275352	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
469	SNRC 22E10	CDC	2275353	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
470	SNRC 22E10	CDC	2275354	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
471	SNRC 22E10	CDC	2275355	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
472	SNRC 22E10	CDC	2275356	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
473	SNRC 22E10	CDC	2275357	Actif	01/05/2012 23:59	55.71	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
474	SNRC 22E10	CDC	2275358	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
475	SNRC 22E10	CDC	2275359	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
476	SNRC 22E10	CDC	2275360	Actif	01/05/2012 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
477	SNRC 22E10	CDC	2275361	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
478	SNRC 22E10	CDC	2275362	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
479	SNRC 22E10	CDC	2275363	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
480	SNRC 22E10	CDC	2275364	Actif	01/05/2012 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)

Table 4.9 – Mining titles list (9) from MRNQ GESTIM mining title management system

481	SNRC 22E10	CDC	2275365	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
482	SNRC 22E10	CDC	2275366	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
483	SNRC 22E10	CDC	2275367	Actif	01/05/2012 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
484	SNRC 22E10	CDC	2275368	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
485	SNRC 22E10	CDC	2275369	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
486	SNRC 22E10	CDC	2275370	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
487	SNRC 22E10	CDC	2275371	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
488	SNRC 22E10	CDC	2275372	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
489	SNRC 22E10	CDC	2275373	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
490	SNRC 22E10	CDC	2275374	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
491	SNRC 22E10	CDC	2275375	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
492	SNRC 22E10	CDC	2275376	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
493	SNRC 22E10	CDC	2275377	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
494	SNRC 22E10	CDC	2275378	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
495	SNRC 22E10	CDC	2275379	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
496	SNRC 22E10	CDC	2275380	Actif	01/05/2012 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
497	SNRC 22E10	CDC	2275381	Actif	01/05/2012 23:59	55.66	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
498	SNRC 22E10	CDC	2275382	Actif	01/05/2012 23:59	55.66	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
499	SNRC 22E10	CDC	2275383	Actif	01/05/2012 23:59	55.66	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
500	SNRC 22E10	CDC	2275384	Actif	01/05/2012 23:59	55.66	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
501	SNRC 22E10	CDC	2275385	Actif	01/05/2012 23:59	55.66	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
502	SNRC 22E10	CDC	2275386	Actif	01/05/2012 23:59	55.65	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
503	SNRC 22E10	CDC	2275387	Actif	01/05/2012 23:59	55.65	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
504	SNRC 22E15	CDC	2275388	Actif	24/02/2013 23:59	55.56	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
505	SNRC 22E15	CDC	2275389	Actif	24/02/2013 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
506	SNRC 22E15	CDC	2275390	Actif	24/02/2013 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
507	SNRC 22E15	CDC	2275391	Actif	24/02/2013 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
508	SNRC 22E15	CDC	2275392	Actif	24/02/2013 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
509	SNRC 22E15	CDC	2275393	Actif	24/02/2013 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
510	SNRC 22E15	CDC	2275394	Actif	24/02/2013 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
511	SNRC 22E15	CDC	2275395	Actif	24/02/2013 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
512	SNRC 22E15	CDC	2275396	Actif	24/02/2013 23:59	55.55	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
513	SNRC 22E15	CDC	2275397	Actif	24/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
514	SNRC 22E15	CDC	2275398	Actif	24/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
515	SNRC 22E15	CDC	2275399	Actif	24/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
516	SNRC 22E15	CDC	2275400	Actif	24/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
517	SNRC 22E15	CDC	2275401	Actif	24/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
518	SNRC 22E15	CDC	2275402	Actif	24/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
519	SNRC 22E15	CDC	2275403	Actif	24/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
520	SNRC 22E15	CDC	2275404	Actif	24/02/2013 23:59	55.54	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
521	SNRC 22E15	CDC	2275405	Actif	24/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
522	SNRC 22E15	CDC	2275406	Actif	24/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
523	SNRC 22E15	CDC	2275407	Actif	24/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
524	SNRC 22E15	CDC	2275408	Actif	24/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
525	SNRC 22E15	CDC	2275409	Actif	24/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
526	SNRC 22E15	CDC	2275410	Actif	24/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
527	SNRC 22E15	CDC	2275411	Actif	24/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
528	SNRC 22E15	CDC	2275412	Actif	24/02/2013 23:59	55.53	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
529	SNRC 22E15	CDC	2275413	Actif	24/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
530	SNRC 22E15	CDC	2275414	Actif	24/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
531	SNRC 22E15	CDC	2275415	Actif	24/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
532	SNRC 22E15	CDC	2275416	Actif	24/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
533	SNRC 22E15	CDC	2275417	Actif	24/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
534	SNRC 22E15	CDC	2275418	Actif	24/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
535	SNRC 22E15	CDC	2275419	Actif	24/02/2013 23:59	55.52	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
536	SNRC 22E15	CDC	2275420	Actif	24/02/2013 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
537	SNRC 22E15	CDC	2275421	Actif	24/02/2013 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
538	SNRC 22E15	CDC	2275422	Actif	24/02/2013 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
539	SNRC 22E15	CDC	2275423	Actif	24/02/2013 23:59	55.51	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
540	SNRC 22E15	CDC	2275424	Actif	24/02/2013 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)

Table 4.10 – Mining titles list (10) from MRNQ GESTIM mining title management system

541	SNRC 22E15	CDC	2275425	Actif	24/02/2013 23:59	55.5	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
542	SNRC 22E14	CDC	2276315	Actif	10/03/2013 23:59	52.62	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
543	SNRC 22E14	CDC	2276316	Actif	10/03/2013 23:59	50.14	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
544	SNRC 22E14	CDC	2276317	Actif	10/03/2013 23:59	35.73	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
545	SNRC 22E14	CDC	2276318	Actif	10/03/2013 23:59	21.2	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
546	SNRC 22E15	CDC	2276319	Actif	10/03/2013 23:59	47.9	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
547	SNRC 22E15	CDC	2276320	Actif	10/03/2013 23:59	54.97	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
548	SNRC 22E09	CDC	2302791	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
549	SNRC 22E09	CDC	2302792	Actif	20/07/2013 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
550	SNRC 22E10	CDC	2302793	Actif	20/07/2013 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
551	SNRC 22E10	CDC	2302794	Actif	20/07/2013 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
552	SNRC 22E10	CDC	2302795	Actif	20/07/2013 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
553	SNRC 22E10	CDC	2302796	Actif	20/07/2013 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
554	SNRC 22E10	CDC	2302797	Actif	20/07/2013 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
555	SNRC 22E10	CDC	2302798	Actif	20/07/2013 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
556	SNRC 22E10	CDC	2302799	Actif	20/07/2013 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
557	SNRC 22E10	CDC	2302800	Actif	20/07/2013 23:59	55.7	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
558	SNRC 22E10	CDC	2302801	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
559	SNRC 22E10	CDC	2302802	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
560	SNRC 22E10	CDC	2302803	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
561	SNRC 22E10	CDC	2302804	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
562	SNRC 22E10	CDC	2302805	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
563	SNRC 22E10	CDC	2302806	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
564	SNRC 22E10	CDC	2302807	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
565	SNRC 22E10	CDC	2302808	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
566	SNRC 22E10	CDC	2302809	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
567	SNRC 22E10	CDC	2302810	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
568	SNRC 22E10	CDC	2302811	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
569	SNRC 22E10	CDC	2302812	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
570	SNRC 22E10	CDC	2302813	Actif	20/07/2013 23:59	55.69	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
571	SNRC 22E10	CDC	2302814	Actif	20/07/2013 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
572	SNRC 22E10	CDC	2302815	Actif	20/07/2013 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
573	SNRC 22E10	CDC	2302816	Actif	20/07/2013 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
574	SNRC 22E10	CDC	2302817	Actif	20/07/2013 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
575	SNRC 22E10	CDC	2302818	Actif	20/07/2013 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
576	SNRC 22E10	CDC	2302819	Actif	20/07/2013 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
577	SNRC 22E10	CDC	2302820	Actif	20/07/2013 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
578	SNRC 22E10	CDC	2302821	Actif	20/07/2013 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
579	SNRC 22E10	CDC	2302822	Actif	20/07/2013 23:59	55.68	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
580	SNRC 22E10	CDC	2302823	Actif	20/07/2013 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
581	SNRC 22E10	CDC	2302824	Actif	20/07/2013 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
582	SNRC 22E10	CDC	2302825	Actif	20/07/2013 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
583	SNRC 22E10	CDC	2302826	Actif	20/07/2013 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
584	SNRC 22E10	CDC	2302827	Actif	20/07/2013 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
585	SNRC 22E10	CDC	2302828	Actif	20/07/2013 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
586	SNRC 22E10	CDC	2302829	Actif	20/07/2013 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
587	SNRC 22E10	CDC	2302830	Actif	20/07/2013 23:59	55.67	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
588	SNRC 22E15	CDC	2315180	Actif	02/10/2013 23:59	55.61	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
589	SNRC 22E15	CDC	2315181	Actif	02/10/2013 23:59	55.6	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
590	SNRC 22E15	CDC	2315182	Actif	02/10/2013 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
591	SNRC 22E15	CDC	2315183	Actif	02/10/2013 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
592	SNRC 22E15	CDC	2315184	Actif	02/10/2013 23:59	55.47	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
593	SNRC 22E15	CDC	2315185	Actif	02/10/2013 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
594	SNRC 22E15	CDC	2315186	Actif	02/10/2013 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
595	SNRC 22E15	CDC	2315187	Actif	02/10/2013 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
596	SNRC 22E15	CDC	2315188	Actif	02/10/2013 23:59	55.46	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
597	SNRC 22E15	CDC	2315189	Actif	02/10/2013 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
598	SNRC 22E15	CDC	2315190	Actif	02/10/2013 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
599	SNRC 22E15	CDC	2315191	Actif	02/10/2013 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
600	SNRC 22E15	CDC	2315192	Actif	02/10/2013 23:59	55.45	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)

Table 4.11 – Mining titles list (11) from MRNQ GESTIM mining title management system

601	SNRC 22E15	CDC	2315193	Actif	02/10/2013 23:59	55.44	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
602	SNRC 22E15	CDC	2315194	Actif	02/10/2013 23:59	55.44	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
603	SNRC 22E15	CDC	2315195	Actif	02/10/2013 23:59	55.44	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
604	SNRC 22E15	CDC	2315196	Actif	02/10/2013 23:59	55.44	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
605	SNRC 22E15	CDC	2315197	Actif	02/10/2013 23:59	55.44	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
606	SNRC 22E15	CDC	2315198	Actif	02/10/2013 23:59	55.43	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
607	SNRC 22E15	CDC	2315199	Actif	02/10/2013 23:59	55.43	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
608	SNRC 22E15	CDC	2315200	Actif	02/10/2013 23:59	55.43	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
609	SNRC 22E15	CDC	2315201	Actif	02/10/2013 23:59	55.32	Ressources D'Arianne Inc.. (Les) (16503) 100 % (responsable)
						33770.15	

Figure 4.4 – Screen capture validation window of owner status of the titles on line from GESTIM

The claims are 100% own by Arianne.

4.3 Royalties

To the author knowledge the identified royalties are:

a) A royalty of 1% NSR is applicable on 4 claims; CDC 2121340, CDC 2121341, CDC 2129818 and CDC 2129819. For clarification (CDC 2129818 and CDC 2129819) over the Paul Zone and (CDC 2121340 and CDC 2121341) over the Manouane zone. This royalty can be purchased at any time for 666,666$ Canadian.

b) A royalty of 1.5% NSR is attached to 12 claims; two of these are in the Zone 2 sector while the remaining 10 are in the Zone 1 sector. An additional royalty of 0.5% NSR is attached to an area of 2 square kilometers around these claims. This royalty can be purchased at any time for 500,000$ Canadian.

For the other claims there is no applicable royalties other than normal exploration works requirements to maintain the claims in good standing with the Quebec Minister of Natural Resources.

4.4 Organization and restrictions

The property is located on Crown land ("Territoires non organisés"), within the Fjord du Saguenay regional municipality ("MRC"), Saguenay-Lac-St-Jean administrative division ("02").

Restriction 6577: A small exclusion to mineral exploration is present just north of the Lac à Paul occurrence along the Manouane River. It has been subtracted for the Betsiamites hydro-electric project. This infrastructure will need to be taken into consideration by d'Arianne during project planning. The Manouane River delivers a hydroelectric potential in excess of 225 KW. Even though limitations to mineral exploration and exploitation are present, these are not indicated on the MRNF claim map.

Restrictions 6573, 6574, 6575 and 6576: A set of exclusions to mineral exploration are present 5 km to the north-east. These are related to the construction of the Betsiamites hydro-electric complex and are not considered as a hindrance to the d'Arianne project.

Restriction 6572: This restriction to mineral exploration is linked to the Betsiamites reservoir, which is expected to be inundated. Mineral exploration is allowed within this restriction under certain conditions and permission from Hydro-Québec is needed. This restriction is not considered a hindrance to Arianne.

Restriction 20551: A small area is restricted to mineral exploration is related to this site along the Manouane River, west of Arianne. This site is designated as Experimental forest. Exploration is allowed under certain conditions.

Restriction 6578: A small exclusion to mineral exploration is present 12 km to the west of the Lac à Paul occurrence, associated with the construction of the Betsiamites hydroelectric complex. This restriction is not considered as a hindrance to the d'Arianne project.

Restriction 21925: Mineral exploration is temporarily excluded within this restriction. A decision depends on the outcome of the current evaluation whether to designate the land as protected. As the proposed route to haul the apatite concentrate traverses this area, a designation as protected may imply the construction of a detour route.

A few parcels of land were loaned by the ministère des Ressources naturelles et de la Faune du Québec to individuals in order to built hunting/fishing cabins. An inventory of these cabins has not been made by Arianne.

The Pourvoirie du Lac à-Paul, an outfitting camp, owns the exclusive fishing and hunting rights over an area which encompasses the northern part of d'Arianne property, including the Paul occurrence. No infrastructures belonging to this outfitter is located within the property. It is considered that the presence of this outfitter shall not be a hindrance to d'Arianne exploration work, assuming that Arianne does not conduct any work during moose hunting season. However, in the event of a mining development on the Paul zone, interference with the outfitter's activities is expected. However Arianne just purchased the outfitter so this is not considered as a hindrance to the Arianne project.

4.5 Native rights

The Lac à Paul property is located within the ancestral territories (Nistassinan) belonging to the Montagnais community of Mashteuiatsh (Pointe Bleue, Lac-St-Jean).

The area is overlapped by the ancestral territories of Betsiamites Montagnais community. Land claims from the Montagnais nation were partly resolved by the "Entente commune" signed with the Québec government. Arianne must request authorization from community councils prior to proceed with exploration work or logging, authorization which is embedded within the government permit.

There are likely to be ancestral trap lines within the project area, although d'Arianne has not been able to obtain a tallyman's name. Tallymen shall be consulted prior to exploration or logging activities.

Arianne is conducting information sessions and consultation with Native Nations representatives in relation to their project.

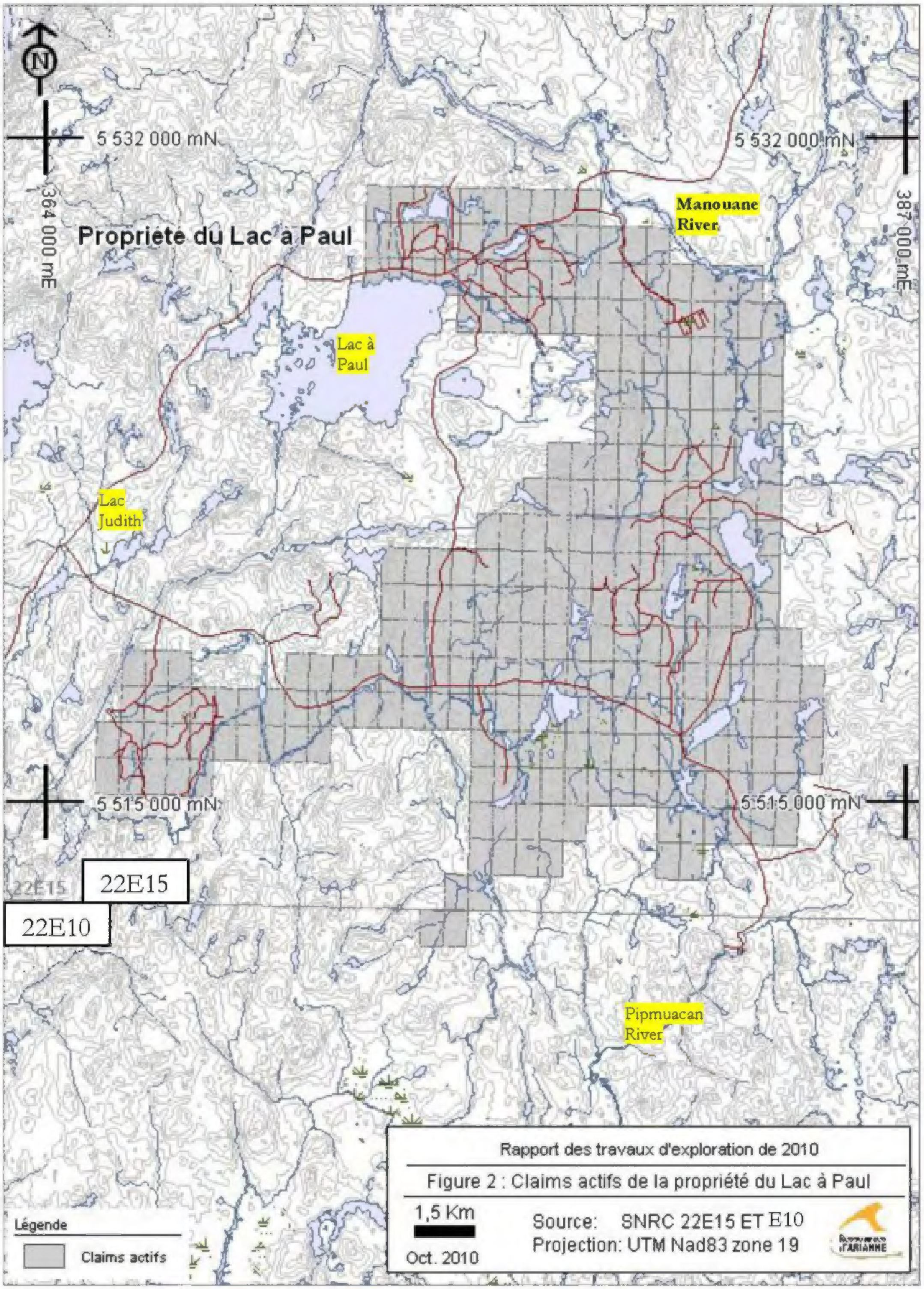
5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

It is possible to access the property by two well maintained gravel roads which are used by large lumber trucks. The first, called "Chemin des Passes" begins from the village of Saint-Ludger-de-Milot, north of Alma city. This road was built by the company ALCAN (now Rio-Tinto-Alcan) during the "Chute des Passes" dam construction in the southern boundary of the reservoir Péribonka (figure below). Since then, foresters companies have added a multitude of other paths that contribute to provide good access in the region. The main road goes through the forest from the SW region to the NE. The second access road begins at the Saint David de Falardeau village north of Chicoutimi. This road is the junction with the Chemin-des-Passes SW corner of the sheet 22E/15.

No community is present in the vicinity of the project. A small settlement exists at Chute des-Passes, about 30 km from the property, where a logging camp, some conveniences and a few cabins are present. Some services are also available at Alcan's Chutes-des-Passes and Hydro-Québec's Péribonka hydro-electric complexes, at various logging camps as well as at outfitters and floatplane bases.

Figure 5.1 – Lac à Paul property boundary (2010) with access roads



5.2 Climate

Statistics from Bagotville, Saguenay, nearest official meteorological station from Météomedia web site as per Tuesday, April 28, 2009 information about Chute des passes is also included.

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

Table 5.1 – 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

Table 5.2 – 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

Table 5.3 – 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

Table 5.4 – 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 total>=25 mm	0	0	0	0	0	0	0	0	0	0	0	0
Snow Cover>=1 cm	31	28	31	17	0	0	0	0	0	1	17	30
Snow Cover>=5 cm	31	28	29	13	0	0	0	0	0	0	13	28
Snow Cover>=10 cm	30	28	29	11	0	0	0	0	0	0	9	25
Snow Cover>=20 cm	26	27	26	7	0	0	0	0	0	0	3	17
Snow Cover>=50 cm	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.

Meteorological data of Chute des Passes, closest area to the property with available data between May 03, 2008 and May 03, 2009:

Maximum temperature: 30.6 °C

Date with maximum temperature: September 2, 2008

Minimum temperature: -38.4 °C

Date with minimum temperature: January 14, 2009

Maximum precipitations in one day: 19 mm

5.3 Local resources

The region of 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. One world renown underground Niobium mine is located at St-Honoré Saguenay which is owned by IAMGOLD.

Even if the region is not qualified as a mining area, qualified personal may be found in the region. The University of Quebec in Chicoutimi has a well developed geological department. The Chibougamau area is around 230 km far from the Lac à Paul project and offers also mining facilities. The city of Alma can provide basic needs such as food and limited accommodation. Several surrounding cities with their distinct services may also provide extensive contractor services and supplies within 200 km.

5.4 Infrastructure

The main infrastructure at the site is the access roads which are generally in good condition. The property area is large enough to support mining operations, infrastructures, processing facilities, waste dump and tailings. The nearest power lines are the major transmission lines from Chute-des-Passes and the Péribona power generation complex. Another power line exists at the former wollastonite project (Orleans Resources) near Saint-Ludger-de-Millot. Otherwise the Lac à Paul project accesses has many facilities left by forestry activities and the property is in the neighbourhood of Betsiamites related hydroelectric projects.

5.5 Physiography

The hills in the region are usually between 425 and 675 meters above sea level. The property is adjacent to lakes and rivers. The claims are limited in the north by the river Manouane which shows along its way very steep cliffs. Manouane River crosses from east to west in the north of the region and north to south in the west region.

In NW part of the property, the main lake is the Lac à Paul which is approximately 400 meters above sea level.

Photo 5.1 taken by Claude Duplessis during August 22 and 23, 2008 site visit, illustrates the type of topography and the regional vegetation.

Photo 5.1 – General topography along access road to Zone 2

Photo 5.2 – Drill access winter trail on Manouane zone winter 2011

Photo 5.2 taken by Claude Duplessis during February 14 and 17, 2011 site visit, illustrates the relatively flat topography and regional vegetation.

In the area, forest fires and forest exploitation have decimated much of the vegetation and contains mainly black spruce. Vegetation includes also white spruce, balsam fir and jack pine. There are also birch, poplar and pine bankesians (St-Hilaire, C., Archer, P., 1997). Along the shores of lakes and rivers, the white cedar is very common. Bogs are also observed in some low regions.

Photo 5.3 taken by Claude Duplessis during August 2008 site visit, shows Nadège Tollari, geologist with Arianne Resources Inc., observing the Nelsonite rock in the field. The pictures to the right illustrates the coarse apatite mineralization observed in the field near zone 2.

Photo 5.3 – Typical surface texture enhanced by surface weathering near zone 2

6.0 HISTORY

Most of this section was taken from the previous Technical Report prepared by IOS-SGS.

6.1 The pre-1994 period

Mineral exploration interest in the Chutes-des-Passes area was initiated by Mr. Lionel Lefebvre, a local prospector, in the 1970's. Some exploration activity for copper and nickel mineralization was recorded by Imperial Oil (GM-27460 and 27031) and N.Q.N. Mines (GM-27033, 27034, 28000, 26105, 26106). Little activity was recorded in the 1980's after the discovery of the Lac du Poisson Blanc deposit.

Mineral exploration in the Lac à Paul area was initiated by the Fonds minier du Saguenay- Lac-St-Jean in 1994 (Barrette, 1994; GM-57004, GM-57006). In the following years, prospector's training camps were set-up in the area (GM 57007, 58152), which lead to the discovery of copper and nickel occurrences (GM-57007), high purity quartz veins (GM 53478, 52422), and subsequently to apatite and ilmenite.

6.2 After 1994 - Virginia and Soquem copper-nickel exploration

Starting in 1995, Virginia Gold Mines initiated a reconnaissance program for nickel-copper in the area and subsequently acquired an option for the Fonds minier claims. Within the same period, SOQUEM initiated a similar program in the same area, which was promptly merged with Virginia into a single joint-venture. Large properties from this project are still active in the area, notably adjacent and east of Arianne. Abundant assessment literature is on file:

- GM-56023: 1998; 18 drill holes, FMSLSJ option;
- GM-56024: 1997; Mag and HLEM surveys, FMSLSJ option;
- GM-56149: 1997; Airborne Mag and EM surveys, FMSLSJ option;
- GM-56382: 1998; Mag and HLEM surveys, FMSLSJ option;
- GM-56422: 1998; Mag and HLEM surveys;
- GM-56578: 1998; Mapping and prospecting;
- GM-57008: 1998; Mapping and prospecting.
- GM-57184: 1997; Airborne Mag and EM surveys;
- GM-58190: 2000; 7 Drill holes, including three with apatite-ilmenite intersections;
- GM-58232: 2000; 3 Drill holes, Apatite-ilmenite;
- GM-58806: 2000; HLEM Survey;
- GM-58807: 2001; 11 Drill holes;
- GM-58815: 2001; 12 Drill holes, MHY occurrence;
- GM-59143: 2001; 11 Drill holes;
- GM-60717: 2002; Soquem, SIROTEM, time domain EM survey;
- GM-60730: 2003; 8 Drill holes, MHY occurrence;

- GM-60731: 2003; Gravimeter survey, MHY occurrence;
- GM-61185: 2004; 6 Drill holes, MHY occurrence.

Part of the Virginia-Soquem exploration effort included the Arianne properties. The discovery of ilmenite and apatite in the Manouane and Paul zones was accidental and occurred in the course of evaluating magnetic and electromagnetic anomalies for their copper-nickel potential. Ground and heliborne geophysics as well as two drill holes in both occurrences are now available on Arianne.

6.3 The FMSLS-d'Arianne period

In 1998, the Québec Department of Energy and Resources (QDER, actually MRNF) carried out geological mapping of the 22E map-sheet (Hébert, 1998; Hébert et al, 2009; Hébert et Beaumier, 2000). Mapping was undertaken in collaboration with a prospector training camp organized by the FMSLSJ (Tremblay, 1998), which lead to the first apatite discovery of the area. Interest in this commodity was triggered by the discovery of the Sept-Îles deposits two years before by the QDER (Cimon, 1996) and by the fast development of the project by SOQUEM. The FMSLSJ and its prospectors staked their discoveries (zones no1 to no3), in which claims were granted for option to Ressources d'Arianne. Some of these initial claims are still active. Arianne, in collaboration with the FMSLSJ, carried out a limited amount of work until 2002:

- GM-57004; 1995; Prospecting;
- GM-57006; 1995, Compilation work;
- GM-57007; 1997; Prospecting;
- GM-58151; 1999; Prospecting;
- GM-58152; 1998; Prospecting;
- GM-58767: 2001; 10 Drill holes;
- GM-58768: 2000; 2 Drill holes;
- GM-58769: 2000; Metallurgical testing;
- GM-59774: 2000; Metallurgical testing;
- GM-59784: 2002; 12 Drill holes.

Due to a lack of interest in the capital market, Arianne abandoned the exploration for apatite and ilmenite in 2002, allowing most claims to lapse.

6.4 Recent Arianne involvement

Arianne's interest in the project resumed in 2008 is stimulated by a surge in phosphate price. Arianne re-staked Virginia's Manouane and Lac à Paul occurrence and initiated prospecting and drilling work. Arianne's work consisted in:

- Summer 2008: Prospecting and surface sampling;
- Fall 2008: Ground magnetometer survey over zone no. 2;

- Fall 2008: 22 drill holes in Paul and zone no. 2 occurrences;
- Winter 2009: 13 drill holes in Manouane occurrence;
- Spring 2009: Resource estimates by SGS Canada Inc.;
- Spring 2009: Apatite beneficiation test, SGS-Lakefield;
- Summer 2009: Geophysical ground survey (Mag) on Paul and Nicole Zones;
- Summer 2009: Prospecting and surface sampling, processing of Geophysical data;
- Fall 2009: 11 Drill holes for exploration purposes, completed September 13;
- Late fall 2009: 18 drills holes in Paul zone;
- May 2010: Preliminary Economic Assessment IOS Services Géoscientifiques inc. SGS Canada Inc.;
- The Lac à Paul Apatite-Ilmenite Project, NI-43-101 Compliant Technical Report.

6.5 Previous resource estimates

The preliminary economic assessment report ("Scoping study") of the Lac à Paul Apatite-Ilmenite Project of May 2010 was triggered by release of the autumn 2009 drill campaign and the publication of indicated resources on the Paul zone by SGS Canada Inc.

Table 6.1 – May 2010 statement of mineral resources (NI 43-101 compliant)

Occurrence	Category	Tonnage	%P_2O_5	%TiO_2
Lac à Paul	Indicated	78 343 000 t	7.24%	7.84%
Lac à Paul	Inferred	58 249 000 t	6.97%	8.00%
Manouane	Inferred	137 652 000 t	5.71%	8.92%
Zone 2	Inferred	64 247 000 t	4.54%	4.56%
Total	Inferred	260 148 000 t	5.70%	7.64%

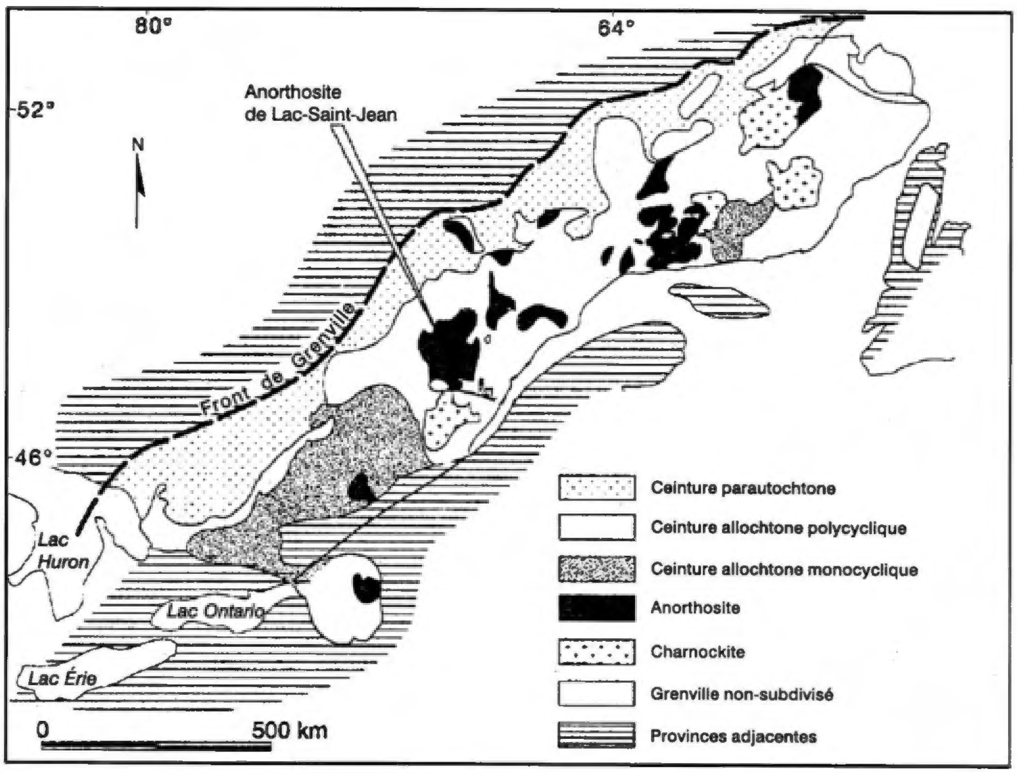
7.0 GEOLOGY SETTINGS AND MINERALIZATION

7.1 Regional geology

This section was extracted from previous reports done in the MRNF sheet 22E/15 by (Cimon, J., and Hébert, C., MB 98-09) and (Hébert, C. and Beaumier, M., RG 99-05), Geology Quebec; the most relevant information has been translated from French to English mainly from that report.

The Lac-Saint-Jean anorthosite is the largest anorthositic complex in the world, occupying an area of nearly 20, 000 km^2. The entire property is covered by Proterozoic rocks of the Grenville Province. It is part of a polycyclic tectonic division according to Rivers et al., 1989. The property lithology consists mainly of intrusive rocks subsequently associated with anorthositic rocks of Lac St-Jean (see Figure 7.1).

Figure 7.1 – Regional geology and location of the anorthosite suite of Lac-Saint-Jean within the Grenville Geological Province map from Cimon, J. and Hebert, C., 1998, PRO 98-06



The rocks are displayed in the form of coalescing lobes of leuconorites, anorthosite, norite, gabbronorite, gabbro with olivine, and gabbro. The lower pyroxenite contains dunites, peridotites, Fe-Ti oxides, apatite, jotunites and mangerites. In general, the morphology of the anorthosite lobes is quite similar; the core of the bodycontains relatively pure anorthosite.

Rocks surrounding the gneissic complex contain hornblende with quartz-biotite, gneiss, granulitic gneiss, and gabbroic ribbon gneiss. These rocks were laterinjected by the intrusion of felsic granite, monzonite and hypersthene (Hébert, C. and Beaumier, M., RG 99-05). The metamorphic phase is upper amphibolite facies to granulites.

In a structural sense the deformed SALS (Suite Anorthositiqie Lac St-Jean) originated from three major events (Hébert et al., 1998; Turcotte, 2001):

- Event D1, associated with the Grenvillien thrust fault; generated an East-West oriented fabric;
- Event D2, folding of D1 generating important north-east south-west deformation corridors with oblique movement and dextral reverse thrust;
- Event D3, sinistral en echelon faulting of D1 & D2 likely responsible for generating the brittle-ductile faults oriented north-south to north-northeast/south-southwest.

Moreover, a major shear crosses the SALSJ, the Lac-Saint-Jean-Pipmuacan fault, oriented north-east south-west. This fault and associated shearing has potentially played a role in the setting of the SALSJ within the Grenville Province. (Hébert et Lacoste, 1998a; Fredette, 2006).

The anorthositic rocks of Lac St-Jean represent an assembly of scales (or sheets) that straddle the older gneissic units. Anorthositic massifs are particularly abundant in the Grenville Province. Its economic potential is usually limited to deposits of Fe-Ti-P.

The property is located in the central region of the Grenville geological province.

7.2 Property Geology

The Lac à Paul property is located in the MNR sheets 22E/15 and 22/10. Its basement contains rocks which belong to the Grenville geological province. The region lies in the allochthonous polycyclic belt according to suggested subdivisions by Rivers et al., 1989.

The dominant rocks are a sequence of mafic to ultramafic rocks, which contain anorthosite, leuconorite, norite, gabbronorite, gabbro with olivine, gabbro, pyroxenite and locally peridotite, dunite and magnetite.

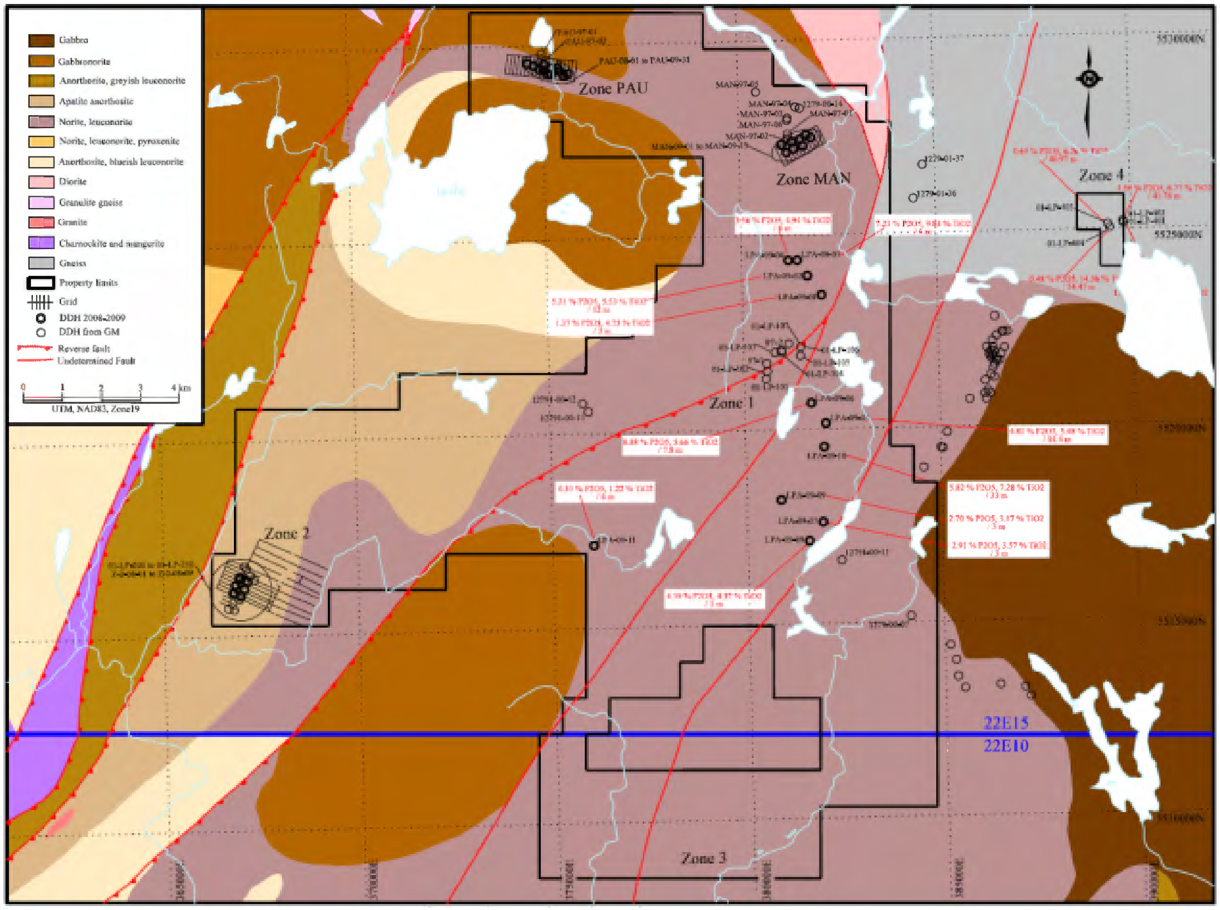
The anorthosite, norite and the leuconorite occupy the most important area of the southern half of map sheet 22E/15. Ultramafic rocks are associated mainly with the norite. The northern part of the anorthosite suite is occupied by a large area of coronitic gabbronorite while the SE corner of the region is occupied by a massive gabbro. The host rock is derived from quartzo-feldspathic gneiss with biotite andhornblende, granulitic gneiss, gray and pink gneiss, and gabbroic gneiss. The following figure presents the regional geology including the 2010 claim blocks of Arianne.

The youngest outcropping rocks lie in the SW corner. They belong to the granite of La Carpe (~ 35 km^2), which contains granite (charnockite) and monzonite (mangerite) with or without hypersthenes. This pluton takes its name after the La Carpe Lake located in the west of Chute-des-Passes (22E/l4) (Hébert, C., and Beaumier, M., 1999 RG 99-05). The rocks of the anorthositic suite overlap the gneiss, which had previously been exposed to one or more phases of deformation. Sub-horizontal shear zones are observed at different scales. A penetrating mass developed simultaneously; it is orthogonal to the plane of overlap with an orientation parallel to the transport direction of the different layers to the ESE or WNW. The mass is a congregation of folds and boudins of nelsonite, which provides a concentrated layer of phosphate enrichment. The mylonite zone orientated SSW-NNE is located immediately to the west of Paul Lake (see figure) and represents the bottom of one of these concentrated layers. A later episode of deformation is represented by sub-vertical ductile shear lineations, which plunge to the north (a trend could not be determined). The zone width is on the order of kilometers and is orientated NNE-SSW with an abrupt dip to SE. Finally, Duhamel Lake is parallel to a roughly N-S trending lineament; however there is no shear or apparent movement observed along it.

The work done by Arianne Resources Inc. in 2000 and 2001 (GM 58768, GM 58767 & GM 59784) confirmed the presence of anorthosite, anorthositic gabbros, and some gneissic horizons in the Lac à Paul area. The master's thesis from Sophie Turcotte indicates a general 30 degree dip to the north; sub-horizontal stratum is frequently observed. The structure is observed in Zone 2 and the Paul zone appears to be sub-vertical. Detailed mapping of the Manouane zone is un-going.

Figure 7.2 is an extract map from the previous technical report and does not reflect the recently updated claim boundaries.

Figure 7.2 – Geological map of the Lac à Paul property (position of the claims in 2010)



Grenvillian geology of the Lac St-Jean area was first described by Laurin and Sharma (1968) at a scale of 1: 250 000 and compiled by Avramtchem and Piché (1981).

Information given on this map is limited. It indicates the Lac à Paul area is included in an anorthosite lobe flanked by gabbros and hosted in quartzofeldspahtic grey gneiss and granites. The area was mapped in greater detail by Hébert (Hébert and Baumier, 2000; RG-99-05), at a scale of 1: 50 000. The property geology map is taken from Hébert and Beaumier (2000). It remains the most accurate geologic map available. According to this map, the vast majority of the property is underlain by norite and leuconorite, with some pyroxenite and gabbronorite. Three north-northeast trending faults have been reported. Lithofacies vary on a small scale and are more diverse than what is indicated on Hébert and Beaumier's map.

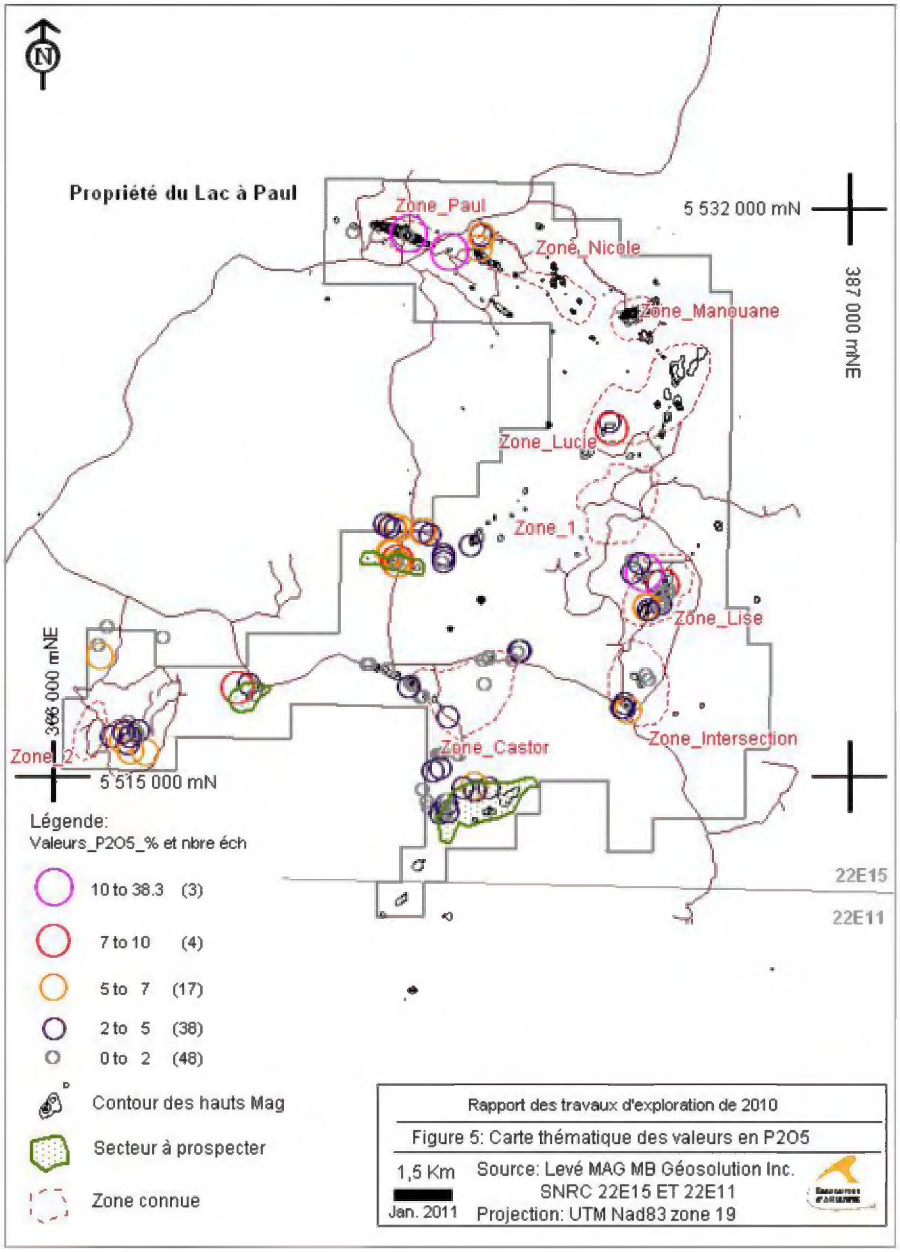
7.3 Mineralization

Mineralization at the Lac à Paul project originated from magmatic sedimentation and segregation within the anorthositic complex. The main geological unit of interest is a Nelsonite consisting of apatite and ilmenite-rich layers.

Nine apatite mineralized zones are reported within Arianne's Lac à Paul project. Zones no. 1, no. 2 and no. 4 are low-grade apatite-ilmenite bearing gabbros discovered by the FMSLSJ and will be discussed only briefly. Only zone no. 2 has been explored significantly with diamond drilling. Zone no3 is no longer part of the land package; Arianne did not renew the claims due to the low grades encountered. The six other zones, Zone Manouane (Man), Zone Paul (Pau), Zone Nicole, Zone Lucie, Zone Lise, Zone Intersection and Zone Castor, are considered nelsonites and show the most promise. The Paul and Manouane zones are the central interest of this report.

The following figure presents the position of each mineralized zones.

Figure 7.3 – Position of zones within the Lac à Paul main block (claims from 2010)



7.3.1 Paul Zone

The Paul zone is Arianne's prime target. It is located in the northern part of the property on claims no. 2129818, no. 2129818 and no. 2167470. The zone occupies a small hillcrest adjacent to the north of Lac à Paul (UTMX: 374000; UTMY: 5529000). It is easily accessible via various logging trails connecting to the road leading to Manouane River. Less than 10 meters of overburden has been reported.

The rocks consist of an olivine nelsonite, composed of similar proportions of apatite, ilmenite, magnetite and olivine, plus accessory pyroxene, feldspar and biotite as reported and validated by Réjean Girard from IOS. Depending on mineral proportions, this layered rock can vary between a genuine nelsonite, a troctolitic nelsonite, a troctolite (olivine-plagioclase rock), a pyroxenite, a gabbroic anorthosite, etc.

These facies are intricate or layered in a disorderly fashion. This zone is embedded in apatite-free gabbroic to anorthositic host rock. The difference between the various facies is subtle, and detailed correlation between drill holes remains tricky.

The Paul zone is known to extend at least 1300 meters, aligned east-southeast.

Ovoid in shape, its width is not constant, between 150 and 300 meters (presumed thickness of zone). The zone is open at depth and presumed true thickness range from 150 to 300 meters.

The zone is open to the east and to the west although the magnetic survey indicates it is pinched. The magnetic survey also indicates a complex internal structure, likely involving folding and stacking. Bedding attitude is not well constrained. Due to the diffuse lithological contacts the structure has been interpreted as twisted, dipping north at the east end, sub-vertical at its center and dipping south at the west end. This interpretation is still considered valid as of today. Knowledge delineating the geometry of the zone is improving; however additional work is still needed. The lack of detailed understanding is not regarded as a severe hindrance considering the bulk open-pit mining approach.

7.3.2 Manouane Zone

The Manouane zone is located in flat terrain, 5.5 km east of Lac à Paul, 2 km south of the bight on the Manouane River (UTMX: 381300, UTMN: 5527000). Access required the logging of a 3 km trail by Soquem in 1998. The zone is situated under poorly drained muskeg; outcrop is therefore limited and summer access for drilling is impeded Thick overburden is reported (10-28 m).

The Manouane zone is dominated by a magnetite-bearing nelsonite, similar to the Paul zone. This nelsonite is interbedded with gabbros, anorthosite and tonalite layers. Again, no detailed correlation was attempted between holes. The exact attitude of layering is uncertain. The zone is currently known to extend to 900 meters long, trend northeast-southwest and be open at both ends. It has an apparent width of about 400 meters, although this width is not well constrained. The Manouane is characterized by two apatite-enriched zones within the sector. These zones are connected in the Eastern region and have variable inclination going west. This current outline approximately mimics the aeromagnetic anomaly. The zone has been tested to a depth of almost 325 meters where it is still open, it is also open at both the east and west ends. Depth is constrained down to 125 meters at the east end.

7.3.3 Zone No. 2

Zone no. 2 is the only zone acquired from the FMSLSJ upon which significant exploration effort was spent. It is located about 10 km south-southwest of Lac à Paul, in an area with rugged topography near the Castor-Qui-Cale River (UTMX: 366500,UTMY: 5516500). Scattered anorthosite outcrops were located in the area, with the typical crumbling weathering style. The zone no. 2 occurrence is made up of apatite-ilmenite bearing homogeneous anorthositic gabbro, with minor variable gabbro and anorthosite. Nelsonite and troctolite are reported as small pods.

The zone is known to extend about 1200 meters trending northeast and has a know width of up to 300 meters. It has been tested by drilling to a depth of about 120 meters. The rock is rather massive. Differences between facies are subtle and detailed correlation between drill holes is difficult. The attitude of the layer is suspected to be sub-horizontal. The zone can be regarded as open in every direction. The magnetic pattern over the zone is irregular and of little help in delineating mineralization.

7.3.4 Zone No. 1

Little exploration has been done in zone no. 1, one of the areas initially discovered by FMSLSJ. It is located 6 km south-east of Lac à Paul, by UTMX 380600 and UTMY 5521700. It consists of an apatite-bearing gabbro which is displayed as friable outcrops along road cuts. Aside from prospecting, two (2) short surface holes were drilled in 2000, followed by an additional seven (7) in 2001 to a depth of 30 meters. The zone is open in all directions and at depth. A preliminary inferred resource estimate was calculated by Arianne at the time, not NI-43-101 compliant.

7.3.5 Other zones (Nicole, Castor, Intersection, Lise and Lucie)

The Nicole, Castor, Intersection, Lise and Lucie zones are zones of prospection and only current limited surface sampling data is available with limited drilling of 2009. During the fall 2009 drilling campaign, 4 holes were drilled near the south-western part of the Lucie Zone, three others near the Lise zone and finally, three were located around the Intersection zone. The best result is an intersection of 99 meters with 5.31% P_2O_5 along the hole LPA-09-10 drilled on the Lise Zone.

No additional drilling has been done as per a current cut-off date of summer 2011. The author is aware of diamond drilling in these zones in summer and fall 2011 but results were not available and are not part of this report. No details are available regarding length, continuity, type and distribution as these zones are at an early stage of exploration.

8.0 DEPOSIT TYPES

The deposits originate from magmatic sedimentation and segregation within the anorthositic complex. The main geological unit is a Nelsonite.

Two types of apatite-ilmenite occurrences are present within the Lac à Paul Project. Both are magmatic in origin and form specific facies of the Lac-St-Jean Anorthositic complex. Although these kinds of deposits are known to be associated with various anorthosite complexes around the world, none are currently being mined for the phosphate content. However, similar deposits with dominant ilmenite are currently mined at Lac Tio (Rio Tinto Iron Titanium, Havre St-Pierre, Québec) and Tellnes (Norsk Hydro, Norway). Numerous occurrences are currently under evaluation in Québec for their iron and titanium content.

8.1 Nelsonite type

Manouane and Paul zones are made of layered, medium-grained, olivine nelsonite. These are layered sequences composed of various proportions of ilmenite, magnetite, apatite and olivine minerals. Nelsonites, first described from Nelson County in Virginia, are usually defined as ilmenite-apatite±rutile, although biotite, magnetite, olivine and pyroxene may be present. Most known occurrences are described from gabbroic and anorthositic intrusions, although some are reported from granites and carbonatites. Genesis of anorthosite-related nelsonite is still debated, but usually accepted as a liquid segregation from a titanium-iron-phosphorus saturated mafic-anorthositic silicate magma. Segregation is considered to be triggered by silica polymerization caused by wall-rock contamination. This explains why such deposits are typically found in the proximity of anorthosite-gneiss contacts. A simple differentiation-accumulation process cannot be invoked to generate these unusual rocks.

Most nelsonite occurrences described in literature are ilmenite dominated, and occur either as pods or layered sequences. Examples are known in the Sept-Îles Complex, Lac De La Blache Anorthosite, St-Urbain Anorthosite, and in various locations within the Lac-St-Jean Anorthosite, as well as in the Archean Lac Doré and Bell River complexes.

8.2 Gabbroic type

The zone 1 to zone 3 occurrences, which initially attracted Arianne's attention, are apatite-ilmenite bearing, coarse-grained gabbros. Coarse-grained, granular, idiomorphic gabbroic rocks with millimetric sized grains host disseminated apatite and ilmenite. Their abundance is lower than nelsonite, and suggests that titanium and phosphorus did not reach saturation in the magma. They form large volumes extending for kilometers. Outcrops in the Lac à Paul area are heavily weathered, with the rock crumbling into gravel due to frost dislocation along straight grain boundaries.

8.3 Carbonatite type

Most apatite currently mined in the world (Ontario, Kola Peninsula, Brazil) is from carbonatite complexes. It should be noted that Lac à Paul deposits are not carbonatite hosted.

Carbonatite hosted deposits have higher apatite grades, typically 30-70%. However, carbonatite deposits present difficulties such as lower apatite recovery, carbonate contamination of the concentrate, and higher harmful contaminants such as uranium and fluorine, among other complications.

9.0 EXPLORATION

The 2010/2011 exploration program has mainly consisted of a sampling campaign performed on select claims of the property. The surface exploration is followed by a diamond drilling campaign which is presented in the next section of this report

9.1 Prospecting 2010

Prospecting occurred from July 27 to August 10, 2010. The purpose of this prospection work was to map and sample outcrops located over magnetic signatures similar to those of the Paul and Manouane Zones. For this reason the Magnetic survey data has been reprocessed and used.

A total of two hundred and ten (210) outcrops were visited. From these one hundred and eight (108) rock samples were taken and sent to ALS Chemex laboratory in Val d'Or. Thirteen (13) major elements under oxide forms have been analyzed by lithium borate fusion with XRF (ALS code ME-XRF06).

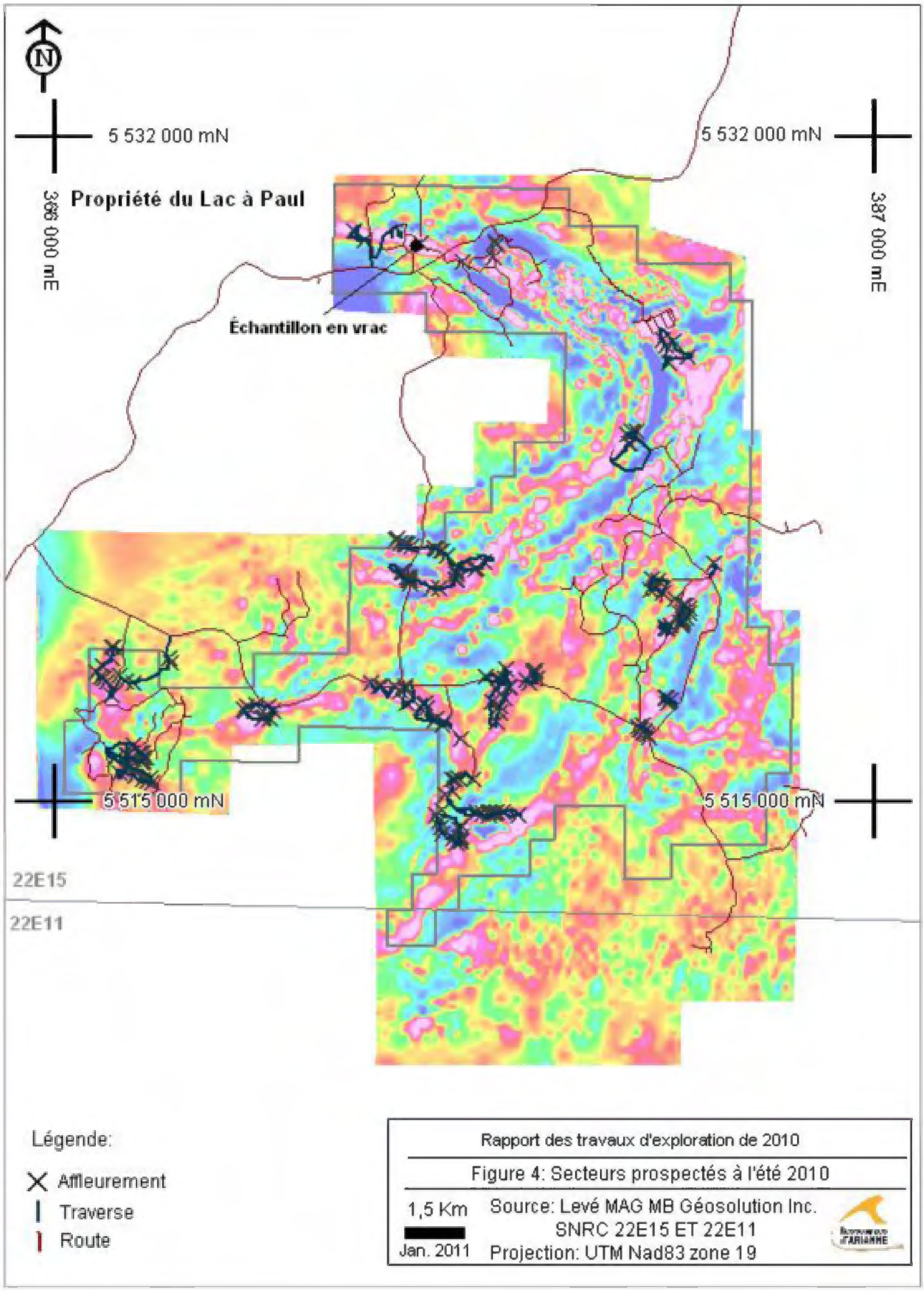
P_2O_5 and TiO_2 are the main components of interest. The following figure presents the prospection work of summer 2010. The work performed was supervised by Patricia Néron, Eng., and supervisor of Arianne.

9.2 Bulk sampling 2010

A bulk sample was taken on July 26, 2010, north of the stripped zone on Paul. The blasting, excavation and reclamation work were performed by Location ALR Inc. from Alma.

Position of the bulk sample is shown on figure below.

Figure 9.1 – Mag with position of investigated outcrops in summer 2010 (claims in 2010)



9.3 Cleaning of the 2009 stripping area

From May 26 to 28, 2010, restoration work was completed on the stripping area from October 2009. The area is roughly 90 m² (30 x 30 m), easily accessible, and is located south of hole PAU-09-18 and west of hole PAU-09-17.

9.4 Results 2010

Most of the outcrops were made of anorthosites, gabbros, ferrogabbros and pyroxenites. Some nelsonites, massive oxides, diorites, tonalites, granites and granodiorites were also observed. No geological map has been produced from this data yet.

Out of the one hundred and ten (110) samples, twenty-four (24) have returned values above 5 % P_2O_5, with three (3) exceptional values of 12.303%, 13.79 % and 38.3 % P_2O_5. The value of 38.3% of P_2O_5 is explained by the nature of the sample, which is a natural concentrate of coarse apatite crystals. In regards to titanium, forty-eight (48) samples have shown values above 5 % TiO_2, with seven (7) between 10-30 % TiO_2. These grades were observed in massive oxide lithologies. The following figures present the P_2O_5 and TiO_2 compilations.

This work has generated new drilling targets.

A part (20 kg) of the one tonne "bulk sample" was crushed and grinded at IOS Laboratory in Chicoutimi for use as an internal standard. The rock has not been milled nor processed as a standard understanding of a bulk sample.

9.5 Exploration works 2011

Prospection works occurred in summer 2011. The purpose of this prospection work was to map and sample outcrops in newly acquired claims and sectors not previously investigated.

The compilation of work is still in progress. The following figure presents prospection work of summer 2011. The work was performed under supervision of Christian Tremblay Sr. Geologist and supervisor of Arianne.

A total of four hundred and twenty seven (427) outcrops were visited. Main lithologies observed were: gabbros, ferro-gabbros, anorthositic gabbros, anorthosites and nelsonites.

Figure 9.2 – Position of investigated outcrops in summer 2011 (claims in 2011)

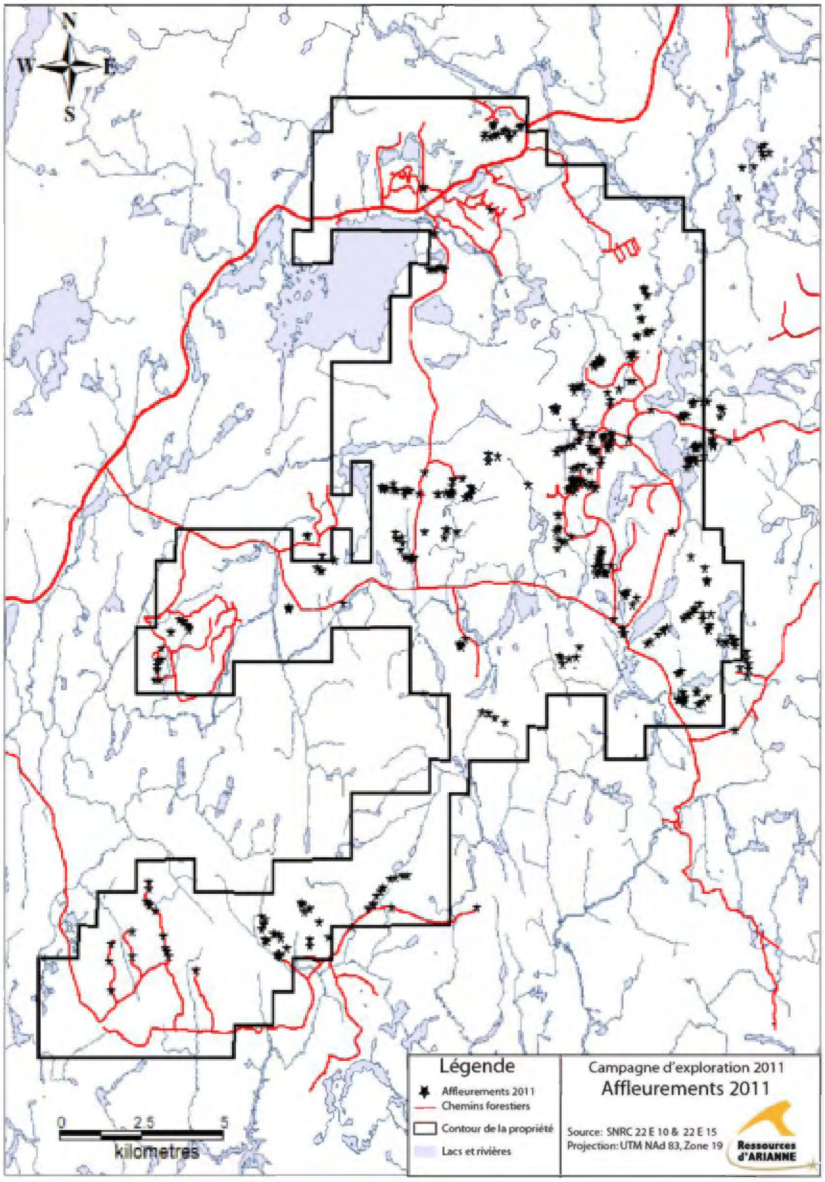
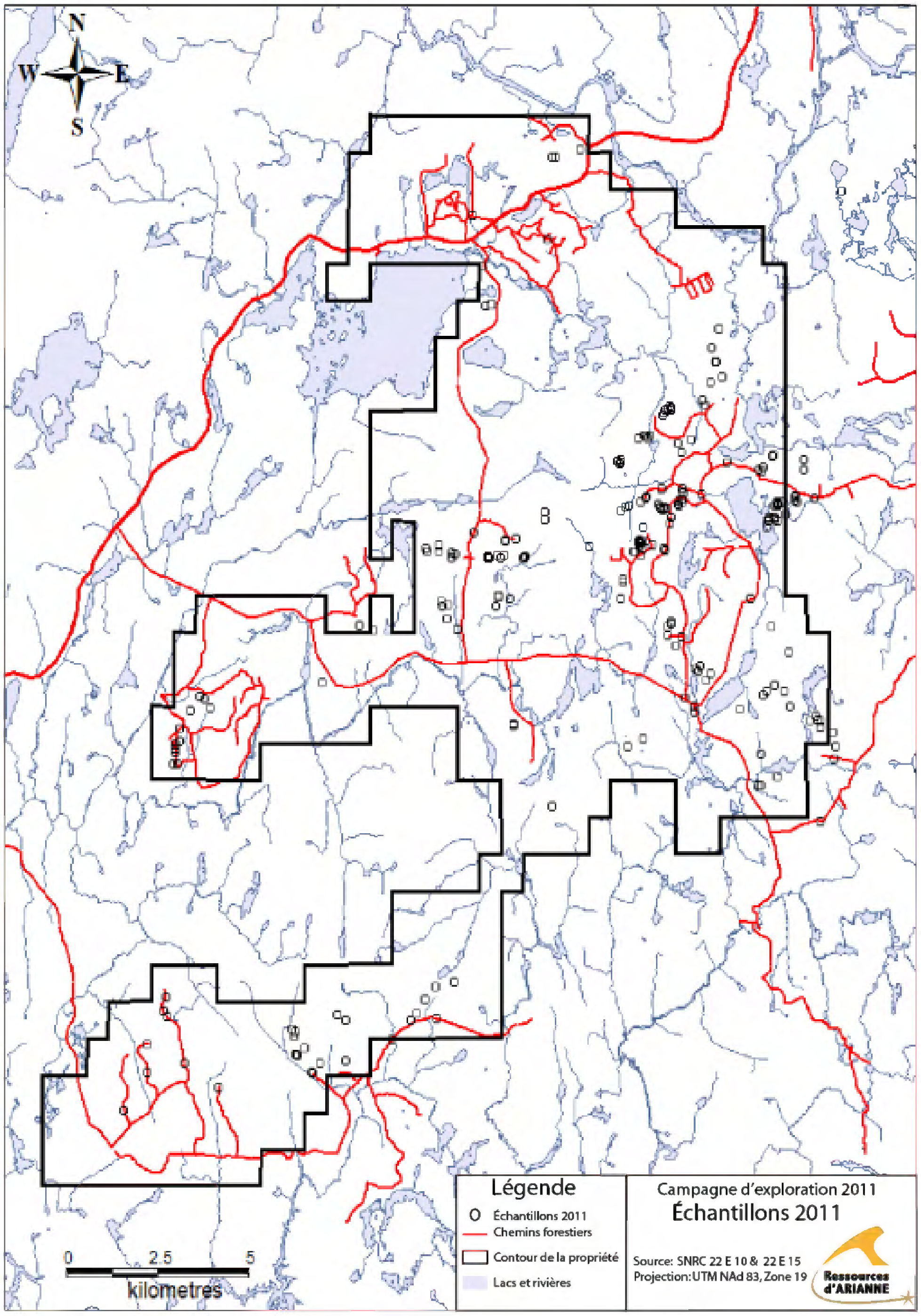


Figure 9.3- Position of sample taken from outcrops in summer 2011 (claims in 2011)



A total of 245 samples were taken from 427 outcrops; 59 samples show results above 5% P_2O_5.

Figure 9.4 – Surface outcrops P_2O_5 grades compilation of 2010 works (claims in 2010)

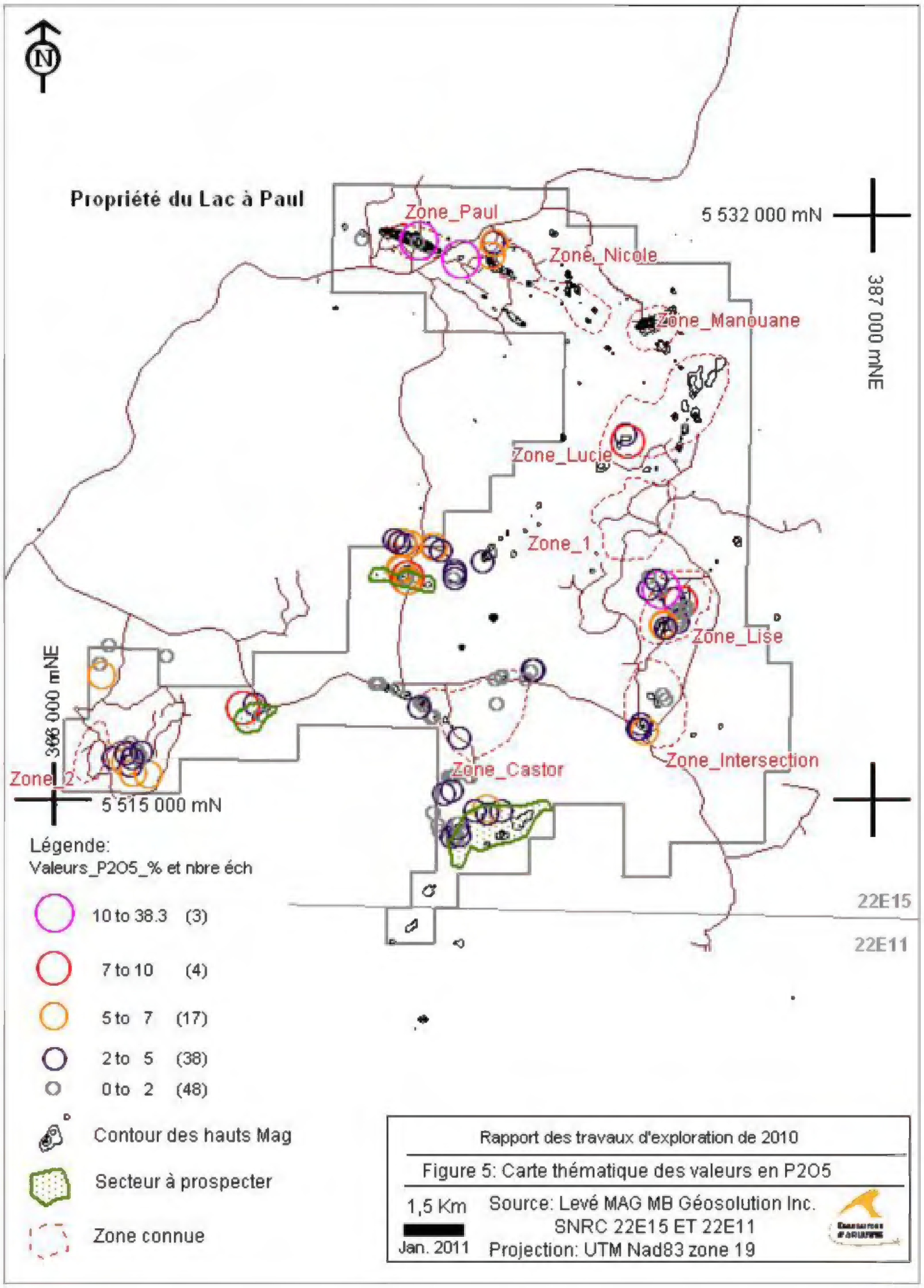
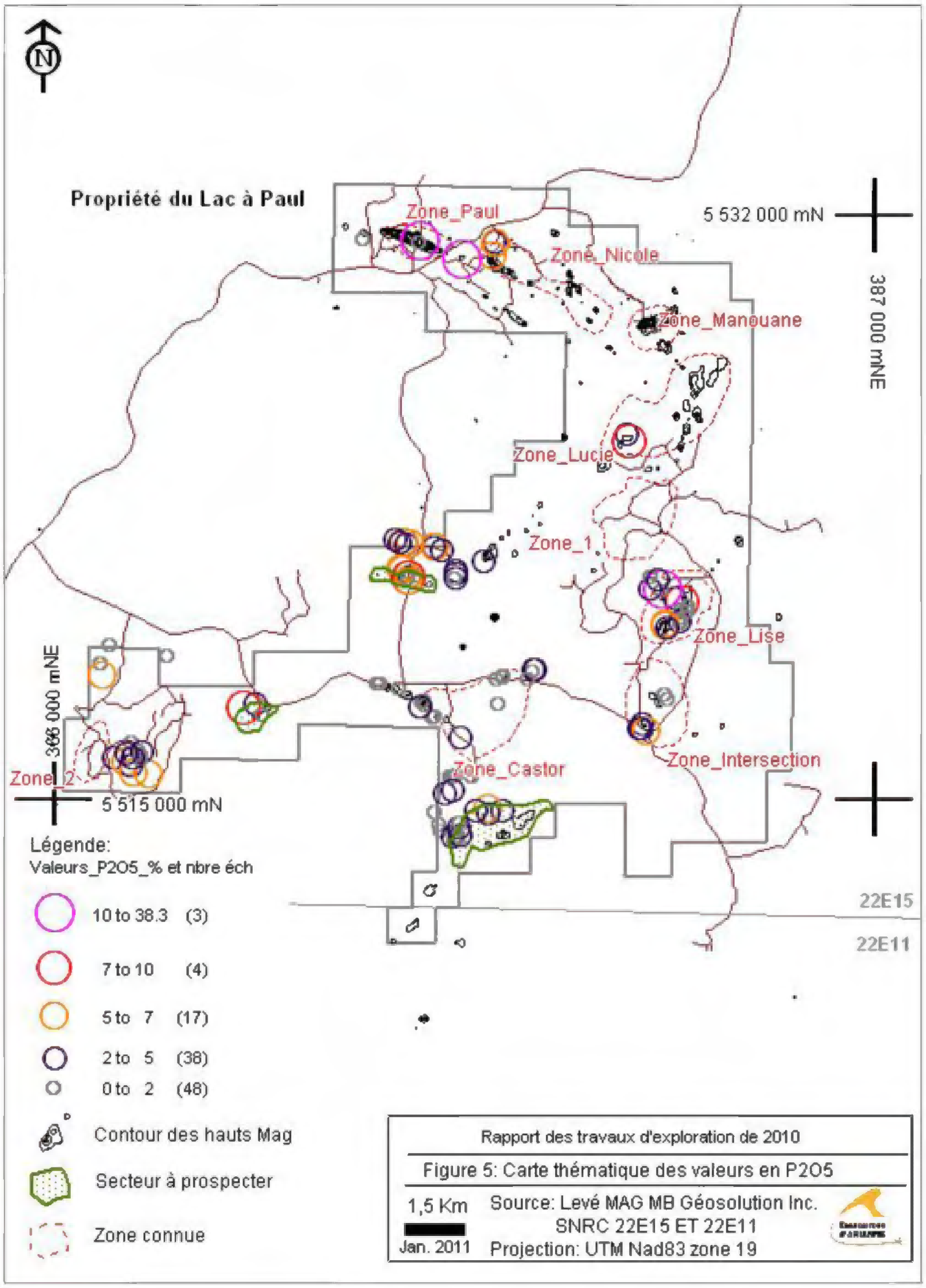


Figure 9.5 – Surface outcrops TiO_2 grades compilation of 2010 works (claims in 2010)



10.0 DRILLING

10.1 Previous & Historical Drilling

Historical drilling on the property has consisted of diamond drill hole.

- 1970

  NQN Mines Ltd carried out exploration work using geophysical methods, geological mapping and drilling, in west of Chute des Passes. No detailed data is available.

- 1997

  Mapping projects in some properties were conducted by Quebec Geology. It was done for series of geological surface sections of recognition. Virginia Gold Mines and SOQUEM did various exploration activities and 18 holes for 1998 m were drilled (Isabelle, R., 2000). 2 of these holes are located in Manouane Zone and 2 holes in Paul zone.

- 1999

  On December 1999, Arianne Resources took an option on the property. A drilling campaign by diamond drill BQ was done and the total length drilled was 51.56 m. It consisted in two (2) holes that were located in Zone 1 and the campaign was completed on March 2000 (IOS, rapport 00-197-2, Girard, R., 2000).

- 2001

  10 drill holes were drilled in the first campaign (Internal report, 2000-2001). The total length drilled was 270m in order to better define the mineralized horizon. 7 holes were drilled on Zone 1 and 3 holes on Zone 2. At the end of 2001 Arianne Resources Inc. had realized 8 additional holes on Zone 2.

- 2008-2009 by Arianne

  Following the positive results of the surface sampling and the increasing Phosphate market value, Arianne Resources Inc. had decided to explore this property in order to prepare the first mineral resource NI 43-101 compliant estimate with the SGS-Geostat Ltd group on 3 main areas of the property (Zone Paul, Zone 2 and Zone Manouane).

  A diamond drilling campaign was planned in order to better define three of the most promising zones and perform a calculation of the mineral resources. This campaign was conducted in two distinct periods by the drilling company Dami-Or of Sullivan, Quebec, Canada.

  The first campaign took place from October 27 to November 22, 2008. More than 1860 meters were drilled with 13 drill holes on the Zone Paul; and 9 drill holes on Zone 2 totalling about 924 meters.

The Paul zone drilling was on 5 sections oriented north/south and separated by 200 to 300 meters. 2 to 3 drill holes spaced approximately 100 meters had been planned by section. It was possible to test a 140 000 m^2 area about 1 km long.

The Zone 2 drilling consisted of 3 sections oriented west/northwest, east/southeast and 200 meters spaced. Each section consisted of 3 holes spaced approximately by 100 meters. It was scheduled to test an area of 120 000 m^2, but only three sections were completed.

The second drilling campaign occurred from January 19 to February 7, 2009. Thirteen (13) drill holes totalling 1947 m were drilled on the Manouane Zone. It consisted of 4 sections oriented northwest/southeast. The drill holes were spaced about 200 meters and included 2 to 4 holes spaced approximately 100 meters apart on sections. Then, it allowed the testing of an area of more than 120,000 m^2.

10.2 New Drilling 2010-2011

The following section is a summary of Arianne exploration reports filed with Quebec's Minister of Natural Resources (work assessment) that were translated into English.

10.2.1 Paul

The drilling program on the Paul Zone was undertaken to upgrade the inferred mineral resources in the western part of the deposit into indicated mineral resources and also to verify the lateral extension of the deposit to the west.

Seventeen holes totalling 4,125 m of diamond drilling were carried out by the company Nordic Drilling of Val d'Or. 1418 samples were sent to ALS Chemex laboratory in Val d'Or. They were analyzed for major elements by X-ray fluorescence (ME-XRF06) method.

The main geological units observed in this area consist of Anorthosites, Gabbros and Nelsonite. 17of 18 holes have intersected the mineralized zone. Several holes have interesting results, such as the following holes: Pau-10-32, 10-33, Pau, Pau, 10-37, 10-38, PAU, PAU-10-40, 10-41, PAU and PAU-10-46. These holes indicate intersections exceeding 200 meters totalling more than 6.00% P_2O_5 and 6.00% TiO_2.

This drilling program has allowed extension of the mineralized zone further to the west. In addition, it remains open laterally and in depth.

The drilling campaign conducted in the fall of 2010 took place between November 2 and December 8, 2010. It was designed to convert inferred resources estimated at 58 Mt grading 6.97% of P_2O_5 and 8.00% of TiO_2 in indicated resources, which would add up to 78 Mt at 7.24% of P_2O_5 and 7.84% of TiO_2 inferred resources (May 2010). It was also required to check the presence of a possible extension to the west and to identify some important geological contacts. A total of seventeen diamond drill holes were carried out by the Nordic Drilling Company. The positions of the drill holes are shown in Figure

10.1 (coordinates UTM NAD 83), the depth, the orientation and the dip of each of them. The list is given in Table 10.1.

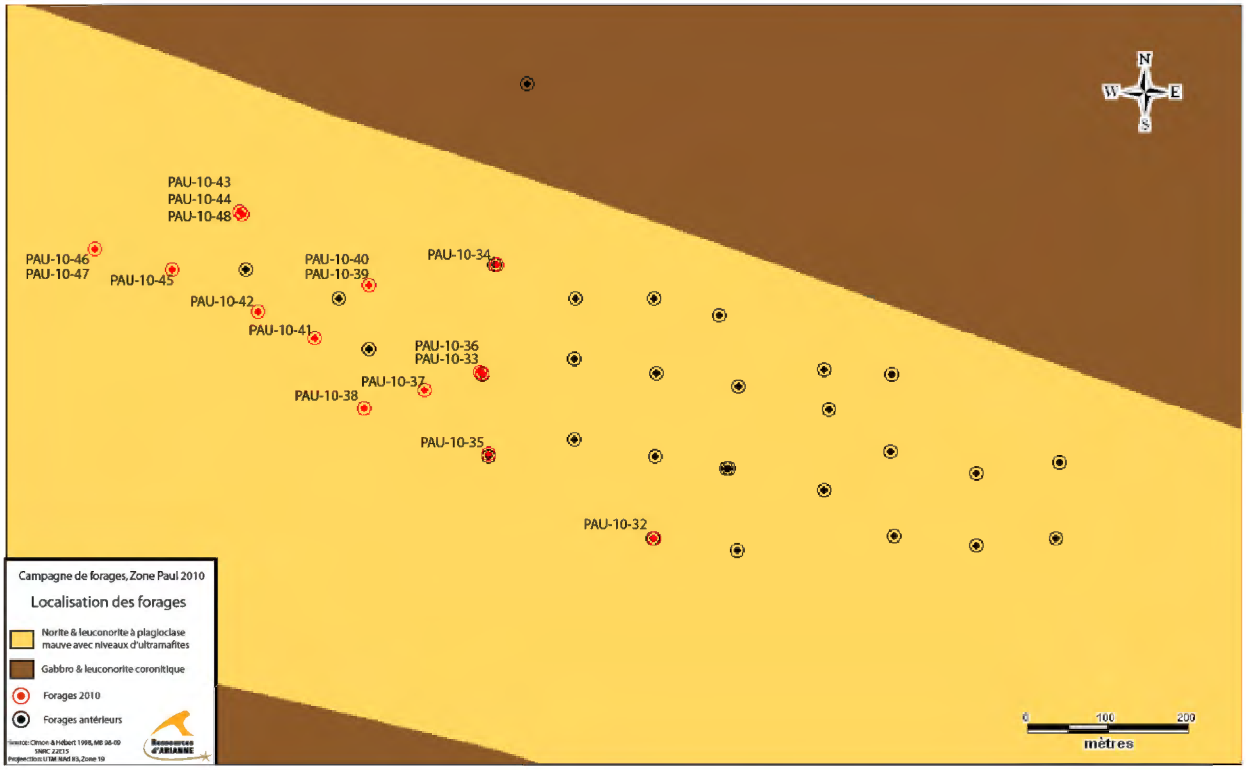
Table 10.1 – Position (UTM NAD 83), direction, Dip and Depth of the drill holes 2010

Hole Name	UTME	UTMN	Direction (°)	Dip (°)	Depth (m)
PAU-10-32	375 138	5 529 247	360	-59	462
PAU-10-33	374 926	5 529 453	360	-60	309
PAU-10-34	374 943	5 529 587	360	-45	54
PAU-10-35	374 934	5 529 352	360	-75	432
PAU-10-36	374 923	5 529 455	180	-45	63
PAU-10-37	374 854	5 529 431	360	-55	360.5
PAU-10-38	374 779	5 529 409	360	-65	351
PAU-10-39	374 785	5 529 562	360	-45	189
PAU-10-40	374 785	5 529 562	360	-70	303.5
PAU-10-41	374 717	5 529 496	360	-65	423
PAU-10-42	374 648	5 529 529	360	-45	72
PAU-10-43	374 648	5 529 529	360	-70	324.5
PAU-10-44	374 628	5 529 651	360	-45	90
PAU-10-45	374 541	5 529 582	360	-60	274.4
PAU-10-46	374 445	5 529 607	360	-70	282.5
PAU-10-47	374 445	5 529 607	360	-45	114
PAU-10-48	374 625	5 529 653	180	-45	21

Seventeen holes totalling 4125 m were drilled. Almost all the drill holes were analyzed and 1,418 samples were collected. They were first sent to the laboratory of IOS Geosciences at Saguenay city. This company is responsible for the pre-treatment of samples (drying, grinding and splitting). Subsequently, a predetermined amount (about 250 g) of each sample was shipped to ALS Chemex for analysis of major elements (including P_2O_5 and TiO_2) by X-ray fluorescence (ME-XRF06).

The rocks intersected by the drill holes are mainly nelsonite, anorthositic gabbros and gabbroic anorthosites. Some diorites, granites, amphibolites and pegmatites are also present. Enrichment in Fe-Ti oxides and Apatite is observed in nelsonite, gabbros, anorthosites and sometimes in the diorites. A total of 17 holes were drilled and 16 holes have intercepted mineralization. In addition, 5 of them remain open in the mineralization at depth.

Figure 10.1 – Location of diamond drill holes fall 2010 - Paul



Several drill holes have interesting intersections that show a marked enrichment in TiO_2 and P_2O_5.

Indeed, seven holes have an intersection that exceeds 200 m long with more than 6.00% of P_2O_5 and 6.00% of TiO_2. The hole PAU-10-32 already analyzed from 174 to 462 m in 2009. This hole was re-analyzed from 0 m to 174 m and interesting results were obtained from 140.75 to 174 m. These have been incorporated with the intersection made in 2009. Table on the next page shows the significant intersections within the different drilling hole.

All drilling reports and geochemistry analysis database were submitted to SGS Canada Inc. in Blainville.

Table 10.2 – Best mineralised intersections

Hole Name	From (m)	To (m)	Length	P_2O_5 (%)	TiO_2 (%)
PAU-10-32	140.75	462	321.25	6.64	6.41
PAU-10-33	3.5	293.6	290.1	7.21	8.76
including	148	182	34	7.21	10.88
	158.7	176.7	18	7.53	9.99
PAU-10-34	0	54	54	0.39	7.98
including	7.1	54	46.9	0.45	9.18
	10.06	35.7	25.64	0.48	10.27
	41.7	54	12.3	0.44	9.59
PAU-10-35	6.3	427	420.7	4.40	4.90
including	18.3	44.3	26	3.44	3.40
	87.4	432	344.6	4.80	5.37
	87.4	208.2	120.8	4.73	3.75
	306	432	126	6.48	9.04
PAU-10-36	4.3	47	42.7	7.95	6.96
PAU-10-37	6.6	330.8	324.2	7.46	8.56
including	39.8	330.8	291	8.10	9.31
	330.8	360.5	29.7	0.66	4.99
PAU-10-38	84	125.2	41.2	4.77	5.11
	135.7	351	215.3	6.69	8.68
including	135.7	211.6	75.9	7.13	9.61
	218	230	12	7.56	9.92
	233.9	351	117.1	6.91	8.72
PAU-10-39	6.6	54.6	48	5.54	11.86
	54.6	189	134.4	0.57	8.00
PAU-10-40	4.9	288.6	283.7	6.82	11.77
PAU-10-41	11.1	395.5	384.4	7.18	8.50
including	78.7	395.5	316.8	8.00	9.50
PAU-10-42	4.4	72	67.6	5.08	5.46
including	40.4	72	31.6	6.27	6.64
PAU-10-43	159.2	324.5	165.3	6.62	9.38
PAU-10-44	0	90	90	0.31	5.81
PAU-10-45	2.8	189	186.2	6.35	6.63
including	27	183	156	6.83	6.61
	44.6	183	138.4	7.01	6.67
	44.6	83.9	39.3	8.34	6.29

Hole Name	From (m)	To (m)	Length	P_2O_5 (%)	TiO_2 (%)
	106.8	183	76.2	8.19	8.44
PAU-10-46	3.8	243	239.2	6.96	8.65
including	12.8	243	230.2	7.06	8.78
	15.8	60	44.2	3.87	4.17
	90.5	223.4	132.9	9.70	10.75
	90.5	243	152.5	8.95	11.41
	120.5	157.4	36.9	10.41	9.61
PAU-10-47	4.3	81.9	77.6	6.20	6.44
including	54.2	81.9	27.7	9.62	9.03
PAU-10-48	4.5	14.9	10.4	5.84	14.37

10.2.2 Manouane

This section presents the definition drilling campaign that was carried out during the winter of 2010 and 2011 on the Manouane Zone located on the Lac à Paul property.

A total of 6,548 m in 35 holes were drilled and the diamond drilling program was performed by Forage Nordic de Val d'Or (QC). 2,072 samples were sent to the ALS Chemex Laboratory located in Val d'Or (QC). They were analysed for major elements using the XRF method (ME-XRF06).

The lithology observed in this area is mainly composed of Nelsonites, anorthositic Gabbros and occurence of Anorthosites, Diorite and Tonalites.

The drilling campaign allowed delimitation of the mineralized zone. This zone covers an area of 1,000 m (length) by 250 m (width). In addition, this mineralized zone still laterally opens to the East. It seems to close at about 150 m depth.

It is recommended to extend the drilling program in this area. Additional diamond drill holes will be useful to verify and confirm the presence of a mineralized extension to the Eastern part of this area.

The drilling campaign carried out in the winter of 2011 was conducted between February 7 and March 30, 2011. It was designed to convert inferred resources estimated at 137.7 Mt grading 5.71% P_2O_5 and 8.92% TiO_2 in indicated resources. It was also necessary to verify the lateral extension and depth of the deposit. A total of thirty-five (35) diamond drilling was carried out by the Nordic Drilling Company. The locations of the drill holes are shown in Figure 10.2. Table 10.3 gives the coordinates (UTM NAD 83), depth, orientation and dip each of them.

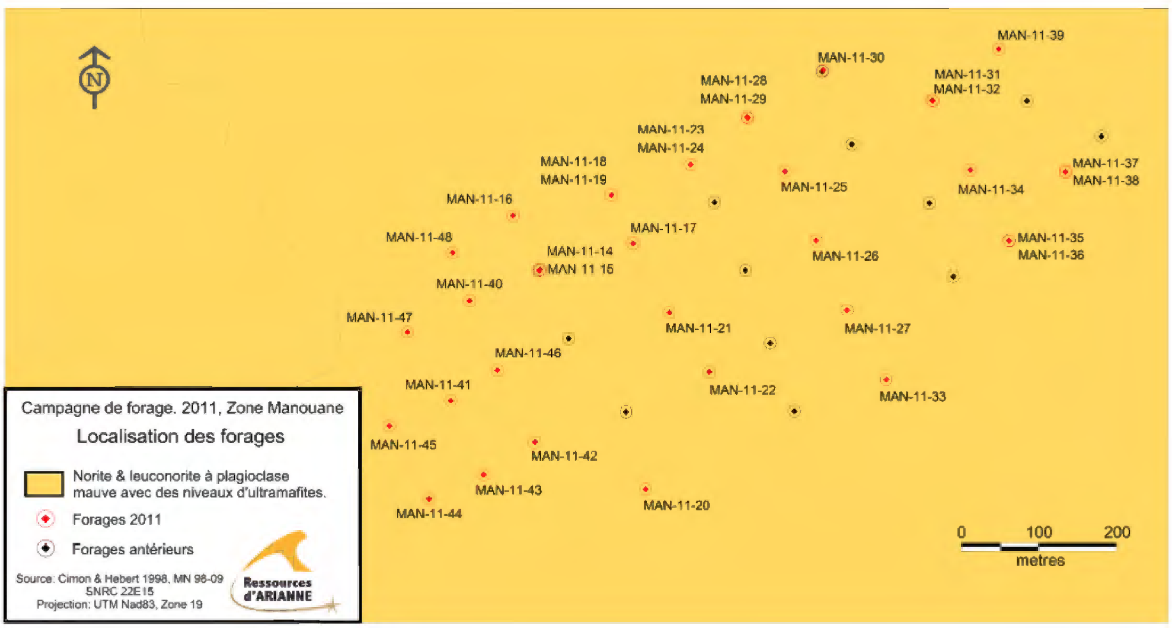
Table 10.3 – Coordinates (UTM NAD 83) direction/dip and drilled hole depth (2011)

Hole Name	UTME	UTMN	Direction	Dip	Depth (m)
MAN-11-14	381 101	5 527 320	360	-90	249
MAN-11-15	381 101	5 527 320	335	-65	228
MAN-11-16	381 067	5 527 391	335	-65	177
MAN-11-17	381 222	5 527 355	360	-90	246
MAN-11-18	381 194	5 527 417	360	-90	159
MAN-11-19	381 194	5 527 417	335	-50	117
MAN-11-20	381 238	5 527 037	335	-70	351
MAN-11-21	381 269	5 527 265	360	-90	300
MAN-11-22	381 320	5 527 189	360	-90	366
MAN-11-23	381 296	5 527 457	335	-75	144
MAN-11-24	381 296	5 527 457	335	-47	171
MAN-11-25	381 418	5 527 448	335	-60	93
MAN-11-26	381 458	5 527 359	335	-60	222
MAN-11-27	381 498	5 527 269	335	-60	225
MAN-11-28	381 370	5 527 517	335	-90	141
MAN-11-29	381 369	5 527 518	335	-50	105
MAN-11-30	381 467	5 527 579	335	-50	96
MAN-11-31	381 608	5 527 539	335	-90	138
MAN-11-32	381 608	5 527 540	335	-50	114
MAN-11-33	381 549	5 527 179	335	-60	186
MAN-11-34	381 657	5 527 450	335	-90	195.6
MAN-11-35	381 707	5 527 359	360	-90	222
MAN-11-36	381 707	5 527 358	155	-60	222
MAN-11-37	381 779	5 527 448	360	-90	185
MAN-11-38	381 780	5 527 447	155	-50	177
MAN-11-39	381 694	5 527 606	360	-90	207
MAN-11-40	381 011	5 527 281	335	-70	168
MAN-11-41	380 987	5 527 152	335	-70	207
MAN-11-42	381 096	5 527 098	335	-70	180
MAN-11-43	381 029	5 527 056	335	-70	225
MAN-11-44	380 959	5 527 024	335	-70	120
MAN-11-45	380 908	5 527 119	335	-70	126
MAN-11-46	381 047	5 527 191	335	-70	219
MAN-11-47	380 931	5 527 240	335	-70	135
MAN-11-48	380 990	5 527 343	335	-70	132

A total of 6,548 m were drilled in the 35 drill holes. Almost all the holes were analyzed and 2,072 samples were collected. They were first sent to the laboratory of IOS Geosciences in Saguenay. This company was in charge of the pre-treatment of samples (drying, grinding and splitting). Subsequently, a predetermined amount (about 250 g) of each sample was shipped to ALS Chemex for analysis of major elements (including P_2O_5 and TiO_2) by X-ray fluorescence (ME-XRF06).

The rocks intersected by the holes are mainly anorthositic gabbros and nelsonites. Some tonalites, anorthosites, diorites, amphibolites and pegmatites are also present. Enrichment in Fe-Ti oxides and apatite is observed in nelsonite, gabbros, anorthosites and sometimes in the diorites. All drill holes intersected mineralization over lengths ranging from 11 to over 250 meters. The hole named Man-11-25 was stopped in mineralization because the drill could not cross a zone interpreted as a fault.

Figure 10.2 - Location of diamond drill holes winter 2011 - Manouane



Several drill holes have interesting that show a marked enrichment in TiO_2 and P_2O_5. Indeed, five drill holes (Man-11-26, 34, 35, 36 and 39) have intersected the mineralized zone over a hundred and fifty (150) meters long with at least 6.00% P_2O_5 and 8.50% TiO_2. The drill hole Man 11-39 has an intersection of 151.85 meters grading 7.16% P_2O_5 and 9.94% TiO_2. Two holes have intersected the mineralized zone over more than 200 meters long, with grades of more than 5.00% of P_2O_5 and 7.50% of TiO_2. Table 1.4 shows the significant intersections connected to each of the drilling holes.

All the drilling reports and geochemistry analysis database were submitted to SGS Canada Inc. in Blainville.

Table 10.4 – Best mineralised intersections

Hole Name	From (m)	To (m)	Length	P_2O_5 (%)	TiO_2 (%)
MAN-11-14	150	191.1	41.1	6.96	9.75
MAN-11-15	38.5	144.25	105.75	5.46	8.26
including	70.5	144.25	73.75	6.65	10.03
MAN-11-16	16	69	53	5.86	8.87
MAN-11-17	9.7	195	185.3	5.71	9.27
including	131.5	183	51.5	6.34	9.21
MAN-11-18	16.9	150	133.1	6.79	10.06
MAN-11-19	19.6	104.9	85.3	6.50	9.80
MAN-11-20	141	338.4	197.4	5.46	7.59
MAN-11-21	15	265.8	250.8	5.29	8.51
MAN-11-22	124.9	350	225.1	4.60	7.61
MAN-11-23	12	100.9	88.9	6.58	9.45
MAN-11-24	15	97.2	82.2	6.97	9.95
MAN-11-25	17.9	93	75.1	6.87	10.13
MAN-11-26	29	185.2	156.2	6.53	9.51
MAN-11-27	35	209.9	174.9	5.73	8.43
MAN-11-28	15	107	92	6.80	9.29
MAN-11-29	22	53.2	31.2	7.28	8.87
MAN-11-30	15	70.1	55.1	7.03	10.20
MAN-11-31	21	105	84	6.14	8.68
MAN-11-32	28.2	97.6	69.4	6.55	9.87
MAN-11-33	120.3	131.2	10.9	6.11	10.82
MAN-11-34	17.8	173.7	155.9	6.70	9.28
MAN-11-35	15.9	198	182.1	6.12	8.62
MAN-11-36	18.6	213.7	195.1	6.23	8.57
MAN-11-37	12.3	62	49.7	5.92	7.79
	73	105	32	5.32	7.43
MAN-11-38	13	116	103	5.72	7.99
MAN-11-39	12.4	164.25	151.85	7.16	9.94
MAN-11-40	38.1	138	99.9	5.29	8.19
MAN-11-41	3.5	80	76.5	5.62	7.91
	104.7	191.3	86.6	5.55	8.43
MAN-11-42	59.25	150	90.75	5.64	8.03
MAN-11-43	29	40.2	11.2	5.36	6.21
	94.4	180.55	86.15	4.73	6.48

Hole Name	From (m)	To (m)	Length	P_2O_5 (%)	TiO_2 (%)
including	159.1	180.55	21.45	5.89	8.00
MAN-11-44	54	105.8	51.8	5.88	8.88
MAN-11-45	44.5	82.5	38	5.91	7.39
MAN-11-46	31.5	207.5	176	5.38	7.50
MAN-11-47	7.3	103.8	96.5	5.27	7.39
MAN-11-48	19	71.5	52.5	5.44	8.71

11.0 SAMPLE PREPARATION, ANALYSIS AND SECURITY

This section describes the method and approach used by Arianne Resources Inc.

The Lac à Paul deposit has been sampled by BQ & NQ diamond drill holes, 2008 to 2011 is NQ drilling. The drill hole spacing now varied from 60 to 125 meters. The cross section spacing varies from 60 meters to 150 meters but generally 90 meters.

The deposits are recognized over lengths over 1 km each and are massive structure with an average thickness of about 150 to 300 meters depending of the deposit.

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 generally of massive fine grain, SGS Geostat does not recommend drilling smaller than BQ diameter.

The mineralization with grade of interest is within the nelsonite unit of the anorthositic complex. This Nelsonite has some inclusions and is intersected from times to times by quartz and dykes which are barren, these sections are not sampled and are considered zero grades. The decision to sample is based on the aspect of the rock and its visual composition. The core is usually sampled and analyzed over its full length.

The mineralization is associated with significant magnetic expression on surface. It was found that a layer of relatively high grade TiO_2 with magnetite is at contact of the Nelsonite, this layer of low grade apatite is difficult to differentiate from the normal mineralization so it is sampled and the analytical results assist in putting the contacts during interpretation phase at the Paul Zone.

The surface sampling by Arianne Resources Inc. is made by hammering the surface rock in order to get about 2 to 5 Kg of rock which is put into a bag with a tag and label. The rock is described and the position recorded with a hand held GPS.

For the core recovered by diamond drilling, the core boxes were identified, length of core were marked with wood blocks and the boxes were closed and wrapped from drill site to portable core logging and splitting facilities of Arianne Resources Inc.

At the core shack the core was reviewed and logged by geologist; sections to sample were identified by geologist (Christian Tremblay, registered P. Geo. in Province of Quebec). Afterward the technicians prepare the core and split the core in half to keep a witness core. This was done under supervision of Arianne Resources Inc. contract geologists Christian Tremblay. Samples bags with label and tags were sealed and put into rice bags and identified for shipping to laboratory facilities.

There are no reason to believe that work performed by Arianne staff and contractors was not made in a professional manner, hence in the author's opinion, the work performed by Arianne is in respect with the standard of best practice for sampling and logging diamond drilling core.

Initially in the Lac à Paul exploration by Arianne, sample length were at 1.5 meter long, after reception of the first drilling campaign results with relatively low variation of grade within 2 samples of 1.5 m, decision was made to increase sample length to 3 meters the author has participated in this decision. The standard sample length for the 2010 and 2011 drilling in this report is three (3) meters.

The NQ core was separated in two parts with a hydraulic core splitter, witness core was preserved. The half core sample is put into plastic bags, tagged and sealed. The sample bags where afterward listed and included into a rice bag for shipment to IOS laboratories in Chicoutimi, Saguenay where the sample is entirely crushed 0 to ¼ inch. An approximate split of 1 kg is taken with riffle splitter after crushing and material afterward grinded with rotary disc pulverizer to approximately 95% passing 2 mm. This material is riffle split and a sample of 200 to 250 grams is bagged for shipping. The sample bags where afterward listed and included into a rice bag for shipment to the ALS laboratory.

The author visited the IOS facility on February14, 2011 and found the equipment and procedures to be adequate in the Lac à Paul context.

The exploration program, emphasis was on P_2O_5 and TiO_2. And the works mainly aim at defining minerals resources of P_2O_5 and TiO_2. All major oxides are analyzed.

11.1 Sample Preparation at the Laboratory

IOS Geoscientific Services for Arianne Resources had shipped the samples to ALS Chemex laboratory in Val d'Or, Quebec. The following procedures are used either separately or combined in a package in order to meet specific sample preparation requirements.

The sample were weighted and afterward pulverized (PUL 31 was used) prior to analysis. An excerpt from a typical certificate is given in Table 11.1.

Table 11.1 – Example of certificate

PRÉPARATION ÉCHANTILLONS	
CODE ALS	DESCRIPTION
WEI- 21	Poids échantillon reçu
LOG- 24	Entrée pulpe - Reçu sans code barre
LOG- 21	Entrée échantillon - Code barre client
PUL- 31	Pulvérisé à 85 % <75 um

PROCÉDURES ANALYTIQUES		
CODE ALS	DESCRIPTION	INSTRUMENT
ME- XRF06	Roche totale - XRF	XRF
OA- GRA06	Perte par calcination pour ME- XRF06	WST- SIM

Pulverizing

All pulverizing procedures make use of "flying disk" or "ring and puck" style grinding mills. Unless otherwise indicated, all pulverizing procedures guarantee that for most sample types at least 85% of the material will be pulverized to 75 micron (200 mesh) or better.

Table 11.2 – Pulverizing procedure by ALS Chemex Laboratory in Val d'Or

Description	Application	Code
Pulverize a split or total sample of up to 250g to 85% passing 75 micron or better.	Default procedure for samples that are finely crushed and split prior to pulverizing or for total samples up to 250g.	PUL-31
Pulverize a 1000g split to 85% passing 75 micron or better.	Pulverizing of a 1kg split or total sample up to 1kg.	PUL-32
Pulverize the entire sample to 85% passing 75 micron or better.	Appropriate for samples up to 3kg.	PUL-21

Arianne Resources Inc. has relied on ALS Chemex as its main laboratory for this project. According to the certificates provided by Arianne Resources Inc. the author concludes 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. Author's independent samples with SGS laboratory are considered 3rd party. QA/QC procedures are presented and discussed in the next section of this report.

11.2 Bulk sample material used for metallurgical testing

In the course of the study, Arianne was requested by COREM to provide about eight (8) tonnes of representative sample from the Paul zone. The Vice-President of exploration from Arianne Mr. Daniel Boulianne Sr. Geologist had elected to use the core coarse rejects material. The independent laboratory IOS which had the rejects in storage, sent these rejects directly to COREM for a total of 6.36 tonnes. The remaining additional 1.5 to 1.7 tonnes has been taken from the blasted outcrop near hole PAU-09-18 under IOS staff supervision.

By doing this approach, Arianne has taken adequate step to prepare a representative unique composite sample.

Table 11.3 is an extract of the sample list in Excel worksheet format, of the rejects from holes: PAU-09-14 to 22 and PAU-09-24 to 31 that composed the 6.36 tonnes that were sent. The remaining 1.7 tonnes had been taken by IOS staff in the field and sent with the rejects to COREM with plastic barrels on wooden crates. Drill hole locations are presented on Figure 11.1.

Table 11.3– Partial list of core reject samples used for the COREM Met Test

A9 · Pau-09-14

	A	B	C
1	Liste d'échantillons 2010-197		
2	# trou	Échantillon	Poids (g) restant
983	Pau-09-31	854759	6245
984	Pau-09-31	854760	7250
985	Pau-09-31	854761	8185
986	Pau-09-31	854762	2980
987	Pau-09-31	854763	4880
988	Pau-09-31	854764	6855
989	Pau-09-31	854765	8640
990	Pau-09-31	854766	8970
991	Pau-09-31	854767	8685
992	Pau-09-31	854768	8870
993	Pau-09-31	854769	8860
994	Pau-09-31	854770	9060
995	Pau-09-31	854771	8805
996	Pau-09-31	854772	standard
997	Pau-09-31	854773	8045
998	Pau-09-31	854774	7980
999	Pau-09-31	854775	8635
1000	Pau-09-31	854776	8520
1001	Pau-09-31	854777	8770
1002	Pau-09-31	854778	10990
1003	Pau-09-31	854779	8120
1004			6304405
1005			6362880 g, 6362,880 Kg, 14030,15 lbs, 6,36 tonnes métriques
1006			6,36 tonnes métriques

Figure 11.1 – Position of diamond drill holes used for the Met bulk sample - Paul

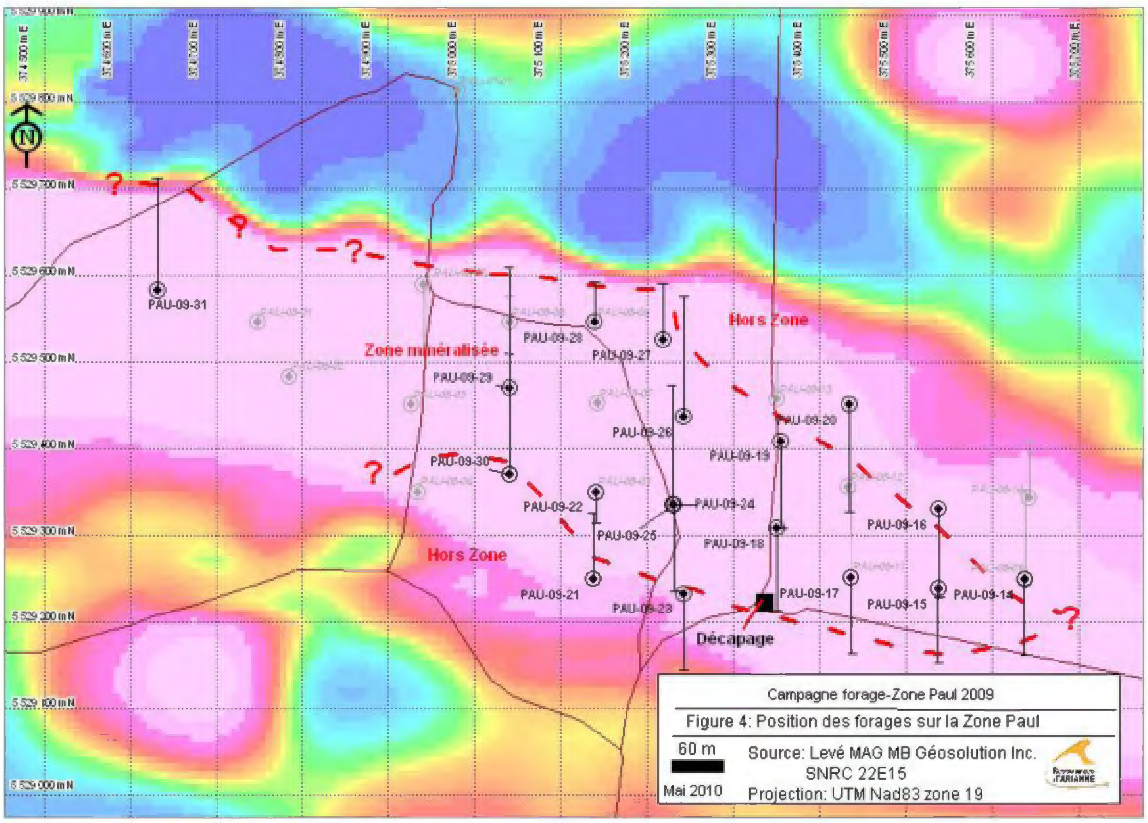


Figure 11.1 confirms material for the metallurgical testing bulk sample (6.36 tonnes) is distributed in the deposit. The stripping zone (black square above in figure) indicates the first place where rock was stripped. The origin of the remaining source of the bulk (around 1.5 to 1.7 tonnes)) is located just to the north of the first stripped area, beside hole PAU-09-18. The total shipment weight was 18,000 pounds. The grade of the in-

house standard gives the average grade of this material. The colour code reflect the magnetic signature.

As a next step, the author recommends that tests on recovery (geometallurgical approach) should take place to assess the variability of recovery across each deposit in 3D.

11.3 Quality control program

The QC program that was put in place by Arianne Resources Inc. was used in the 2010-2011 drilling program. Arianne relies on its own program and independent samples taken by SGS Geostat as external quality control complete the QC program.

11.3.1 Paul QAQC-Reliability of results

The reliability of analytical results in TiO_2 and P_2O_5 from ALS Chemex laboratory has been verified. Indeed, 53 blanks and 103 standards were sent to this laboratory.

The blanks used in this drill program are blocks of quartz from the Siteq quarry at St. Francis de Sales. They were brushed and cleaned with oxalic acid before sending them for analysis. These rocks show no enrichment in TiO_2 and P_2O_5 known. Values in P_2O_5 and TiO_2 are shown in Table 11.4. They vary from 0.01 to 0.21% TiO_2 and from 0.009 to 0.336% P_2O_5.

Table 11.4 – Arianne blank check samples sent to ALS Chemex Laboratory in Val d'Or

Hole Name	Depth (m)	Sample Number	ALS values P_2O_5(%)	ALS values TiO_2(%)
PAU-10-32	0	H853153	0.014	-0.01
	270	H853188	0.026	-0.01
	365	H853223	0.044	-0.01
	462	H853256	0.052	0.01
PAU-10-33	0	H853259	0.013	0.03
	99.6	H853296	0.054	0.02
	209.7	H853332	0.053	0.02
	309	H853364	0.03	0.02
PAU-10-34	0	H853367	0.014	0.02
	54	H853387	0.014	0.02
PAU-10-35	0	H853390	0.011	-0.01
	120.9	H853427	0.03	-0.01
	239.3	H853462	0.027	-0.01
	354	H853498	0.04	0.06
	432	H854828	0.062	-0.01
PAU-10-36	0	H854831	0.016	-0.01
	47	H854848	0.045	0.04
PAU-10-37	0	H854851	0.023	-0.01

Hole Name	Depth (m)	Sample Number	ALS values P_2O_5(%)	ALS values TiO_2(%)
	119.9	H854887	0.059	0.02
	222.4	H854923	0.111	0.08
	321.4	H854959	0.069	0.04
	360.5	H854977	0.016	-0.01
PAU-10-38	0	H854980	0.018	0.01
	144.7	H855016	0.042	0.02
	245.9	H855050	0.052	0.03
	344.9	H855086	0.052	0.03
	351	H855090	0.044	0.01
PAU-10-39	0	H855093	0.022	-0.01
	111	H855130	0.009	0.01
	189	H855159	0.009	0.05
PAU-10-40	0	H855163	0.013	0.01
	105.5	H855200	0.102	0.1
	203.8	H855234	0.052	0.03
	303.5	H855268	0.021	-0.01
PAU-10-41	0	H855272	0.015	-0.01
	114.7	H855311	0.336	0.21
	219	H855350	0.056	0.05
	323	H855389	0.063	0.02
	423	H855423	0.019	-0.01
PAU-10-42	0	H855426	0.015	-0.01
PAU-10-43	0	H855441	0.024	-0.01
	183.2	H855480	0.051	0.03
	295.3	H855519	0.114	0.12
PAU-10-44	0	H855546	0.018	-0.01
PAU-10-45	0	H855572	0.031	0.03
	121.8	H855611	0.132	0.08
	237	H855650	0.013	-0.01
PAU-10-46	0	H855657	0.016	-0.01
	123.5	H855696	0.024	-0.01
	232.4	H855735	0.031	0.03
PAU-10-47	0	H855749	0.013	-0.01
	114	H855790	0.014	0.03
PAU-10-48	0	H855793	0.012	-0.01

In addition, four standards were used to validate the analytical results. There are two certified standards the DC79003 and the SY-4, one standard approved, the FER-1, and one home made standard the PMRI10.

The SY-4 standard is certified by CANMET Mining and Mineral CANMET services in Ontario. It was used to check the values for P_2O_5 and TiO_2. The certified values are: 0.131% of P_2O_5 and 0.287% of TiO_2.

The values obtained with the laboratory analysis for this drilling campaign have given relative errors ranging from 1.527% to 11.450% for P_2O_5 and absolute relative errors ranging between 1.045% and 5.923% for TiO_2.

The other standard certified, DC 79003, is only valid for P_2O_5. He is certified by China National Analysis Center for Iron and Steel. The standard value is 6.06% for P_2O_5. The values obtained during laboratory tests showed an absolute error that varies from 4.274% to 5.099%. The standard FER-1 is prepared by CANMET and is used as material reference by the Geological Survey of Canada. Standard values are: 2.39% P_2O_5 and 75.86% Fe_2O_3. The results obtained in laboratory tests show absolute errors ranging from 0.01% to 4.79% as Fe_2O_3 and 1.674% to 16.276% P_2O_5.

Finally, the standard PMRI 10 is a home made standard that was made with rock from the Paul Zone stripping. It is used to check the values P_2O_5 and TiO_2. With the numbers that are available today, the average is 10.286% P_2O_5 (min: 9.175, max: 10.435) with a standard deviation of 0.134, and an average of 5.576% TiO_2 (min: 5.13, max: 5.54) with a standard deviation of 0.044. Using the previous averages, the lab tests show errors ranging from 0 to 10.801% P_2O_5 and 0.073 to 6.318% in TiO_2.

All results of analysis of standards and the percentage of errors in the calibration values are presented in Table 11.5 to Table 11.9 on the following pages. Samples of drill hole PAU-10-35 and PAU-10-40 were reversed by the laboratory. Analysis of recovery have been made. The laboratory confirmed that the samples had been reversed and that the good results to be considered are those of the analysis times. The certificates of the first analysis and the reanalysis were provided for validation.

Table 11.5 – Arianne SY-4 Standard check

Drill hole Name	Depth (m)	Sample Number	Standard values P_2O_5 (%)	Obtained value P_2O_5 (%)	Relative Error (%)	Standard value TiO_2 (%)	Obtained value TiO_2 (%)	Relative Error (%)
PAU-10-32	0	H853151	0.131	0.126	-3.817	0.287	0.28	-2.439
PAU-10-33	0	H853257	0.131	0.127	-3.053	0.287	0.28	-2.439
PAU-10-34	0	H853365	0.131	0.126	-3.817	0.287	0.29	1.045
PAU-10-35	0	H853388	0.131	0.126	-3.817	0.287	0.28	-2.439
PAU-10-36	0	H854829	0.131	0.127	-3.053	0.287	0.27	-5.923
PAU-10-37	0	H854849	0.131	0.126	-3.817	0.287	0.28	-2.439
PAU-10-38	0	H854978	0.131	0.126	-3.817	0.287	0.29	1.045
PAU-10-39	0	H855091	0.131	0.126	-3.817	0.287	0.28	-2.439
PAU-10-40	0	H855161	0.131	0.129	-1.527	0.287	0.29	1.045
PAU-10-41	0	H855270	0.131	0.116	-11.450	0.287	0.27	-5.923
PAU-10-42	0	H855424	0.131	0.126	-3.817	0.287	0.3	4.530
PAU-10-43	0	H855439	0.131	0.126	-3.817	0.287	0.28	-2.439
PAU-10-44	0	H855544	0.131	0.127	-3.053	0.287	0.29	1.045
PAU-10-45	0	H855570	0.131	0.129	-1.527	0.287	0.28	-2.439
PAU-10-46	0	H855655	0.131	0.126	-3.817	0.287	0.29	1.045
PAU-10-47	0	H855747	0.131	0.126	-3.817	0.287	0.29	1.045
PAU-10-48	0	H855791	0.131	0.126	-3.817	0.287	0.28	-2.439

Table 11.6 – Arianne DC79003 Standard Check

Drill hole Name	Depth (m)	Sample Number	Standard value P_2O_5 (%)	Obtained value P_2O_5 (%)	Relative Error (%)
PAU-10-32	0	H853152	6.06	5.789	-4.472
PAU-10-33	0	H853258	6.06	5.772	-4.752
PAU-10-34	0	H853366	6.06	5.768	-4.818
PAU-10-35	0	H853389	6.06	5.775	-4.703
PAU-10-36	0	H854830	6.06	5.79	-4.455
PAU-10-37	0	H854850	6.06	5.765	-4.868
PAU-10-38	0	H854979	6.06	5.782	-4.587
PAU-10-39	0	H855092	6.06	5.785	-4.538
PAU-10-40	0	H855162	6.06	5.766	-4.851
PAU-10-41	0	H855162	6.06	5.786	-4.521
PAU-10-42	0	H855425	6.06	5.76	-4.950
PAU-10-43	0	H855440	6.06	5.758	-4.983
PAU-10-44	0	H855545	6.06	5.751	-5.099
PAU-10-45	0	H855571	6.06	5.76	-4.950
PAU-10-46	0	H855656	6.06	5.801	-4.274
PAU-10-47	0	H855748	6.06	5.782	-4.587
PAU-10-48	0	H855792	6.06	5.795	-4.373

Table 11.7 – Arianne FER-1 Standard Check part 1

Drillhole Name	Depth (m)	Sample Number	Standard value Fe_2O_3 (%)	Obtained value Fe_2O_3 (%)	Relative Error (%)	Standard value P_2O_5 (%)	Obtained value P_2O_5 (%)	Relative Error (%)
PAU-10-32	246	H853178	75.86	75.55	-0.41	2.39	2.251	-5.816
	332	H853211	75.86	76	0.18	2.39	2.231	-6.653
	441	H853247	75.86	75.85	-0.01	2.39	2.241	-6.234
PAU-10-33	66.6	H853283	75.86	75.55	-0.41	2.39	2.251	-5.816
	173.7	H853319	75.86	75.5	-0.47	2.39	2.242	-6.192
	279	H853355	75.86	75.65	-0.28	2.39	2.24	-6.276
PAU-10-35	87.4	H853414	75.86	75.77	-0.12	2.39	2.257	-5.565
	208.2	H853451	75.86	76.04	0.24	2.39	2.319	-2.971
	324	H853487	75.86	75.7	-0.21	2.39	2.252	-5.774
	421	H854823	76.86	75.8	-1.38	2.39	2.24	-6.276

Table 11.8 – Arianne FER-1 Standard Check part 2

Drill hole Name	Depth (m)	Sample Number	Standard value Fe_2O_3 (%)	Obtained value Fe_2O_3 (%)	Relative Error (%)	Standard value P_2O_5 (%)	Obtained value P_2O_5 (%)	Relative Error (%)
PAU-10-37	83.9	H854874	75.86	75.75	-0.15	2.39	2.241	-6.234
	186.1	H854910	75.86	75.67	-0.25	2.39	2.241	-6.234
	285.4	H854946	75.86	75.95	0.12	2.39	2.245	-6.067
PAU-10-38	99	H855003	75.86	75.85	-0.01	2.39	2.232	-6.611
	207.7	H855039	75.86	75.76	-0.13	2.39	2.251	-5.816
	314.9	H855075	75.86	75.75	-0.15	2.39	2.241	-6.234
PAU-10-39	74.2	H855117	75.86	75.79	-0.09	2.39	2.251	-5.816
	174	H855153	75.86	75.3	-0.74	2.39	2.221	-7.071
PAU-10-40	69.5	H855187	75.86	76.02	0.21	2.39	2.261	-5.397
PAU-10-41	81.7	H855299	75.86	79.49	4.79	2.39	2.001	-16.276
	186.6	H855338	75.86	77.59	2.28	2.39	2.338	-2.176
	290	H855377	75.86	76.15	0.38	2.39	2.541	6.318
	406.1	H855417	75.86	73	-3.77	2.39	2.35	-1.674
PAU-10-42	72	H855543	75.86	75.76	-0.13	2.39	2.261	-5.397
PAU-10-43	150.2	H855468	75.86	75.97	0.15	2.39	2.251	-5.816
	262.3	H855507	75.86	76	0.18	2.39	2.261	-5.397
PAU-10-44	64.2	H855569	75.86	75.71	-0.20	2.39	2.263	-5.314
PAU-10-45	75.2	H855599	75.86	75.59	-0.36	2.39	2.261	-5.397
	204.5	H855638	75.86	75.78	-0.11	2.39	2.006	-16.067
PAU-10-46	85.7	H855684	75.86	75.72	-0.18	2.39	2.262	-5.356
	199.4	H855723	75.86	75.41	-0.59	2.39	2.251	-5.816
PAU-10-47	78.1	H855776	75.86	75.78	-0.11	2.39	2.251	-5.816

Table 11.9- Arianne PMRI10 Standard check

Drill hole Name	Depth (m)	Sample Number	Standard value P_2O_5 (%)	Obtained value P_2O_5 (%)	Relative Error (%)	Standard value TiO_2 (%)	Obtained valueTiO_2 (%)	Relative Error (%)
PAU-10-32	202	H853165	10.286	10.301	0.146	5.476	5.47	-0.110
	303	H853200	10.286	10.312	0.253	5.476	5.5	0.438
	411	H853236	10.286	10.291	0.049	5.476	5.48	0.073
PAU-10-33	37	H853273	10.286	10.29	0.039	5.476	5.48	0.073
	140.7	H853307	10.286	10.301	0.146	5.476	5.46	-0.292
	246	H853343	10.286	10.309	0.224	5.476	5.51	0.621
PAU-10-34	32.7	H853378	10.286	10.26	-0.253	5.476	5.46	-0.292
PAU-10-35	36.3	H853402	10.286	10.261	-0.243	5.476	5.47	-0.110
	173.2	H853438	10.286	10.261	-0.243	5.476	5.41	-1.205
	275.6	H853474	10.286	10.304	0.175	5.476	5.43	-0.292
	387	H854810	10.286	10.275	-0.146	5.476	5.45	-0.475
PAU-10-37	47.5	H854862	10.286	10.287	0.010	5.476	5.47	-0.110
	153.1	H854898	10.286	10.288	0.019	5.476	5.47	-0.110
	252.4	H854934	10.286	10.302	0.156	5.476	5.49	0.256
	348.1	H854971	10.286	10.301	0.146	5.476	5.48	0.073
PAU-10-38	65	H854991	10.286	10.282	-0.039	5.476	5.46	-0.292
	174.7	H855027	10.286	10.301	0.146	5.476	5.48	0.073
	278.9	H855062	10.286	10.31	0.233	5.476	5.47	-0.110
PAU-10-39	39.6	H855105	10.286	10.312	0.253	5.476	5.5	0.438
	141	H855141	10.286	10.31	0.233	5.476	5.49	0.256
PAU-10-40	34.9	H855174	10.286	10.31	0.233	5.476	5.46	-0.292
	140.8	H855211	10.286	10.31	0.233	5.476	5.42	-1.023
PAU-10-41	46.6	H855286	10.286	10.312	0.253	5.476	5.5	0.438
	153.7	H855325	10.286	9.175	-10.801	5.476	5.13	-6.318
	254	H855364	10.286	10.261	-0.243	5.476	5.45	-0.475
	365	H855403	10.286	10.272	-0.136	5.476	5.45	-0.475
PAU-10-42	43.4	H855532	10.286	10.282	-0.039	5.476	5.47	-0.110
PAU-10-43	42.6	H855455	10.286	10.31	0.233	5.476	5.47	-0.110
	225.1	H855494	10.286	10.281	-0.049	5.476	5.46	-0.292
	324.5	H855530	10.286	10.321	0.340	5.476	5.5	0.438
PAU-10-44	41.8	H855560	10.286	10.152	-1.303	5.476	5.47	-0.110
PAU-10-45	41.8	H855586	10.286	10.435	1.449	5.476	5.51	0.621
	160.8	H855625	10.286	10.281	-0.049	5.476	5.46	-0.292

Drill hole Name	Depth (m)	Sample Number	Standard value P_2O_5 (%)	Obtained value P_2O_5 (%)	Relative Error (%)	Standard value TiO_2 (%)	Obtained valueTiO_2 (%)	Relative Error (%)
PAU-10-46	42.8	H855671	10.286	10.3	0.136	5.476	5.46	-0.292
	163.4	H855710	10.286	10.31	0.233	5.476	5.5	0.438
	282.5	H855746	10.286	10.295	0.087	5.476	5.48	0.073
PAU-10-47	42.2	H855763	10.286	10.31	0.233	5.476	5.51	0.621
PAU-10-48	21	H855800	10.286	10.301	0.146	5.476	5.5	0.438

11.3.2 Manouane QAQC-Reliability of results

The reliability of analytical results in TiO_2 and P_2O_5 from ALS Chemex laboratory has been verified. Indeed, hundred three (103) blanks and hundred seventy nine (179) standards were sent to this laboratory.

The blanks used in this drill program are blocks of quartz from the Siteq quarry at St. Francis de Sales. They were brushed and cleaned with oxalic acid before sending them for analysis. These rocks show no enrichment in TiO_2 and P_2O_5 known. Values in P_2O_5 and TiO_2 are shown in Table 11.10. They vary from 0 to 0.55 % TiO_2 and from 0 to 0.543 % P_2O_5.

In holes MAN-11-21 et MAN-11-22, blank samples J414331, J414366 and J414541 were reversed by the lab with samples J414330, J414366 and J414540 respectively. The data results have been corrected.

Table 11.10 – Arianne blank check samples sent to ALS Chemex Laboratory in Val d'Or

Hole #	Depth m	# Sample	Lab Value P_2O_5 (%)	Lab Value TiO_2 (%)
MAN-11-14	150	H855803	0.013	-0.01
	248	H855836	0.012	-0.01
MAN-11-15	0	H855839	0.011	-0.01
	123	H855879	0.021	-0.01
	219.4	H855912	0.012	-0.01
MAN-11-16	0	H855918	0.011	0.01
	111	H855960	0.011	0.06
	177	H855979	0.01	-0.01
MAN-11-17	0	H855982	0.011	0.01
	120	J414019	0.035	0.06
	216	J414060	0.013	-0.01
	246	J414072	0.011	-0.01

Hole #	Depth m	# Sample	Lab Value P_2O_5 (%)	Lab Value TiO_2 (%)
MAN-11-18	0	J414075	0.01	-0.01
	105	J414112	0.034	-0.01
	159	J414133	0.014	-0.01
MAN-11-19	0	J414136	0.012	-0.01
	111	J414173	0.038	0.06
	117	J414176	0.013	0.02
MAN-11-20	0	J414179	0.01	-0.01
	180	J414218	0.033	-0.01
	275.05	J414257	0.042	0.04
	351	J414292	0.019	-0.01
MAN-11-21	15	J414295	0.012	-0.01
	96	J414331	0.025	-0.01
	180.4	J414366	0.059	0.06
	253.2	J414402	0.056	0.05
MAN-11-21	300	J414423	0.016	-0.01
MAN-11-22	0	J414426	0.013	-0.01
	138	J414465	0.016	-0.01
	234	J414504	0.041	0.02
	345	J414541	0.036	-0.01
	366	J414550	0.018	-0.01
MAN-11-23	12	J414553	0	-0.01
	100.9	J414591	0.017	-0.01
	144	J414607	0	-0.01
MAN-11-24	0	J414610	-0.01	-0.01
	111.6	J414649	0.004	-0.01
	171	J414674	0.001	-0.01
MAN-11-25	0	J414677	0.001	-0.01
	93	J414707	0.02	0.02
MAN-11-26	0	J414710	-0.01	-0.01
	126	J414749	0.015	-0.01
	222	J414785	-0.01	-0.01
MAN-11-27	0	J414788	0.011	-0.01
	122.8	J414826	0.024	-0.01
	220	J414866	0.014	-0.01

Hole #	Depth m	# Sample	Lab Value P_2O_5 (%)	Lab Value TiO_2 (%)
MAN-11-28	0	J414869	0.013	-0.01
	107	J414907	0.028	0.01
	141	J414922	0.014	0.21
MAN-11-29	0	J414925	0.001	-0.01
	105	J414959	0.001	-0.01
MAN-11-30	0	J414962	0.001	-0.01
	96	J414996	0.001	-0.01
MAN-11-31	21	J414999	0.01	0.02
	124.4	J415041	-0.01	0.01
	138	J415047	-0.01	-0.01
MAN-11-32	0	J415050	-0.01	-0.01
	114	J415087	0.001	-0.01
MAN-11-33	0	J415090	0.015	-0.01
	183	J415118	0.013	-0.01
MAN-11-34	0	J415121	0.01	-0.01
	114	J415158	0.027	-0.01
	195.6	J415191	0.062	0.44
MAN-11-35	0	J415194	-0.01	-0.01
	222	J415287	0.011	0.08
MAN-11-35	102	J415232	0.003	-0.01
	177	J415270	0.001	-0.01
MAN-11-36	0	J415290	0.013	-0.01
	120	J415330	0.033	-0.01
	205	J415368	0.026	-0.01
	222	J415377	0.012	-0.01
MAN-11-37	12.3	J415380	0.001	-0.01
	102	J415419	0.017	0.06
	185	J415444	-0.01	-0.01
MAN-11-38	13	J415447	0.001	-0.01
	111	J415488	0.023	0.04
	177	J415510	0.001	-0.01
MAN-11-39	12.4	J415513	0.02	0.01
	120	J415553	0.543	0.55
	207	J415589	-0.01	-0.01

Hole #	Depth m	# Sample	Lab Value P_2O_5 (%)	Lab Value TiO_2 (%)
MAN-11-40	15.2	J415592	0.01	-0.01
	97.3	J415629	0.016	-0.01
	168	J415653	0.015	-0.01
MAN-11-41	3.5	J415656	0.011	-0.01
	102	J415698	0.011	-0.01
	204.2	J415739	0.012	-0.01
MAN-11-42	0	J415742	-0.01	-0.01
	96.7	J415779	0.012	-0.01
	180	J415813	-0.01	0.12
MAN-11-43	0	J415816	-0.01	0.07
	117	J415853	0.024	0.04
	225	J415889	0.002	-0.01
MAN-11-44	9	J415892	0.076	0.08
	120	J415934	0.014	0.03
MAN-11-45	3.5	J415937	0.015	-0.01
	126	J415972	-0.01	-0.01
MAN-11-46	11.4	J415975	-0.01	-0.01
	112.7	H900516	-0.01	-0.01
	219	H900559	0.001	-0.01
MAN-11-47	6.5	H900562	-0.01	-0.01
	135	H900613	-0.01	-0.01
MAN-11-48	17.5	H900616	-0.01	-0.01
	132	H900665	-0.01	-0.01

In addition, four standards were used to validate the analytical results. There are two certified standards the DC79003 and the SY-4, one standard approved, the FER-1, and one home made standard the PMRI10.

The SY-4 standard is certified by CANMET Mining and Mineral CANMET services in Ontario. It was used to check the values for P_2O_5 and TiO_2. The certified values are: 0.131% of P_2O_5 and 0.287% of TiO_2.

The values obtained with the laboratory analysis for this drilling campaign have given relative errors ranging from 1.527% and 4.580% for P_2O_5 and absolute relative errors ranging between 1.045% and 1.045% and 2.439% for TiO_2.

The other certified standard, DC 79003, is only valid for P_2O_5. It is certified by China National Analysis Center for Iron and Steel. The standard value is 6.06% for P_2O_5. The values obtained during laboratory tests showed an absolute error that varies from 4.323% to 5.033%.

The standard FER-1 is prepared by CANMET and is used as material reference by the Geological Survey of Canada. Standard values are: 2.39% P_2O_5 and 75.86% Fe_2O_3. The results obtained in laboratory tests show absolute errors ranging from 0.00% to 4.77% for Fe_2O_3 and 3.389% to 15.230% for P_2O_5.

Finally, the standard PMRI 10 is a home made standard that was made with rock from the Paul Zone stripping. It is used to check the values P_2O_5 and TiO_2. With the numbers that are available today, the average is 10.286% P_2O_5 (min: 9.175, max: 10.435) with a standard deviation of 0.134, and an average of 5.576% TiO2 (min: 5.13, max: 5.54) with a standard deviation of 0.044. Using the previous averages, the lab tests show errors ranging from 0.010 to 0.350% for P_2O_5 and 0.073 to 1.205% in TiO_2.

All results of analysis of standards and the percentage of errors in the calibration values are presented in Table 11.11 to Table 11.14 on the following pages. Samples of drill hole MAN-11-17 were reversed by the laboratory. Analyses of recovery have been made. The laboratory confirmed that the samples had been reversed and that the good results to be considered are those of the last analysis. The certificates of the first analysis and the reanalysis were provided for validation.

Moreover sample J414191 from hole MAN-11-20, supposed to be a FER-1 standard, was analyzed as a blank, error in the insertion of standard occurred. This result has been removed from the data.

Table 11.11 – Arianne SY-4 Standard check

Drill hole Name	Depth (m)	Sample Number	Standard value P_2O_5 (%)	Obtained value P_2O_5 (%)	Relative Error (%)	Standard value TiO_2 (%)	Obtained value TiO_2 (%)	Relative Error (%)
MAN-11-14	150	H855801	0.131	0.129	-1.527	0.287	0.29	1.045
MAN-11-15	0	H855837	0.131	0.126	-3.817	0.287	0.28	-2.439
MAN-11-16	0	H855916	0.131	0.126	-3.817	0.287	0.29	1.045
MAN-11-17	0	H855980	0.131	0.125	-4.580	0.287	0.28	-2.439
MAN-11-18	0	J414074	0.131	0.126	-3.817	0.287	0.28	-2.439
MAN-11-19	0	J414135	0.131	0.126	-3.817	0.287	0.28	-2.439
MAN-11-20	0	J414178	0.131	0.128	-2.290	0.287	0.28	-2.439
MAN-11-21	15	J414294	0.131	0.128	-2.290	0.287	0.28	-2.439
MAN-11-22	0	J414425	0.131	0.126	-3.817	0.287	0.28	-2.439
MAN-11-23	12	J414552	0.131	0.128	-2.290	0.287	0.29	1.045
MAN-11-24	0	J414609	0.131	0.127	-3.053	0.287	0.28	-2.439
MAN-11-25	0	J414676	0.131	0.127	-3.053	0.287	0.29	1.045

Drill hole Name	Depth (m)	Sample Number	Standard value P_2O_5 (%)	Obtained value P_2O_5 (%)	Relative Error (%)	Standard value TiO_2 (%)	Obtained value TiO_2 (%)	Relative Error (%)
MAN-11-26	0	J414709	0.131	0.127	-3.053	0.287	0.29	1.045
MAN-11-27	0	J414787	0.131	0.127	-3.053	0.287	0.28	-2.439
MAN-11-28	0	J414868	0.131	0.127	-3.053	0.287	0.28	-2.439
MAN-11-29	0	J414924	0.131	0.127	-3.053	0.287	0.29	1.045
MAN-11-30	0	J414961	0.131	0.126	-3.817	0.287	0.28	-2.439
MAN-11-31	21	J414998	0.131	0.126	-3.817	0.287	0.29	1.045
MAN-11-32	0	J415049	0.131	0.127	-3.053	0.287	0.29	1.045
MAN-11-33	0	J415089	0.131	0.126	-3.817	0.287	0.28	-2.439
MAN-11-34	0	J415120	0.131	0.126	-3.817	0.287	0.28	-2.439
MAN-11-35	0	J415193	0.131	0.127	-3.053	0.287	0.29	1.045
MAN-11-36	0	J415289	0.131	0.127	-3.053	0.287	0.29	1.045
MAN-11-37	12.3	J415379	0.131	0.128	-2.290	0.287	0.29	1.045
MAN-11-38	13	J415446	0.131	0.127	-3.053	0.287	0.28	-2.439
MAN-11-39	12.4	J415512	0.131	0.128	-2.290	0.287	0.28	-2.439
MAN-11-40	15.2	J415591	0.131	0.126	-3.817	0.287	0.28	-2.439
MAN-11-41	3.5	J415655	0.131	0.128	-2.290	0.287	0.29	1.045
MAN-11-42	0	J415741	0.131	0.127	-3.053	0.287	0.29	1.045
MAN-11-43	0	J415815	0.131	0.128	-2.290	0.287	0.29	1.045
MAN-11-44	9	J415891	0.131	0.129	-1.527	0.287	0.29	1.045
MAN-11-45	3.5	J415936	0.131	0.128	-2.290	0.287	0.28	-2.439
MAN-11-46	11.4	J415974	0.131	0.126	-3.817	0.287	0.29	1.045
MAN-11-47	6.5	H900561	0.131	0.129	-1.527	0.287	0.29	1.045
MAN-11-48	17.5	H900615	0.131	0.126	-3.817	0.287	0.29	1.045

Table 11.12 – Arianne DC79003 Standard check

Hole #	Depth m	Sample #	Standard Value P_2O_5 (%)	Obtained Value P_2O_5 (%)	Relative Error (%)
MAN-11-14	150	H855802	6.06	5.782	-4.587
MAN-11-15	0	H855838	6.06	5.798	-4.323
MAN-11-16	0	H855917	6.06	5.788	-4.488
MAN-11-17	0	H855981	6.06	5.782	-4.587
MAN-11-18	0	J414073	6.06	5.791	-4.439
MAN-11-19	0	J414134	6.06	5.782	-4.587
MAN-11-20	0	J414177	6.06	5.792	-4.422
MAN-11-21	15	J414293	6.06	5.791	-4.439
MAN-11-22	0	J414424	6.06	5.781	-4.604
MAN-11-23	12	J414551	6.06	5.791	-4.439
MAN-11-24	0	J414608	6.06	5.786	-4.521
MAN-11-25	0	J414675	6.06	5.789	-4.472
MAN-11-26	0	J414708	6.06	5.791	-4.439
MAN-11-27	0	J414786	6.06	5.785	-4.538
MAN-11-28	0	J414867	6.06	5.762	-4.917
MAN-11-29	0	J414923	6.06	5.772	-4.752
MAN-11-30	0	J414960	6.06	5.791	-4.439
MAN-11-31	21	J414997	6.06	5.792	-4.422
MAN-11-32	0	J415048	6.06	5.773	-4.736
MAN-11-33	0	J415088	6.06	5.782	-4.587
MAN-11-34	0	J415119	6.06	5.791	-4.439
MAN-11-35	0	J415192	6.06	5.763	-4.901
MAN-11-36	0	J415288	6.06	5.783	-4.571
MAN-11-37	12.3	J415378	6.06	5.76	-4.950
MAN-11-38	13	J415445	6.06	5.771	-4.769
MAN-11-39	12.4	J415511	6.06	5.78	-4.620
MAN-11-40	15.2	J415590	6.06	5.772	-4.752
MAN-11-41	3.5	J415654	6.06	5.771	-4.769
MAN-11-42	0	J415740	6.06	5.798	-4.323
MAN-11-43	0	J415814	6.06	5.78	-4.620
MAN-11-44	9	J415890	6.06	5.769	-4.802
MAN-11-46	11.4	J415973	6.06	5.815	-4.043
MAN-11-47	6.5	H900560	6.06	5.765	-4.868
MAN-11-48	17.5	H900614	6.06	5.755	-5.033

Table 11.13- Arianne FER-1 Standard check

Drill hole Name	Depth (m)	Sample Number	Standard value P_2O_5 (%)	Obtained value P_2O_5 (%)	Relative Error (%)	Standard value TiO_2 (%)	Obtained valueTiO_2 (%)	Relative Error (%)
MAN-11-14	217	H855830	75.86	75.75	-0.15	2.39	2.251	-5.816
MAN-11-15	96	H855866	75.86	75.85	-0.01	2.39	2.261	-5.397
	189	H855900	75.86	75.85	-0.01	2.39	2.261	-5.397
MAN-11-16	78	H855947	75.86	75.75	-0.15	2.39	2.261	-5.397
MAN-11-17	87	J414007	75.86	76.08	0.29	2.39	2.262	-5.356
	183	J414046	75.86	75.89	0.04	2.39	2.28	-4.603
MAN-11-18	69.5	J414099	75.86	75.61	-0.33	2.39	2.253	-5.732
MAN-11-19	78.65	J414160	75.86	75.55	-0.41	2.39	2.251	-5.816
MAN-11-20	249	J414244	75.86	75.6	-0.34	2.39	2.251	-5.816
	333	J414283	75.86	75.42	-0.58	2.39	2.26	-5.439
MAN-11-21	72	J414319	75.86	75.47	-0.51	2.39	2.264	-5.272
	156	J414355	75.86	75.49	-0.49	2.39	2.251	-5.816
MAN-11-22	100.1	J414452	75.86	75.55	-0.41	2.39	2.252	-5.774
	198	J414491	75.86	75.55	-0.41	2.39	2.261	-5.397
	312	J414528	75.86	75.58	-0.37	2.39	2.261	-5.397
MAN-11-23	69	J414578	75.86	75.75	-0.15	2.39	2.251	-5.816
MAN-11-24	78	J414635	75.86	75.7	-0.21	2.39	2.251	-5.816
MAN-11-25	81.1	J414702	75.86	75.85	-0.01	2.39	2.251	-5.816
MAN-11-26	93	J414736	75.86	75.58	-0.37	2.39	2.261	-5.397
	156	J414760	75.86	75.75	-0.15	2.39	2.251	-5.816
MAN-11-27	94.65	J414813	75.86	75.72	-0.18	2.39	2.261	-5.397
	184.6	J414851	75.86	75.59	-0.36	2.39	2.242	-6.192
MAN-11-28	72.2	J414894	75.86	75.84	-0.03	2.39	2.251	-5.816
MAN-11-30	81	J414988	75.86	75.51	-0.46	2.39	2.251	-5.816
MAN-11-31	90	J415028	75.86	75.72	-0.18	2.39	2.251	-5.816
MAN-11-32	87	J415075	75.86	75.53	-0.44	2.39	2.261	-5.397
MAN-11-33	150	J415114	75.86	75.65	-0.28	2.39	2.251	-5.816
MAN-11-34	84	J415146	75.86	75.55	-0.41	2.39	2.251	-5.816
	186	J415184	75.86	75.58	-0.37	2.39	2.246	-6.025
MAN-11-35	75	J415220	75.86	75.75	-0.15	2.39	2.209	-7.573
	152	J415258	75.86	75.84	-0.03	2.39	2.269	-5.063
MAN-11-36	84	J415316	75.86	75.94	0.11	2.39	2.294	-4.017
	178.5	J415355	75.86	75.61	-0.33	2.39	2.218	-7.197

Drill hole Name	Depth (m)	Sample Number	Standard value P_2O_5 (%)	Obtained value P_2O_5 (%)	Relative Error (%)	Standard value TiO_2 (%)	Obtained value TiO_2 (%)	Relative Error (%)
MAN-11-37	71.6	J415405	75.86	75.58	-0.37	2.39	2.291	-4.142
MAN-11-38	78	J415475	75.86	75.83	-0.04	2.39	2.258	-5.523
MAN-11-39	87.5	J415540	75.86	75.29	-0.75	2.39	2.234	-6.527
	183	J415579	75.86	75.97	0.15	2.39	2.245	-6.067
MAN-11-40	69	J415617	75.86	75.95	0.12	2.39	2.245	-6.067
MAN-11-41	68.6	J415684	75.86	75.9	0.05	2.39	2.238	-6.360
	168	J415725	75.86	75.79	-0.09	2.39	2.239	-6.318
MAN-11-43	177.3	J415878	75.86	75.82	-0.05	2.39	2.25	-5.858
MAN-11-44	96	J415921	75.86	79.48	4.77	2.39	2.026	-15.230
MAN-11-45	91	J415964	75.86	75.74	-0.16	2.39	2.27	-5.021
MAN-11-46	84	H900503	75.86	75.58	-0.37	2.39	2.223	-6.987
	180	H900543	75.86	75.71	-0.20	2.39	2.309	-3.389
MAN-11-47	81.3	H900590	75.86	75.86	0.00	2.39	2.244	-6.109
MAN-11-48	80	H900643	75.86	76	0.18	2.39	2.229	-6.736

Table 11.14 – Arianne PMRI10 Standard check

Hole #	Depth (m)	Sample #	Value standard P_2O_5 (%)	Value obtained P_2O_5 (%)	Relative error (%)	Value standard TiO_2 (%)	Value obtained TiO_2 (%)	Relative error (%)
MAN-11-14	186	H855817	10.286	10.302	0.156	5.476	5.47	-0.110
MAN-11-15	49.2	H855853	10.286	10.32	0.331	5.476	5.5	0.438
	153	H855889	10.286	10.3	0.136	5.476	5.5	0.438
MAN-11-16	48	H855932	10.286	10.31	0.233	5.476	5.47	-0.110
	147	H855973	10.286	10.31	0.233	5.476	5.48	0.073
MAN-11-17	48	H855995	10.286	10.294	0.078	5.476	5.42	-1.023
	153.2	J414033	10.286	10.282	-0.039	5.476	5.41	-1.205
MAN-11-18	51	J414088	10.286	10.31	0.233	5.476	5.48	0.073
	139	J414125	10.286	10.321	0.340	5.476	5.47	-0.110
MAN-11-19	48	J414148	10.286	10.312	0.253	5.476	5.49	0.256
MAN-11-20	141	J414205	10.286	10.312	0.253	5.476	5.46	-0.292
	210	J414230	10.286	10.321	0.340	5.476	5.48	0.073
	309	J414270	10.286	10.295	0.087	5.476	5.49	0.256
MAN-11-21	42.2	J414307	10.286	10.31	0.233	5.476	5.5	0.438

Hole #	Depth (m)	Sample #	Value standard P_2O_5 (%)	Value obtained P_2O_5 (%)	Relative error (%)	Value standard TiO_2 (%)	Value obtained TiO_2 (%)	Relative error (%)
	126	J414343	10.286	10.316	0.292	5.476	5.48	0.073
	208.65	J414378	10.286	10.321	0.340	5.476	5.49	0.256
	281	J414414	10.286	10.294	0.078	5.476	5.46	-0.292
MAN-11-22	59.3	J414439	10.286	10.31	0.233	5.476	5.5	0.438
	168.5	J414478	10.286	10.31	0.233	5.476	5.49	0.256
	267	J414516	10.286	10.31	0.233	5.476	5.46	-0.292
MAN-11-23	42	J414566	10.286	10.31	0.233	5.476	5.5	0.438
MAN-11-24	45	J414623	10.286	10.311	0.243	5.476	5.47	-0.110
	143	J414662	10.286	10.283	-0.029	5.476	5.47	-0.110
MAN-11-25	51	J414690	10.286	10.281	-0.049	5.476	5.47	-0.110
MAN-11-26	57	J414722	10.286	10.301	0.146	5.476	5.46	-0.292
	195.1	J414774	10.286	10.281	-0.049	5.476	5.49	0.256
MAN-11-27	60	J414800	10.286	10.31	0.233	5.476	5.47	-0.110
	153	J414838	10.286	10.281	-0.049	5.476	5.54	1.169
MAN-11-28	42	J414882	10.286	10.31	0.233	5.476	5.5	0.438
	135.2	J414919	10.286	10.31	0.233	5.476	5.51	0.621
MAN-11-29	53.2	J414938	10.286	10.274	-0.117	5.476	5.47	-0.110
MAN-11-30	54	J414976	10.286	10.302	0.156	5.476	5.49	0.256
MAN-11-31	60	J415015	10.286	10.301	0.146	5.476	5.49	0.256
MAN-11-32	57	J415062	10.286	10.3	0.136	5.476	5.46	-0.292
MAN-11-33	85.2	J415102	10.286	10.321	0.340	5.476	5.5	0.438
MAN-11-34	51	J415134	10.286	10.312	0.253	5.476	5.48	0.073
	153	J415172	10.286	10.292	0.058	5.476	5.47	-0.110
MAN-11-35	45	J415207	10.286	10.355	0.671	5.476	5.44	-0.657
	128	J415245	10.286	10.258	-0.272	5.476	5.42	-1.023
	213	J415283	10.286	10.273	-0.126	5.476	5.47	-0.110
MAN-11-36	54	J415303	10.286	10.281	-0.049	5.476	5.49	0.256
	151.1	J415343	10.286	10.289	0.029	5.476	5.49	0.256
MAN-11-37	43.8	J415392	10.286	10.285	-0.010	5.476	5.48	0.073
	130.5	J415431	10.286	10.28	-0.058	5.476	5.49	0.256
MAN-11-38	48	J415461	10.286	10.292	0.058	5.476	5.47	-0.110
	148.3	J415500	10.286	10.28	-0.058	5.476	5.49	0.256
MAN-11-39	51	J415527	10.286	10.292	0.058	5.476	5.49	0.256

Hole #	Depth (m)	Sample #	Value standard P_2O_5 (%)	Value obtained P_2O_5 (%)	Relative error (%)	Value standard TiO_2 (%)	Value obtained TiO_2 (%)	Relative error (%)
	152.4	J415566	10.286	10.29	0.039	5.476	5.49	0.256
MAN-11-40	42	J415604	10.286	10.282	-0.039	5.476	5.47	-0.110
	126	J415641	10.286	10.274	-0.117	5.476	5.49	0.256
MAN-11-41	36.4	J415670	10.286	10.283	-0.029	5.476	5.5	0.438
	134	J415712	10.286	10.25	-0.350	5.476	5.48	0.073
MAN-11-43	34.2	J415828	10.286	10.296	0.097	5.476	5.49	0.256
	148	J415866	10.286	10.291	0.049	5.476	5.49	0.256
MAN-11-44	58.5	J415907	10.286	10.279	-0.068	5.476	5.48	0.073
MAN-11-45	58.5	J415951	10.286	10.297	0.107	5.476	5.48	0.073
MAN-11-46	56	J415990	10.286	10.295	0.087	5.476	5.49	0.256
	144.9	H900530	10.286	10.272	-0.136	5.476	5.47	-0.110
MAN-11-47	37.5	H900576	10.286	10.3	0.136	5.476	5.46	-0.292
	117	H900605	10.286	10.285	-0.010	5.476	5.48	0.073
MAN-11-48	51.9	H900630	10.286	10.287	0.010	5.476	5.48	0.073
	103.5	H900653	10.286	10.284	-0.019	5.476	5.49	0.256

11.3.3 Reliability of results

Arianne has made the appropriate effort to control the quality of data and analytical results reported by ALS laboratory. Controlled deficiencies were addressed and corrected. It is the author's opinion, the data use is reliable for the estimation of resources.

11.4 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. ALS Chemex and Arianne Resources geologists and professional team have a good reputation for their standard work.

12.0 DATA VERIFICATION

The author has verified the database assay table against the 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, holes 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 by the author, Claude Duplessis QP. He supervised the preparation and sampling protocol and participated to the sample bags sealing and sent them to the SGS Lakefield laboratory facilities.

No field duplicate was done by the author. SGS check samples for this resource update have been done on ¼ witness core, pulp and "crushed'' samples.

12.1 Independent sampling – personal inspection

The author visited the site and the property in February from the 14 to the 17, 2011. The workers live at the Chute des Passes permanent camp during exploration campaigns. Arianne has installed (Logging and splitting). The drill cores are cross piles on wood palette and were in process to be placed into the core rack behind the office (pictures below). The site is constantly monitored.

Drill sites are identified by wooden stick with a number. The author was able to locate the drill holes and verify their location using a hand held GPS. The holes that were visited had a GPS position consistent with that recorded in the database. SGS is satisfied with evidence of exploration on the site and has no reason to doubt the authenticity of boreholes. Pictures taken during personal inspection with Arianne exploration staff present outside core review set-up (with hole MAN-11-20), core logging and splitting.

Photo 12.1 – Core logging and splitting

Core rack in core logging facility

Core splitting in action

Photo 12.2 – Box opening and review prior to being logged

The personal inspection is positive; sites were clean and well maintained, organization and work process was up to standard and best practices. The site visit took place this way. On Monday 14, traveling from Blainville to Saguenay with a meeting at IOS laboratory facilities for the presentation of the sample reduction procedures. On Tuesday morning, meeting at Arianne's office and traveling to Chute des passes. Site visit at drill site at Manouane zone. Quick review of core at mobile core shack installations. On Wednesday, core inspection and selection of samples for independent sampling, two holes were sampled. Return to Saguenay and meeting at Arianne's office. Thursday, return from Saguenay to Blainville.

The author had already extensively sampled and controlled previous drilling campaigns, work focused on new drilling samples. Core witness samples were taken directly while sub samples from IOS storage were prepared according to author instruction and sent to SGS Blainville.

Samples were put in plastic bags with sample tag identification and sealed with a tie-wrap. The samples in plastic bags were 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 in Blainville. The samples were wrapped and shipped to SGS Laboratory by a commercial carrier. Core samples from MAN-11-18 and 19 were taken on site. From IOS storage from hole MAN 22. A split samples of 1 kg after crushing for MAN-11-22 and the associated 250 grams.

Table 12.1 – List of samples for verification of reduction process

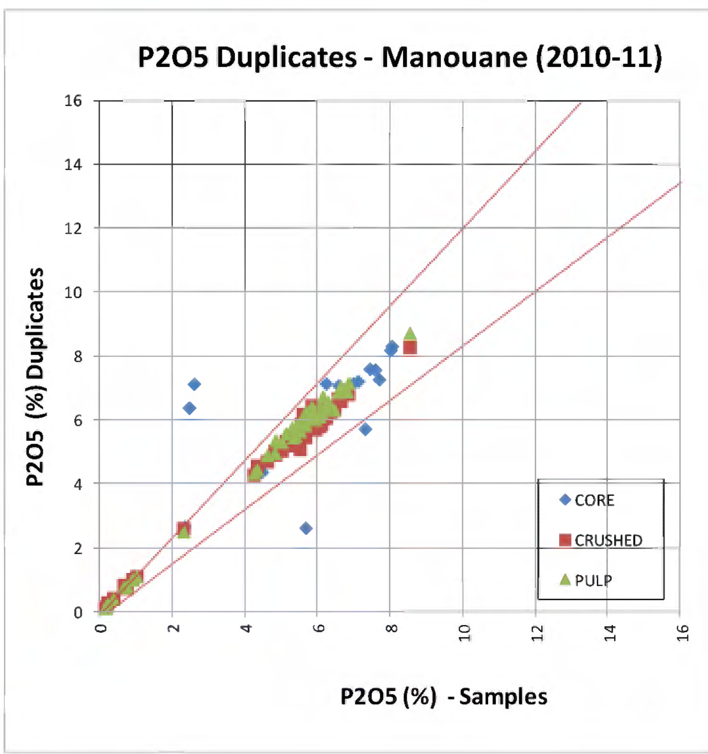
Échantill	numéro attr	Trou	1000 g concassé
J414424	19710958	MAN-11-22	Standard DC79003
J414425	19710957	MAN-11-22	Standard SY-4
J414426	19710956	MAN-11-22	blanc
J414464	19710955	MAN-11-22	876
J414465	19710954	MAN-11-22	Blanc 930
J414466	19710953	MAN-11-22	1275
J414467	19710952	MAN-11-22	1138
J414468	19710951	MAN-11-22	1031
J414469	19710950	MAN-11-22	1023
J414470	19710949	MAN-11-22	1125
J414471	19710948	MAN-11-22	1298
J414472	19710947	MAN-11-22	1160
J414473	19710946	MAN-11-22	1463
J414474	19710945	MAN-11-22	1004
J414475	19710944	MAN-11-22	1061
J414476	19710943	MAN-11-22	1023
J414477	19710942	MAN-11-22	1216
J414478	19710941	MAN-11-22	Standard PMRI10
J414479	19710940	MAN-11-22	979
J414480	19710939	MAN-11-22	1428
J414481	19710938	MAN-11-22	1205
J414482	19710937	MAN-11-22	1202
J414483	19710936	MAN-11-22	1212
J414484	19710935	MAN-11-22	1294
J414485	19710934	MAN-11-22	1140
J414486	19710933	MAN-11-22	1459
J414487	19710932	MAN-11-22	952
J414488	19710931	MAN-11-22	942
J414489	19710930	MAN-11-22	1375
J414490	19710929	MAN-11-22	1126
J414491	19710928	MAN-11-22	Standard FER-1
J414492	19710927	MAN-11-22	1014
J414493	19710926	MAN-11-22	1469
J414494	19710925	MAN-11-22	1012
J414495	19710924	MAN-11-22	954
J414496	19710923	MAN-11-22	1070
J414497	19710922	MAN-11-22	1005
J414498	19710921	MAN-11-22	1066
J414499	19710920	MAN-11-22	952
J414500	19710919	MAN-11-22	983
J414501	19710918	MAN-11-22	1053
J414502	19710917	MAN-11-22	1316
J414503	19710916	MAN-11-22	1122
J414504	19710915	MAN-11-22	Blanc 1189
J414505	19710914	MAN-11-22	1026
J414506	19710913	MAN-11-22	1005
J414507	19710912	MAN-11-22	955
J414508	19710911	MAN-11-22	1024
J414509	19710910	MAN-11-22	1041
J414510	19710909	MAN-11-22	1019
J414511	19710908	MAN-11-22	1180
J414512	19710907	MAN-11-22	1372
J414513	19710906	MAN-11-22	1024
J414514	19710905	MAN-11-22	1289
J414515	19710904	MAN-11-22	1015
J414516	19710903	MAN-11-22	Standard PMRI10
J414517	19710902	MAN-11-22	1172
J414518	19710901	MAN-11-22	860
J414541	19710900	MAN-11-22	Blanc

Échantillon	Trou	250 g pulvérisé
J414424	MAN-11-22	Standard DC79003
J414425	MAN-11-22	Standard SY-4
J414426	MAN-11-22	blanc
J414464	MAN-11-22	228.6
J414465	MAN-11-22	Blanc 216,4
J414466	MAN-11-22	226.4
J414467	MAN-11-22	229.0
J414468	MAN-11-22	229.4
J414469	MAN-11-22	245.0
J414470	MAN-11-22	240.0
J414471	MAN-11-22	250.2
J414472	MAN-11-22	245.8
J414473	MAN-11-22	224.6
J414474	MAN-11-22	214.0
J414475	MAN-11-22	216.0
J414476	MAN-11-22	233.3
J414477	MAN-11-22	226.0
J414478	MAN-11-22	Standard PMRI10
J414479	MAN-11-22	223.2
J414480	MAN-11-22	246.8
J414481	MAN-11-22	248.5
J414482	MAN-11-22	223.8
J414483	MAN-11-22	221.3
J414484	MAN-11-22	246.5
J414485	MAN-11-22	236.3
J414486	MAN-11-22	225.9
J414487	MAN-11-22	246.5
J414488	MAN-11-22	236.6
J414489	MAN-11-22	230.0
J414490	MAN-11-22	222.2
J414491	MAN-11-22	Standard FER-1
J414492	MAN-11-22	233.9
J414493	MAN-11-22	211.6
J414494	MAN-11-22	244.8
J414495	MAN-11-22	213.6
J414496	MAN-11-22	211.5
J414497	MAN-11-22	220.9
J414498	MAN-11-22	240.5
J414499	MAN-11-22	237.4
J414500	MAN-11-22	219.8
J414501	MAN-11-22	223.6
J414502	MAN-11-22	245.4
J414503	MAN-11-22	252.3
J414504	MAN-11-22	239.9
J414505	MAN-11-22	Blanc 211,5
J414506	MAN-11-22	229.5
J414507	MAN-11-22	222.2
J414508	MAN-11-22	238.7
J414509	MAN-11-22	237.5
J414510	MAN-11-22	249.4
J414511	MAN-11-22	224.1
J414512	MAN-11-22	232.0
J414513	MAN-11-22	222.1
J414514	MAN-11-22	219.8
J414515	MAN-11-22	228.8
J414516	MAN-11-22	Standard PMRI10
J414517	MAN-11-22	223.3
J414518	MAN-11-22	230.8
J414541	MAN-11-22	Blanc

Table 12.2 – List of samples for verification witness quarter core

		SGS data		Ressources Ariannes Data				
Sample #	Type	TiO2	P2O5	NomSondage	NuEchantillon	TiO2	P2O5	
15451	Core	10.8	5.99	MAN-11-18	J414089	10.78	5.68	CORE
15452	Core	10.7	7.57	MAN-11-18	J414090	10.79	7.58	
15453	Core	8.54	6.43	MAN-11-18	J414091	8.55	6.33	
15454	Core	10.9	7.6	MAN-11-18	J414092	10.57	7.44	
15455	Core	9.87	7.15	MAN-11-18	J414093	9.91	6.97	
15456	Core	4.81	4.37	MAN-11-18	J414094	5.23	4.46	
15457	Core	11.1	8.31	MAN-11-18	J414095	11.7	8.04	
15458	Core	11	7.21	MAN-11-18	J414101	11.35	7.11	
15459	Core	9.76	8.19	MAN-11-18	J414102	10.34	8.00	
15460	Core	9.55	7.27	MAN-11-18	J414103	10.23	7.69	
15462	Core	9.94	6.38	MAN-11-19	J414163	4.04	2.46	
15463	Core	9.73	7.14	MAN-11-19	J414164	9.85	6.23	
15464	Core	9.33	6.65	MAN-11-19	J414165	9.9	6.56	
15465	Core	8.7	6.66	MAN-11-19	J414166	9.89	6.65	
15466	Core	10.5	6.81	MAN-11-19	J414167	9.38	6.79	
15467	Core	10.3	7.08	MAN-11-19	J414168	11.12	6.58	
15468	Core	10.5	5.72	MAN-11-19	J414169	11.52	7.30	
15469	Core	4.97	2.62	MAN-11-19	J414170	11.71	5.67	
15470	Core	4.93	2.66	MAN-11-19	J414171	5.69	2.34	
15471	Core	10.4	7.13	MAN-11-19	J414172	5.14	2.60	

Figure 12.1 – Correlation graph between original data and control data

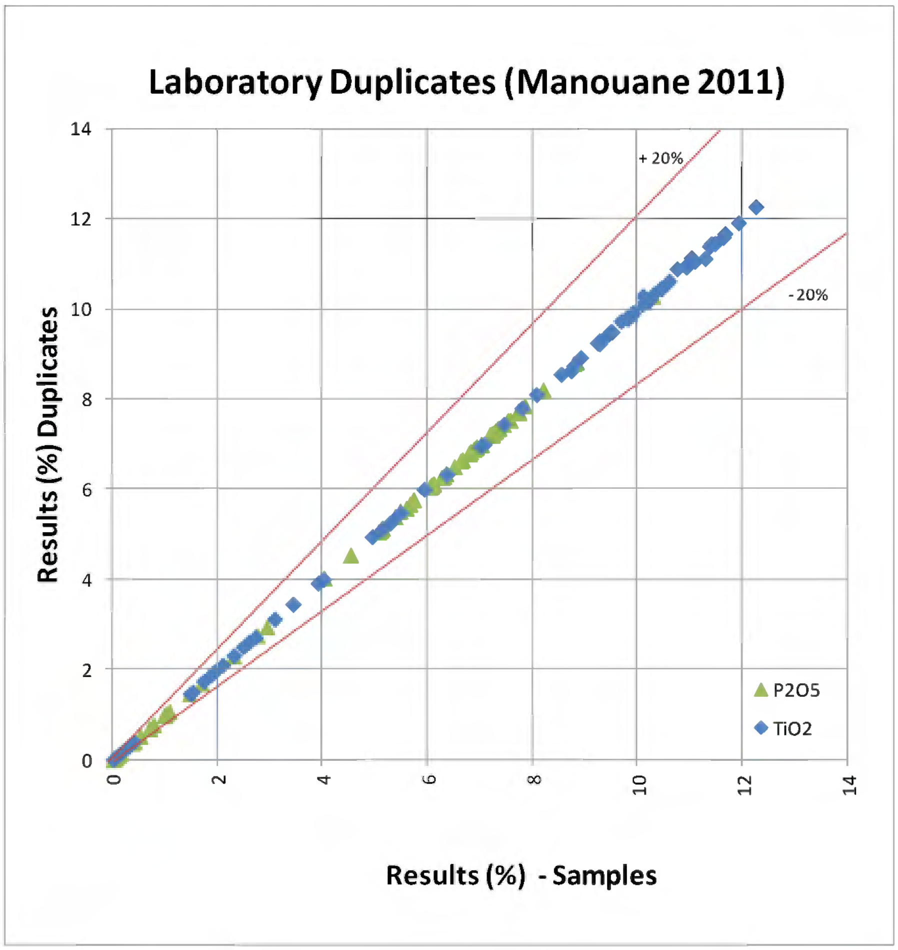


The crushing and reduction stage at IOS facilities does not create a biais. The samples ½ core vs. ¼ core samples show discrepancies. In author opinion with this limited amount of samples we can not say there is a problem. The discrepancy may come from different sample size or a physical error in sampling by the author. The sign-test is OK. The control data done by the author with the core, crushed material and pulp show that results in the database are reproducible and reliable for resources.

12.2 Pulp duplicate verification

Laboratory duplicates have been verified by SGS personnel under author supervision. Results for P_2O_5 and TiO_2 were reviewed. The analysis of the pulps are reliable and repeatable as shown in the following graphics for Manouane and Paul.

Figure 12.2- Correlation graph between original data and lab duplicate (Manouane P_2O_5)



13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 Introduction

Preliminary metallurgical investigation for the Lac à Paul deposit was first carried out in 2008 by SGS[1]. More recently COREM was mandated with the following tasks to be completed on samples from the Lac à Paul's apatite deposits:

Paul zone

- Task 1: Sample preparation;
- Task 2: Ore characterization & variability;
- Task 3: Mineralogical analysis;
- Task 4: Magnetite removal;
- Task 5: Laboratory bench scale flotation;
- Task 6: Pilot testing.

Paul zone and Manouane zone

Additional grinding and flotation test work on three samples from Paul zone and Manouane zone were tested at the bench scale. The objective was to test recovery of Paul zone at a lower grade and obtain preliminary indications for the Manouane zone.

The tasks were to be done in conjunction with the generation of apatite concentrate for the Paul zone. COREM was also to test the effect of inserting magnetic separation at either the grind mill discharge or the discharge of the flotation concentrate.

13.2 Previous Testwork Summary

The main objective of SGS's 2008 metallurgical test program was to assess the concentrate quality of the apatite. Some results are referenced in Section 13.3.

SGS Lakefield's report was first referenced in a previous NI 43-101 Technical Report and the complete testwork report can be found in Appendix 1 of the SGS Geostat Ltd report entitled: "Technical Report Phosphate and Titanium resource estimation of the Lac à Paul property deposit, dated May 8, 2009".

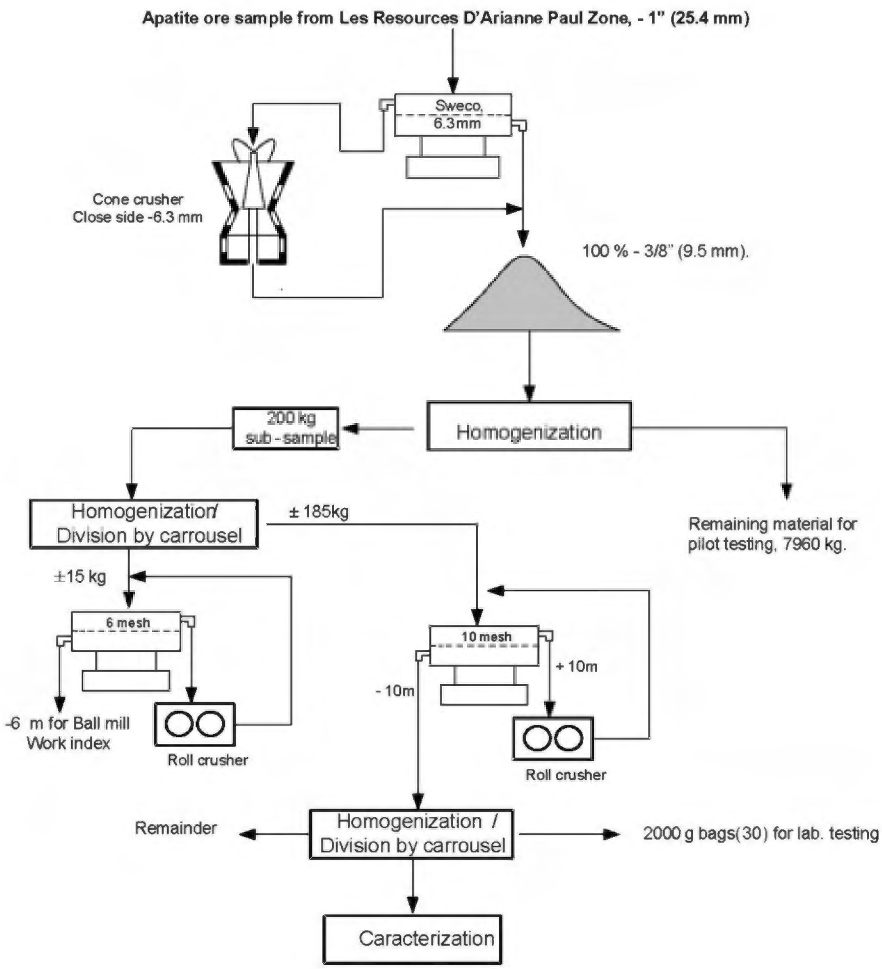
13.3 Testwork Update and Results

13.3.1 Sample Preparation

Of the original Paul zone's 8,160 kg sample, 7,960 kg was set aside for the pilot plant, 15 kg was used for ball mill Work index testing, 60 kg was separated into 2 kg bags for lab testing and the remaining 125 kg was kept for characterization and/or kept aside.

[1] SGS Lakefield Research Limited, An Investigation into Metallurgical Testing on the Lac à Paul Apatite Deposit prepared for Ressources d'Arianne, Project 12057-001 – Final Report, February 24, 2009.

Figure 13.1 – Diagram of T1225 sample preparation



13.3.2 Ore characterization and Variability

The size distribution of the -1.7 mm material was measured along with a size-by-size assay. It was seen that P_2O_5 tends to concentrate in the finer size fractions as opposed to its main gangue component SiO_2, which reports a higher grade in the coarser size fractions. This indicates that P_2O_5 is reduced in size preferentially than its harder gangue components.

Table 13.1 shows the material properties of the -1.7 mm material.

Table 13.1 – Material characterization for the -1.7 mm material

Bulk Density of the -1.7 mm material	1.96 g/cm^3
Specific gravity of the -1.7 mm material	3.42
Head Grade (P_2O_5)	7.93
Head Grade (TiO_2)	7.29

13.3.3 Work Index Determination

Bond Ball & Rod mill work index testing and crushing work index were performed on drill cores with different apatite grades from different location within the deposit (low, medium and high at 3.9, 7.21 and 10.4 % P_2O_5 respectfully) as well as a sample with a high ilmenite grade but low apatite grade (0.46 % P_2O_5 and 9.93 % TiO_2). There is a direct link between apatite grade with low, medium and high grades reporting Ball mill work indexes of 14.80, 11.60 and 10.30 kWh/tonne respectfully. The same relation apply for Rod mill and crushing work index. The bulk sample used in the pilot plant had a similar grade to the medium (7.8% P_2O_5) and had a similar work index of 12.27 kWh/tonne. These results demonstrate how apatite is much more amenable to grinding then the other mineral components. This coincides with the mineralogical analysis which showed the size distribution of the apatite was finer than the entire sample size distribution.

Table 13.2 – Results of Work Index determination tests

Sample	Drill #	Comments	Gross weight (kg)	WI (kwh/t)			Grade	
				Ball Mill	Rod Mill	Crush.	P_2O_5 (%)	TiO_2 (%)
#1	PAU 10-34 (10.06 m to 35.7 m and 41.7 m to 54 m)	Ilmenite zone	79	13.9	10.70	6.18	0.46	9.93
#2	PAU 10-46 (120.5 m to 157.4 m)	High P_2O_5	83	10.30	7.5	4.69	10.4	9.6
#3	PAU 10-46 (15.8 m to 66 m)	Low P_2O_5	85	14.80	11.8	6.13	3.9	4.2
#4	PAU 10-33 (148 m to 182 m)	Medium P_2O_5	83	11.60	6.00	-	7.21	10.88
Bulk Paul	Sample for T1225 bench and pilot testing	7.8% P_2O_5	7900	12.27	-	-		

JK drop weight test and JKSimmet interpretation was done on two samples from Paul deposit. One sample had a low content of P_2O_5 and the other one had a high content of P_2O_5. See results in Table 13.3 below.

Table 13.3 – SAG impact parameters

Sample	Type of try	A	b	A·b	Classification
PAU-10-46 (Low P_2O_5)	Partial*	75.57	0.98	74.13	Soft
PAU-10-46 (High P_2O_5)	Partial*	73.82	0.87	64.22	Relatively soft

13.3.4 Mineralogical analysis

A mineralogical analysis was performed. Apatite was measured at 18% w/w, the main gangue minerals are the ferrous: magnetite (12.2% w/w); ilmenite (14.0% w/w); pyroxene (15.1 % w/w); and the micas: chlorite (14.7% w/w) and phlogopite (6.2 % w/w). No Rare Earth Element (RRE) bearing minerals were indicated in the analysis.

The sample submitted for analysis was highly liberated (> 95%). Preliminary observations place the liberation of apatite around -150 µm to +75 µm. Apatite is seen to have an association with ilmenite, which contaminates the apatite as globular inclusions.

13.3.5 Magnetite Removal

Magnetic separation was applied pre-flotation via a hand magnet. The removal of ferrous bearing minerals was promising with the grade of the magnetic concentrate ranging from 64.5 to 72.1% and a recovery of 24.3 to 27.6 %. There were minimal losses to overall apatite recovery as the amount of apatite in magnetic concentrate ranged from 1.7 to 3.3% w/w of the plant feed apatite. The mass split of the test material that reported to magnetic separation concentrate ranged from 9.0 to 11.3 % w/w. Overall; the magnetic separation achieved prior to flotation was not changed with a grind time greater than 16.5 minutes.

13.3.6 Laboratory bench scale flotation

The following bench scale flotation conditions were varied to search for optimized testing conditions:

- Rougher Flotation Time;
- Na_2SiO_3 dosage in Rougher/Scavenger;
- Na_2SiO_3 and WW82 dosages in 1st cleaner;
- Percent solids on apatite flotation performance;
- Effect of pH on rougher-scavenger performance;
- Optimized bench open circuit test;
- Locked cycle bench test.

Rougher flotation time was tested for 7 values and COREM chose 4 minutes suitable retention time for roughers.

The depressant for silicates and aluminates (sodium silicate or Na_2SiO_3) had its dosage varied in the rougher and the scavenger in order to improve concentrate grade. The dosage of 200/70 and 400/130 g/tonne (rougher dosage/scavenger dosage) improved the grade (21.40 and 24.43 % respectfully) without sacrificing recovery (96.2% in both tests).

Concentrations of the silicates/aluminates depressant (sodium silicate or Na_2SiO_3) and the iron depressant (caustic starch or WW82) were varied in the 1st cleaner in order to improve concentrate grade. COREM chose 1st cleaner concentration ranges of 400-450 g/tonne Na_2SiO_3 and 100 to 150 g/tonne WW82.

The effect of conditioning percent solids on flotation response was investigated with two tests. The higher pulp density conditioning resulted in better recoveries for the rougher/scavenger. COREM recommended higher pulp density for flotation feed conditioning.

The pH for the rougher – scavenger was tested at 9.5, 10.0, 10.5 and 11.0. Results show higher grades and recoveries for pH values 10.5 and 11.0. Grade dropped from 31.9 to 18.0 % with the corresponding pH values of 10.5 to 10.0 respectfully.

Open circuit tests were performed using conditions determined by COREM to be optimum for both grade and recovery of apatite. Table 13.4 describes the reagent consumption used for Test 7.1. The objective of grade and recovery (>38% and >90% respectfully) were met with cleaner 2 concentrate reporting a recovery of 83.63% and a grade of 40.20%.

Table 13.4 – Optimized reagent consumption for open circuit flotation test 7.1

Operation	Na_2SiO_3 (g/tonne)	WW82 (g/tonne)	Liacid 1800 (g/tonne)
Rougher	360	270	108
Scavenger	118	0	45
Cleaner 1	450	135	0
Cleaner 2	180	0	0

In order to estimate the effect of recirculation on the circuit, a 7 cycle locked-cycle test was performed. The tails from the 1st cleaner reported to the rougher while tails from the 2nd cleaner reported back to the 1st cleaner feed. Reagent dosages were adjusted twice, once at the start of the 2nd cycle and again at the start 5th cycle. Table 13.5 shows the reagent scheme adopted at the start of the 5th cycle.

Table 13.5 – Reagent consumption used for the locked cycle flotation test

Operation	Na_2SiO_3 (g/tonne)	WW82 (g/tonne)	Liacid 1800 (g/tonne)
Rougher	180	180	100
Scavenger	50	0	50
Cleaner 1	125	65	0
Cleaner 2	50	0	0

The depressant consumptions (Na_2SiO_3 and WW82) were significantly reduced for the locked cycle test.

Concentrate grade and recovery of the 2nd cleaner concentrate for the last 3 cycles (cycle 5, 6 and 7) are listed in Table 13.6. The fact that both grade and recovery are changing in a continuous direction indicates that steady state had not been achieved for the system and that further cycles were required.

However, as for the bench test, the objective of grade and recovery (>38% and >90% respectfully) was met with the locked cycle test.

Table 13.6 – Locked cycle results of the last three cycles (cleaner 2 concentrate)

Cycle	P_2O_5 grade (%)	Recovery (%)
Cycle 5	39.4	75.2
Cycle 6	38.6	81.4
Cycle 7	38.5	94.2

13.3.7 Pilot testing

Pilot plant testing for producing apatite concentrate was broken into two separate plants: grinding with magnetic separation and apatite flotation. The main objective was to produce as much qualified apatite concentrate as possible.

a) Grinding – magnetic separation

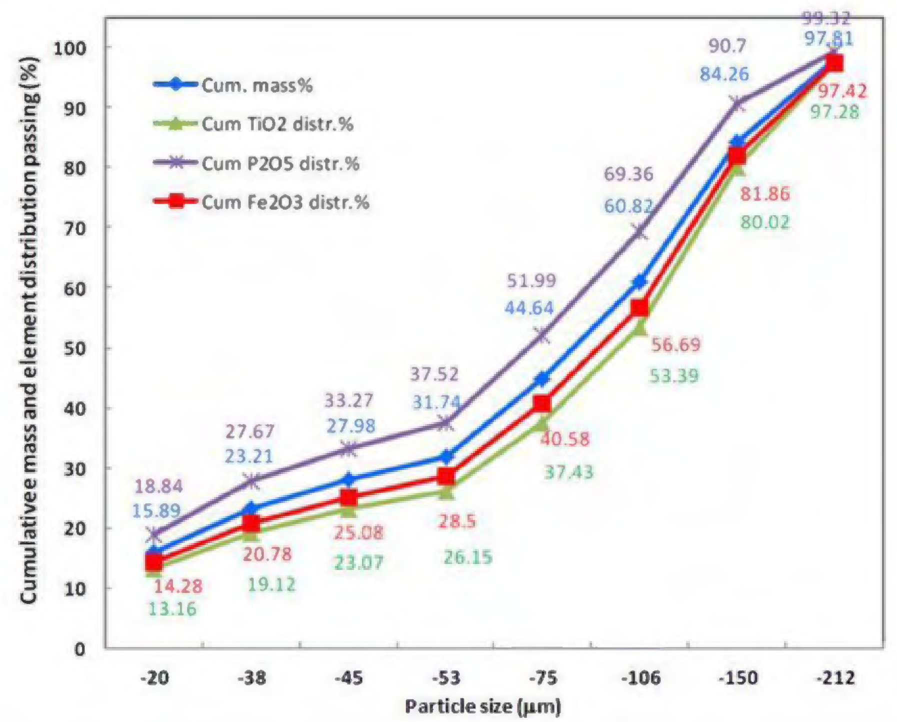
A ball mill is fed with a P_{80} feed of 3.9 mm. The discharge is fed to a multi-feed derrick screen (with a screen opening of 212 µm). Screen undersize is fed to a light intensity drum magnet. The non-magnetic fraction was dried and homogenized and separated in small samples and fed to the apatite flotation circuit. The final grinding-magnetic circuit product size target was a P_{80} of 146 µm.

b) Grinding feed rate

Four grinding feed rates were tested. When the different grinding products were combined, the composite P_{80} was measured to be 138 µm (a much finer distribution then the 146 µm goal).

Figure 13.2 shows how when the sample is ground to a distribution, the apatite mineral has a finer distribution (the curve lies above the cum. mass % curve). Therefore, when the sample is ground too fine, the apatite is ground to an even greater degree. Minerals that are too finely ground will not be recovered easily during flotation of oxide without having an impact on concentrate grade and can result in poor flotation results.

Figure 13.2 – Size Distribution Results



c) Optimization of magnetite removal

Two light intensity magnetic drums were used. The first drum was set to a field intensity of 1000 Gauss was a rougher, while the second, with a field intensity of 800 gauss, served as the cleaner. It was found that approximately 10% of the feed mass reported to the magnetic concentrate. It was found that 1.6% of the apatite mass was lost to the magnetic fraction. The magnetite was seen to be very fine <50µm and therefore not fully liberated, leading impurities in the magnetic concentrate.

d) Apatite flotation

Circuit setup was adjusted during the pilot plant. The changes were:

- A smaller conditioning tank was inserted at the head of the circuit as the larger 2100-L tank was thought to be causing shearing and the fine particles produced were 'sliming' the flotation feed, reducing the plant operation.
- Three cleaner stages were used instead of two.
- The circuit was run without recirculation streams until June 2, 2011.
- The 1st cleaner tails reported to final tails as opposed to rougher feed, as the initial setup dictated.

After initial adjustments to the pilot plant produced unsatisfactory results, the pilot plant feed was fed to bench testing using the conditions which had provided the best results. Table 13.7 shows how the pilot plant feed does not exhibit the same grade and recovery as the prior bench scale test. The suspected reason is that the feed size distribution was too fine.

Table 13.7 – Comparison of Test 7.1 Bench Scale Test results with pilot flotation feed under test 7.1 conditions

	Test 7.1 Open Circuit Test		Pilot Flotation Feed with conditions of Test 7.1	
Products	**Grade P_2O_5 (%)**	**Recovery P_2O_5 (%)**	**Grade P_2O_5 (%)**	**Recovery P_2O_5 (%)**
Cleaner 1 Conc.	38.30	90.74	33.50	76.15
Cleaner 2 Conc.	40.20	83.63	36.98	71.76
Cleaner 3 Conc.	-	-	39.10	66.47

The May 31st pilot plant was run without recirculation. The best results obtained were with a grade and recovery of 32.40% P_2O_5 and 78.2% respectively.

Due to pilot plant concentrates' low grade, further upgrading was required to produce a sample for phosphoric acid production testing (testing performed at the Jacobs facility, Florida). High depressant dosages with long residence time produced 218 kg of concentrate with a grade of 39.1 % P_2O_5.

e) Sedimentation testing

Static settling tests were performed for both the pilot plant concentrate and tailings. Reagents used were $CaCl_2$ and Magnafloc 358 (at 1.5 mg/L and 10 g/t respectfully).

f) Filtration tests

Larox pressure filter testing was performed on the pilot plant concentrate. Cake and filtrate flux velocities were determined for all the different tests as well as the resulting cake moisture content.

13.4 Additional flotation test work for Paul and Manouane zones

Three samples were tested for grinding and flotation: Paul Zone Low Grade; Manouane Low Grade; Manouane Low Grade. Samples were ground to a P_{80} of 150 µm.

Although all three samples had lower head grades (5.63, 4.83 and 5.99% P_2O_5) then the bulk sample used for project T1225 (7.74 % P_2O_5) the rougher + scavenger concentrates showed similar recoveries (94.27% in Project T1225's test 7.1 versus 93.75 to 95.75%) for similar rougher + scavenger concentrate grade. It is hence expected that final concentrate grade and recoveries will also be similar to those obtain from Paul's bulk sample head grade.

13.5 Analytical Method

COREM has used the following analytical methods:

- For Elements: SiO_2, AL_2O_3, MgO, CaO, K_2O, TiO_2, MnO, P_2O_5, Co, Cr, Cu, Fe, Ni, Pb, S, Zn. Chemical preparation: Fusion with a mix of lithium metaborate and lithium tetraborate. (Fluorescence X).
- For Elements (rock): SiO_2, AL_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, Ce_2O_3, La_2O_3, Nd_2O_3: Fusion with a mix of lithium metaborate and lithium tetraborate. (Fluorescence X).
- For fluoride, Chemical preparation: Alkaline fusion using specific electrode.
- For chloride, Chemical preparation: Alkaline fusion using colorimetry.

13.6 Final Results & Interpretation

The objective of achieving an apatite concentrate with grade > 38% and recovery > 90% P_2O_5 was achieved for both the bench scale lab work and the locked cycle tests. The pilot plant results did not reproduce the batch or lock cycle results in a satisfactory manner and results are poor due to two factors: over grinding of the feed and over-dosage of Na_2SiO_3.

However, it is expected that with a suitable grind and proper depressant dosages, flotation performance of both the batch test (Test 7.1) and the lock cycle test (see Table 13.8 below) will be obtained.

The project plant design is based on a concentrate grade of 38% P_2O_5 and a 90% recovery.

Table 13.8 – Summary of COREM Testing Results

Test	P_2O_5 grade (%)	P_2O_5 recovery (%)
Batch Test (Test 7.1)	38.3	90.7
Lock Cycle	38.5	94.2
Pilot Plant	32.4	78.2

14.0 MINERAL RESOURCE ESTIMATES

This section presents the modelling of the Paul, Manouane and number 2 zones followed by the resource estimates.

14.1 Data used

The final drill hole database used for the resource estimation of the Lac à Paul Project zones namely Zone 2, Paul and Manouane is in *file LAC_PAUL_260711_final.accdb* dated July 27, 2011. The database holds information for 121 diamond drill holes. Out of the hundred and twenty-one (121) holes, thirteen (13) are not used in the resource estimates: the two (2) 1997 holes and the eleven (11) exploration holes of LPA-09 group.

The surface samples are not integrated into the database at the moment. The location of this data on maps is in 2D, i.e.: no elevation and they are therefore not equivalent to core holes samples. They are not used in the estimation of resources.

A database in MS-Excel format has been transferred to SGS Geostat from the client. SGS Geostat has imported and validated the database into GEOBASE and it was also cross checked with the laboratory certificates.

It is to be noted that the reader is advised that Arianne Resources Inc. has announced partial results of the 2011 Fall Drilling Campaign on December 12th 2011 which are not included in the estimation of resources presented in this Technical Report with effective date of November 8th 2011.

According the Press Release reproduced in Figure 14.1 *in addition to drilling on the Paul Zone, 18 holes totalling 3,561 meters were drilled in the Nicole area located between Paul and Manouane Zones. This area was drilled in three different sections for a length of 500 meters. It covers a width of about 200 meters. Additional drilling on the Eastern part of this area is expected to be completed during the month of December.*

It is in the author's opinion that these results increase the lateral extension of the Paul Zone near the surface. The new Nicole Zone with its drilling results show potential for a new future mineral resource estimate.

Figure 14.1 – December 12th Press Release by Ressources d'Arianne

<<SAGUENAY, QUEBEC--(Dec. 12, 2011) - **Ressources d'Arianne (the "Company") (TSX VENTURE: DAN) (FRANKFURT: JE9N) (OTCBB: DRSSF)** is pleased to announce partial results of drilling conducted during the fall of 2011 on its Lac à Paul project. The goal of this drilling program is to test the potential of new mineralized zones and extensions of the Paul Zone, one of two main deposits of apatite and ilmenite (titanium and phosphorus) in the Lac à Paul project. Drilling was conducted in the Paul Zone and Nicole, Lise and La Traverse areas.

Partial results of the analysis show that the Paul Zone now extends an additional 200 meters to the East and 450 meters to the West. The Paul Zone now appears to have a minimum length of 1,950 meters compared to 1,300 meters after the 2010 drilling campaign (see March 3rd, 2011 press release). Also very important is that these drilling results show the Paul Zone remains open in both directions. As noted in previous press releases, the Paul Zone also remains open to a vertical depth of 400 meters.

A total of 16 holes (PAU-11-49 to PAU-11-64) encompassing 4,664 meters were drilled in the fall 2011 campaign in the Paul Zone. The following table shows partial results of drilling PAU-11-49 to PAU-11-52, located in the Eastern extension and drilling PAU-11-53 to PAU-11-58 and PAU-11-62, located in the Western extension of the Paul Zone.

In addition to drilling on the Paul Zone, 18 holes totalling 3,561 meters were drilled in the Nicole area located between Paul and Manouane Zones. This area was drilled in three different sections for a length of 500 meters. It covers a width of about 200 meters. Additional drilling on the Eastern part of this area will be completed during the month of December. An additional 1,401 meters of drilling (7 holes) was also completed in the Lise area (7 km south of Manouane) and 471 meters (3 holes) in the La Traverse area (8 km south of Paul), however assay results are not yet available. This drilling continues until December 16 and is planned to restart early next year>>.

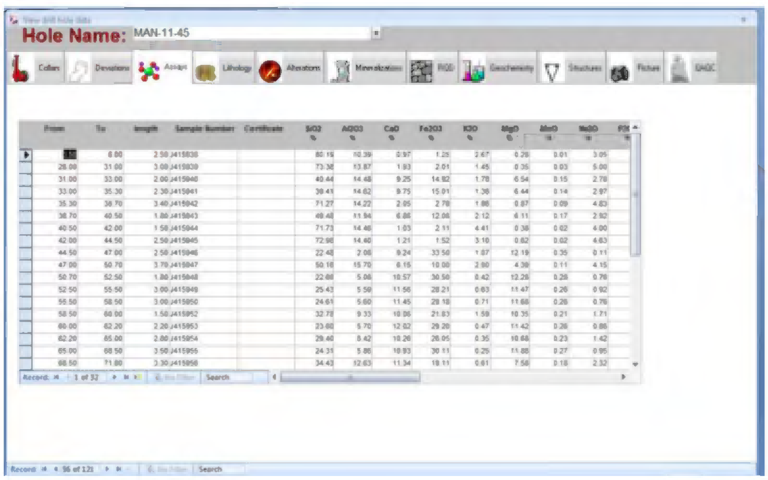
Hole #	% P2O5	% TiO2	Length (m) Along the hole	From X to Y (m)
Nic-11-01	**5.58**	7.23	**124.9**	3.2 to 128.1
Nic-11-02	**3.19**	3.38	**185.3**	3.7 to 189.0
including	*6.38*	*9.41*	*26.3*	*3.7 to 30.0*
and	*5.10*	*5.00*	*28.0*	*98.0 to 126.0*
and	*7.54*	*5.70*	*15.2*	*173.8 to 189.0*
Nic-11-03	**6.35**	6.53	**120.0**	3.0 to 123.0
Nic-11-04	**6.24**	6.18	**140.7**	3.0 to 143.7
including	*6.75*	*6.76*	*121.9*	*3.0 to 124.9*
Nic-11-05	**3.34**	3.80	**58.4**	1.8 to 60.2
Nic-11-06	**3.07**	3.44	**154.0**	5.0 to 159.0
including	*4.24*	*4.86*	*23.25*	*27.00 to 50.25*
and	*4.99*	*4.96*	*43.4*	*76.0 to 119.4*
Nic-11-07	**4.15**	5.32	**172.1**	41.10 to 213.2
including	*10.17*	*9.89*	*153.0*	*183.0 to 336.4*
Nic-11-08	**3.18**	3.89	**71.5**	63 to 134.5
	5.52	5.65	**144.5**	158.2 to 302.7
Nic-11-09	**1.13**	1.86	**21.5**	75.7 to 97.2
Nic-11-10	**3.29**	3.85	**87.9**	11.0 to 98.9
including	*5.48*	*5.91*	*23.2*	*11.0 to 34.2*
and	*4.37*	*5.42*	*27.1*	*47.2 to 74.3*
Nic-11-11	**4.98**	5.95	**300.1**	35.9 to 336.0
including	*5.66*	*7.82*	*37.5*	*35.9 to 73.4*
and	*5.23*	*6.08*	*238.5*	*97.5 to 336.0*
Nic-11-12	**5.08**	6.00	**131.9**	3.0 to 134.9
including	*6.05*	*6.83*	*36.5*	*23.5 to 60.0*
and	*5.77*	*7.02*	*62.3*	*72.6 to 134.9*
Nic-11-13	**4.39**	5.39	**75.0**	6.0 to 81.0
Nic-11-14	**3.36**	4.05	**244.3**	7.1 to 251.4
including	*6.26*	*8.07*	*21.0*	*7.1 to 28.1*
and	*3.95*	*3.78*	*38.9*	*111.0 to 149.9*
Nic-11-15	**3.56**	4.56	**228.4**	8.6 to 237.0
including	*5.03*	*5.02*	*72.4*	*164.6 to 237.0*
Nic-11-16	**4.14**	4.54	**101.0**	2.9 to 103.9
including	*4.89*	*5.34*	*21.6*	*2.9 to 24.5*
and	*5.21*	*5.19*	*20.4*	*34.0 to 54.4*
and	*4.82*	*5.34*	*37.8*	*66.1 to 103.9*
Nic-11-17	**3.35**	4.13	**77.3**	10.9 to 88.2
including	*4.80*	*4.42*	*12.5*	*57.50 to 70.0*
and	*6.19*	*5.54*	*11.8*	*76.4 to 88.2*
Nic-11-18	**1.94**	4.24	**159.5**	21.0 to 180.5

Hole #	% P2O5	% TiO2	Length (m) Along the hole	From X to Y m
Pau-11-49	**6.74**	8.00	**138.2**	139.8 to 278.0
including	*8.32*	*9.71*	*33.2*	*153.0 to 186.2*
and	*8.02*	*8.55*	*67.0*	*211.0 to 278.0*
Pau-11-50	**6.65**	6.17	**35.3**	105.0 to 140.0
Pau-11-51	**7.49**	8.48	**180.0**	108.0 to 288.0
including	*8.90*	*8.91*	*129.1*	*137.9 to 267.0*
Pau-11-52	**6.36**	5.69	**86.75**	129.0 to 215.75
including	*7.41*	*6.67*	*68.00*	*129.0 to 197.0*
Pau-11-53	**5.29**	5.69	**342.0**	18.0 to 360.0
including	*6.36*	*5.97*	*81.0*	*18.00 to 99.0*
and	*6.34*	*7.17*	*133.4*	*180.6 to 314.0*
Pau-11-54	**7.24**	7.35	**426**	3.0 to 429.0
including	*9.47*	*9.27*	*257.0*	*72.0 to 429.0*
Pau-11-55	**6.84**	7.01	**323.65**	12.35 to 336.40
including	*10.17*	*9.89*	*153.0*	*183.0 to 336.4*
Pau-11-56	**6.05**	7.38	**193.8**	4.2 to 198.0
including	*9.58*	*10.35*	*68.0*	*118.0 to 186.0*
Pau-11-57	**5.05**	6.86	**111.0**	6.0 to 117.0
including	*6.49*	*8.07*	*52.5*	*54.0 to 106.5*
Pau-11-58	**6.59**	6.76	**293.4**	5.5 to 298.9
including	*9.54*	*9.47*	*105.9*	*150.9 to 256.8*
Pau-11-62	**5.97**	6.47	**287.5**	2.3 to 289.8
and	*6.92*	*7.34*	*205.8*	*84.0 to 289.8*

14.1.1 Computerized drill hole database used for resources

- The database has information for 121 drill holes from the entire Lac à Paul property main block;
- The total drill holes length in the database is 20,557 meters;
- There are 6,544 assay records for % P_2O_5, % TiO_2, % SiO_2, % Fe_2O_3, % AL_2O_3, % CaO, % K_2O, % Na_2O, % MnO and % MgO;
- There are 258 deviation record;
- There are 2675 lithology records;
- There are no RDQ records.

Figure 14.2 – Hole MAN-11-45, typical assay view in Geobase



14.1.2 Topographic survey

The topography used is the same as the one used in 2009 where Arianne had contracted an independent surveyor to survey topography with a differential GPS along the lines in order to be able to have a representative and adequate surface for resource calculation.

Each zone has a local field line grid; however UTM NAD 83 is used as coordinate system.

The resource model uses the UTM NAD 83 system and the surveyed topography model.

SGS Geostat recommendation for the next step is to proceed with a detailed airborne LIDAR survey of all the areas of interest in 2012.

14.1.3 Mineralized envelope modelling approach

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 (Nelsonite mass with enriched Apatite content) was made by Claude Duplessis geological engineer and Senior QP for the Paul and Zone 2, while Manouane has been done by Guy Desharnais Ph. D. P. Geo., QP under Claude Duplessis' supervision.

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

In SGS Geostat's mineralized envelope interpretation the following Zones were studied respectively:

- Paul (PAU) Zone centered on 375141.90E, 5529452.00N;
- Manouane (MAN) Zone centered on 381327.00E, 5527408.00N;
- Zone 2 centered on 366947.96E, 5516273.78N.

The following sections present for each Zone, the interpretation on sections, mineralized intersections, composites, estimation parameters and block models. This information is followed by classification and tabulation of mineral resource statements.

14.2 Paul Zone

A set of cross sections have been developed with the new drilling information. Interpretation of the Nelsonite bodies has been done on cross sections. Following a first interpretation on cross-sections, the interpretation has been revised with control level plans. The relatively rich TiO_2 layer observed on the north side of the zone with very low P_2O_5 is still used to assist in the interpretation and extensions. Once interpretation makes sense, the prism on sections are linked together to create a solid. Extremities of solids are completed with stumps prior to meshing. The North- south cross sections spacing ranges from 65 m to 115 m apart, and is in general 90 meters. The overburden-bedrock contact has been interpreted on each cross section.

Figure 14.3 – Drill hole layout in plan view UTM NAD 83 coordinates (Y is due North)

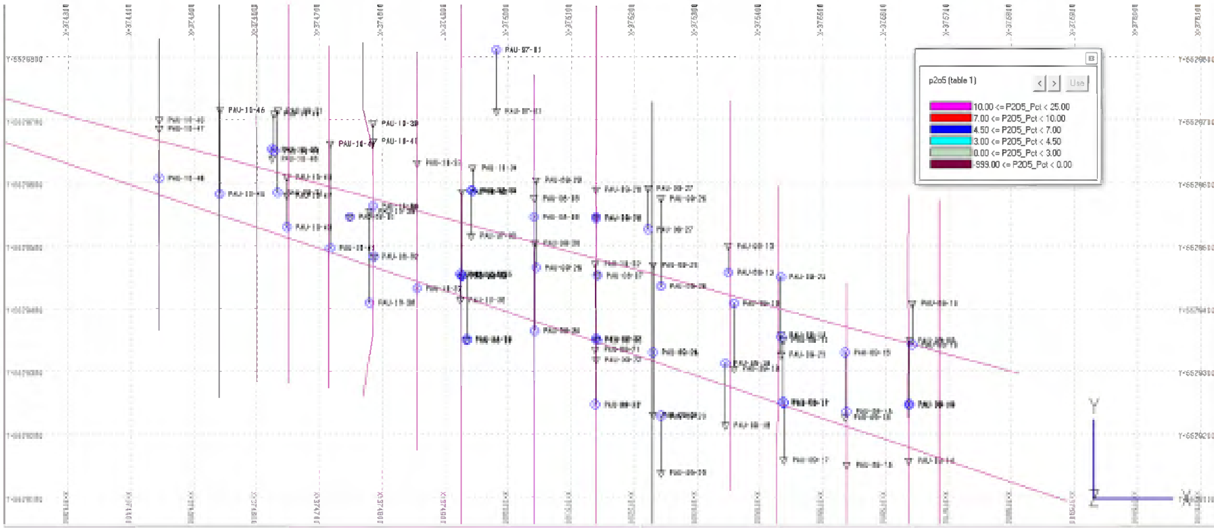


Figure 14.4 – Cross sections looking West at 375230E with $\%P_2O_5$ and interpretation

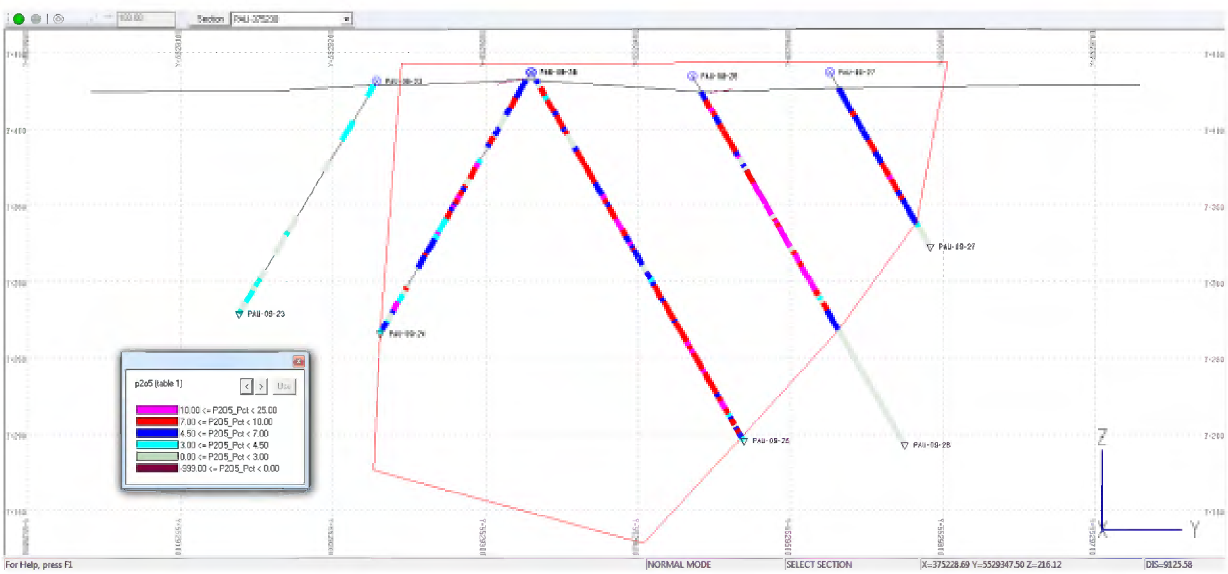


Figure 14.5 – Cross sections looking West at 375140E with %P_2O_5 and interpretation

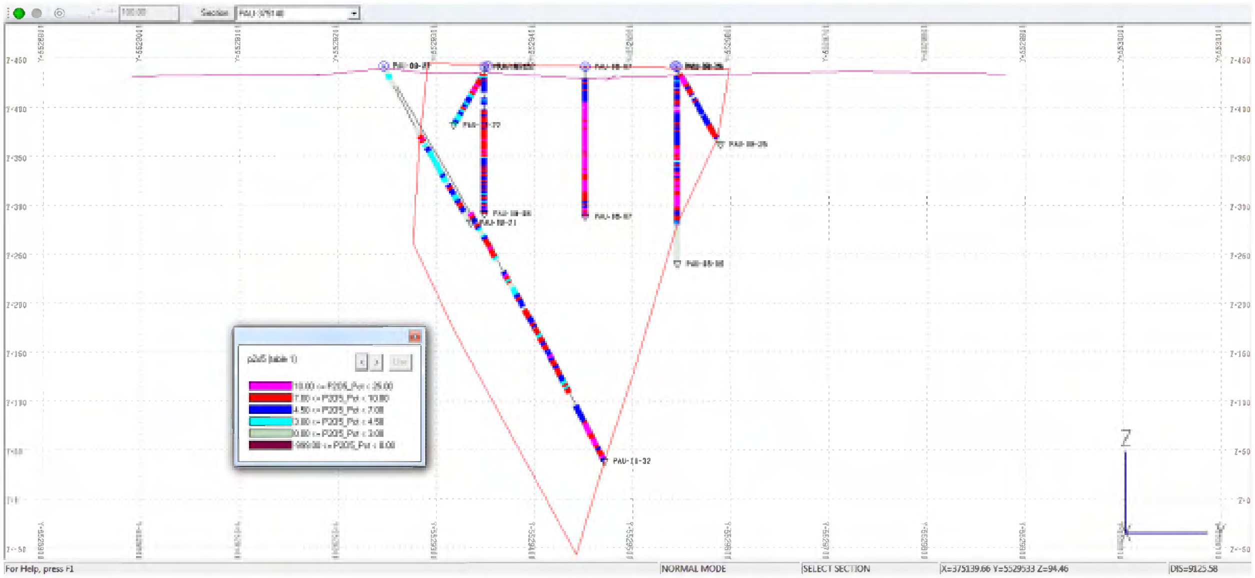


Figure 14.6 – Plan view with %P_2O_5 and trace of section interpretation

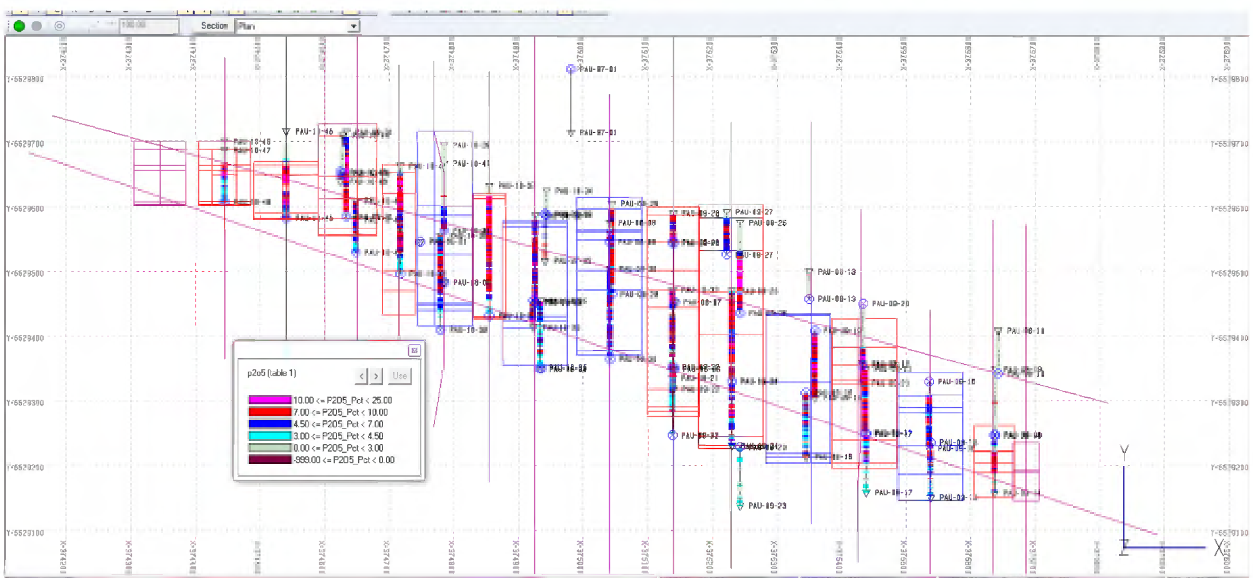
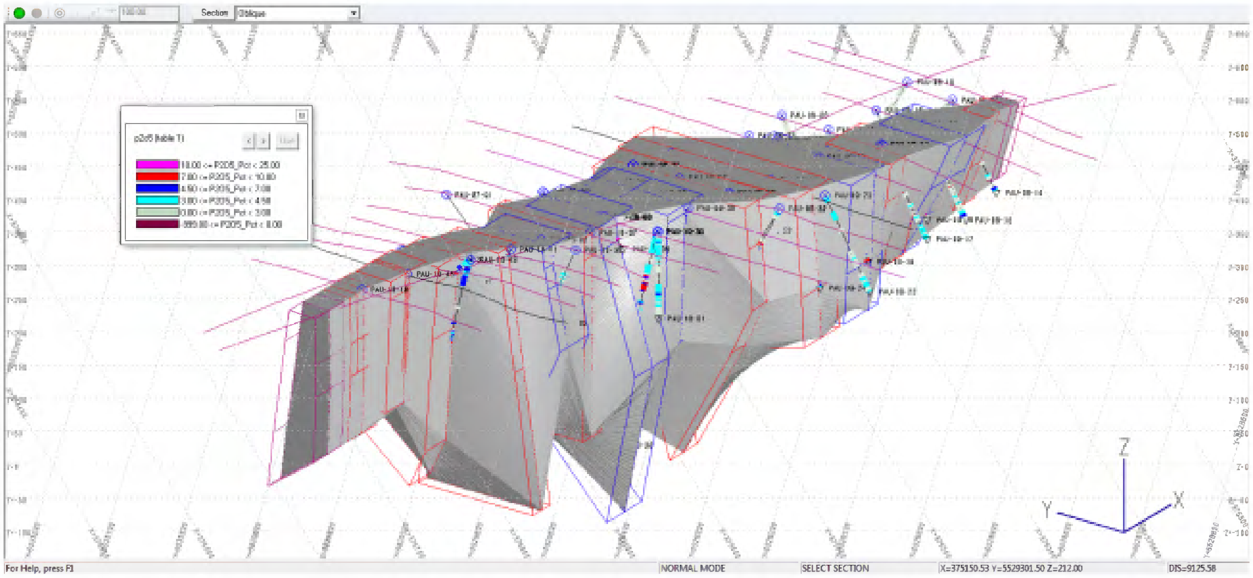


Figure 14.7 – Oblique view of the solid looking down North East



14.2.1 Mineralized intersections

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

A total of 41 intersections have been defined from the holes, some holes having intersected more than one zone and some are not crossing the zone. Holes not listed in the sequences did not cut the apatite zone.

Table 14.1 is the list of the intersection limit file used for the creation of standard length composites. This is with dilution of gaps.

Drilling results and database of the fall of 2011 drilling program on Paul Zone was not available at cut-off date.

Table 14.1 – List of mineralized intersections for mineralized zone definition

Hole Name	From (m)	To (m)	Length (m)	P2O5_Pct	TiO2_Pct
PAU-08-01	4	164	160	7.50	8.11
PAU-08-02	4	153	149	6.20	7.33
PAU-08-03	3	159	156	7.45	7.32
PAU-08-05	9	160.3	151.3	7.80	11.01
PAU-08-06	6.5	150	143.5	7.04	5.94
PAU-08-07	12	153	141	10.32	7.80
PAU-08-08	4	38	34	6.62	10.84
PAU-08-11	3	156	153	7.99	8.70
PAU-08-12	66	126	60	8.98	10.66
PAU-09-14	48.55	113	64.45	8.74	8.33
PAU-09-15	3	99	96	5.82	6.35
PAU-09-16	42	193.5	151.5	7.06	7.38
PAU-09-17	3	87	84	6.67	5.59
PAU-09-18	3	192	189	5.42	6.28
PAU-09-19	6	201	195	8.39	8.66
PAU-09-20	135	249	114	8.31	9.30
PAU-09-21	80.7	183	102.3	4.47	4.63
PAU-09-22	6	69	63	6.32	6.21
PAU-09-24	6	198	192	5.81	5.07
PAU-09-25	6	276	270	7.48	7.27
PAU-09-26	12	192	180	8.29	8.37
PAU-09-27	12	114	102	7.02	11.13
PAU-09-28	9	85.3	76.3	6.87	10.65
PAU-09-29	6	261.6	255.6	7.18	9.27
PAU-09-30	11	279	268	5.92	7.89
PAU-09-31	6	246	240	8.50	10.71
PAU-10-32	174.3	462	287.7	6.87	6.71
PAU-10-33	3.5	293.6	290.1	7.63	9.27
PAU-10-35	153.8	430	276.2	5.52	6.42
PAU-10-36	4.3	47	42.7	7.95	6.96
PAU-10-37	6.6	330.8	324.2	8.01	9.20
PAU-10-38	75	351	276	6.56	8.32
PAU-10-39	6.6	54.6	48	5.54	11.86
PAU-10-40	4.9	303.5	298.6	6.78	11.55
PAU-10-41	11.1	395.5	384.4	7.37	8.72
PAU-10-42	40.4	72	31.6	7.10	7.52
PAU-10-43	144.2	324.5	180.3	6.76	9.49
PAU-10-45	2.8	165.1	162.3	7.88	7.43
PAU-10-46	3.8	243	239.2	7.46	9.27
PAU-10-47	4.3	81.9	77.6	6.20	6.44
PAU-10-48	4.5	21	16.5	3.92	9.33

14.2.2 Compositing of assay intervals within mineralized intercepts

Since original assay intervals do not have all the same length, 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 1.5 m and 3 meters. The selectivity of 1.5 m is not commonly achievable in bulk tonnage mining, therefore a 3 m standard length has been elected. This also allows for internal smoothing and internal dilution, since it could be difficult and unrealistic in the Lac à Paul context to exclude dykes and barren inclusions of smaller dimension within a blast. The material not analyzed is considered barren with 0% P_2O_5 and 0% TiO_2.

No capping on grade is done; from our point of view it is not necessary due to the nature of mineralization.

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. 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.

14.2.3 Specific gravity data

Based on previous SG measurements of core, the specific gravity value used to convert volumes into tonnes was set to a conservative fixed value of 3.42 t/m^3 for Paul zone. Additional SG measurements should be done in the next phase of drilling in order to derive ideally a regression based on variable SG. The challenge is that SG is not 100% dependent of apatite content, iron and titanium but it is also affected by low SG minerals.

14.2.4 Resource block grade interpolation

Estimations are done with SGS Geostat SECTCAD plus which includes SGS Geostat BLKCAD block modelling and resource estimation software.

The grades are estimated in each 10 m (EW) x 10 m (NS) x 10 m (Z) block of a regular matrix of 171 columns (EW), 101 rows (NS) and 66 benches (Z) with its center within the limits of the mineralized zones. A total of 2,256 composites (data points representing 3 meters) were used to estimate the blocks. The block model is cut by overburden\rock surface and the topography.

The average %P_2O_5 and % TiO_2 grade of each block is interpolated by inverse of the distance from the grades of nearby 3 m composites.

The author has used interpolation parameters based on drill spacing, envelope extension and orientation.

For the interpolation process, estimation was made with one run:

A search ellipse of 350 m, 150 m, 75 m maximum composite 10, minimum of 2, maximum from same hole is 4. With long axis North 112 degrees and now sub vertical 90 degrees.

Figure 14.8 – Block model origin and extent Paul zone

Database Status | Data Contraints | Default Transformation | Default Blocks Grid

+/- | A.Z | C | Load | Save

Blocks Grid Origin	
Origin X	374 200
Origin Y	5 529 000
Origin Z	550
Blocks Size	
Size in X	10
Size in Y	10
Size in Z	-10
Blocks Discretization	
Discretization in X	1
Discretization in Y	1
Discretization in Z	1
Blocks Grid Index	
Min iX	1
Min iY	1
Min iZ	1
Max iX	171
Max iY	101
Max iZ	66
Blocks Grid Coordinate	
Min X	374 200
Min Y	5 529 000
Min Z	550
Max X	375 900
Max Y	5 530 000
Max Z	-100

Figure 14.9 – Search ellipsoid parameters Paul zone

+/- | A.Z | Col

Rotation	
Yaw (Azimuth)	112
Pitch (Dip)	0
Roll (Spin)	90
Yaw2 (Azimuth2)	0
Scaling	
Major Axis (Y)	350
Intermediate Axis (X)	150
Minor Axis (Z)	75

14.2.5 Resource Categories

An assessment of the grade continuity was undertaken to establish the drill spacing necessary to attain a measured, indicated or inferred level of confidence.

The author has observed that a range of 150 m for % P_2O_5 provides some evidence that this drill spacing has meaningful information about the grade in the intervening distance

A first pass of automatic classification was done using an anisotropic search ellipsoid for the Measured category (60 m long axis) and then for the Indicated category (120 m long axis), the rest within the envelope was classified as Inferred category. The figures below present the effective search ellipsoid orientation and size.

Figure 14.10 – Search ellipsoid parameters for indicated Paul zone

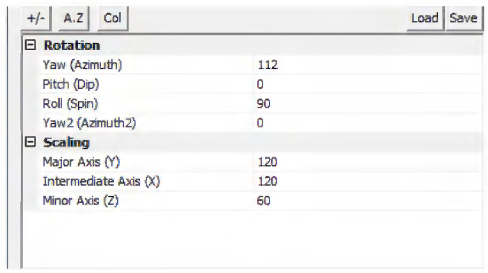
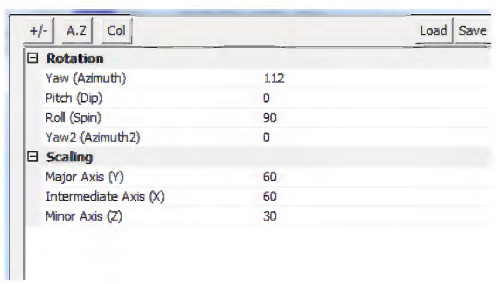


Figure 14.11 – Search ellipsoid parameters for measured Paul zone



The following figures present bench plans with blocks colour coded by class.

The block model was provided to Met-Chem to be used for the estimate of the Mineral Reserves. The results of the pit optimization showed that there were blocks of inferred resources within the pit shell. These blocks were a result of the automatic classification that required two holes in the ellipse creating thin slices and small patches within the pit, due to a not exact regular grid. Since this material falls within the economic pit limits, the inferred blocks within the pit were reclassified as indicated.

Figure 14.12 – Bench 400 with classification colour coded (red measured, blue indicated)

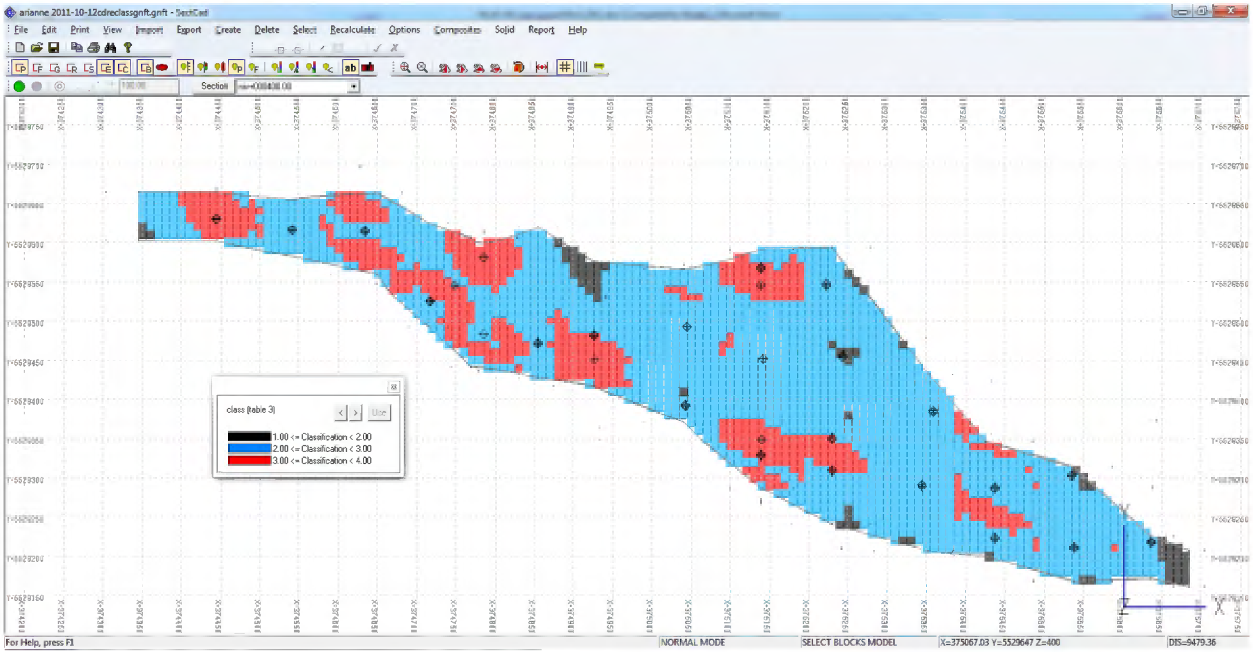
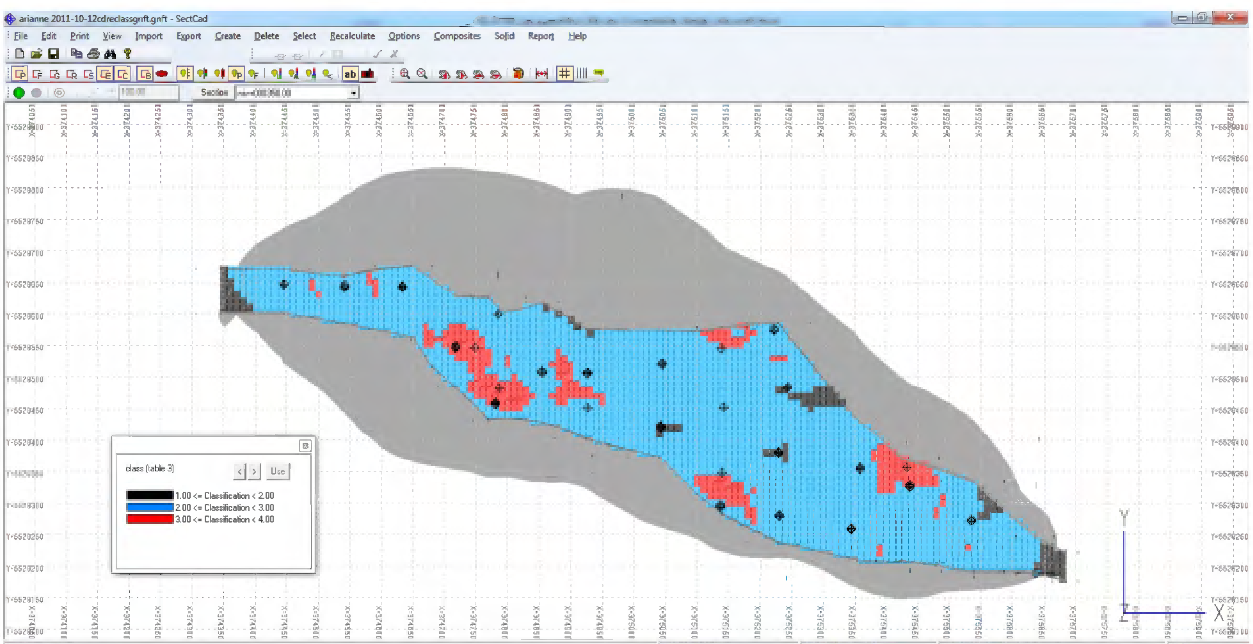
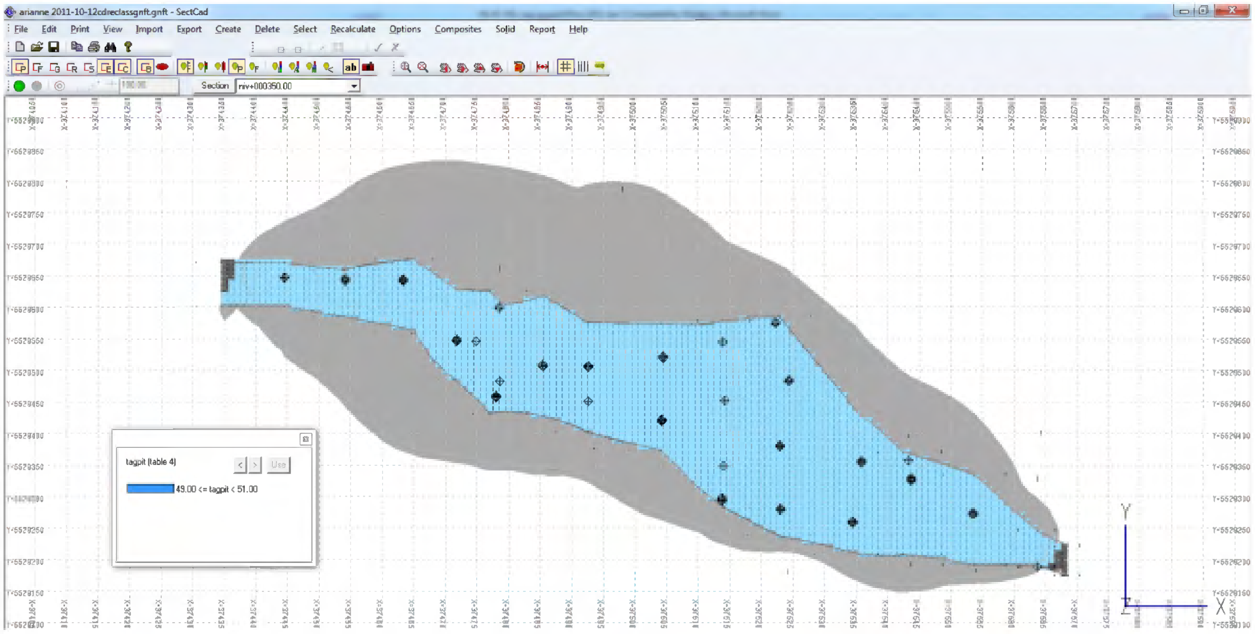


Figure 14.13 – Bench 350 with classification colour coded (red measured, blue indicated)



The figure above presents the pit outline with first classification. The black blocks proved to be inadequate and were reclassified. It is important to mention that red blocks in previous figure are still categorized as measured blocks in the resource model.

Figure 14.14 – Bench 350 with blocks in blue classified as measured and indicated



14.2.6 Mineral Resource Statement

Mineral resources for the Lac à Paul zone were estimated by using a 2.43% P_2O_5 cut-off grade. At this base case cut-off, the Paul Zone hosts a Measured Resource of 22.1 million tonnes grading 6.82% P_2O_5, an Indicated Resource of 161.8 million tonnes grading 7.10% P_2O_5 and an additional Inferred Resource of 50.3 million tonnes grading 6.61% P_2O_5. The mineral resource estimates are outlined in the table below. Results are presented as in-situ. There are no known factors or issues related to permitting, legal, mineral title, taxation, socioeconomic or political relations that could materially affect the mineral resource estimate. Potential modifying factors regarding marketing are discussed in the Market study section.

Table 14.2 – Resource Summary for Paul using a 2.43% cut-off grade

Ressources d'Arianne			**For Public disclosure**	
cut-off >=2.43% P2O5			Rounded numbers	
Lac à Paul	Resources	07-Nov-11		
OFFICIAL RESOURCES PAUL				
	FixedDensity	P2O5_Pct	TiO2_Pct	Million tons
inferred	3.42	6.61	8.25	50,300,000
indicated	3.42	7.10	8.21	161,800,000
measured	3.42	6.82	7.89	22,100,000
Meas+Ind	3.42	7.06	8.17	183,900,000

The resource block model with colour coded grades of P_2O_5 is presented in the following figures for bench 400 and 350, which are 50 and 100 meters below surface.

Figure 14.15 – Bench 400 with blocks colour coded according to grade

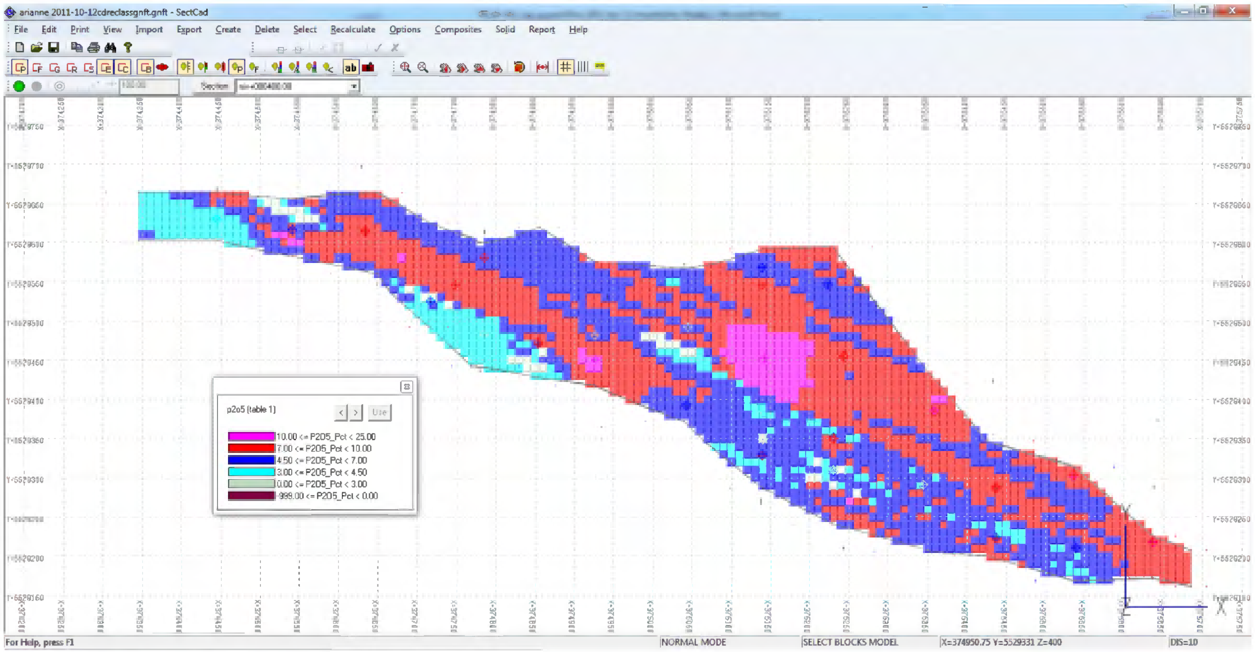
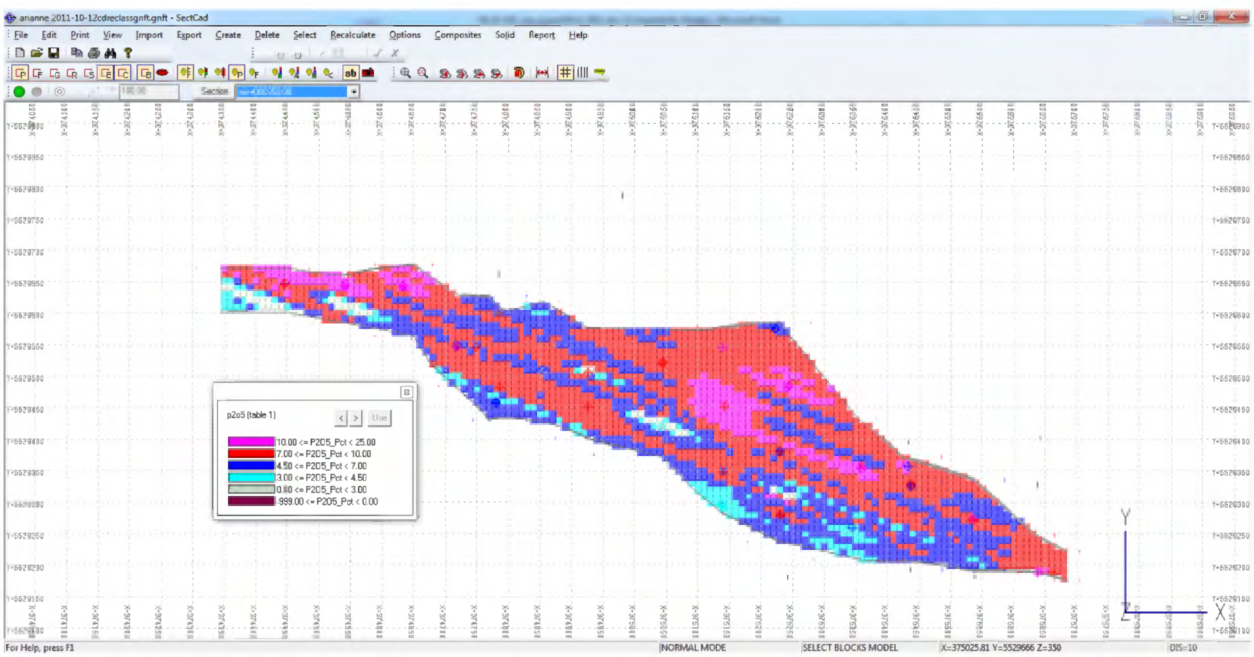


Figure 14.16 – Bench 350 with blocks colour coded according to grade



14.3 Manouane Zone

A set of cross sections have been developed with the new drilling information. Interpretation of the Nelsonite bodies has been done on cross section. After first interpretation on cross-sections, the interpretation has been revised with control level plans. Once interpretation make sense, the prism on sections are linked together to create a solid. Extremities of solids are completed with stumps prior to meshing. North 25 West cross sections spacing ranges from 80 m to 120 m apart, in general sections are at 80 meters. The interpretation is limited to overburden-rock contact on each cross section.

Figure 14.17 – Drill hole layout in plan view UTM NAD 83 coordinates (Y is due North)

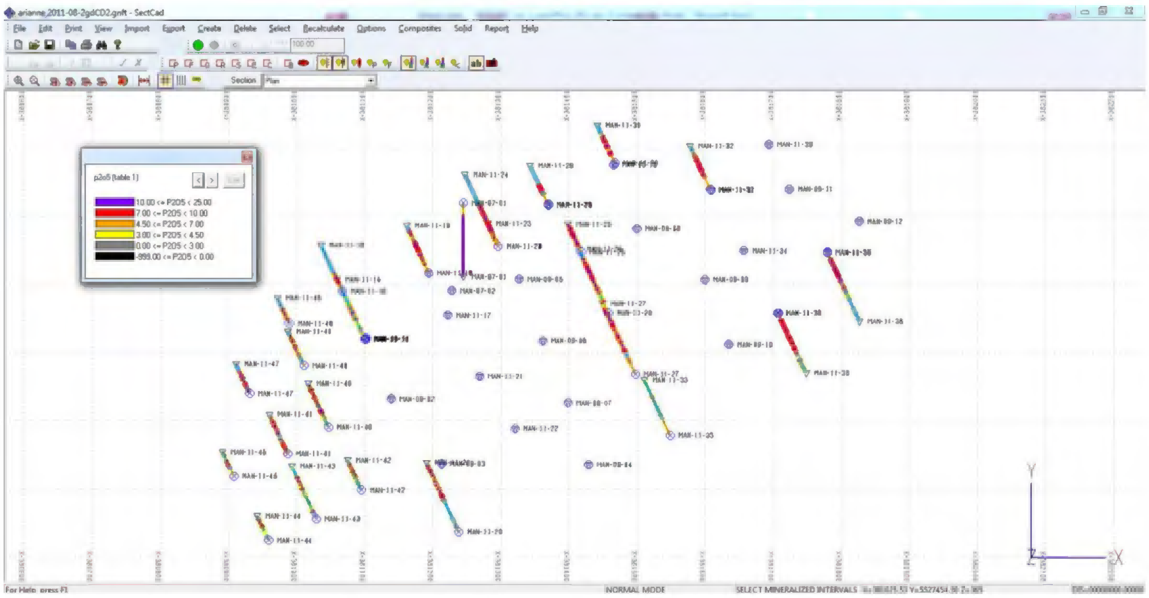


Figure 14.18 – Cross sections looking 65 degrees (Man 1500) with %P_2O_5 and interpretation

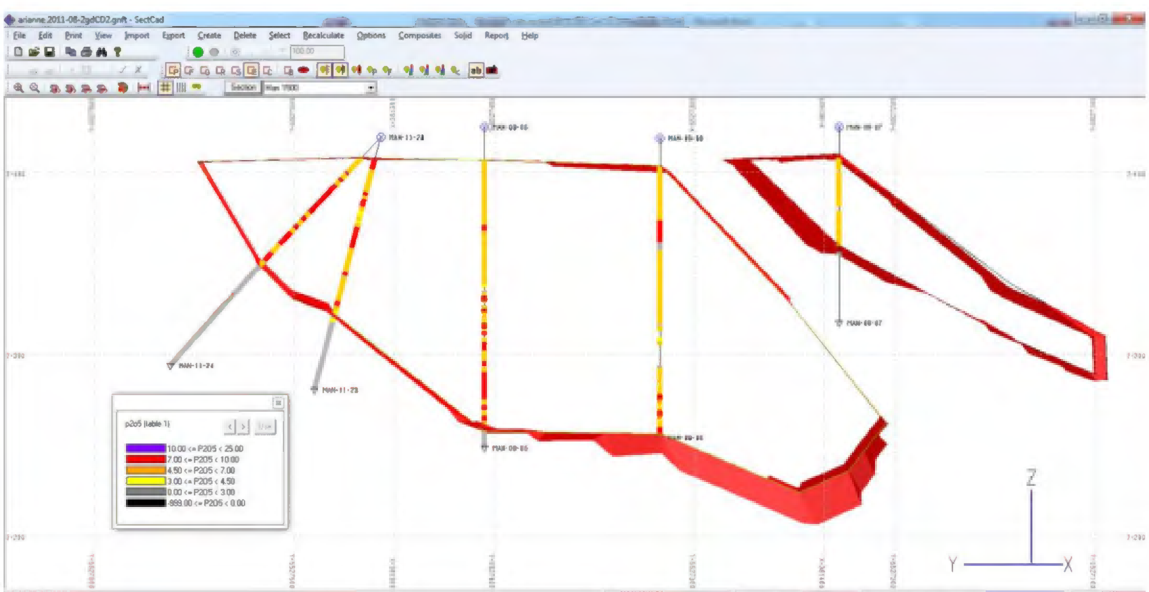


Figure 14.19 – Cross sections looking 65 degrees (Man 1700) with %P_2O_5 and interpretation

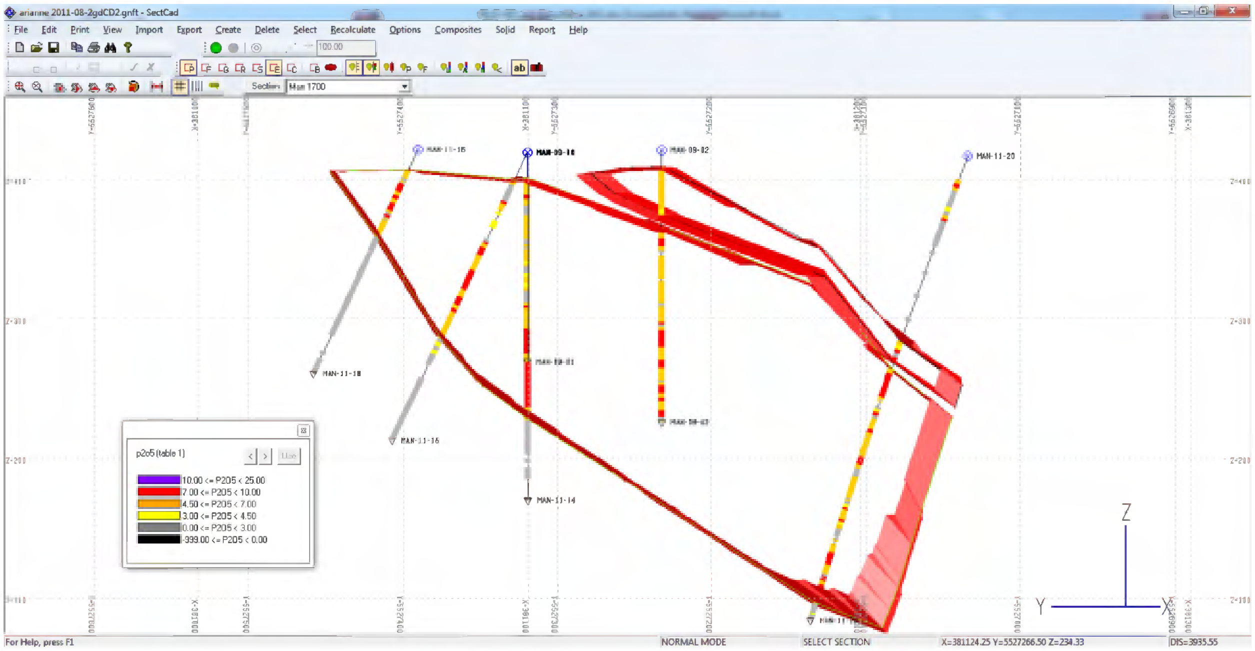
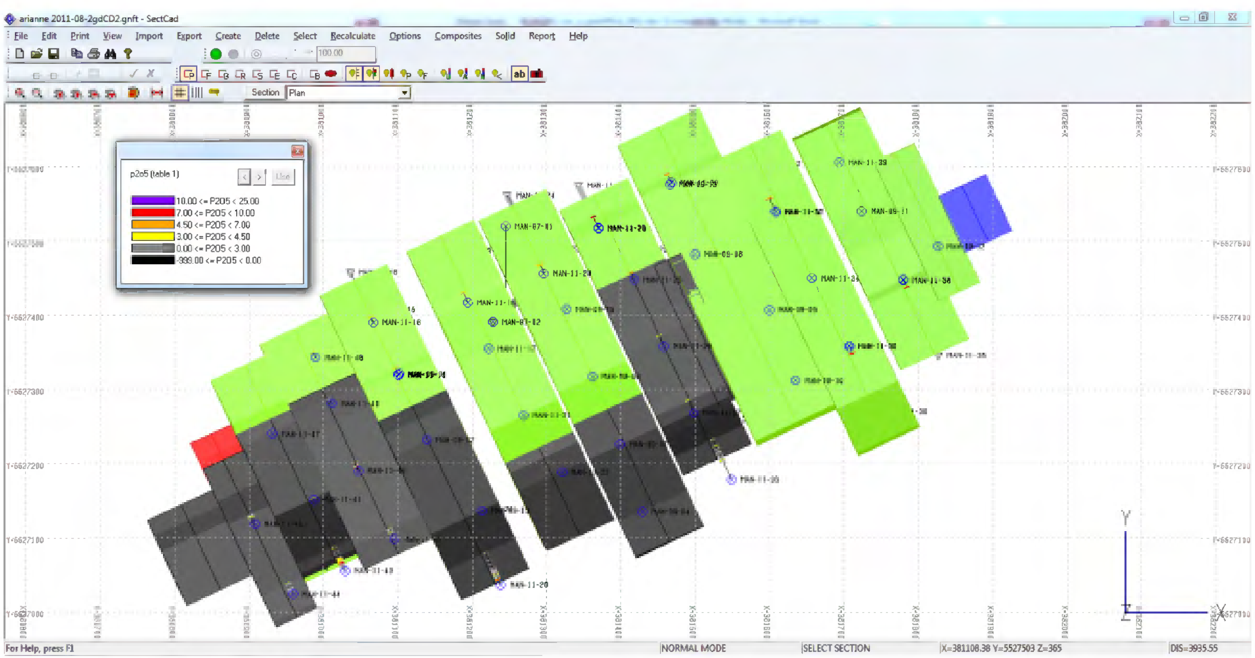


Figure 14.20 – Plan view with trace of section interpretation



Drill holes from 1997 were not taken into account. The Manouane zone is made of two separated zones which merge together to the North-East portion of the zone.

Figure 14.21 – Oblique view of the solid looking down North East

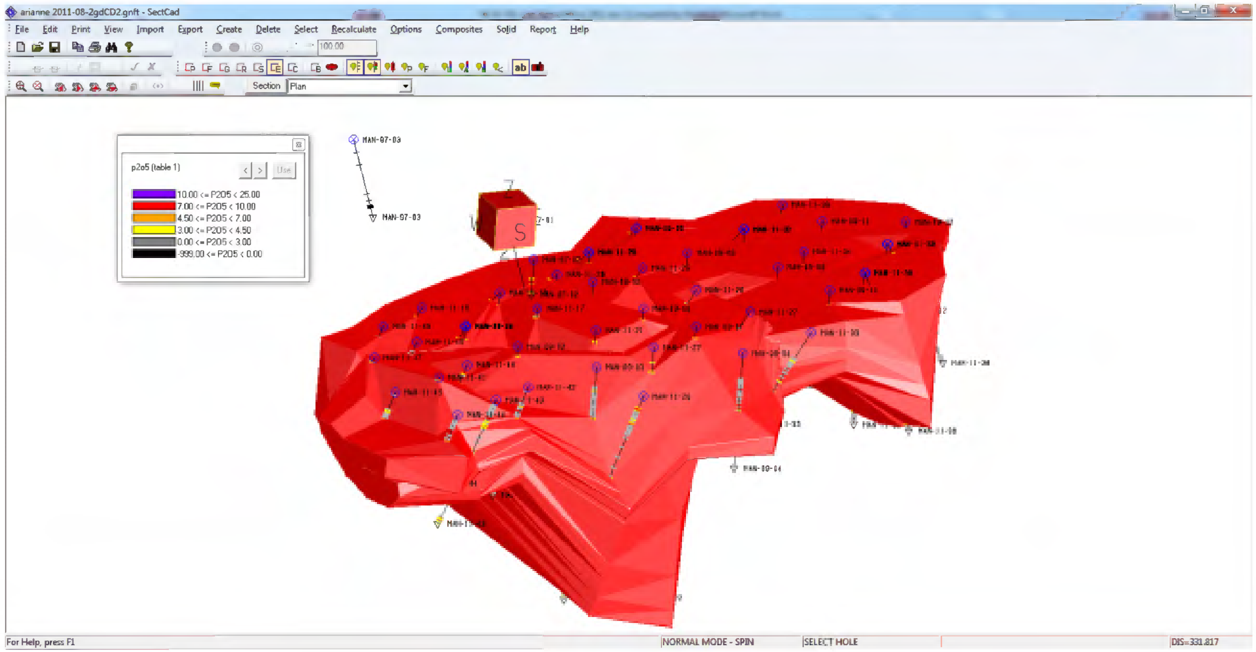
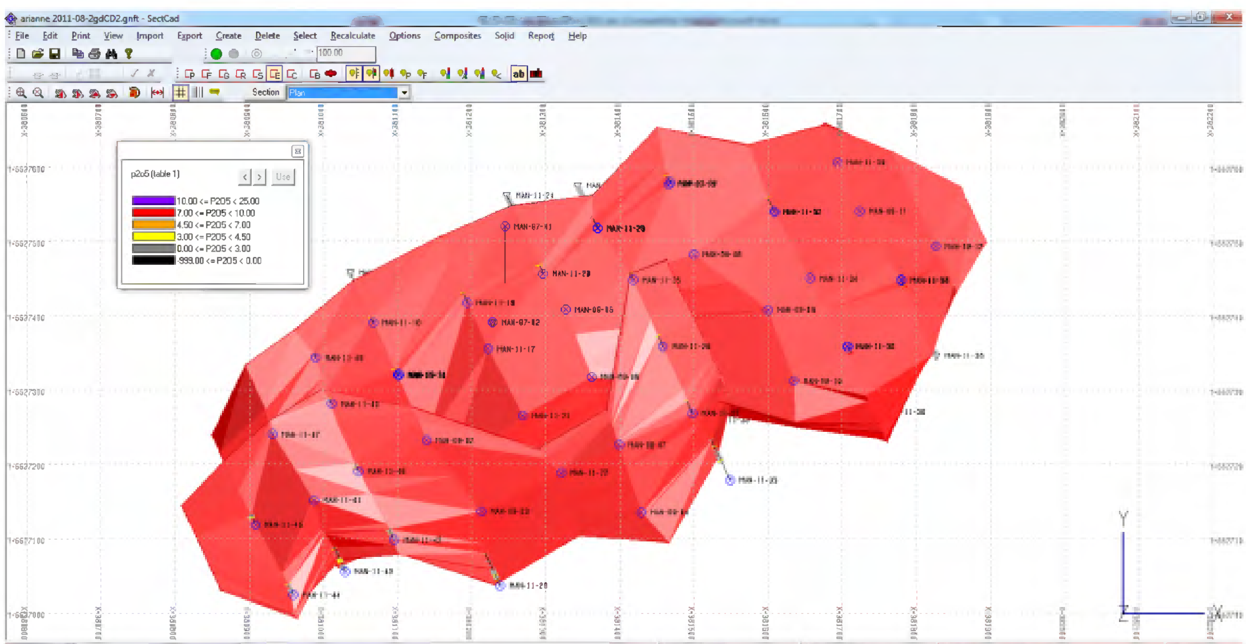


Figure 14.22 – Plan view of the solids looking down North East



14.3.1 Mineralized intersections

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

A total of 41 intersections have been defined from the holes, some holes having intersected more than one zone and some are not crossing the zone. Holes not listed in the sequences did not cut the apatite zone.

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

Table 14.3 – List of mineralized intersections for mineralized zone definition

Hole Name	From (m)	To (m)	Length (m)	P2O5_Pct	TiO2_Pct
MAN-09-01	18.00	150.00	132.00	5.35	8.27
MAN-09-02	12.00	46.50	34.50	5.70	9.02
MAN-09-02	55.00	195.00	140.00	5.97	9.73
MAN-09-03	73.30	91.70	18.40	4.37	7.05
MAN-09-03	100.00	150.00	50.00	6.92	8.24
MAN-09-04	81.20	111.00	29.80	5.84	8.17
MAN-09-05	18.00	168.00	150.00	6.53	9.85
MAN-09-06	15.00	163.00	148.00	6.10	9.72
MAN-09-07	15.00	65.60	50.60	5.22	10.23
MAN-09-08	18.00	123.40	105.40	6.31	10.16
MAN-09-09	18.00	137.50	119.50	7.15	9.92
MAN-09-10	20.00	117.00	97.00	6.49	10.22
MAN-09-11	12.00	55.50	43.50	7.76	10.94
MAN-09-11	55.50	81.00	25.50	2.14	4.48
MAN-09-11	81.00	154.20	73.20	6.62	9.23
MAN-09-12	12.00	87.70	75.70	6.02	8.78
MAN-09-13	10.00	78.30	68.30	6.50	9.65
MAN-11-14	150.00	191.10	41.10	6.96	9.74
MAN-11-15	21.00	147.00	126.00	5.61	8.59
MAN-11-16	16.00	69.00	53.00	5.86	8.87
MAN-11-17	12.00	200.20	188.20	5.91	9.67
MAN-11-18	16.90	150.00	133.10	6.79	10.06
MAN-11-19	19.60	104.90	85.30	6.50	9.80
MAN-11-20	141.00	157.40	16.40	5.72	4.43
MAN-11-20	161.70	338.40	176.70	5.68	8.26
MAN-11-21	15.00	277.50	262.50	5.25	8.43
MAN-11-22	36.00	47.00	11.00	5.08	7.79
MAN-11-22	124.90	350.00	225.10	5.18	8.57
MAN-11-22	183.50	185.20	1.70	6.06	10.14
MAN-11-22	248.55	252.30	3.75	6.25	11.07
MAN-11-22	345.00	350.00	5.00	4.25	7.65
MAN-11-23	12.00	100.90	88.90	6.58	9.45
MAN-11-24	15.00	97.20	82.20	6.97	9.95
MAN-11-25	17.90	93.00	75.10	6.87	10.13
MAN-11-26	29.00	63.10	34.10	5.13	6.75
MAN-11-26	63.10	185.20	122.10	6.92	10.28
MAN-11-27	35.00	51.70	16.70	6.00	10.33
MAN-11-27	66.50	209.90	143.40	6.48	9.34
MAN-11-28	15.00	107.00	92.00	6.80	9.29
MAN-11-29	22.20	53.20	31.00	7.33	8.93
MAN-11-30	15.00	70.10	55.10	7.03	10.20
MAN-11-31	21.00	105.00	84.00	6.14	8.68
MAN-11-32	28.20	92.70	64.50	6.82	10.01
MAN-11-33	120.30	131.20	10.90	6.11	10.81
MAN-11-34	17.80	173.70	155.90	6.81	9.42
MAN-11-35	15.90	203.80	187.90	6.00	8.58
MAN-11-36	18.60	213.70	195.10	6.22	8.57
MAN-11-36	159.00	162.15	3.15	4.39	6.39
MAN-11-37	12.30	63.70	51.40	5.85	7.77
MAN-11-37	63.70	71.60	7.90	0.38	0.92
MAN-11-37	71.60	105.00	33.40	5.25	7.31
MAN-11-38	13.00	116.00	103.00	5.72	7.99
MAN-11-39	12.40	164.25	151.85	7.16	9.94
MAN-11-40	22.70	32.00	9.30	3.83	5.45
MAN-11-40	38.10	140.90	102.80	5.25	8.23
MAN-11-41	3.50	80.00	76.50	5.62	7.91
MAN-11-41	104.70	191.30	86.60	5.55	8.43
MAN-11-42	51.00	92.00	41.00	5.95	7.50
MAN-11-42	94.85	152.10	57.25	5.45	8.53
MAN-11-43	94.40	114.00	19.60	4.12	5.42
MAN-11-43	117.00	189.00	72.00	4.88	6.69
MAN-11-44	44.80	105.80	61.00	5.59	8.32
MAN-11-45	44.50	92.60	48.10	5.35	6.76
MAN-11-46	31.50	87.00	55.50	5.89	7.54
MAN-11-46	88.50	207.50	119.00	5.42	7.91
MAN-11-47	7.30	15.00	7.70	6.18	8.38
MAN-11-47	28.50	103.80	75.30	6.23	8.99
MAN-11-48	19.00	71.50	52.50	5.44	8.71

14.3.2 Compositing of assay intervals within mineralized intercepts

Since original assay intervals do not have all the same length, 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 1.5 and 3 meters. The selectivity of 1.5 m is not commonly achievable in bulk tonnage mining; therefore a 3m standard length has been elected. This also allows for internal smoothing and internal dilution, since it could be difficult and unrealistic in the Lac à Paul context to exclude dykes and barren inclusions of smaller dimension within a blast. The material not analyzed is considered barren with 0% P_2O_5 and 0% TiO_2.

No capping on grade is done; from our point of view it is not necessary due to the nature of mineralization.

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. 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.

14.3.3 Specific gravity data

Based on previous SG measurements of core, the specific gravity value used to convert volumes into tonnes was set to a conservative fixed value of 3.42 t/m^3 for Manouane zone. Additional SG measurements should be done in the next phase of drilling in order to derive ideally a regression based on variable SG. The challenge is that SG is not 100% dependent of apatite content, iron and titanium but it is also affected by low SG minerals.

14.3.4 Resource block grade interpolation

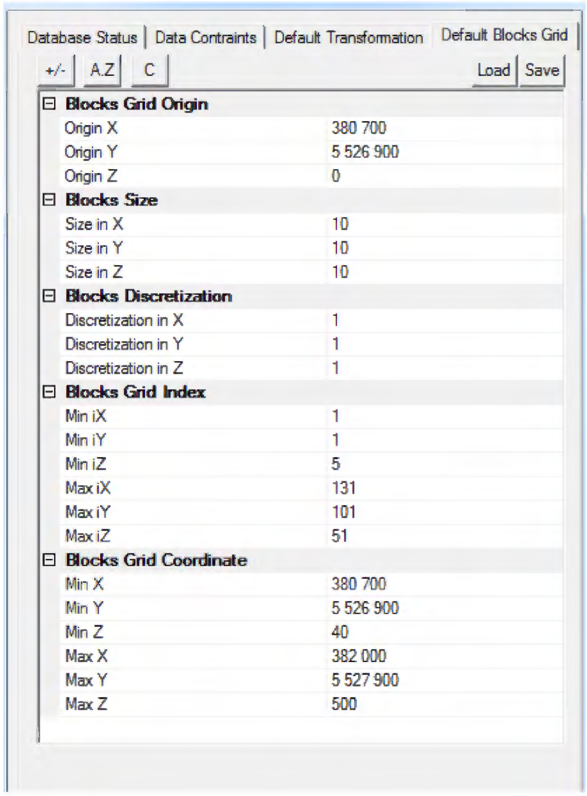
Estimations are done with SGS Geostat SECTCAD plus which includes SGS Geostat BLKCAD block modelling and resource estimation software.

The grades are estimated in each 10 m (EW) x 10 m (NS) x 10 m (Z) block of a regular matrix of 131 columns (EW), 101 rows (NS) and 51 benches (Z) with its center within the limits of the mineralized zones. A total of 4,411 composites (data points representing 3 meters) were used to estimate the blocks. The block model is cut by overburden\rock surface. The Manouane zone does not outcrop.

The average %P_2O_5 and % TiO_2 grade of each block is interpolated by inverse of the distance from the grades of nearby 3 m composites.

The author has used interpolation parameters based on drill spacing, envelope extension and orientation.

Figure 14.23 – Block model origin and extent Manouane zone



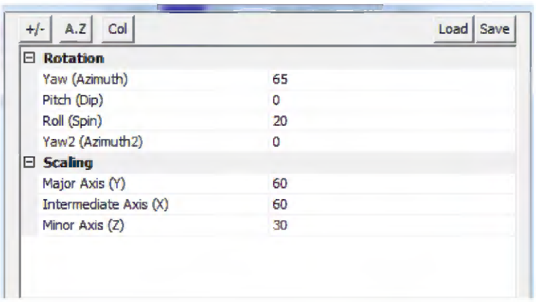
Blocks Grid Origin	
Origin X	380 700
Origin Y	5 526 900
Origin Z	0
Blocks Size	
Size in X	10
Size in Y	10
Size in Z	10
Blocks Discretization	
Discretization in X	1
Discretization in Y	1
Discretization in Z	1
Blocks Grid Index	
Min iX	1
Min iY	1
Min iZ	5
Max iX	131
Max iY	101
Max iZ	51
Blocks Grid Coordinate	
Min X	380 700
Min Y	5 526 900
Min Z	40
Max X	382 000
Max Y	5 527 900
Max Z	500

The grades of all P_2O_5 and TiO_2 were interpolated by inverse square distance method. The mineral resources were estimated using SectCad software. Results from the drilling of winter 2011 were used for the resource estimation; even though sparse and shallow historic drilling is present in around the Manouane Zone. In the estimation process, a maximum number of composite to use by hole is 4, maximum per block is 10 and minimum number is 4.

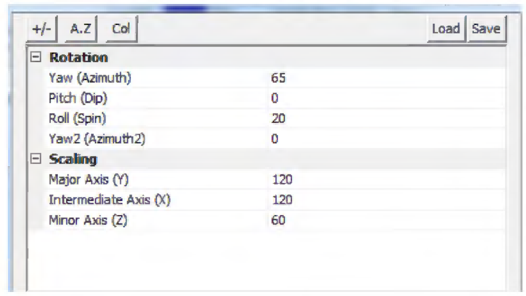
Three successively larger search ellipses were used for the interpolation

Blocks that were interpolated from an earlier pass were not re-interpolated. Inverse square of the distance was used to interpolate the grade within each block.

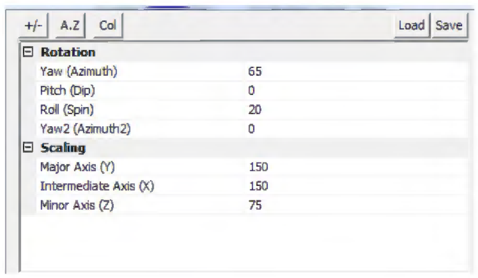
Figure 14.24 – Search ellipsoids parameters Manouane zone and also for classification



Rotation	
Yaw (Azimuth)	65
Pitch (Dip)	0
Roll (Spin)	20
Yaw2 (Azimuth2)	0
Scaling	
Major Axis (Y)	60
Intermediate Axis (X)	60
Minor Axis (Z)	30



Rotation	
Yaw (Azimuth)	65
Pitch (Dip)	0
Roll (Spin)	20
Yaw2 (Azimuth2)	0
Scaling	
Major Axis (Y)	120
Intermediate Axis (X)	120
Minor Axis (Z)	60



Rotation	
Yaw (Azimuth)	65
Pitch (Dip)	0
Roll (Spin)	20
Yaw2 (Azimuth2)	0
Scaling	
Major Axis (Y)	150
Intermediate Axis (X)	150
Minor Axis (Z)	75

14.3.5 Resource Categories

An assessment of the grade continuity was undertaken to establish the drill spacing necessary to reach a measured, indicated or inferred level of confidence.

The author has observed that a range of 150 m for $\%P_2O_5$ provides some evidence that drill spacing has meaningful information about the grade in the intervening distance

Three ellipsoids were used (previous table) for the estimation and they were also been used for the automatic classification. For the Measured category, 60 meters; for the Indicated category, 120 meters and 150 meters major axis was used for the Inferred category.

The following figures present a bench plan with blocks colour coded by class and a cross section.

Figure 14.25 – Bench 350 with classification colour coded (red Measured, cyan Indicated, blue Inferred)

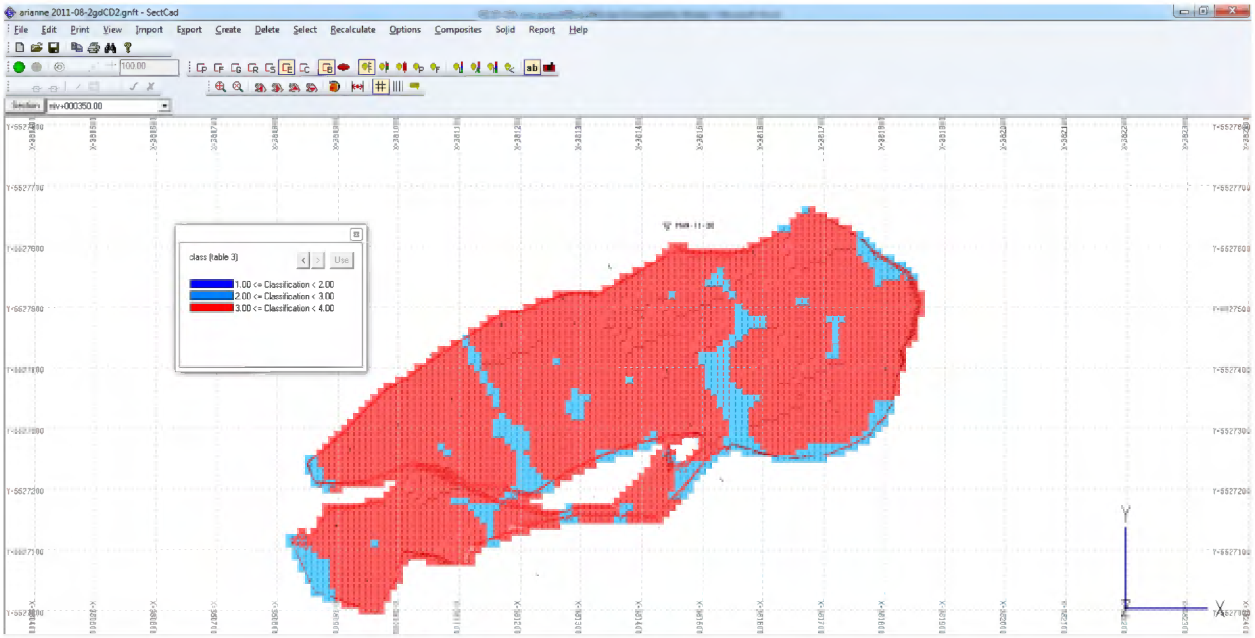
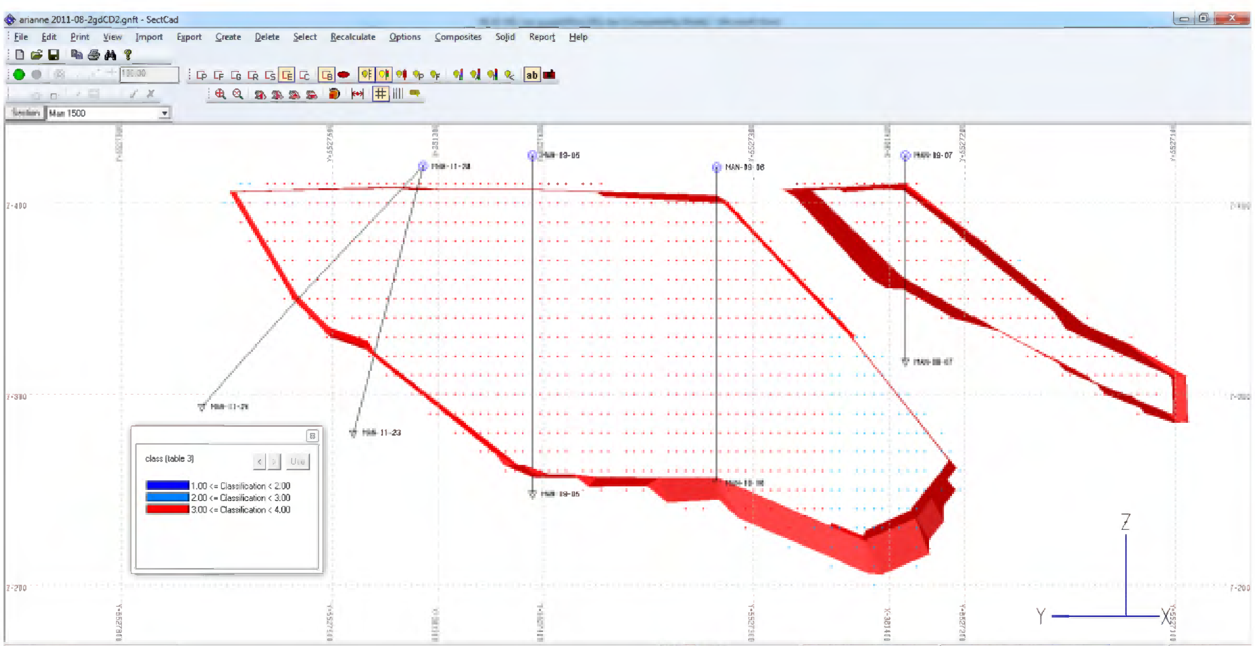


Figure 14.26 – Section Man 1500 with classification colour coded (red Measured, cyan Indicated, blue Inferred)



It is important to mention that all blocks were classified within the Measured and Indicated categories in the Manouane zone.

14.3.6 Mineral Resource Statement

Mineral resources for the Lac à Paul Manouane zone were estimated by using a 2.43% P_2O_5 cut-off grade. This is the economic cut-off grade calculated by Met-Chem. At this base case cut-off, the Manouane Zone hosts a Measured Resource of 136.9 million tonnes grading 5.93% P_2O_5 and an Indicated Mineral Resource of 26.9 million tonnes grading 5.64% P_2O_5. The mineral resource estimates are outlined in the table below. Results are presented as in-situ. There are no known factors or issues related to permitting, legal, mineral title, taxation, socioeconomic or political relations that could materially affect the mineral resource estimate. Potential modifying factors regarding marketing are discussed in the Market study section.

Table 14.4 – Mineral Resource Summary for Manouane using a 2.43% cut-off grade

Ressources d'Arianne			For Public disclosure	
cut-off >=2.43% P2O5			Rounded numbers	
Lac à Paul	Resources	07-Nov-11		
OFFICIAL RESOURCES	MANOUANE			
	FixedDensity	P2O5_Pct	TiO2_Pct	Tons
indicated	3.42	5.64	8.46	26,900,000
measured	3.42	5.93	8.77	136,900,000
Meas+Ind	3.42	5.88	8.72	163,800,000

The resource block model with colour coded grades of P_2O_5 is presented in the following figures for bench 360 and section Man 1500.

Figure 14.27 – Bench 360 with blocks colour coded according to grade

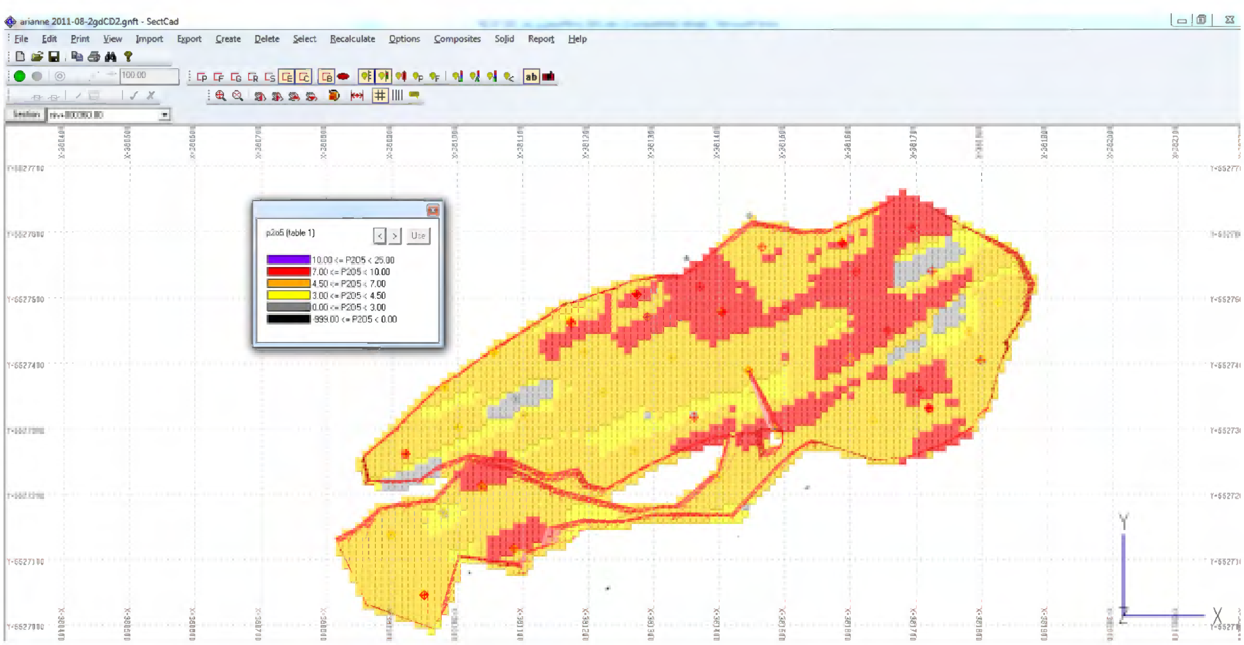
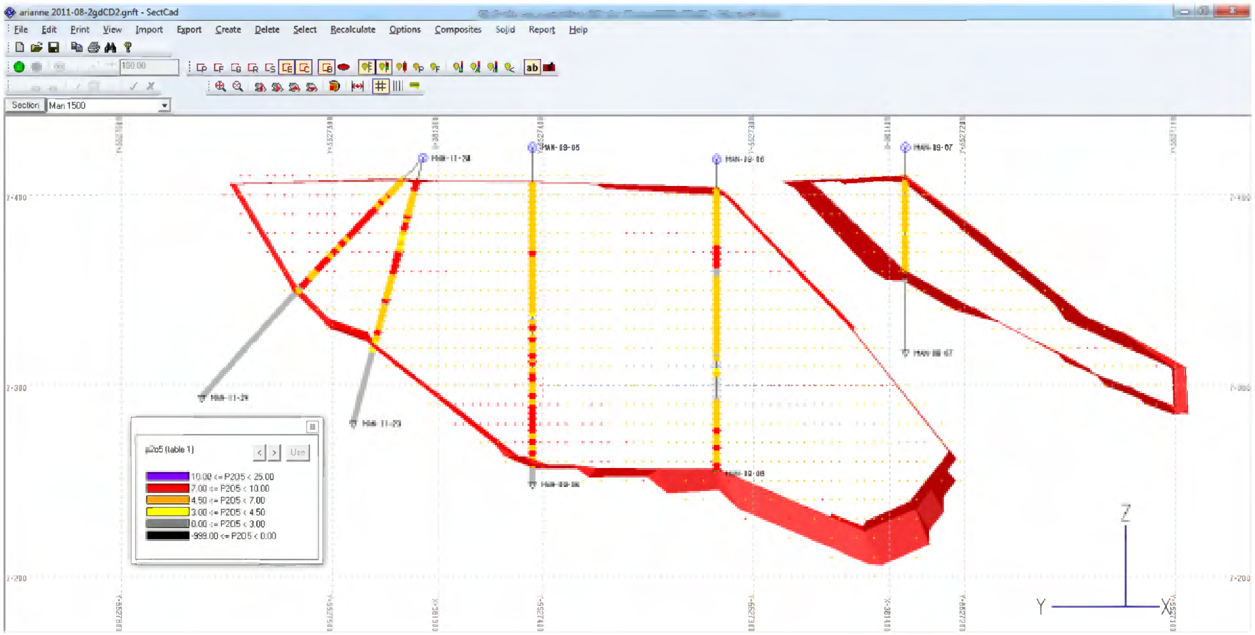


Figure 14.28 – Section Man 1500 in the middle of Manouane with blocks colour coded according to grade



14.4 Zone 2

The mineral resources at Zone 2 have not changed since 2009 and this section reproduces the previous technical report that was prepared by the same Author, whom is also the author of the current report.

The mineral resources of Zone 2 are not used in the Preliminary Feasibility Study because they are categorized as Inferred mineral resources.

Figure 14.29 – Drill hole layout in plan view UTM NAD 83 coordinates

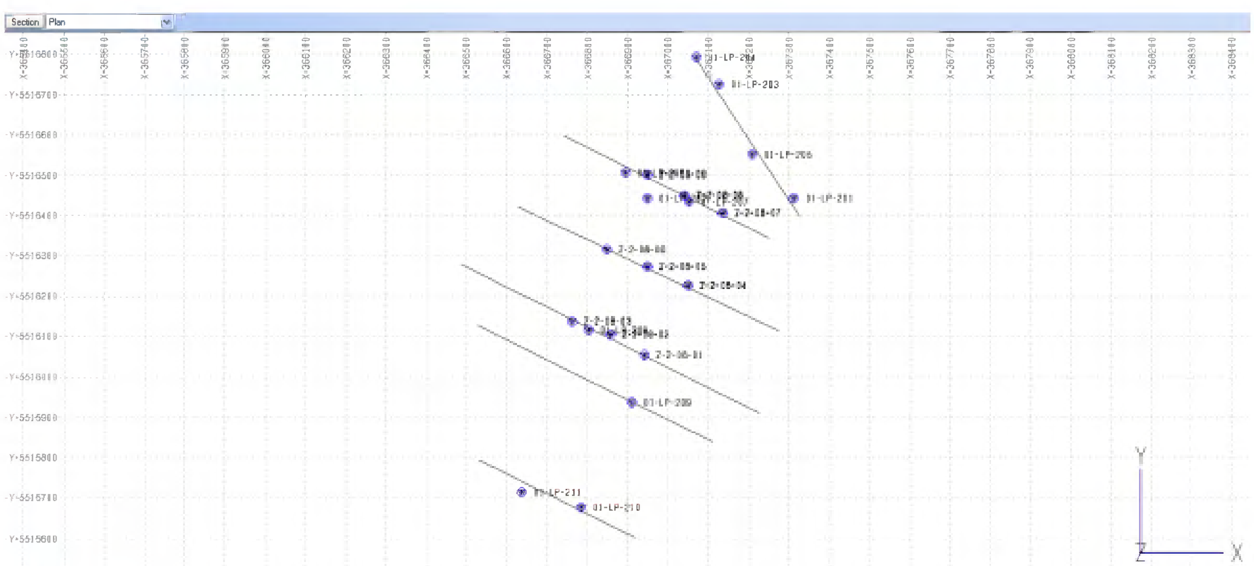


Figure 14.30 – Typical cross section labelled Z3 in zone 2

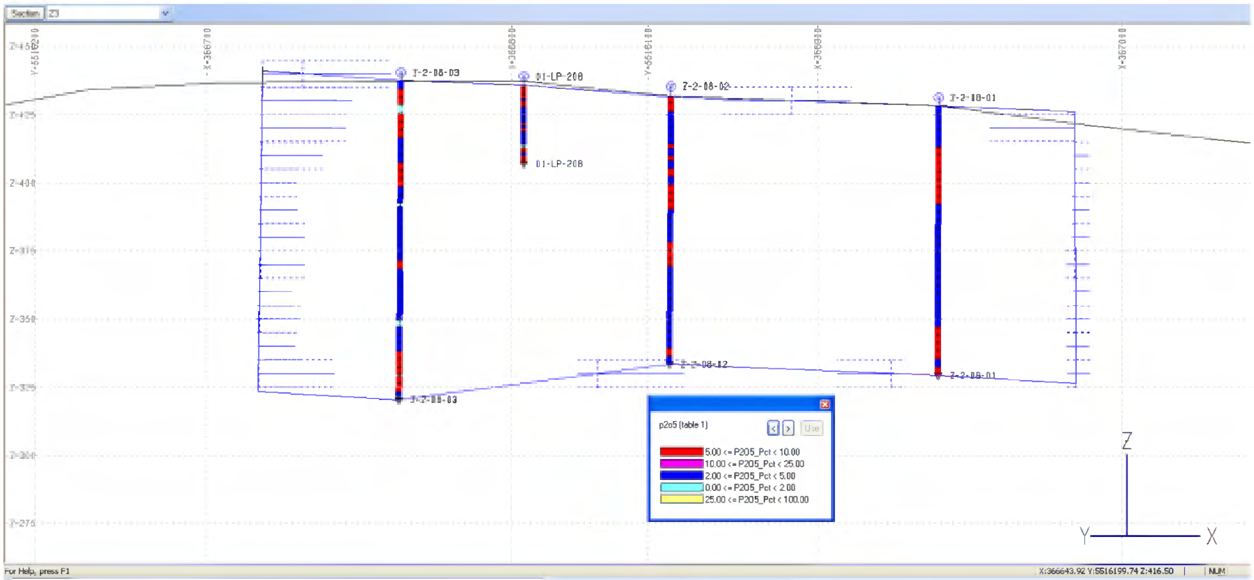
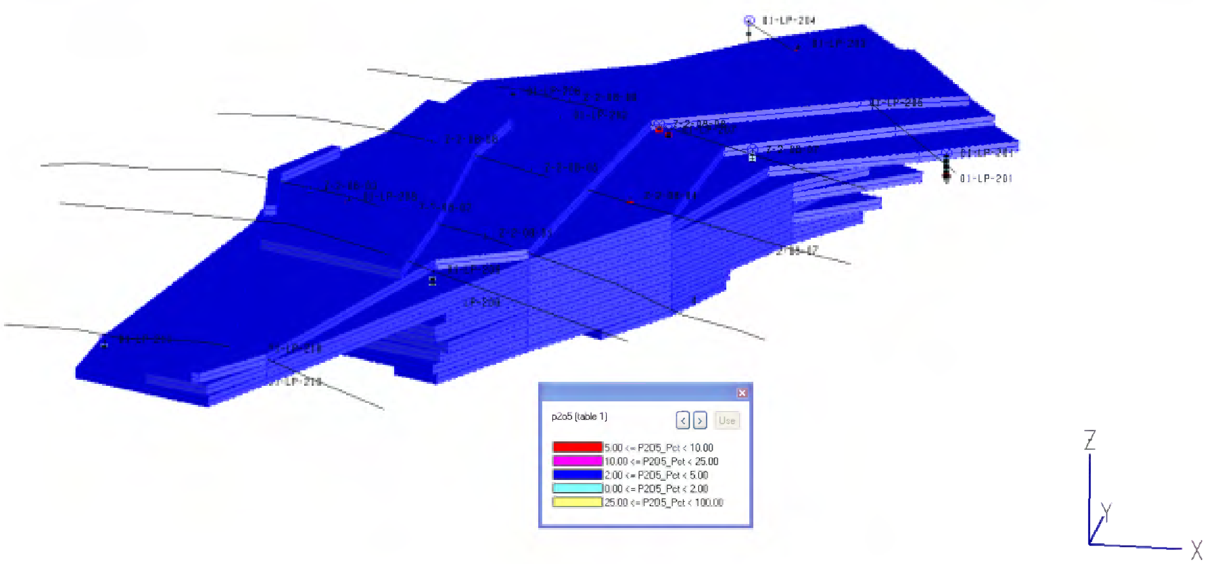


Figure 14.31 – Oblique view of the interpretation on 10 m levels looking North West



The grades are estimated in each 10 m (EW) x 10 m (NS) x 10 m (Z) block of a regular matrix of 161 columns (EW), 179 rows (NS) and 32 benches (Z) with its center within the limits of the mineralized zones. Altogether, 20,272 blocks were estimated within the envelope from 383 composites (data points representing 3 meters). The block model is cut by overburden\rock surface and the topography.

The average % P_2O_5 and % TiO_2 grade of each block is interpolated by inverse of the distance from the grades of nearby 3 m composites.

The interpolation parameters are based on drill spacing, envelope extension and orientation.

Figure 14.32 – Block model origin and extent Zone 2

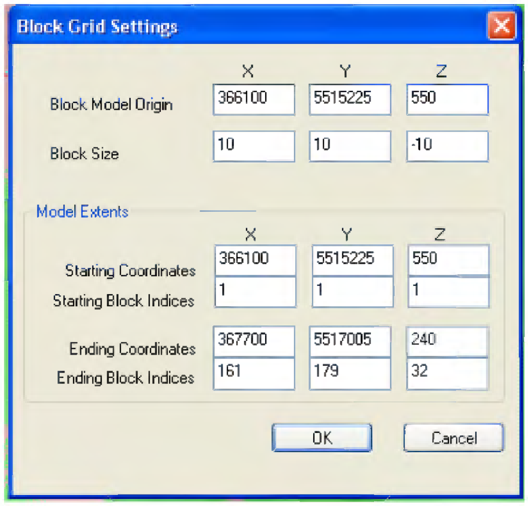
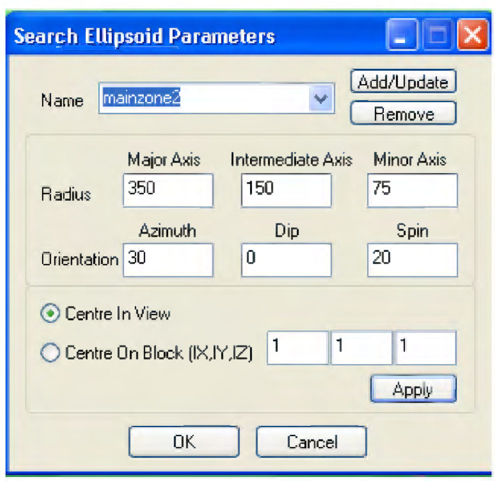


Figure 14.33 – Search ellipsoid parameters Zone 2



For the interpolation process, estimation was made with one run. A search ellipse of 350 m, 150 m, 75 m maximum composite 10, minimum of 2, maximum from same hole is 4, with long axis North 30 degrees and dipping South East at 20 degrees.

14.4.1 Mineral Resource Statement

Mineral resources for Lac à Paul Number 2 Zone were estimated using the same 2.43% P_2O_5 cut-off grade as in Paul and Manouane. At this base case cut-off, the number 2 Zone hosts an Inferred Mineral Resource of 64.0 million tonnes grading 4.55% P_2O_5. The mineral resource estimates are outlined in the table below. Results are presented as in-situ. There are no known factors or issues related to permitting, legal, mineral title, taxation, socioeconomic or political relations that could materially affect the mineral resource estimate. Potential modifying factors regarding marketing are discussed in the Market study section.

Figure 14.34 – Mineral resource summary for Zone 2 using a 2.43% cut-off grade

Ressources d'Arianne			For Public disclosure	
cut-off >=2.43% P2O5			Rounded numbers	
Lac à Paul	Resources	07-Nov-11		
OFFICIAL RESOURCES	ZONE 2			
	FixedDensity	P2O5_Pct	TiO2_Pct	Tons
inferred	3.23	4.55	4.57	64,000,000

14.5 Mineral Resource Estimates Paul, Manouane, Zone 2 and Totals

The following mineral resources models are presented for each zone and total for the 3 zones.

Table 14.5 – Mineral Resource model for 3 zones 43-101 compliant at 2.43% P_2O_5 cut-off

Ressources d'Arianne			For Public disclosure	
cut-off >=2.43% P2O5			Rounded numbers	
Lac à Paul	Resources	07-Nov-11		
OFFICIAL RESOURCES	PAUL			
	FixedDensity	P2O5_Pct	TiO2_Pct	Million tons
inferred	3.42	6.61	8.25	50,300,000
indicated	3.42	7.10	8.21	161,800,000
measured	3.42	6.82	7.89	22,100,000
Meas+Ind	3.42	7.06	8.17	183,900,000
OFFICIAL RESOURCES	MANOUANE			
	FixedDensity	P2O5_Pct	TiO2_Pct	Tons
indicated	3.42	5.64	8.46	26,900,000
measured	3.42	5.93	8.77	136,900,000
Meas+Ind	3.42	5.88	8.72	163,800,000
OFFICIAL RESOURCES	ZONE 2			
	FixedDensity	P2O5_Pct	TiO2_Pct	Tons
inferred	3.23	4.55	4.57	64,000,000
All 3 deposits				
Measured	3.42	6.05	8.65	159,000,000
Indicated	3.42	6.89	8.24	188,700,000
Inferred	3.31	5.46	6.19	114,400,000
Total M+I	3.42	6.51	8.43	347,700,000

15.0 MINERAL RESERVE ESTIMATES

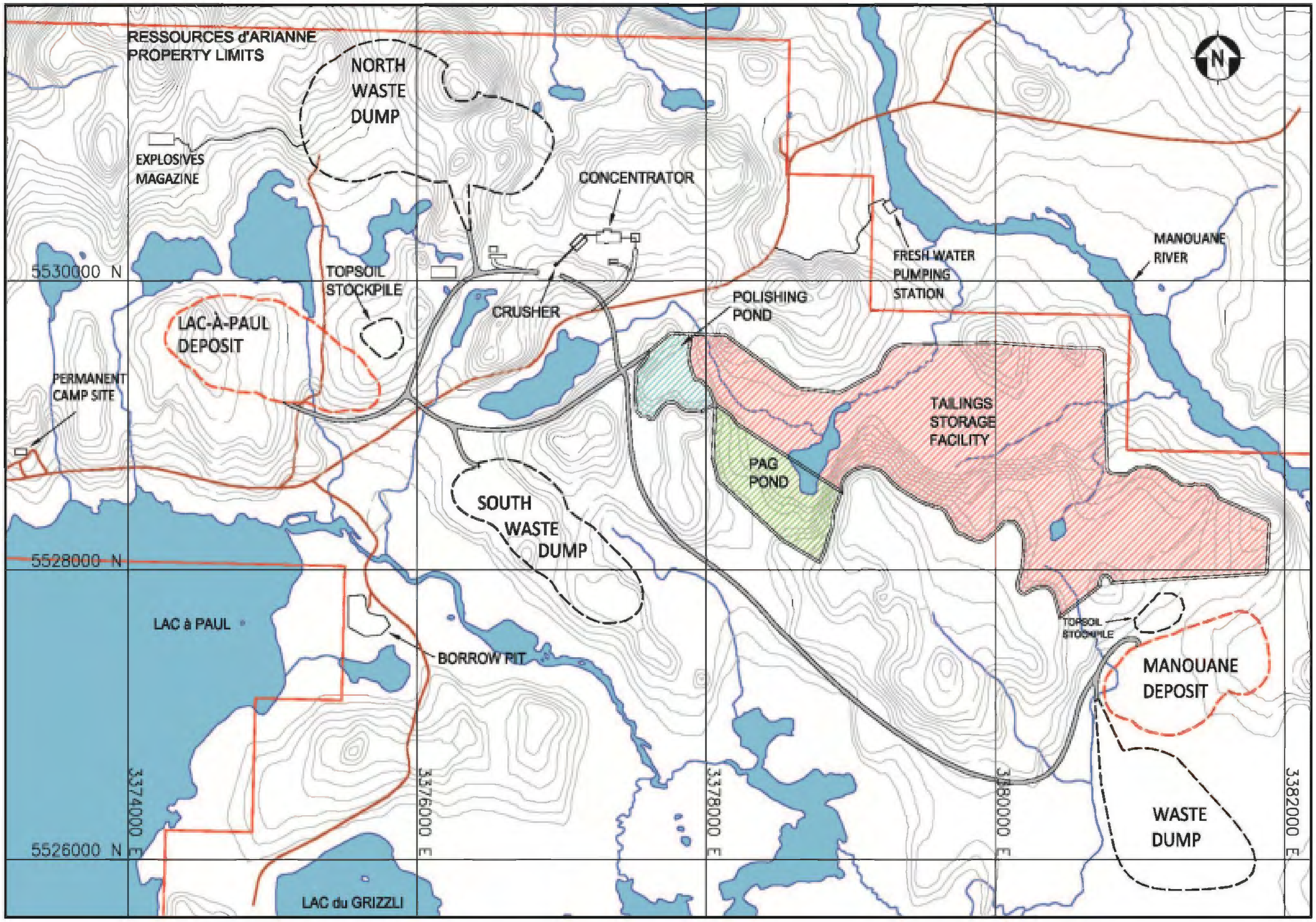
This section of the report discusses the Mineral Reserves for the Paul and Manouane deposits that were estimated by Met-Chem. The Zone 2 deposit was not evaluated by Met-Chem and is not included in this section of the report.

Table 15.1 summarizes the proven and probable mineral reserves and Figure 15.1 provides a general layout of the Paul and Manouane deposits.

Table 15.1 – Mineral Reserves

Category	Ore (Mt)	P_2O_5 (%)	TiO_2 (%)
Paul			
Proven	21.4	6.85	7.94
Probable	140.3	7.21	8.29
Sub-Total	**161.7**	**7.16**	**8.25**
Manouane			
Proven	123.3	5.99	8.84
Probable	22.1	5.72	8.54
Sub-Total	**145.4**	**5.95**	**8.79**
Total Reserves			
Proven	144.7	6.12	8.71
Probable	162.4	7.01	8.33
Grand-Total	**307.1**	**6.59**	**8.51**

Figure 15.1 – Paul and Manouane General Layout



15.1 Block Model

The 3-Dimensional Geological Block Models for the Paul and Manouane deposits were supplied to Met-Chem by SGS Canada Inc. in the form of comma delimited text files. The block models are composed of blocks that are 10 m x 10 m x 10 m high. Met-Chem imported this information into MineSight® Version 6.10, creating a 3-Dimensional mine planning block model for each deposit.

SGS supplied a topographic surface for each deposit as well as the overburden contact. This information was used by Met-Chem to calculate the amount of overburden contained within each block. Overburden is defined as loose sand and gravels that can be excavated without the need for drilling and blasting.

The mineral resources for the Paul and Manouane deposits were verified using Met-Chem's mine planning block model. The results matched SGS's resource estimate, thus validating the block model import.

15.2 Pit Optimization

Open pit optimization was conducted on the Paul and Manouane deposits to determine the economic pit limits. The optimization was carried out during the initial stage of the Project using cost, sales price and pit and plant operating parameters that were identified in the Scoping Study from 2010. The pit optimization was re-evaluated after a preliminary mine plan was completed and the cost, sales price and pit and plant operating parameters were better defined.

The pit optimization was done using the Economic Planner optimizer of MineSight®. The optimizer operates on a net value calculation for all the blocks in the model, i.e. revenue from sales of apatite concentrate less operating cost. The formula is presented below:

- Concentrate Tonnage = Ore Tonnage x Recovery x Grade of Feed / Concentrate Grade;
- Revenue = Concentrate Tonnage x Sales Price;
- Net Value = Revenue – (Mining Cost + Processing Cost + Transportation Cost + General & Administration Cost).

In order to comply with the guidelines of the NI 43-101 on Standards of Disclosure for Mineral Projects, only ore blocks classified in the measured and indicated categories were allowed to drive the pit optimizer. Inferred Resource blocks were treated as waste, bearing no economic value. For the Paul deposit, a constraint was added to the optimization to ensure that the pit limit remains a minimum 75 m from the lakes to the North.

15.2.1 Pit Optimization Parameters

The following section discusses the pit optimization parameters that were used to define the economic pit limits. The parameters are based on results from the preliminary mine plan that was developed during the Project.

Mining Cost – The mining cost used in the analysis was 2.00 US$/t for ore and waste at Paul and 3.25 US$/t at Manouane. The increased cost at Manouane reflects the longer haul to the crusher. These costs represent the drilling, blasting, loading and hauling of material as well as road maintenance, dewatering and other services associated with the mining operation. A cost of 1.75 US$/t for overburden was used at Paul and 1.95 US$/t at Manouane. The overburden cost is lower since no drilling and blasting is required.

Processing Cost – A cost of 8.33 US$/t was used for crushing and processing the ore to produce the concentrate product.

Concentrate Transport Cost – A cost of 11.00 US$/t of concentrate was used for the transportation of the concentrate from the plant to the rail facility in Dolbeau/Mistassini. This cost reflects trucking the concentrate as well as road maintenance.

General, Administration and Infrastructure Cost – A cost of 5.85 US$/t of concentrate was used to represent general, administration and infrastructure costs. This cost is associated with support functions such as purchasing and warehousing, accounting, environmental management, health and safety, human resources, insurance and general management.

Sales Price – A sales price of 175 US$/t of concentrate was used for this analysis. This price is discussed in further detail in Section 19 of this report.

Plant Recovery – The plant recovery used in the pit optimization is based on metallurgical testwork that was carried out by Corem during this Study. Table 15.2 and Table 15.3 present the recoveries for each deposit. These recoveries assume a concentrate product with an average grade of 38% P_2O_5.

Table 15.2 – Paul Plant Recovery

Head Grade (% P_2O_5)	Recovery (%)
< 4.5	82.5
4.5 – 6.5	87.5
6.5 – 8.5	90.0
> 8.5	92.5

Table 15.3 – Manouane Plant Recovery

Head Grade ($\% P_2O_5$)	Recovery (%)
< 4.5	83.0
4.5 – 6.0	85.0
> 6.0	87.0

Pit Slope – An overall pit slope of 50° was used in the pit optimization. The pit slope was based on Met-Chem's experience with similar projects in the region.

Table 15.4 summarizes the economic parameters that were used in the pit optimization.

Table 15.4 – Pit Optimization Parameters

Item	Value*	Units
Mining Cost – Ore / Waste Rock (Paul)	2.00	US$/t (mined)
Mining Cost – Ore / Waste Rock (Manouane)	3.25	US$/t (mined)
Mining Cost – Overburden (Paul)	2.00	US$/t (mined)
Mining Cost – Overburden (Manouane)	1.75	US$/t (mined)
Processing Cost	8.33	US$/t (processed)
Concentrate Transport Cost	11.00	US$/t (conc.)
General, Admin & Infrastructure Cost	5.85	US$/t (conc.)
Sales Price	175	US$/t (conc.)
Recovery	Table 15.2 & 15.3	%
In-Situ Dry Density – Overburden	2.00	t/m^3
In-Situ Dry Density – Ore	3.42	t/m^3
In-Situ Dry Density – Waste Rock	2.91	t/m^3

* The cost parameters are preliminary estimates for developing the economic pit and should not be confused with the operating costs subsequently developed for the Prefeasibility Study and given elsewhere in this report.

15.2.2 Cut-off Grade

Using the economic parameters presented above, Met-Chem calculated a cut-off grade of 2.43% P_2O_5 for Paul and Manouane. The cut-off grade is used to determine whether the material being mined will generate a profit after paying for the processing, transportation and G&A costs. Material that is mined below the cut-off grade is sent to the waste dump.

15.2.3 Pit Optimization Results

The pit optimization identified an economic resource of 173.4 Mt of ore for the Paul deposit with a P_2O_5 grade of 7.10%. A total of 163.9 Mt of waste is included in this pit resulting in a waste to ore stripping ratio of 0.9:1. The economic resource for the Manouane deposit is 153.5 Mt of ore with a P_2O_5 grade of 5.94%. A total of 73.1 Mt of waste is included in this pit resulting in a waste to ore stripping ratio of 0.4:1.

The pit optimization does not account for dilution and ore loss and does not provide an access ramp into the pit. These issues are discussed in the Mine Design Section (16.2) of this report. Figure 15.2 and Figure 15.3 present the pit optimization results for the Paul and Manouane deposits.

Figure 15.2 – Pit Optimization Results (Paul Deposit)

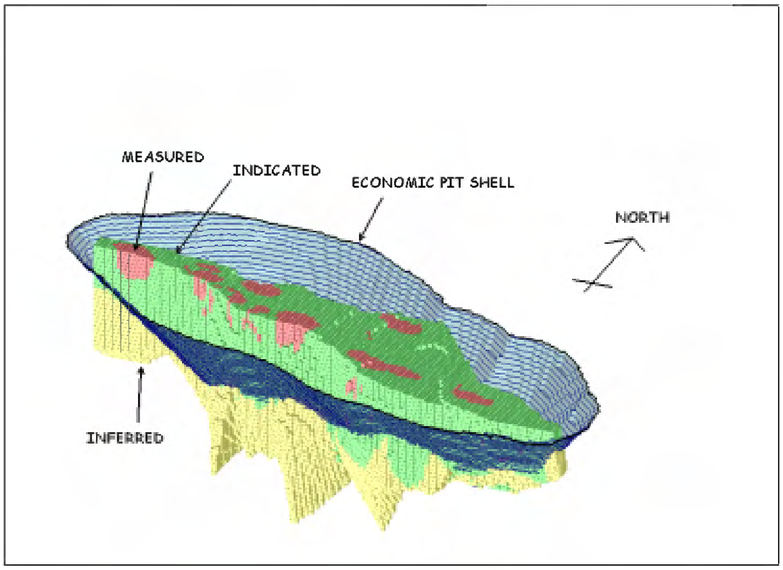
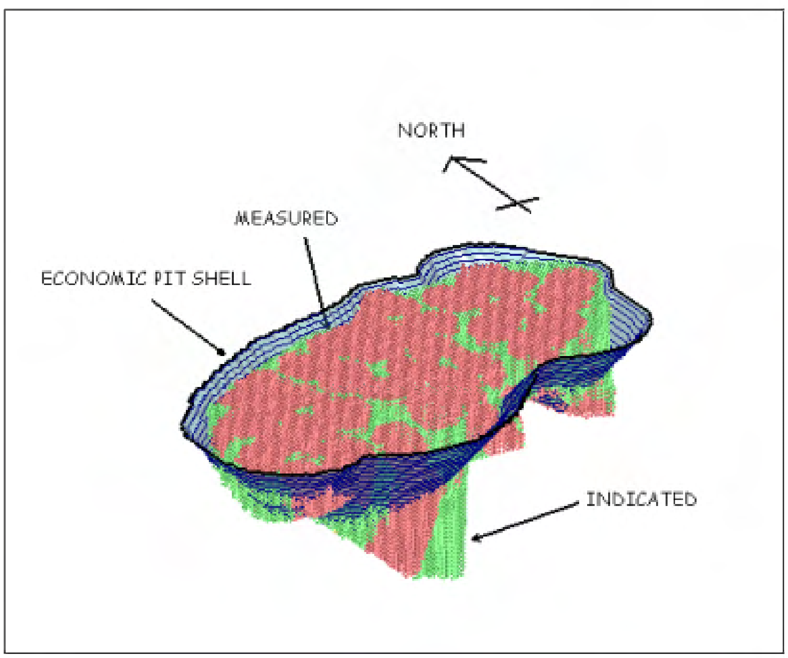


Figure 15.3 – Pit Optimization Results (Manouane Deposit)



Upon completion of the Pre-Feasibility Study, Met-Chem confirmed that the pit optimization exercise was still valid using the updated cost estimate developed in the Study.

15.3 Pit Design

The Paul and Manouane pit designs were completed using the following parameters:

- Overall Pit slope — 50°;
- Overburden Density – 2.00 t/m^3 (In-situ dry);
- Waste Density – 2.91 t/m^3 (In-situ dry);
- Ore Density – 3.42 t/m^3 (In-situ dry);
- Mining losses - a 2% ore loss is assumed for both Paul and Manouane pit designs.

These parameters are discussed in further detail in Section 16.

The pit that has been designed for the Paul deposit is approximately 1,500 m long and 700 m wide at surface with a maximum pit depth of 340 m. The total surface area of the pit is roughly 0.7 km^2. The overburden thickness averages 5.2 m with a range of 1 m to 15 m. As a result of the ramp design, the pit limit approaches the corner of a lake. This should be revisited in the Feasibility stage to ensure a minimum offset of 75 m from the lake.

The ramp accesses the pit at the 440 m elevation in the Southeast corner. The ramp descends down the western wall and has a switch back at the 355 m elevation. The ramp switches back once again at the 185 m and 155 m elevations and is developed as a slot until the pit bottom at the 115 m elevation.

The pit that has been designed for the Manouane deposit is approximately 1,200 m long and 600 m wide at surface with a maximum pit depth of 300 m. The total surface area of the pit is roughly 0.6 km^2. The overburden thickness averages 12.2 m with a range of 4 m to 21 m.

The ramp accesses the pit at the 425 m elevation on the North side. The ramp descends down the West and southern walls until developing into a slot at the 245 m elevation. The elevation of the pit bottom is 135 m.

15.3.1 Mineral Reserves

The Paul pit includes 21.4 Mt of proven mineral reserves and 140.3 Mt of probable mineral reserves for a total of 161.7 Mt. The grade of the Paul deposit is 7.16 % P_2O_5. In order to access these reserves, 7.6 Mt of overburden and 163.2 Mt of waste rock must be removed, resulting in a waste to ore stripping ratio of 1.1:1. At the planned production rate of 12 Mt of ore per year, the pit contains roughly 14 years of mineral reserves.

The Manouane pit includes 123.3 Mt of proven mineral reserves and 22.1 Mt of probable mineral reserves for a total of 146.0 Mt. The grade of the Manouane deposit is 5.95 % P_2O_5. In order to access these reserves, 14.7 Mt of overburden and 70.3 Mt of waste rock must be removed, resulting in a waste to ore stripping ratio of 0.6:1. At the planned production rate of 12 Mt of ore per year, the pit yields roughly 12 years of mineral reserves.

Table 15.5 shows the proven and probable mineral reserves that resulted from the pit designs for the Paul and Manouane deposits. These mineral reserves which account for ore loss form the basis of the mine plan. The pit layouts are shown in Figure 15.4 and Figure 15.5.

Table 15.5 – Proven and Probable Mineral Reserves (Paul, Manouane and Total)

Category	Ore (Mt)	P_2O_5 (%)	TiO_2 (%)	Waste (Mt)	Strip Ratio
Paul					
Proven	21.4	6.85	7.94		
Probable	140.3	7.21	8.29		
Sub-Total	**161.7**	**7.16**	**8.25**	**170.8**	**1.1**
Manouane					
Proven	123.3	5.99	8.84		
Probable	22.1	5.72	8.54		
Sub-Total	**145.4**	**5.95**	**8.79**	**85.0**	**0.6**
Total Reserves					
Proven	144.7	6.12	8.71		
Probable	162.4	7.01	8.33		
Grand-Total	**307.1**	**6.59**	**8.51**	**255.8**	**0.8**

15.3.2 Dump Design

Waste dumps were designed to contain the capacity of overburden and waste rock from the Paul and Manouane deposits. These dumps were designed using the following parameters:

- Overall Slope: 34°;
- Maximum Dump Height: 75 m;
- Setback from Pit Crest: 100 m;
- Setback from Major Creeks and Rivers: 100 m.

The waste dumps will be constructed in 5 m high lifts, compacted by a bulldozer.

The Paul North dump has a capacity of 40 Mm^3 and is located to the Northwest of the plant site. The dump is designed to an elevation of 505 m and has a footprint of 1.4 km^2.

The Paul South dump has a capacity of 22 Mm^3 and is located to the Southeast of the pit. The dump is designed to an elevation of 475 m and has a footprint of 0.7 km^2.

The Manouane dump has a capacity of 39 Mm^3 and is located to the South of the pit. The dump is designed to an elevation of 485 m and has a footprint of 0.8 km^2.

The dump layouts are included in Figure 15.4 and Figure 15.5.

Figure 15.4 – Pit and Dump Layout (Paul)

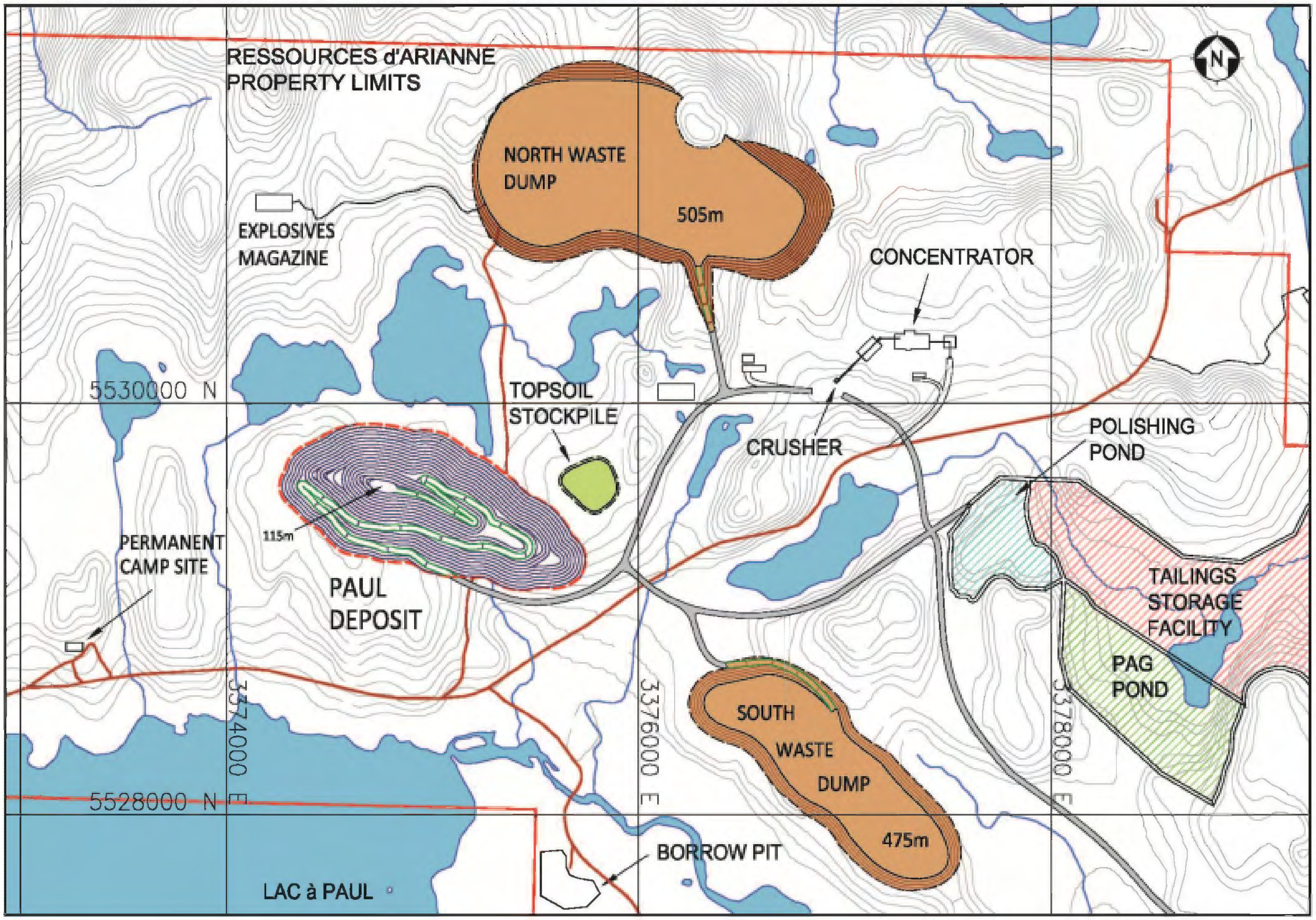
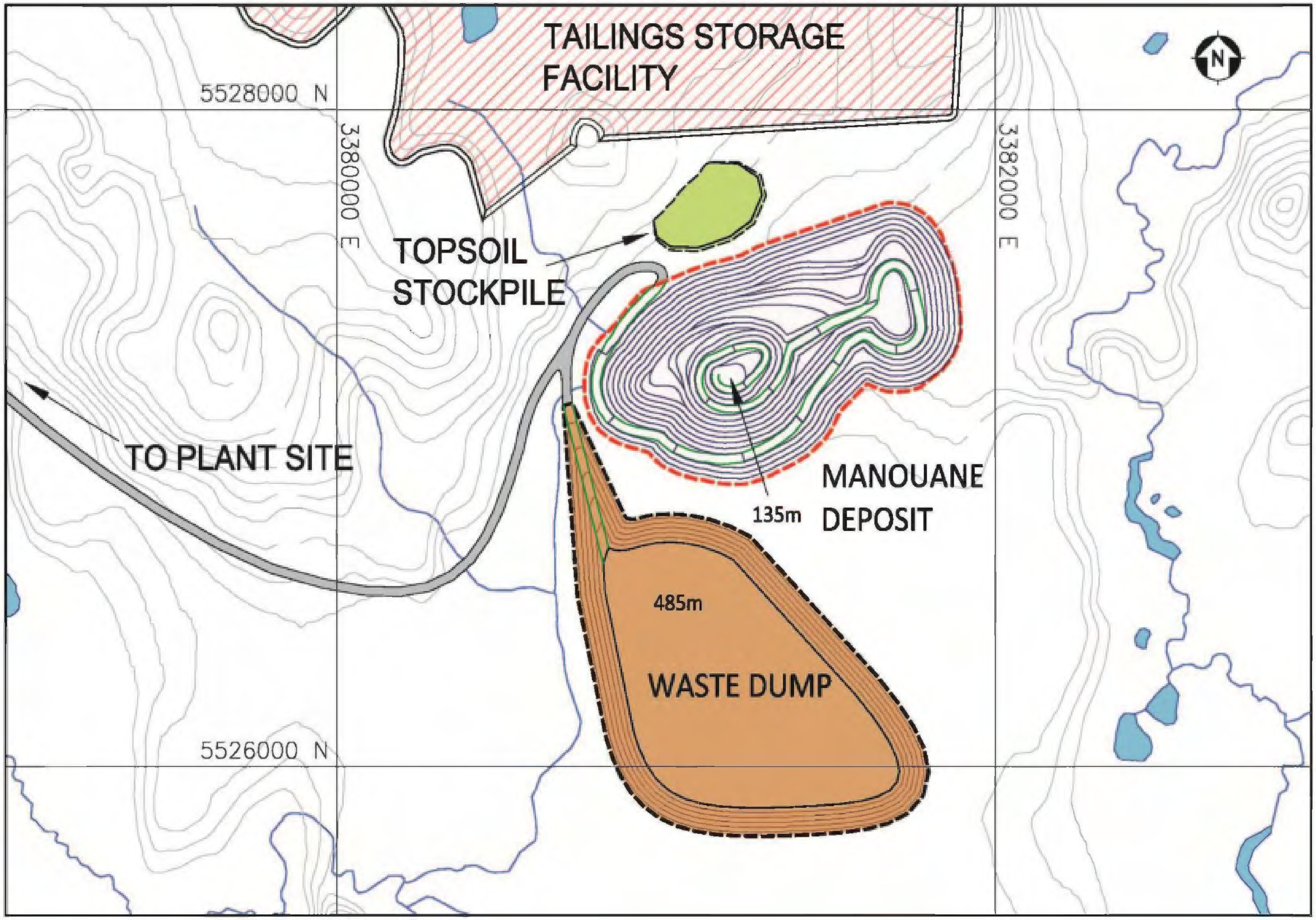


Figure 15.5 – Pit and Dump Layout (Manouane)



16.0 MINING METHODS

16.1 Mining Method

The mining method selected for the Project is conventional truck and shovel with 10 m bench height.

Vegetation and topsoil will be cleared by dozers ahead of the mining operation. Suitable organic material will be stockpiled for future reclamation use. Overburden will be stripped with front end hydraulic shovels and loaded into rigid frame mining trucks which will haul it to the waste dump. The ore and waste rock will be drilled and blasted then loaded and hauled with the same fleet of trucks and shovels. The ore will be hauled roughly 2 km to the primary crusher and the waste rock will be hauled to the dump.

To properly manage water infiltration into the pit, a sump will be established at the lowest point on the pit floor. Water collected in this sump will be pumped to a collection point at surface.

16.2 Mine Design

The economic pit limits derived from the pit optimization were used as a guideline for the detailed pit design. The pit design process includes smoothing the pit wall, adding ramps to access the pit bottom and ensuring that the pit can be mined using the initially selected equipment. The following section provides the parameters that were used for the detailed pit design.

16.2.1 Material Properties

Table 16.1 defines the material properties that were used for mine design and mine planning purposes. The density of ore was supplied by SGS while the remaining parameters were taken from Met-Chem's internal database. These properties are important for determining the mine equipment fleet requirements.

Table 16.1 – Material Properties

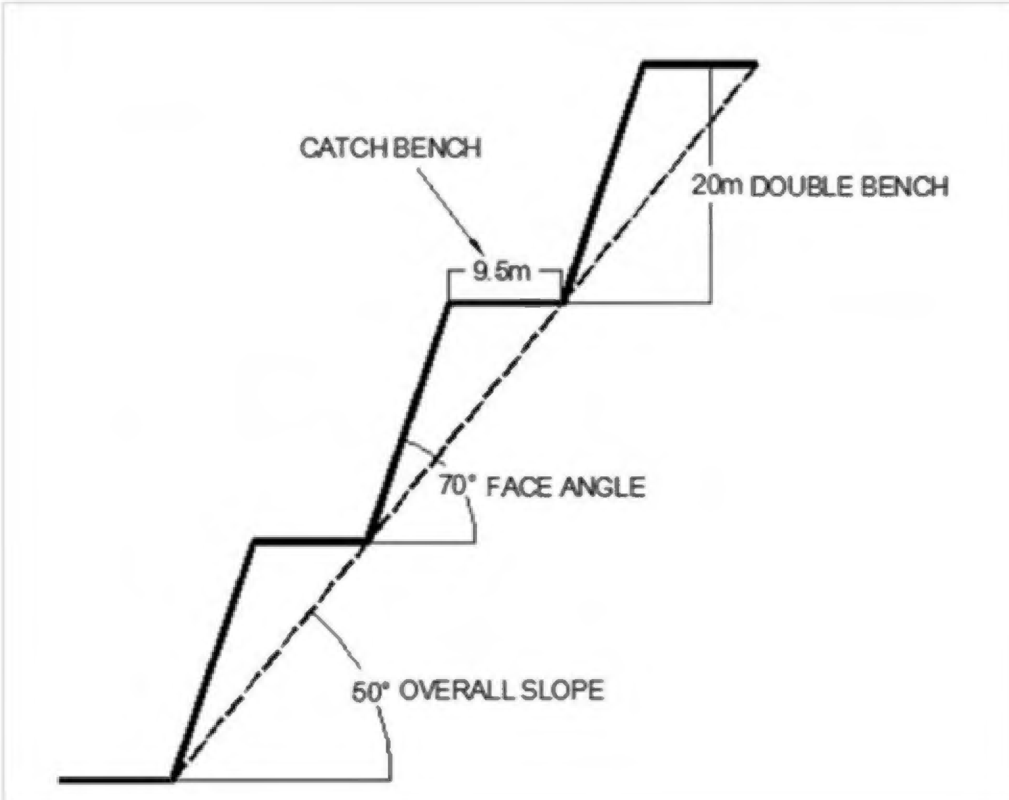
Material Type	In-Situ Dry Density (t/m^3)	Moisture Content (%)	Swell Factor (%)
Overburden	2.00	5	25
Waste	2.91	5	25
Ore	3.42	5	25

16.2.2 Geotechnical Pit Slope Parameters

An overall pit slope of 50° was used for the Paul and Manouane pit designs. The final pit wall includes a 9.5 m catch bench for every two (2), 10 m high benches and accounts for a 70° face angle. This design is based on Met-Chem's internal database for similar deposits in the region. Met-Chem recommends a complete pit slope analysis if the Project advances to the Feasibility stage. The pit wall configuration is illustrated in Figure 16.1.

A minimum mining width of 30 m has been considered in the pit design.

Figure 16.1 – Pit Wall Configuration



16.2.3 Haul Road Design

The ramps and haul roads were designed with an overall width of 28 m. For double lane traffic, industry practice indicates the running surface width to be a minimum of 3 times the width of the largest truck Caterpillar 785 (143 t) with allowances for berms and ditches.

A maximum ramp grade of 10% was used. The ramp width was reduced to 21 m for the final few benches at the bottom of the pit. This was done to reduce the quantity of waste in the overall pit design. The final few benches will see less truck traffic thus allowing for the reduced ramp width.

16.2.4 Mine Dilution and Ore Loss

During the mining operation, material at the ore waste contacts will not be separated perfectly. This effect is accounted for as either dilution, ore loss or a combination of both.

In order to protect the ore zone from waste contamination and to maintain the deposit's P_2O_5 grade, an ore loss was assumed at these contacts.

Met-Chem calculated an ore loss of 2% for both the Paul and Manouane deposits. During the production scheduling, 2% of the ore tonnage is converted into waste and sent to the waste dump. The grade of P_2O_5 is not affected since no dilution is accounted for. The ore loss is reflected in the mineral reserves.

If the Project advances into the Feasibility stage, the mine dilution and ore loss assumption should be evaluated in more detail.

16.3 Mine Planning

16.3.1 Annual Production Requirements

The production target for the mine is to supply the maximum ore feed that the plant can handle. The target for Year 1 is 8.9 Mt of run of mine ore. This target is a function of the plant's ramp up before obtaining full operating capacity. The plant's availability is expected to increase from 93% in Year 2 to 95% in Year 4. At 95% plant availability, the mine is expected to supply 12.304 Mt of run of mine ore per year (33,710 t/d).

The mine plan will attempt to supply a constant head grade close to the deposit's average although due to the grade variability in the deposits, the grade in the mine plan ranges from 6.7% to 7.3% for Paul and from 5.5% to 6.3% for Manouane. The amount of concentrate produced is a function of head grade and plant recovery and thus varies from an average of 2.1 Mt per year for Paul to an average of 1.7 Mt per year for Manouane.

The Paul deposit has been selected to be the first deposit to be mined. When its reserves are depleted in Year 14, production will begin at the Manouane deposit. The reserves at Manouane are depleted in Year 26.

The decision to mine the Paul deposit first was based on the order in which the deposits were drilled. If the Project advances to the Feasibility stage, an in-depth analysis should be made to determine the preferred mining sequence.

16.3.2 Work Schedule

Mining operations for the Project will be 365 days per year, operating around the clock on two (2), twelve (12) hour shifts. The fleet requirements and manpower are based on this work schedule.

16.3.3 Pre-Production

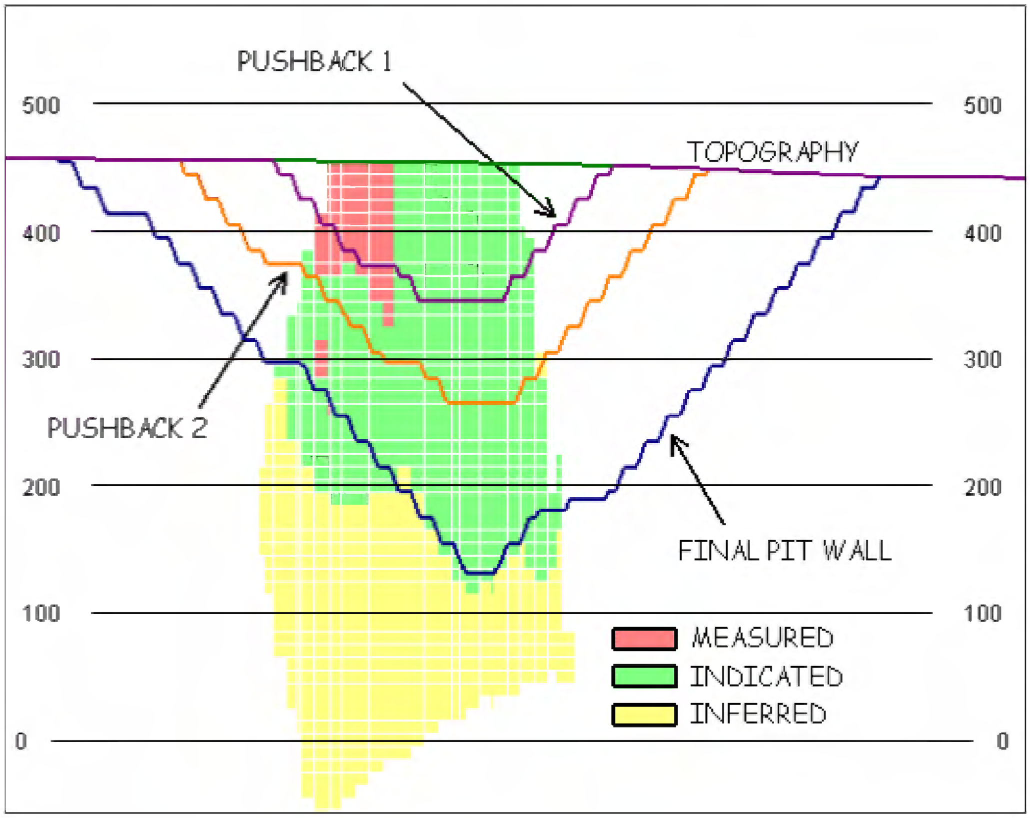
A pre-production phase of six (6) months has been planned at the Paul deposit to achieve the following objectives:

- Supply road construction material;
- Supply construction material for the tailings dyke and polishing pond;
- Strip overburden and waste rock to expose the ore.

16.3.4 Pushback Sequencing

In order to minimize the waste removal in the early years of production, the Paul deposit will be mined in a series of three (3) pushbacks. Figure 16.2 shows a typical cross-section of the Paul deposit, highlighting the pushback designs.

Figure 16.2 – Paul Pushback Design



16.3.5 Production Schedule (Mine Plan)

A production schedule was developed for the life of the Paul and Manouane deposits. The schedule realizes the pre-production requirements and meets the annual production target.

The pre-production phase of mining will begin in Pushback 1 of the Paul deposit. A total of 2.6 Mt of material will be excavated in pre-production. Of this material, 1.5 Mt will be hauled to construct the tailings and polishing pond dykes. A total of 4 km of mine roads will be built during pre-production using suitable waste material from the mine. The remaining waste material will be hauled to the Paul North dump.

During the first year of production, mining will progress in Pushback 1 of the Paul deposit. A total of 1.4 Mt of concentrate will be produced in Year 1, which accounts for the plant ramp-up (waste to ore stripping ratio of 0.4:1).

Overburden stripping and waste removal will begin in Pushback 2 during the second year of production. The ore for Year 2 will be mined from Pushback 1 (waste to ore stripping ratio will be 1.1:1).

During Year 3, Pushback 1 will be completed and Pushback 2 will begin producing ore. Overburden stripping and waste removal will begin in Pushback 3 in Year 4. The Paul deposit will be mined until reserves are depleted in Year 14.

Waste rock from the Paul deposit will be used to elevate the tailings dykes as required. Remaining overburden and waste rock will be hauled to the North Waste Dump until Year 8. During Year's 9 - 14, waste rock hauled from the Paul deposit will be hauled to the South Waste Dump.

The Manouane deposit will be mined in a series of two (2) pushbacks. Mining at the Manouane deposit will begin in Year 13 and continue until reserves are depleted in Year 26. The haul distance from the Manouane deposit to the crusher is approximately 7 km and requires the construction of a haul road.

A summarized production schedule for the Paul and Manouane deposits is presented in Table 16.2. Detailed end of period maps showing the pit and dump advances were produced as part of the Pre-Feasibility Study.

Table 16.2 – Mine Production Schedule (in '000 t)

Description		PRE PROD	Year 01	Year 02	Year 03	Year 04	Year 05	Year 6 - 8	Year 9 - 11	Year 12 - 14	Year 15 - 17	Year 18 - 20	Year 21 - 23	Year 24 - 26	Total
CONCENTRATE	kt	0	1,409	1,969	2,055	2,075	2,134	6,197	6,415	6,151	5,141	5,048	5,134	3,503	47,229
Ore	kt	0	8,882	12,045	12,175	12,304	12,304	36,912	36,912	36,912	36,912	36,912	36,912	27,940	307,122
P_2O_5	%	0.0	6.7	6.9	7.1	7.1	7.3	7.1	7.3	7.1	6.1	6.0	6.1	5.5	6.59
TiO_2	%	0.0	8.0	8.4	8.2	8.1	8.2	7.7	8.1	9.2	9.0	8.8	8.9	8.3	8.50
Total Waste	kt	2,622	3,152	10,560	11,559	12,373	15,784	48,784	44,142	32,700	33,406	17,172	15,381	8,198	255,834
Overburden	kt	664	912	1,845	734	964	1,829	662	0	8,675	6,061	0	0	0	22,346
Waste	kt	1,959	2,240	8,716	10,824	11,409	13,954	48,122	44,142	24,024	27,345	17,172	15,381	8,198	233,488
Stripping Ratio		n/a	0.4	0.9	0.9	1.0	1.3	1.3	1.2	0.9	0.9	0.5	0.4	0.3	0.8

Paul		PRE PROD	Year 01	Year 02	Year 03	Year 04	Year 05	Year 6 - 8	Year 9 - 11	Year 12 - 14	Year 15 - 17	Year 18 - 20	Year 21 - 23	Year 24 - 26	Total
Ore	kt	0	8,882	12,045	12,175	12,304	12,304	36,912	36,912	30,201	0	0	0	0	161,735
P_2O_5	%	0.0	6.7	6.9	7.1	7.1	7.3	7.1	7.3	7.2	0.0	0.0	0.0	0.0	7.16
TiO_2	%	0.0	8.0	8.4	8.2	8.1	8.2	7.7	8.1	9.2	0.0	0.0	0.0	0.0	8.25
Total Waste	kt	2,622	3,152	10,560	11,559	12,373	15,784	48,784	44,142	21,843	0	0	0	0	170,819
Overburden	kt	664	912	1,845	734	964	1,829	662	0	0	0	0	0	0	7,610
Waste	kt	1,959	2,240	8,716	10,824	11,409	13,954	48,122	44,142	21,843	0	0	0	0	163,210
Stripping Ratio		n/a	0.4	0.9	0.9	1.0	1.3	1.3	1.2	0.7	n/a	n/a	n/a	n/a	1.1

Manouane		PRE PROD	Year 01	Year 02	Year 03	Year 04	Year 05	Year 6 - 8	Year 9 - 11	Year 12 - 14	Year 15 - 17	Year 18 - 20	Year 21 - 23	Year 24 - 26	Total
Ore	kt	0	0	0	0	0	0	0	0	6,711	36,912	36,912	36,912	27,940	145,387
P_2O_5	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	6.1	6.0	6.1	5.5	5.95
TiO_2	%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.4	9.0	8.8	8.9	8.3	8.79
Total Waste	kt	0	0	0	0	0	0	0	0	10,857	33,406	17,172	15,381	8,198	85,014
Overburden	kt	0	0	0	0	0	0	0	0	8,675	6,061	0	0	0	14,736
Waste	kt	0	0	0	0	0	0	0	0	2,182	27,345	17,172	15,381	8,198	70,278
Stripping Ratio		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.6	0.9	0.5	0.4	0.3	0.6

Waste Placement		PRE PROD	Year 01	Year 02	Year 03	Year 04	Year 05	Year 6 - 8	Year 9 - 11	Year 12 - 14	Year 15 - 17	Year 18 - 20	Year 21 - 23	Year 24 - 26	Total
Tailing Dyke	'000 m^3	647	342	438	0	0	1,875	2,964	3,344	2,723	0	0	0	0	12,334
Paul North Dump	'000 m^3	609	1,190	4,458	5,109	5,503	5,263	18,120			0	0	0	0	40,252
Paul South Dump	'000 m^3	0	0	0	0	0	0	0	15,618	6,659	0	0	0	0	22,277
Manouane Dump	'000 m^3	0	0	0	0	0	0	0	0	6,359	15,534	7,376	6,607	3,521	39,398

16.4 Mine Equipment Fleet

The following section discusses equipment selection as well as fleet requirements in order to carry out the mine plan discussed in the previous section. More detailed information is provided in the Pre-Feasibility Study.

16.4.1 Haul Trucks

The haul truck selected for the Project is the Caterpillar 785. The following parameters were used to calculate the number of trucks required to carry out the mine plan.

- Mechanical Availability – 85%;
- Utilization – 90%;
- Nominal Payload – 143 tonnes (85 m^3 heaped);
- Shift Schedule – Two (2), twelve (12) hour shifts per day, seven (7) days per week;
- Operational Delays – 80 min/shift (this includes 15 minutes for shift change, 15 minutes for equipment inspection, 40 minutes for lunch and coffee breaks and ten (10) minutes for fuelling). Fuelling will be carried out once every two (2) shifts for 20 minutes;
- Job Efficiency – 90% (54 min/h; this represents lost time due to queuing at the shovel and dump as well as interference along the haul route);
- Rolling Resistance – 3%.

Table 16.3 summarizes the annual hours of a haul truck based on the specified parameters. Haul routes were generated for ore and waste for each period to calculate the truck requirements. These haul routes were imported in Talpac©, a commercially available truck simulation software package that Met-Chem has validated with mining operations. Talpac© calculated the travel time required for a Caterpillar 785 to complete each route.

Table 16.3 – Truck Hours

Scheduled Hours	8,760	h/y	7 days per week, 24 hours per day, 52 weeks per year
Down Mechanically	1,314	h/y	15% of total hours
Available	7,446	h/y	Total hours minus hours down mechanically
Standby	745	h/y	10% of available hours (represents 90% utilization)
Operating	6,701	h/y	Available hours minus standby hours
Operating Delays	745	h/y	80 min/shift (only incurred only when the truck is available)
Net Operating Hours	5,957	h/y	Operating hours minus operating delays
Working Hours	**5,361**	**h/y**	**90% of net operating hours (reflects job efficiency)**

Haul productivities (tonnes per work hour) were calculated for each haul route using the truck payload and cycle time. The productivity during pre-production has been derated to reflect the fact that hauling and dumping conditions on the tailings dyke will be poor.

Table 16.4 shows the cycle time and productivity for the ore and waste haul routes in Year 4 as an example.

Truck hour requirements were calculated by dividing the production into the productivity for each haul route. The number of trucks required was calculated assuming each truck has the 5,361 hours available to work in a full year, presented in Table 16.4.

Table 16.4 –Truck Productivities (Year 4)

Destination	Cycle Times (min)					Productivity	
	Travel	Spot	Load	Dump	Total	Loads/h	t/h
Ore	17.46	0.70	3.00	1.00	22.16	2.71	387
Waste	23.10	0.70	3.00	1.00	27.80	2.16	309

A fleet of five (5) trucks is required during pre-production. This number increases to six (6) in Year 1, twelve (12) in Year 2 and reaches a peak of 22 in Year six (6). The number of trucks begins to decrease in Year 12 reaching a total of 16 in the last year of the mine life.

16.4.2 Shovels

The main loading machine selected for the Project is the CAT 6030FS (formerly known as the RH120) hydraulic excavator. The CAT 6030FS is a shovel that will be suitable to handle the production requirements as well as the face heights expected.

Met-Chem carried out an analysis to determine whether the hydraulic excavators should be diesel or electric driven. Even though the electric drive models require more capital investment for the electrical infrastructure, the operating cost for the electric shovel was considerably lower than the diesel shovel. The analysis demonstrated that the electric drive CAT 6030FS is the preferred option for the Project.

The following parameters were used to calculate the number of excavators required to carry out the mine plan.

- Mechanical Availability – 85%;
- Utilization – 90%;
- Bucket Capacity – 30 tonnes (16.5 m^3);
- Bucket Fill Factor – 70% in ore, 80% in waste and 100% in overburden;
- Shift Schedule – Two (12), twelve (12) hour shifts per day, seven (7) days per week;
- Operational Delays – 70 min/shift (this includes 15 minutes for shift change, 15 minutes for equipment inspection, 40 minutes for lunch and coffee breaks.
- Job Efficiency – 87% (52 min/h; this represents lost time due to waiting for trucks, cleaning up the loading area and relocating).

The CAT 6030FS excavator can load the Caterpillar 785 haul truck in five (5), 36 second passes for a total load time three (3) minutes. Assuming there are trucks available to load, the excavator can load 20, 143 tonne trucks per hour for a theoretical productivity of 2,860 t/h. Accounting for mechanical availability, utilization, operational delays and job efficiency, each excavator has 5,243 available work hours in a full year. In order to mine the tonnages presented in the mine plan, one (1) shovel is required during pre-production and Year 1, followed by two (2) shovels for the remainder of the life of the mine.

A Komatsu WA900-3 wheel loader equipped with a 28 tonne capacity bucket has been included in the fleet to be used as an alternate loading machine.

16.4.3 Drilling and Blasting

Blast patterns for ore and waste have been identified for the Pre-Feasibility Study. Production drilling will be done using Atlas Copco L8-30 drills equipped with down-the-hole hammers and 165 mm (6.5") diameter bits. The number of drills required was estimated assuming an 85% mechanical availability a 90% utilization and a penetration rate of 25 m/h.

One (1) drill is required in pre-production, two (2) in Year 1 and four (4) from Year 2 to 11. Three (3) drills are required from Year 12 to 24.

Blasting will be executed under contract with an explosives supplier who will store all the blasting materials and technology required by the mine. During full production there will be roughly two (2) blasts per week each producing approximately 300,000 t of material.

16.4.4 Auxiliary Equipment

A fleet of support and service equipment was included to carry out the mine plan.

Table 16.5 provides a summary of the auxiliary equipment.

Table 16.5 – Auxiliary Equipment

Support Equipment			**# Units**
Track Dozer	Komatsu	D275-AX	3
Utility Excavator	Komatsu	PC200LC-8	2
Wheel Dozer	Komatsu	WD600-3	1
Road Grader	Caterpillar	16M	2
Water / Sand Truck	Komatsu	HD785-7	1
Skid Steer	Caterpillar	242B3	1
Light Tower		10.5 hp	4
Service Equipment			**# Units**
Fuel / Lube Truck	International	7600 SBA (6x4)	1
Mechanic Truck	International	7400 SBA (4x2)	1
Tire Handler	IMT	1449-A	1
Boom Truck	International	7400 SBA (4x2), 17 t	1
Tow Trailer	Schmitz	100 t Cargobull	1
Truck to Pull Tow Trailer	International	5900 SBA (6x4)	1
Transport Bus	Mitsubishi	Rosa, 25 passenger	1
Pick-up Truck	Mitsubishi	L200, double cab	6

16.4.5 Long Lead Delivery

Haul trucks (CAT 785D) are considered as long lead delivery items for the mine with 80 weeks and this situation has to be considered for project scheduling.

The estimated time delivery for major mining equipment is presented in Table 16.6.

Table 16.6 – Mining Equipment Lead Delivery Time

Equipment	**Source**	**Lead Delivery Time (weeks)**
Haul Truck (CAT 785D)	Caterpillar	80
Hydraulic Excavator (CAT 6030FS)	Caterpillar	45
Wheel Loader (WA900-3)	Komatsu	52
Tracked Dozer (D275AX)	Komatsu	75

16.5 Mine Dewatering

Prior to mining activities, a ditch will be established around the perimeter of each pit to intercept water before it infiltrates into the pit. Rain water and ground water that is collected in the pit will be collected in an in-pit sump and pumped to a settling pond at surface.

A ditch system will be established around the footprint of all waste dumps and topsoil stockpiles. Water collected in these ditches will be directed to settling ponds. All water that is collected in the ditches and sumps will be treated and sampled prior to discharge into the environment. The creek that currently runs North/South through the Paul deposit will be blocked at the North end and diverted into the lake system on the North side of the pit.

If the Project advances to the Feasibility stage, a hydrogeology study should be carried out to estimate the quantity of water that is expected to be encountered during the mining operation.

16.6 Manpower Requirements

The total mine workforce for the Project ranges from 143 employees in pre-production to a maximum of 227 from Years 6 to 11. This workforce is comprised of staff as well as hourly employees. The fifteen (15) staff employees include the mine superintendant, the maintenance superintendant, the engineering supervisor, two (2) mining engineers, two (2) geologists, two (2) grade control technicians, two (2) planning technicians and four (4) surveyors. The twelve (12) non-supervisory staff employees will work on a 2 week on, 2 week off rotation; therefore the number of employees stated accounts for duplication.

The hourly workforce includes four (4) crews in order to provide 24 hour per day coverage, 7 days per week. Each crew will be comprised of two (2) pit foremen, a maintenance foreman, equipment operators, mechanics, welders, millwrights, electricians and labourers. The number of mechanics, welders, millwrights and electricians required was estimated assuming one (1) employee from each trade is required per fourteen (14) pieces of mine equipment, per crew. Table 16.7 shows the mine manpower requirements for Year 7.

Table 16.7 –Mine Manpower Requirements (Year 7)

Description	# Employees
Mine Superintendant	1
Maintenance Superintendant	1
Engineering Supervisor	1
Mining Engineer	2
Geologist	2
Grade Control Technician	2
Planning Technician	2
Surveyor	4
Pit Foreman	8
Equipment Operators	120
Fuel and Lube Truck Driver	4
Labourers	16
Dewatering Crew	4
Power Distribution Crew	4
Maintenance Foreman	4
Welders	12
Millwrights	12
Mechanics	12
Electricians	12
Warehouse Clerks	4
Total Mine Workforce	**227**

In order to house the mine employees at the camp site during the pre-production phase, a total of 76 places are required. This accounts for the three (3) supervisory positions, six (6) staff employees, 64 hourly employees and 3 members of the explosive contractor's crew. This number of places reaches a maximum of 118 from Year's 6 - 11.

16.7 Contract Mining

An option to employ a mining contractor to carry out the mining activities for the Project was evaluated. Contract mining has the effect of lowering the Project's capital expenditures but results in higher operating costs. A most probable price was determined based on budget pricing that was received from 4 contractors. This price was entered into the Project's financial analysis where it was determine that an owner's mine operation is more economical for the Project.

17.0 RECOVERY METHODS

Based on metallurgical testing results of Section 13, the process design criteria were developed and process flowsheets as well as plant layouts were prepared. The following section summarizes the process developed for the project while detailed information may be found in the Pre-Feasibility Study report.

The apatite processing activities are located at the mine site and include crushing, grinding, magnetic separation, flotation and filtration and drying of the concentrate.

The phosphate concentrate is then transported by trucks some 200 km south of the processing plant to Dolbeau-Mistassini to be loaded into railcars. This second part of the plant is composed of two areas, the storage/reclaim system located on the north shore of the Mistassini River where the concentrate would be transported via a conveyor bridge to a rail car load out station on the south shore of the river.

17.1 Processing Plant Design Criteria

The processing plant is scheduled to operate three hundred sixty five (365) days per year, seven (7) day per week and twenty four (24) hours per day.

The crushing plant is operating eighteen (18) hours per day at an average hourly rate of 1,833 t/h. A stock pile, uncovered, will secure a constant feed to the processing plant.

The Pre-Feasibility study is based on run-of-mine from the Paul pit for the first 14 years and the remaining 11 years from the Manouane open pit. The process plant is designed for a capacity of about 33,000 tpd for a phosphate concentrate average production rate of 2,000,000 tonnes per year at a grade of 38% and recovery of 90%.

A summary of design criteria is presented in Table 17.1.

Table 17.1 – Design Criteria-Summary

Parameter	Unit	Value
Ore average processing rate	tonne / year (tpy)	12,045,000
Ore average processing rate	tonne / day (tpd)	33,000
Concentrate Average Production Rate	tonne / year (tpy)	2,000,000
Head grade (Paul deposit)	% P_2O_5 / TiO_2	7.16/8.25
Head grade (Manouane deposit)	% P_2O_5 / TiO_2	5.95/8.79
Crushing plant operating time	h / day	18.0
Crusher average feed rate	tonne / hour (tph)	1,833
Crushed ore stockpile capacity	tonne (t)	33,000
Overall processing plant availability	%	93.0
Processing plant average feed rate	tonne / hour (tph)	1,375
Concentrate Average Production	tonne / day (tpd)	5,500

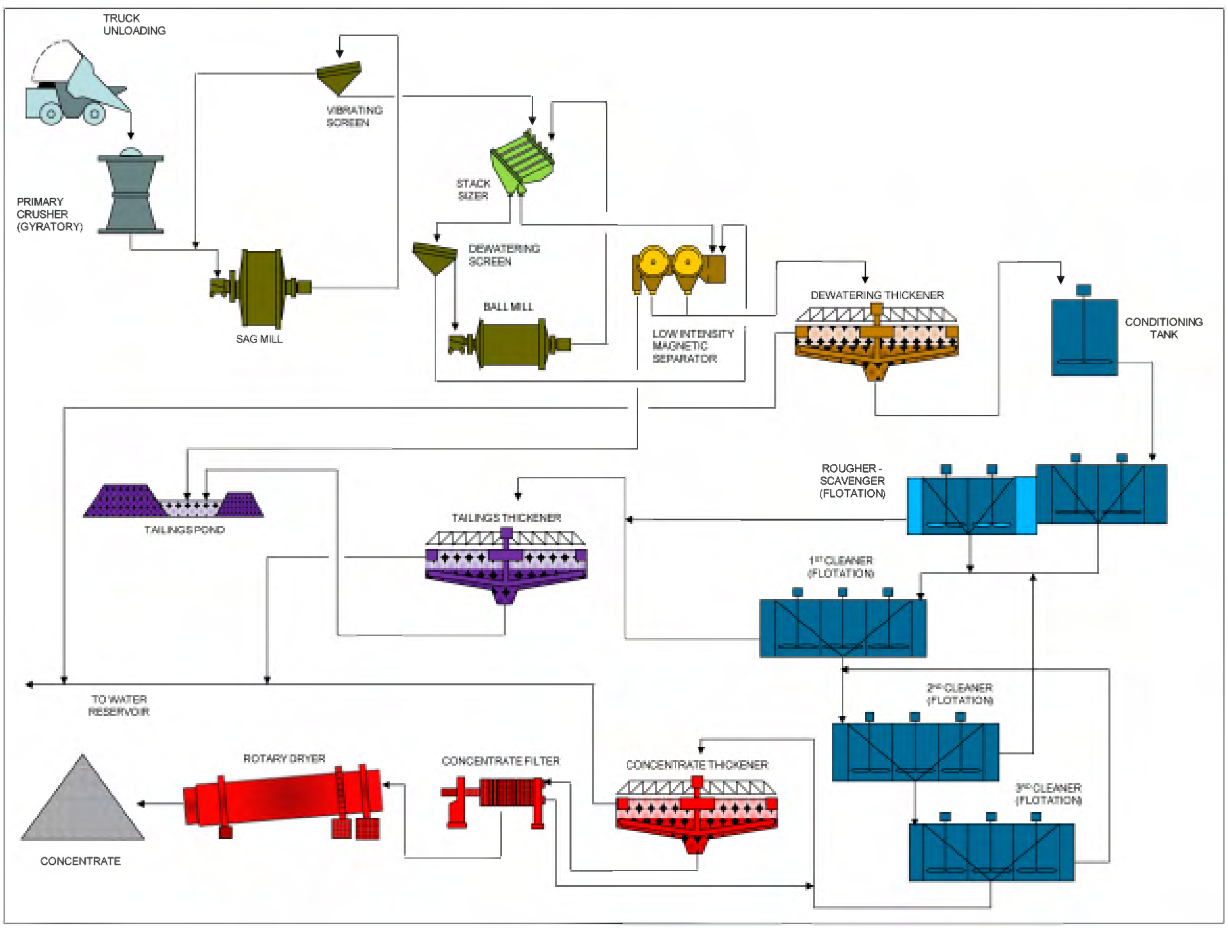
Parameter	Unit	Value
Concentrate storage capacity	tonne (t)	13,000
Final product moisture	%	< 2.0
Apatite Concentrate Recovery	%	90
Apatite Concentrate Grade	% P_2O_5	38.0

17.2 Flow Sheets and Process Description

17.2.1 Simplified Flow Sheet

A simplified flow sheet of the process is presented in Figure 17.1 and summarizes different steps during the process of phosphate. The equipment list is based on the flowsheet diagrams and equipment size is calculated based on the mass balance.

Figure 17.1 – Simplified Flowsheet for Apatite Concentration



17.2.2 Process Description

The ore will be hauled by 143 tonne mine trucks and discharged into a gyratory crusher driven by an 800 hp motor.

The ore is then crushed to approximately minus 160 mm and the apron feeder located underneath the gyratory crusher will direct crushed product to a radial telescopic belt conveyor that loads the stockpile (33,000 tonne capacity) located ahead of the grinding circuit. The coarser rocks in the crusher cavity could be broken down using a rock breaker.

The ore from the stockpile is reclaimed using six (6) apron feeders and loaded onto a belt conveyor to feed the primary grinding circuit composed of a single SAG mill. The 7,500 kW SAG mill operates in a closed circuit with a vibrating screen. The SAG mill feed is controlled with a belt scale working in conjunction with the variable speed conveyor.

The secondary grinding circuit consists of two 8,000 kW Ball Mills operating in parallel in a closed circuit with stack sizers.

The product of both Ball Mills combine with the SAG Mill screen undersize and is then pumped to two parallel trains of 12 stack sizers per train for a total of twenty-four (24) stack sizers.

The stack sizers' undersize gravity flows to a pump box and is then pumped to the magnetic separation circuit to remove magnetite.

The magnetic separation circuit is composed of three (3) trains of low intensity magnetic separation (LIMS). Each train has five double drums separators.

The concentrate from each train, containing magnetite and a small amount of sulphide minerals is pumped to the secondary tailings dam.

The non magnetic (magnetic separation tails) is pumped to thickeners. The underflow slurry is pumped to the high density conditioning tank prior to the flotation circuit.

The flotation circuit is composed of the following:

- Ten (10) rougher flotation cells having a capacity of 100 m^3 each;
- Four (4) Scavenger flotation cells (100 m^3);
- Ten (10) first cleaner flotation cells with a capacity of 51 m^3 each;
- Fourteen (14) second cleaner flotation cells (40 m^3);
- Eight (8) third cleaner flotation cells having a capacity of 30 m^3 each.

The overflow of rougher cells is containing as much apatite as possible and the underflow called also rougher tails is pumped to the scavenger circuit to recover as much apatite as possible. The concentrate from both rougher and scavenger is feeding the cleaner circuit to increase the grade of apatite concentrate to the commercial level.

The scavenger and first cleaner tails are directed to a pump box and pumped to the inert tailings thickener.

The concentrate from the first cleaner is pumped to the second cleaner circuit. The tail from the second cleaner is returned to the first cleaner circuit and the concentrate is pumped to the third cleaner where the tails are returned to the second cleaner feed and the concentrate is the final product and is pumped to the dewatering equipments.

The flotation concentrate is pumped to the apatite concentrate high rate thickener. The overflow of the thickener is directed to the process water reservoir for recycling to the processing plant and the underflow is thickened to 55% solid weight. The flotation tails is feeding the tailings thickener (31 m diameter). The tailings thickener underflow is pumped out to the tailings pond.

The underflow of the apatite concentrate high rate thickener is then pumped to two agitated storage tanks and to the filter presses in parallel to reduce the moisture content to 8%. The filtrate is directed to the inert tailings thickener and the filter cake is conveyed to a rotary dryer to reduce the moisture from 8.0% to 2.0%.

The dewatered concentrate (2% moisture) coming out of the dryer is then sent to a 13,000 tonne capacity covered stockpile providing enough room to store 2 days of concentrate production.

The stored concentrate is then reclaimed in a tunnel with three apron feeders and the concentrate is conveyed to fill a 600 tonne truck load-out bin. The concentrate is then trucked over 200 km to the Dolbeau storage facilities (Off-Site).

Trucks will unload the concentrate and it will be stored on a covered stockpile of 13,000 tonnes.

The stored concentrate is then reclaimed in a tunnel with three apron feeders and the concentrate is conveyed over the Mistassini River to fill a single train 2000 tonne load-out bin on the other side of the river. The distance between the storage and the load-out system is approximately 4 km.

17.2.3 Reagents

There are five (5) reagents used in the apatite flotation process including one flocculant used for thickening:

The reagents used for phosphate flotation to produce apatite concentrate are:

- Liacid, as a collector for the apatite;
- Sodium silicate, to depress silicates and aluminates;
- Starch, to depress the ilmenite and iron bearing minerals;
- NaOH, to adjust the pH in the flotation circuit;
- Flocculant to help sedimentation during slurry thickening.

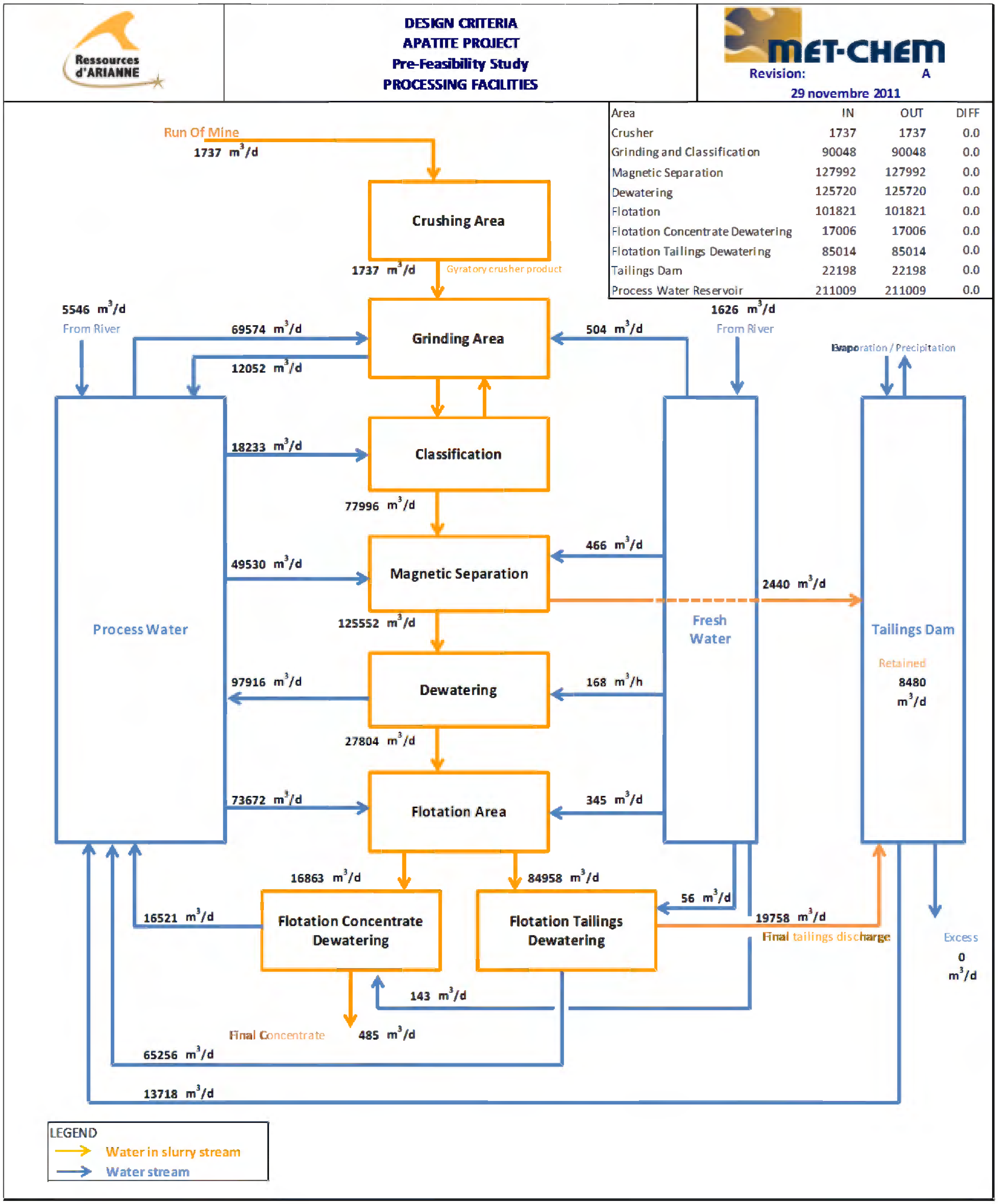
17.2.4 Plant Services

Air systems will support the air requirement for the process plant. A provision for fuel reservoirs to feed the Dryer is included in project capital expenditure.

17.2.5 Water Balance

The water balance (presented below in Figure 17.2) is divided into the following sections: grinding; classification; magnetic separation; dewatering; flotation; flotation tailings dewatering; flotation concentrate dewatering; process water and tailings dam. Grinding contains the SAG mill and the two ball mills, while classification includes the stack sizers, the SAG mill screen and the dewatering screen. Flotation concentrate dewatering contains both the thickener and the filter press. 1,737 m^3/d enters the process as moisture in the ore, while 485 m^3/d leaves with the product (as product moisture and as rotary dryer evaporate). The process reservoir's make-up water, 13,718 m^3/d, is supplied by the tailings dam. All fresh water, used for gland seal water, is from the river. Water entering the tailings dam comes from two tailings slurry streams, the magnetic concentrate and the flotation tails, at 2,440 m^3/d and 19,758 m^3/d respectively. The tailings dam retains about 38% of the entering water, to have 8,480 m^3/d retained. Based on the process water balance, the tailings dam is not expected to show excess water but this is not taking into account precipitation.

Figure 17.2 – Process Water Balance



Area	IN	OUT	DIFF
Crusher	1737	1737	0.0
Grinding and Classification	90048	90048	0.0
Magnetic Separation	127992	127992	0.0
Dewatering	125720	125720	0.0
Flotation	101821	101821	0.0
Flotation Concentrate Dewatering	17006	17006	0.0
Flotation Tailings Dewatering	85014	85014	0.0
Tailings Dam	22198	22198	0.0
Process Water Reservoir	211009	211009	0.0

17.2.6 Long Lead Items

The estimated lead delivery time for major process plant equipment is presented Table 17.2.

Table 17.2 – Lead Delivery Time

Equipment	Source	Lead Delivery Time (weeks)
Gyratory Crusher	FLSmidth	52
SAG Mill	FLSmidth	60
Ball Mill	FLSmidth	60
Stack Sizer	Derrick	40
Magnetic Separation	Ohio	10
Flotation Cell	Westpro	26
Thickeners	(Met-Chem Database)	22
Filters Press	Outotec	52
Rotary Dryer	FEECO	34
Conveyors	Continental Conveyors	24
Long Conveyor	(Met-Chem Database)	26 to 52

17.3 Plant Layout

The process plant facilities from crusher to thickener and final product material handling are illustrated in Figure 17.3.

18.0 PROJECT INFRASTRUCTURE

This section summarizes infrastructure such as off-site power line, access road, concentrate transportation and concentrate rail load out and on site buildings, tailings storage facility, permanent camp and site services that are required to complement the processing of apatite ore at a production rate of 33,000 tpd.

All topographic information for the location of infrastructure was gathered from readily available data from Government of Canada and 5 m contours were used. It is understood that LIDAR based topographic map will be available for the Feasibility Study phase of the project.

There have been no geotechnical investigations for surface infrastructure performed to date. Detailed geotechnical investigations will need to be performed in order to optimize civil design criteria related to foundation of mills and process plant.

It is expected that field investigations will begin as the project will progress to feasibility phase. Provision for site preparation and earthwork is based on a 68,400 m^2 area for the industrial site.

An overall general site layout and access is provided on Figure 18.1 below. General layouts of the processing plant at a production rate of 33,000 tpd as well as of the administration building and warehouse are provided in the December 2011 Pre-Feasibility Study.

18.1 Off-Site Infrastructure

18.1.1 Power Line

The Lac à Paul mine and processing plant will be fed through a 161 kV overhead electrical power line supplied and installed by Hydro-Québec from the existing distribution point at the Péribonka power generation substation.

The calculated cost of electricity is expected to be 0.05$ per kWh.

18.1.2 Main Access Road

Up to the Péribonka Power Station the Chemin-des-Passes access road is reportedly accessible year-round without any interruption. The last part of the Chemin-des-Passes, between Péribonka IV and the Lac à Paul site, is subject to restrictions during thaw season. Provision has therefore been made to upgrade the Chemin-des-Passes on a distance of approximately 100 km to allow year-round transportation.

18.1.3 Concentrate Transportation and Load-Out Facility

The type of haul truck selected for calculation of concentrate haulage from the plant site to the Dolbeau/Mistassini load-out facility is the GINAF HD4466. The truck's GCW (gross combined weight) has been limited to 165 tonnes, for a payload of 115 tonnes, to comply with the specifications for the network of bridges along the existing road.

Using the same work schedule as the mine, two (2), twelve-hour shifts per day, seven (7) days per week. Each truck can transport one (1), 115 tonne load per shift, for roughly 84,000 tonnes per year. A total of 18 trucks are required during the first year of operation, followed by 25 in Year 2. The maximum number of trucks required is 28 which occur in Year 5.

The trucks will be loaded at the plant site from a concentrate silo using an automated loading system. The trucks will be unloaded in Dolbeau/Mistassini using a bottom dump configuration.

In order to account for road maintenance, 1.8 M$ per year has been included to the mine operating cost estimate and provision is also included to upgrade part of the gravel road.

The bottom dump trucks will unload the apatite concentrate at the receiving hopper and the stockpile feed conveyor located on the North shore of the Mistassini River. The apatite concentrate will be stored in the covered 13,000 tonne stockpile.

The stored concentrate is then reclaimed in a tunnel with three apron feeders and the concentrate is conveyed over the Mistassini River to fill a single train load-out bin of 2,000 tonne capacity on the other side of the river. The distance between the storage and the train load-out system is approximately 4 km. Provision is made for a 300 m Accrow-type conveyor bridge over the Mistassini River for part of the conveyor.

18.2 Site Infrastructure

18.2.1 Tailings Storage Facility and Water Management

A preliminary assessment of tailings disposal requirements to store and manage the tailings and process water was prepared for the life of mine of the Lac à Paul project.

Tailings storage design is based on two distinct periods: Year 1 to 14, corresponding to the processing of Paul pit ore and Years 15 to 25 for the processing of Manouane pit ore. A traditional tailings storage facility is designed for Paul mill tailings while it is proposed that the Manouane mill tailings will be stored within Paul's depleted pit.

Several scenarios were examined in order to optimize the location of the tailings park and minimize the height of the various dykes and hence material quantities and costs. The pond locations and construction scenarios examined were based on topographic information made available for the project and take into account the location of infrastructure and of additional mineral potential on the property. The selected Tailings Storage Facility for the first period is shown in Figure 18.2.

The first phase of operation is planned for a 14 year continuous operation. The scheme of operation proposes transfer of free water from the tailings pond to a polishing pond to allow for sedimentation of fine particles and other minerals. Water will be then transferred from the polishing pond to the plant to be used in processing. The tailings park includes a potential acid generating tailings storage pond for the magnetite tailings (about 10% of the total production). The water from this pond will be treated on a continuous basis before re-used or released to the environment.

a) Paul Mill Tailings

The tailings storage requirements were based on the production of approximately 10 M tonnes of mill tailings per year over a period of 25 years, based on a concentrator production rate of 12 M tonnes per year, considering at first the processing of the Paul zone ore for a period of 14 years. Design criteria were based on an assumed final depositional density of 1.66 t/m^3 and a total tailings placement requirement of about 84.5 M m^3. A potential acid generating (PAG) tailings storage pond is required for magnetite tails or about 10% of the total production while the remaining production is considered non-PAG. Figure 18.2 illustrates the tailings storage facility proposed for Year 1 to 14.

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The water volume pumped into the tailings ponds is expected to be 22,198 m^3 per day. The tailings will retain about 38% of the pumped water while 62% will be released, i.e. 13,718 m^3 per day will be available.

More detailed water balance estimates will be prepared during the Feasibility Study. They will be calculated on a per month basis accounting for variations of average monthly precipitations, evaporation and/or icing of the pond surface water in the winter for a normal, dry and a wet year, with the worst condition being that of a dry year.

b) Manouane Mill Tailings

Once the operation will reach the Manouane deposit after year 14, mills tailings will be sent to the depleted Paul pit.

It is a common method to dispose tailings in an open pit that has been mined-out. Hydrogeology and rock mechanics studies will need to be performed to confirm if there would be a potential for seepage and thus risk of contamination (acid rock drainage, etc.) and identify control methods (liners, grouting, etc.), if and as required.

The pit is relatively close to the process plant, thereby minimizing capital and operating costs for the tailings handling and process water feed systems.

The total volume available in Paul pit would be 82 M m^3. Approximately 70 M m^3 of mill tailings will be produced from Manouane deposit. It is expected that Paul pit will be sufficient to contain Manouane's mill tailings.

c) Recommendations

Geotechnical work such as geotechnical drilling, seismic analysis, stability analysis is recommended in the Feasibility Stage to confirm assumptions used for the tailings storage facility design and waste piles in the Pre-feasibility assessment as well as to permit preliminary foundations evaluation for the plant facilities.

Rock mechanics as well as hydrogeological studies will be required to further confirm rock slopes, permeability, ground and underground water flows and water balance. Testing of the tailings geochemical and physical/mechanical properties and behaviour is recommended, such as:

- Geochemical properties testing: ABA (for acid generation), humidity tests (coarse and fine fractions), fresh and aged supernatant analysis (coarse and fine fractions);
- Physical/mechanical properties testing: size distribution, specific gravity, Atterberg limits, proctor maximum dry density and optimum water content, maximum density by vibrator and by drying, minimum density, settling, low and overburden stress consolidation settlement.

Investigation for borrow banks for suitable materials for construction of the various dykes, pads and roads as well as concrete aggregates should be undertaken during the Feasibility Study to determine quantities available and distance from the various facilities.

Condemnation drilling will be required in the area of the Paul's mills tailings storage facility.

More detailed topographic survey of the site during the Feasibility Phase will enhance accuracy of the estimates and associated cost analyses.

18.2.2 Camp Site Accommodations

The Camp will be located on the north side of the main road approximately 5 km west of the industrial site. Permanent housing will be built on the basis that approximately 200 operations personnel including managing, office as well as support staff.

18.2.3 Site Roads

Site and service roads, 10 m wide except for the mine roads, will provide access to:

- Process facility from the Chutes-des-Passes main road;
- Fresh water pumping station;
- Tailings storage facility;
- Explosive depot;
- Equipment maintenance facilities for mining equipment;
- Mine roads to crusher and waste rock dump areas.

18.2.4 Site Buildings

In addition to the concentrator building which will house grinding, magnetic separation, flotation and concentrate filtering and drying, the site will include the following:

- The administrative building;
- The mine equipment maintenance facility;
- The warehouse;
- The emergency vehicles building, and
- The mine dry (change house).

18.2.5 Site Services

Provision has been made in the project for the following site services:

- Mine dewatering system;
- Fresh water pumping system from the Manouane river;
- Reclaim water system from the polishing pond to the process;
- Water treatment system at tailings excess water discharge;

- Potable water treatment;
- Fuel storage and fuelling station;
- Aggregate crushing plant;
- Sanitary waste water treatment;
- Allowances for plant mobile equipment (light vehicles, earth moving vehicles at the stockpiles, mobile crane, manlift, boom truck, fire, ambulance and rescue trucks;
- Mine explosive storage.

18.2.6 Site Power and Automation

The power requirements of the Lac à Paul Project will be supplied by a 161 kV power line. The total power demand is estimated at 46.7 MW of which 42.3 MW is required for the process. A power demand of 0.5 MW is estimated for the concentrate handling and storage facility in Dolbeau-Mistassini.

Based on the power requirements, two oil type 30/40/50 MVA transformers were selected which will ensure the operation of the plant even if one transformer fails.

Provision is made for three (3) electrical rooms to feed the crusher, the crushed ore stockpile and the process areas.

An emergency power system consisting of four (4) diesel generators will provide a standby source of power to feed essential services (emergency and exit lighting, fire pumps, etc.) as well as critical process loads (slurry tank agitators preventing settling down of material, thickener lifting devices, etc.) in the event of power loss from the grid.

Allowances have been included in the estimate for automation, fire alarm, communication system and security system.

More detailed information is provided in the Pre-Feasibility Study report.

19.0 MARKET STUDIES AND CONTRACTS

An independent market study is expected to be carried out as the project will proceed to Feasibility Studies, but no independent analysis of the market for phosphate concentrate or price survey have been conducted to date for the Lac à Paul Apatite project.

Similarly no sales contract has been secure at this early stage of the project.

The sales price that has been suggested by Ressources d'Arianne and which was used for the project economic analysis is based on the 85% BPL Russian prices over recent years with consideration of the September 2011 CRU 10-year outlook report on the phosphate rock market.

Recent information regarding market assumptions and pricing are provided in the CRU 10-year outlook report[2] on the phosphate rock market, dated September 2011. As mentioned in the report, the phosphate rock demand has increased to record level after two years of decline following the high of 2008. Prices have followed the demand with 223 US$/tonne (85% BPL Russia) forecasted for 2011 compared with 225 US$/tonne for 2008 and 158 US$/tonne for 2010. CRU is forecasting that phosphate rock prices will go downward during 2012. According to the same report and CRU's phosphate rock average price forecast in current dollars, from 2012 onward to 2020, prices are expected to vary between 203 US$/tonne and 180 US$/tonne with a forecast price of 190 US$/tonne for 2012. Based on this information, a constant price of 175 US$/tonne (85% BPL Russia) has been selected for the project.

[2] CRU, Phosphate Rock Ten Year Outlook 2011, Annual Report, September 2011

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

20.1 Legislative Framework

The preparation of the environmental impact assessment (EIA) of the Lac à Paul Apatite Project will be guided by a series of provincial and federal laws, regulations and administrative procedures presented below. The Project Notice has been filed with the Government in May 2011 and the project guidelines to prepare the EIA have been provided to Ressources d'Arianne in June 2011.

20.1.1 Provincial Legislation

a) Environment Quality Act (EQA)

i) Environmental impact assessment (EIA)

Under subsection 31.1 of the *Quebec Environment Quality Act*, (R.S.Q., c. Q-2):

"No person may undertake any construction, work, activity or operation, or carry out work according to a plan or program, in the cases provided for by regulation of the Government without following the environmental impact assessment and review procedure and obtaining an authorization certificate from the Government (1978, c. 64, s. 10)."

ii) Projects Subject to the EIA Procedure

The list of projects subject to the *Environmental Impact Assessment and Review Procedure* is presented in the *Regulation Respecting Environmental Impact Assessment and Review.* Under paragraph (p), the Lac à Paul Apatite Project falls within this category because the intended daily production will exceed 500 metric tons.

It should be noted however that, as stated in the same regulation, projects involving several elements subject to an EIA require a single EIA statement and a single application for a certificate of authorization.

iii) Administrative Procedure

There is a total of six phases to complete the environmental impact assessment process as described hereafter.

- Emission of a Directive by the Ministry of Sustainable Development, Environment and Parks (MSDEP)

Any person wishing to undertake projects contemplated in Section 31.1 of the EQA must file a written notice with the Minister describing the general nature of his project. The Minister, in turn, will indicate through a directive to the proponent of the project the nature, scope and extent of the environmental impact assessment statement to be prepared (ss. 31.2) 1978, c. 64, s. 10.

The Ministry emitted, in April 2005, a general directive specific to mining activities called Directive 19. This document mainly covers the general environmental baseline and the operational aspects of the mining activities and requirements for the preparation of requests for a Certificate of authorization. However, some of its content will have to be considered in the EIA for the Lac à Paul Apatite Project, namely the standards fixed for water effluents, groundwater and noise and vibrations.

More recently, on September 2010, the Ministry produced a specific directive detailing the requirements on conducting an EIA for mining projects triggering article 31.1. This document will be the baseline for the EIA of the Lac à Paul Apatite Project.

- Environmental Impact Assessment Study

In broad terms, there are four key steps to an environmental impact assessment study:

- Describe the project in detail;
- Describe the biophysical and human environment;
- Evaluate the negative environmental effects;
- Determine ways to eliminate or reduce the negative effects on the environment.

The specific steps in the process can vary depending upon the scope of the project, the anticipated level of the impact on the environment and several other factors.

- Public Participation (Bureau d'audience publique sur l'environnement, BAPE)
- Public Consultation

After confirming acceptance of the environmental impact assessment statement, the Minister will make the document public and the public information and consultation process as required by law will be initiated.

- Public Hearing

Any person, group or a municipality may, within the timeframe prescribed by law, apply to the Minister to hold a public hearing for the project.

- Report

Unless he considers such an application to be unfounded the Minister shall require the Public Hearings Bureau (the Bureau or as commonly known in French, the BAPE) to hold a public hearing and report its findings and its analysis thereof to him. (ss. 31.3) 1978, c. 64, s. 10; 1999, c. 40, s. 239.

– Analysis by the MSDEP

In order to study certain matters more thoroughly, or to research elements which he considers necessary to fully evaluate the impact of the proposed project on the environment, the Minister may, at any time, request the proponent of the project to provide supplementary information. (ss. 3.4) 1978, c. 64, s. 10.

– Decision

Once the environmental impact assessment statement is considered satisfactory by the Minister, it is submitted to the Government along with the application for authorization. The Government may or may not issue the decree authorizing the project, with or without amendments, and on such conditions as it may determine. That decision may be made by any committee of ministers of which the Minister is a member and to which the Government has delegated that power (ss. 3.4).

– Control

The MSDEP reserves the right to do site inspections during the various work phases of the project to ensure that the terms of the decree and certificates of authorization emitted are respected.

b) Other Laws, Regulations and Guidelines

Once the environmental impact assessment and review procedure for the Lac à Paul Apatite Project required under subsection 31.1 of the Quebec EQA is completed, and the decree obtained from the provincial Government, the detailed engineering of the project will be finalized. This step shall take into account the environmental mitigation measures associated with mining equipment and infrastructure as presented in the EIA and incorporated by the Government in the decree. It shall also consider all applicable environmental standards included in other relevant provincial laws and regulations. These include:

- The Mining Act (R.S.Q., c. M-13.1);

This Act is presently under review by the provincial government (Project Bill 14) and according to the preliminary available information, many important changes will be included that could render more complicated exploration work and the opening and exploitation of a new mining site. Amongst the main potential new requirements there are:

  - The need to obtain authorization from private land owners before gaining access to their property;
  - The exclusion of some land area from mining exploration and operations, including those within an urbanization perimeter and any area dedicated to vacationing. To do any work on these excluded

claims, holders would have to obtain the consent of the local municipality concerned;

- The increase of the security deposit from 70% to 100% of the estimated costs of the rehabilitation plan for the mining site accumulation areas (waste rock dumps and tailings storage facilities);
- The security deposit must be provided over a period of three years at the beginning of the operation;
- The future evolution of the content of this review of the mining act will have to be carefully monitored as it progresses and evolves.

- Directive 19 on the mining industry (April 2005);
- The Forest Act (R.S.Q., c. F-4.1);
- The Watercourses Act (R.S.Q., c. R-13);
- The Dam Safety Act (R.S.Q., c. S-3);
- The Transportation of Dangerous Substances Regulation (R.R.Q. c. C-24.2, r.4.2.)
- The Petroleum Products Act (R.S.Q., c. P-29.1);
- The Groundwater Catchment Regulation (R.R.Q., c. Q - 2, r.1.3);
- The Regulation Respecting Pits and Quarries (R.R.Q., c. Q-2, r.2);
- The Regulation Respecting Wastewater Disposal Systems for Isolated Dwellings (R.R.Q., c. Q-2, r.8);
- The Act Respecting Threatened or Vulnerable Species, (R.S.Q, c E-12.01).

This list of laws, regulations and guidelines may require that the proponent of the project obtains one or various specific certificates of authorization (CofA). These CofA's are obtained through the same department of the Ministry's central office that revised the EIA, but the follow up activities specified in the CofA's will be conducted by the concerned regional office of the Ministry.

20.1.2 Federal Legislation

a) Canadian Environmental Assessment Act (CEAA)

Under Section 5 of the Canadian Environmental Assessment Act, a federal environmental assessment may be required when, in respect of a project:

- A federal authority is the proponent,
- A federal authority makes or authorizes payment or any other form of financial assistance to the proponent;
- A federal authority sells, leases, or otherwise disposes of lands;
- A federal authority issues a permit, license, or other form of approval.

Statutory and regulatory approvals requiring environmental assessments under the Canadian Environmental Assessment are itemized in the *Law List Regulations*. In the case of the Lac à Paul Apatite Project, based on a review of the project description available at this stage of the pre-feasibility studies, an environmental assessment under the Act may be required if for example, completion of the project was to involve on-site storage of explosives, obstruction of watercourses, pumping of underground water from the open pit mine, disruption or destruction of fish habitat or alteration of water quality or threatening of species at risk.

Relevant regulatory provisions of potentially applicable laws are described below.

b) Relevant Regulatory Provisions

The Explosives Act (Sch. I, P.I, It.5)

The Explosives Act governs the manufacture, testing, sale, storage and importation of explosives in Canada. Under Section 7(1) (a), an approval is required from the Minister of Natural Resources for an explosives magazine (storage).

The Fisheries Act (Sch. I, P.I, It.6) and (Sch. II, It.5)

The Fisheries Act deals with the proper management and control of the fisheries, the conservation and protection of fish and the protection of fish habitat, and prevention of pollution. It provides for the following authorizations, requirements and orders:

- Section 22(1): Requirement, as determined by the Minister of Fisheries and Oceans, for the owner or occupier of any obstruction to provide sufficient flow of water over the spillway or crest for the safe and unimpeded descent of fish.
- Section 22(2): Requirement, as determined by the Minister, for the owner or occupier of any obstruction to ensure the free passage of migratory fish during construction of the obstruction.
- Section 22(3): Requirement, as determined by the Minister, for the owner or occupier of any obstruction to provide sufficient water below the obstruction to ensure the safety of the fish and the water level necessary for the safety of ova in spawning grounds.
- Section 32: Authorization by the Minister or under regulations made by the Governor in Council (Cabinet) for the destruction of fish by any means other than by fishing.
- Section 35(2): Authorization by the Minister or under regulations made by the Governor in Council to cause the harmful alteration, disruption or destruction of fish habitat in the course of carrying out a work or undertaking.
- Section 36(5) (a to e): Site-specific regulations by the Governor in Council authorizing the deposit of deleterious substances. Deleterious substances are defined as substances that, if added to water, would alter or degrade the quality of that water so that it is deleterious to fish.
- Section 37(2): Ministerial order requiring modifications, additions or restrictions to, or the closing of a work that does or could result in the

harmful alteration, disruption or destruction of fish habitat, or the deposit of deleterious substances.

Normally, most projects are only submitted to Section 35(2) requirements.

The Migratory Birds Convention Act (Sch.I, P.I, It.7.1)

The Migratory Birds Convention Act, 1994 provides for the implementation in Canada of the 1916 Convention between the United Kingdom and the United States of America for the Protection of Migratory Birds in Canada and the United States. The Convention may be amended from time to time. Under Section 5.1 (1) of the Act:

> *"No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area."*

The Species at Risk Act (S.C. 2002, c.29)

The Species at Risk Act (SARA) was created to prevent wildlife species from becoming extinct. The Act protects species at risk and their critical habitats. SARA also contains provisions to help manage species of special concern to prevent them from becoming endangered or extinct.

Once a species is listed under the Species at Risk Act, it becomes illegal to kill, harass, capture or harm it in any way. Critical habitats are also protected from destruction. The Act also requires that recovery strategies, action plans and management plans be developed by the competent minister for all listed species. Under Section 33:

> *"No person shall damage or destroy the residence of one or more individuals of a wildlife species that is listed as an endangered species or a threatened species, or that is listed as an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada."*

Administrative Procedure

A project triggering some of the Federal environmental regulations but for which the Federal government is not directly implicated (on federal land, federal loan or initiated by a federal agency), will be managed by the Quebec Ministry of Sustainable development, Environmental and Parks (MSDEP). As mentioned previously (Section 20.1), it is the MSDEP that emits the directive, following the written notice submitted by the proponent, that will be followed to conduct the EIA. The written notice is submitted simultaneously to the Federal Agency.

Nonetheless, depending on the Federal regulation triggered, the corresponding federal authorities will prepare an internal environmental screening that will be based on the information transmitted through the EIA prepared by Ressources d'Arianne and on the answers supplied to the questions and commentaries formulated by the Federal agencies on this EIA. The questions and comments of these agencies will be taken into account in the EIA, before it is considered acceptable and the decree is issued by provincial authorities. This step will ensure that environmental concerns associated with federal statutory and regulatory approvals have been properly addressed in the EIA.

In the end, the Quebec provincial government will make the final decision on the acceptability of the EIA and emit their authorization to proceed (the decree), while the federal agencies will emit their own permits based on their environmental screenings.

20.2 Environmental Sensitive Areas

The description of the environmentally sensitive areas are based on existing studies conducted in the area by Hydro-Québec for the derivation of the Manouane River project and from a site visit conducted on June 22-23, 2011.

20.2.1 Physical Aspects

The regional climate is of the continental type and characterized as temperate-cold. Information available from the Chute-des-Passes station show a mean yearly temperature is of -0.3 °C with up to 225 days of freezing conditions (Hydro-Québec, 2000). Average precipitations amount to 1 250 mm resulting in a snow covert that lasts up to at least six months, that is from November to April (Hydro-Québec, 2000). Dominant winds come from the west and north-west with an average yearly speed of 11.7 km/hr (Hydro-Québec, 2000).

Rolling hills and the presence of narrow valleys describe the topography of the area surrounding Lac à Paul, which is typical of the Laurentian Highlands.

The Lac à Paul area is part of the Manouane river watershed. The Manouane River flows around the north and west of Lac à Paul and continues southeast to feed the Péribonka River. Lac à Paul overflows into the Manouane River through the Naja River.

Lac à Paul is fed by a number of smaller lakes that overflow into it through various unnamed streams. The area is also strewed with wetlands and bogs of various sizes, the most important surrounding Epinette Lake, east of Lac à Paul.

Water quality in the vicinity of Lac à Paul is unknown at this time. However, surface water sampling and analysis completed on various section of the Manouane River showed, for the section closest to Lac à Paul a neutral pH (7.1), a temperature of 12.8°C and a conductivity of 18.4 µS/cm. Furthermore, other compiled sources show a slight acidity of the lakes water (pH between 4.9 and 6.1) but no other specific problem considering Quebec's surface water quality criteria.

Air quality in the area is presumed to be good as the only regular sources of pollutants includes dust generated by the passing vehicles on the local gravel access road and logging activities.

Ambient sound levels are essentially of natural origin with the exception of vehicles passing on the local access road and some logging activities.

20.2.2 Biological Aspects

a) Flora

The area of Lac à Paul is part of the ecological region of the Toulnustouc River and is characterized by the forest domain of the Black Spruce with Fir and mosses. This type of forest is dominated by coniferous species. Broad-leaves trees are more sporadic and rarely form more than 25% of the forest.

Semi-aquatic vegetation is generally present in narrow bands along the various local streams, lakes and ponds.

Many areas to the north, east and south have been logged some time ago and the existing forest is in various stages of development towards the typical regional climax of the Black Spruce forest.

At this time, there are no protected areas near the Lac à Paul site although there is a project to create such an area some 20 km to the south west of the proposed mine site. This project was initiated by the Parks and Ecological Heritage Direction of the MSDEP and is still under review and its protection status has yet to be determined (Michel Bergeron, MSDEP, Personal communication, August 2011).

b) Fauna

Terrestrial fauna associated with the forest domain of the Black Spruce with Fir and mosses includes a wide variety of bird species, various mammals and some reptiles and amphibians. Lac à Paul is located in an area perturbed by logging activities and the forest is in various stages of development thus creating a wide variety of niches for animal species. Approximately 150 bird species could potentially use the region for nesting and roosting.

According to previous study, a little over 40 species of mammals could be observed in the area including a wide variety of rodents.

The Forest Reindeer (*Rangifer tarandus tarandus*) a once common mammal of the Boreal forest is now considered vulnerable. The Lac à Paul area is located within its known range and some specimens have been observed some 30 km to the southeast in the area of the Pipmuacan Lake. In its Territorial Portrait of Saguenay-Lac-Saint-Jean (MRNF, 2006), the MRNF presented various areas under study for the protection of this Reindeer. The closest sites extend from the north shores of the Pipmuacan reservoir and there western limit is only 11 km from Lac à Paul. A second group of sites are located along the shores of Lake Péribonka and their southern limits are located 16 km from Lac à Paul. Finally, a third area, surrounding Manouane Lake and extending towards the southeast is located 25 km north of Lac à Paul. Nature Quebec has published in 2007 a proposition for the creation of protected areas for this reindeer which identified various areas showing a good potential to become protected areas. The nearest of these areas is corresponds to a section of the Manouane lake site identified by the MRNF (2006). This area located approximately 70 km north of Lac à Paul.

A limited number of herpetofaunal species, including amphibians and reptiles, are present in the area. According to the Quebec Amphibians and Reptiles Atlas web site (consulted on July 5, 2011), only nine species of amphibians (Newt, Salamaders and Frogs) and one species of reptile (Common Garter Snake (*Thamnophis sirtalis*)) could potentially be found in the area of Lac à Paul.

There is a significant variety of aquatic fauna occupying the various lakes, ponds, streams and rivers found in the area. Amongst the main fish species registered by Hydro-Québec in 2000 the three most common include the Ouananiche, the Lake Whitefish and the Northern Pike. According to Hydro-Québec (2000), the Ouananiche is present in Lac à Paul. According to Mr. Omer Gauthier (Personal communication, MRNF, July 2011) and information available on the internet site of the Lac-Paul Outfitter, the Brook trout, the White Sucker, the Longnose Sucker and various species of the Cyprinidae family are also present in the area's watershed.

20.2.3 Human Aspects

a) Regional context

The Lac à Paul Property is located in the northern area of the Lac St-Jean administrative area on Crown land. It is part of the unorganized territory of Mont-Valin corresponding to the northern section of Le Fjord-du-Saguenay Regional County Municipality (RCM), one of the RCM of the Saguenay-Lac-St-Jean administrative division (02). The unorganized territory of Mont-Valin makes up 85% of Le Fjord-du-Saguenay RCM and is the largest subdivision of the Saguenay–Lac-Saint-Jean region. The surface area of the unorganized territory of Mont-Valin is 37 565 km^2. The global mining activities will also have repercussions on the MRC of Maria-Chapdelaine where the main infrastructure for the shipment throughout North America and the world could be located.

The project is linked to the more organized areas of the MRC of Maria-Chapdelaine through four season and forestry roads connecting the mine site to Dolbeau-Mistassini (some 225 km to the southwest of the mine). The first town encountered in the organized territory when driving on road R0251 is St-Ludger-de-Milot located approximately 165 km South of Lac à Paul.

Similar roads also link the mine to the north shore of the Saguenay River (some 200 km to the southeast of the mine) at the limit of Le Fjord-du Saguenay RCM in the municipality of St. Fulgence. From Dolbeau, the mine gains access to the rest of North America through a connection with the railway system. This railway system also links the mine to the city of Saguenay from where the concentrated ore could be shipped anywhere in the world via the Grande-Anse Marine Terminal of Port of Saguenay.

b) Planning

The official manager of the provincial public land is the Ministry of Natural Resources and Wildlife (MNRW). This ministry is responsible for the preparation and amendments of public land use plans with the cooperation of various internal departments and independent organizations. These plans ensure a coherency of interventions across the territory. They convey government direction with respect to the development and preservation of land and resources, thereby guiding the actions of the government of Québec's departments and public agencies with respect to granting rights or status on public land.

c) Land Use

The area covered by the Lac à Paul project is completely located within a forest land use designation. There is no known residential land use in the project area.

Most of the area considered for the mining project is located inside the Lac-Paul outfitter's territory, where people come for nature recreational activities.

With a surface area of 98 km^2, the outfitter's territory includes 26 lakes and two (2) rivers. There are some cottages, part of the Lac-Paul outfitter's installations, located on an island (1½ km) within the heart of Lac à Paul. Some cottages for hunters and fishermen are also present on the lake's shore.

Ressources d'Arianne was negotiating the purchase of Lac Paul outfitter's rights for hunting and fishing on this territory and has since purchased as announced November 4th, the Lac Paul oufitter's rights.

According to Hydro-Quebec (Manouane River Derivation Impact Study, 2000), some native camping sites can also be found near the Lac à Paul Lake and the Manouane River as well as canoe-camping activities along the Manouane River which is part of the canoe-camping circuit of the Fédération québécoise du canot et du kayak (Quebec Federation of canoeing and kayaking).

Furthermore, there are various cottages owned by individuals (natives and non-natives) distributed along the various roads giving access to this region. Their exact location has not been determined at this stage but will be in the course of the impact study. Also, along the main local roads (R0251 and R0253), there are the facilities of the ZEC des Passes (starting approximately 5 km from St-Ludger-de-Milot and extending to Km 90 along the R0251) and the Des Passes Pavilion (located approximately 35 Km to the south west of Lac à Paul) that could be impacted by a traffic increase.

The project area is located within the Bersimis beaver reserve and trapping ground (Hydro Quebec, March 2009).

d) Cultural heritage

The evaluation of the archaeological potential of the Manouane River Derivation conducted by Hydro-Quebec led to the identification of 125 zones (for a total of 346 ha) of archaeological potential. However it appears that none of these zones are located within the Lac à Paul project area. Nevertheless, there is a good probability that the Lac à Paul area was used by the native communities in the past because of its proximity to the Manouane River, but this remains to be confirmed.

e) Native communities

i) Nistassinan Territory

The Lac à Paul project area is located within the Innu ancestral territories called Nistassinan, or "our land". Globally, Nistassinan corresponds to the territory of Saguenay–Lac-Saint-Jean, the RCM's of Haute-Côte-Nord and Manicouagan, the southern part of the RCM of Caniapiscau and the eastern part of the RCM of Minganie. This territory is divided into various Nistassinan, corresponding to the native communities using the land and its right of use is presently under negotiation between the government and the Innu communities.

The Lac à Paul project appears to be located entirely within the Nistassinan of Betsiamites (Pessamit), but the effective limit with the Nistassinan of Mashteuiash is very near to the west of the exploitation area (approximately 10 km). As mentioned previously, these Nistassinan are also under negotiation and the specific limit between these two territories remains under discussion and may be revised.

According to the agreement currently under negotiation, there would be no change to the status of this vast territory. It would remain under full Québec jurisdiction, and the current laws of Québec and Canada would continue to apply there.

However, on these territories, except for that of the island of Anticosti, the Innu governments:

- Would be entitled to a share of the mining royalties collected by Québec for the exploitation of natural resources[3];

[3] http://www.versuntraite.com/negociations/territoire_en.htm

- Would supervise the traditional hunting and fishing activities of the Innu according to a regime agreed upon with the governments of Québec and Canada;
- Would participate in the government processes to manage the territory, natural resources and the environment;
- Would take part in socioeconomic activities (i. e.: exploitation of natural resources, park management).

In certain precise areas, the proposal for an agreement-in-principle allows for the negotiation of special arrangements to protect heritage sites.

ii) Reserves[4]

- Mashteuiatsh

  The Mashteuiatsh Reserve is located on the west shore of Lake Saint-Jean and covers 14.5 km^2. It is located some 280 km to the southwest of the Lac à Paul area. According to Statistics Canada, in 2006, the resident population of the Mashteuiatsh Reserve was 1,749 people and the population density was 120.6 per square kilometer. The population is considered quite young, with 35% of residents below 19 years of age.

  Amongst the various Aboriginal communities established in reserves, the Mashteuiatsh community is one of the oldest in Quebec. A great number of people work for the Band Council which is the most important employer in Mashteuiatsh. The public service, teaching, healthcare and social service sectors account for just over half the jobs in the community. Other sources of employment are in forestry, manufacturing, construction, transportation, retail stores, and the accommodation and restaurant industries.

- Betsiamites

  Covering 256 km^2, the Betsiamites (Pessamit) community is the largest Aboriginal reserve in southern Quebec. In a straight line, t is located more or less 160 km from the Lac à Paul area but following the existing road network it is at more than 500 km from the future exploitation area. The population, which totalled 2,357 people in 2006, is considered young as almost 40% of residents are under 19 years of age. The Band Council employs close to 200 people full time, providing more than two-thirds of jobs in the community. Other fields of economic activity are forestry, construction, petty trade and traditional activities.

[4] Fisheries and Oceans Canada, *Canadian Environmental Assessment Act, Comprehensive Study Report.* July 2002 (Amended version, September 2002)

f) Infrastructures

Aside from road facilities, there is no infrastructure along the section of the Manouane River bordering the project area or within the Lac à Paul area. The main road crossing the future mine's property is a four season's gravel road known as R0251. South of the lake is Road R0258 that gives access to various forest exploitation areas and to the Pipmuacan Lake area. Further south along R0251 is R0253 which descends south following more or less the eastern side of the Péribonka River and eventually reaches Road 172 at the level of Saint-Fulgence near the City of Saguenay. R0251 continues towards the southwest and after crossing the Péribonka River, it connects to the R0250 which continue south to Saint-Ludger-de-Milot where it connects to the paved regional road network and eventually to the provincial road 169 that surrounds the Lac Saint-Jean.

As mentioned previously, the railway network is accessible from the City of Dolbeau-Mistassini located some 50 km west of Saint-Ludger-de-Milot and a harbour is accessible within the City of Saguenay which could be reached with the train from Dolbeau-Mistassini.

However, at a larger regional scale, there are two hydroelectric power plants located relatively near the project. They are Rio Tinto Alcan hydroelectric complex of Chutes-des-Passes located some 35 km to the west-southwest of the Lac à Paul area and Péribonka IV located some 60 km away.

Finally, a series of dams and dikes were constructed by Hydro-Quebec on the Manouane River some 10 to 15 km to the northeast of the Lac à Paul area to redirect part of the river's water into the Pipmuacan Reservoir.

g) Initial social concerns

Two public information sessions were held in the cities of Dolbeau-Mistassini and Saguenay on June 8 and 9, 2011. These sessions were mainly aimed at presenting some preliminary information on the project and collect first impressions, concerns and expectations from the participants. The following aspects highlight the main concerns and expectations expressed:

- The importance of implementing a security plan for the use of the ore's transportation routes;
- The number of trucks and the traffic generated by the ore's transportation to southern destinations;
- The communication of the time and schedules related to the use of the transport routes;
- The environmental and social impacts of the presence of trucks on the transport routes and of the overall increase in traffic;
- The importance of integrating a revegetation and reforestation plan into the mitigation measures that will be proposed;

- The elaboration of a good communication plan that will ensure transparency at all stages of the project. The creation of a round table including stakeholders should be considered;
- The need to clarify the role and participation of native communities;
- Defining the benefits for the local economy and how local man power will be implicated in the project.

20.3 Environmental Issues

20.3.1 Physical Issues

Five main potential physical issues have been identified in relation to the installation and operation of a mining facility at the Lac à Paul site. Three are related to water management, one is associated with air quality and the last one to ambient noise levels. They are:

- The installation and exploitation of the mining infrastructure and sites will imply significant modifications to the local water network, filling some of the smaller lakes and ponds as well as sections of existing streams, redirecting streams and overflows of some of the local lakes and ponds;
- The open pit approach proposed for the mine implies the management of an unknown amount of groundwater that will infiltrate the pit. This water may contain contaminants in concentrations that will make it unfit to be released directly in the environment;
- The processing of the extracted ore, the storing of the sterile material and of the excess material resulting from the processing of the ore at the concentration plant will result in waste water generated by the concentration process and the leaching of rain and snow melting through the piles of residues. This waste water may contain contaminants in concentrations that will make it unfit to be released directly in the environment;
- The extraction of waste rocks and of the ore, the crushing and conveying of the crushed ore, and the trucking of the waste rock and the tailings in their final storage sites will generate dust that will be deposited downwind from the mining site on the local vegetation and soils. Depending on its composition, this dust could contaminate the soil's surface as well as affect surface water quality and the components of the local ecosystems (flora and fauna);
- The use of dynamite and of various types of heavy machinery to extract and transport the rock and ore as well as crushing and conveying will be the source of noise and vibration that could affect existing activities (hunting, fishing, etc.) and the normal activities and habits of the local fauna.

20.3.2 Biological Issues

The construction of the mine's components and infrastructure and its operation could be the source of six main biological issues affecting the flora and fauna of the Lac à Paul area. These issues include:

- The loss of vegetation cover caused by the logging required for the site preparation at the construction stage;
- The loss of terrestrial fauna habitat through vegetation cutting, excavation and backfilling as well as through the presence of the pit, plant and storage areas;
- The loss of aquatic fauna habitat through the backfilling of some small lakes, ponds and local streams;
- The potential perturbation of local fauna activities through the increase in noise levels, vibration generation and dust production;
- The potential contamination of terrestrial and aquatic habitat through dust fallout generated by blasting activities, the manipulation of the sterile rocks and ore and by the preparation of the ore for concentration (crushing and sieving);
- The potential contamination of aquatic habitat through inadequately treated waste water generated by the pumping of accumulating groundwater in the pit, by the concentration process of the ore and by the leachate generated by the piles of sterile rock and of residual material from the concentration process.

20.3.3 Human Issues

The construction of the mine's components and infrastructure and its operation could be the source of nine main human issues affecting mainly the territories use and access and the regional economy of the Lac à Paul area. These issues include:

- Depending on the resulting modifications to the Mining Act imposed by the current review process, it is possible that the RCM will have to be contacted to obtain some authorizations to ensure that the mining activities proposed comply with their regulations;
- Potential land use conflict with native communities related to traditional activities;
- The potential disturbance of recreational activities such as cottages, fishing, hunting and outfitting operations;
- The traffic increase on roads R0250, R0251 and R0253 may have an effect on the population using these routes to access their cottage and hunting/fishing territories (security and road degradation);
- The improvement of the quality of the roads that will be used to access the exploitation area;
- The distribution of the economic windfalls of the project which should benefit to as much of the regional population possible (job creation);

- The continuous implication of the population in the development process of the project through information dissemination and direct consultation of local and regional stakeholders;
- The effect of the mining activities on the local and regional landscape (visibility of open pit and waste deposit piles);
- The electrification of the of the exploitation area.

20.4 Mitigation Measures

Various mitigation measures have been included in the project design. Additional mitigation measures will be developed and identified in the environmental management plan during construction, operation and at the mine closure phase of the project.

- As indicated in Section 18.2.1, a tailings storage facility has been designed for the project. The tailings storage facility will include a designated area for potentially acid generating magnetite tailings;
- Location for waste rock material has been identified for both Paul and Manouane pits;
- It is assumed that residual matters will be collected and hauled to the nearest waste management facility;
- The requirements for site monitoring and water management as detailed in Guideline 019 for the mining industry will be met.

20.5 Project Stakeholders List

A stakeholders' list has been prepared and is based on a preliminary inventory of the governmental, community members and associations made by the "Chaire d'Éco-Conseil" of the Quebec University of Chicoutimi (UQAC). These stakeholders should be involved in the information process of the project to ensure that general and specific concerns are identified and addressed.

As mentioned above public meetings have been conducted by Ressources d'Arianne with the "Chaire d'Éco-Conseil" early in the project and they are expected to continue as the project proceeds with further studies. Separate meetings are also being held with First Nations.

20.6 Health and Safety

Ressources d'Arianne intends to provide a safe work environment as well as the necessary material and training to enable its employees to work safely. Permanent and effective programs will be developed and standards and methods will be adopted to ensure compliance with laws and enforce regulated standards.

Provision for a nurse aid station is provided in the change house facility.

Provision for a fire truck, an ambulance and an emergency vehicle are provided in the capital cost estimate.

20.7 Environmental Characterization

Geochemical testing was conducted on mine rock and tailings samples to give a preliminary assessment of the metal leaching and acid rock drainage (ML/ARD) potential of mine wastes generated by the project.

Static testing consisted of acid-base accounting (ABA) and total metal analysis. Radioactivity tests were also performed. The metal leaching test was performed according to the TCLP EPA 1311 method as per Guideline 019 requirements. These tests were completed on four (4) samples from Paul Zone: one waste rock sample, one ore sample and on two tailings samples, one from the magnetic fraction of the tailings and one from the flotation tailings.

Requests were made to Maxxam International Analytic Corporation, located in Québec City, to perform these tests.

20.7.1 Acid-Base Accounting

Acid-base accounting (ABA) determines the neutralization potential (NP) and acid potential (AP) of a sample. These values are used to determine the samples Net Potential Ratio (NPR, where NPR = NP/AP). Samples with an NPR<1 are considered to be likely acid generating, whereas values of NPR <2 are considered possibly acid generating. Materials with NPR >2 have a low potential for ARD, and samples with NPR>4 have no potential for acid generation.

Preliminary acid-base accounting data have been gathered and only the magnetic tailings sample can be considered possibly acid generating.

20.7.2 Radioactivity

The tests performed on both magnetic tailings and flotation tailings samples show very low values, below detection at level stated, that do not reach the threshold for radioactive tailings as identified in the "Guide de caracterization des résidus miniers et du minerai"[5]. Based on these results, radioactivity will not be an issue in the context of this project. Results are detailed in the Pre-Feasibility Study report.

20.7.3 Leaching

Leaching tests as per TCLP 1311 (Toxicity Characteristic Leaching Procedure) were performed on all samples and results are given in Table 20.1.

Results indicate that water quality parameters are not expected to exceed Surface Water criteria or "Directive 019" criteria.

[5] Ministère de l'environnement, Direction des politiques du secteur industriel, Guide de caractérisation des résidus miniers et du minerai, 6 mai 2003.

Table 20.1 – Leaching Results (TCLP 1311)

	Units	Detection Limit	Resurgence to surface water Criteria [2]	Directive 019 Criteria [3]	Waste rock	Ore	Magnetic Tailings	Flotation Tailings
Mercury (Hg)	mg/L	0.01	0.00013	0.1	ND[1]	ND	ND	ND
Uranium (U)	mg/L	0.02	-	2.0	ND	ND	ND	ND
Arsenic (As)	mg/L	0.004	0.34	5.0	ND	ND	ND	ND
Baryum (Ba)	mg/L	0.005	5.3	100.0	0.58	0.30	0.21	0.73
Bore (B)	mg/L	0.1	-	-	ND	ND	ND	ND
Cadmium (Cd)	mg/L	0.002	0.0021	0.5	ND	ND	ND	ND
Chromium (Cr)	mg/L	0.007	-	5.0	0.032	0.02	0.036	0.016
Lead (Pb)	mg/L	0.01	0.034	5.0	ND	ND	ND	ND
Selenium (Se)	mg/L	0.005	0.02	1.0	ND	ND	ND	ND
Fluorure total (F)	mg/L	0.1	4	150.0	0.1	0.2	0.1	0.2
Phosphore total	mg/L	0.02	3	-	0.09	0.42	0.33	0.23
Nitrates (N) + Nitrites (N)	mg/L	0.2	-	1000.0	ND	ND	ND	ND
Nitrites (N-NO_2-)	mg/L	0.2	0.06	100.0	ND	ND	ND	ND

[1] Below detection limit
[2] Province of Québec Ministry of Environment "Politique de protection des sols et de réhabilitation des terrains contaminés"
[3] Province of Québec Ministry of Environment "Directive 019"

20.8 Mine Closure and Rehabilitation

20.8.1 Introduction

As stipulated in the current Mining Law, a rehabilitation plan will have to be prepared. The rehabilitation and restoration plan will have to be developed in accordance with the provincial Guidelines for preparing a mining site rehabilitation plan and general mining site rehabilitation requirements (MRNF and MDDEP, 1997). The economic analysis of a mining project will have to take into account the costs required for mine closure.

Furthermore, Project Law 14 to modify Quebec Mining Law (May 2011), suggests additional means to ensure the restoration of mining sites. The Project Law 14 proposes that the coverage of estimated costs of rehabilitating the accumulation areas be increased to 100% and that the security payment schedule be accelerated into 3 payments (50%, 25% and 25% of total costs) starting Year 1. Provision has therefore been made in the economic analysis for the disbursement of 100% of the estimated cost of rehabilitation of tailings storage facility and waste rock dumps in the first three years of the project.

The closure plan, that needs to be approved before the onset of the operations, will need to address the following items:

- Securing the mining area;
- Dismantling the infrastructures;
- Reclamation of waste rock disposal areas;
- Reclamation of tailings management facility;
- Contaminated waste characterisation and disposal;
- Waste water management;
- Emergency plan and monitoring.

Preliminary closure plan costs have been estimated based on the rehabilitation of the tailings disposal area and the waste rock disposal area.

20.8.2 Closure Cost

Based on the accumulation areas identified in Table 20.2 the total cost for the rehabilitation of the tailings storage facility and waste rock dumps has been estimated at $22.7 M.

Table 20.2 – Accumulation Areas for Waste Rock Dump and Tailings Storage Facility

Accumulation Areas	Unit	Cost
Paul North Waste Rock Dump area	m^2	1,356,000
Paul South Waste Rock Dump area	m^2	694,000
Manouane Waste Rock Dump area	m^2	783,000
Tailings Flotation (non PAG) area	m^2	3,470,775
Tailings (Potentially Acid Generating) (PAG)	m^2	428,826
Polishing Pond	m^2	189,152

20.9 Recommendations

Meetings with Stakeholders should continue as the project progresses to Feasibility Studies.

A summary table of Issues/Potential Impacts identified by Stakeholders should be maintained closely.

A detailed schedule of environmental permitting requirement will need to be prepared. This schedule should be integrated in the Master Schedule of the project.

Based on the preliminary characterization results obtained, it is recommended that at the Feasibility Study stage of the project the following be analyzed:

- Increase the number of samples per type of material that requires environmental characterization;
- Add the environmental characterisation of overburden material type to the database of results;
- Add Manouane zone to the environmental characterisation of waste rock, ore, and process tailings;
- Include Guideline 019 toxicity tests on process tailings decant water for both Paul and Manouane deposits.

21.0 CAPITAL AND OPERATING COST

21.1 Capital Cost

21.1.1 Capital Cost Estimate and Battery Limits

This capital cost estimate covers Ressources d'Arianne's Lac à Paul Project for apatite concentrate production and it is based on Met-Chem's standard methods applicable for a pre-feasibility study to achieve the accuracy level of ± 25%.

The capital cost estimate includes the work required to develop the mine, to build the ore processing facilities to process the ore, and to establish all site and off-site infrastructure and services necessary to support the mine operation.

The off-site facilities include the concentrate transportation and, stockpile/railcar load-out facility. The concentrate transportation facilities consist of the transport trucks and trailers, the Mistassini River conveyor bridge and rail spurs and sidings. The concentrate stockpile and railcar load-out facility consists of the stockpile and reclaim tunnel, and the railcar load-out.

The base case was developed where the owner executes all the activities. An alternative was studied where open pit development and mining activities as well as concentrate transport would be subcontracted; therefore there would be no requirement to acquire mining equipment and facilities as well as transport equipment. These options are further discussed in Section 22 (Economic Analysis).

All duties and taxes are excluded from the capital cost, but are considered in the economic analysis.

The effective date for the cost estimate is the third quarter of 2011. The estimate is expressed in US dollars.

The estimate is currently in Revision E. The pre-production initial capital cost for the base case scope of work is US$ 649.2 M, of which US$ 453.9 M is direct cost, US$ 121.8 M is indirect cost including US$9.0 M of financial costs and US$ 73.5 M is contingency.

The sustaining capital requirement is US$ 304.2 M. The total capital cost for the project life is US$ 953.4 M.

The costs are summarized in Table 21.1. Details are provided in Pre-Feasibility Study report.

Table 21.1 – Summary of Capital Cost Estimate

	Item Description	Total Initial Capital US$ M	Total Sustaining Capital US$ M	Total Capital US$ M
0	**Total Direct Cost**	**454.0**	**304.2**	**758.2**
10	Open Pit Mine	46.9	135.7	182.6
20	Ore Process	217.5		217.5
30	Tailings and water Management facilities	12.1	103.7	115.8
40	General Services (Fuel, Water Dam, etc.)	10.8		10.8
50	Infrastructures	28.5		28.5
60	Power and Communication	51.9		51.9
70	Off-Site Concentrate Stockpile and Load-Out	52.7	64.8	117.5
80	Service Vehicle and Equipment (Allowance)	5.0		5.0
90	Contractor's Indirect Costs	28.6		28.6
I	**Indirect Cost (including financial costs)**	**121.7**	**0.0**	**121.7**
C	Contingency	73.5	0.0	73.5
T	**Total Capital Cost**	**649.2**	**304.2**	**953.4**

21.1.2 Basis of Estimate for Direct Capital Cost

a) Currencies

Updated indices were used for quotation received before third quarter of 2011. No allowances for escalation or currency fluctuation are included. The exchange rates used when quotations were received in foreign currencies are 1.00 CAD /1.00 USD and 1.44 CAD/1.00 EUR.

b) Construction Labour

The labour rate was developed for a typical crew from a detailed table of current rates developed by the Corporation des Entrepreneurs Généraux du Québec. The all-inclusive hourly rate is US$127, and includes the basic hourly rates for the tradesman, social benefits and employer's burden, industrial site premium, direct supervision, small tools and consumables, and contractor's overhead and profit.

Indirect supervision is excluded from the hourly rate but is included in the construction contractor's site management provision. Similarly, workers transportation from the camp to the construction site is covered in owner's cost while transportation within the construction site is included in the construction contractor's mob/demob provision.

In addition to the labour cost, a construction allowance based on delivered equipment cost was established from similar projects to cover for construction material, sub-contract and mobile cranes. A factor of 5% is applied for all process areas except for the concentrator where 3% is applied.

The working calendar was defined as one shift per day, 10 hours per day and 7 days per week for a total of 70 hours per week. According to the Québec collective agreement for industrial construction, 40 hours are paid at regular rate while 30 hours are paid as overtime. The typical turnaround would be 4 weeks in and 2 weeks out, as majority of the workers will probably be coming from outside the region.

The estimate is based on construction contracts attributed on the base of competitive bidding process amongst qualified contractors. It is also expected that an average level of site management, contract administration, quality control and adequate safety requirements will be required from the contractors by the construction management.

Considering the working calendar, the type of project and availability of the workforce, a compounded factor of 1.07 was applied to the man hours to account for productivity loss with respect to specific conditions such as temperature, work schedule, adequate coordination between contractors, continuity of work flow, average number of changes to contracts, availability of experienced contractors and skilled workers, etc.

c) Freight, Duties and Taxes

Based on recent surveys and studies and when not included in the cost, the freight was accounted for by adding a factor of 11% to the value of the goods. All other duties and taxes are excluded from the capital cost, but are considered for the economic analysis.

d) Contractor's indirect costs

Provisions have been included to cover for the mobilisation and demobilisation of contractor's site establishment including owned and rented construction equipment, vehicles and other facilities such as trailers and lunch rooms, tool cribs, power panels, containers, maintenance of area, janitorial and clean-up. Special installations, tools, cranes, scaffolding, cribbing and dunnage are also included as well as work place weather protection. Workers transportation within the construction site is also included in mob/demob.

Provision have also been made for construction contractor's site management including high level supervision and support staff such as administration and procurement, coordination and scheduling, and quality and safety.

e) Mining

The mine development costs were estimated using unit rates established for the production and the pre-development quantities taken from the mine schedule for the project.

Budget prices were obtained from qualified suppliers or database from recent similar projects for the major, support and service equipment. Freight and erection of the equipment were either quoted by the suppliers or estimated as a percentage of the value of the equipment.

f) Process

The process facilities at the mine site include the crusher building, the crushed ore stockpile and reclaim tunnel, the main process building consisting of the grinding, the concentrator area, the mechanical shop, the office and lunch room and the laboratory area, the concentrate stockpile and reclaim tunnel as well as the truck load-out facility.

The process facilities off-site include the concentrate stockpile and reclaim tunnel as well as the railcar load-out facility.

i) Civil Work and Concrete Quantities

Quantities for civil work including site preparation, excavation and backfill, for concrete work including buildings foundations, slabs on-grade, elevated slabs and equipment foundations, were calculated from plan site and buildings layout and based on preliminary assumptions regarding geotechnical indication. It is to be noted that these quantities are planned to be re-evaluated once final soil conditions will be known.

ii) Structural Steel and Buildings Quantities

Preliminary structural steel and building quantities were calculated from layouts.

iii) Budget Unit Prices

The costs of the Civil, Concrete and Buildings Works were estimated by applying budget unit prices to the quantities. The budget unit prices were established based on recent similar projects.

iv) Process Equipment

The process equipment list was derived from the flow sheets. For the main equipment, budget prices were requested from qualified suppliers based on datasheets, data tables or a preliminary technical description. Excluding the Mistassini river conveyor that was estimated based on recent database estimation, close to 70% of the process equipment value is based on budget quotes. The remaining equipment was estimated from databases from recent similar projects or in house estimation.

v) Piping and Pipelines

Process piping cost was established for each area by factorisation on delivered process equipment. Process pipeline costs were established from dimensions and budget unit prices from recent similar projects, estimation database and local conditions.

vi) Electrical

Electrical equipment list and quantities were derived from the single line diagram. Budget prices were established based on databases from recent projects. Quantities and costs for material as well as installation man-hours were also established based on recent similar projects.

vii) Instrumentation

Instrumentation, automation and communication costs were established for each area by factorisation on delivered process equipment.

viii) Buildings Services and Supplies

For each process area, buildings services and supplies were estimated by applying a factor to delivered equipment cost, based on recent similar projects.

g) Tailings Management Facilities

The tailings storage facilities were designed and estimated by Journeaux Associates. The budget estimate is included in the capital cost.

h) General Services, Infrastructure and Anciliary Buildings

General services such as fuel storage, fresh water and sanitary services, as well as general fire protection were estimated based on recent similar projects.

Site preparation and site roads cost estimate was developed based on quantities derived from general layouts and budget unit price based on recent similar projects.

i) Ancillary buildings and facilities

Quantities were calculated from the layout for the garage and storage area and unit rates were applied to estimate the costs.

Ancillary buildings and facilities such as the office complex, the change house and canteen, the permanent camp were estimated from recent similar projects.

j) Access to Mine Site

The main road will allow access to the mine site. Provisions have been made to upgrade the main road to meet the increase in year-round heavy traffic resulting from the concentrate transport from the mine site to the storage and load-out near Dolbeau.

k) Power supply, main substation and communication

Requirements were established for the main power line and two scenarios were developed by Hydro-Québec. An early stage order of magnitude budget was then estimated by Hydro-Québec based on one of the scenarios.

Requirements were established for the site distribution power lines. Estimation of the cost was based on quantities and prices for material as well as installation man-hours, based on recent similar projects.

Requirements were established for emergency power supply. A budget price was estimated based on recent similar projects.

An allowance was made for the main communication tower based on recent similar projects

Requirements were established for the main substation based on the power demand. Equipment budget prices and costs for material and installation were established based on databases from recent similar projects.

l) Service Vehicles and Equipment

An allowance was made for the service vehicles and equipment fleet based on recent similar projects.

21.1.3 Indirect Costs

A preliminary allowance for indirect costs is included in Table 21.1. This allowance should typically cover for the major items detailed here under: Project Development, Project Implementation, Financial Costs and Closure Costs.

a) Project Development

A global allowance based on recent similar projects was established for the project development owner's costs which usually include: Permitting Process, Land Acquisition, Administration, NSR buyout, Exploration and Drilling Program, Engineering Studies (Feasibility studies as well as any Independent Review), Environmental Impact Assessment, Metallurgical Testing, Geotechnical and Occupational Hazard studies, Social Impact Studies and Community Relations, Preproduction Operation Group and Legal Fees.

b) Project Implementation

These costs include but are not limited to: EPCM, Spares, First Fills and Commissioning and Owner's Costs.

EPCM includes Detailed Engineering, Procurement and Construction Management. Commissioning Assistance and Site Assistance. Factors were applied within acceptable range for each major area to estimate the budget for EPCM.

Spares, First Fills and Commissioning include Capital and Commissioning Spare Parts, Capital First Fills, and Dry and Wet Commissioning that includes Vendors Representative on site.Budgets were estimated by factorization on delivered process equipment.

Owner's costs include Construction Indirect, Owner's Project Team, Room & Board and Transportation of workers to the project site. An allowance was established for the construction indirect costs by applying a factor on the total direct cost of the project. An allowance was established to estimate the budget for Owner's Project Team based on preliminary assessment of personnel requirements and duration of the construction.

c) Financial Costs

Insurances were estimated as a factor of the total direct cost.

Working capital, taxes and duties are excluded from the Capital Cost estimate but are addressed in the Economic Analysis.

Escalation and interests incurred during construction are excluded from the Capital Cost.

d) Closure and Rehabilitation of the site

Closure Cost and Rehabilitation of the site are excluded from the Capital Cost but an allowance has been included in the Economic Analysis. Details are provided in Section 20.7 of this Report.

21.1.4 Contingency

Level of development of the project as well as risks were assessed for each major area, and factors were applied within acceptable range to estimate the budget for the contingency.

21.1.5 Sustaining Capital Expenditures

Estimates for Sustaining Capital requirements were established for the Mining Equipment (replacement over time), the Concentrate Transport Equipment (replacement over time) and the Tailings Management Facilities (costs to reach final design elevation) are integrated in the economic analysis. The amounts are shown in Table 21.1.

21.2 Operating Cost

21.2.1 Introduction

Operating costs were estimated for the Lac à Paul Apatite project and cover Mining, Ore Processing, Tailings Management, Concentrate Transportation, Site Services and Administration. Details are provided in the Pre-Feasibility Study.

The sources of information used to develop the operating costs include in-house databases and outside sources particularly for materials, services and consumables.

21.2.2 Summary Operating Costs

The life of mine average operating cost estimate, given as dollar per tonne of concentrate, is summarised in Table 21.2.

Table 21.2 – Summary of Life of Mine Average Operating Cost Estimate ($/tonne concentrate)

Area	Average Operating Cost ($/tonne of concentrate)
Mining	26.63
Ore Processing	54.16
Tailings Management	Included in Ore Processing Costs
Concentrate Transportation	10.90
Plant Administration, Infrastructure & Tech. Serv.	5.85
Total Operating Costs	**97.54**

21.2.3 Manpower Requirement

Table 21.3 presents the estimated personnel requirements for the Lac à Paul operation by area.

Table 21.3 – Total Personnel Requirement

Area	Number
Management	6
Mine	227
Ore Processing	77
Environment	2
Administration and Technical Services	24
Human Resources	4
Total Manpower	**340**

Total annual costs for the above manpower including base salary, bonus and fringe benefits have been estimated at $ 38.3 M including the concentrate transport operators.

This manpower level accounts for duplication for staff employees on rotation.

21.2.4 Mining

The mine operating cost was estimated for each period of the mine plan. This cost is based on operating the equipment, the manpower associated with operating the mine, the cost for explosives as well as dewatering, road maintenance and other activities.

In order to determine the operating cost, the following assumptions were used;

- Diesel Fuel Price – 1.0 US$/l;
- Electricity – 0.05 US$ / kWh;
- Explosives Cost - 0.23 US$/t plus a fixed annual cost of US $ 1,142,076;
- Dewatering – 200,000 US$/year;
- Mine Road Maintenance – 50,000 US$/year;
- Concentrate Transport Road Maintenance – 1,800,000 US$/ year.

The mine operating cost was estimated to average 2.24 US$/t mined for the life of the open pit mine. This cost is divided into 2.39 US$/t for ore, 1.87 US$/t for overburden and 2.09 US$/t for waste.

21.2.5 Ore Processing

For a typical year at design processing rate, the operating costs for the process plant, which includes the crusher, are summarized in Table 21.4. These are subdivided into these components: labour, electrical power, consumables, reagents, material handling, laboratory/environmental/consultants and spare parts. These costs were derived from supplier information, Met-Chem's database or factored from similar operations.

Table 21.4 - Summary of Average Annual Process Plant Operating Costs

Description	Total Annual Cost (US $)	Unit Cost (US $/tonne processed)	% of Total Costs
Labour	6,008,100	0.50	6.0%
Power	19,457,916	1.62	19.4%
Consumables	1,592,137	0.12	1.5%
Reagents	67,516,140	5.61	67.3%
Material Handling	594,603	0.05	0.6%
Lab, Environment and Consultants	1,156,320	0.10	1.2%
Spare Parts and miscellaneous	4,081,840	0.34	4.1%
Total	**100,407,056**	**8.33**	**100.0%**

21.2.6 Plant Administration and Technical Services Costs

This section regroups the costs for Manpower related to Administration & Accounting, Purchasing & Stores and Human Resources, as well as Material & Technical Services, and Power for Heating. The operating cost summary is given in Table 21.5.

Table 21.5 – Summary of Estimated Annual Plant Administration and Services Costs

Description	Total annual Cost (US $/year)	Unit cost (US $/tonne of concentrate)
General Administration		
Administration - Manpower (Mine Site)	2,156,000	1.08
Administration - Manpower (Dolbeau)	1,414,000	0.71
Sub-Total	**3,570,000**	**1.79**
Administration - Material & Services		
Administration - Material & Services	**7,025,000**	**3.51**
Infrastructure		
Power for heating, Miscellaneous	1,103,206	0.55
Total	**11,698,206**	**5.85**

22.0 ECONOMIC ANALYSIS

22.1 General

A preliminary economic analysis of the project has been carried out using a cash flow model prepared in Microsoft Excel. The model is constructed using annual cash flows in constant money terms (fourth quarter 2011). No provision is made for the effects of inflation. As required in the financial assessment of investment projects, the evaluation is carried out on a so-called "100% equity" basis, i.e. the debt and equity sources of capital funds are ignored. Results are presented before and after taxation.

The model reflects the base case macro-economic and technical assumptions given in this report on the basis that the owner will own and operate the mining equipment.

22.2 Assumptions

22.2.1 Macro-Economic Assumptions

The main macro-economic assumptions used in the base case are given in Table 22.1.

The average phosphate price of 175 US$/tonne of concentrate is based on the 85% BPL Russian prices over recent years with consideration of the September 2011 CRU 10-year outlook report[6] on the phosphate rock market.

The sensitivity analysis examines a range of phosphate prices 30% above and below the base case price.

Table 22.1 – Macro-Economic Assumptions

Item	Unit	Base Case Value
Phosphate Concentrate Price	US$/tonne	175
Exchange Rate	CAD$/US$	1.00
Life of Mine (Paul zone and Manouane zone)	years	25 ¼
Discount Rate 1	% per year	8.0%
Discount Rate 2	% per year	10.0%

The current Canadian tax system applicable to mining income is used to assess the project's overall annual tax liability. This consists of federal and provincial corporate taxes as well as provincial mining taxes (mining duties in Québec, revised in the 2010 budget). The federal and provincial corporate tax rates currently applicable over the project's operating life are 15.0 % and 11.9 % of taxable income, respectively. The rate applicable for the purpose of assessing mining duties is 16 % to taxable income.

The discount rate variants used to determine the net present value of the project is assumed to represent the weighted-average cost of capital.

[6] CRU, Phosphate Rock Ten Year Outlook 2011, Annual Report, September 2011.

22.2.2 Mineral Royalties

No provision for mineral royalties is included in the present cash flow analysis.

A 1% NSR remains on 2 privately owned claims. In lieu of this NSR payment, a buyout amount of US$ 700,000 was included in the Project Development Owner's Cost of the project capital expenditures.

22.2.3 Technical Assumptions

The main technical assumptions used in the base case are given in Table 22.2.

Table 22.2 – Technical Assumptions

Total Ore Mined (Life Of Mine)	M tonnes	307.1
Average Ore Grade to Mill	% P_2O_5	6.57
Concentrate Grade	% P_2O_5	38
Total Tonnes of Concentrate Produced	M tonnes	47.2
Processing Design Rate	Tonnes/day	33,000
Average Process Recovery over Mine Life	%	88.7
Average Mining Operating Cost	($ / tonne mined)	2.24
Average Process Operating Cost	($ / tonne milled)	8.33
Average General & Administration Cost	($ / tonne concentrate)	5.85
Average Concentrate Transport Operating Cost	($ / tonne concentrate)	10.90

On average, 12.304 Mt of run of mine ore will be supplied per year to the process plant when full production is reached. The amount of concentrate produced is a function of head grade and recovery and thus varies from 1.7 M tonnes to 2.1 M tonnes per year. The process recovery for the Manouane zone ore is slightly lower than that of the Paul zone ore.

22.3 Financial Model and Results

A summary of the base case cash flow results is given in Table 22.3.

The cash flow statement for the base case is given in Figure 22.1.

This summary indicates that the total pre-production capital expenditure was evaluated at US$ 649.2 M and the sustaining capital requirement was evaluated at US$ 304.2 M for a total project capital expenditure over the project life of US$ 953.4 M.

For taxation purposes, all contingencies as well as owner's and contractor's indirects were redistributed by area in the cash flow statement of Figure 22.1. The cash flow statement shows a capital cost breakdown by area and provides a preliminary capital spending schedule over a 2-year pre-production period.

A working capital equivalent of 3 months of total annual operating costs is maintained throughout the production period.

A total of US$ 22.7 M was added for mine reclamation purposes. The total operating cost was estimated at US$ 4,606.6 M for the life of the mine or $ 15 / tonne milled.

The financial results indicate positive before-tax Net Present Values (NPV) of US$ 475.6 M and US$ 683.7 M at discount rates of 10% and 8% per year, respectively. The before-tax Internal Rate of Return is 19.2% and the payback period is 4.70 years.

The after-tax Net Present Values are US$ 222.8 M and US$ 362.2 M at discount rates of 10% and 8%, respectively. The after-tax Internal Rate of Return is 15.2% and the payback period is 5.18 years.

Table 22.3 – Project Evaluation Summary

Base Case 33,000 tpd Owner Operated (million US$)	
Initial Capital Cost	649.2 $
Sustaining Capital Cost	304.2 $
Total Direct Capital Cost	953.4 $
Mine Closure and Rehabilitation	22.8 $
Total Mining Operating Cost	1,257.6 $
Total Process Operating Cost	2,557.9 $
Total General & Administration Operating Cost	514.9 $
Total Concentrate Transport Operating Cost	276.2 $
Total Operating Cost	4,606.6 $
Before-Tax NPV@10 %	475.6 $
Before-Tax NPV @ 8%	683.7 $
Before-Tax IRR (%)	19.2%
Before-Tax Payback Period (years)	4.70
After-Tax NPV@10 %	222.8
After-Tax NPV @ 8%	362.2
After-Tax IRR (%)	15.2%
After-Tax Payback Period (years)	5.18

Figure 22.1 – Cash Flow Statement

2010-052 LAC A PAUL APATITE PROJECT - PRE FEASIBILITY STUDY
Monetary values in US $ BASE CASE 33,000 TPD (MINING & CONC. TRANSP. OPERATED BY OWNER)

Years	-2	-1	1	2	3	4	5	6	7	8	9	10	11
Ore (t)			**8,882,089**	**12,045,002**	**12,175,353**	**12,303,725**	**12,303,681**	**12,304,033**	**12,304,033**	**12,304,033**	**12,304,058**	**12,304,058**	**12,304,058**
Overburden (t)		663,629	912,022	1,844,638	734,357	964,229	1,829,239	220,551	220,551	220,551	0	0	0
Waste Rock (t)		1,958,712	2,240,360	8,715,566	10,824,372	11,408,926	13,954,335	16,040,709	16,040,709	16,040,709	14,714,160	14,714,160	14,714,160
Total Waste (t)		**2,622,341**	**3,152,382**	**10,560,204**	**11,558,729**	**12,373,155**	**15,783,574**	**16,261,260**	**16,261,260**	**16,261,260**	**14,714,160**	**14,714,160**	**14,714,160**
Stripping ratio (w : o)			0.35	0.88	0.95	1.01	1.28	1.32	1.32	1.32	1.20	1.20	1.20
Concentrate Selling Price ($/t)			175	175	175	175	175	175	175	175	175	175	175
Ore Grade (% P2O5)			6.70	6.90	7.13	7.12	7.32	7.09	7.09	7.09	7.34	7.34	7.34
Process Recovery (%)			90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Concentrate Production – 38 % P2O5 (t)			**1,408,784**	**1,968,705**	**2,054,994**	**2,074,750**	**2,133,789**	**2,065,508**	**2,065,508**	**2,065,508**	**2,138,280**	**2,138,280**	**2,138,280**
Total Revenue ($)			246,537,122	344,523,406	359,623,915	363,081,329	373,413,001	361,463,835	361,463,835	361,463,835	374,198,982	374,198,982	374,198,982
Total Revenue ($)			**246,537,122**	**344,523,406**	**359,623,915**	**363,081,329**	**373,413,001**	**361,463,835**	**361,463,835**	**361,463,835**	**374,198,982**	**374,198,982**	**374,198,982**
Mine Operating Cost Overburden ($)			1,894,955	2,806,268	1,171,287	1,652,263	3,296,540	427,523	427,523	427,523	0	0	0
Mine Operating Cost Overburden ($/t)			2.08	1.52	1.59	1.71	1.80	1.94	1.94	1.94	0.00	0.00	0.00
Mine Operating Cost Waste ($)			4,730,750	14,571,683	19,650,880	22,036,326	23,382,876	31,543,311	31,543,311	31,543,311	30,191,674	30,191,674	30,191,674
Mine Operating Cost Waste ($/t)			2.11	1.67	1.82	1.93	1.68	1.97	1.97	1.97	2.05	2.05	2.05
Mine Operating Cost Ore ($)			19,624,700	20,131,202	21,685,917	21,516,349	22,480,295	22,893,887	22,893,887	22,893,887	24,834,548	24,834,548	24,834,548
Mine Operating Cost Ore ($/t)			2.21	1.67	1.78	1.75	1.83	1.86	1.86	1.86	2.02	2.02	2.02
Process Operating Cost ($) 8.33			73,974,561	100,316,909	101,402,545	102,471,686	102,471,326	102,474,257	102,474,257	102,474,257	102,474,466	102,474,466	102,474,466
Concentrate Transportation Cost ($)			15,927,820	21,147,217	21,951,670	22,056,433	23,063,282	22,007,421	22,007,421	22,007,421	22,740,202	22,740,202	22,740,202
Concentrate Transportation Cost ($/t)			11.31	10.74	10.68	10.63	10.81	10.65	10.65	10.65	10.63	10.63	10.63
General & Administration Cost ($) 5.85			8,240,120	11,515,160	12,019,871	12,135,429	12,480,749	12,081,367	12,081,367	12,081,367	12,507,020	12,507,020	12,507,020
Average Mine Operating Cost ($/t mined)			2.18	1.66	1.79	1.83	1.75	1.92	1.92	1.92	2.04	2.04	2.04
Total Operating Costs ($)			124,392,905	170,488,439	177,882,170	181,868,486	187,175,069	191,427,766	191,427,766	191,427,766	192,747,910	192,747,910	192,747,910
Total Operating Costs ($)			**124,392,905**	**170,488,439**	**177,882,170**	**181,868,486**	**187,175,069**	**191,427,766**	**191,427,766**	**191,427,766**	**192,747,910**	**192,747,910**	**192,747,910**
Operating Profit ($)			122,144,217	174,034,968	181,741,745	181,212,844	186,237,932	170,036,070	170,036,070	170,036,070	181,451,072	181,451,072	181,451,072
Pre-production Capital Expenditure													
MINE DEVELOPMENT : Pre-stripping	5,927,143	8,890,714											
OPEN PIT MINE	20,759,980	31,139,970											
ORE PROCESS	134,642,454	201,963,680											
TAILINGS AND WATER MANAGEMENT FACILITIES	7,367,515	11,051,273											
GENERAL SERVICES MINE SITE	6,806,890	10,210,335											
INFRASTRUCTURE MINE SITE	17,993,685	26,990,528											
POWER AND COMMUNICATION	26,870,517	40,305,776											
CONCENTRATE STOCKPILE AND RAIL CAR LOAD-OUT	32,093,679	48,140,519											
SERVICE VEHICLES AND EQUIPMENT	3,057,085	4,585,628											
FINANCIAL COSTS (Insurances)	5,220,182												
Total	260,739,130	383,278,422											
Indexed for Sensitivity	260,739,130	383,278,422											
Contingency, Owner's and Contractor's Indirects Included													
Working Capital													
FINANCIAL COSTS (Spare parts)		5,177,738											
W.C. (includes Spare Parts cost estimate above) 3.0		31,098,226	11,523,883	1,848,433	996,579	1,326,646	1,063,174	0	0	330,036	0	0	-977,493
Sustaining Capital Expenditure (all same class)													
Tailings			0	3,695,762	6,401,580	6,397,906	6,397,906	6,397,906	8,753,478	8,753,478	8,753,478	9,183,385	9,183,385
Concentrate Transport			0	6,618,780	945,540	0	1,891,080	15,836,250	0	0	0	0	0
Mine			0	22,594,363	6,998,712	5,968,712	14,921,780	8,953,068			400,000		
Total			0	32,908,905	14,345,832	12,366,618	23,210,766	31,187,224	8,753,478	8,753,478	9,153,478	9,183,385	9,183,385
Indexed for Sensitivity			0	32,908,905	14,345,832	12,366,618	23,210,766	31,187,224	8,753,478	8,753,478	9,153,478	9,183,385	9,183,385
Total Capital Expenditure ($)	**260,739,130**	**414,376,649**	**11,523,883**	**34,757,338**	**15,342,411**	**13,693,264**	**24,273,940**	**31,187,224**	**8,753,478**	**9,083,514**	**9,153,478**	**9,183,385**	**8,205,892**
Mine Closure and Rehabilitation Payments ($)		**11,378,028**	**5,689,014**	**5,689,014**									
Federal Corporate Income Taxes	0	0	0	0	0	0	18,034,836	20,584,069	20,579,937	20,594,389	22,042,663	22,058,467	22,076,229
Provincial Corporate Income Taxes	0	0	0	0	0	0	14,307,636	16,330,028	16,326,750	16,338,216	17,487,180	17,499,717	17,513,808
Quebec Mining Duties	0	0	0	0	4,828,190	10,753,689	15,598,744	14,804,877	17,145,072	18,783,209	21,743,915	22,531,726	23,083,194
Total Corporate Income Taxes and Mining Duties ($)	**0**	**0**	**0**	**0**	**4,828,190**	**10,753,689**	**47,941,216**	**51,718,975**	**54,051,759**	**55,715,814**	**61,273,758**	**62,089,911**	**62,673,231**
BEFORE-TAX CASH FLOW ($)	**-260,739,130**	**-425,754,677**	**104,931,319**	**133,588,616**	**166,399,334**	**167,519,580**	**161,963,992**	**138,848,846**	**161,282,592**	**160,952,556**	**172,297,594**	**172,267,687**	**173,245,180**
Cumulative CF	-260,739,130	-686,493,807	-581,562,488	-447,973,872	-281,574,538	-114,054,959	47,909,033	186,757,879	348,040,471	508,993,027	681,290,621	853,558,308	1,026,803,488
Payback period work area		1.00	1.00	1.00	1.00	1.00	0.70	0.00	0.00	0.00	0.00	0.00	0.00
AFTER-TAX CASH FLOW ($)	**-260,739,130**	**-425,754,677**	**104,931,319**	**133,588,616**	**161,571,144**	**156,765,891**	**114,022,776**	**87,129,870**	**107,230,832**	**105,236,742**	**111,023,837**	**110,177,777**	**110,571,949**
Cumulative CF	-260,739,130	-686,493,807	-581,562,488	-447,973,872	-286,402,728	-129,636,837	-15,614,062	71,515,809	178,746,641	283,983,383	395,007,220	505,184,997	615,756,945
Payback period work area		1.00	1.00	1.00	1.00	1.00	1.00	0.18	0.00	0.00	0.00	0.00	0.00

Years	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	Total
Ore (t)	**12,304,058**	**12,304,058**	**12,304,058**	**12,304,000**	**12,304,000**	**12,304,000**	**12,304,000**	**12,304,000**	**12,304,000**	**12,304,000**	**12,304,000**	**12,304,000**	**12,304,000**	**12,304,000**	**3,331,513**	**307,121,813**
Overburden (t)	2,891,701	2,891,701	2,891,701	2,020,446	2,020,446	2,020,446	0	0	0	0	0	0	0	0	0	22,346,207
Waste Rock (t)	8,008,136	8,008,136	8,008,136	9,114,998	9,114,998	9,114,998	5,724,008	5,724,008	5,724,008	5,127,072	5,127,072	5,127,072	5,127,072	3,070,911	0	233,487,504
Total Waste (t)	**10,899,836**	**10,899,836**	**10,899,836**	**11,135,443**	**11,135,443**	**11,135,443**	**5,724,008**	**5,724,008**	**5,724,008**	**5,127,072**	**5,127,072**	**5,127,072**	**5,127,072**	**3,070,911**	**0**	**255,833,711**
Stripping ratio (w : o)	0.89	0.89	0.89	0.91	0.91	0.91	0.47	0.47	0.47	0.42	0.42	0.42	0.42	0.25	0.00	0.83
Concentrate Selling Price ($/t)	175	175	175	175	175	175	175	175	175	175	175	175	175	175	175	
Ore Grade (% P2O5)	7.08	7.08	7.08	6.08	6.08	6.08	5.97	5.97	5.97	6.08	6.08	6.08	5.48	5.48	5.48	6.57
Process Recovery (%)	89.45%	89.45%	89.45%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	87.0%	
Concentrate Production – 38 % P2O5 (t)	**2,050,366**	**2,050,366**	**2,050,366**	**1,713,528**	**1,713,528**	**1,713,528**	**1,682,543**	**1,682,543**	**1,682,543**	**1,711,376**	**1,711,376**	**1,711,376**	**1,542,803**	**1,542,803**	**417,740**	**47,229,168**
Total Revenue ($)	358,814,059	358,814,059	358,814,059	299,867,365	299,867,365	299,867,365	294,445,044	294,445,044	294,445,044	299,490,739	299,490,739	299,490,739	269,990,570	269,990,570	73,104,434	8,265,104,424
Total Revenue ($)	**358,814,059**	**358,814,059**	**358,814,059**	**299,867,365**	**299,867,365**	**299,867,365**	**294,445,044**	**294,445,044**	**294,445,044**	**299,490,739**	**299,490,739**	**299,490,739**	**269,990,570**	**269,990,570**	**73,104,434**	**8,265,104,424**
Mine Operating Cost Overburden ($)	6,097,185	6,097,185	6,097,185	3,369,523	3,369,523	3,369,523	0	0	0	0	0	0	0	0	0	40,504,003
Mine Operating Cost Overburden ($/t)	2.11	2.11	2.11	1.67	1.67	1.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.87
Mine Operating Cost Waste ($)	16,401,048	16,401,048	16,401,048	19,415,499	19,415,499	19,415,499	14,325,629	14,325,629	14,325,629	13,260,906	13,260,906	13,260,906	7,710,477	7,710,477	7,710,477	482,918,147
Mine Operating Cost Waste ($/t)	2.05	2.05	2.05	2.13	2.13	2.13	2.50	2.50	2.50	2.59	2.59	2.59	1.50	2.51	0.00	2.09
Mine Operating Cost Ore ($)	29,945,308	29,945,308	29,945,308	30,694,830	30,694,830	30,694,830	35,282,263	35,282,263	35,282,263	36,297,628	36,297,628	36,297,628	29,626,952	29,626,952	29,626,952	734,164,706
Mine Operating Cost Ore ($/t)	2.43	2.43	2.43	2.49	2.49	2.49	2.87	2.87	2.87	2.95	2.95	2.95	2.41	2.41	8.89	2.39
Process Operating Cost ($) 8.33	102,474,466	102,474,466	102,474,466	102,473,979	102,473,979	102,473,979	102,473,979	102,473,979	102,473,979	102,473,979	102,473,979	102,473,979	102,473,979	102,473,979	27,746,533	2,557,866,898
Concentrate Transportation Cost ($)	21,927,131	21,927,131	21,927,131	19,100,312	19,100,312	19,100,312	18,936,011	18,936,011	18,936,011	19,088,900	19,088,900	19,088,900	13,119,180	13,119,180	13,119,180	514,903,896
Concentrate Transportation Cost ($/t)	10.69	10.69	10.69	11.15	11.15	11.15	11.25	11.25	11.25	11.15	11.15	11.15	8.50	8.50	31.41	10.90
General & Administration Cost ($) 5.85	11,992,803	11,992,803	11,992,803	10,022,601	10,022,601	10,022,601	9,841,368	9,841,368	9,841,368	10,010,013	10,010,013	10,010,013	9,024,015	9,024,015	2,443,402	276,248,276
Average Mine Operating Cost ($/t mined)	2.26	2.26	2.26	2.28	2.28	2.28	2.75	2.75	2.75	2.84	2.84	2.84	2.14	2.43	11.21	2.24
Total Operating Costs ($)	188,837,940	188,837,940	188,837,940	185,076,743	185,076,743	185,076,743	180,859,251	180,859,251	180,859,251	181,131,426	181,131,426	181,131,426	161,954,604	161,954,604	80,646,544	4,606,605,927
Total Operating Costs ($)	**188,837,940**	**188,837,940**	**188,837,940**	**185,076,743**	**185,076,743**	**185,076,743**	**180,859,251**	**180,859,251**	**180,859,251**	**181,131,426**	**181,131,426**	**181,131,426**	**161,954,604**	**161,954,604**	**80,646,544**	**4,606,605,927**
Operating Profit ($)	169,976,120	169,976,120	169,976,120	114,790,622	114,790,622	114,790,622	113,585,793	113,585,793	113,585,793	118,359,313	118,359,313	118,359,313	108,035,966	108,035,966	-7,542,110	3,658,498,496
Pre-production Capital Expenditure																
MINE DEVELOPMENT : Pre-stripping																14,817,857
OPEN PIT MINE																51,899,950
ORE PROCESS																336,606,134
TAILINGS AND WATER MANAGEMENT FACILITIES																18,418,788
GENERAL SERVICES MINE SITE																17,017,225
INFRASTRUCTURE MINE SITE																44,984,213
POWER AND COMMUNICATION																67,176,293
CONCENTRATE STOCKPILE AND RAIL CAR LOAD-OUT																80,234,198
SERVICE VEHICLES AND EQUIPMENT																7,642,713
FINANCIAL COSTS (Insurances)																5,220,182
Total																644,017,553
W.C. (includes Spare Parts cost estimate above) 3.0	0	0	-940,299	0	0	-1,054,373	0	0	68,044	0	0	-4,794,206	0	-20,327,015	-20,161,636	0
Tailings	9,183,385	10,302,432	10,302,432	0	0	0	0	0	0	0	0	0	0	0	0	103,706,513
Concentrate Transport	23,638,500	0	0	0	0		15,836,250	0	0	0	0	0	0	0	0	64,766,400
Mine	60,977,071		0	14,921,780	0	0	0	0	0	0	0	0	0	0	0	135,735,487
Total	93,798,956	10,302,432	10,302,432	14,921,780	0	0	15,836,250	0	0	0	0	0	0	0	0	304,208,400
Indexed for Sensitivity	93,798,956	10,302,432	10,302,432	14,921,780	0	0	15,836,250	0	0	0	0	0	0	0	0	304,208,400
Total Capital Expenditure ($)	**93,798,956**	**10,302,432**	**9,362,133**	**14,921,780**	**0**	**-1,054,373**	**15,836,250**	**0**	**68,044**	**0**	**0**	**-4,794,206**	**0**	**-20,327,015**	**-20,161,636**	**948,225,953**
Mine Closure and Rehabilitation Payments ($)																**22,756,056**
Federal Corporate Income Taxes	18,085,224	18,677,807	19,133,006	12,393,328	13,005,793	13,473,042	13,197,795	13,582,899	13,876,146	14,700,234	14,869,672	14,998,266	13,797,398	13,871,271	0	353,632,471
Provincial Corporate Income Taxes	14,347,611	14,817,727	15,178,851	9,832,040	10,317,929	10,688,613	10,470,251	10,775,766	11,008,409	11,662,186	11,796,606	11,898,624	10,945,936	11,004,541	0	280,548,427
Quebec Mining Duties	17,563,454	18,998,423	20,002,902	11,623,105	12,676,335	13,413,596	12,973,866	13,563,166	13,975,676	15,030,894	15,233,024	15,374,515	13,806,047	13,875,378	0	357,382,999
Total Corporate Income Taxes and Mining Duties ($)	**49,996,290**	**52,493,957**	**54,314,759**	**33,848,473**	**36,000,058**	**37,575,251**	**36,641,913**	**37,921,831**	**38,860,231**	**41,393,314**	**41,899,302**	**42,271,406**	**38,549,380**	**38,751,190**	**0**	**991,563,897**
BEFORE-TAX CASH FLOW ($)	**76,177,163**	**159,673,688**	**160,613,987**	**99,868,842**	**114,790,622**	**115,844,995**	**97,749,543**	**113,585,793**	**113,517,749**	**118,359,313**	**118,359,313**	**123,153,518**	**108,035,966**	**128,362,981**	**12,619,526**	**2,687,516,487**
Cumulative CF	1,102,980,651	1,262,654,339	1,423,268,326	1,523,137,167	1,637,927,789	1,753,772,785	1,851,522,328	1,965,108,121	2,078,625,870	2,196,985,182	2,315,344,495	2,438,498,013	2,546,533,980	2,674,896,961	2,687,516,487	
Payback period work area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
AFTER-TAX CASH FLOW ($)	**26,180,874**	**107,179,731**	**106,299,228**	**66,020,368**	**78,790,564**	**78,269,745**	**61,107,630**	**75,663,962**	**74,657,518**	**76,965,998**	**76,460,010**	**80,882,113**	**69,486,586**	**89,611,791**	**12,619,526**	**1,695,952,590**
Cumulative CF	641,937,819	749,117,550	855,416,778	921,437,146	1,000,227,711	1,078,497,455	1,139,605,086	1,215,269,047	1,289,926,565	1,366,892,563	1,443,352,574	1,524,234,686	1,593,721,272	1,683,333,064	1,695,952,590	
Payback period work area	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

FINANCIAL INDICATORS	
Before Tax	
Payback Period (years)	**4.70**
NPV @ 8% ($)	**683,698,895**
NPV @ 10% ($)	**475,605,788**
Internal Rate of Return	**19.2%**
After Tax	
Payback Period (years)	**5.18**
NPV @ 8% ($)	**362,169,960**
NPV @ 10% ($)	**222,809,415**
Internal Rate of Return	**15.2%**

22.4 Sensitivity Analysis

A sensitivity analysis has been carried out, with the base case described above as a starting point, to assess the impact of changes in phosphate concentrate price, total pre-production capital costs and operating costs on the project's NPV (@ 8% and 10%) and IRR. Each variable is examined one-at-a-time. An interval of ±30% with increments of 10% was used for all three variables.

The before-tax results of the sensitivity analysis are shown in Figure 22.2 to Figure 22.4, that indicate that the project's before-tax viability is not significantly vulnerable to the under-estimation of capital and operating costs, taken one at-a-time. The net present value is more sensitive to variations in operating expenses, as shown by the steeper curves. As expected, the net present value is most sensitive to variations in price. A reduction of about 20% in the price forecast (from $175 to $140 per tonne) results in a break-even net present value @ 10%.The price curve intersects the dashed horizontal line (10% IRR break-even) at a relative variation of about -20%. In contrast with Figure 22.5 and Figure 22.6 which show linear variations in net present value for the three variables studied, variations associated with internal rate of return are not linear.

Figure 22.2 – Before-Tax $NPV_{8\%}$: Sensitivity to Capital Expenditure, Operating Cost and Price

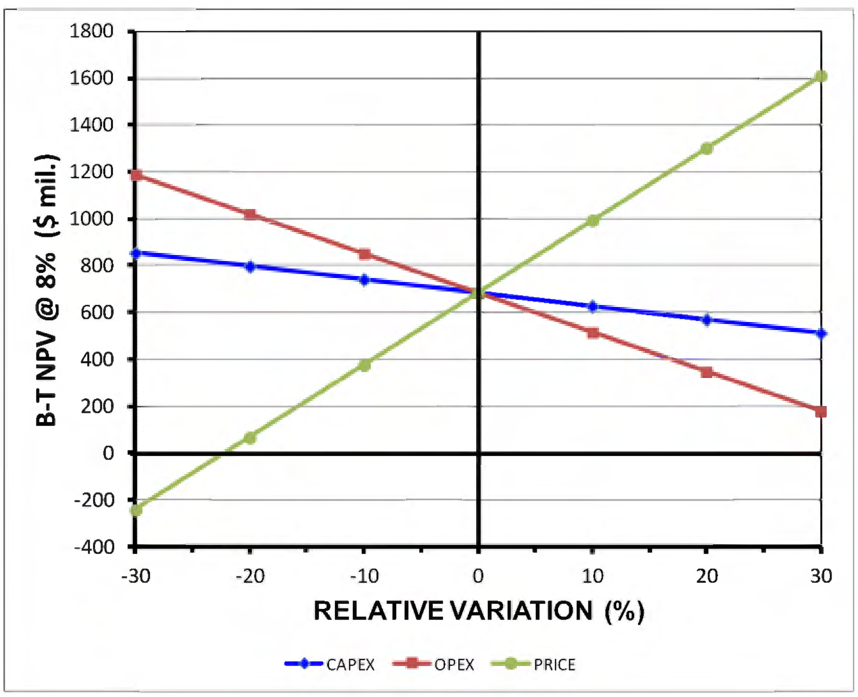


Figure 22.3 – Before-Tax $NPV_{10\%}$: Sensitivity to Capital Expenditure, Operating Cost and Price

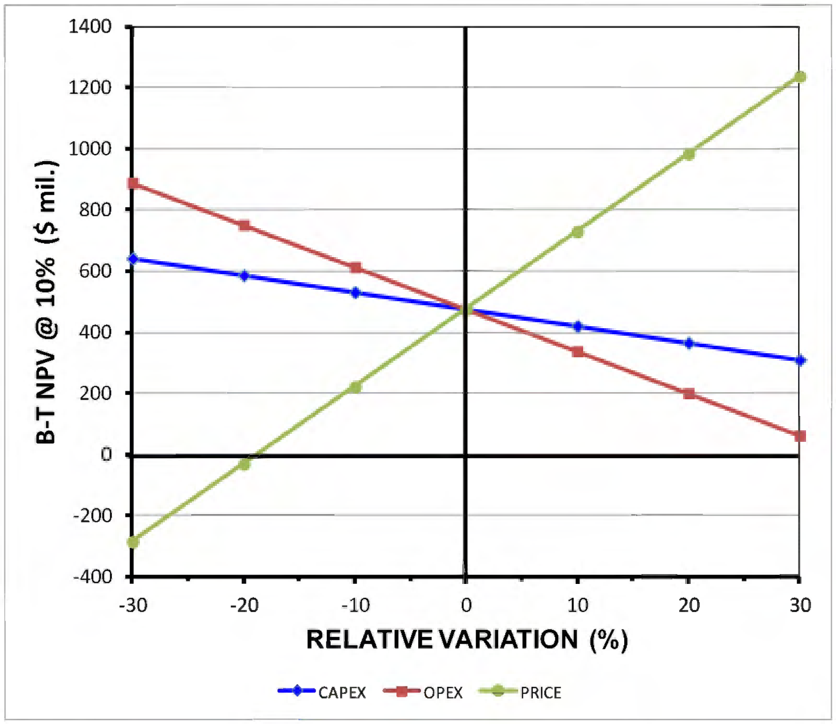
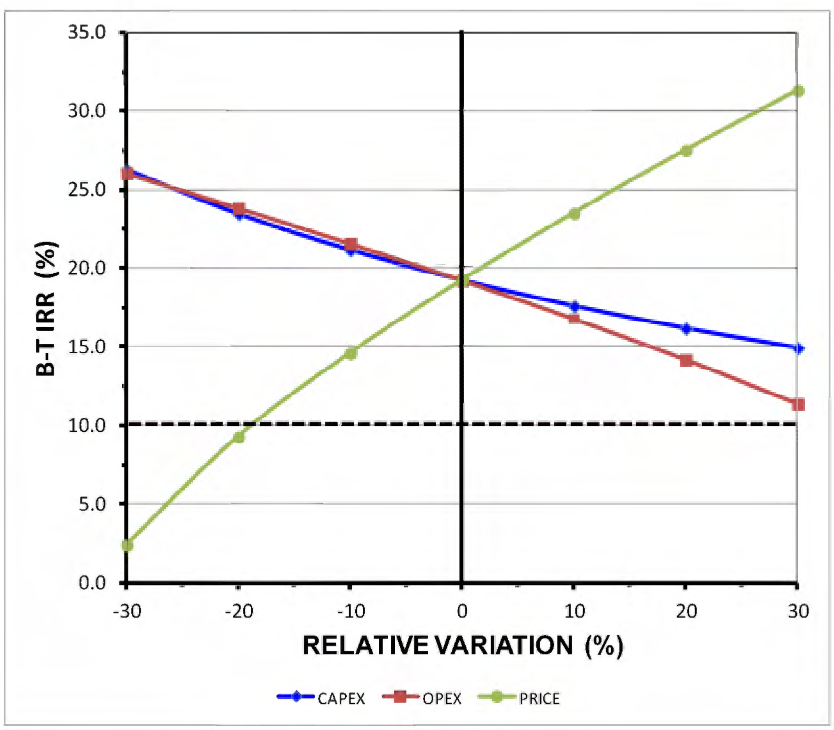


Figure 22.4 – Before-Tax IRR: Sensitivity to Capital Expenditure, Operating Cost and Price



The after-tax results of the sensitivity analysis are shown in Figure 22.5 to Figure 22.7.

Figure 22.5 indicates that the project's after-tax viability is vulnerable to the under-estimation of operating costs, i.e. the net present value @ 10% becomes negative for an increase in operating costs of more than 25%. As well, a reduction of about 13% in the price forecast (from $175 to $152 per tonne) results in a break-even net present value @ 10%. Figure 22.6, which shows variations in internal rate of return, provides the same conclusions. The operating cost curve intersects the dashed horizontal line (10% IRR break-even) at a relative variation of about 25% and the price curve intersects the same line at a relative variation of about -13%.

Figure 22.5 – After-Tax $NPV_{8\%}$: Sensitivity to Capital Expenditure, Operating Cost and Price

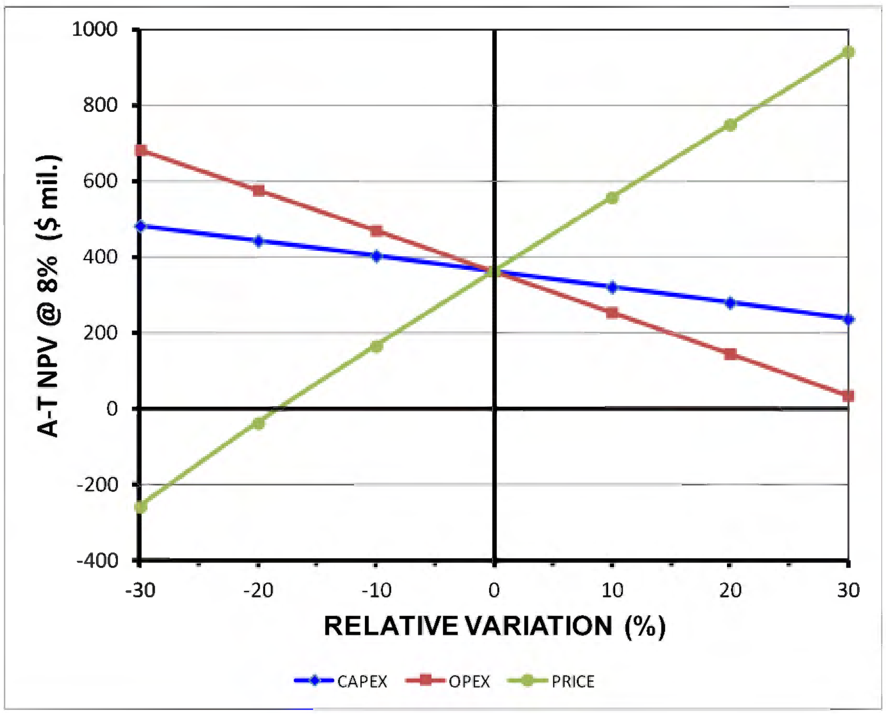


Figure 22.6 – After-Tax $NPV_{10\%}$: Sensitivity to Capital Expenditure, Operating Cost and Price

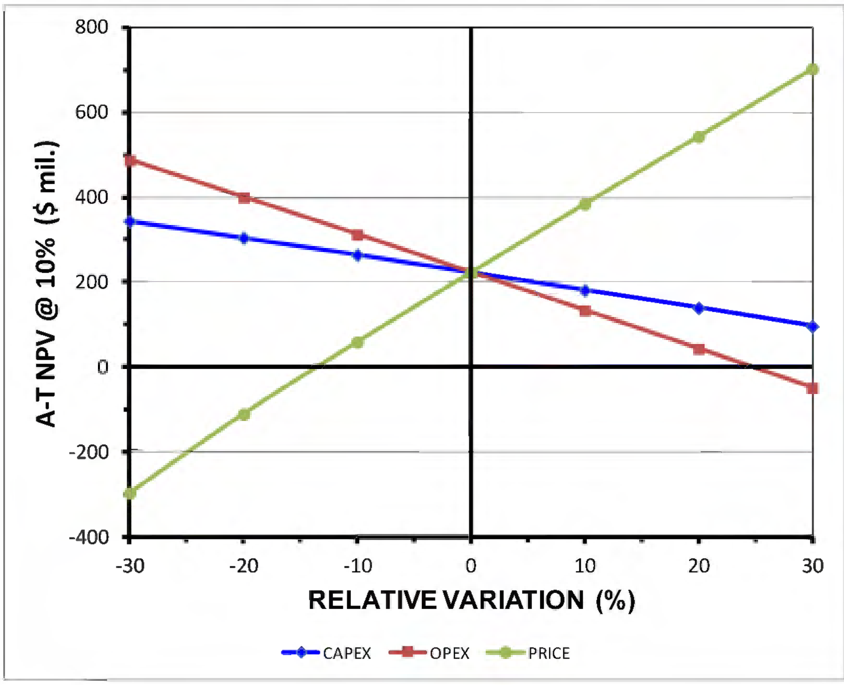
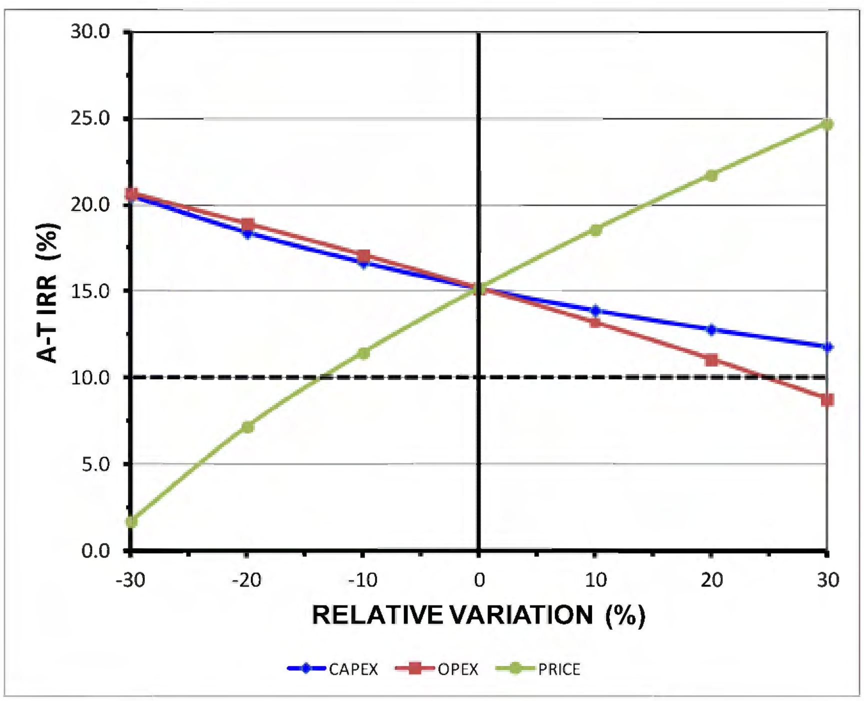


Figure 22.7 – After-Tax IRR: Sensitivity to Capital Expenditure, Operating Cost and Price



22.5 Additional Scenarios

22.5.1 Introduction

Efforts have been made to identify additional scenarios to improve the economics of the project. Additional scenarios to the Base Case were added to analyze the effect of using a mining contractor for the mining activities and a subcontractor for transportation of the concentrate.

A preliminary evaluation of increasing the production rate has also been addressed briefly in this study, but will be developed further as the project progresses into Feasibility Study.

22.5.2 Subcontracting Mining and Concentrate Transportation

An option to employ a mining contractor to carry out the mining activities for the Project was evaluated. Contract mining has the effect of lowering the Project's capital expenditures but results in higher operating costs. A most probable cost was determined based on budget pricing that was received from four (4) contractors.

The capital expenditures were reduced to take into account a contractor using his own mining equipment and providing a maintenance garage and accommodation for the equipment operators. Owner's operating costs were adjusted upward to include contractor supervision.

A most probable cost was also determined for the transportation of the concentrate from the mine site to Mistassini, based on the budget price provided by two (2) contractors. Capital expenditures and operating costs were adjusted accordingly.

As indicated in Table 22.4, this scenario does not improve the economics of the project as the IRR is reduced by three (3) percentage points when both mining and concentrate transport are subcontracted (Scenario A) and by two (2) percentage points when only the mining activities are subcontracted (Scenario B).

Table 22.4 – Mining Scenarios Evaluation Summary (Before-Tax)

	Base Case 33,000 tpd (Owner Operated)	Scenario A 33,000 tpd (Mining and Concentrate Transportation by Subcontractor)	Scenario B 33,000 tpd (Contract Mining only)
Life Of Mine	25 ¼	25 ¼	25 ¼
Initial Capital Cost (M US$)	649.2	570.9	588.4
Sustaining Capital Cost (M US$)	304.2	103.7	168.5
Total Direct Capital Cost (M US$)	953.4	674.6	756.9
Mining Opex ($/tonne mined)	2.24	3.51	3.51
Process Opex ($/tonne milled)	8.33	8.33	8.33
G&A Opex ($/tonne of concentrate)	5.85	4.75	4.75
Concentrate Transport Opex ($/tonne of concentrate)	10.90	16.91	10.88
Before-Tax NPV@10 % (US $ M)	475.6	267	320.5
Before-Tax NPV@ 8%	683.7	424.5	492.1
Before-Tax IRR	19.2%	15.8%	16.8%
Before-Tax Payback Period (years)	4.70	5.72	5.41

22.5.3 Increased Production Rate

The addition of the Manouane zone to the mineral reserves in August 2011 renewed the interest of increasing the production rate for the project. A preliminary assessment of increasing the production rate to 40,000 tpd and 50,000 tpd was therefore prepared at a scoping level towards the end of the study.

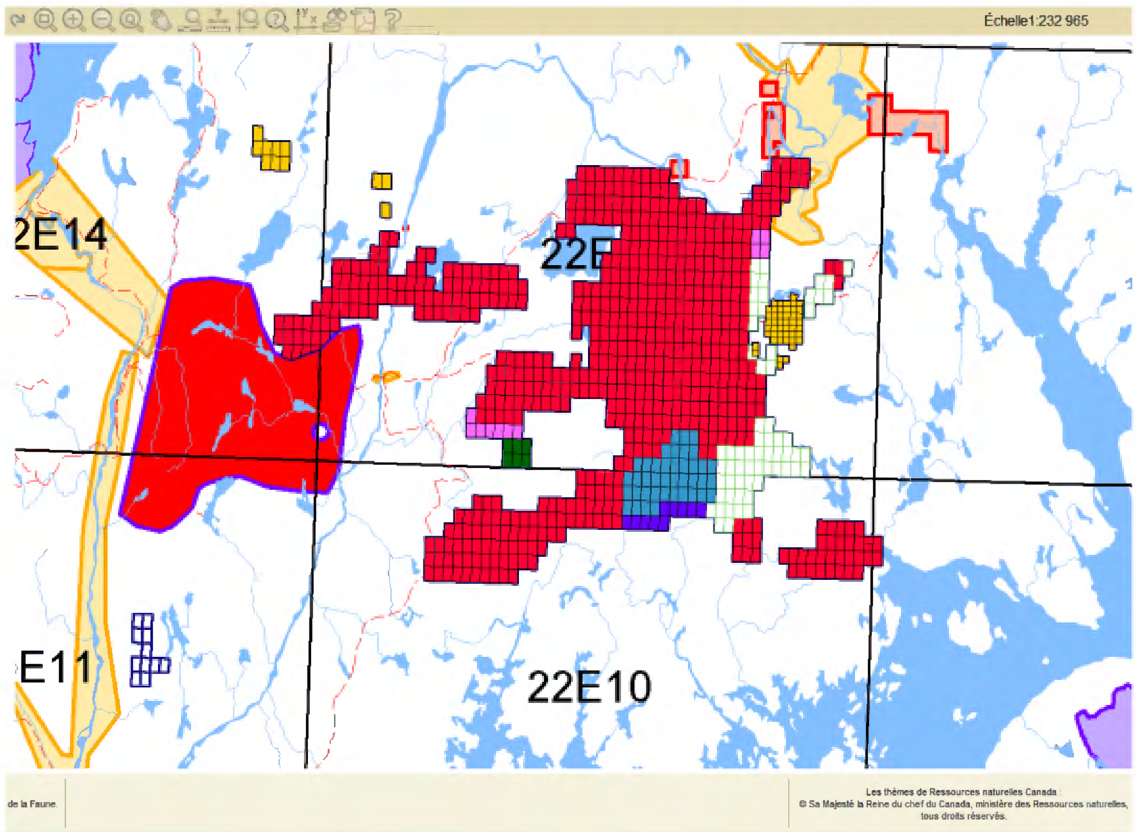
Preliminary results indicate that economics are expected to be improved at these production rates with an increase of about 4 percentage points in IRR for a production rate of 50,000 tpd, requiring additional capital expenditures of about 20% and reducing the life of mine to about 17 years.

This will be further addressed as the project advances to Feasibility Study and the results would allow the possibility of examining other methods such as a pipeline for the transportation of concentrate.

23.0 ADJACENT PROPERTIES

Figure 23.1 (sheets 22E15 and 22E10 MRNQ) shows the adjacent properties surrounding the Lac à Paul properties.

Figure 23.1 – Map of adjacent properties of Lac à Paul property (GESTIM-MRNQ)



Adjacent property:

- Arianne Resources (100%) +Red
- Bertrand Brassard (100%) +White fill with Green outline
- JV Gervais Simard (50%) & Jean-Louis Tremblay (50%) +Blue
- Ghislaine Savard (100%) +Pink
- JV SOQUEM (50%) & Virginia Mines (50%) +Yellow
- Monique Delisle (100%) +Purple
- 9187-1400 Quebec Inc. (100%) +Green

A part of the property lies within Lac à Paul fishing and hunting resort.

24.0 OTHER RELEVANT DATA AND INFORMATION

24.1 Project Implementation Schedule

24.1.1 Paul Deposit

The project implementation schedule includes the main engineering, procurement and construction activities as indicated. The information contained in this schedule is derived from information taken from supplier's quotes or in-house database. The schedule presents the total duration of the project considering all additional metallurgical testing, Feasibility Study are completed first quarter (Q1) of 2013.

According to the preliminary permitting schedule, it is assumed that if public hearing are required, the Minister's decision on the project can be expected March 2014.

Long lead delivery process equipments and manufacturing capacity for specific type of equipment like grinding mills, mining equipments and others need to be considered in order to foresee the duration of a project.

Emphasis should be made on:

- Advanced procurement of long lead process equipment.
- Infrastructure and site preparation engineering to satisfy the pre-stripping and construction phases.

a) EPCM

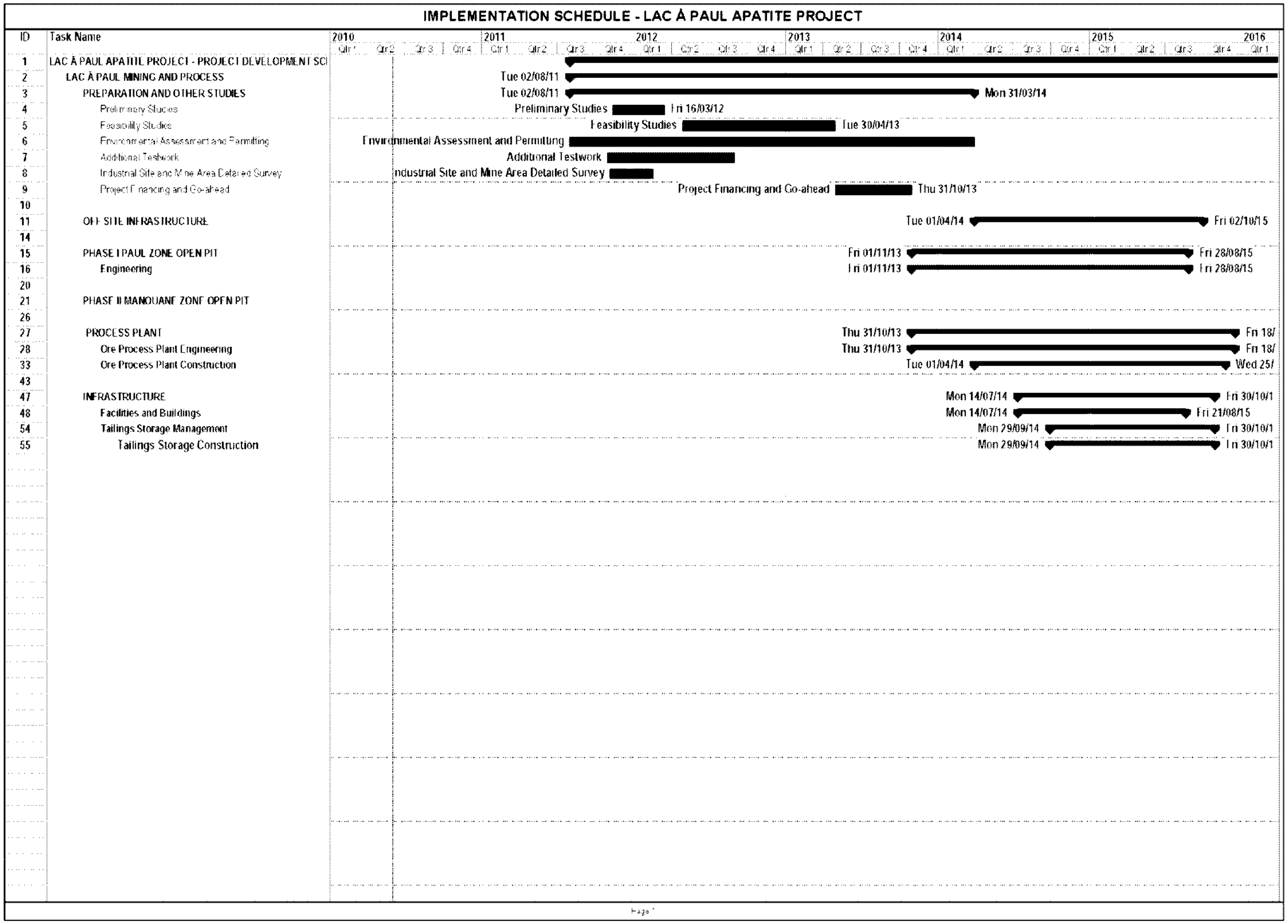
The main tasks to be accomplished during this phase are:

- Engineering for the mine, mine infrastructure, tailings management facilities, site preparation, site infrastructure, process buildings, offices and off-site infrastructure (stockpile, conveyor bridge and load-out);
- Procurement for the above including bid preparation and evaluation, organisation of site visits, contract preparation and contract administration;
- Mobilize the construction management team to site, provide site assistance when needed and supervise dry and wet commissioning and ramp-up.

b) Project Implementation Schedule

The preliminary schedule, presented in Figure 24.1, has been prepared for the project with the information available to date. A more detailed project implementation schedule may be found in the Pre-Feasibility Study report.

Figure 24.1 – Preliminary Schedule



As can be seen, considering an environmental authorisation to proceed with construction for March 2014 and due to grinding mills current equipment delivery estimated at 60 weeks after receipt of an order, the start-up date will be end of 2015 providing an order is placed with suppliers by end of 2013.

Engineering for open pit mining should start November-2013 in order to have the pre-stripping completed by end of 3rd quarter 2015.

c) Project Milestones

Grinding Mills Purchase Order	February 2014;
Detailed Engineering Start	November 2013;
Mobilisation on Site	April 2014;
Access Road Upgrade Required by	Mid 2015;
Power Line Required by	Mid 2015;
Tailings Storage Facility Required by	October 2015;
Wet Commissioning Start	September 2015;
Ramp-Up Completed	December 2015.

24.1.2 Manouane Deposit

Preliminary milestones have been identified for the Manouane open pit development which would be scheduled for 2030.

a) Project Implementation Schedule

The development and process of the Manouane open pit would not require modification to the processing plant at the propose production rate of 33,000 tpd.

The only requirement would be for the relocation of tailings pipeline from the Tailings Storage Facility towards Paul's depleted open pit.

Manouane pre-stripping should start March 2030 in order to have pre-development completed by September 2030.

25.0 INTERPRETATION AND CONCLUSIONS

Manouane's mineral resources are in a well developed zone that is still open. Additional drilling will be required in order to increase its size.

The Paul zone has a higher average grade than Manouane and emphasis should be made on this deposit. There is potential in Paul zone to increase the quality of the mineral resources in addition to increase its size on lateral extension. It also appears to be open at depth. However, the author recommends to increase the quality of existing resources to the measured category while aiming at expanding laterally for near surface, low stripping ratio, mineralized zone.

Proven and probable mineral reserves were developed from the pit designs for the Paul and Manouane deposits. These mineral reserves which account for ore loss formed the basis of the mine plan that was prepared.

The Paul pit includes 21.4 Mt of proven mineral reserves and 140.3 Mt of probable mineral reserves for a total of 161.7 Mt. The grade of the Paul deposit is 7.16 % P_2O_5. In order to access these reserves, 7.6 Mt of overburden and 163.2 Mt of waste rock must be removed, resulting in a waste to ore stripping ratio of 1.1:1. At the planned production rate of 12 Mt of ore per year, the pit contains roughly 14 years of mineral reserves.

The Manouane pit includes 123.3 Mt of proven mineral reserves and 22.1 Mt of probable mineral reserves for a total of 146.0 Mt. The grade of the Manouane deposit is 5.95 % P_2O_5. In order to access these reserves, 14.7 Mt of overburden and 70.3 Mt of waste rock must be removed, resulting in a waste to ore stripping ratio of 0.6:1. At the planned production rate of 12 Mt of ore per year, the pit yields roughly 12 years of mineral reserves.

The objective of achieving an apatite concentrate with grade > 38% and recovery > 90% P_2O_5 was achieved for both the bench scale lab work and the locked cycle tests. The pilot plant was unable to meet the objective for three main reasons:

- The pilot plant feed was ground too finely, resulting in a poor selectivity;
- Due to grind fineness, the sodium silicate depressant, Na_2SiO_3, was used frequently in dosage amounts that depressed the apatite as well as the silicates and aluminates;
- Closed circuits made reagent dosage control much more difficult and often resulted in high depressant concentrations.

It is expected, with a suitable grind and proper depressant dosages, that flotation performance of the pilot plant can achieve an apatite grade of 38.3% and a recovery of 90.7%.

The processing plant is designed to process an average of 33,000 t/d of ore to produce approximately 5,500 t/d of phosphate concentrate grading at about 38.0% P_2O_5 based on a concentrate recovery of 90%. A suitable process flowsheet includes crushing, grinding, magnetic separation, flotation, and concentrate thickening, filtering and drying. Mining equipment, tailings storage facility, concentrate transportation and load-out facilities as well as infrastructure and services have been added to complete the investment cost of the project.

The total capital cost for the project life, at an accuracy level of ± 25%, is estimated at US$ 953.4 M where the pre-production initial capital cost is evaluated at US$ 649.2 M while the sustaining capital requirement is US$ 304.2 M.

The life of mine average operating cost estimate is evaluated at 97.54 $/tonne of concentrate.

Preliminary environment considerations have been addressed and legislative framework, environmental sensitive areas, issues and project stakeholders have been identified. Geochemical testing was conducted on mine rock and tailings samples to give a preliminary assessment of the metal leaching (ML) and acid rock drainage (ARD) as well as radioactivity potential of the tailings generated by the project. Testing results show that radioactivity will not be an issue for the project and preliminary environmental characterization indicates that only the magnetic fraction of the tailings can be considered potentially acid generating.

Mine closure and rehabilitation cost have been estimated at US$ 27.5 M.

The economic analysis of the project has demonstrated positive results at an estimated sale price of phosphate concentrate of $175/tonne. The financial results indicate a before-tax Net Present Values (NPV) of US$ 475.6 M and US$ 683.7 M at discount rates of 10% and 8% per year, respectively. The before-tax Internal Rate of Return is 19.2% with a payback period of 4.70 years.

26.0 RECOMMENDATIONS

26.1 Geology and Mineral Resources

SGS Geostat makes the following recommendations to focus on two aspects: the improvement of the available data and a working plan to further develop the property.

26.1.1 Improvement to Available Data

- In the next round of diamond drilling, the author suggests that specific gravity be measured for each sample interval in order to develop a correlation between specific gravity and main components (iron, titanium, silica and phosphate). Unfortunately, actual SG measurements do not allow the use of a variable SG. The SG that was used in this mineral resource update is conservative 3.42 fixed SG value.
- All geological, geographical, geophysical, property boundaries, access and surface analytical data should be integrated into a single Geographical Information System with the satellite imagery.

26.1.2 Work Program to Further Develop the Project

The author is aware that Arianne has continued the drilling in the fall of 2011. The results of the latest drilling were not available in time for the preparation of this report. Arianne Resources Inc. has recently released the results in a Press Release, however, this data is not part of the updated mineral resources of the Lac à Paul project that is disclosed in the present 43-101 Technical Report. The author is assisting from time to time the management and exploration team in the drill hole location at Paul and Manouane zones.

The author proposes that extensive drilling takes place on the Paul zone in 2012 as a priority. Again, it is the Author's opinion that drilling should focus on the Paul zone which has better grade and low overburden.

A diamond drilling program for 20,000 m of NQ drilling is proposed. This program will serve the following three goals:

- Increase the quantity and quality of resources in Paul and Manouane Zones;
- Define variability within the zones to allow a better mine sequence forecast;
- Test other anomalies on the property and develop additional resources near surface.

RQD should be done on all core as well as SG measurements.

This first phase program is estimated at four million dollars (4,000,000$) out of which 75% should be dedicated to Paul (infill drilling, lateral extensions and infill drilling for lateral extensions) and 25% for the other zones.

26.2 Mining

Met-Chem has identified the following opportunities that should be studied as the Project advances to the Feasibility stage.

- The sequencing of the Paul and Manouane deposits should be revisited with the intent of maximizing the project NPV (Net Present Value). The solution may be to mine both deposits concurrently;
- Assessment and testing regarding pit slope analysis, hydrogeology, and waste rock dump stability will need to be performed to further validate the open pit mining technical parameters.

26.3 Process

Additional metallurgical testing will be required to bring the project to a Feasibility Study level. The testing performed to date indicated that:

- Liberation analysis of the samples from the Paul and Manouane deposits needs to be completed.
- Grind times need to be completed to achieve the size determined in the liberation study.
- Reagent dosages need to be adjusted, especially for the depressant sodium silicate, for optimized recovery and grade.

Additional metallurgical testing will be required as the project proceeds to Feasibility stage:

- Additional testwork to firm up design basis of both Paul and Manouane deposits;
- Identification of potential by-products to the phosphate recovery.

26.3.1 Additional Testwork

- Work indices: Crusher, Ball Mill and Rod Mill (CWi, BWi, RWi). To better define rock hardness and rock variability for each of the deposit;
- Slime removal using cyclones instead of thickeners;
- Delivery of 60 t from Paul deposit to the selected Laboratory;
- Batch bench scale test work to make sure that this sample is responding well to the developed flowsheet;
- Continuous Pilot Plant runs;
- Prepare samples for vendors testwork (Stack Sizers, thickeners, filters, magnetic separations);
- Specific Gravity determination, Ore and Product bulk densities, Ore and product angle of repose, and other design parameters.

26.3.2 Potential By-Products

- Liberation analysis of the samples from the Paul and Manouane deposits needs to be completed;
- Grind size determination for both Paul and Manouane deposits;

- Batch bench scale test work for flowsheet development of apatite, ilmenite and magnetite production of Paul deposit;
- Lock cycle test (2) to confirm flowsheet for Paul deposit (cycles to be done until circulating loads are constant and/or equilibrium is reached);
- Batch bench scale test work for flowsheet development of apatite, ilmenite and magnetite production of Manouane deposit;
- Lock cycle test (2) to confirm flowsheet for Manouane deposit (cycles to be done until circulating loads are constant and/or equilibrium is reached).

26.4 Tailings Storage Facility and Water Management

- Geotechnical work such as geotechnical drilling, seismic analysis, stability analysis is recommended in the Feasibility Stage to confirm assumptions used for the tailings storage facility design and waste piles in the Pre-feasibility assessment as well as to permit preliminary foundations evaluation for the plant facilities.
- Rock mechanics as well as hydrogeological studies will be required to further confirm rock slopes, rock permeability, ground and underground water flows and water balance.
- Testing of the tailings geochemical and physical/mechanical properties and behaviour is recommended, such as:
  - Geochemical properties testing: ABA (for acid generation), humidity tests (coarse and fine fractions), fresh and aged supernatant analysis (coarse and fine fractions);
  - Physical/mechanical properties testing: size distribution, specific gravity, Atterberg limits, proctor maximum dry density and optimum water content, maximum density by vibrator and by drying, minimum density, settling, low and overburden stress consolidation settlement.
- Investigation for borrow banks for suitable materials for construction of the various dykes, pads and roads as well as concrete aggregates should be undertaken during the Feasibility Study to determine quantities available and distance from the various facilities.
- Condemnation drilling will be required in the area of the Paul's mill tailings storage facility.
- More detailed topographic survey of the site during the Feasibility Phase will enhance accuracy of the estimates and associated cost analyses.

26.5 Infrastructure

Condemnation drilling will be required for Lac à Paul mine site and infrastructure location such as waste rock dump, primary crusher, process plant, buildings, etc.

Manouane River, Lac Paul and groundwater hydraulics should be verified at Feasibility stage to determine available flow rates for plant make-up water.

As the project progresses to Feasibility Studies more information regarding potential siting of the Dolbeau-Mistassini concentrate handling site and railcar loading station, regional development projects and municipal zoning should be gathered in order to reach the required level of detail for Cost estimate. Discussions should also be held regarding the proposed trestle bridge across the Mistassini River.

26.6 Environment Considerations

Meetings with Stakeholders should continue as the project progresses to Feasibility Studies.

A summary table of Issues/Potential Impacts identified by Stakeholders should be maintained closely.

A detailed schedule of environmental permitting requirement will need to be prepared. This schedule should be integrated in the Master Schedule of the project.

Based on the preliminary characterization results obtained, it is recommended that at the Feasibility Study stage of the project the following be analyzed:

- Increase the number of samples per type of material that requires environmental characterization;
- Add the environmental characterisation of overburden material type to the database of results;
- Add Manouane zone to the environmental characterisation of waste rock, ore, and process tailings;
- Include Guideline 019 toxicity tests on process tailings decant water for both Paul and Manouane deposits.

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