



**NI 43-101 TECHNICAL REPORT ON THE PRE-FEASIBILITY STUDY
ON NUTAC PROJECT
Issue Date: July 21st, 2016
FINAL REPORT**

**Prepared for
New Millennium Iron Corp.**

By the following Qualified Persons:

Yves A. Buro, P.Eng.
Schadrac Ibrango, P.Geo., Ph.D.
Jeffrey Cassoff, P.Eng.
Angelo Grandillo, P.Eng.
Joseph J. Poveromo, P.Eng., Ph.D.
Ann Lamontagne, P.Eng., Ph.D.
Michel L. Bilodeau, P.Eng., M. Sc. (App.) Ph.D.
Rock Gagnon, P. Eng.

Effective Date: June 9th, 2016

DATE AND SIGNATURE PAGE – CERTIFICATES

Effective Date: June 9th, 2016

Issue Date: July 21st, 2016

CERTIFICATE OF QUALIFIED PERSON

Yves A. Buro, P. Eng.

To Accompany the Report entitled, "NI 43-101 Technical Report on the Pre-Feasibility Study on NuTac Project" with an effective date of June 9th, 2016.

I, Yves A. Buro, P. Eng., do hereby certify that:

- 1) I am a Senior Geologist presently with Met-Chem Canada Inc. (Met-Chem) with an office situated at Suite 300, 555 René-Lévesque West Blvd, Montréal, Canada;
- 2) I am a graduate of University of Geneva, Switzerland with the equivalent of a B.Sc. and a M.Sc. in Geology obtained in 1976;
- 3) I am a member in good standing of the Ordre des ingénieurs du Québec (Reg. 42279);
- 4) I have worked as a geologist continuously since graduation from University in 1976. I have gained direct experience on iron deposits similar to the NuTac Project, as exploration geologist, in Canada, the U.S.A., Africa, India, South America;
- 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 this Technical Report and am responsible for Sections 4 to 12 inclusive and 23 and parts of Sections 1, 25, 26 and 27;
- 7) I visited the site property that is the subject of this Technical Report between September 18th and 19th, 2012;
- 8) I have had prior involvement with the property as a Qualified Person for the NI 43-101 Technical Report on the Feasibility Study on KéMag Taconite Project;
- 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.

Dated this 21st day of July, 2016

(Original signed and sealed)

Yves A. Buro, P. Eng

Yves A. Buro, P. Eng.
Senior Geological Engineer

CERTIFICATE OF QUALIFIED PERSON

Schadrac Ibrango, P. Geo., Ph. D., MBA

To Accompany the Report entitled, "NI 43-101 Technical Report on the Pre-Feasibility Study on NuTac Project" with an effective date of June 09th, 2016.

I, Schadrac Ibrango, P. Geo., Ph. D. MBA, do hereby certify that:

- 1) I am a Senior Geologist with Met-Chem Canada Inc. ("Met-Chem") with an office situated at Suite 300, 555 René-Lévesque West Blvd, Montreal, Canada;
- 2) I am a graduate of University of Ouagadougou (Burkina-Faso) with a Master Degree in Geology obtained in 1998, a Ph.D. in Engineering of Darmstadt University of Technology (Germany) obtained in 2005 and an executive MBA of Université du Québec à Montréal (Canada) obtained in 2016;
- 3) I am a member in good standing of the "Ordre des Géologues du Québec" (1102);
- 4) I have practiced my profession continuously since 1998. I have gained direct experience on iron projects similar to the NuTac Project, as geologist in Canada;
- 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 this Technical Report and am responsible for Section 14 and parts of Sections 1, 25 and 26;
- 7) I visited the site property that is the subject of this Technical Report between September 18th and 19th, 2012 (2 days);
- 8) I have had prior involvement with the property as a Qualified Person for the NI 43-101 Technical Report on the Feasibility Study on KéMag Taconite Project;
- 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.

Dated this 21th day of July, 2016

(Original signed and sealed)

Schadrac Ibrango, P. Geo.

Schadrac Ibrango, P. Geo., Ph. D., MBA
Lead Geology & Hydrogeology



CERTIFICATE OF QUALIFIED PERSON

Jeffrey Cassoff, P. Eng.

To Accompany the Report entitled, "NI 43-101 Technical Report on the Pre-Feasibility Study on NuTac Project" with an effective date of June 9th, 2016.

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

- 1) I am a Senior Mining Engineer with BBA Inc. with an office located at 630 René-Lévesque Blvd West, Suite 1900, Montréal, Canada.
- 2) I graduated with a Bachelor's degree in Mining Engineering from McGill University in Montréal in 1999.
- 3) I am registered as a Professional Engineer in the Province of Québec (Licence # 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 supervised the compilation of Sections 15 and 16 and parts of Sections 1, 21, 25 and 26.
- 7) I have visited the mine site on September 18th, 2012.
- 8) I have had prior involvement with the property as a Qualified Person for the NI 43-101 Technical Report on the Feasibility Study on KÉMag Taconite Project.
- 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.

Dated this 21st day of July, 2016



Jeffrey Cassoff, P. Eng.
Senior Mining Engineer



CERTIFICATE OF QUALIFIED PERSON


Angelo Grandillo, P. Eng.

To Accompany the Report entitled, "NI 43-101 Technical Report on the Pre-Feasibility Study on NuTac Project" with an effective date of June 9, 2016.

I, Angelo Grandillo, P. Eng., do hereby certify that:

- 1) I am an Associate and Project Manager with BBA Inc. with an office located at 630 René-Lévesque Blvd West, Suite 1900, Montréal, Canada.
- 2) I graduated with a Bachelor's degree in Metallurgical Engineering from McGill University in Montréal in 1981 and a Master's degree in Engineering from McGill University in 1988.
- 3) I am registered as a Professional Engineer in the Province of Québec (Licence # 383422) and in the Province of Newfoundland and Labrador (License # 06360).
- 4) I have practiced my profession continuously since my graduation in 1981. My relevant experience includes technical and operations management and project management in iron ore and gold 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, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
- 6) I have supervised the compilation of Sections 2, 3, 13, 17 and 18 and parts of Sections 1, 21, 24, 25, 26 and 27.
- 7) I have not personally visited the property.
- 8) I have had no prior involvement with the 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.
- 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.

Dated this 21st day of July 2016


Angelo Grandillo, P. Eng.
Project Manager



CERTIFICATE OF QUALIFIED PERSON

Joseph, J. Poveromo, Ph. D. Eng.

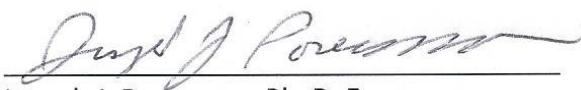
To Accompany the Report entitled, "NI 43-101 Technical Report on the Pre-Feasibility Study on NuTac Project" dated July 21st, 2016 with an effective date of June 9th, 2016.

I, Joseph J. Poveromo, Ph. D. Eng., do hereby certify that:

- 1) I am the President of Raw Materials & Ironmaking Global Consulting with an office situated at 1992 Easthill Drive, Bethlehem, PA, USA;
- 2) I am a graduate of Rensselaer Polytechnic Institute in Troy, New York with a Bachelor's degree in Chemical Engineering obtained in 1968;
- 3) I am a graduate of the State University of New York at Buffalo, Center for Process Metallurgy, with a Ph. D. degree obtained in 1974;
- 4) I am a member in good standing of the Association of Iron & Steel Technology (10361) and the Society of Mining Engineers (4031590);
- 5) I have worked as a metallurgical engineer continuously since graduation from university in 1974;
- 6) 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;
- 7) I have participated in the preparation of this Technical Report and am responsible for Section 19 and parts of Sections 1, 25 and 26;
- 8) I have not visited the site property that is the subject of this Technical Report;
- 9) I have had prior involvement with the property as a Qualified Person for the NI 43-101 Technical Report on the Feasibility Study on KéMag Taconite Project;
- 10) 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;
- 11) 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;
- 12) I am independent of the issuer as defined in section 1.5 of NI 43-101; and
- 13) 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.

Dated this 21st day of July, 2016

(Original signed and sealed)



Joseph J. Poveromo, Ph. D. Eng.

President of Raw Materials & Ironmaking Global Consulting

CERTIFICATE OF QUALIFIED PERSON

Ann Lamontagne, P. Eng., Ph. D.

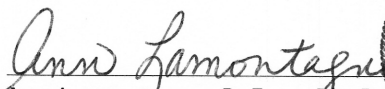
To Accompany the Report entitled, "NI 43-101 Technical Report on the Pre-Feasibility Study on NuTac Project" with an effective date of June 9th, 2016.

I, Ann Lamontagne, P. Eng., Ph. D., do hereby certify that:

- 1) I am a Senior Civil Engineer, president of Lamont inc. with an office located at 10 chemin des Conifères, Lac-Beauport, QC, Canada.
- 2) I graduated with a Bachelor's degree in Civil Engineering from Laval University in Québec in 1990.
- 3) I am registered as a Professional Engineer in the Province of Québec (Licence # 104345).
- 4) I have worked as a civil engineer continuously since graduation from university in 1990.
- 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 supervised the compilation of Section 20 and parts of Section 1.
- 7) I have not personally visited the property.
- 8) I have had no prior involvement with the 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.
- 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.

Dated this 21st day of July, 2016

(Original signed and sealed)


Ann Lamontagne, P. Eng., Ph. D.
Présidente



CERTIFICATE OF QUALIFIED PERSON

Michel L. Bilodeau, P. Eng., M. Sc. (App.). Ph. D.

To Accompany the Report entitled, "NI 43-101 Technical Report on the Pre-Feasibility Study on NuTac Project" dated July 21st, 2016 with an effective date of June 9th, 2016.

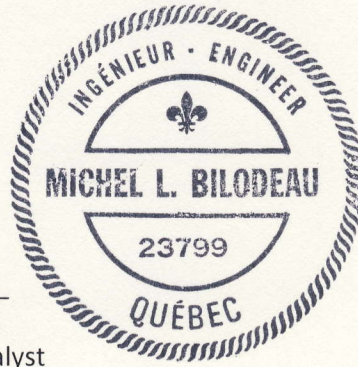
I, Michel L. Bilodeau, P. Eng., M. Sc. (App.). Ph. D., do hereby certify that:

- 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 have continued teaching on a contract basis the mineral economics course of the mining engineering program at McGill in the Winter terms of 2010, 2011 and 2012;
- 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 (1978);
- 3) I am a member in good standing of the "Ordre des ingénieurs du Québec" (23799);
- 4) While employed at McGill (1975-2009), 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, 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 mining industry that includes teaching for more than 30 years and consulting activities over the past 25 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 this Technical Report as an Economic/Financial Analysis Consultant and am responsible for Section 22 and parts of Sections 1, 25 and 26;
- 7) I have not visited the site property that is the subject of this Technical Report;
- 8) I have had prior involvement with the property as a Qualified Person for the NI 43-101 Technical Report on the Feasibility Study on KéMag Taconite Project.
- 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; and
- 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.

Dated this 21st day of July, 2016

Michel Bilodeau

Michel L. Bilodeau, P. Eng., M. Sc. (App.). Ph. D.
Independent Consultant - Economic/Financial Analyst



CERTIFICATE OF QUALIFIED PERSON

Rock Gagnon, P. Eng.

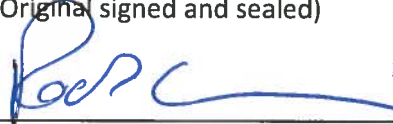
To Accompany the Report entitled, "NI 43-101 Technical Report on the Pre-Feasibility Study on NuTac Project" prepared for New Millennium Iron Corp. ("New Millennium") dated July 21st, 2016 with an effective date of June 9th, 2016.

I, Rock Gagnon, P. Eng., do hereby certify that:

- 1) I am a Consultant with an office located at 1109 Chateauroux St., Quebec City (Québec), Canada.
- 2) I graduated with a Bachelor's degree in Mining Engineering from Laval University in Québec City in 1993.
- 3) I am registered as a Professional Engineer in the Province of Québec (Licence # 110811).
- 4) I have worked continuously since graduation from university in 1993 in various positions as a Mineral Processing Engineer and as a supervisor in mining operations, as a Senior Process Engineer with Met-Chem Canada Inc. and self-employed Consultant where I was involved in the design and optimization of multiple mining projects and in iron ore and as the Technical Leader and Project Manager for New Millennium.
- 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 redaction of the complete Report under the supervision of the independent Qualified Persons and supervised the integration of the Report.
- 7) I have not personally visited the property.
- 8) I have had prior involvement with the property that is the subject of the Technical Report in development of the Feasibility Study for the Taconite Project where the KéMag deposit was involved.
- 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 not independent of New Millennium as such term is 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.

Dated this 21st day of July, 2016

(Original signed and sealed)



Rock Gagnon, P. Eng.
Consultant



TABLE OF CONTENTS

LIST OF ABBREVIATIONS	X
1.0 SUMMARY.....	1
1.1 Introduction	1
1.2 Property Description and Location	1
1.3 Accessibility, Climate, Local Resources, Infrastructure and Physiography	2
1.4 History	2
1.5 Geological Setting and Mineralization	2
1.6 Deposit Types.....	3
1.7 Exploration	3
1.8 Drilling	3
1.9 Sample Preparation, Analysis and Security	4
1.10 Data Verification	4
1.11 Mineral Processing and Metallurgical Testing	5
1.12 Mineral Resources Estimate.....	6
1.13 Mineral Reserves Estimate.....	7
1.14 Mining Methods.....	8
1.15 Recovery Methods	8
1.16 Project Infrastructure.....	10
1.17 Marketing.....	13
1.18 Environmental Studies, Permitting and Social or Community Impact	16
1.19 Capital and Operating Costs.....	17
1.20 Economic Analysis	19
1.21 Adjacent Properties.....	24
1.22 Other Relevant Data and Information	24
1.23 Interpretation and Conclusions.....	25
1.24 Recommendations	27
2.0 INTRODUCTION.....	29
3.0 RELIANCE ON OTHER EXPERTS	31
4.0 PROPERTY DESCRIPTION AND LOCATION	33
4.1 Location and Access	33
4.2 Property Description	35
4.3 Mineral Tenure in Québec	35
4.4 Underlying Agreements and Royalties.....	38
4.5 Surface and Access Rights.....	39
4.6 Permitting	39
4.7 Factors that May Affect Mineral Titles.....	39
5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY	40
5.1 Accessibility	40
5.2 Climate and Vegetation.....	40
5.3 Local Resources and Infrastructure.....	41
5.4 Physiography.....	42
6.0 HISTORY	43

6.1	Prior Ownership	43
6.2	Historical Exploration and Development	43
6.3	Historical Mineral Resources Estimate.....	44
7.0	GEOLOGICAL SETTING AND MINERALIZATION.....	49
7.1	Regional Geology	49
7.2	Property Geology	49
7.3	Structure	52
7.4	Mineralization	52
8.0	DEPOSIT TYPES.....	53
9.0	EXPLORATION	54
10.0	DRILLING.....	55
10.1	2006 Drilling Program	55
10.2	2007 Drilling Program	55
10.3	2008 Drilling Program	55
11.0	SAMPLE PREPARATION, ANALYSIS AND SECURITY	58
11.1	Sampling and Assaying	58
11.2	Sample Preparation and Analysis.....	58
11.3	Quality Assurance and Quality Control Programs	59
12.0	DATA VERIFICATION.....	61
12.1	Data Verification by Geostat (2007).....	61
12.2	Data Verification by WGM (2007)	62
12.3	Data Verification by BBA (2008).....	62
12.4	QP Visit by Met-Chem (2012).....	62
12.5	Geological Review and Audit by Met-Chem.....	64
13.0	MINERAL PROCESSING AND METALLURGICAL TESTING.....	66
13.1	Representative Samples.....	66
13.2	Summary of Relevant Testwork Results.....	67
13.3	Summary of Recommended Test Work for Next Phase.....	79
14.0	MINERAL RESOURCES ESTIMATES	80
14.1	Mineral Resources Estimate Statement	80
14.2	Definitions.....	81
14.3	Mineral Resources Estimation Procedures	82
14.4	Drill Hole Database, Data Verification and Validation	83
14.5	Geological Modeling Procedures	86
14.6	Statistical Analysis of Sampling Length and Compositing	89
14.7	Variogram Modeling	89
14.8	Density/Specific Gravity	90
14.9	Block Model Setup/Parameters	91
14.10	Resource Interpolation.....	96
14.11	Estimates Validation.....	99
14.12	Resource Classification.....	100
14.13	Mineral Resources Statement.....	101
15.0	MINERAL RESERVE ESTIMATES.....	104
15.1	Geological Information	104
15.2	Economic Pit Optimization	107
15.3	Ultimate Pit Design	112

15.4	Recommendations	118
16.0	MINING METHODS.....	120
16.1	Geotechnical Pit Slope Parameters	120
16.2	Hydrogeology and Hydrology Parameters	120
16.3	Dump Design	121
16.4	Mine Planning	123
16.5	Mine Manpower Requirements	135
17.0	RECOVERY METHODS.....	137
17.1	Process Plant Design Criteria	137
17.2	Process Facilities Location Criteria	138
17.3	Description and Geometry	140
17.4	Crushing Systems	143
17.5	Concentrator	144
17.6	Tailings Processing and Handling	149
17.7	Concentrate Drying and Load Out.....	154
17.8	Pellet Plant	155
17.9	Plant Control Systems	162
18.0	INFRASTRUCTURE.....	163
18.1	Mine Site Infrastructure	163
18.2	Railway	174
18.3	Pellet Plant Infrastructure.....	175
18.4	Pellet Stockpiling and Ship loading	180
18.5	Fire Alarm and Detection Systems	181
19.0	MARKET STUDIES AND CONTRACTS	182
19.1	Introduction	182
19.2	Market Context and Opportunity	183
19.3	Products	185
19.4	Pricing.....	185
19.5	Conclusion	186
20.0	ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT.....	189
20.1	Applicable Environmental Assessment Regimes and Permitting	189
20.2	Baseline Data Collection and Environmental Impact Statement Status	194
20.3	General Socio-Political and Institutional Setting	197
20.4	General Environmental Setting	200
20.5	Aboriginal Groups and Public Participation	205
20.6	Anticipated Impacts	207
20.7	Geochemical Characterization of Waste Rock and Tailings	208
20.8	Rehabilitation and Closure	209
21.0	CAPITAL AND OPERATING COSTS	211
21.1	Capital Costs.....	211
21.2	Operating Costs.....	216
21.3	Manpower.....	225
22.0	ECONOMIC ANALYSIS	228
22.1	Methodology.....	228
22.2	Summary of Input Data	229
22.3	Royalties, Benefit Agreement and Taxation.....	231

22.4	Residual Value	233
22.5	Financial Model and Results	233
22.6	Sensitivity Analysis	234
23.0	ADJACENT PROPERTIES.....	239
24.0	OTHER RELEVANT DATA OR INFORMATION.....	240
24.1	Project Execution Plan	240
24.2	Feasibility Study and Environmental Impact Study.....	241
24.3	EA Releases and Engineering	242
24.4	Logistics Study	245
24.5	Project Schedule.....	245
25.0	INTERPRETATION AND CONCLUSIONS.....	249
25.1	Project Highlights	249
25.2	Risk Evaluation	250
25.3	Conclusion and Next Phase	251
26.0	RECOMMENDATIONS	252
26.1	Mining and Geology	253
26.2	Process	253
26.3	Opportunities	255
27.0	REFERENCES.....	256

LIST OF TABLES

Table 1.1	– Summary of the Mineral Resources – (Cut-Off of 18 % DTWR)	6
Table 1.2	– Mineral Reserves for KéMag Deposit.....	7
Table 1.3	– Capital Cost Estimate Summary	17
Table 1.4	– Currency Exchange Rates and Percent Content.....	18
Table 1.5	– Summary of Estimated Opex by Area	19
Table 1.6	– Labour Force Year-4	19
Table 1.7	– Base Case Financial Results (100 % Equity).....	20
Table 1.8	– Before-tax Financial Indicators	21
Table 1.9	– After-tax Financial Indicators	21
Table 1.10	– Major Milestones	25
Table 1.11	– Cost Estimate of Next Phase	28
Table 2.1	– Major Design Differences (Taconite vs NuTac)	30
Table 3.1	– Qualified Persons for KéMag NI 43-101 Technical Report.....	31
Table 4.1	– Summary of Claims Covering the KéMag Property	36
Table 4.2	– Registration Fee of Map Designated Claim (North of the 52° Latitude)	37
Table 4.3	– Claim Renewal Fee (North of the 52° Latitude)	37
Table 4.4	– Minimum Cost of Work to be Carried out on a Claim (North of the 52° Latitude)	38
Table 5.1	– Schefferville – Historical Weather Data	40
Table 6.1	– Summary of Exploration Work	43
Table 6.2	– Global Mineral Resources, 2007 (Cut-off Grade of 18 % DTWR)	45
Table 6.3	– Mineral Resources as in May 2008 Report (Cut-off Grade of 18 % DTWR)	45
Table 6.4	– Mineral Resources as in September 2008 Report (Cut-off Grade of 18 % DTWR).....	46
Table 6.5	– LOM Reserves as in the BBA March 2009 Report (Cut-off Grade of 18 % DTWR)	46
Table 6.6	– Cumulative Mineral Resources – In Situ Grades (2012 Model)	47
Table 6.7	– Cumulative Mineral Resources – In Situ Grades (2013 Model)	47
Table 6.8	– Comparison of Models for KéMag	48
Table 7.1	– Stratigraphy of the Property	51

Table 10.1 – Summary of Drilling by NML, by Year	57
Table 13.1 – BF Pellets Metallurgical Properties (Outotec).....	78
Table 13.2 – DR Pellets Metallurgical Properties (Outotec)	78
Table 14.1 – Summary of the Mineral Resources (Cut-Off of 18 % DTWR)	81
Table 14.2 – Drilling Statistics by Year	83
Table 14.3 – KéMag Database Content	83
Table 14.4 – KéMag Lithological Units.....	84
Table 14.5 – Basic Statistics by Seam of Main Quality Elements.....	84
Table 14.6 – Secondary Porosity Estimation of Rock Units for Tested Boreholes	90
Table 14.7 – Block Model Parameters	96
Table 14.8 – Composite Statistics for LC Seam.....	96
Table 14.9 – Composite Statistics for JUIF Seam	96
Table 14.10 – Composite (3 m) Statistics for GC Seam.....	97
Table 14.11 – Composite Statistics for URC Seam.....	97
Table 14.12 – Composite Statistics for PGC Seam	97
Table 14.13 – Composite Statistics for LRC Seam.....	97
Table 14.14 – Composite Statistics for LRGC Seam	98
Table 14.15 – Interpolation Parameters for KéMag	99
Table 14.16 – Descriptive Statistics for Comparison of Assays, Composites and Block Grades	100
Table 14.17 – Cumulative Mineral Resources – In Situ Grades	101
Table 14.18 – Mineral Resources by Seam Basis	103
Table 15.1 – Mineral Reserves.....	104
Table 15.2 – Density by Rock Type	106
Table 15.3 – Pit Optimization Parameters.....	108
Table 15.4 – Pit Optimization Results.....	110
Table 15.5 – Mineral Reserves by Category	117
Table 15.6 – Mineral Reserves by Rock Type.....	118
Table 16.1 – BF Concentrate to Pellet Weight Gain	124
Table 16.2 – DR Concentrate to Pellet Weight Gain.....	124
Table 16.3 – Mine Production Schedule.....	126
Table 16.4 – Major Mining Equipment Fleet	129
Table 16.5 – Truck Hours (h/y)	130
Table 16.6 – Blasting Parameters	132
Table 16.7 – Auxiliary Equipment	134
Table 16.8 – Mining Equipment Lead Delivery Time	135
Table 16.9 – Mine Manpower Requirements (Year-5)	136
Table 17.1 – Process Plant General Design Basis.....	138
Table 17.2 – Process Plant Coordinates.....	140
Table 17.3 – Ore Characteristics – KéMag	142
Table 17.4 – Mineralogical Properties of the Ore Feed Used for the Mass Balance	143
Table 17.5 – Primary Crushing Circuit Nominal Capacity.....	144
Table 17.6 – Tailings Process Streams Summary	150
Table 17.7 – Induration Cycle	158
Table 17.8 – Typical Electrical Energy Consumption.....	161
Table 17.9 – Average Thermal Energy Consumption for BF Fluxed and DR Pellets.....	161
Table 18.1 – Estimated Compressed Air Consumption	177
Table 18.2 – Fuel Oil Characteristics	179
Table 20.1 – Environmental Assessment Regimes Applicable to Principal Infrastructure	189
Table 20.2 – Timeline for EIS Tabling.....	196
Table 20.3 – Timeline for EA Releases	197
Table 21.1 – NuTac Capex Summary ('000s)	212

Table 21.2 – NuTac Currency Exchange Rates and Percent Content.....	213
Table 21.3 – Summary of Estimated Opex by Area	217
Table 21.4 – Summary of Mining Opex	220
Table 21.5 – Summary of Beneficiation Plant Opex	221
Table 21.6 – Summary of Concentrate Drying and Loadout Opex	222
Table 21.7 – Summary of Concentrate Transportation Opex.....	223
Table 21.8 – Summary of Pellet Plant Opex	223
Table 21.9 – Summary of General and Administration Opex	225
Table 21.10 – Power Distribution by Area – Year-4.....	225
Table 21.11 – Estimated Operating Labour Costs – Year-4	226
Table 22.1 – Financial Results (100 % Equity).....	228
Table 22.2 – Iron Ore Shipments per Year.....	230
Table 22.3 – Life-of-Mine Revenues	231
Table 22.4 – Summary of Production Costs.....	231
Table 22.5 – Capex Summary	231
Table 22.6 – Before-tax Financial Indicators	234
Table 22.7 - After-tax Financial Indicators.....	234
Table 22.8 – Cash Flow Statement	235
Table 24.1 – Major Milestones	247
Table 26.1 – Cost Estimate of Next Phase	252

LIST OF FIGURES

Figure 1.1 – Physical Properties of BF Grade Fluxed Pellet	14
Figure 1.2 – Physical Properties of DR Grade Pellet	15
Figure 1.3 – Sensitivity of the Before-Tax Net Present Value.....	22
Figure 1.4 – Sensitivity of the Before-Tax Internal Rate of Return	23
Figure 1.5 – Sensitivity of the After-tax Net Present Value	23
Figure 1.6 – Sensitivity of the After-tax Internal Rate of Return	24
Figure 4.1 – Project Location	33
Figure 4.2 – KéMag Property, Claim Map.....	34
Figure 7.1 – Geological Map with Drill Hole Location.....	50
Figure 10.1 – Drill Hole Locations	56
Figure 12.1 – Scatter Diagram Showing the Correlation Between the Original and the Met-Chem’s Check Samples.....	64
Figure 13.1 – Cobber Weight Rejection vs HPGR Transfer Size	68
Figure 13.2 – Ball Mill Grinding Power vs HPGR Transfer Size (8.7 Mtpy).....	70
Figure 13.3 – Optimized Flotation Flowsheet.....	71
Figure 13.4 – Effect of Re grind Fineness on Silica Rejection	72
Figure 13.5 – Silica Rejection Efficiency vs IsaMill Power (SGS 2014 & 2015)	73
Figure 13.6 – IsaMill Signature Plots (SGS 2014 & 2015).....	73
Figure 13.7 – Cold Compression Strength (Outotec)	75
Figure 13.8 – Tumble and Abrasion (Outotec)	76
Figure 13.9 – Bivalent Iron (Outotec)	77
Figure 14.1 – Typical Vertical Cross-Section	87
Figure 14.2 – Drill Hole Locations	88
Figure 14.3 – Sampling Length Histogram	89
Figure 14.4 – Scatter of LabMag and KéMag Pair Data for LC Seam	91
Figure 14.5 – Regression Model for LC Seam	92
Figure 14.6 – Regression Model for JUIF Seam	92
Figure 14.7 – Regression Model for GC Seam	93
Figure 14.8 – Regression Model for URC Seam	93

Figure 14.9 – Regression Model for PGC Seam	94
Figure 14.10 – Regression Model for LRC Seam	94
Figure 14.11 – Regression Model for LRGC Seam.....	95
Figure 14.12 – Plan View of Resource Zones	102
Figure 14.13 – Typical Cross-Section with Categorized Resources	103
Figure 15.1 – Grade Tonnage Histogram	109
Figure 15.2 – Pit Optimization Results.....	111
Figure 15.3 – Pit Wall Configuration.....	113
Figure 15.4 – Haul Road Configuration.....	114
Figure 15.5 – Blending of Lithologies.....	115
Figure 15.6 – Dilution Calculation.....	116
Figure 15.7 – Pit Layout	119
Figure 16.1 – Waste Dump Configuration	123
Figure 16.2 – Pit Advance (Plan View)	127
Figure 16.3 – Mine Production Schedule (Production).....	128
Figure 16.4 – Mine Production Schedule (Grades)	129
Figure 17.1 – KéMag Summary Block Flow Sheet and Mass Balance	139
Figure 17.2 – KéMag General Site Layout.....	141
Figure 17.3 – Typical Tailings Closure Cut and Fill and Reclamation	154
Figure 17.4 – Induration Gas Flow	159
Figure 19.1 – Physical Properties of BF Grade Fluxed Pellet	187
Figure 19.2 – Physical Properties of DR Grade Pellet	188
Figure 20.1 – Comparison of Taconite Project and Project Study Areas	190
Figure 20.2 – Socio-Political and Institutional Context.....	198
Figure 20.3 – Directly Affected Watercourses and Waterbodies	202
Figure 21.1 – Summary of Estimated Opex by Year	217
Figure 21.2 – Operation Organizational Structure by Facility and Services – Overall	227
Figure 22.1 – Sensitivity of the Before-Tax Net Present Value	237
Figure 22.2 – Sensitivity of the Before-Tax Internal Rate of Return	237
Figure 22.3 – Sensitivity of the After-Tax Net Present Value	238
Figure 22.4 – Sensitivity of the After-tax Internal Rate of Return	238
Figure 24.1 – NuTac Feasibility Study and EIS Schedule.....	242
Figure 24.2 – Master Schedule Road Map.....	248

List of Abbreviations

Abbreviation	Description	Abbreviation	Description
µm	Microns, Micrometre	CAGR	Compound Annual Growth Rate
"	Inch	Capex	Capital Expenditures
\$	Dollar Sign	CCR	Central Control Room
%	Percent Sign	CCTV	Close Circuit Television
°	Degree	CDC	<i>Claim désigné sur carte</i>
°C	Degree Celsius	CDP	Closure and Decommissioning Plan
3D	Three Dimension	CEAA	Canada Environmental Assessment Act
≈	Approximately Equal	CEPA	Canada Environmental Protection Act
~	Approximately	CFA	Chemin de Fer Arnaud
		CFR	Cost and Freight
AACE	American Association of Cost Engineers	CIF	Cost Insurance and Freight
AC	Alternating Current	CIM	Canadian Institute of Mining, Metallurgy and Petroleum
ACSR	Aluminium Cable, Steel Reinforced	CIS	Commonwealth Independent States
ARD	Acid Rock Drainage	cm	Centimetre
ASTM	American Association for Testing and Materials	cm ² /g	Centimetre Square per Gram
AQ	Drill Core Size (2.7 cm Diameter)	CMRL	Coleraine Mineral Research Lab
BAPE	<i>Bureau d'Audiences Publiques sur l'Environnement</i>	COG	Cut Off Grade
BBA	Breton, Banville et Associés	COSEPAC	Comité sur la situation des espèces en péril au Canada
BF	Blast Furnace	COV or CV	Coefficient of Variation
BIF	Banded Iron Formation	CPESI	<i>Corporation de protection de l'environnement de Sept-Îles</i>
BM	Ball Mill	cSt	Viscosity in Centistokes
BMF	Ball Mill Feed	Cw	Concentration by Weight
BOF	Basic Oxygen Furnace	d	Day
BQ	Drill Core Size (36.4 mm Diameter)	d/w	Days per Week
BRASS	BRASS Engineering International	d/y	Days per Year
BWI	Bond Ball Mill Work Index	DB	Database
BTW	Drill Core Size (42 mm Diameter)		
CA	Collabouration Agreement		

Abbreviation	Description
dB	Decibel
DC	Direct Current
DCS	Distributed Control System
DDD	Downdraft Drying
DDH	Diamond Drill Hole
DDRS	Double Deck Roller Screen Feeder
deg	Angular Degree
DEM	Digital Elevation Model
D-LRS	Dual Liquid Rheostat Starter
DR	Direct Reduction
DRI	Direct Reduced Iron
DSOP	Direct Shipping Ore Project
DSTF	Dry Stack Tailings Facility
DT	Davis Tube
DTC	Davis Tube Concentrate
DTWR	Davis Tube Weight Recovery
DWI	Drop Weight Index
DWT	Drop Weight Test
E	East
EA	Environmental Assessment
EAB	Environmental Assessment Board
EAF	Electric Arc Furnace
EIS	Environmental Impact Statement
EM	Electro-Magnetic
EP	Environmental Permit
EPA	Environmental Protection Act
EPCM	Engineering, Procurement and Construction Management
EQA	Environment Quality Act
ER	Electrical Room
ESIA	Environmental and Social Impact Assessment

Abbreviation	Description
EUR	Euro
Fe	Iron
FMP	Flow Moisture Point
FOB	Free on Board
FS	Feasibility Study
ft	Feet
g	Grams
GC	Green Cherty
G&A	General and Administration
g/cm ³	Gram Per Cubic Centimetre
g/l	Grams Per Litre
g/t	Grams Per Tonne
GIS	Gas Isolated Switchgear
g/ml	Grams Per Milliliter
GOH	Gross Operating Hours
GoNL	Government of Newfoundland and Labrador
GoC	Government of Canada
GoQ	Government of Quebec
GPS	Global Positioning System
Gr	Granular
h	Hour
h/d	Hours per Day
h/y	Hour per Year
H ₂	Hydrogen
ha	Hectare
HBI	Hot Briquetted Iron
HFO	Heavy Fuel Oil
HL	Heavy Liquid
HMC	Hanna Mining Company
HMI	Human Machine Interfaces

Abbreviation	Description
HoA	Heads of Agreement
hp	Horse Power
HPGR	High Pressure Grinding Rolls
HQ	Drill Core Size (6.4 cm Diameter)
HQ	Hydro-Québec
HR	Human Resources
HSEC	Health, Safety, Environment and Community
HV	High Voltage
HVAC	Heating Ventilation and Air Conditioning
Hz	Hertz
IDW	Inverse Distance Weighted
IDW2	Inverse Distance Squared Method
IMSBC	International Maritime Solid Bulk Cargoes Code
in	Inches
IN	Innu Nation
INREST	<i>Institut Nordique de Recherche en Environnement et en Santé au Travail</i>
IOCC	Iron Ore Company of Canada
IRR	Internal Rate of Return
ISLLP	Innu SNC Lavalin Limited Partnership
ISO	International Standard Organization
IT	Information Technology
ITUM	Innu Takuaiakan Uashat mak Mani-Utenam
JBNQA	James Bay and Northern Québec Agreement
JUIF	Jasper Upper Iron Formation
kcal/kg	Kilocalories per Kilogram
KE	Kriging Efficiency

Abbreviation	Description
KEQC	Kativik Environmental Quality Commission
kg	Kilogram
kg/l	Kilogram per Litre
kg/t	Kilogram per Metric Tonne
km	Kilometre
km ²	Square Kilometre
km/h	Kilometre per Hour
kV	Kilovolt
kVA	Kilovolt Ampere
kW	Kilowatt
kWh	Kilowatt-hour
kWh/t	Kilowatt-hour per Metric Tonne
L	Line
l	Litre
LAN	Local Area Network
l/h	Litre per Hour
LBI	Lerch Brothers Inc.
LC	Lean Cherty
LCP	Local Control Panels
LCR	Local Control Rooms
LG-3D	Lerchs-Grossman – 3D Algorithm
LIF	Lower Iron Formation
LIMS	Low Intensity Magnetic Separator
LM&E	Labrador Mining and Exploration Co
LNG	Liquid Natural Gas
LOE	Loi sur la qualité de l'environnement
LOI	Loss On Ignition
LOM	Life Of Mine
LRC	Lower Red Cherty
LRGC	Lower Red Green Cherty
m	Metre

Abbreviation	Description
m/h	Metre per Hour
m/s	Metre per Second
m ²	Square Metre
m ³	Cubic Metre
m ³ /d	Cubic Metre per Day
m ³ /h	Cubic Metre per Hour
m ³ /y	Cubic Metre per Year
MagFe	Magnetic Iron
Mm ³	Million Cubic Metres
MCC	Motor Control Center
MDDEP	<i>Ministère du Développement Durable de l'Environnement, et le Faune et des Parcs</i>
MENA	Middle East and North Africa
MERN	Ministère d'Énergie et Ressources Naturelles du Québec
mg/l	Milligram per Litre
Min	Minimum
Min	Minute
min/h	Minute per Hour
min/shift	Minute per Shift
ml	Millilitre
ML	Metal Leaching
mm	Millimetre
mm/d	Millimetre per Day
mm/y	Millimetre per Year
Mm ³	Million Cubic Metres
MMER	Metal Mining Effluent Regulations
MOU	Memorandum of Understanding
MPWR	Magnetic Plant Weight Recovery
MRC	Midland Research Center
MRN	<i>Ministère des Ressources Naturelles</i>

Abbreviation	Description
MS	Menihek Shale
Mt	Million Metric Tonnes
Mt/h	Million Tonnes per Hour
Mtpy	Millions of Metric Tonnes per Year
MTO	Material Take-offs
MV	Medium Voltage
MVA	Mega Volt-Ampere
MW	Megawatts
MWh	Megawatts per Hour
N	North
NAD	North American Datum
NCC	NunatuKavut Community Council
NEB	National Energy Board
NEQA	Northeastern Québec Agreement
NFPA	National Fire Protection Association
NI	National Instrument
NIMLJ	Nation Innu Matimekush-Lac John
Nm ³ /h	Normal Cubic Metre per Hour
NNK	Naskapi Nation of Kawawachikamach
NML	New Millennium Iron Corp. (since June 23 rd , 2011) New Millennium Capital Corp. (from August 8 th , 2003 to June 23 rd , 2011)
NPV	Net Present Value
NO _x	Nitrogen Oxides
NQ	Drill Core Size (48 mm Diameter)
NRCan	Natural Resources Canada
NRRI	Natural Resources Research Institute
NTS	National Topographic System
OIQ	Ordre des ingénieurs du Québec

Abbreviation	Description
OB	Overburden
OD	Outside Diameter
OK	Ordinary Kriging
Opex	Operating Expenditures
OT&R	Ore Testing and Research Laboratory
P&ID	Piping and Instrumentation Diagram
PA	Public Address
P&C	Paterson and Cooke
PBX	Private Branch Exchange
PCC	Point of Client Connection
PCS	Plant Control System
PEA	Preliminary Economic Assessment
PEP	Project Execution Phase
PF	Power Factor
PFD	Process Flow Diagram
PFS	Pre-Feasibility Study
PGC	Pink Grey Cherty
p/h	Per Hour
ph	Phase (Electrical)
pH	Potential Hydrogen
PLC	Programmable Logic Controllers
POV	Pre Operational Verification
PP	Preproduction
PPE	Personal Protective Equipment
Ppm	Parts per Million
psi	Pounds per Square Inch
PSTN	Public Switched Telephone Network
QA/QC	Quality Assurance/Quality Control
QMS	Quality Management System
QNS&L	Quebec North Shore and Labrador Railway

Abbreviation	Description
QP	Qualified Person
ROE	Return on Equity
ROM	Run of Mine
ROW	Right of Way
rpm	Revolutions per Minute
RQD	Rock Quality Designation
S	South
S	Sulfur
S/R	Stripping Ratio
SAG	Semi-Autogenous Grinding
SAGDesign	SAGDesign Consulting Group
sec	Second
Set/y/unit	Set per Year per Unit
SG	Specific Gravity
SGA	Studiengesellschaft für Eisenerzaufbereitung
SGS	SGS Canada (since March 9, 2010) SGS-Geostat Ltd. (from September 8, 2008 to March 9, 2010) Geostat Systems International Inc. (from April 7, 1981 to September 8, 2008)
SI	Système International d'Unités
SIPA	Sept-Îles Port Authority
SL	Sanitary Landfill
SLE	SNC-Lavalin inc., Environment & Water Division
SNRC	<i>Système National de Référence Cartographique</i>
SR	Stripping Ratio
t or T	Metric Tonne
t/d	Metric Tonne per Day
t/d/m ²	Metric Tonne per Day per Square Metre

Abbreviation	Description
t/h	Metric Tonne per Hour
t/h/m	Metric Tonne per Hour per Metre
t/h/m ²	Metric Tonne per Hour per Square Metre
t/m ³	Metric Tonne per Cubic Metre
t/y	Metric Tonne per Year
tCO ₂ eq/y	Tonnes of CO ₂ Equivalent/Year
TIA	Tailings Impoundment Areas
TMF	Tailings Management Facilities
TMO	TransportableMoisture Unit
ton	Short Ton
tonne	Metric Tonne
TotFe	Total Iron
TP	Taconite Project
TS	Tata Steel Global Minerals Holdings Pte Ltd.
TSE	Tata Steel Minerals Europe
TSF	Tailings Storage Facility
TSH	Tshuuetin Rail Transportation Inc.
TSX	Toronto Stock Exchange
UDD	Updraft Drying
UIF	Upper Iron Formation
URC	Upper Red Cherty
USA	United Stated of America
UTM	Universal Transverse Mercator
V	Vertical
V	Volt
VFD	Variable Frequency Drive
VLf	Very Low Frequency
W	Watt
WAN	Wide Area Network
WGM	Watts, Griffis and McOuat Limited

Abbreviation	Description
WSD	World Steel Dynamics
wt	Wet Metric Tonne
X	X Coordinate (East-West)
XRD	X-Ray Diffraction
XRF	X-Ray Fluorescence
y	Year
Y	Y Coordinate (North-South)
Z	Z Coordinate (depth or elevation)

1.0 SUMMARY

1.1 Introduction

In September 2015, New Millennium Iron Corp (“NML”) announced its NuTac initiative and commissioned this Pre-Feasibility Study (“PFS”) to examine a further range of options for the development of the seven NI 43-101 compliant iron ore taconite properties it controls all of which are in the region of Schefferville, Québec, adjacent to the Newfoundland and Labrador border and about 550 km north of port city of Sept-Îles, Québec. Among these is the KéMag Deposit in which NML holds a 100% interest.

This PFS draws from the comprehensive KéMag Feasibility Study carried out by Innu/SNC-Lavalin Limited Partnership and published in March 2014 and the related NI 43-101 Technical Report issued by Met-Chem Canada Inc. in May 2014. It is in response to the widely reported macro-economic changes since 2014 that have impacted the commodities markets and resulted in the need for a new approach to project development.

The NuTac initiative has thus produced the re-scoped project development plan for KéMag discussed herein (the “Project”), featuring transferrable, state-of-the-art mining and processing technologies from the earlier study with the same focus on high-quality products at a competitive cost, but with a lower capital cost, the use of infrastructure that could not previously be considered, and a scale adaptable to changing market conditions.

This PFS incorporates several changes that improve Project economics:

- Process flowsheet optimization,
- Use of the existing rail network (TSH, QNS&L, CFA) that already hauls saleable products from the Schefferville region to shiploading facilities at Sept-Îles, and will connect to the new deep-water dock in the PSI’s Pointe-Noire terminal system;
- The GoQ’s recent purchase of land and infrastructure at Pointe-Noire, including the CFA railway, to facilitate multi-user stockpiling and shiploading.

1.2 Property Description and Location

The KéMag property (the “Property”), previously known as the Lac Harris Iron property, is situated in the non-organized territory of Rivière Koksoak in Northern Québec, about 40 km to the northwest of the town of Schefferville, Québec. The Property lies approximately 245 km north of Labrador City, and 550 km due north of Sept-Îles, Québec.

KéMag is comprised of one block of 171 contiguous claims covering an area of approximately 81 km² along a north northwest-south southeast trend and within a large block of claims held by NML. The Property is contiguous on the southeast with NML’s claims and lies approximately 18 km to the northwest of NML’s LabMag Iron property in Labrador. The claims were acquired as Map-Designated Claims by NML. All the claims are currently active and in good standing. The drilled portion of the KéMag Deposit is located in the southern half of the claims.

1.3 Accessibility, Climate, Local Resources, Infrastructure and Physiography

The Property is accessible by well-maintained roads for 25 km northwest of Schefferville and for a further 30 km westward along a trail that reaches Lac de la Frontière, seven (7) km away from the Property. Schefferville is connected to the populous south by airplane or by train.

The Project area is under the influence of humid, sub-arctic continental climate conditions experiencing very severe winters and cool summers. Daily temperatures exceed 0°C for only about five (5) months per year.

Schefferville survived despite the closing of iron mining operations in 1982 and experienced an influx of workers after 2011 principally triggered by the re-start of iron exploration in the region, some of which has now been curtailed. According to the 2011 census, 213 persons inhabited Schefferville in 2011, while 2014 government registers indicated that some 780 members of the Nation Innu Matimekush-Lake John were living on the nearby Matimekush community and Lac John reserves. The Naskapi Nation of Kawachikamach, located about 15 km northeast of Schefferville counted some 884 members in 2014 according to the registers.

The town of Schefferville and the local First Nations collectively provide basic services, supplies and equipment, contractors and charter flight operators. A significant portion of the labour force required for a mining operation at KéMag would come from the First Nations population and the remainder from other parts of Québec, supported by intensive training programs, some of which have been established by other operators. A camp at the mine site would be required to house the construction crews and the permanent work force.

1.4 History

All recorded exploration work prior to staking of the Property by NML was carried out by Iron Ore Company of Canada (“IOCC”). In 1972, IOCC acquired an exploration permit covering the KéMag area but conducted no further work. In December 2003, NML was formed as a capital pool company listed on the TSX Venture Exchange. The KéMag Property was acquired by NML by claim staking between 2004 and 2008.

IOCC conducted reconnaissance mapping, airborne magnetic and electro-magnetic surveying, and drilled a series of short holes, between 1949 and 1971. Since 2005, NML has conducted different phases of ground and airborne geophysical surveying, drilling and metallurgical test work including resource estimates in 2006, 2007 and 2008. These were historical estimates and were superseded by the Taconite Project Feasibility Study and NI 43-101 compliant estimate published in 2014. Since then, there has been no further exploration and this PFS is therefore based on the same 2014 resource estimate.

1.5 Geological Setting and Mineralization

The Property is located in the western margin of the Labrador Trough that extends for more than 1,000 km, from Ungava Bay to Lake Pletipi in Québec. The belt is about 100 km wide in its central part and narrows considerably to the north and south. The Grenville Front crosses the

southern part of the Trough. The rocks in the Trough are subdivided into an upper volcanic-dominated suite (Doublet Group) and a lower sedimentary sequence (Knob Lake Group) that includes the Sokoman Formation hosting the iron formations found in the region.

The units of the Knob Lake Group underlie the majority of the Property and lie on Archean gneiss. The Sokoman formation is essentially un-deformed, strikes northwest and has a shallow dip to the northeast. The iron formation at KéMag has been explored by diamond drilling over a strike length of 9.5 km and it extends beyond the northwest and southeast Property boundaries.

The Sokoman formation has been broken down into individual stratigraphic units on the basis of facies. The taconite at the KéMag Deposit consists mostly of alternating small-scale beds of chert or jasper and massive or disseminated magnetite, with subordinate amounts of hematite and martite. Gangue minerals are represented by iron silicates, iron and manganese carbonates. Alumina, sulphur and phosphorus generally occur at low levels in the iron formation.

1.6 Deposit Types

The KéMag Deposit consists of magnetite Banded Iron Formation (“BIF”) of the Lake Superior type. BIFs are sedimentary rocks composed of alternating mm- to cm-scale beds of quartz (chert or jasper) and iron oxides (predominantly magnetite and hematite). Variable amounts of gangue minerals, mostly silicates and carbonates, are present. Banded iron formations have greater than 15% iron content and represent the principal sources of iron throughout the world and are mined in the Great Lakes region of the United States. The Lake Superior-type BIF are associated with typical shelf-type sedimentary rocks with minimal volcanic input and most formed during the Paleoproterozoic era.

The model used by NML to design the exploration activities and the drilling is principally based on the interpretation of the drill data indicating the presence of gently dipping, Lake Superior type iron formation (taconite).

1.7 Exploration

Historical exploration in the KéMag region has consisted principally of field mapping, sampling, and drilling, as well as geophysical surveying that included ground magnetic and airborne magnetic and EM surveys.

Resources estimates have been completed following the main phase of drilling. Cumulatively, the exploration and development work has allowed estimating NI 43-101 compliant Mineral Resources in the drilled area.

1.8 Drilling

Historical drilling on the Property consisted of 23 shallow holes testing targets defined by the dip-needle magnetic survey completed by IOCC in 1958. These historical holes were not used in any of the Mineral Resource estimations.

In 2006, NML drilled 3,586 m in 29 holes in order to test airborne anomalies outlined during the 1950s and in 1971. The drilling indicated that the economic stratigraphic horizons are similar to those occurring at the LabMag Deposit.

The 2007 drill program, comprised of a total of 4,979 m in 46 holes, was a follow-up of the 2006 program. The KéMag Deposit was found to be narrower and shallower in the central part than in the rest of the drilled area.

In 2008, 15 holes were drilled for a total of 2,216 m. The drilling on the southern part of the Deposit confirmed that the eastern extension of the deposit lies under Lac Harris, Lac de la Frontière and the swampy grounds to the south.

1.9 Sample Preparation, Analysis and Security

Each stratigraphic unit was sampled separately, in 2006 to 2008, except for Menihek Shale and Ruth Formation, with sample lengths varying from 1.6 m to 9.1 m, based on the extent of magnetite/hematite mineralization.

The split core samples, and the check samples, were sent to Midland Research Center (“MRC”), Nashwauk, Minnesota, USA, for total Fe analysis on head grades, Davis Tube Weight Recovery (“DTWR”) and iron and silica on the -325 mesh concentrates. In addition, trace elements and sulphur were analyzed on 21 crude samples, Davis Tube concentrates and tailings.

In 2006, NML monitored the laboratory performance with a total of 13 second half core samples re-assayed at MRC. Seventy-one (71) check samples were submitted in 2007 and a further four (4) were submitted in 2008. NML’s QA/QC system did not provide for insertion of standard and blank materials into the sample stream.

MRC applied its own internal QA/QC program, including random selection of samples for re-assay by an external laboratory, Lerch Brothers Inc. (“LBI”) of Minnesota.

1.10 Data Verification

Geostat visited the site in 2007 and collected 27 samples from the remaining core halves. Geostat observed a bias in the head Fe of the check samples, but Met-Chem’s coarse rejects check samples submitted to XRF analysis showed a high correlation with the original results. Watts, Griffis and McQuat Limited (“WGM”) completed a site visit in 2007 and noted that the drill core handling was well done. A BBA senior metallurgist travelled to the site in 2008 and examined some of the drill core, but did not complete a new validation of the analytical results. Neither WGM nor BBA were required to collect check samples because independent validation had already been completed by Geostat.

In September 2012, the KéMag Property was visited by Yves Buro, Eng., and Schadrac Ibrango, P. Geo., Ph.D., both senior geologists at Met-Chem. Met-Chem independently selected 26 samples from the Deposit.

The previous Resource Estimates were completed using the density determined by the pycnometer method, without correction for the effects of porosity and permeability. At Met-

Chem's recommendation, NML requested the sample preparation laboratory in Chibougamau (Table Jamésienne de Concertation Minière) to perform bulk density determination on 167 samples from the KéMag Deposit.

The results were used to build a regression function for each seam in the Deposit.

1.11 Mineral Processing and Metallurgical Testing

NML controls seven long-life taconite iron ore deposits of which two are in Québec and five in Newfoundland and Labrador. The main ore characteristics and beneficiation properties can be derived from the deposit core testing results. The Davis Tube ("DT") test provides an evaluation of the magnetite content in the ore, and the DT concentrate assays provide the liberation characteristics that can be expected from the industrial plant performance through correlations with pilot plant tests and industrial operation experience. Blending will ensure a proper quality of feed to the concentration plant.

The test work carried out by NML since the start of the initial pilot plant tests in 2005 sought to characterize the ore and establish the process flow sheet and design criteria that would allow development of an efficient and economical process. The process has evolved through various stages of development to prepare an optimized feed for the production of high quality pellets with low silica content for both blast furnace ("BF") and direct reduced ("DR") iron based steelmakers.

From multiple test programs performed over the years, NML developed a significant database of information related to ore behaviour and equipment performance data to develop process models and energy requirements to reach various grind fineness under different concentrator arrangements. These results were used to calculate the process plant mass balance and size equipment for the selected flowsheet. The main features of the process plant are the use of secondary crushing with High Pressure Grinding Rolls ("HPGR") in an arrangement which substantially reduces the power requirement and grinding cost. To complete the magnetic concentration process, the plant uses flotation to reach the targeted silica grades for pelletizing. The final concentrate was tested for freezing properties to enable the design of a dewatering and drying system that will mitigate material handling issues during cold weather periods.

Test work also included multiple suppliers' tests to design equipment such as thickeners, filters, HPGRs, grinding mills, and so forth.

A specific focus of the NuTac Project design is the safe management of tailings through the use of tailings dry stacking. NML retained Paterson & Cooke to carry out test work and produce a PFS level design of a filtration plant for tailings, including the associated stacking systems.

Finally, there has been a comprehensive series of pelletizing tests at leading specialist laboratories and vendors to confirm pellet quality and the capacity of a new pellet plant. The latest program was done by Outotec, a well-known pellet plant supplier which optimized the

induration cycle while evaluating the plant's capacity and product quality criteria needed to meet international standards for pellet marketing.

1.12 Mineral Resources Estimate

Although there has been no drilling at KéMag since the last Resource Estimate by Geostat in 2008, Met-Chem was able to refine the resource estimate introducing changes to the drillhole database and geological interpretation. In addition, Met-Chem calculated a new regression function to take into account the secondary porosity in the density model, and another regression function to model density with varying iron content in the mineralization. The estimate was done in accordance with NI 43-101 Rule (2011) and guidelines on resource classification adopted by the Council of the Canadian Institute of Mining, Metallurgy and Petroleum ("CIM") (November 2010).

Eighty-nine (89) holes drilled by NML between 2006 and 2008 were used to interpolate 3D blocks constrained within surfaces (top and bottom) related to each geological seam. The same variogram parameters that had been defined for the more densely drilled LabMag Deposit were used for grade interpolation. A block model was created using MineSight® software package and Mineral Resources were interpolated on a seam by seam basis. The resource interpolation was performed using the Inverse Distance Weighted to the power of 2 ("IDW2"), and ordinary kriging ("OK") was used to validate the results of IDW2. The block size used by Geostat in the previous estimates was adjusted to take into account the drilling density at the KéMag Deposit. The Mineral Resources summarized in Table 1.1 are reported to a cut-off grade of 18 % DTWR and are not constrained to a pit.

Table 1.1 – Summary of the Mineral Resources – (Cut-Off of 18 % DTWR)

Resource by Category	Tonnage (Mt)	TotFe (%)	DTWR (%)	DT Concentrate	
				Fe (%)	SiO ₂ (%)
Measured	1,507	31.45	26.97	69.69	2.56
Indicated	876	31.95	27.32	69.83	2.51
Measured + Indicated	2,383	31.63	27.10	69.74	2.54
Inferred	1,007	31.56	26.97	69.31	2.65

The estimate of Mineral Resource may be materially affected by environmental, permitting, legal title, socio-political, marketing, or other relevant issues. However, Met-Chem is not aware of any known issues that would materially affect the Mineral Resource.

The quantity and grade of reported Inferred Mineral Resource in this estimate are uncertain in nature and there has been insufficient exploration to define the Inferred Mineral Resource as Indicated or Measured Mineral Resource and it is unknown if further exploration will result in upgrading them to Indicated or Measured categories. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.

1.13 Mineral Reserves Estimate

The Mineral Reserves are the portion of the Measured and Indicated Mineral Resources that have been identified as being economically extractable and that incorporate mining losses and the addition of waste dilution. The Mineral Reserves for the KéMag Deposit have been developed using best practices in accordance with CIM guidelines and NI 43-101 reporting.

A pit optimization analysis was carried out on the Mineral Resources block model to determine the appropriate cut-off grades and to what extent the Deposit can be mined profitably. The pit optimization for the KéMag Deposit was done using the MS Economic Planner module of MineSight® Version 10.50.

The optimizer uses the 3D Lerchs-Grossman algorithm to determine the economic pit limits based on input of mining and processing costs and revenue per block. In order to comply with NI 43-101 guidelines regarding the Standards of Disclosure for Mineral Projects, only blocks classified in the Measured and Indicated categories are allowed to drive the pit optimizer. Inferred Resource blocks are treated as waste, bearing no economic value.

The pit optimization analysis used a DTWR cut-off of 18% to be consistent with the Mineral Resources estimate. However, indications show that a lower cut-off grade could be beneficial to the operation and should be further studied during the next Project phase.

After the completion of a detailed pit design and the addition of mining losses and waste dilution, the Mineral Reserves for the KéMag Deposit have been estimated to include 328 Mt of Proven Mineral Reserves and 487 Mt of Probable Mineral Reserves for a total of 815 Mt. In order to access these reserves, 88 Mt of overburden, 0.2 Mt of Menihek Shale and 55 Mt of Inferred Mineral Resources must be mined. This total waste quantity of 144 Mt results in a stripping ratio of 0.18 to 1. The Mineral Reserves are included in the Mineral Resources and the reference point is the mill feed. Table 1.2 presents the total Mineral Reserves for the KéMag Deposit.

Table 1.2 – Mineral Reserves for KéMag Deposit

Category	Tonnage (Mt)	DTWR (%)	TotFe (%)	DT Concentrate	
				Fe (%)	SiO ₂ (%)
Proven	328	27.9	30.4	68.8	3.3
Probable	487	27.0	32.0	70.3	2.0
Proven & Probable	815	27.3	31.4	69.7	2.5

The totals may not add up due to rounding errors.

A portion of KéMag's resources lie underneath Lac Harris. In order to mine these, a system of dams and ditches will be constructed. As the mine progresses into Lac Harris in the area that is actually below the water surface, water will be pumped in the main stream and all water from this zone will flow towards the Goodwood River.

1.14 Mining Methods

The mining method selected for the Project is conventional truck and wheel loader. Vegetation and topsoil will be cleared using a mining contractor and be carried out with a fleet of dozers, small excavators and articulated haul trucks ahead of the mining operation. Suitable organic material will be stockpiled for future reclamation use. Overburden will then be stripped using a fleet of excavators and hauled to the overburden dump. The ore and waste rock will be mined with 15 m high benches, drilled and blasted and then loaded with wheel loaders into a fleet of rigid frame trucks that will haul the material either to the waste dump or the primary crushers.

The mining operations for the Project will be 365 days per year, operating around the clock on two (2) 12-hour shifts. A total of seven (7) days per year have been factored in for when the mine will be shut down due to severe weather conditions. These conditions may occur during peak rainfall or snowfall periods or at times when the ambient temperature is extremely low.

The 25-year mine plan is based on an annual production of 8.7 Mt of concentrate to yield 4 Mt of BF and 5 Mt of DR grade pellets. The mine plan has a planned ramp-up of 60% in Year-1 (5.1 Mt of concentrate) and 85% in Year-2 (7.5 Mt of concentrate) before reaching full capacity in Year-3. The mine plan incorporates blending of the different rock types in order to minimize the variations in properties of the material that is sent to the plant and to supply a run-of-mine feed suitable for the desired pellet produced. The mine operation will be batched to provide a low silica feed when DR pellets are produced and the constraints will be removed for the production of BF pellets which have a higher silica tolerance.

During peak production, the total number of 180-tonne haul trucks is expected to reach ten (10), along with three (3) wheel loaders, three (3) production drills and a fleet of support and service equipment. The total mine workforce during peak production is expected to reach 191 employees.

1.15 Recovery Methods

1.15.1 Concentration

The process design for the concentration plant is based on extensive laboratory and pilot plant test work performed from 2005 to 2012 by NML and supplemented by suppliers' test work to support their equipment selection.

The process plant is designed to treat approximately 35 Mtpy of taconite ore (dry basis), at a DTWR of 27% and Fe grade of approximately 32%. Any hematite present will not be recovered as it is uneconomical to recover. Operating 360 days per year, 24 hours per day with an availability of 92%, (at a nominal rate of 4,334 t/h), the process plant will recover a nominal 8.7 Mtpy of concentrate (1,082 t/h, dry basis after flotation). The concentrate product quality will be such that DR grade and BF grade pellet feed can be produced as needed. The plant design is based on a 25-year plant life.

The basic process flow sheet consists of primary and secondary crushing and screening circuits feeding the concentrator. The first and main grinding stage uses two (2) passes of HPGRs in

closed circuit with screens and cobber magnetic separation. During this separation stage, a large amount of tailings are rejected. After cobbing, the liberation of the iron bearing mineral (magnetite) is completed in two (2) stages of Vertimill grinding. Two (2) additional stages of low intensity magnetic separators are also used. If needed, the magnetic separation concentrate is sent to the flotation circuit. The final concentrate is thickened and stored in slurry storage tanks prior to pressure filtration.

The combination of HPGRs with secondary crushing have been selected to replace the conventional SAG mill circuit for the primary grinding circuit. The main advantages of HPGR over other mills are their low energy consumption and the fact that they require no grinding media. NML has done extensive pilot scale testing of HPGR for the grinding of its taconite ore, which is a very hard and abrasive material and test work by all three major HPGR suppliers has been successful.

Depending on the product silica level required at the pellet plant, part or all of the concentrate will be floated. Final concentrate will be filtered for transportation via rail. During winter, drying will be required to achieve the moisture level of less than 4% that prevents freezing during the transportation to the port.

To produce low silica BF fluxed or DR grade pellets, the concentrate must contain 2.2% and 1.5% silica respectively so two flotation lines, each with roughers, regrind down to a P_{80} of 14 μm and cleaner magnetic separators have been added to reduce silica. The flotation circuit uses tank-type flotation cells. Regrinding will be performed in ultra-fine grinding mills.

All tailings will be dewatered by pressure filters and conveyed for dry stacking disposal to a dedicated storage pile.

1.15.2 Pelletizing

Outotec's mandate, during the Taconite Project Feasibility Study, was to engineer the additives preparation, balling and pelletizing for a pellet line with a capacity of 9.0 Mtpy complete with capital and operating cost estimates and design criteria. The plant will be located in Pointe-Noire adjacent to the stockyard and near the shipping facility.

Based on joint test work by SGA and Outotec in 2012, tests were undertaken in 2013 at Outotec's facility to fine-tune the design and provide a process guarantee for pelletizing plant throughput and pellet quality. The physical properties of the indurated pellets such as cold compression strength, tumble strength and Abrasion Index met or exceeded the desired levels in most tests, especially in the tests that were used as basis for plant design. The product specifications for BF pellets is presented in Figure 1.1 and for DR pellets at Figure 1.2. They are also provided in Section 19 of this Report.

After completion of the 2013 tests, Outotec issued a confirmation letter guaranteeing a nominal annual capacity of 8.5 Mtpy for the 816 m^2 pellet machine operating 330 days per year. It was also stated that the equipment is expected to ramp up to 9.0 Mtpy after a period

of stable and routine operation. The pelletizing line can produce low silica fluxed BF pellets or DR grade pellets.

For the purposes of this PFS, the production is divided as follows:

- Four (4) Mtpy of low silica BF pellets with 2.5% SiO₂; and
- Five (5) Mtpy of DR grade pellets with 1.8% SiO₂

The concentrate arrives by train from the mine site and is unloaded using the existing rotary car dumper at Pointe-Noire. The concentrate is conveyed to the ore storage sheds. From there, the concentrate is directed to the pellet plant feed bins.

The pellet plant includes wet grinding of dolomite and limestone and dry grinding of bentonite as well as feeding systems for organic binders, if required, for low silica DR grade pellets.

A proper mix of concentrate and additives is made into green balls which are screened to meet a tight size distribution specification and indurated into a 204 m long by 4 m wide induration furnace. The discharged pellets are screened and transported to the storage yard where they are stored according to their quality via dedicated conveying and stacking systems.

Pellets are reclaimed for ship loading via a bucket wheel reclaimer and are then conveyed to a shared multi-user dock managed by the Sept-Îles Port Authority capable of loading the full range of vessel sizes needed to reach global markets.

1.16 Project Infrastructure

1.16.1 High Voltage Electrical Distribution Network

Two (2) incoming lines at different voltage will feed each of the Project installation locations, being at mine site and at Pointe-Noire.

The KéMag mine site will be powered by a new 315 kV aerial power line. The expected power requirement is 130 MW at the mine and concentrator site.

The pellet plant requires approximately 35 MW of power in operation and will be fed from the existing Cliffs' pellet plant electric substation fed by Hydro-Québec.

1.16.2 Emergency Power Plant

The mine and process plant emergency loads will be supplied from a set of three (3) diesel generators. The facilities in Pointe-Noire will be equipped with a similar arrangement of diesel generators properly sized to cover all the emergency load requirements.

1.16.3 Explosives Preparation and Storage

All required turn-key infrastructure for the manufacturing and the delivery of bulk explosives as well as for a down-the-hole blasting service will be provided and executed by an explosives supplier. The explosives plant will consist as a minimum of an emulsion plant, a storage area for ammonium nitrate, emulsion and explosives and the support installations.

1.16.4 Roads

The main access road from Schefferville to the mine site will be designed to permit heavy traffic to circulate at normal speed as regulated by provincial governments. The existing gravel road from Schefferville to the mine site will be upgraded.

Access for mine haul trucks and other large equipment to maintenance facilities, diesel fuel service and primary crushing areas are by mine roadways designed according to standard regulations and practice.

Plant roads are used for normal operation traffic, which consists of light vehicles, small personnel buses and freight transport trucks. Site access roads are provided for the main entrance to the facility in order to allow delivery of materials, large personnel buses, and light vehicle traffic. Plant roads and access roads have provision for two-way traffic.

At Pointe-Noire, the main access to the facilities will be from provincial highway 138. On-site roads will provide access to all facilities including the water treatment pond and access along the site security fence.

1.16.5 Process Water Pumping Station

A process water pumping station is installed inside the process plant with two horizontal pumps. Each pump delivers the water necessary for one ore processing line.

The make-up water for the process plant comes from the site water collection and treatment system. When there is insufficient water from this system, fresh water from the Goodwood River will be used.

The main contributor to the process water basin is the overflow of the tailings thickener. It flows by gravity into the pumping station basin. Some additional water comes from the flotation water pump station.

1.16.6 Temporary Construction Camps

Lodging requirements are estimated based on the total construction hours for the Project and the planned schedule. The construction camp at the mine site is presently sized to 1,000 rooms which includes 350 beds from the site's permanent accommodation complex. The camp design includes all required ancillary facilities such as catering, recreational rooms and other amenities.

1.16.7 Permanent Accommodation Complex

The permanent accommodation complex will be designed to meet the sleeping, hygiene, dining and recreational requirements for 350 workers and future employees. Each room will be equipped with shower/water closets and all furniture and related equipment. The central kitchen is used to prepare all meals that are served in the central dining area for the operations personnel.

1.16.8 Railway

The concentrate will be transported by rail from the mine site to the pellet plant at Pointe-Noire. A new 80 km section of rail will be required from the existing Tshuetin Rail Transportation Inc. (TSH) line to the mine site. A new rail loop will be required at the mine site for loading of the concentrate into 100 t railcars and new sidings required to receive materials and supplies.

The new railway will connect to the TSH line down to Emeril at which point, the Québec North Shore and Labrador Railway (QNS&L) line will be utilized to transport the concentrate to Sept Îles and then on the Chemin de Fer Arnaud (“CFA”) to Pointe-Noire.

The train size will consist of 240 cars transporting approximately 24,000 tonnes of concentrate. Five (5) sets of railcars are required to transport the required tonnages on a consistent schedule.

At Pointe Noire, railcars will be unloaded by a multi-user car dumper and concentrate conveyed to the pellet plant storage shed. Unloading services will be provided by a common service provider.

1.16.9 Product Storage and Ship Loading

Products from the pellet plant are transported to the former Cliffs’ storage yard owned by the Government of Québec. The pellets will be reclaimed by a bucket wheel reclaimer and transported to ship loaders via conveyors to the transfer tower and ship loading system that will be operated by the Sept-Îles Port Authority. Pellet storage and reclaim will be a contracted service provided by the operator of the common train unloading, product storage and reclaim facility.

1.16.10 Maintenance Facilities

The mine trucks and light vehicles garage and warehouse area is designed for the maintenance of heavy equipment with flexibility to service light vehicles. It includes a mine truck washing and tire changing facility.

The port facilities’ existing maintenance workshop and main warehouse are sized to support the pellet plant and other port operations equipment on a leased basis.

The railcars and locomotives will be maintained using the existing CFA maintenance shop through a rental or a contractual services agreement.

1.16.11 Fuel Storage

Three (3) diesel storage tanks provide sufficient capacity for mine and process plant operations. Two (2) vehicle refuel stations are provided. One is dedicated to mine trucks and one to light vehicles. Two diesel tanks will be dedicated to provide sufficient capacity for the drying of the concentrate during the winter months.

Bunker C oil storage at the port will be done with the existing Wabush Mines Bunker C storage tanks. A Bunker C delivery will be sufficient to supply the pellet plant for 8 months of operation which is the expected size of ships plus some reserve.

Emergency power plant diesel fuel day tanks provide fuel for diesel generator sets at both sites.

1.17 Marketing

NuTac is a pellet supply opportunity underpinned by changes in ironmaking production and practices that continue to structurally increase the consumption of pellets globally even through periods of market volatility.

The NuTac project would be a competitive new producer of pellets in terms of cost and product quality, with the ability to supply high quality grades for both the blast furnace (BF) and direct reduced iron (DRI) production routes for steelmaking, and to a diversified portfolio of customers across Europe, the Americas, the Middle East/North Africa (“MENA”) and Asia.

There are growing changes in the way steel is made with focus on cleaner and optimized primary ironmaking operations. As a result, the following technical and environmental developments are structurally increasing the use of pellets globally:

- Productivity improvement in BF operations with pellets as a higher quality alternative to lump or sinter, or as a low-silica input that reduces slag volumes and, in turn, coke consumption;
- Addressing environmental concerns as BF operations and sinter plants come under pressure for emissions, a noteworthy development in China, where domestic pellet plants could also be affected;
- New demand from DRI-based EAF steelmaking, especially in the Americas and MENA, where cheap natural gas makes DRI production attractive.

It is acknowledged that the steel and iron ore industries are presently in a period of adjustment as the rate of economic growth in China slows, measures are taken globally to reduce excess steelmaking capacity, and increased production from expansions and new projects in Australia and Brazil continues to oversupply the fines segment of the iron ore market. However, as demonstrated through the steadiness of the pellet price premium structure, the pellet supply side capacity is more limited.

Figure 1.1 – Physical Properties of BF Grade Fluxed Pellet

SGA Studiengesellschaft für Eisenerzaufbereitung GmbH & Co. KG

Pellet test No.:	A 7228 - No. 19	
Physical properties		
<u>Crushing strength, ISO 4700</u>		
Mean	[daN/p]	275
Portion <150 daN/p	[% <150daN/p]	9,5
<u>ISO-tumbler test, ISO 3271</u>		
Strength >6.3 mm	[%]	95,5
Abrasion <0,5 mm	[%]	4,0
Chemical analysis		
Fe _{tot}	[%]	66,42
SiO ₂	[%]	2,44
Al ₂ O ₃	[%]	0,13
CaO	[%]	2,04
MgO	[%]	0,15
P	[%]	0,005
S	[%]	<0,01
Na ₂ O	[%]	0,010
K ₂ O	[%]	0,010
Mn	[%]	0,135
TiO ₂	[%]	0,017
V	[%]	0,004
L.O.I	[%]	0,04
Basicity CaO/SiO ₂	[]	0,84
Metallurgical properties		
<u>Reduction under load RUL, ISO 7992</u>		
Reducibility R ₄₀	[%/min]	1,35
dp ₈₀	[mmWG]	2
<u>Reducibility, ISO 4695</u>		
Reducibility R ₄₀	[%/min]	1,12
<u>Swelling index, ISO 4698</u>		
Volume increase by buoyancy method	[%]	16,3
<u>Static Disintegration, ISO 4696-1</u>		
Strength >6.3mm	[%]	93,8
Index <3.15mm	[%]	5,0
Abrasion <0.5mm	[%]	4,3
<u>Dynamic Low Temp. Disint. LTD, ISO 13930</u>		
Strength >6.3mm	[%]	84,9
Index <3.15mm	[%]	8,0
Abrasion <0.5mm	[%]	6,4
<p>Physical, chemical and metallurgical properties of KéMag BF grade fluxed pellet (Pot grate Test No. 19, August 2012)</p>		

A7228_NML_KeMag-Pelletizing-2012_results.xlsm (KeMag-BF)

Figure 1.2 – Physical Properties of DR Grade Pellet

SGA Studiengesellschaft für Eisenerzaufbereitung GmbH & Co. KG

Pellet test No.:	A 7228 - No. 5	
Physical properties		
<u>Screen analysis</u>		
+16 mm	[%] [cum.%]	0,1 / 0,1
+12.5 mm	[%] [cum.%]	43,0 / 43,1
+10 mm	[%] [cum.%]	55,4 / 98,5
+ 8 mm	[%] [cum.%]	1,2 / 99,7
<u>Crushing strength, ISO 4700</u>		
Mean	[daN/p]	310
Portion <150 daN/P	[% <150daN/p]	7,2
<u>ISO-tumbler test, ISO 3271</u>		
Strength >6.3 mm	[%]	96,3
Abrasion <0,5 mm	[%]	2,8
Chemical analysis		
Fe _{tot}	[%]	67,92
SiO ₂	[%]	1,78
Al ₂ O ₃	[%]	0,12
CaO	[%]	0,68
MgO	[%]	0,12
P	[%]	0,004
S	[%]	<0,005
Na ₂ O	[%]	0,019
K ₂ O	[%]	0,008
Mn	[%]	0,124
TiO ₂	[%]	0,016
V	[%]	0,004
L.O.I	[%]	0,03
Basicity CaO/SiO ₂	[]	0,38
Metallurgical properties		
<u>Sticking test, ISO 11256 (on coated pellets)</u>		
Clustering index CI	[%]	4,0
<u>Disintegration and Metallisation, ISO 11257</u>		
<u>"MIDREX-LINDER-Test"</u>		
Red.-disint. index (RDI _{DR}) <3.15 mm	[%]	3,0
Metallisation	[%]	95,5
Fe _{met} / Fe _{tot}	[%]	89,51 93,73
<u>Reducibility, ISO 11258</u>		
Reducibility R ₄₀ / R ₉₀	[%/min]	1,23 0,23
Metallisation	[%]	88,1
Fe _{met} / Fe _{tot}	[%]	81,25 92,27
Physical, chemical and metallurgical properties of KéMag DR grade pellet (Pot grate Test No. 5, August 2012)		

A7228_NML_KeMag-Pelletizing-2012_results.xlsx (KeMag-DR)

1.18 Environmental Studies, Permitting and Social or Community Impact

1.18.1 Applicable Environmental Assessment Regimes and Permitting

The Project is expected to trigger the environmental assessment (“EA”) regimes of general application established by the Canadian Environmental Assessment Act 2012, the *Loi sur la qualité de l’environnement* of the Government of Québec, and the Environmental Protection Act of the Government of Newfoundland and Labrador, in addition to the regime of Section 23 of the James Bay and Northern Québec Agreement.

Once the regulatory authorities have released NuTac from further EA, the applications for the various permits that are required for site-preparation and construction can begin to be filed, followed by applications for permits for the start of operations. In order to expedite the start of construction, preparation of the permit applications can begin before the completion of the EA.

1.18.2 Baseline Data Collection and Environmental Impact Statement Status

NuTac is a variant of the Taconite Project (“TP”), for which much of the baseline data have been collected and analyzed and part of the EIS has been drafted.

Given that the study areas of NuTac overlap to a large degree with those of the TP, much of the baseline data collection/analysis and EIS drafting done to date can be used to a significant degree in the NuTac EA.

1.18.3 Timetable

The tentative timetable for the filing of the EIS starting from the filing of the Project Description is 15-18 months.

The tentative timetable for the EA releases starting from the tabling of the EIS is 24 months.

1.18.4 Communities

Six Aboriginal groups are potentially affected by NuTac: Naskapi Nation of Kawawachikamach, Nation Innu Matimekush-Lac John, Innu Takuaihan Uashat mak Mani-Utenam, Inuit of Kuujjuaq, Innu Nation and NunatuKavut Community Council.

Two non-Native communities, Ville de Schefferville and Ville de Sept-Îles, would be directly affected, while other non-Native communities would be indirectly affected, mainly in terms of positive economic impacts.

1.18.5 Potential Impacts, Mitigation and Monitoring

It is anticipated that all the potentially adverse impacts can be mitigated to a satisfactory degree. Monitoring programs would ensure that the mitigation measures are effective.

1.19 Capital and Operating Costs

1.19.1 Capital Costs Estimate (Capex)

The Capex estimate for the NuTac Project is based on data derived from the capital costs finalized in February 2013 for the KéMag feasibility study, and prepared for the Taconite Project NI 43-101 Technical Report submitted in May 2014. That Capex estimate was based on a higher concentrate and pellet production.

The current Capex has been further adjusted based on the design improvements adopted since May 2014 and on the new production quantities of concentrate and pellets. Additional pricing was obtained from suppliers to verify current pricing and numbers adjusted to a February 2016 basis.

The Project includes the mine, process plant, rail loadout facilities and a new railroad spur starting at the KéMag mine/concentrator site and continuing on the existing railway network to a pellet plant at a multi-user port in Pointe-Noire, Québec.

The Capex shown in Table 1.3 has been developed on the basis of a number of engineering, procurement and construction management (EPCM) contractors that will provide the design, procurement and construction activities for the Project. All EPCM contractors will be managed by the Owner's Team.

Table 1.3 – Capital Cost Estimate Summary

Cat	Area	Direct	Indirects / Contingency	Total Cost
1000	Mine Area	149,793	Incl	\$149,793
2000	ROM Crushing, Storage and Reclaim	162,607	65,043	\$227,650
3000	Concentration (Grinding, Separation & Upgrade)	372,596	149,038	\$521,634
4000	Tailings Disposal and Water Management	152,919	61,168	\$214,087
5000	Train Load out, Concentrate Drying and Rail	284,286	113,714	\$398,000
	Rail Cars	108,000	Incl	\$108,000
6200	Pellet Plant (Outotech Package)	618,550	204,121	\$822,671
8100	Infrastructure and Utilities – Mine Site	188,304	75,322	\$263,626
	Powerline to Mine Site	303,000	Incl	\$303,000
8200	Infrastructure and Utilities – Pellet Plant and Port	84,569	27,908	\$112,477
	Owner's cost	0	98,628	\$98,628
	Total Costs	2,424,624	794,941	3,219,566

1.19.2 Basis of Estimate

The estimated Capex is based on the following key assumptions:

- Use of existing facilities where applicable such as railways, port infrastructure, car dumping, storage yards etc.;
- A project strategy using the latest successful project execution methods;
- Modularization to the extent possible;
- The estimate is expressed in February 2016 Canadian Dollars (CAD);
- The Capex consists of items quoted in various foreign currencies that have been converted into CAD using exchange rates as of February 2016. The vast majority of pricing for equipment and bulk materials are based on CAD. Table 1.4 shows the currency exchange rates and the percentage content for different currencies and the percent content of costs for each of the listed currencies;

Table 1.4 – Currency Exchange Rates and Percent Content

Currency Code	Currency Name	Canada	Percent Content
CAD	Canadian Dollar	1.00	84%
USD	US Dollar	1.35	10%
EUR	Euro	1.50	6%

- The proposed construction work week is on the basis of 60-hours with rotations of 21 days in followed by seven (7) days out.

1.19.3 Operating Costs (Opex)

The Opex was developed for each component of the Project and is presented in detail in Section 21.0. The costs at Year 4 of operation are summarized in Table 1.5 below.

The Opex presented is based on the estimated utilization of consumables, reagents and power. Maintenance supplies cost factors were used for buildings and regular equipment maintenance parts. Vendor data were used where possible. The accuracy level is in the range of $\pm 15\%$. The Opex has been updated to comply with the latest flow sheet and equipment selection.

The currency exchange rates applied are the same rates used for the Capex presented in this section.

The base date of the operating cost estimate is February 2016. The Capex used for factoring operating supplies, maintenance of buildings and of fixed equipment was updated in February 2016. The Bunker C fuel oil is based on a price of \$60 US per barrel and the diesel cost is \$1/l delivered at mine site.

Table 1.5 – Summary of Estimated Opex by Area

Areas	Description	Costs for LOM (\$'000)	Unit Costs (\$)	Units
1000	Mine	1,862,292	8.46	per tonne of pellets
2000/3000/4000	Crushing, concentration and tailings management	2,481,111	11.27	per tonne of pellets
5000	Concentrate Drying and Loadout	696,258	3.16	Per tonne of pellets
5000	Concentrate transportation	3,722,787	16.92	per tonne of pellets
6100/6200	Pelletizing plant	2,735,884	12.43	per tonne of pellets
6300/6600	Port operation	747,503	3.40	per tonne of pellets
8000	G&A and infrastructure	1,061,493	4.82	per tonne of pellets
Unit Cost for Pellets			60.46	per tonne of pellets
Note: IBAs cost not included in unit costs				

Table 1.6 presents the Project operating labour force at Year-4 of operation.

Table 1.6 – Labour Force Year-4

Area	Total
Mine	187
Concentrator	148
Concentrate Drying and Loadout	20
Pellet Plant (Port)	169
General Administration and Infrastructure	110
Total	634

The organizational structure for the operations phase is designed to support the successful operation of an iron ore mine and beneficiation plant in a remote location, a rail transportation system and a pelletizing facility with associated material handling systems, while producing high quality and cost competitive iron ore pellets.

1.20 Economic Analysis

The economic/financial assessment of the Project is based on first-quarter 2016 price projections and cost estimates in Canadian currency. An exchange rate of USD/CAD 0.80 is assumed for long-term sales of pellets.

No provision is made for the effects of inflation. The evaluation is carried out on a 100 % equity basis. Current Canadian tax regulations are applied to assess the corporate tax liabilities, while

the recently adopted regulations in Québec (originally proposed as Bill 55, December 2013) are applied to assess the provincial mining tax liabilities.

The assessment of the Project assumes that all infrastructure elements are capitalized except for third party owned systems in Pointe-Noire which were recently acquired by the Government of Québec from Cliffs. The financial indicators under base case conditions are presented in Table 1.7.

Table 1.7 – Base Case Financial Results (100 % Equity)

Financial Indicators	Results	Units
Before-tax Net Present Value (“NPV”) @ 8 %	1,319.5	\$M
After-tax NPV @8 %	482.6	\$M
Before-tax Internal Rate of Return (“IRR”)	12.2	%
After-tax IRR	9.8	%
Before-tax Payback Period	7.1	Years
After-tax Payback Period	7.6	Years

A sensitivity analysis reveals that the Project’s viability is not significantly vulnerable to variations in capital and operating costs, within the margins of error associated with PFS estimates. However, the Project’s viability remains vulnerable to the larger uncertainty in future sale prices and the USD/CAD exchange rate.

The complete text of the Economic Analysis can be seen in Section 22.0.

1.20.1 Financial Model and Results

Table 1.8 presents the financial analysis results on a before-tax basis.

Table 1.9 presents the financial analysis results on an after-tax basis. The first five (5) lines of Table 1.8 (i.e., total revenue to total sustaining capital) are not reproduced in Table 1.9 because they are identical.

Table 1.8 – Before-tax Financial Indicators

Before-tax Financial Indicators	Results (\$M)
Total LOM Revenue	27,456.4
Total LOM Operating Costs*	13,733.0
Initial Capital Cost	3,219.6
Total LOM Sustaining Capital	537.3
Closure Costs	100.0
Total Cash Flow	9,866.5
NPV @ 8 %	1,319.5
NPV @ 10 %	565.8
NPV @ 12 %	34.7
IRR	12.2%
Payback Period	7.1 Years

* Includes Agreement payments

Table 1.9 – After-tax Financial Indicators

After-tax Financial Indicators	Results (\$M)
Total LOM Corporate Taxes	2,358.6
Total LOM Mining Taxes	1,147.1
Total Cash Flow	6,360.9
Net Present Value @ 8 %	482.6
Net Present Value @ 10 %	-44.5
Net Present Value @ 12 %	-417.1
Internal Rate of Return	9.8%
Payback Period	7.6 Years

1.20.2 Sensitivity Analysis

A sensitivity analysis was carried out on the base case scenario described above to assess the impact of changes in market prices (across-the-board variations in pellet prices), total pre-production capital cost and operating costs on the Project's NPV @ 8% discount rate and IRR. Each variable was examined one-at-a-time. An interval of $\pm 30\%$ with increments of 10% was used for all three (3) variables. It is to be noted that the margin of error for cost estimates at

the pre-feasibility study level is typically $\pm 25\%$. However, the uncertainty in price forecasts usually remains significantly higher, and is a function of price volatility.

The before-tax results of the sensitivity analysis are shown in Figure 1.3 and Figure 1.4. Figure 1.3, showing variations in NPV, 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 NPV is more sensitive to variations in operating expenses than it is to capital expenditure, as shown by the steeper curve. As expected however, the NPV is most sensitive to variations in product prices. Across-the-board reductions of about 16.3% in prices result in break-even conditions, i.e., a net present value of zero.

Figure 1.3 – Sensitivity of the Before-Tax Net Present Value

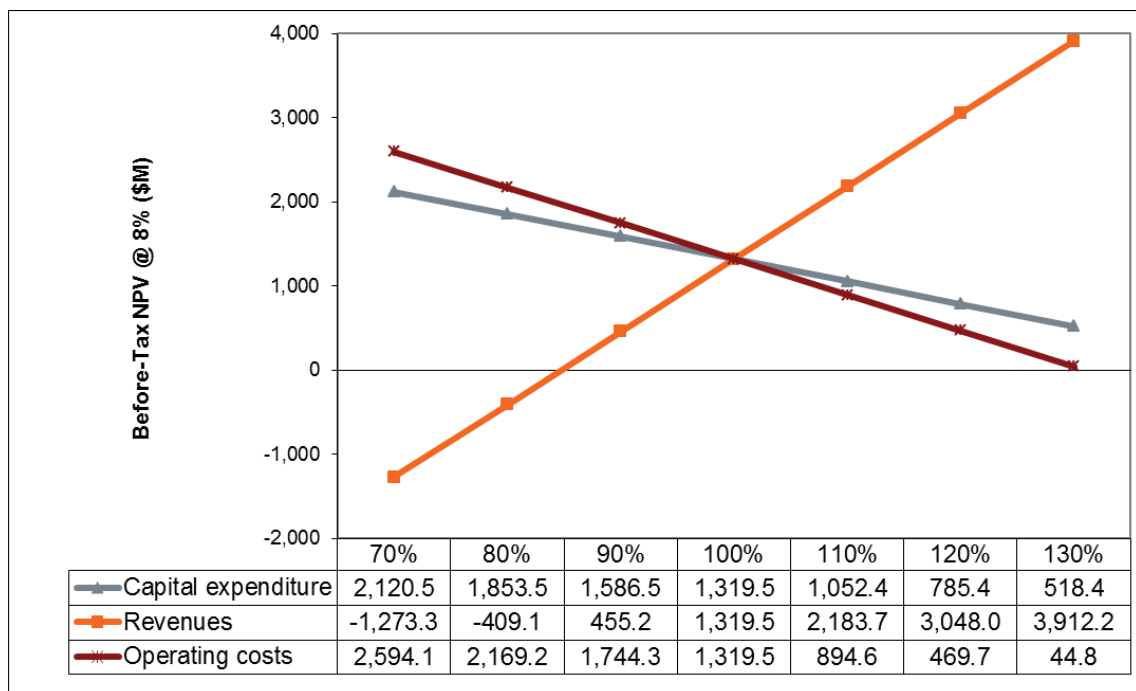


Figure 1.4 showing variations in IRR provides similar conclusions. In contrast with Figure 1.3 which shows linear variations in NPV for the three (3) variables studied, variations associated with IRR are not linear. Due to the different timing of pre-production capital expenditure versus operating expenses over the mine life, the IRR is more sensitive to negative variations in capital expenditure. The IRR is reduced to 8%, i.e., break-even conditions (shown by the horizontal dashed line), for the same across-the-board reductions in prices as noted above in the case of the NPV.

The after-tax results of the sensitivity analysis are shown in Figure 1.5 and Figure 1.6. The same conclusions about the sensitivity of the Project's viability to variations in capital expenditure, operating expenses and prices can be drawn here. On an after-tax basis however, break-even

conditions are reached at across-the-board reductions in prices of 8.5%. As well, it can be seen that the Projects breaks-even for variations in operating expenses of about +30%.

Figure 1.4 – Sensitivity of the Before-Tax Internal Rate of Return

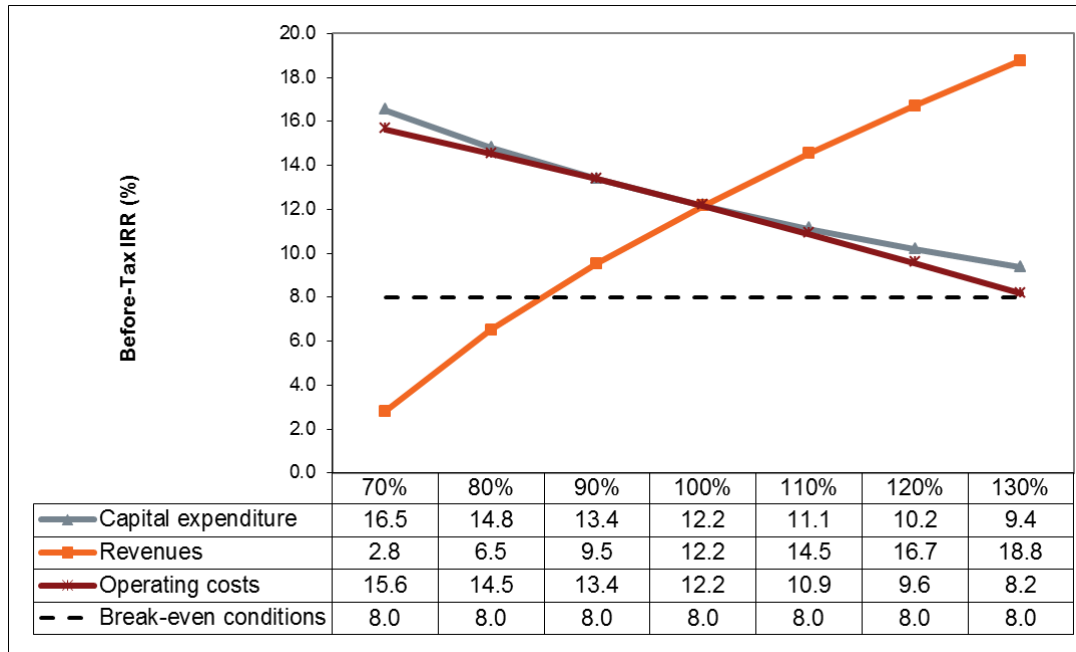


Figure 1.5 – Sensitivity of the After-tax Net Present Value

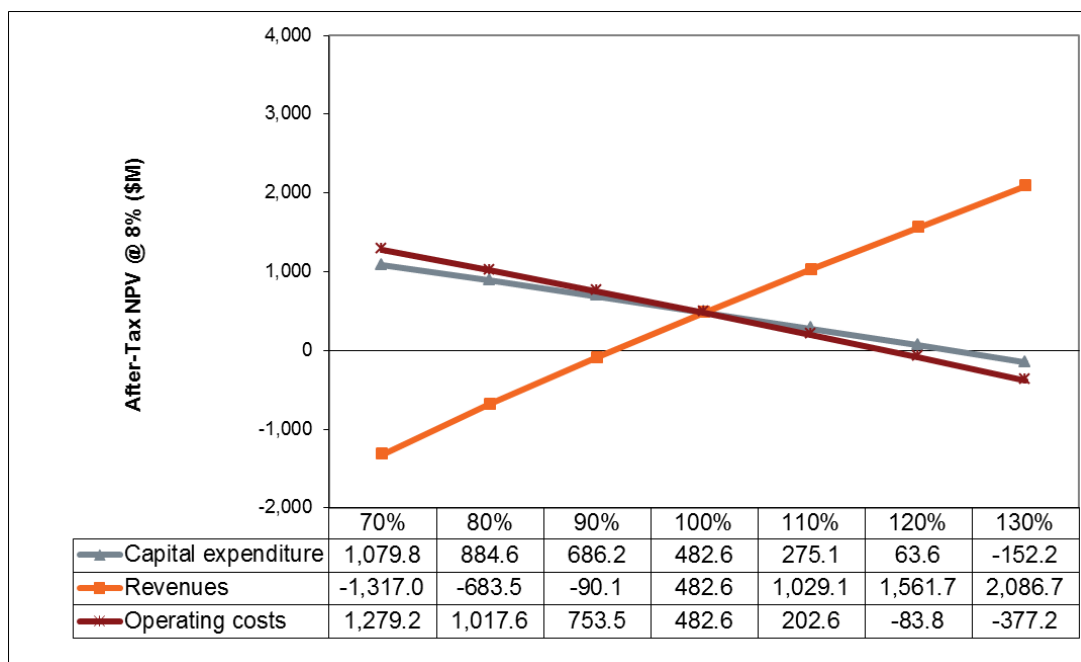
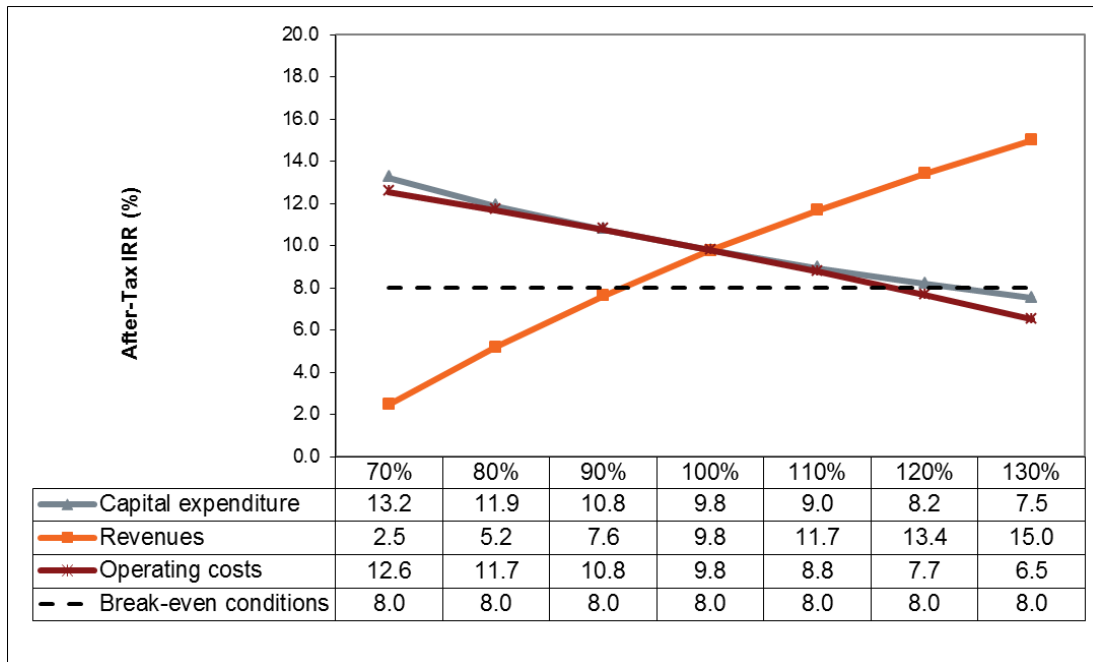


Figure 1.6 – Sensitivity of the After-tax Internal Rate of Return



1.21 Adjacent Properties

The Property is surrounded on all sides by claims held by NML, except for a block of adjacent claims at the southeastern boundary registered under Tata Steel Minerals Canada (in which NML has a 6% ownership interest). The southeastern limit of the KéMag Property follows the Québec-Labrador boundary and abuts against the licenses held by NML, Tata Steel Minerals Canada and LabMag Limited Partnership, the latter hosting the LabMag iron deposit.

1.22 Other Relevant Data and Information

1.22.1 Schedule

A Project master schedule for the Feasibility Study has been developed to cover the major Project milestones. The Project master schedule contains engineering, procurement, construction and pre-operational testing and commissioning activities at a level of detail commensurate with the progress of scope definition.

The major milestones have been tabulated in Table 1.10 showing the Project activities through its cycle.

Table 1.10 – Major Milestones

Description	Duration	Month from Project Description
Stage 1 Financing Secured		-2
Start of FS and Tabling of Project Description		0
Final FS Study and NI 43-101	18	18
Tabling of EIS	18	18
Project Approval	1	19
Stage 2 Financing Secured	3	21
Start Basic Engineering	10	24
EIS Acceptance		34
Geotechnical Survey Completed	8	37
Procurement Start	8	37
EA Releases		42
Stage 3 Approval and Full Project Funding	4	43
Start Detailed Engineering	18	43
Start Construction	32	46
End of Construction		78
Plant Commercial Operation Start	7	85

1.22.2 Project Execution Plan

The project execution plan has been developed based on a number of EPCM contractors under the direction of a strong Owner’s team. The plan anticipates that the basic engineering activities will be carried out during the EA process and detail engineering activities can commence promptly following EA Release. This is described in detail in Section 24.0.

1.23 Interpretation and Conclusions

The Project is technically feasible and economically viable given the right product pricing environment. Ore can be mined, treated and delivered into export vessels by incorporating proven processes, technologies and infrastructure either in place or near completion.

Based on 25-year cash-flow, the IRR before taxes is 12.2% and 9.8% after taxes assuming 100% equity and standard mining income taxes.

1.23.1 Project Highlights

The geology and mineral reserve are well known and can supply a consistent quality run of mine ore to the concentrator for 25 years of production and possibly much longer.

The process has been developed after extensive test work and by experienced process engineers, although refinements and confirmation of certain processing steps are possible. There is enough confidence in the flow sheets so that refinements and optimization can be undertaken during the feasibility study phase.

Dry stacking of tailings can be engineered to meet and exceed environmental requirements while remaining economically viable.

Concentrate transportation to the port will be by existing rail and a new rail spur extension of 80 km.

Pelletizing testing has confirmed high plant throughput and the laboratory pellets produced met or exceeded all quality requirement for marketing.

The new multi-user dock with a capacity of 50 Mtpy and capability of handling 350,000 DWT vessels will be available for ship loading. The product handling facilities will connect to this deep-water port terminal for which NML has advanced funds in order to secure shiploading capacity at favourable rates.

The Project is expected to trigger several regimes of EA. An EIS is proposed to be prepared during the feasibility study phase and tabled soon thereafter.

The construction strategy of using pre-engineered structures, skid mounted equipment and modularization to the maximum extent allowed by the transportation routes to the mine site is expected to lower the risk of cost and schedule overruns.

1.23.2 Risk Evaluation

A risk review was conducted to identify risks, mitigations and action plans in the PFS phase to pursue in the next study phase. The outcome of this review is compiled in a risk register and an action plan formulated for the Project.

1.23.3 Principal Risks

- Mining below Lac Harris although the area impacted is limited in the 25-year mine plan while the lake is shallow and its flow can be maintained;
- Concentrate freezing during transportation to the port although the tests indicate this can be managed by partial drying below 4% moisture in winter
- Government environmental approvals and permitting,
- Developing partnerships for off-take agreement and project financing

1.23.4 Conclusion and Next Phase

The next project development phase would be to undertake a feasibility study for the Nutac project as well as to initiate the EIS. Early identification of construction techniques to maximize pre-assembly of concrete, steel, equipment, and any other means of reducing the installation time on site, is paramount for a successful project.

Early in the Project's lifecycle, an experienced construction engineering team should review the design layouts, specifications, objectives and site conditions to work with the design engineers to establish possible guidelines to standardize buildings, foundations and any other criteria to minimize labour costs and impact on schedules.

During the feasibility study, the construction team should also work very closely with the logistics group to determine the ideal transportation and construction philosophy for the engineering team.

In summary, during the next phases of the Project development, the following construction activities should be considered:

- Establish the Project execution strategy based on recent successful projects;
- Incorporate an analysis of operations and maintenance into the facility design;
- Review site conditions and access;
- Audit of condition of existing facilities and scope and estimate of improvements;
- Design development considering construction details and strategy;
- Design quality control;
- Standardize, modularize, coordinate and involve suppliers, consultants and subcontractors;
- Complete the 3D model of the plant and facilities; and
- Refine the scheduling strategy.

1.24 Recommendations

Based on the Project economic results and a balanced market outlook, it is recommended to proceed with a feasibility study and preparation of the EIS. It is also recommended to execute test work and field surveys that are required to support basic engineering. Topographical surveys would be best executed prior to the basic and detailed engineering activities. Table 1.11 presents an estimate of the costs for the next Project phase excluding the costs of owner's team.

At this stage, there are areas of lesser definition that need to be developed on, before, or during the feasibility study stage. The main areas are:

- Mine dewatering (hydrogeology);
- Detailed logistics survey and transportation of materials and modules to the mine site and specifically over the Menihok Dam.

Field work and test work must be done, as required, in each area of lesser definition. This will be followed by trade-offs and complementary studies required for basic engineering for each of the facilities. During that period of time, the Owner(s) must establish a Project team and carry out the EA process.

Table 1.11 – Cost Estimate of Next Phase

	\$ Millions
NuTac Feasibility Study	5.60
Powerline FS (Hydro-Québec)*	6.00
EIS preparation	7.80
EA releases	2.41
Others**	3.55
Total	25.36

* Includes powerline EIS/EA done by Hydro-Québec

** Test work, geotechnical investigations, contingency

Additional recommended work for the next phase is provided in Section 26.0.

2.0 INTRODUCTION

In September 2015, New Millennium Iron Corp. (“NML”) commissioned a Pre-Feasibility Study (“PFS”) to explore the development of one of its taconite deposits in the Millennium Iron Range, which is a 210 km belt located near Schefferville, Québec, that has resources in both the Province of Newfoundland and Labrador and the Province of Québec.

Following the submission of the KéMag Taconite Project, which was managed by Innu SNC Lavalin Partnership (“ISLLP”), a National Instrument 43-101 (“NI 43-101”) Technical Report (“Taconite FS”) of the study was prepared by Met-Chem Canada Inc. and filed on SEDAR on May 12, 2014. Since then, a number of macro-economic conditions have changed including pricing in the iron ore market due to a general slowdown in the world economy and especially in China.

These changes prompted NML to rescope the original KéMag Project to a smaller scale project that better suits the current market environment and has a reduced overall initial capital requirement. In addition, this project takes advantage of improvements to the process design that were developed following the Taconite FS as well of other improvements that reduce the capital and operating costs. It also uses existing infrastructure capacity that appeared unavailable at the time of NML’s earlier taconite development studies.

This project is appropriately called NuTac-KéMag (NuTac) and it has as its foundation key elements and information from the Taconite FS.

While NML has maintained much of the original design of the Taconite feasibility study, there are many changes that have been made in this new pre-feasibility study. Table 2.1 outlines the major design differences between the Taconite FS and the NuTac PFS.

Other than the major differences shown in Table 2.1, two additional preliminary studies were conducted. The first preliminary study was to determine whether to locate the pellet plant at the mine site or at the Port of Sept-Îles. It was determined that the ideal location is at the port.

The second preliminary study was to determine the optimal power supply arrangement. This included a study of a power line feed from Hydro-Québec (either High Voltage Alternating Current or High Voltage Direct Current) or alternatively, the use of a power plant at the mine site. It was determined that the High Voltage Alternating Current power line feed was the most economical option and was retained for the PFS.

Table 2.1 – Major Design Differences (Taconite vs NuTac)

Item	Description	Taconite FS	NuTac PFS
1	Production Capacity	12 Mtpy BF Pellets 5 Mtpy DR Pellets 6 Mtpy concentrate	4 Mtpy BF Pellets 5 Mtpy DR Pellets
2	Mining	87 Mtpy plant feed with 20 Mtpy low grade material stockpiled + balanced waste mining	35 Mtpy plant feed with no low grade stockpiling and reduced and deferred waste mining
3	Crushing	1 permanent crushing station with 2 crushers	2 semi mobile in-pit crushers
4	Concentration Plant	Traditional HPGR and Ball Mill process	Improved HPGR and Vertimill process
5	Concentrate Filtration	22 Mtpy capillary filtration	8.7 Mtpy pressure filtration
6	Tailings Disposal	Coarse tailings filtered Fine tailings in a traditional pond	Combined tailings filtration and dry stacking
7	Pellet Plant Location	At Pointe-Noire - Independent on greenfield land	At Pointe-Noire - Use of existing GoQ infrastructure - brownfield
8	Transportation	620 km slurry pipeline	Existing railway network + rail spur connection to mine site
9	Power Supply (Mine Site)	Powerline @ 315 MW	Powerline @ 130 MW

3.0 RELIANCE ON OTHER EXPERTS

The authors have compiled this report using information contained in the previous FS on KéMag, in consultants' reports and other documents supporting this Pre-Feasibility Study.

NML contracted BBA Inc., Met-Chem Canada Inc, Lamont Inc., J. Poveromo and M. Bilodeau to provide independent verification of the work by NML. Each of the independent qualified persons identified above and in the table presented below, have worked on the KéMag Project from 2009 through 2016 and have intimate knowledge of the sections of the Report for which they are responsible.

The expertise and certificate of authorship of each Independent Qualified Person is included in this NI 43-101 Technical Report. The section(s) reviewed by each Independent Qualified Person are shown in Table 3.1.

The independent QPs have not verified the legal titles to the Property nor any underlying agreement(s) that may exist concerning the licenses or other agreement(s) between third parties, but has relied on NML to have conducted the proper legal due diligence.

Any statements and opinions expressed in this document are given in good faith and in the belief that such statements and opinions are not false or misleading at the effective date of this Report.

Table 3.1 – Qualified Persons for KéMag NI 43-101 Technical Report

Section	Title	A. Grandillo (BBA)	J. Cassoff (BBA)	Y. Buro (MC)	S. Ibrango (MC)	A. Lamontagne	J. Poveromo	M. Bilodeau
1	Summary	X	X	X	X	X	X	X
1.1	Introduction	X						
1.2	Property Description and Location			X				
1.3	Accessibility, Climate			X				
1.4	History			X				
1.5	Geology Setting and Mineralization			X				
1.6	Deposit Type			X				
1.7	Exploration			X				
1.8	Drilling			X				
1.9	Sample Preparation			X				
1.10	Data Verification			X				
1.11	Metallurgical Testing	X						
1.12	Mineral Resources Estimate				X			
1.13	Mineral Reserves Estimate		X					
1.14	Mining Methods		X					

Section	Title	A. Grandillo (BBA)	J. Cassoff (BBA)	Y. Buro (MC)	S. Ibrango (MC)	A. Lamontagne	J. Poveromo	M. Bilodeau
1.15	Recovery Methods	X						
1.16	Project Infrastructure	X						
1.17	Market Studies and Contracts						X	
1.18	Environmental Studies					X		
1.19	Capital and Operating Costs	X	X					
1.20	Economic Evaluation							X
1.21	Adjacent Properties			X				
1.22	Other Relevant Data and Information	X				X		
1.23	Interpretation and Conclusions	X	X	X	X	X	X	X
1.24	Recommendations	X	X	X	X	X	X	X
2	Introduction	X						
3	Reliance on Other Experts	X						
4	Property Description and Location			X				
5	Accessibility, Climate, Local Resources			X				
6	History			X				
7	Geological Setting and Mineralization			X				
8	Deposit Types			X				
9	Exploration			X				
10	Drilling			X				
11	Sample Preparation, Analysis and Security			X				
12	Data Verification			X				
13	Mineral Processing and Metallurgical Testing	X						
14	Mineral Resources Estimates				X			
15	Mineral Reserves Estimates		X					
16	Mining Methods		X					
17	Recovery Methods	X						
18	Infrastructure	X						
19	Market Studies and Contracts						X	
20	Environmental Studies, Permitting and Social					X		
21	Capital and Operating Costs	X	X					
22	Economic Analysis							X
23	Adjacent Properties			X				
24	Other Relevant Data or Information	X				X		
25	Interpretation and Conclusions	X	X	X	X	X	X	X
26	Recommendations	X	X	X	X	X	X	X
27	References	X		X		X		

4.0 PROPERTY DESCRIPTION AND LOCATION

4.1 Location and Access

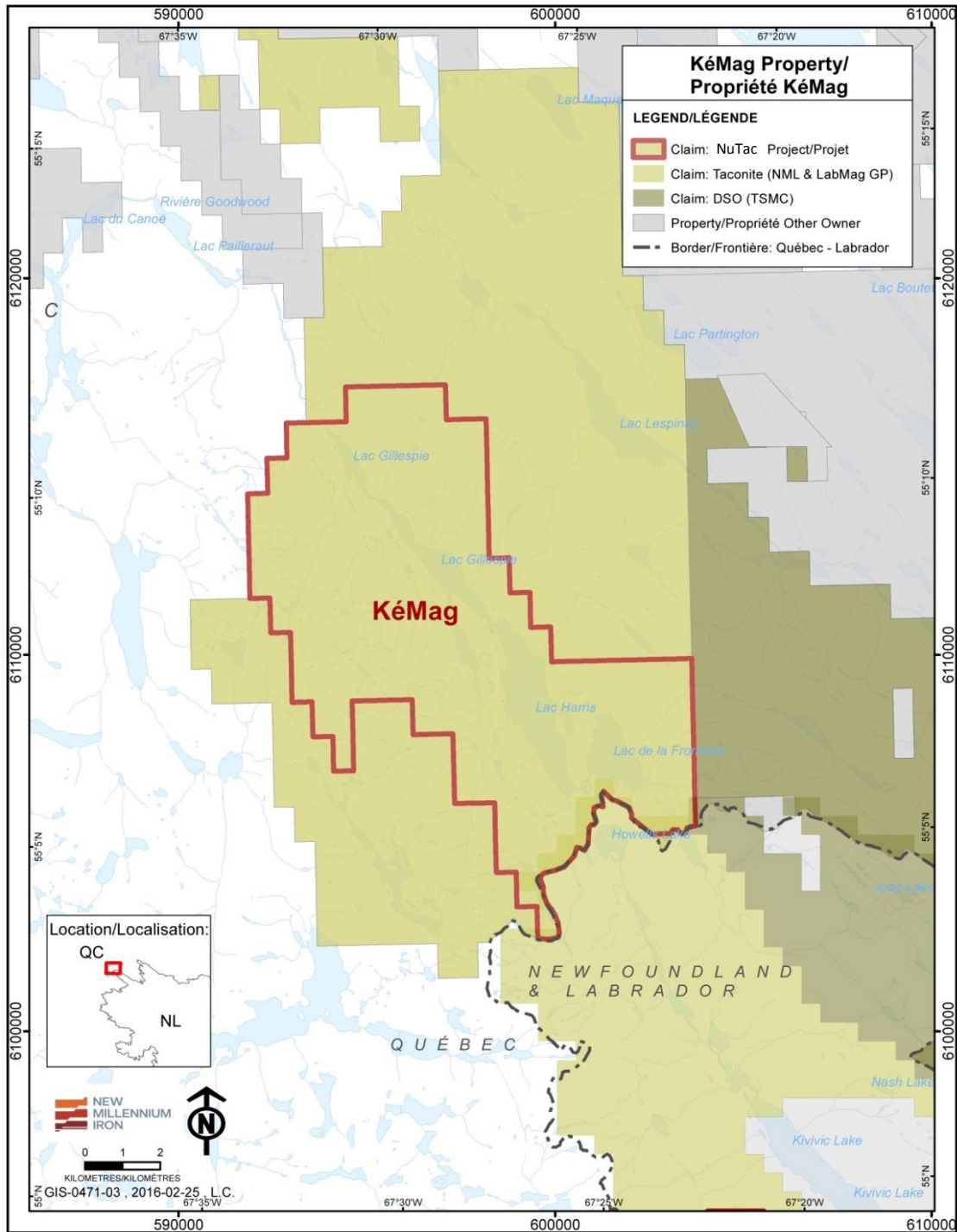
The KéMag Property, previously known as the Lake Harris Iron Property, is situated in the non-organized territory of Rivière-Koksoak in Northern Québec, about 40 km northwest of the town of Schefferville, Québec. The Property is approximately 245 km north of Labrador City, and 550 km due north of Sept-Îles, Québec. The location of the KéMag Property and other Project elements is shown in Figure 4.1 and Figure 4.2.

The area is centered at 55°07'N Latitude and 67°27'W Longitude and is located on 1/50,000 National Topographic Map Reference (NTS or SNRC: Système National de Référence Cartographique) sheets 230/03 and 230/04.

Figure 4.1 – Project Location



Figure 4.2 – KéMag Property, Claim Map



4.2 Property Description

The Property is comprised of one (1) block of 171 contiguous claims covering an area of approximately 81 km² cut out of a large swath of land extending toward the northwest and northeast covered by claims held by NML (Figure 4.2). The claim group extends for a distance of about 15.5 km along a north northwest – south southeast trend. The KéMag Property abuts the boundary of the Province of Newfoundland and Labrador on the southwest.

All the claims were acquired as Map-Designated Claims (Claim désigné carte “CDC”) and registered under NML as the 100 % holder. The Property has not been legally surveyed but the location of map-staked claims is defined on the basis of Universal Transverse Mercator (“UTM”) coordinates.

The information on the claims in Québec is accessible through the Register of Real and Immovable Mining Rights via the GESTIM geomatics application of the Ministère de l’Énergie et des Ressources naturelles du Québec (“MERN”). In May 2016, NML accessed the GESTIM system and noted the registration dates for the Property extending from the earliest on January 20, 2005 to the most recent acquisition on May 7, 2008. Expiry dates of the claims range from January 19, 2017 to May 6, 2018.

The registered excess assessment work amounted to over \$6 M, while the future required work to renew the claims was about \$194,500. All the claims were active and in good standing at the time of writing this Report. A listing of the active claims and details such as expiry dates, fees and required assessment work is provided in Table 4.1. A reduction of 35% on the required amount of work has been granted by MERN for 2 years from December 31, 2016. This 35% is included in the figures in the table.

The information in this Section was extracted from the GESTIM system but full and official details on the claim status are available on the website of the MERN.

NML has not applied for a mining lease.

4.3 Mineral Tenure in Québec

Map designation is now the primary method of acquiring a claim in Québec, and once the map designation notice is accepted, the office of the Registrar of the MERN issues a certificate for the claim. Within surveyed territory, the outline of a claim is the same as that of a land lot, or part of a lot.

The claims give the owner exclusive rights to explore for any mineral substances in the public domain, with a few exceptions like:

- Hydrocarbons;
- Loose deposits such as sand, gravel and clay;
- Land that is also subject to an exploration or mining right for surface mineral substances.

Table 4.1 – Summary of Claims Covering the KéMag Property

Map Sheet (SNRC)	Claim From	Claim To	Area (ha)	Issuance Date	Expiry Date	Excess Work (\$)	Required Assessment (\$)	Required Renewal Fees (\$)
23O/03	50761	50808	2,268.44	20/01/2005	19/01/2017	3,867,912.58	54,795.00	5,698.62
23O/03	2001307	2001320	690.24	23/02/2006	22/02/2018	406,986.24	16,380.00	1,723.68
23O/03	2066137	2066150	646.48	12/03/2007	11/03/2017	1,022,213.73	15,496.00	1,618.11
23O/03	2082473	2082527	1,313.54	04/05/2007	03/05/2017	812,432.00	31,330.00	3,298.32
23O/03	2092019	0	49.21	13/06/2007	12/06/2017	0.00	1,170.00	123.12
23O/04	2092039	0	49.32	13/06/2007	12/06/2017	0.00	1,170.00	123.12
23O/04	2092042	2092043	98.62	13/06/2007	12/06/2017	0.00	2,340.00	246.24
23O/04	2092045	2092049	246.5	13/06/2007	12/06/2017	0.00	58,500.00	615.60
23O/04	2092051	2092085	1,724.17	13/06/2007	12/06/2017	7,887.88	40,950.00	4,309.20
23O/04	2092087	2092091	246.1	13/06/2007	12/06/2017	0.00	5,850.00	615.60
23O/04	2092095	2092096	98.42	13/06/2007	12/06/2017	0.00	2,340.00	246.24
23O/03	2095143	2095152	492.32	22/06/2007	21/06/2017	281,328.56	11,700.00	1,231.20
23O/04	2116679	2116681	147.76	10/08/2007	09/08/2017	7,887.88	3,510.00	369.36
23O/03	2148794	2148797	14.08	07/05/2008	06/05/2018	994.80	1,664.00	122.04
TOTAL		171	8,085.20			6,407,643.67	194,545.00	20,340.45

The claims have a validity of two (2) years and can be renewed indefinitely for two-year periods, provided the required exploration work is completed, subject to certain conditions, and renewal fees are paid. The assessment work requirement and renewal fees for the land north of the 52° N Latitude (effective January 1, 2016) are listed in Table 4.2 and Table 4.3.

Table 4.2 – Registration Fee of Map Designated Claim (North of the 52° Latitude)

Area of Claim	Number of Map-Designated Claims	
	1 to 150	Over 150 (Within a single SNRC sheet, by the same person, on the same day)
Less than 25 ha	\$30.61	Five (5) times the registration fees
25 to 45 ha	\$110.16	
45 to 50 ha	\$123.12	
Over 50 ha	\$138.24	

Table 4.3 – Claim Renewal Fee (North of the 52° Latitude)

Renewal Application	Area of Claim			
	Less than 25 ha	25 to 45 ha	45 to 50 Ha	Over 50 ha
More than 60 Days Before Expiry Date	\$30.61	\$110.16	\$123.12	\$138.24
From 60 Days Before the Expiry Date to the Expiry Date	Twice the registration fees			

The holder is required to carry out assessment work prior to the 60th day preceding the expiry date of the claim, but special conditions apply for property examination work, technical evaluation studies or work preceding the staking date. If the required work was not performed or was insufficient to cover the renewal of the claim, the claim holder is required to pay twice the amount of the minimum required work that should have been performed. In addition, the MERN may impose certain conditions and obligations concerning the work to be performed on claims that lie within the boundaries of a town or on territories identified as State Reserves. The Minister also reserves the right to modify these conditions in the public's interest.

Excess work on one (1) claim may be applied to the renewal of other contiguous claims held by the same owner within a radius of 4.5 km from the centre of the claim from which the credits will be used. Excess credits may only be carried forward on a claim for a maximum of 6 terms or 12 years.

Access to the claims is granted to carry out exploration work. However, the claim holder cannot enter land granted for non-mining purposes or land leased for mining surface mineral substances without permission from the current holder of these rights.

A claim holder cannot erect or maintain a construction on lands in the public domain without obtaining the permission of the MERN, unless such a construction is specifically allowed for by ministerial order or consists of temporary shelters that can be easily dismantled and transported.

The information in this Section is only a summary description of the mining rights and the reader seeking full and official descriptions on titles or rights and obligations of the claim holders should refer to the website of the MERN.

**Table 4.4 – Minimum Cost of Work to be Carried out on a Claim
(North of the 52° Latitude)**

Year	Area of Claim		
	Less than 25 ha	25 to 45 ha	Over 45 ha
1	\$31.20	\$78.00	\$87.75
2	104.00	260.00	292.50
3	208.00	520.00	585.00
4	312.00	780.00	877.50
5	416.00	1,040.00	1,170.00
6	487.50	1,170.00	1,170.00
7 and over	650.00	1,625.00	1,625.00

4.4 Underlying Agreements and Royalties

On March 6, 2011, NML and Tata Steel Global Minerals Holdings Pte Ltd. (“TSG”) entered into a Heads-of Agreement (“HOA”) in respect of the development of the KéMag Deposit, the subject property of this PFS and the LabMag Deposit, collectively referred to as the Taconite Project.

Under the HOA, the parties undertook to carry out the TFS, with TSG paying NML 64% of the costs in exchange for an option to own a portion of the Taconite Project. The HOA also called for TSG and NML to enter into a binding joint venture agreement upon the successful completion of the TFS and TSG electing to develop one or both of the deposits. Upon the formation of development enterprise, NML would have the opportunity to hold a 36% equity interest in the Taconite Project, including a 20% free carry equity interest. In addition, should TSG exercise its right to invite third-party investors into the Taconite Project. NML will have the right of first refusal to acquire an additional 4% of paid equity, thereby increasing its ownership in the Taconite Project to a maximum of 40%.

A National Instrument 43-101 technical report entitled, “NI 43-101 Technical Report on the Feasibility Study on KéMag Taconite Project” dated May 9, 2014 with an effective date of March 27, 2014 was issued by NML in connection with the TFS (the “KéMag Technical Report”). The KéMag Technical Report was prepared by Yves Buro, Schadrac Ibrango, Jeffrey

Cassoff, Luc Bélanger, Éric Giroux, Pierre Julien, Joe Poveromo, Michel Bilodeau and Charles Cauchon of Met-Chem Canada Inc. and was filed on SEDAR on May 12, 2014.

On October 5, 2015, NML announced a review process for the HOA which recognized that the current macro-economic situation poses challenges for development of the Taconite Project as conceived in the HOA. As part of this review, TSG agreed to consider current, or potentially future, participation in the NuTac Project. To date, no agreement has been entered into by the parties in that regard.

4.5 Surface and Access Rights

The proposed mine, concentrator, tailings containment area, waste dump, camp and associated infrastructure at the KéMag Deposit will be located on Crown Land that NML will lease from the Government of Québec (“GoQ”).

The currently planned power transmission line between the Brisay hydro-electric power station and the Property site lie on Crown Land. It is assumed that the power line and its maintenance will be provided by Hydro-Québec.

4.6 Permitting

Permits will be required for additional activities that may be completed on the Project, such as exploration or construction work and operations.

Several environmental permits will be necessary, as described in Chapter 20 of this Report. A mining lease will be required prior to production.

4.7 Factors that May Affect Mineral Titles

No significant factors or risks that may affect access, title or the right or ability to perform work on the KéMag Property are known to NML.

5.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

The KéMag Property is accessible by well-maintained roads for 25 km northwest of Schefferville, past former open pit mines, and for a further 30 km westward by 4x4 pick-up truck or all-terrain vehicle over a trail that reaches Lac de la Frontière, seven (7) km away from the Property. A camp was built at the end of this trail for the 2007 drill program, but no longer exists. There is also a upgraded haul road going to Kivivic, a distance of 45 km from Schefferville, that was built by Tata Steel Minerals Canada Limited for its direct shipping ore (DSO) project. There is no current access to the KéMag Property, a distance of about 5 km from the end of the existing upgraded road. No roads connect Schefferville to the populous south, but there is established access either by air or train.

5.2 Climate and Vegetation

The Project area is under the influence of humid, sub-arctic continental taiga climate conditions experiencing very severe winters and cool summers. Daily average temperatures exceed 0 °C for only five (5) months of the year. Daily mean temperatures for Schefferville average -24.1 °C and -22.6 °C in January and February, respectively, and +12.4 °C and +11.2 °C in July and August respectively. Additional data on the weather in Schefferville are presented in Table 5.1.

Table 5.1 – Schefferville – Historical Weather Data

Month	Daily Temperature (°C)		Total Rainfall (mm)	Total Snowfall (cm)	Average Snow Days
	Maximum	Minimum			
January	5.1	-48.3	0.26	53.72	17
February	5.1	-50.6	0.29	33.26	14
March	9.4	-45.0	1.40	54.65	17
April	13.1	-36.1	9.04	50.49	14
May	28.3	-23.3	26.12	22.38	11
June	34.3	-7.8	69.53	5.76	4
July	31.7	0.0	96.06	0.15	0
August	28.7	-3.3	81.94	0.38	0
September	26.7	-9.4	102.99	11.05	6
October	20.6	-19.4	24.46	50.78	18
November	9.8	-35.6	4.51	62.75	21
December	5.0	-47.2	0.73	53.04	19
TOTAL			417.33	398.41	141

Source: Environment Canada, Weather Station at Schefferville Airport (Data: 1948-1993)

Although the KéMag Property lies in the northern part of Québec, Canadian miners are experienced with operating mines under even harsher climatic conditions than the ones prevailing in the Property area.

The KéMag Property is located in a sporadic discontinuous permafrost zone. However, 167 packer tests conducted by ISLLP in 2012 on the KéMag Property showed relatively low porosity which implies little effect can be expected on rock stability or water influx.

The KéMag Property is located in the broad transitional zone between boreal forest and tundra. Lichen woodlands form a mosaic with treeless ridges, forested valleys and lowland bogs and swamps. Sheltered valleys are sparsely occupied by black spruce trees, with some shrubs on exposed ridges and a full ground cover of feathermoss or lichen.

5.3 Local Resources and Infrastructure

Schefferville, an incorporated municipality in the Province of Québec, is the closest town to the KéMag Property. Schefferville survived despite the closing of the Iron Ore Company of Canada (“IOCC”) iron mines in 1982 and the subsequent demolition of a number of houses and public buildings.

In 2011, Schefferville had a population of 213 inhabitants (Canada census). However, the town has experienced an influx of workers since 2011, principally triggered by the re-start of iron production in the region. In addition, the 2014 registers of Aboriginal Affairs and Northern Development Canada (“AANDC”) and Ministère de la Santé et des Services sociaux (“MSSS”) indicated that some 780 members of the Innu Nation of Matimekush-Lac John lived on the nearby Matimekush and Lac John reserves.

The economy of Schefferville is based on outfitting, recreational hunting and fishing and public service administration. The town also provides services such as hotels and restaurants, basic supplies and equipment, contractors and charter flight operators. Although part of the labour force required for a mining operation at KéMag could be found locally, a significant portion would come from other parts of Eastern Canada and training programs would be required.

The region is served by a modern airport that has a 1,525-m runway and offers scheduled flights to Wabush, Sept-Îles, Québec City and Montréal, as well as connecting to many destinations in eastern North America and other northern communities. Several airlines offer charter service in and out of Schefferville Airport.

Rail service is provided by Québec North Shore & Labrador Railway (“QNS&L”) between Sept-Îles and Emeril, and by Tshuetin Rail Transportation Inc. (“TSH”) between Emeril and Schefferville. Trains operate twice weekly and accommodate passengers and freight, including large vehicles, gasoline, fuel oil and refrigerated goods.

Schefferville is supplied by a power line from the hydro-electric generating station at Menihék Lake, which is approximately 40 km south of the town.

Kawawachikamach, a community located 15 km northeast of Schefferville, is the home of the Naskapi First Nation of Canada. The community was established following the signing in 1978 of the Northeastern Québec Agreement. In 2014, AANDC and MSSS indicated a population of 884 living in a modern community that has its own school, medical clinic, recreational complex, municipal garage, police station, fire station, community center, swimming pool and many other amenities. Kawawachikamach is linked to Schefferville by a gravel-surfaced all-season road.

Potable water supply is abundant and will require minimal treatment. Process water requirements are expected to be limited and can be secured year-round by recovering site water runoff and pit dewatering. In addition, some water may be sourced from lakes located adjacent to the KéMag Property.

The Property is relatively large, as compared to the area covered by the proposed mine, and it can accommodate the proposed mine and associated infrastructure.

5.4 Physiography

The Property has an average elevation of 535 m above sea level. It slopes gently from southwest to northeast, away from the height of land representing the Québec-Labrador border and towards Lac Harris and Lac Gillespie, more or less parallel to the dip of the rocks. Terrain on the Property is gently rolling to flat, with total relief of 100 m. The streams to the east and west of the height of land in Québec flow into the Caniapiscaw watershed and then northward into Ungava Bay. Lac Harris, Lac Gillespie, Lac des Foreurs and Lac Otta overlie parts of the Deposit.

6.0 HISTORY

6.1 Prior Ownership

All recorded exploration work prior to staking of the Property by NML in 2004 was carried out by IOCC. In 1972, IOCC acquired an exploration permit covering the KéMag area and, in the winter of 1958, conducted a dip-needle magnetic survey that defined testing targets. IOCC's drilling on the Property consisted of 23 shallow holes testing these targets. Sixteen (16) holes were drilled on Harris and Gillespie lakes for a total of 246 m (807 ft) but only three (3) holes intersected unleached upper iron formation ("UIF"). Those samples were not analyzed and these historical holes were not used in any of the Mineral Resources estimations. The KéMag Property was acquired by NML by claim staking between 2004 and 2008.

6.2 Historical Exploration and Development

A summary of recorded exploration and work on the Property is presented in Table 6.1.

Table 6.1 – Summary of Exploration Work

Company	Year	Work Performed
IOCC	1949-50	Regional aeromagnetic survey (covered the KéMag and LabMag Properties)
	1950	Field mapping, sampling
	1958	Dip-needle magnetic survey (19.5 km ²); and drilling of 23 holes
	1968	Remnant magnetism study of the iron formations within a 64 km radius of Schefferville
	1971	Airborne electromagnetic and magnetic survey (518 km ² in Howells River region)
NML	2005	Staking of the claims covering the KéMag Deposit (staked in 2004, issued in 2005)
		Reconnaissance mapping and sampling
	2006	Claim staking; drilling: 29 holes for 3,585.6 m; and metallurgical testing
	2007	Geostat Systems International: Resources Estimation (First Public Disclosure); March 20, 2007 Watts, Griffis and McOuat Limited ("WGM"): Technical Report (Certification of Geostat Resource Estimation); September 19, 2007
		Claim staking; drilling: 46 holes for a total of 4,979.2 m; and metallurgical testing
	2008	Geostat: Update of the Resource Model (May 2008); Geostat: Update of the Resource Model (September 18, 2008); Drilling: 15 holes totaling 2,216.1 m; and Claim staking
	2009	BBA; Prefeasibility Study for the KéMag Project (January 2009; NI 43-101 Technical Report on the Pre-Feasibility Study (March 2, 2009)
	2010	Airborne magnetic and gravity survey
	2011	Drilling for metallurgical samples (PQ Core)
	2012	Metallurgical testing
	2014	Innu-SNC: Completion of a Feasibility Study on the Taconite Project
2014	Met-Chem: NI 43-101 Technical Report on the Taconite Feasibility Study (March 2014)	
2014-15	Acid rock drainage ("ARD") characterization test work	

6.3 Historical Mineral Resources Estimate

6.3.1 Mineral Resources Estimate, Geostat (2007)

Geostat was retained by NML to carry out a mineral resource estimate of the KéMag Deposit. Geostat issued a Technical Report NI 43-101 dated March 20, 2007 to support NML's first public disclosure of Mineral Resources on the Property.

Considering the similarities between the LabMag and KéMag Deposits, a cut-off grade of 18 % Davis Tube Weight Recovery ("DTWR") was used based on a PFS by NML for the LabMag Deposit. Watts, Griffis and McOuat Limited ("WGM") reviewed the PFS and found the costs and assumptions to be reasonable and to support the 18 % DTWR cut-off grade.

Data from 29 drill holes for a total of 3,585.6 m completed in 2006 were used by Geostat for the Resource Estimate. Each seam was modeled separately, using the lithological information from the drill logs to generate the contacts between the different units.

Since most drill sections only contained one drill hole, Geostat extrapolated the seam contacts at an angle of 6° northeast along the dip, based on its similarities with the lithology occurring at the more densely drilled LabMag Deposit to the southeast.

A series of density measurements completed at the Midland Research Center ("MRC"), Nashwauk, Minnesota, USA, on 43 drill core samples were used to derive an average density for each seam.

Geostat used 3D block modeling and the Inverse Distance method to interpolate grades within each seam independently (multi-seam model), based on the similarities between the iron formation at KéMag and LabMag.

The Mineral Resources for the KéMag Deposit were defined according to NI 43-101 and the CIM Standards. However, since the drill hole layout formed a line with holes every 500 m, rather than a grid, most of the resources should have been classified as Inferred. However, based on the knowledge of the consistency of grade and geometry of the LabMag Deposit, Geostat considered that where a drill hole intersects the iron formation, a classification of Indicated was warranted, provided that a spacing of no more than 500 m separated the drill holes. Yet, Geostat elected not to classify any resources as Measured.

WGM reviewed Geostat's technical report (September 19, 2007) and was satisfied that the work had been conducted professionally and to industry standards.

The resources on a per seam basis are contained in the reports from Geostat (March 20, 2007) and WGM (September 19, 2007), but the figures for the global resources are presented in Table 6.2.

Table 6.2 – Global Mineral Resources, 2007 (Cut-off Grade of 18 % DTWR)

Category	Tonnage (Mt)	DTWR (%)	TotFe (%)	Concentrate	
				Fe (%)	SiO ₂ (%)
Indicated	1,349	27.13	30.85	69.09	2.92
Inferred	992	26.91	30.85	68.98	2.97

Although the resources are NI 43-101 compliant and were validated by WGM, they are mentioned in this PFS for their historical interest only but should not be relied upon, since they are no longer current and are superseded by mineral resource estimates from additional work carried out to delineate more resources on the KéMag Property.

6.3.2 Mineral Resources Estimate, Geostat (May and September 2008 Updates)

The May 2008 Mineral Resources estimate of the KéMag Deposit constitutes an update of the estimation done by Geostat in 2007, adding the drill holes completed in the summer of 2007. The September 2008 estimate includes additional holes drilled in the winter of 2007/2008. Geostat used 88 holes totaling 10,774 m for the September Mineral Resources update.

The Mineral Resources were estimated using a block model, a cut-off of 18 % DTWR and grade interpolation by the Inverse Distance method. The same average density per seam as in the previous calculations was used, since no additional measurements were available.

A first update of the resources was completed by Geostat and documented in a report dated May 2008 (Table 6.3.).

Table 6.3 – Mineral Resources as in May 2008 Report (Cut-off Grade of 18 % DTWR)

Category	Tonnage (Mt)	DTWR (%)	TotFe (%)	DT Concentrate	
				Fe (%)	SiO ₂ (%)
Measured	991	27.41	31.00	69.01	3.02
Indicated	1,323	26.09	31.48	69.80	2.48
Measured + Indicated	2,314	26.65	31.27	69.46	2.71
Inferred	1,034	26.99	31.35	69.30	2.82

A second update of the resources was completed by Geostat and documented in a report dated September 2008 (Table 6.4). These results are mentioned for their historical interest only.

Table 6.4 – Mineral Resources as in September 2008 Report (Cut-off Grade of 18 % DTWR)

Category	Tonnage (Mt)	DTWR (%)	TotFe (%)	DT Concentrate	
				Fe (%)	SiO ₂ (%)
Measured	1,538	26.26	31.20	69.27	2.71
Indicated	911	26.45	31.38	69.59	2.60
Measured + Indicated	2,448	26.33	31.27	69.39	2.67
Inferred	1,014	26.73	31.15	69.17	2.81

6.3.3 Pre-Feasibility Study, BBA (January 2009)

In 2009, BBA completed a PFS on the KéMag Project and a NI 43-101 report was filed in March, 2009. This study allowed for the first statement of mineral reserves for the KéMag Deposit, which are shown in Table 6.5.

Table 6.5 —LOM Reserves as in the BBA March 2009 Report (Cut-off Grade of 18 % DTWR)

Reserve Category	Tonnage (Mt)	DTWR (%)	TotFe (%)	DT Concentrate	
				Fe (%)	SiO ₂ (%)
Proven	1,347	26.9	31.2	69.1	2.8
Probable	794	27.0	31.4	69.1	2.5
Proven + Probable	2,141	27.0	31.3	69.1	2.7
Inferred	73				
Waste	1,015				
Inferred + Waste	1,088				
Waste : Ore Ratio	0.51				

6.3.4 Taconite Feasibility Study, Met-Chem (March 2014)

Over the course of the Taconite feasibility study (TFS), Met-Chem audited Geostat’s September 2008 model and found a number of small issues. Met-Chem created a new block model that corrected these issues (“Met-Chem 2012 Model”). This model used IDW2 interpolation as Geostat had done in the past, and used average densities per seam with a correction factor of 3%.

In order to meet the schedule requirements for completing the feasibility study, Met-Chem proceeded with mine planning based on this 2012 Model. However, a subsequent density measurement study was completed using water immersion.

This study allowed for seam-wise density regression functions to be built based on iron content, which is more accurate than the average densities by seam.

With this new information, Met-Chem created two more sets of block models (“Met-Chem 2013 OK Models” and “Met-Chem 2013 IDW2 Models”) using ordinary kriging and IDW2 interpolation respectively.

When comparing the two (2) IDW2 models (Met-Chem 2012 and Met-Chem 2013 IDW2), the results show a decrease of 28.9 Mt (-1.20%) in resources. When comparing the ordinary kriging model to the Met-Chem 2012 IDW2 model, the variation is 28.1 Mt (-1.17%). These differences are relatively small and allow for a high level of confidence in the 2012 Model resource estimate, which remained the one used for mine planning and mineral reserves in the feasibility study.

Table 6.6 depicts the cumulative mineral resources based on the 2012 IDW2 model which formed the basis for the TFS.

Table 6.7 depicts the cumulative mineral resources based on the 2013 IDW2 model which formed the basis for the Technical Report NI 13-101.

Table 6.6 – Cumulative Mineral Resources – In Situ Grades (2012 Model)

Resource by Category	Tonnage (Mt)	TotFe (%)	DTWR (%)	DT Concentrate	
				Fe (%)	SiO ₂ (%)
Measured	1,516	31.39	26.86	69.42	2.63
Indicated	868	32.03	27.30	69.73	2.57
Measured + Indicated	2,384	31.62	27.02	69.53	2.61
Inferred	1,011	31.73	26.99	69.17	2.74

Table 6.7 – Cumulative Mineral Resources – In Situ Grades (2013 Model)

Resource by Category	Tonnage (Mt)	TotFe (%)	DTWR (%)	DT Concentrate	
				Fe (%)	SiO ₂ (%)
Measured	1,507	31.45	26.97	69.69	2.56
Indicated	876	31.95	27.32	69.83	2.51
Measured + Indicated	2,383	31.63	27.10	69.74	2.54
Inferred	1,007	31.56	26.97	69.31	2.65

As noted by Met-Chem in the TFS, future work should consider one of the 2013 models. Either 2013 Model is valid and includes the most up-to-date information. The 2013 Model (IDW2) was selected as the basis for this Pre-feasibility Study since IDW2 has historically been the interpolation method used.

Table 6.8 compares the results of the resources based on the 3 models prepared by Met-Chem and the 2008 Model prepared by SGS.

Table 6.8 – Comparison of Models for KéMag

Resource Comparison for KéMag (Measured + Indicated), 18% Cut-Off																				
	SGS 2008 Model					Met-Chem 2012 Model (IDW2)					Met-Chem 2013 Model (Ordinary Kriging)					Met-Chem 2013 Model (IDW2)				
Seam	Tonnage (Mt)	FeH%	DTW R%	FeC%	SiO2C %	Tonnage (Mt)	FeH%	DTWR %	FeC%	SiO2C %	Tonnage (Mt)	FeH%	DTW R%	FeC%	SiO2 C %	Tonnage (Mt)	FeH%	DTW R%	FeC%	SiO2C %
LC	626.25	30.21	27.91	68.92	2.72	711	28.28	30.52	69.39	2.46	696	30.39	28.4	69.89	2.33	695.5	30.40	28.44	69.94	2.35
JUIF	153.07	32.66	26.01	69.90	2.27	107	27.15	32.89	69.62	2.5	86.2	33.20	27.13	69.47	2.66	106.9	33.20	26.42	69.52	2.63
GC	4.65	24.54	19.49	69.27	2.61	9	20.94	24.44	69.61	2.51	4.5	21.61	19.10	69.67	2.31	6.2	24.06	20.33	69.56	2.50
URC	146.51	33.52	26.78	70.27	1.95	143	26.77	33.82	70.36	1.84	145	34.02	26.66	70.38	1.83	144.3	34.02	26.67	70.38	1.84
PGC	358.45	33.43	30.7	70.09	2.26	354	30.64	33.33	70.09	2.24	358.4	33.37	30.28	70.12	2.23	348.5	33.30	30.55	70.09	2.26
LRC	48.35	33.47	25.42	70.02	2.48	44	26.64	33.77	70.16	2.38	35.5	33.97	24.45	71.17	1.35	38.7	33.89	25.30	71.11	1.38
LRGC	977.3	31.65	25.94	69.15	3.1	1,044	25.42	31.49	69.29	2.96	1,058.3	31.34	25.17	69.34	2.93	1,043	31.36	25.28	69.37	2.90
Total	2,314	31.74	27.24	69.37	2.73	2,412	27.19	31.69	69.53	2.61	2,383.9	31.60	26.99	69.71	2.67	2,383.1	31.63	27.1	69.74	2.54

7.0 GEOLOGICAL SETTING AND MINERALIZATION

7.1 Regional Geology

The KéMag Property is located in the western margin of the Labrador Trough, adjacent to Archean basement gneisses. The Labrador Trough, also known as the Labrador-Québec Fold Belt, extends for more than 1,000 km along the eastern margin of the Superior Craton, from Ungava Bay to Lac Pletipi in Québec. The belt is about 100 km wide in its central part and narrows considerably to the north and south. The Grenville Front crosses the southern part of the Labrador Trough.

The rocks in the Labrador Trough are subdivided into a lower sedimentary sequence known as the Knob Lake Group and an upper mafic volcanic-dominated succession known as the Doublet Group. These rocks are collectively referred to as the Kaniapiskau Supergroup (Frarey and Duffell, 1964; Wardle, 1981). The Knob Lake Group is subdivided, from oldest to youngest, into the Seward, Lac Le Fer, Denault, Fleming, Dolly, Wishart, Sokoman and Menihék Formations. The iron formations found in the region are within sub-units of the Sokoman Formation.

Metamorphic grade increases from sub-greenschist facies in the west to upper amphibolite facies in the eastern part of the Labrador Trough.

7.2 Property Geology

Drilling by NML has shown that units of the Knob Lake Group, including the Sokoman Formation, underlie a major part, if not all, of the Property. It also indicates that the stratigraphic sequence and type descriptions developed for the Howells River area (LabMag Deposit) are applicable to the KéMag Property with only slight differences in the average unit thicknesses.

Archean granitic gneiss of the Ashuanipi Complex occupies several rows of claims lying along the southwestern Property boundary (Figure 7.1). A description of the rock types and the stratigraphy of the Property are summarized in Table 7.1.

The Sokoman Formation has been broken down into members and individual stratigraphic units (sub-members) and all the geological work on the Property has used this classification. The iron formation sub-members within the Sokoman Formation have been classified on the basis of facies (sulphide, silicate, magnetite-carbonate and hematite-carbonate) (Table 7.1). Most of the contacts between the sub-members of the Sokoman Formation are gradational, except for the Green Chert that has two (2) sharp and easily discernible contacts, making it an excellent marker horizon.

Figure 7.1 – Geological Map with Drill Hole Location

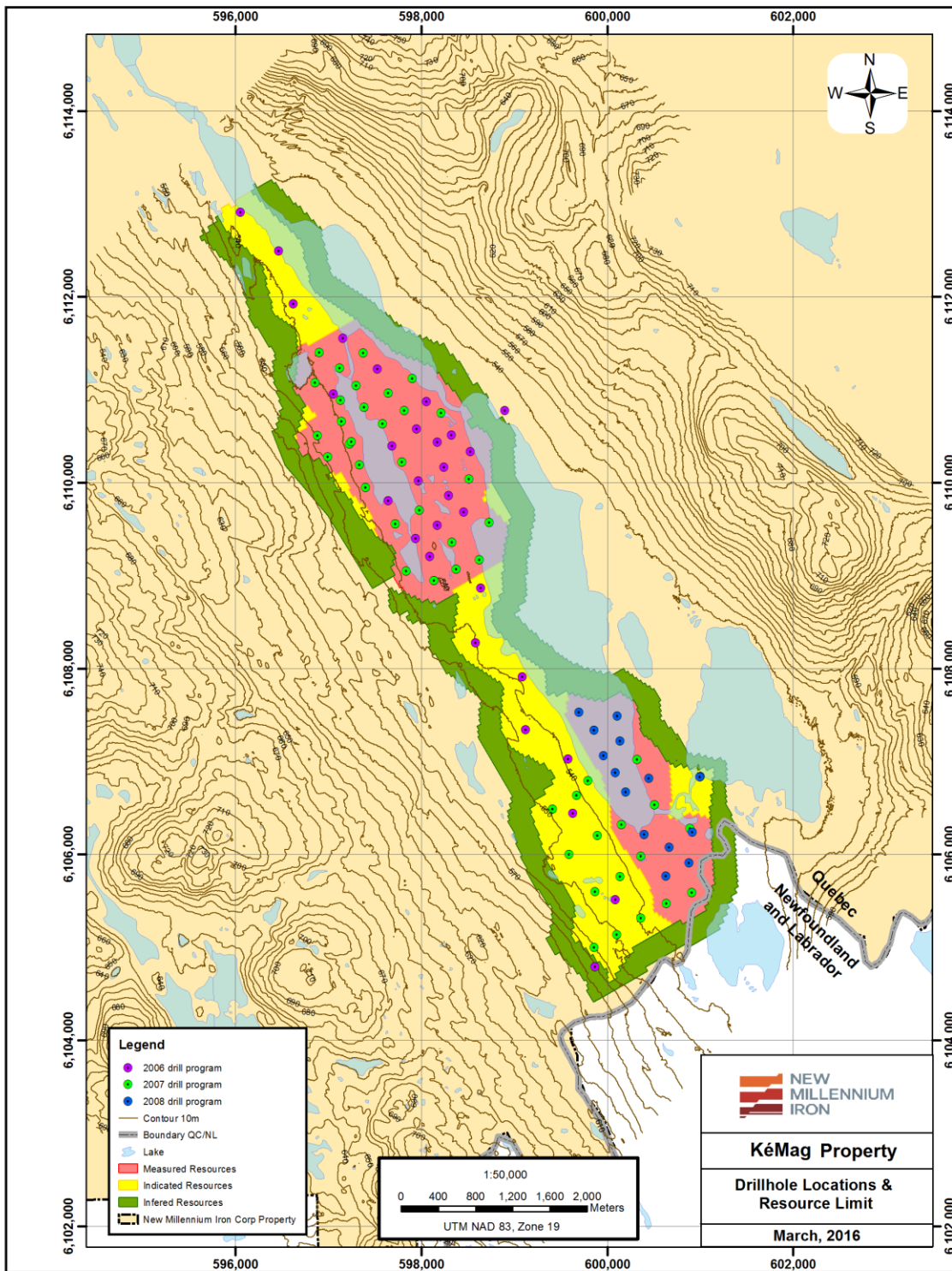


Table 7.1 – Stratigraphy of the Property

Formation	Member	Sub-Member	Facies	Average Thickness and (Range) (m)	Description
PROTEROZOIC					
Menihék				Over 79.2	Shale, minor greywacke and carbonate, carbonaceous pyritic shale
Thrust Fault					
Sokoman	UIF	Lean Chert (LC)	Silicate	25.0 (18.4-32.5)	Magnetite-chert, local shaley (siderite-magnetite) chert IF and stromatolite band
		Jasper Upper IF (JUIF) Fe Mineralization	Magnetite-carbonate	26.2 (20.7-30.8)	Magnetite-chert IF
		Green Chert (GC)	Magnetite-carbonate	3.8 (1.2-9.4)	Marker Horizon ; green chert
	MIF	Upper Red Chert (URC)	Hematite-carbonate	8.1 (4.4-16.8)	Jasper-magnetite-chert
		Pink-Grey Chert (PGC) Fe Mineralization	Magnetite-carbonate	12.6 (4.0-22.9)	Disseminated magnetite-chert IF
	LIF	Lower Red Chert (LRC) Fe Mineralization	Hematite-carbonate	8.6 (0-18.6)	Layered magnetite-chert IF; gradational lower contact
		Lower Red-Green Chert LRGC	Magnetite-carbonate	21.2 (0-46)	Silicate-magnetite-carbonate, magnetite-chert IF gradational lower contact
		Lower IF LIF	Silicate	8.2 (1.4-32.8)	Silicate-carbonate-magnetite-chert
	RUTH		Sulphide	5.2 (2.9-8.7)	Laminated chert-siderite-shale
Wishart				17.7 (14.6-20.4)	Black chert quartzite
Unconformity					
ARCHEAN					
Ashuanipi Complex		Granitic dykes and mafic intrusives			

The Sokoman Formation overlies the Wishart Formation, which is a fine to medium grained quartzose sandstone with varying amounts of feldspar grains. In turn, the Sokoman Formation is overlain by the Menihék Formation and is in probable fault thrust contact that generally manifests itself as an intensely deformed and brecciated zone. The shale of the Menihék Formation is exposed along the northeastern margin of the Property. The granite of the Ashuanipi Complex occurs within the southwestern side of the Property. The KéMag Deposit is part of the Sokoman Iron Formation, is approximately 120 m thick and all the sub-member units show variation in thickness as observed from drilling.

The Sokoman Formation in the Property area has undergone very low-level metamorphism. Furthermore, it has been subjected to minimal post-depositional leaching or weathering. The central part of the Deposit is narrower and shallower than in the southern and northern parts, indicating the presence of two (2) shallow basins separated by a plateau.

The Property is overlain for the most part by deep overburden which is locally boggy. However, the extension of the stratigraphic sequence on the KéMag Property is well-established based on:

- Sporadic exposures of the lower Sokoman Formation overlying the continuous outcrops of the lowermost unit of the Knob Lake Group along the southwestern margin of the deposit;
- Aeromagnetic response;
- Drilling results.

7.3 Structure

Drilling results indicate that the Wishart and Sokoman formations on the KéMag Property dip at about five (5) to seven (7) degrees to the northeast. Core angles for bedding appear to be in accordance with this interpretation of shallow dip, which is similar to that delineated on the much more densely drilled LabMag Property to the southeast.

7.4 Mineralization

The taconite at the KéMag Deposit consists mostly of alternating small-scale (mm to cm) beds of recrystallized chert or jasper and massive or disseminated magnetite. Magnetite is the predominant iron oxide mineral, while hematite and martite occur in subordinate amounts. Gangue minerals are represented by iron silicates (minnesotaite and stilpnomelane), iron carbonate (siderite) and manganese carbonates (rhodochrosite and kutnahorite).

The iron formation at the KéMag Deposit has been explored by diamond drilling over a strike length of 9.5 km and it extends beyond the northwest and southeast Property boundaries.

Alumina, carbon and sulphur are only concentrated at the base of the Sokoman Formation (Ruth Member) that would not be mined. Phosphorus generally occurs at low levels in the oxide iron formation.

The seven sub-members LC, JUIF, GC, URC, PGC, LRC, and LRGC are those considered mineralized and potentially economic to extract.

8.0 DEPOSIT TYPES

The KéMag Deposit consists of magnetite Banded Iron Formation (“BIF”) of the Lake Superior type. BIFs are sedimentary rocks composed of alternating mm- to cm-scale beds of quartz (chert or jasper) and iron oxides (predominantly magnetite and hematite). Variable amounts of gangue minerals, mostly silicates and carbonates, are present. BIFs have greater than 15% iron content and have been the principal sources of iron throughout the world and host many gold deposits (Gross, 1996).

The BIFs can be generalized and classified in two (2) main types, the Lake Superior and Algoma BIFs, on the basis of tectonic systems and depositional environments (Gross, 1965, 1983, 1986). Oxide, silicate and carbonate lithological facies are common to both BIF types.

The Lake Superior-type BIF formed in passive margins settings, in near-shore continental shelves and platform basins. They are associated with typical shelf-type sedimentary rocks with minimal volcanic input (James, 1954; Gross, 1965). Most Lake Superior-type BIFs formed during the Paleoproterozoic (2.5 - 1.8 Ga). The Lake Superior-type BIFs represent a vastly more abundant source of iron than the Algoma type and are a major part of the iron mined in the Great Lakes region of the United States.

The BIFs in the Labrador Trough were variably affected by metamorphism and alteration. The taconite is a lithofacies represented by hard, unoxidized BIF, little affected by metamorphism or alteration. Strongly metamorphosed taconites are known as meta-taconite, as those found in the iron deposits in the Grenville part of the Labrador Trough, in the vicinity of Fermont and Wabush.

The exploration model used to design the exploration activities and the drilling at the KéMag Deposit is principally based on the interpretation of the drill data indicating the presence of gently dipping, Lake Superior-type BIF.

9.0 EXPLORATION

Historical exploration in the KéMag region has consisted principally of field mapping, sampling and drilling, as well as geophysical surveying including ground magnetic, airborne magnetic and electro-magnetic surveys.

Resources estimates have been completed following each phase of drilling. Cumulatively, the exploration and development work has allowed estimating NI 43-101 compliant Mineral Resources in the drilled area. Table 6.1 provides a summary of the main exploration and development work that has been carried out on the Property.

10.0 DRILLING

10.1 2006 Drilling Program

The 2006 drilling program was initiated by NML to test airborne anomalies outlined during the 1950s and in 1971.

Drilling started on June 9, 2006 and concluded on October 14, 2006 but was suspended between August 14 and September 7. A total of 3,585.6 m was drilled in 29 holes at the KéMag Deposit (see Table 10.1).

All of the holes were drilled vertically and core size for most drilling was BTW (42 mm diameter) and BQ (36.4 mm diameter). The holes were spotted using a Global Positioning System ("GPS") receiver and surveyed at the end of the program. No downhole directional or geophysical surveys were carried out.

The drilling completed in 2006 indicated that the seven (7) economic stratigraphic horizons were similar to those occurring at the LabMag Deposit with some minor changes in the individual thicknesses and magnetite content. The taconite beds dip at the same average six (6)^o slope towards the northeast.

10.2 2007 Drilling Program

The 2007 program, during which 46 holes were drilled for a total of 4,979.2 m (Table 10.1), was a follow-up of the 2006 program, with the objective of completing the drilling in the regular adopted pattern of 250 m by 300 m grid. This was accomplished in the northern part of the Deposit but the drilling continued in the southern part in the same pattern as used in 2006. Drilling started on July 18 and concluded on October 17, 2007. As in 2006, all the drill holes were surveyed at the end of the program.

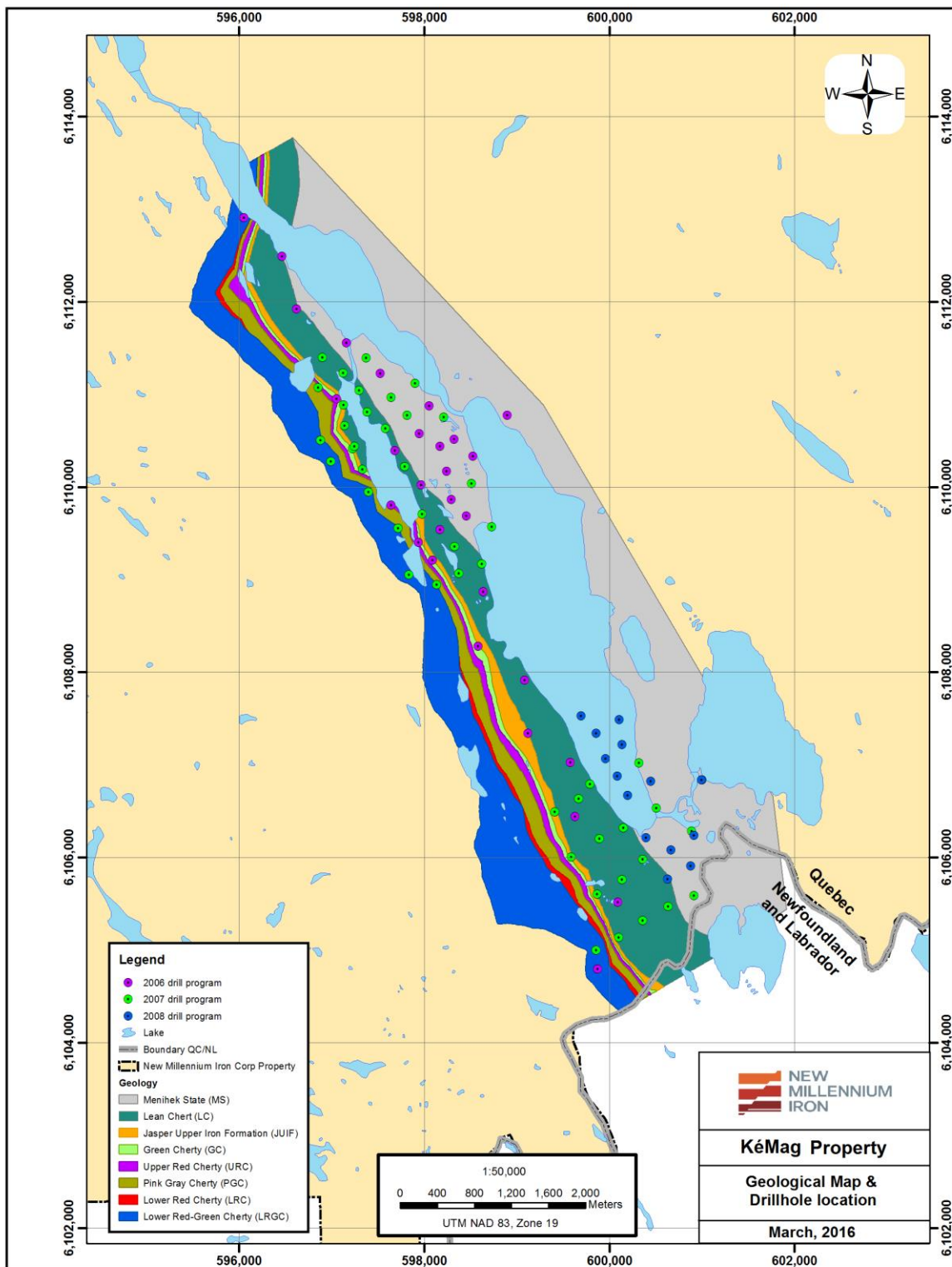
Logging and subsequent analytical results of the drill core samples indicated no major changes in stratigraphy or the mineralogical characteristics of the seven (7) economic units. The Deposit is narrower and shallower in the central part than in the southern and northern parts.

10.3 2008 Drilling Program

From March 5 to April 30, 2008, drilling continued on the southern part of the KéMag Deposit, to confirm that the eastern extension of the Deposit lies under Lac Harris, Lac de la Frontière and the swampy grounds to the south. Fifteen (15) holes were drilled on lines spaced 250 m apart for a total of 2,216.1 m (Table 10.1). The holes were spotted using a GPS receiver.

The drill hole locations showing the drilling program since 2006 are presented in Figure 10.1.

Figure 10.1 – Drill Hole Locations



The results of the drilling confirmed that the Deposit continues beyond the western shores of Lac de la Frontière, dipping at angles of six to eight degree slope towards the northeast, and that the stratigraphy, mineralogy and structure are similar to the other parts of the KéMag Deposit.

Table 10.1 – Summary of Drilling by NML, by Year

Year	Holes	Drilled Length (m)
2006	29	3,585.6
2007	46	4,979.2
2008	15	2,216.1
Total	90	10,780.9

11.0 SAMPLE PREPARATION, ANALYSIS AND SECURITY

11.1 Sampling and Assaying

The core was photographed and logged at the core storage facility in Schefferville. Rock Quality Designation, core recovery and magnetic susceptibility measurements were recorded and the core was split using a hydraulic splitter and sampled for assaying. All logging and sample descriptions were recorded on paper for later transfer to Microsoft Excel spreadsheets.

Each stratigraphic unit was sampled separately, except for MS and RF, with sample lengths varying from 1.6 m to a maximum of 9.05 m. LIF was sampled as well, even though it is considered as waste. The sampling intervals within the units were based on the extent of magnetite/hematite mineralization. The lean cherty zones exceeding three (3) m were sampled separately, although individual sample lengths seldom exceeded six (6) m in both the mineralized and waste zones.

The split half ($\frac{1}{2}$) core was placed on the original core tray and returned to the core storage building to serve as reference samples.

The same method was used for sampling the core produced during the 2006, 2007 and 2008 drilling programs.

11.2 Sample Preparation and Analysis

All the 1,570 split core samples from the 2006, 2007 and 2008 drilling programs, including 88 check samples, were sent to Midland Research Center ("MRC") for chemical and Davis Tube ("DT") analyses covering head assay for total iron, DTWR on -325 mesh pulverized samples and assay of the concentrates for iron and silica.

In addition, 21 samples on three (3) fractions (Crude, DT Concentrate and DT Tailings) were analyzed for trace elements and sulphur.

MRC's sample preparation and analytical procedure consisted of the following steps:

- Core samples crushed to 3/8" with a jaw crusher;
- Split 1,500 g for test work, save the balance;
- Roll crush 1,500 g to 100% passing 10 mesh;
- Split 50 g for DT test and crude ore sample analysis, save the balance;
- Stage grind 50 g to 100% passing 325 mesh, as per MRC procedure (Hanna Procedure);
- DT test on 25-30 g samples, as per the procedure provided by MRC (Hanna Procedure);
- Analyze DT concentrate samples for Fe and SiO₂ (non-mercury titimetric method for total iron; SiO₂ determination using hydrofluoric acid);
- Analyze crude ore sample for Fe, save the balance.

11.3 Quality Assurance and Quality Control Programs

11.3.1 NML's QA/QC Protocols (2006-2008)

In 2006, NML monitored the laboratory performance with a total of thirteen (13) samples from selected drill hole intersections re-assayed at MRC. The samples consisted of second half core bearing new drill hole names and sample numbers and submitted blindly to the laboratory.

The thirteen (13) check samples of 2006 reported consistent values, with the exception of one (1) sample that was re-assayed and yielded an acceptable second result of the 2006 to 2008 drill programs.

Sixty-five (65) duplicate samples were inserted into the sample stream of the 2007 drill program. In addition, seven (7) samples were collected in Hole 07-HL-1014A drilled at the same location as 07-HL-1014D and were used as twin hole check samples. Sixty-four (64) duplicate samples and the seven (7) twin-hole check samples were sent to MRC, while one (1) duplicate sample was sent to an external laboratory, Lerch Brothers Inc. ("LBI") of Minnesota.

The analytical results were reviewed by Met-Chem and a high correlation between the pairs of duplicate samples was found. Four (4) samples yielded a significant difference between the original and duplicate Tot_{Fe} %, ranging from 14.37 to 4.22. However, even if these four (4) samples were included in the calculations, the respective averages and standard deviations were 30.71 vs. 30.84 and 6.08 vs. 5.96. The same applied for the head silica analyses. Correlation of DTWR in the pairs was very high, with a correlation coefficient of 99.3.

Four (4) duplicate samples were collected by NML in 2008. This data was also reviewed by Met-Chem who found a slight positive bias in the duplicate sample analyses for Tot_{Fe}. However, no conclusion could be drawn from such a small set of data.

NML's QA/QC system did not provide for insertion of standard and blank materials into the sample stream of the 2006 to 2008 drill programs.

11.3.2 MRC's Internal Laboratory Protocols

MRC had its own internal QA/QC program of random selection of samples for re-assay, as follows:

- Analysis of standards at the start of procedure to calibrate the instruments;
- Submittal of four (4) percent of the samples by management to monitor the analytical accuracy of the work. The samples were selected and submitted according to the following procedure:
 - Randomly pick pulp to be assayed and place in an envelope;
 - Assign a new number;
 - Record old and new numbers in a folder that is not in the laboratory;
 - Submit as blind samples for analysis;
 - Record old and new assays for comparison purposes.

In addition, MRC sent 60 selected samples to be checked by LBI.

In 2006, a total of 20 samples were selected for check assays, ten (10) for head assays and ten (10) for DT concentrates. MRC concluded that all check assays returned values well within normal ranges and that no significant bias was observed.

Of the 60 sample pulps sent in 2006 by MRC to the LBI for external check assay, 29 were assayed for Tot_{Fe} and 30 were assayed for Fe in concentrate. Geostat reviewed the results of the LBI assays and found that:

- Tot_{Fe} % did not present a statistical bias;
- Fe % and SiO₂ % in concentrate did present a bias.

However, although a bias seems to exist, it is small, amounting to -0.6% on an average of 69% for Fe in concentrate and +10.9% on an average of 3% for SiO₂ % in concentrate. The bias has no impact on the Mineral Resources tonnage estimates because the tonnages are based solely on DTWR. Although the small number of pairs available for comparisons could not lead to a statistically significant conclusion, Geostat recommended increasing the number of check samples and further investigating the potential bias by the laboratories concerned in future sampling campaigns.

Geostat also noted that DTWR was not internally checked at MRC nor was it at LBI. Only the NML blind half-core samples were checked. Since DTWR is a critical component of the Mineral Resources, owing to the fact that it is used as the cut-off grade, Geostat recommended adding DTWR checks to its QA/QC program.

Geostat concluded that the quality of the samples used was sufficient to support the estimation of a Mineral Resources at the Indicated level but that a more extensive QA/QC program will be required to support the estimation of Measured Resources.

12.0 DATA VERIFICATION

12.1 Data Verification by Geostat (2007)

12.1.1 Drill Hole Database

Geostat checked the database and compared a limited number of assay values in the database against the original assay certificates, as well as some of the lithological descriptions from the geologist logs against the database contents and found no errors.

Geostat reviewed the results of the QA/QC program and considered that the amount of control samples should be increased, but did not find any issue that could significantly impact the Mineral Resources estimate.

12.1.2 Site Visit

During a three-day site visit starting on February 20, 2007, Geostat visited the site and NML's core storage facility in Labrador City, examined drill core and collected 27 samples from the remaining core halves.

Four (4) hole collars were found in the field where expected using a handheld GPS instrument.

12.1.3 Control Sample Results

Geostat sent the 27 samples to LBI, where the original samples (half core) had been prepared and analyzed. The head and concentrate portion of the check samples were analyzed as follows:

- DTWR: LBI overestimates MRC by 4% of MRC's value, with a systematic bias. Geostat's rationale was that, since the bias is positive, its impact on the Mineral Resources would be conservative;
- Tot_{Fe}: LBI systematically overestimates MRC by 5.5% of MRC's value. Since the bias is positive, its impact on the Mineral Resources would be conservative;
- Fe in Concentrate: no observed bias;
- SiO₂ in Concentrate: LBI's results were systematically higher than MRC's by 15.7% of MRC's value. Geostat concluded that, although high concentration of SiO₂ in concentrate adversely affects Mineral Reserves, it had no impact on its estimated Mineral Resources. However, Geostat recommended addressing this bias, since it is systematic and large.

Geostat did not study the source of the observed bias as their primary objective was to confirm the iron mineralization in the control samples.

The origin of the bias in Tot_{Fe}% yielded by the Geostat's check samples is unclear. Check samples (coarse rejects) submitted by Met-Chem to XRF analysis showed a high correlation between the original and the check samples. Met-Chem believed the bias observed between the concentrates from Geostat's original and duplicate samples might have originated from an

inconsistent grind size achieved by LBI at the different times at which the samples were processed.

12.2 Data Verification by WGM (2007)

WGM completed a site visit on July 10-11, 2007. The field offices and several drill sites and outcrops were visited and drill core was reviewed. WGM noted that drill core was in excellent condition, core splitting was well done and corroborated that the observed core corresponded to that described in the drill logs. WGM was not required to complete any validation drill core sampling because independent validation had already been completed by Geostat for its Mineral Resources estimate.

WGM noted that, although drill core descriptions in logs are generally adequate, some description of contact relationships between units would be helpful. Contacts are generally transitional. Some are more definite, being gradational over 0.1 m, while others are transitional over ten (10) m. WGM also noted that some samples included significant core loss.

GPS measurements were taken on four (4) drill hole collars. For one of the hole collars (DDH HL-1042), coordinates were considerably different than those recorded in the drill hole database. WGM's preliminary conclusion is that this hole is mis-located by about 100 m. WGM also noted that several of the collar markers had no drill hole identifiers. WGM recommended that all of the collars be re-surveyed.

12.3 Data Verification by BBA (2008)

BBA Senior Metallurgist, Mr. John Dinsdale, visited the site in November 2008. It was not possible to access the proposed mine site but an inspection was made of the drill core still in storage in Schefferville. IOCC's abandoned mines in the area, the electrical substation, the northern terminal of the Tshuëtin Railway and other infrastructure and facilities in the town of Schefferville were also visited.

BBA was not required to complete any validation drill core sampling because independent validation had already been completed by Geostat for its Mineral Resources estimate.

12.4 QP Visit by Met-Chem (2012)

12.4.1 Field Visit

Messrs. Yves A. Buro, Eng., and Schadrac Ibrango, P. Geo., Ph.D., both Senior Geologists, Met-Chem, visited the site on September 18 and 19, 2012. They were accompanied in the field by Mr. Henry Simpson, NML's Senior Geologist, and Mr. Rabi Mohanty, Tata Steel Minerals Canada's Chief Geologist. A helicopter was available for transportation from Schefferville to the field and the visit of a few outcrops and a second trip was taken the same day with a pick-up truck to stop at more outcrops.

A series of outcrops representing the major units of the Sokoman Formation were examined in the field and six (6) readings of hole collars were taken with a hand-held GPS instrument. The

office and core handling (logging and sampling) facilities in Schefferville were visited, as well as the core storage facility in Labrador City where the core was stored in the original labeled boxes stacked on pallets in a closed building. The core from selected holes was examined by Met-Chem, with Messrs. Rabi Mohanty and Alex Howe (NML's Junior Geologist).

Met-Chem did not find any major errors, in the core examined, relating to the description and contacts of the lithological units and sample intervals that had been selected while logging and sampling the core.

The GPS measurements of the drill hole collars corresponded well with the entries into the database and the plot on the maps. No issues that might have had a significant impact on the reliability of the data collected by NML were observed during the visit.

12.4.2 Independent Check Samples

During the QP site visit, Met-Chem independently selected 26 samples from the KéMag Deposit for check analysis. The samples represented a fair geographical distribution within the KéMag Deposit, strike- and depth-wise, and a range of iron values. The samples consisted of coarse rejects from the original samples and were analyzed by SGS Lakefield using the XRF analytical technique.

The major oxides, including Fe_2O_3 , were analyzed, as well as sulphur by Leco, Loss on Ignition ("LOI") and sum of oxides. Four (4) Certified Reference Materials and two (2) duplicate samples were inserted into the sample sequence. Met-Chem prepared the sample bags and tags, as well as the standards and the list of duplicate samples, and sent them to NML which sent the samples directly to SGS.

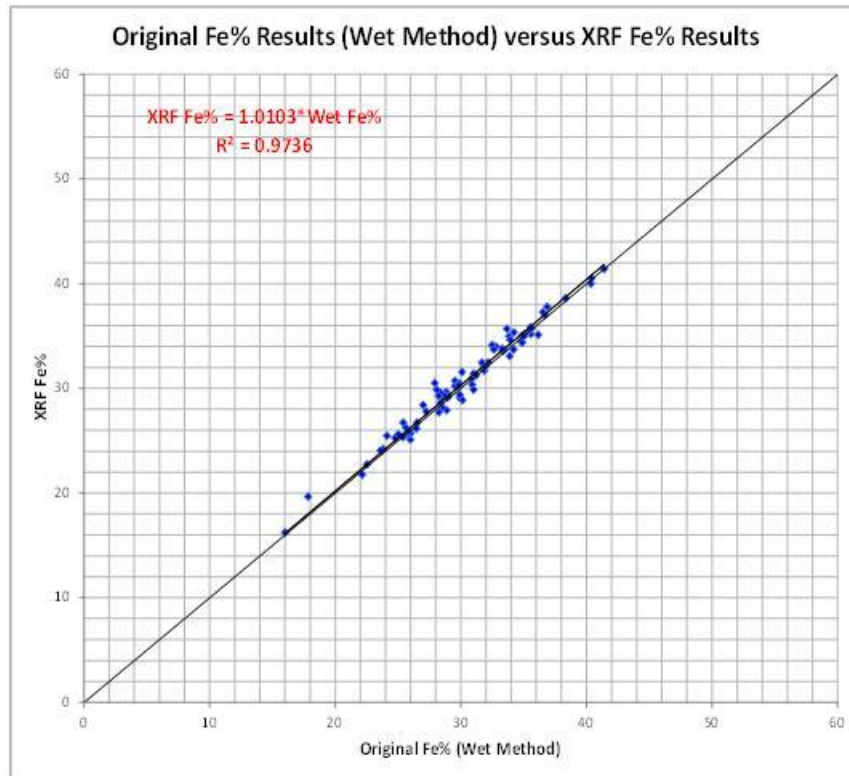
The analytical results from the duplicate samples showed a high correlation between the original and the check samples. The maximum differences of Fe% between the pairs of samples was -1.24% and 2.58%, with an average of 30.44% Fe for the original samples as compared to 30.78% Fe for the check samples.

A slight positive bias is visible in the XRF analyses, which can be expected since the XRF technique using fused discs allows full dissolution of the total iron, including the iron locked in silicates, as opposed to the soluble iron determinations on the original samples.

The square of the correlation coefficient between the two (2) populations was calculated as 0.9736, which is high (Figure 12.1). Using the relative difference to describe the differences between pairs of duplicate analyses shows a maximum of 9.73%, but with 75 pairs below 5%, which is excellent.

In the absence of appropriate Standard Reference Material, Met-Chem used two (2) available standards, but they did not perform well owing to the presence of sulphides in them, which prevented accurate XRF analysis. No blanks were included in the check samples.

Figure 12.1 – Scatter Diagram Showing the Correlation Between the Original and the Met-Chem’s Check Samples



The two (2) pairs of duplicate samples inserted by Met-Chem did not perform very well, exhibiting differences of -2.37% and -1.40% Fe in the duplicate versus the first analysis. Although the differences are high, no conclusion can be drawn from only two (2) sets of data. Silica determination was included in the XRF analyses but was not part of the wet chemistry method applied to the original samples.

12.4.3 Bulk Density

The previous resource estimates were completed using the density determined by the pycnometer method, without correction for the effects of porosity and permeability. At Met-Chem’s recommendation, NML had the technicians from a sample preparation laboratory in Chibougamau, the Table Jamésienne de Concertation Minière, perform bulk density determination on 167 samples from the KéMag Deposit. The work was completed in 2012 at NML’s core shack in Schefferville. The results from the KéMag Deposit were used to build a single regression function for each seam. This matter is discussed in Section 14.0 of this PFS.

12.5 Geological Review and Audit by Met-Chem

In 2012, Met-Chem was requested to provide an audit of the resources estimated by Geostat and carry out a new resource estimate of the KéMag Deposit. During the course of the work,

some issues were investigated that led to a few corrections and changes to Geostat's resource model.

The primary concerns raised by Met-Chem dealt with the validation of some entries into the drill hole database, weaknesses in the geological interpretation on some sections, the mesh size at which the samples were pulverized before being analyzed and the conversion of DT results at different mesh sizes, the use of Specific Gravity versus In Situ density to convert volumes to tonnes, the sample compositing and the spatial continuity of the mineralization.

These issues and the actions taken to address them are discussed in Section 14.0 of this Report, with the revised resource estimate by Met-Chem.

This was not revisited by NML for the purpose of this PFS.

13.0 MINERAL PROCESSING AND METALLURGICAL TESTING

Metallurgical testwork has previously been performed for the feasibility study on the KéMag deposit. Detailed description of this testwork can be found in the publicly filed NI 43-101 report dated May 9th, 2014. Much of this historic testwork has been used for the current pre-feasibility study but new testwork has been performed in the areas where the flowsheet has been modified, namely, the HPGR circuit, fine grinding (Vertimill and IsaMill), optimized flotation, tailings filtering for dry stacking and concentrate freezing and handling properties. This section of the report provides a summary of the key takeaways from the testwork results.

13.1 Representative Samples

Since the beginning of work on the deposits of the Millennium Iron Range by NML in 2003, NML has maintained a standard testing procedure to characterize the resources in the various deposits it owns. The procedure allows characterizing the two main parameters of the process plant performance, namely the weight recovery (the amount of magnetic material present in the ore) and the product quality of the recovered concentrate.

All drill core samples were processed to determine the Davis Tube Weight Recovery (“DTWR”), as well as Fe and SiO₂ content of the concentrate as per the Midland Research Center (“MRC”) DT test procedure. The characterization test uses a staged grinding procedure to produce a DT feed of 100% passing 45 microns (325 Mesh) control screen.

The DT test is considered an accurate indication of magnetic iron recovery and product quality and translates well to a full scale plant performance with a correlation adjustment. The test programs performed by NML and the data available from existing operations with similar types of ores can be used to predict the process plant performance in relation to the plant feed characteristics included in the mine block model.

The KéMag orebody was modeled using the drill core data developed using the MRC DT test procedure and the mine planning was done to optimize the overall economics of the project. The mineral reserves are provided in Chapter 15.0 while the mine planning and design for the 25 years mine plan is provided in Chapter 16.0.

All the ore samples used in the test work programs since 2005 were composite samples representing all of the geological layers of the orebodies in a proportion similar to their occurrence. For test results interpretation, the composite samples were characterized using the same DT test method as the drill core samples for block modeling to establish proper correlation between the block model and the process plant performance.

The samples used during test work are representative of the ore to be processed during operation.

13.2 Summary of Relevant Testwork Results

13.2.1 Final Pellet Product

The overall process targets a grind fineness (Blaine) of 2000 cm²/g. This was established through testwork to optimize the process plant magnetic separation stages, ensure sufficient liberation to reach final concentrate quality targets and provide a very efficient balling and induration performance for maximum pellet plant output. A detailed study on pellet plant design, supported by testwork was performed by Outotec as part of the original project feasibility study. This will be described in more detail later in this section.

13.2.2 Primary Grinding Circuit

The concentrator design is based on a 2-pass HPGR flowsheet. Testwork on the HPGR circuit was conducted at SGA and with HPGR manufacturers. The results from the testwork were used to size the major equipment in the HPGR circuit as well as auxiliary equipment such as screens, conveyors, bins and magnetic separators. Scale up procedures have considered the impacts of plant scale equipment for HPGRs (edge effect and throughput impacts) and screens efficiencies.

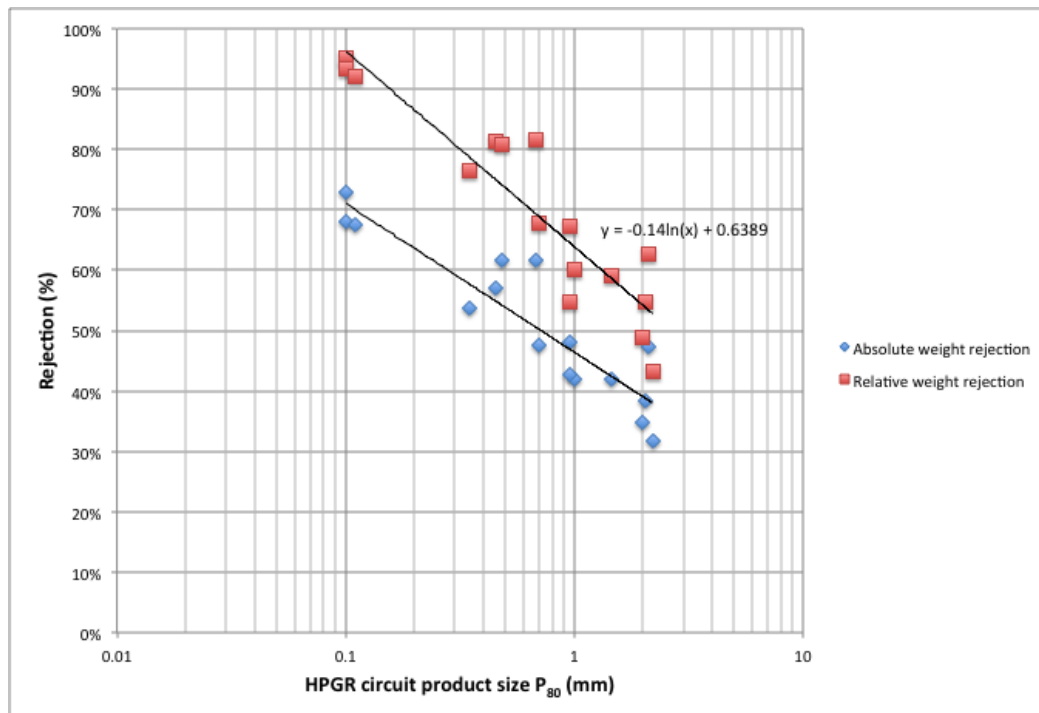
The HPGR tyre wear rates are based on practice and recommendation from manufacturers which performed wear tests. The ore does not tend to make flakes and no de-agglomeration stage is needed in the HPGR circuit because of wet screening.

13.2.3 Magnetic Separation Concentration Plant

a) Cobber Magnetic Separation Weight Rejection Model

The weight rejection at the cobber magnetic separation stage is heavily impacted by the HPGR circuit transfer size. Figure 13.1 shows the modelled cobber magnetic separation weight rejection. Absolute and relative weight rejections are presented. The relative weight rejection is based on the total tailings rejection calculated from the final concentrate weight recovery of the pilot plant tests. This takes into consideration the feed quality and its effect on the rejection at cobber stage. A higher weight recovery ore will have a lower absolute weight rejection at cobber but its relative weight rejection should remain similar.

Figure 13.1 – Cobber Weight Rejection vs HPGR Transfer Size



The selected 2-pass HPGR flowsheet produced a transfer size P₈₀ between 0.35-0.48 mm. According to the model in Figure 13.1, the relative weight rejection ranged between 77% and 81%. The logarithmic model predicts a relative weight rejection between 74% and 79% of total tailings. A relative weight rejection of 78% is used to predict the process plant performance. The weight rejection is used jointly with the plant weight recovery variance to calculate the ball milling feed tonnage after cobber magnetic separation. The feed to the ball mill circuit (“BMF”) is provided from the following equation:

$$BMF = 1 - (1 - MPWR) \times 78\% \quad Eq 1$$

b) Magnetic Plant Weight Recovery

The magnetic separation plant weight recovery is estimated on the basis of prior experience for magnetite recovery and corrected for the final product quality.

The magnetic iron content of the material is calculated directly from the Davis Tube results included in the block model. The DTWR is multiplied by the Davis Tube Concentrate (“DTC”) iron obtained. The formula is:

$$Fe_{mag} = DTWR \times DTC_{Fe} \quad Eq 2$$

The amount of Fe_{mag} recovered by the process plant is 95%, which is based on performance of existing operations. To calculate the magnetic separation plant recovery, the recovered magnetic iron must be divided by the expected Fe in the concentrate. The magnetic separation plant concentrate will have 0.5% higher silica than the DTC based on pilot plant tests. This corresponds to a reduction in iron content of 0.36% ($0.5\% / 1.382$). 1.382 is the estimated correlation slope between Fe and silica in the concentrate.

The overall magnetic plant weight recovery (“MPWR”) formula is:

$$MPWR = \frac{DTWR \times DTC_{Fe} \times 95\%}{(DTC_{Fe} - 0.36\%)} \quad Eq\ 3$$

c) Ball Mill Grinding Power

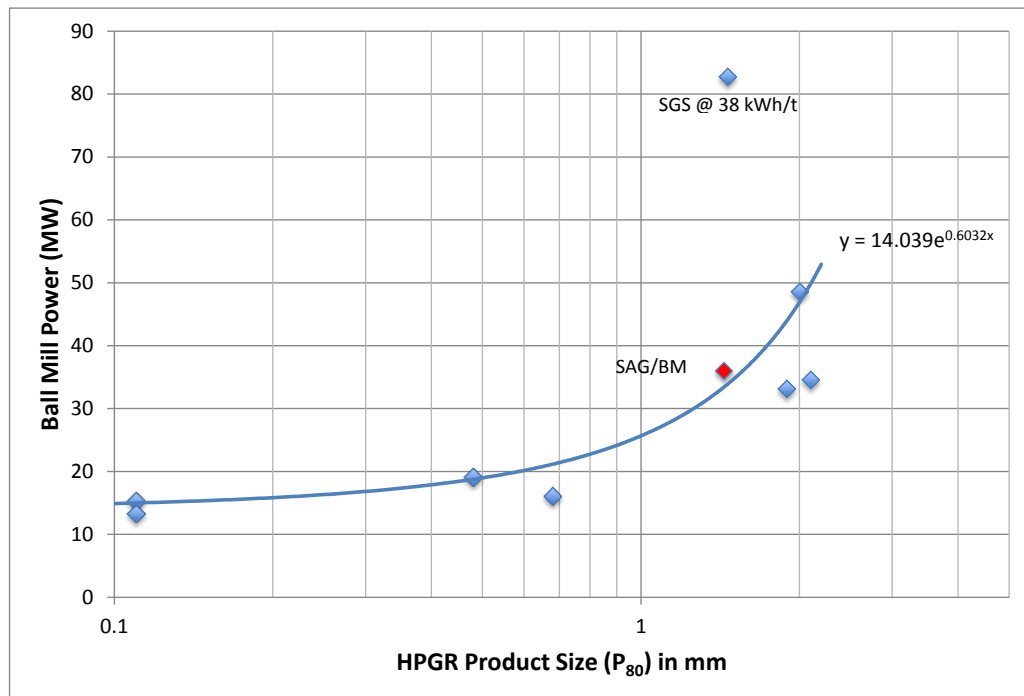
Figure 13.2 presents the calculated ball mill power from the pilot plant tests performed over the years on the different process options. The ball mill power is calculated for a production of 8.7 Mtpy of final concentrate.

There is one (1) outlier test point from the expected grinding power results. The SGS Lakefield pilot plant test in 2006 provided a ball mill power estimate of 38 kWh/t of cobber concentrate or 83 MW. The measured Bond Work Index was 14 kWh/t of cobber concentrate during the same test program. Using the Bond equation to calculate the required ball mill power gives only 16.6 kWh/t of cobber concentrate, which corresponds to 36 MW using the observed cobber separation rejection during the test. This is exactly the same ball mill power estimated for the SAG/BM option. Therefore, this SGS Lakefield pilot plant result is ignored in assessing the required ball mill power.

The model in Figure 13.2 indicates that the process plant needs approximately 19 MW of ball mill power for the 2-pass HPGR flowsheet with an approximate HPGR transfer size P_{80} of 0.5 mm.

In the proposed circuit, the ball mills are replaced by Vertimills. This choice of grinding technology influences the power efficiency. In the range of product size desired, Vertimills are more energy efficient than standard ball mills. This contributes to reduce the necessary grinding power. Metso Minerals (Metso) considers that Vertimills require 30% less than standard ball mills in this range. Based on the pilot plant work, bench scale testing at Metso and the general Metso sizing rule, the total Vertimill installed power (in the two stages of grinding) could be reduced to 7 kWh/t of Vertimill feed or 13.2 MW in total.

Figure 13.2 – Ball Mill Grinding Power vs HPGR Transfer Size (8.7 Mtpy)



d) Magnetic Separation Plant Product Quality

In 2012, a pilot plant test was done at the Coleraine Minerals Research Laboratory (“CMRL”) in Minnesota. The ore sample used for the testing program had 2.2% SiO₂ from Davis Tube tests. The pilot plant tests provided a magnetic separation plant concentrate with 0.5% higher silica than the Davis Tube test results. This rule can therefore be applied to the block model database for plant performance prediction as it was compared on the same basis.

13.2.4 Flotation Plant Design and Performance

Flotation test work has spanned many years and was mostly part of the same test programs as the Magnetic Separation Plant work and a complement to reach a concentrate grade suitable for the production of DR pellets. The production of DR pellets requires a concentrate at 1.5% SiO₂ which will keep the total acid gangue (SiO₂ + Al₂O₃) in the final indurated pellets under 2.0%. The silica constraint could be increased slightly if organic binder was used in pelletizing but, since this is not a proven practice, NML has considered reaching 1.5% SiO₂ in the concentrate prior to pelletizing for safe design.

Flotation work was done through SGA in Germany and SGS Lakefield in Canada. They both performed bench-scale flotation tests while continuous pilot plant operation of the full flotation flowsheet was only done by SGS Lakefield.

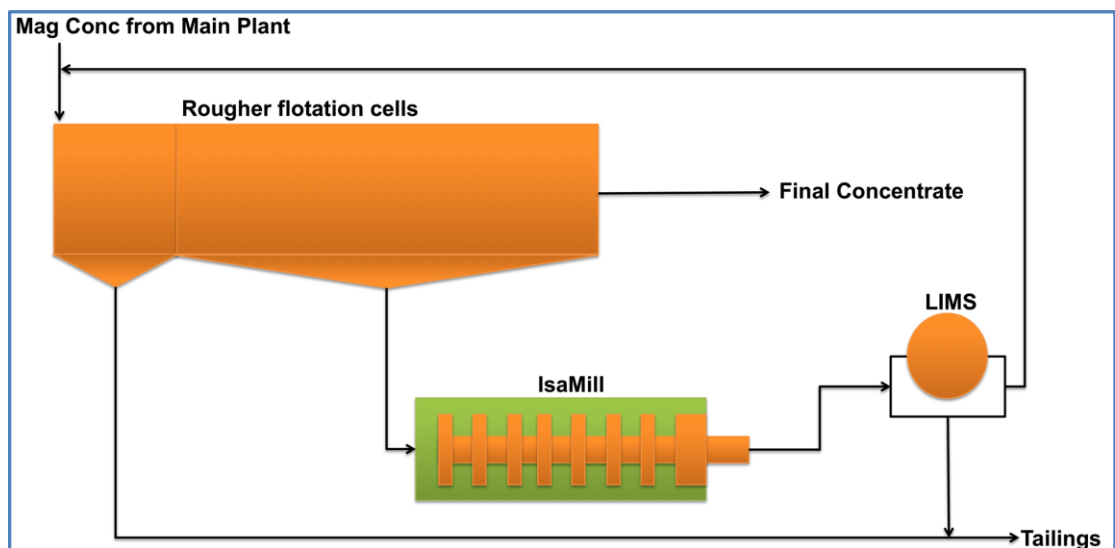
The following discussion summarizes the relevant information for the final flotation plant design and performance. The latest pilot plant work will be used for plant performance calculation.

a) Flotation Circuit Flowsheet

The flotation flowsheet was developed in two phases. Both initial and optimized flowsheets included a rougher/scavenger flotation stage with a retention time that varied between 30 and 43 minutes and averaged 36 minutes.

To reach a concentrate of 1.5% silica, the first stage of rougher flotation was sent directly to tailings to allow some middling to escape the flotation circuit and reduce the load on the regrind mill and magnetic separation cleaner. This is presented in Figure 13.3.

Figure 13.3 – Optimized Flotation Flowsheet



The flowsheet is very simple, stable and easy to operate. Adjustments could be made depending on the desired final product.

b) Regrind Fineness and Power Requirement

The target regrind size and required power was tested by SGS Lakefield with different tests. Figure 13.4 shows the regrind size vs silica rejection efficiency (% SiO₂ rejected - % Fe rejected) at the magnetic separation stage that follows the regrind mill.

The figure indicates that efficiency increase with finer grind but the gain becomes marginal beyond a certain size.

To get a better understanding of the separation efficiency, it was plotted against the IsaMill input power and shown in Figure 13.5 for two IsaMill signature plots. It can be seen that most of the liberation work happens in the first 20 kWh/t of regrind power

input. The separation efficiency reaches over 70%. This would result in a regrind product size P_{80} in the range of 13 to 14.5 μm according to the IsaMill signature plots shown in Figure 13.6.

Figure 13.4 – Effect of Regrind Fineness on Silica Rejection

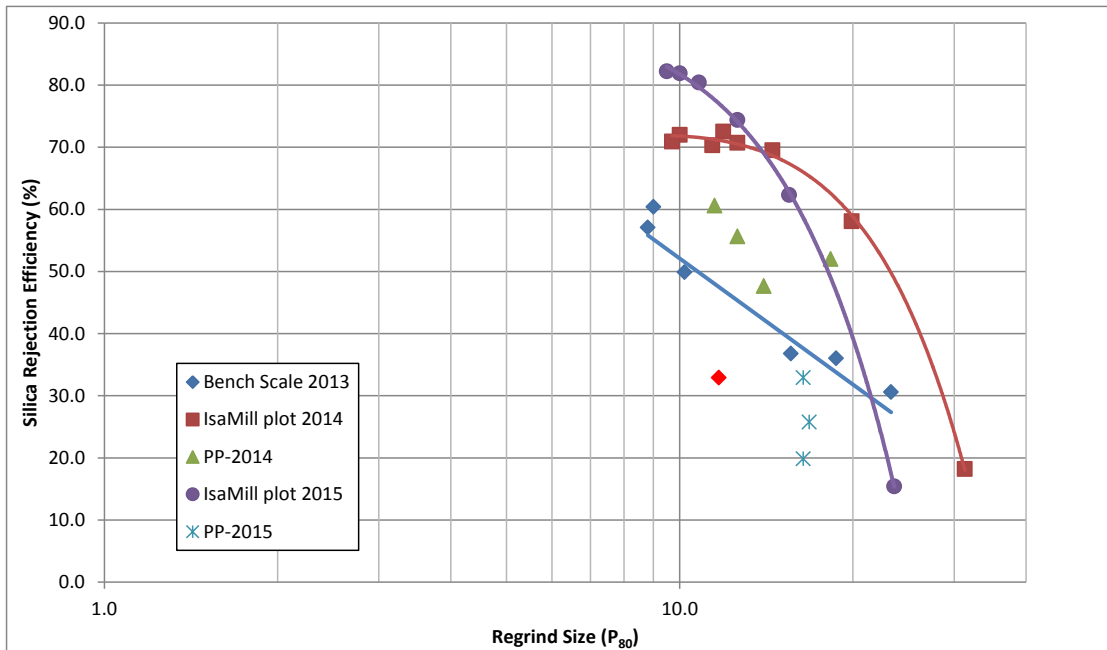


Figure 13.5 – Silica Rejection Efficiency vs IsaMill Power (SGS 2014 & 2015)

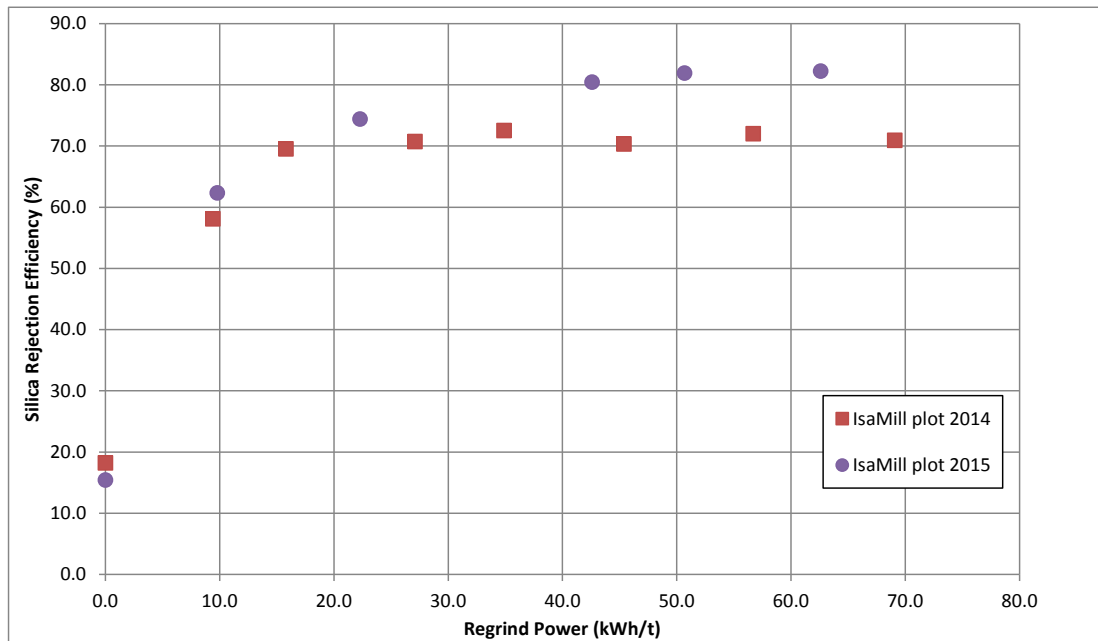
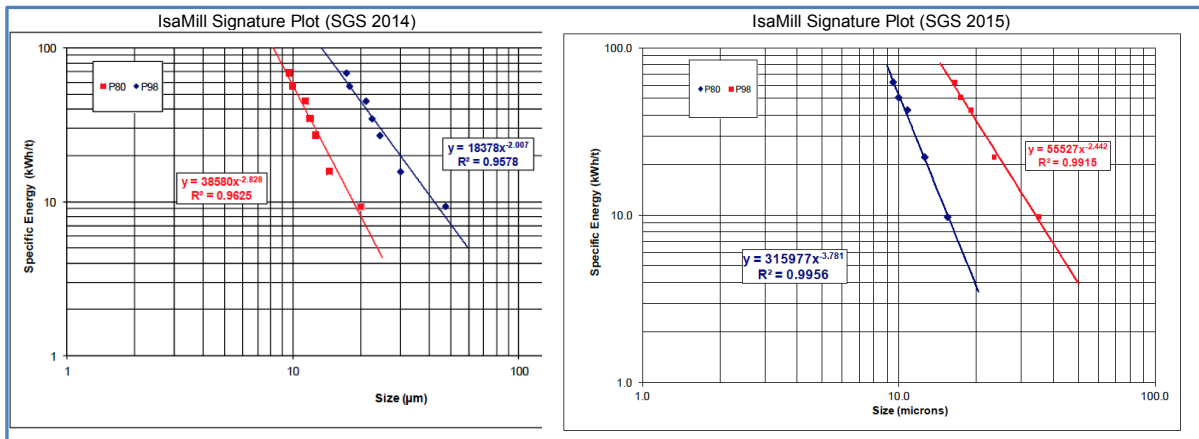


Figure 13.6 – IsaMill Signature Plots (SGS 2014 & 2015)



c) Flotation Recovery

The prediction of iron recovery and silica rejection is based on the latest bench scale and continuous pilot plant tests. The best balance of silica rejection is obtained when the first rougher cell rejects about 20% of the silica in 2% of the flotation feed weight. This leaves about 30% of the silica to be rejected at the cleaner magnetic separation stage, which it can do by rejecting approximately 1.3% of the flotation feed weight. The total weight rejection is 3.3% of

flotation feed (weight recovery of 96.7%) and this corresponds to an overall Fe recovery of 98.0%.

When DR pellet feed is produced, the flotation weight loss is 3.3% of magnetic separation plant concentrate and Fe recovery is 98%. When BF pellet feed is produced, the flotation weight loss is equivalent to 1.7% of magnetic separation plant concentrate and Fe recovery is 99%.

13.2.5 Supplier Design Tests for Process Plant Equipment

Multiple suppliers' tests have been done over the years to properly size the concentrator equipment. This includes the following:

- Crusher sizing testwork;
- HPGR design testwork;
- Screen design testwork;
- Desliming and final concentrate thickener testwork;
- Final concentrate filtration testwork;
- Material handling properties on plant feed;
- Concentrate freezing and handling.

The results of those tests have been used to size the equipment needed to achieve the plant design performance. In general, the ore is hard and abrasive. This leads to high wear of comminution equipment such as crushers and grinding mills. The concentrate will need to be partially dried to less than 4% moisture in winter to prevent freezing during transportation by rail.

13.2.6 Tailings Dewatering, Handling and Storage Testing

In 2015, Paterson and Cooke ("P&C") performed tailings characterization, processing, dewatering and transport test work for the filtered stacked tailings option of the Taconite Project. The samples used were produced from a pilot plant test done by SGA in Germany in late 2014. The results of this test program form the basis for the tailings dewatering and dry stacking design.

The test program showed that combined pressure filtration of the coarse and fine tailings is the best alternative.

The tailings dewatering testwork included coarse tailings hydro-separation tests, tailings thickener test, tailings filtration tests, transportable moisture limit and conveyability tests and dewatered tailings geotechnical properties.

13.2.7 Pellet Test Work and Process Development

Pot grate tests have been done by SGA and by Outotec both in Germany. The tests by Outotec have been used for pellet plant design. A summary of the results is provided below.

12 pot grate tests were conducted in 2013 at Outotec to target 8.5 Mt/y throughput guarantee for the 816 m² machine. In nine (9) of the tests, BF grade pellets were produced. The remainder were DR grade pellet tests.

The chemical and metallurgical design criteria were determined by a market study for high quality BF and DR grade pellets. The SiO₂ content of the concentrate was at 1.6% and 2.3% for DR and BF grade pellets respectively. This was achieved by flotation at pilot scale by SGA in Germany. The DR grade pellet feed results from 100% floated material while the BF grade pellet feed was a mixture of 50% magnetic separation concentrate (un-floated) and 50% floated DR grade pellet feed material as will be applied in the full scale plant.

The basicity levels (CaO/SiO₂) were at 0.4 for DR grade pellets and 0.85 for BF grade pellets. Limestone was used as the fluxing medium in all tests. The level of bentonite was at 0.48% for the first three (3) tests and increased to 0.54% in the subsequent tests.

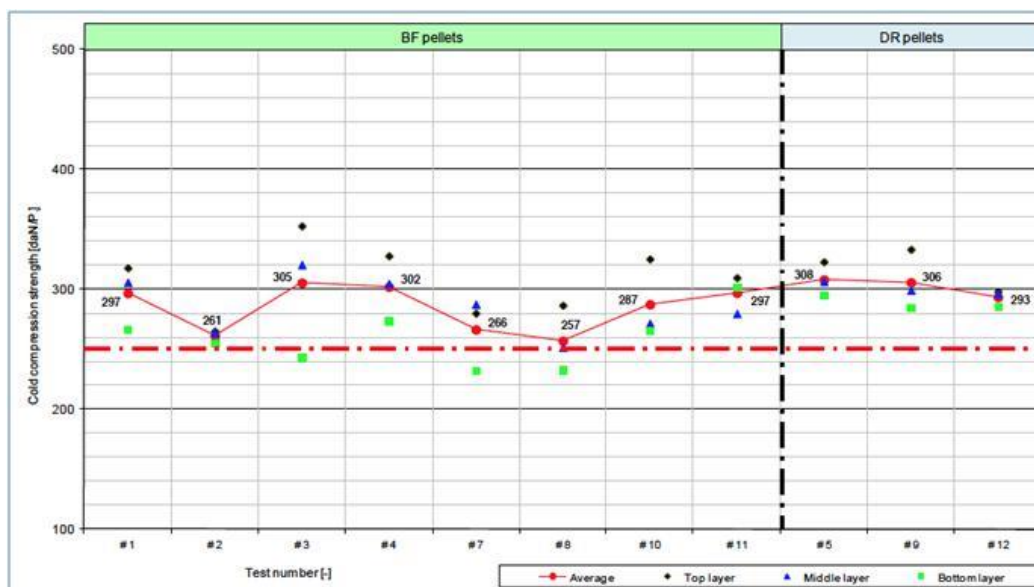
a) Green Ball Properties

The Outotec green ball wet compression strength was acceptable throughout the test work, being always above one (1) kg/pellet. The dry compression strength was between 2.5 and 3.8 kg/pellet. The drop number varied between 2.7 and 3.8.

b) Properties of Fired Pellets

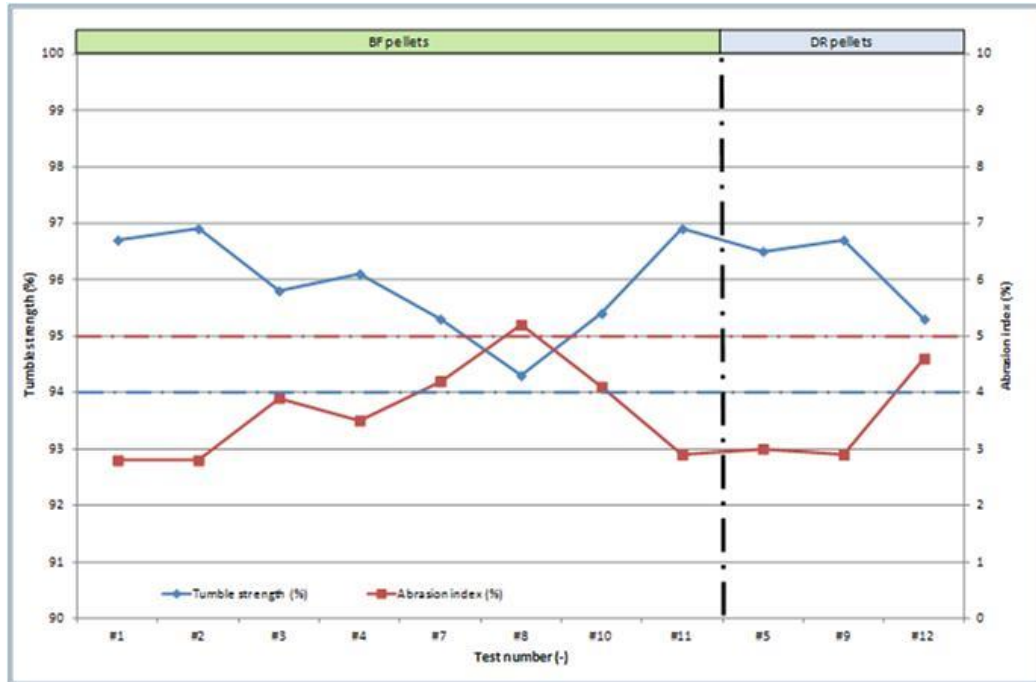
While some parameters fluctuated during the testing period, the conditions of Tests #9 and #10, for DR and BF pellets respectively, were selected as the basis for the final equipment design and process guarantee.

Figure 13.7 – Cold Compression Strength (Outotec)



The Tumble Index was very good in all tests (always above the lower limit of 94 %) as shown in Figure 13.8. The Abrasion Index values were lower than the desired five (5) % maximum.

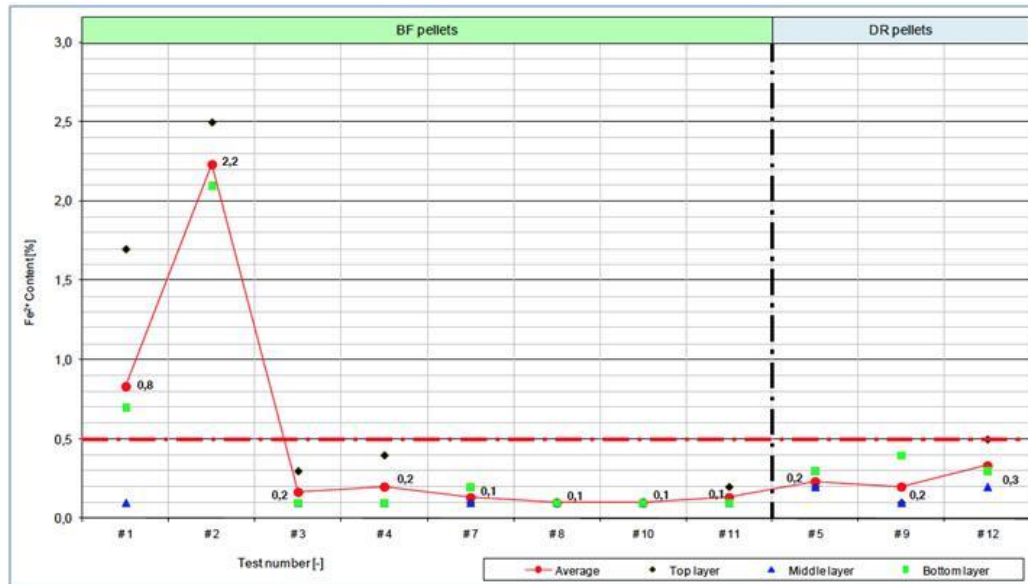
Figure 13.8 – Tumble and Abrasion (Outotec)



Cold compression strength values required are a minimum value of 280 daN/pellet for DR grade pellets and of 250 daN/pellet for BF grade pellets. This requirement could be reached for the average values in almost all tests, with results between 293 to 308 daN/pellet for DR pellets, 257 and 305 daN/pellet for BF pellets (average values over all layers). The cold compression strength values are shown in Figure 13.7.

After two (2) initial high bivalent iron readings, the hot gas temperature was decreased to 1,250°C from Test #3 onwards, and all subsequent tests were successful in that regard. The full results are shown in Figure 13.9.

Figure 13.9 – Bivalent Iron (Outotec)



c) Grate Factor/Productivity

The targeted Grate Factor of 36.3 t/d/m² was achieved in almost all of the tests to reach a production of 8.5 Mtpy in 330 days per year with a safety margin of 15%. The bed depth was maintained at 370 mm for all tests.

The net safety margins over the targeted capacity of 8.5 Mtpy varied between +11.4% and +21.8% for BF grade pellets and the DR pellets tests remained above 15%.

d) Metallurgical Properties

The BF pellets' metallurgical properties were analyzed in Tests #4 and #10 and the results are shown in Table 13.1. All the results met the required values except for the Free-Swelling Index of Test #10 at 22.4% when the maximum should be 20%. This target should be achieved in the operating plant by adding some additional dolomite in the flux.

The DR metallurgical properties are shown in Table 13.2. Pellets from Tests #5 and #9 were analyzed. The DR pellets met the target values except for the sticking test of Test #5 where the Clustering Index of 18.8% surpassed the 15% maximum. However, this test was performed without a dolomite coating which is common practice in industrial plants. Pellets from Test #9 had a very good result at 4.1% Clustering Index using a bauxite coating.

Table 13.1 – BF Pellets Metallurgical Properties (Outotec)

Description	Units	Requirements		Test #4	Test #10
		Min.	Max.		
Swelling Test (ISO 4698)					
Free-Swelling Index	%		20.0	18.8	22.4
Static Test for Low-Temperature Reduction Disintegration (ISO 4696-1)					
Reduction Disintegration Index RDI _{+6.3}	%	90.0		93.2	97.0
Reduction Disintegration Index RDI _{-3.15}	%			4.1	2.1
Reduction Disintegration Index RDI _{-0.5}	%			3.2	2.0
Determination of Reducibility (ISO 4695)					
Degree of Reduction (t=240)	%			97.3	98.1
Minimum dR/dt at R=40%	%	1.0		1.1	1.2
Dynamic Test for Low-Temperature Reduction Disintegration (ISO 13930)					
Low Temperature Disintegration Index LTD _{+6.3}	%	80.0		81.1	96.6
Low Temperature Disintegration Index LTD _{-3.15}	%			11.9	2.4
Low Temperature Disintegration Index LTD _{-0.5}	%		11.0	7.7	2.2

Table 13.2 – DR Pellets Metallurgical Properties (Outotec)

Description		Requirements		Test #5		Test #9	
		Min.	Max.	5-1	5-2	9-1	9-2
Sticking Test (ISO 11256)							
Coating				n.a.		Bauxite	
Clustering Index	%		15.0	18.8		4.1	
Reduction Disintegration Test (ISO 11257)							
Degree of Metallization	%			92.2		86.7	94.7
Reduction Disintegration Index DR RD ₊₁₀	%			95.7		97.4	96.0
Reduction Disintegration Index DR RDI _{-3.15}	%		1.5	1.2		0.8	0.9
Reduction Test (ISO 11258)							
Minimum Degree of Metallization (Calculated)	%	95.0		98.8	96.0	94.8	97.0
Degree of Reduction	%	95.0		98.6	97.2	96.4	97.9
dR/dt at R=40%	%			2.2	1.6	1.4	1.4
dR/dt at R=90% Estimated	%			0.7	0.4	0.5	0.7

e) Summary of Pelletizing Test Work

Based on the test results, Outotec issued a confirmation letter guaranteeing a nominal annual capacity of 8.5 Mtpy for the 816 m² pellet machine. It was also stated that the pellet line was expected to ramp up to 9.0 Mtpy after a period of stable and routine operation.

The physical properties of the indurated pellets such as cold compression strength, tumble strength and Abrasion Index met or exceeded the desired levels in most tests, especially in the tests which were used as basis for plant design. The metallurgical properties of the pellets were very good though some improvements may be made in selected parameters.

13.3 Summary of Recommended Test Work for Next Phase

The following is a summary of recommended additional test work to be performed during the feasibility study phase:

- The 2-pass HPGR flowsheet was only tested once at SGA. Because this flowsheet is new, it should be assessed by HPGR manufacturers and retested to confirm the circuit design parameters and HPGR size selection. It is complex to test for HPGR manufacturers as it includes an embedded magnetic separation stage. It may require the rental of a magnetic separator unit for testing;
- During NuTac PFS, an option of using IsaMills to replace the Vertimills was tested. The results indicated that higher energy than expected is needed to complete the final magnetic plant concentrate grinding. The Vertimill regrind power should be validated through a pilot scale test to confirm the final selection;
- Testing of the final concentrate properties for drying and material handling was done at the PFS level. However, a verification of possible extra testing required to complete the detailed engineering should be done with Jenike & Johanson;
- Supplemental tests may be needed to complete the tailings dewatering and dry stacking design. A verification of possible missing design data and the need for a final validation of certain critical design aspect should be done during the feasibility study phase;
- Identification of the need for pellet feed samples to be provided to pellet plant suppliers (Outotec, Metso, Danieli) to determine if a larger bulk sample needs to be processed for production to allow suppliers to test, design and provide performance guarantees for pellet plant supply.

14.0 MINERAL RESOURCES ESTIMATES

14.1 Mineral Resources Estimate Statement

The Mineral Resources estimate of the KéMag Deposit performed by Met-Chem as part of the Taconite Feasibility Study remains the most current as no additional exploration work has been performed on the Property since the 2014 TFS. In fact, no additional drilling campaign had been performed on the Property since the resources estimate prior to Met-Chem's, which was performed by SGS-Geostat Ltd. in September 2008. The resources were re-estimated by Met-Chem in order to take into account minor corrections to the drill hole database and the geological interpretation that were made during the course of its audit.

The most important changes introduced were: (1) the addition of a correction factor for the density in order to account for secondary porosity; (2) the estimation of density based on regression functions for each seam that modeled the density based on the head iron content (TotFe). Previously, SGS estimated density using an average density per seam based on density measurements by pycnometer. A more recent study of core density by water immersion better captured in-situ density and allowed Met-Chem to create the regression functions, which provide a more accurate definition of density.

The effective date of the Mineral Resources estimate is December 4, 2012, which is the date the core density measurements were completed on both LabMag and KéMag core samples at NML's core shack in Labrador City. Met-Chem last visited the KéMag Property in September 2012. Since then, no field work or drilling has been carried out that may have any impact on the geometry, geology or grade of the KéMag Deposit. Since none of the parameters used in the 2012 Resources Estimates has changed, Met-Chem's QP Schadrac Ibrango is satisfied that the 2012 resource figures are still valid and current at the time this Report was prepared.

The entire database used contained 90 records resulting from exploration work performed between 2006 and 2008. Eighty-nine (89) holes were used to interpolate blocks constrained within surfaces (top and bottom) related to each geological seam. Variogram parameters defined for the more drilled LabMag Deposit were used in resource interpolation. Using a block modeling approach, the resource interpolation was performed using the Inverse Distance Weighted method at a power of 2 ("IDW2"). The resources estimate was performed by Schadrac Ibrango P. Geo., Ph.D., from Met-Chem.

The resource classification followed the NI 43-101 standards and guidelines. The criteria used by Met-Chem for classifying the estimated resources were based on certainty of continuity of geology and grades. The CIM standards for resource classification are provided in Section 14.2. Mineral Resources are stated using a DTWR cut-off of 18%. A summary of the Mineral Resources is provided Table 14.1.

Table 14.1 – Summary of the Mineral Resources (Cut-Off of 18 % DTWR)

Resource by Category	Tonnage (Mt)	In Situ Grades			
		TotFe (%)	DTWR (%)	DT Concentrate	
				Fe (%)	SiO ₂ (%)
Measured	1,507	31.45	26.97	69.69	2.56
Indicated	876	31.95	27.32	69.83	2.51
Measured + Indicated	2,383	31.63	27.10	69.74	2.54
Inferred	1,007	31.56	26.97	69.31	2.65

14.2 Definitions

According to the latest version of the CIM Standards/NI 43-101 that was adopted by the CIM Council on May 10, 2014:

A **Mineral Resource** is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

Material of economic interest refers to diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals.

An **Indicated Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit.

Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation.

An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

A **Measured Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit.

Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation.

A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource.

It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.

An **Inferred Mineral Resource** is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling.

Geological evidence is sufficient to imply but not verify geological and grade or quality continuity.

An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve.

It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

14.3 Mineral Resources Estimation Procedures

The estimation of the KéMag Mineral Resources included the following procedures:

- Detailed analysis and audit of the drill holes database received from NML;
- Import of the database into MineSight® v. 7.80-2;
- Generation of basic descriptive statistics of the entire Data Base (“DB”) to analyze and compare the different statistical parameters in order to provide a general representation of grades behavior;
- Decision on the compositing length and, if need be, of grade capping;
- Import, audit and necessary adjustments of the sectional geological interpretation provided by NML;
- Re-generation of basic descriptive statistics on a seam by seam basis;
- Construction of geological surfaces representative of top and bottom of each geological layer;
- Analysis of the drilling density in order to determine block size parameters;
- Generation and setup of a block model;
- Analysis of the relationship between TotFe % and density on a seam by seam basis. Development of a linear regression model for each seam in order to automatically calculate the density of each block depending on its iron content;
- Resource interpolation and validation;
- Classification of the Mineral Resources according to CIM/NI 43-101 standards;

- Mineral Resources statement.

14.4 Drill Hole Database, Data Verification and Validation

14.4.1 Data Verification and Validation

A Microsoft Access database containing both the LabMag and KéMag Deposit data was provided by NML. Data specifically related to KéMag were extracted in a Microsoft Excel file for audit, validation purposes and subsequent use. The following issues were highlighted when auditing the database and discussed with NML prior to corrective actions being taken:

- Three (3) holes in the KéMag database did not have coordinates. These holes are 07-HL-1003A, 07-HL-1007A and 07-HL-1069A. They were noted by NML as having been abandoned due to technical difficulties. Replacement holes were restarted in the nearby vicinity and are already present in the database. The related holes were removed from the resource database.
- Duplicate intervals with different lithological codes were found in the database. NML reported such intervals as having been introduced by SGS for the previous resources estimate. The duplicated intervals were removed from the database.

14.4.2 Drill Hole Database

The corrected and updated database contains 90 records of holes drilled during the 2006, 2007 and 2008 drilling campaigns. A summary of drilling work performed during these campaigns is provided in Table 14.2. Fields contained in the database are summarized in Table 14.3.

Table 14.2 – Drilling Statistics by Year

Company	Drilling Year	Holes	Drilled Length (m)	Sampling Length (m)
NML	2006	29	3,585.60	2,493.9
NML	2007	46	4,979.20	3,875.44
NML	2008	15	2,216.10	1,503.5
Total		90	10,780.90	7,872.84

Table 14.3 – KéMag Database Content

File	Fields
Collar	Easting, Northing, Elevation, Azimuth, Dip, Length
Assays	Hole ID, From, To, Fe%h, DTWR%, Fe%c, SiO ₂ %c, SiO ₂ %h, SMG%h, SMG%c, P%h, Mn%h, Al ₂ O ₃ %h, TOx%h, SpGrav, Fe++, P%c, Mn%c, Al ₂ O ₃ %c, tOx%c, CaO%c, MgO%c, TiO ₂ %c, Na ₂ O%c, K ₂ O%c, MagSus, Cr ₂ O ₃ %c, V%c, LOI%h, LOI%c, Zone
Lithology	Hole ID, From, To, RCODE, GCODE

Table 14.4 presents the different lithological units as logged by geologists and their classification by rock group. Basic statistics by seam basis and calculated from the entire database for iron formation are presented in Table 14.5.

The statistics on DTWR % show PGC as being the most magnetic rich layer. The highest iron content in head is observed in JUIF and URC. The high head iron content in URC could be explained by its mixed nature (hematite and magnetite). The lowest DTWR % and Fe % are observed in GC.

Table 14.4 – KéMag Lithological Units

RCODE	GCODE	Rock Type	Rock Group
1	OB	Overburden	Stripping
2	MS	Menihék Shale	Stripping
3	LC	Lean Chert	Iron Oxide
4	JUIF	Jasper Upper Iron Formation	Iron Oxide
5	GC	Green Chert	Iron Oxide
6	URC	Upper Red Chert	Iron Oxide
7	PGC	Pinky-Green Chert	Iron Oxide
8	LRC	Lower Red Chert	Iron Oxide
9	LRGC	Lower Red-Green Chert	Iron Oxide
10	LIF	Lower Iron Formation	No Ore

Table 14.5 – Basic Statistics by Seam of Main Quality Elements

Seam		TotFe	DTWR	DT Concentrate	
		(%)	(%)	Fe (%)	SiO ₂ (%)
LC	Average	29.50	27.05	68.65	2.73
	Min	4.21	0.00	0.00	0.00
	Max	40.28	45.00	72.10	10.80
	Stdev	5.04	8.31	8.17	2.12
	COV	0.17	0.31	0.12	0.78
	Samples	385	385	385	385

Seam		TotFe	DTWR	DT Concentrate	
		(%)	(%)	Fe (%)	SiO ₂ (%)
JUIF	Average	34.04	22.63	69.85	2.31
	Min	14.41	8.00	64.32	1.16
	Max	38.18	38.50	71.29	9.50
	Stdev	3.86	8.54	1.07	1.11
	COV	0.11	0.38	0.02	0.48
	Samples	80	80	80	80
GC	Average	21.16	12.78	70.06	1.75
	Min	12.19	2.50	66.70	0.00
	Max	36.82	36.00	71.60	4.30
	Stdev	5.50	6.81	0.94	0.65
	COV	0.26	0.53	0.01	0.37
	Samples	80	80	79	79
URC	Average	33.90	26.71	70.35	1.87
	Min	16.38	13.50	64.32	0.00
	Max	39.39	41.00	72.00	9.50
	Stdev	3.54	4.72	1.06	1.06
	COV	0.10	0.18	0.02	0.56
	Samples	79	79	79	79
PGC	Average	33.20	30.53	70.11	2.21
	Min	4.66	1.50	64.07	0.00
	Max	44.04	46.00	71.70	8.28
	Stdev	3.58	9.57	1.11	1.14
	COV	0.11	0.31	0.02	0.52
	Samples	172	172	172	172
LRC	Average	33.48	19.68	70.71	1.75
	Min	31.22	7.50	61.30	0.66
	Max	37.27	39.50	72.30	12.60
	Stdev	1.27	9.51	1.82	2.00
	COV	0.04	0.48	0.03	1.14
	Samples	42	42	42	42
LRGC	Average	31.46	25.14	69.29	2.97
	Min	19.06	6.50	51.70	0.44
	Max	39.53	49.00	72.00	22.40
	Stdev	3.09	9.06	2.91	3.00
	COV	0.10	0.36	0.04	1.01
	Samples	461	461	461	461

14.5 Geological Modeling Procedures

The geological modeling was performed by NML's geological team and used by SGS in the previous estimates and by Met-Chem in the current estimate. The KéMag Deposit is composed of a series of sub-horizontal layers (or seams) slightly dipping at -6° to the northeast without any significant deformation. Each layer is modeled separately. The methodology used for the geological modeling is based on the generation of vertical sections, where digitalized lines are snapped between seam contacts from hole to hole.

These section lines are then joined together by triangulation to create geological surfaces representing each seam. NML supplied Met-Chem with the section lines and geological surfaces triangulated by SGS. Inconsistencies were found when Met-Chem audited the data received. They were discussed with NML and agreement was reached before the necessary actions were taken. Relevant inconsistencies found were related to:

- Undulating and no realistic digitalized lines that did not reflect the actual conditions or seam contacts;
- Some seam extensions that did not respect the principle of layers parallelism;
- Discrepancies observed on some seams between NML's original interpretation (sections in PDF format) and SGS's digitalization. It was highlighted that SGS had not strictly considered the sectional interpretation provided by NML for digitalization, but rather had generated its own digitalization using the numerical database provided. However, it appeared that minor modifications and readjustments were added on the sections where some geological intervals were recoded to have a better consistency of the seam thickness from hole to hole. These modifications were not reflected in the database transmitted to SGS. Met-Chem had taken these modifications into account in the resource modeling.

The geological interpretation of first and last cross sections, at the northwest and southeast ends, was extrapolated for an additional 250 m, which represents in average half ($\frac{1}{2}$) of the drilled sections spacing. In order to complete the surfaces and properly constrain the geology, the surfaces at the ends of cross sections (i.e. up and down dip) were extended at an angle of -6° to cover the lateral extension of the deposit. Thus, the surfaces were extrapolated along the natural slope of seams for an additional 250 m beyond the last drill hole on the down dip slope and until the seam intersected the surface topography on the up dip slope. Figure 14.1 and Figure 14.2 show a typical vertical cross section and drill holes location respectively.

Figure 14.1 – Typical Vertical Cross-Section

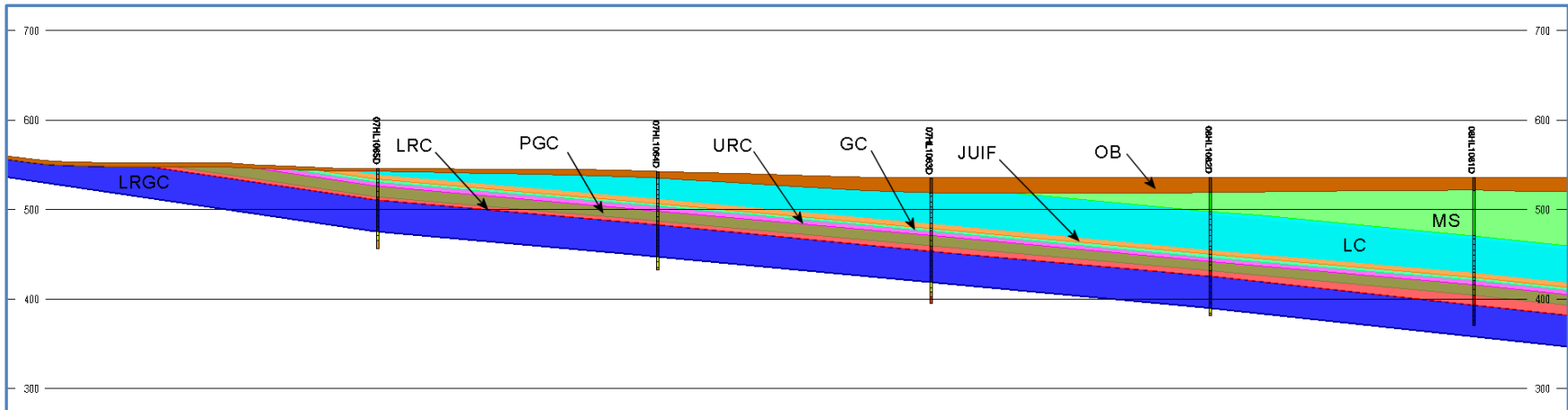
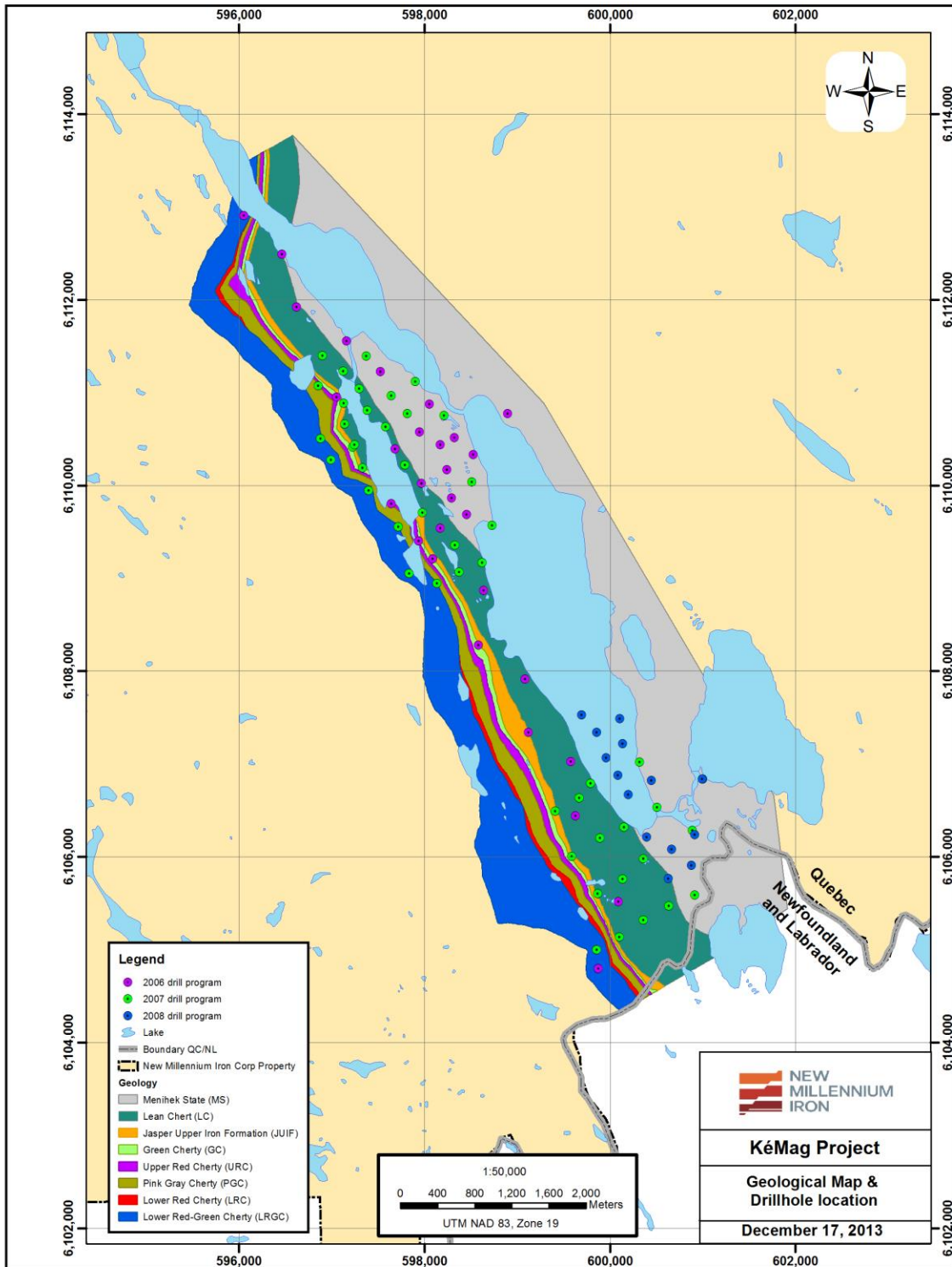


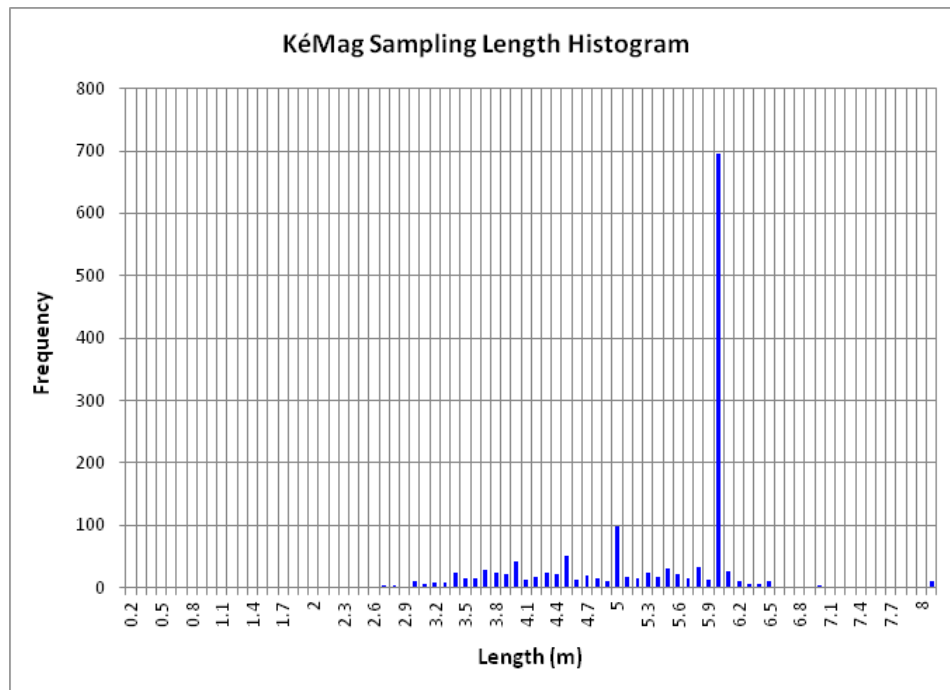
Figure 14.2 – Drill Hole Locations



14.6 Statistical Analysis of Sampling Length and Compositing

A statistical analysis of the sampling length at the KéMag Deposit shows that most samples were taken at a six (6) m interval. The sampling length histogram is presented in Figure 14.3.

Figure 14.3 – Sampling Length Histogram



Using this statistical mode allows most assayed intervals to remain unchanged after compositing. Met-Chem elected to consider the statistical mode of the sampling length, being six (6) m, as compositing length for the resources estimate of the KéMag Deposit. The GC seam was composited at three (3) m in order to take into account its particularly thin thickness.

14.7 Variogram Modeling

Variograms generated for the KéMag Deposit were of poor quality due to the sparseness of the drilling density. The LabMag Deposit, which geology is similar, is relatively more densely drilled, but even on a seam by seam basis, variograms generated for LabMag were mostly of poor quality and the best results were obtained using a “One Seam” model. For the present estimate, variogram parameters defined for the LabMag Deposit for a “One Seam” model were applied to the KéMag Deposit. Such parameters are related to a range of 900 m on the strike direction and a range of 450 m on the dip direction. The third parameter (Z vertical direction) is set equal to the thickness of each seam.

14.8 Density/Specific Gravity

In order to account for secondary rock porosity and permeability, a study was carried out to quantify the effects of the secondary porosity (also called permeability or fractures porosity). SNC-Lavalin was requested to carry-out Packer Tests on five (5) selected holes of LabMag.

The results showed a secondary porosity varying between 0.1% and 0.3% in the Menihék Formation, 0.1% and 0.5% in the Upper Iron Member (LC, JUIF and GC) of the Sokoman Iron Formation, 0.1% and 1.2% in the Middle Iron Member (URC, PGC and LRC) of the Sokoman Iron Formation and between 0.1% and 0.8% in the Lower Iron Member (LRGC and LIF) of the Sokoman Iron Formation. The results are tabulated in Table 14.6.

Based on these measurements, a single average factor of 3% was used in order to account for the vertical component of the secondary porosity missed during the Packer Tests, since all drill holes tested were drilled vertically.

In addition to the Packer Tests, 167 bulk density measurements were performed on half (½) of the core in December 2012 in NML's core storage facility located in Labrador City. The method used was the classical Archimedes' water displacement technique, where a sample is weighed in air and in water and the bulk density calculated as the ratio between the weight in air and the difference of the weight in air and the weight in water. This work was recommended by Met-Chem in order to build regression functions, per mineralized seam basis, between density and TotFe%. Such regression functions give a better estimate of the density than using an average density per seam as done in previous estimates.

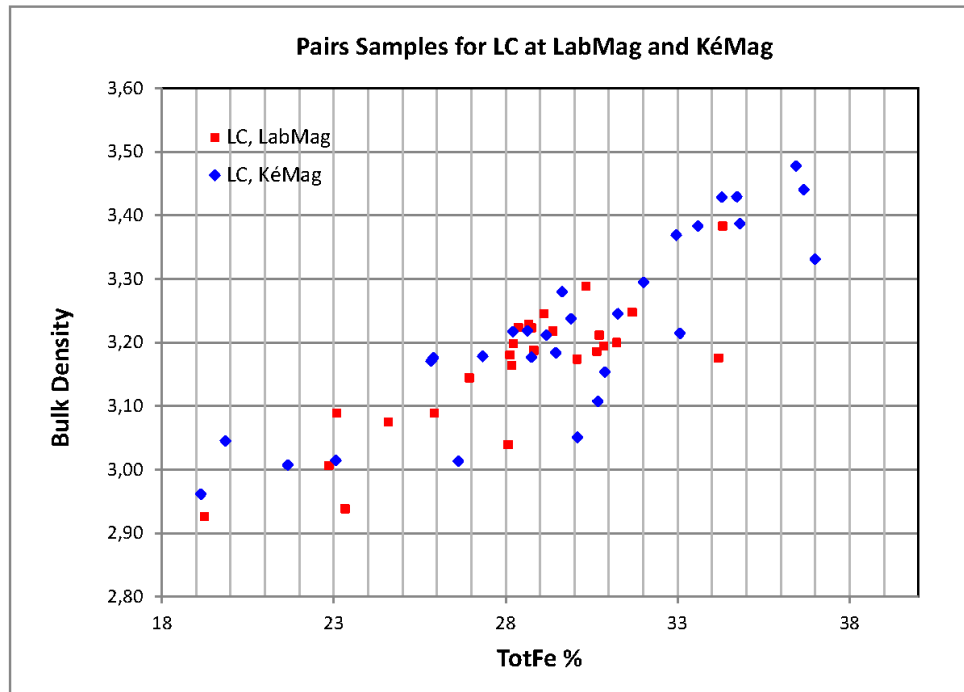
**Table 14.6 – Secondary Porosity Estimation
 of Rock Units for Tested Boreholes**

Unit	06HR1266D n (%)	06HR1267D n (%)	06HR1270D n (%)	06HR1275D n (%)	06HR1278D n (%)
MS	0.3-1	0.1-0.2	0.1-0.3	0.1-0.2	0
LC	0.1-2.4	0.1-?	0.4-?	0	0.5
JUIF	1.3-1.8	0	0	0	0
LC-JUIF-GC	0	0.2	0.1	0	0.5
URC-PGC-LRC	0.6	0.1	0.2	1.2	0.1
LRGC	0.2	0.1	0	0.8	0
LRGC-LIF	0	0	0	0	0.7

A preliminary evaluation of the results from the density measurement campaign was to superimpose the pair data, TotFe% against density, for each seam of LabMag and KéMag using different colors. It was noted that there is no systematic bias between the populations. An example is shown for the LC seam in Figure 14.4. The lack of bias for any seam demonstrates that the LabMag and KéMag pair data originated from the same statistical population.

Consequently, subsequent seam-wise regression functions should be built by combining the available data for both LabMag and KéMag.

Figure 14.4 – Scatter of LabMag and KéMag Pair Data for LC Seam



Due to difficulties in retrieving selected boxes containing GC samples in the case of LabMag during work performed in December 2012, the bulk density measurements were only performed on samples originating from KéMag. Figure 14.5 to Figure 14.11 display scatter plots of density against TotFe% and regression equations set for each seam to convert the volume of each block into tonnage.

14.9 Block Model Setup/Parameters

A new block model was created using the MineSight® software package to generate a grid of regular blocks for the estimation of tonnages and grades. The selected block size is based on the drilling density. Industry standards recommend that the size of blocks (in the X and Y directions) not be smaller than one half ($\frac{1}{2}$) to one fourth ($\frac{1}{4}$) of the drilling spacing.

Block size is a particularly sensitive parameter and plays a key role when using geostatistical estimation methods such as kriging. In this case, the kriging variance, which is used for evaluating the interpolation results and for resources classification, is related to the block size and the spatial distribution of holes. The closer the composites used to interpolate a block are, the lower the kriging variance will be.

Figure 14.5 – Regression Model for LC Seam

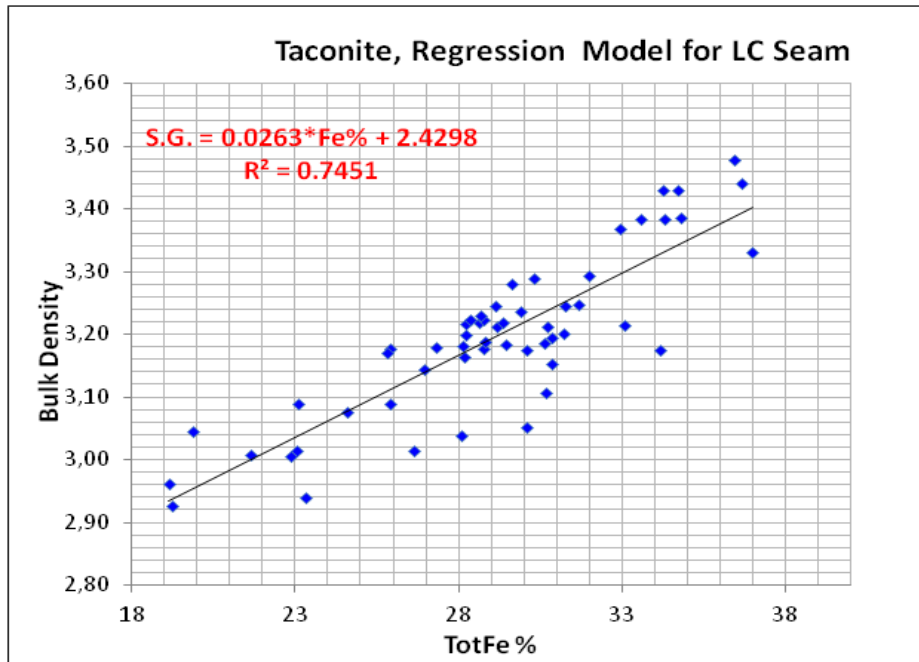


Figure 14.6 – Regression Model for JUIF Seam

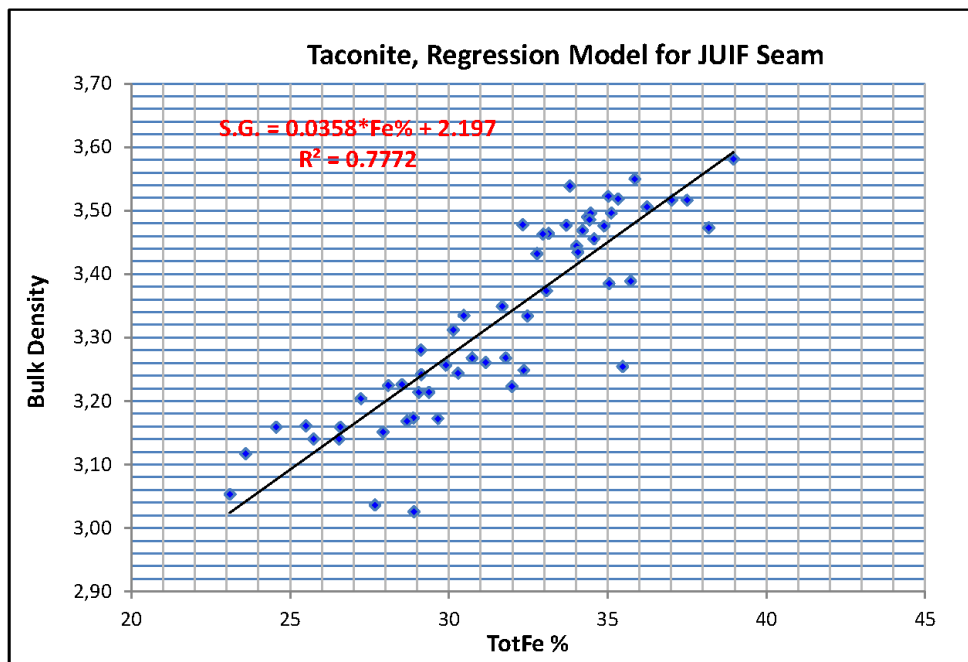


Figure 14.7 – Regression Model for GC Seam

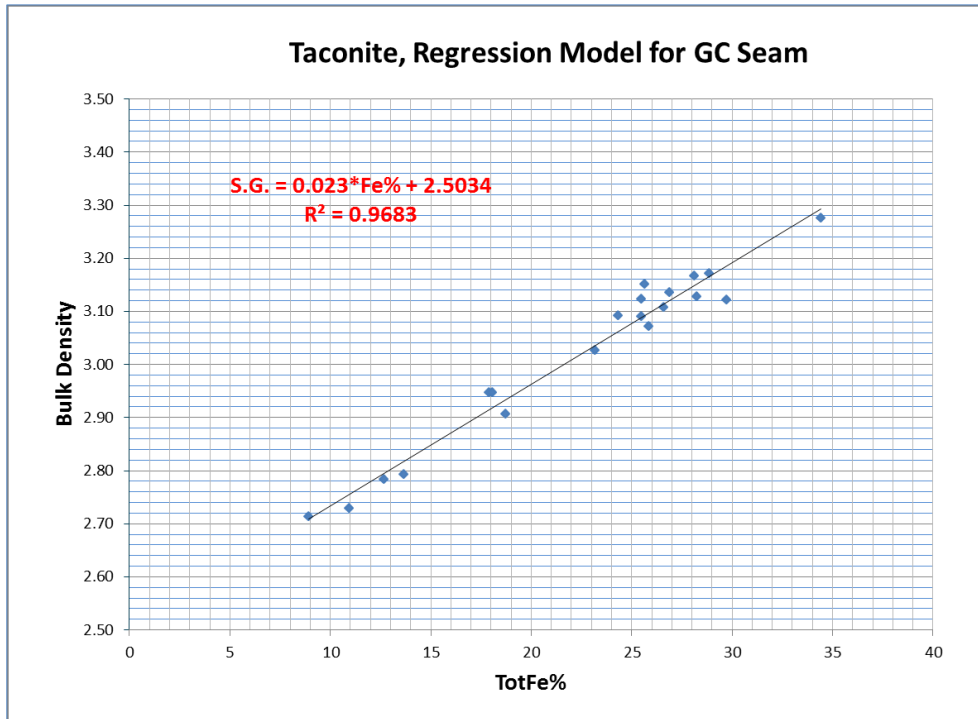


Figure 14.8 – Regression Model for URC Seam

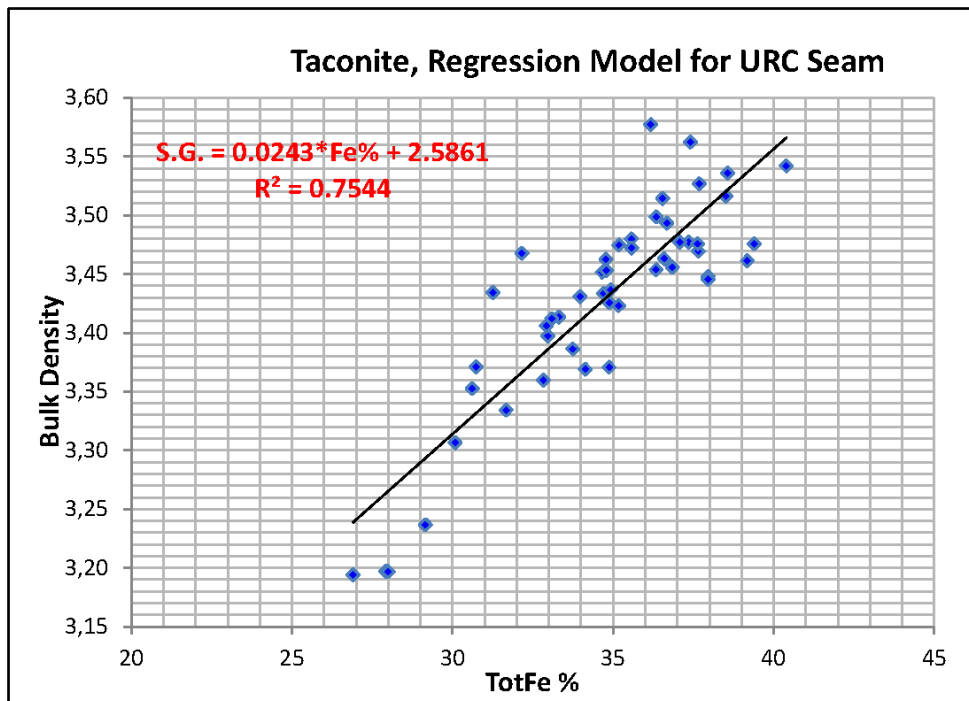


Figure 14.9 – Regression Model for PGC Seam

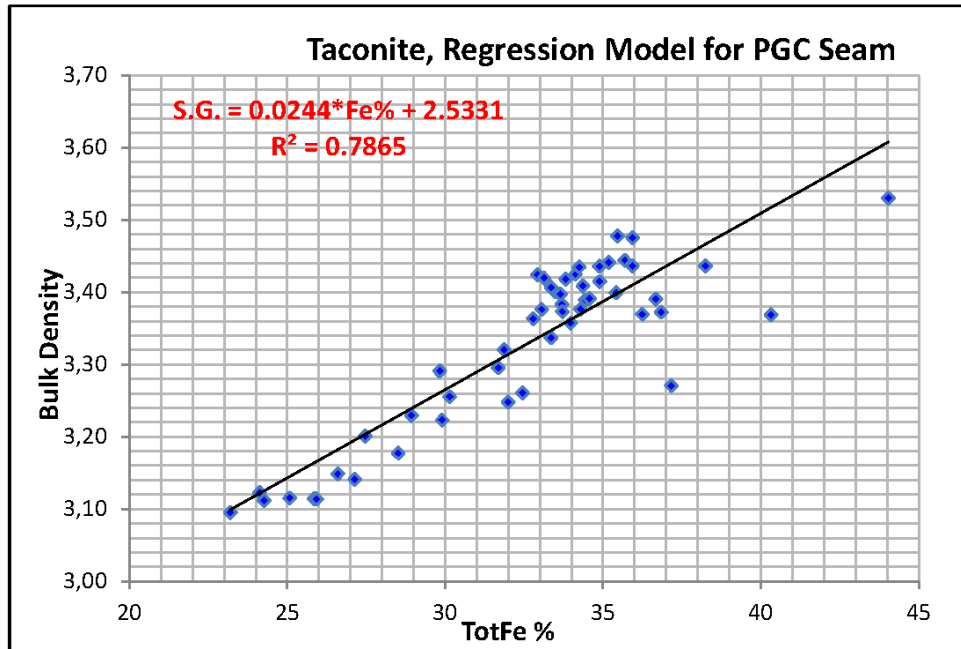


Figure 14.10 – Regression Model for LRC Seam

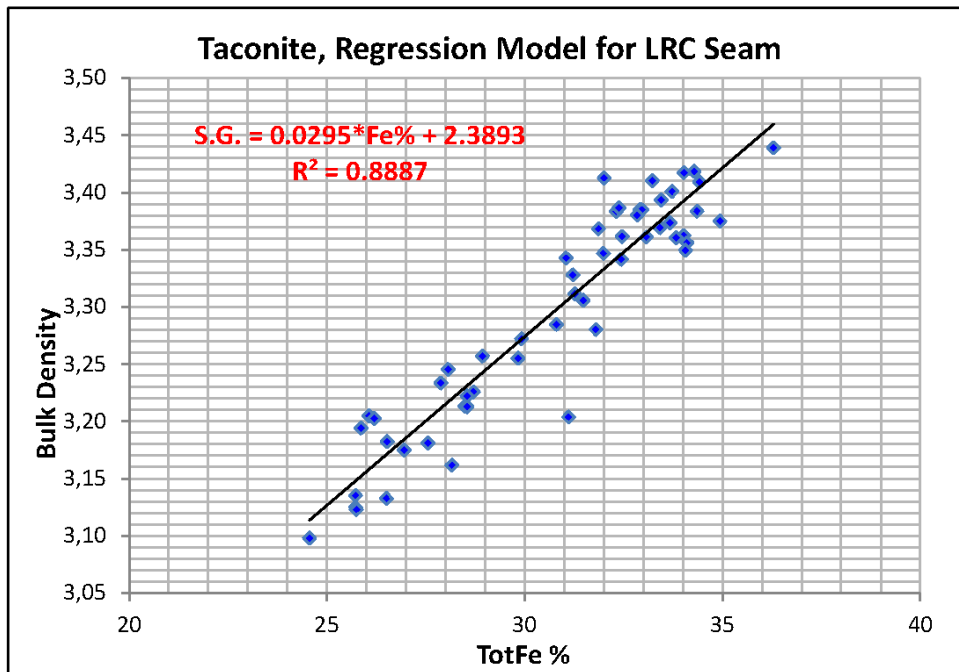
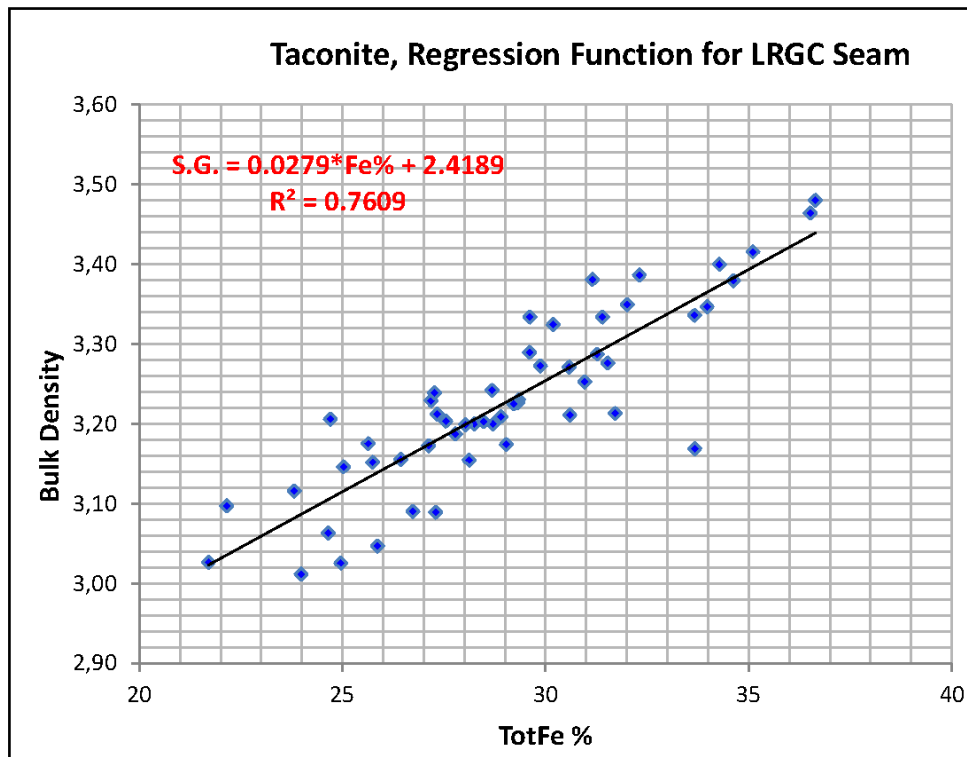


Figure 14.11 – Regression Model for LRGC Seam



Even for estimation approaches other than geostatistical, such as IDW2, too small a block size can lead to false impressions of the grades of blocks located far from drill hole intercepts. In this case, the representativity of local estimates would be questionable, even if the global statistics appear to reflect assay and composite average statistics.

The average drilling spacing estimated for the KéMag Deposit is 410 m. Taking this average spacing into account, Met-Chem elected to consider blocks having 120 m in the X direction by 120 m in the Y direction. A vertical bench height of 15 m was selected to match the projected type of mining equipment.

Due to the oblique pattern of the mineralization comparatively to the UTM coordinate system, Met-Chem used a rotated model. The rotation angle is 330° in the manner that the north grid is oriented according to the seam strike direction. Block model parameters are summarized in Table 14.7.

Table 14.7 – Block Model Parameters

Direction	Minimum (UTM)	Maximum (UTM)	Block Size	Number of Blocks	Model Origin (UTM)
Easting (X)	593,722.44	602,475.81	120	34	597,646.63
Northing (Y)	6,103,480	6,114,561.5	120	87	6,109,804.5
Elevation (Z)	290	815	15	35	0
Rotation	330° along the UTM North				

14.10 Resource Interpolation

All seams, exclusion made of GC, were composited at a fixed length of six (6) m. The GC seam was composited at a fixed length of three (3) m in order to better match its thinner thickness. A normal down-the-hole compositing approach was used. For the six (6) m composites, all composites shorter than three (3) m were discarded in order to preserve sample representativeness and avoid bias introduced by shorter interval composites. For the three (3) m composites, all composites shorter than 1.5 m were discarded in order to preserve sample representativeness and avoid bias introduced by shorter intervals composites. Each seam was constrained and interpolated separately. Table 14.8 to Table 14.14 display the composite statistics for each seam.

Table 14.8 – Composite Statistics for LC Seam

LC	Average	Median	Mode	St. Dev.	Variance	Range	Minimum	Maximum	Samples
TotFe %	29.58	29.99	30.96	4.93	24.29	34.34	4.21	38.55	366
DTWR %	27.08	27.54	27.50	8.09	65.40	45.00	0.00	45.00	366
Fe % Concentrate	68.60	70.32	70.90	8.33	69.43	71.97	0.00	71.97	366
SiO ₂ % Concentrate	2.73	1.92	0.00	1.98	3.94	10.09	0.00	10.09	366

Table 14.9 – Composite Statistics for JUIF Seam

JUIF	Average	Median	Mode	St. Dev.	Variance	Range	Minimum	Maximum	Samples
TotFe %	33.97	34.86	33.07	3.84	14.77	23.77	14.41	38.18	74
DTWR %	22.33	22.00	13.00	8.49	72.16	30.50	8.00	38.50	74
Fe % Concentrate	69.83	70.10	70.52	1.09	1.18	6.97	64.32	71.29	74
SiO ₂ % Concentrate	2.31	2.08	1.70	1.13	1.28	8.34	1.16	9.50	74

Table 14.10 – Composite (3 m) Statistics for GC Seam

GC	Average	Median	Mode	St. Dev.	Variance	Range	Minimum	Maximum	Samples
TotFe %	20.84	19.68	18.04	4.99	24.86	24.63	12.19	36.82	103
DTWR %	12.80	10.50	10.50	6.60	43.51	33.50	2.50	36.00	103
Fe % Concentrate	70.00	70.16	69.89	0.91	0.83	4.90	66.70	71.60	103
SiO ₂ % Concentrate	1.80	1.58	1.44	0.64	0.41	4.30	0.00	4.30	103

Table 14.11 – Composite Statistics for URC Seam

URC	Average	Median	Mode	St. Dev.	Variance	Range	Minimum	Maximum	Samples
TotFe %	34.08	34.75	34.78	3.33	11.09	23.01	16.38	39.39	72
DTWR %	26.65	26.00	23.50	4.75	22.55	27.50	13.50	41.00	72
Fe % Concentrate	70.38	70.50	69.70	1.07	1.14	7.68	64.32	72.00	71
SiO ₂ % Concentrate	1.88	1.61	1.98	1.11	1.22	9.50	0.00	9.50	71

Table 14.12 – Composite Statistics for PGC Seam

PGC	Average	Median	Mode	St. Dev.	Variance	Range	Minimum	Maximum	Samples
TotFe %	33.25	33.81	33.26	2.99	8.92	27.46	10.16	37.62	154
DTWR %	30.43	33.30	38.00	9.05	81.94	38.17	6.16	44.33	154
Fe % Concentrate	70.15	70.36	70.80	0.99	0.97	5.89	65.81	71.70	154
SiO ₂ % Concentrate	2.19	1.95	2.14	1.02	1.04	6.67	0.82	7.49	154

Table 14.13 – Composite Statistics for LRC Seam

LRC	Average	Median	Mode	St. Dev.	Variance	Range	Minimum	Maximum	Samples
TotFe %	33.53	33.45	34.02	1.18	1.38	6.05	31.22	37.27	39
DTWR %	19.71	15.58	13.50	9.64	92.99	32.00	7.50	39.50	39
Fe % Concentrate	70.74	71.10	71.12	1.87	3.48	11.00	61.30	72.30	39
SiO ₂ % Concentrate	1.75	1.26	1.20	2.06	4.23	11.81	0.79	12.60	39

Table 14.14 – Composite Statistics for LRGC Seam

LRGC	Average	Median	Mode	St. Dev.	Variance	Range	Minimum	Maximum	Samples
TotFe %	31.49	31.90	31.56	2.81	7.92	18.29	19.06	37.35	429
DTWR %	25.18	25.00	27.50	8.18	66.93	39.43	6.50	45.93	429
Fe % Concentrate	69.25	70.26	70.30	2.72	7.40	17.71	54.29	72.00	429
SiO ₂ % Concentrate	3.02	2.02	1.88	2.79	7.78	19.69	0.78	20.47	429

The resource interpolation was performed using the IDW method at a power of 2 (IDW2). In Met-Chem’s opinion, this method gives similar results to those of a geostatistical approach, such as ordinary kriging (“OK”), in the case of uniform and relatively continuous geological formations, such as BIF. In the case of IDW, each weighting factor is inversely proportional to the distance to the center of the block and the composite considered. Met-Chem has also taken into account the anisotropy of the mineralization, which is defined in variograms analysis.

A second interpolation was performed using OK in order to compare with the results provided by the IDW2 method. In the OK approach, a block is estimated by combining linearly (adding) selected composites that are weighted with factors resulting from its geometrical position and the quality of the variogram, range and nugget, in the considered direction.

The two estimation approaches gave similar results.

Three (3) interpolation passes were used in the resources estimation. The basic search ellipse was kept the same during the first and second passes and only the minimum number of composites to interpolate a block was reduced from nine (9) to six (6) in the case of the second pass.

The maximum number of composites to interpolate a block was set at 15, while the maximum number of composites belonging to a single hole was fixed at three (3). This ensures that at least three (3) holes are required to allow a block to be interpolated during the first pass, while at least two (2) holes are necessary for interpolating a block in the second pass.

In the third pass, the basic search ellipse was relaxed using a multiplicative factor of 1.5. The minimum number of composites is set at three (3), while the maximum number of composites to interpolate a block and the maximum number of composites allowed for a single hole were kept the same as in the first and second passes. Consequently, at least one (1) hole is required for interpolation during the third pass. An octant search method, where the maximum number of composites per octant was set equal to four (4), was used as declustering method. Interpolation parameters are summarized in Table 14.15.

Table 14.15 – Interpolation Parameters for KéMag

Items	Description		
Grade Interpolation Method	Ordinary IDW2, seam by seam interpolation		
Composites	By fixed length of six (6) m [three (3) m for GC]		
Search Method : Octant	Maximum of four (4) composites per Octant		
Ellipse Orientation	Azimuth 315°, dip -6°		
Resource Category	Pass 1	Pass 2	Pass 3
Minimum Number of Composites for a Block	9	6	3
Maximum Number of Composites for a Block	15	15	15
Maximum Number of Composites per Hole	3	3	3
Ellipse Size Along Strike (N315°)	900 m	900 m	1,350 m
Ellipse Size Across Strike (N45°)	450 m	450 m	675 m
Ellipse Size on the Minor Axis (-90°)	Seam Thickness	Seam Thickness	Seam Thickness

14.11 Estimates Validation

14.11.1 Visual Comparison

Estimated blocks were compared with composite and raw assay grade, on section, plan and 3D bases, as the first step of the mineral resources validation. The correlation was adequate and no evident discrepancies were found. Blocks interpolated were well constrained between the top and bottom of each geological unit. The search ellipse was also well oriented, block grade pattern follows the directions of best continuity, namely the strike and dip direction.

14.11.2 Descriptive Statistics

Met-Chem generated basic descriptive statistics based on the data from assays, composites and interpolated blocks in order to validate the soundness of the Mineral Resources estimates. In this case, no cut-off was applied to the blocks model. The results are presented in Table 14.16. They show that statistics of assays and composites are well repeated in the block model after interpolation. However, it appears that DTWR % and SiO₂ % averages for blocks are reasonable but slightly lower than the average of assays and composites. Both quality elements show rather high standard deviation and coefficient of variation. This high scattering has an impact on the quality of the estimate. However these differences are not considered to be significant.

Table 14.16 – Descriptive Statistics for Comparison of Assays, Composites and Block Grades

		TotFe (%)	DTWR (%)	DT Concentrate	
				Fe (%)	SiO ₂ (%)
Assays	W. Average	31.04	25.71	69.63	2.64
	St. Dev.	4.97	9.43	4.86	2.27
	CV	0.16	0.37	0.07	0.88
	Samples	1,300	1,300	1,299	1,299
Composites	Average	30.93	25.59	69.42	2.57
	St. Dev.	4.66	8.81	4.76	2.09
	CV	0.15	0.34	0.07	0.81
	Samples	1,315	1,315	1,314	1,314
Blocks	Average	30.59	24.27	69.61	2.39
	St. Dev.	4.74	7.63	2.26	1.40
	CV	0.16	0.31	0.03	0.58
	Samples	15,983	15,983	15,983	15,983

14.12 Resource Classification

The Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories. Two (2) key parameters, geological continuity and grades continuity, play a key role in increasing the confidence level. They are generally directly related to the drilling density, and areas more densely drilled are usually better known and understood than areas having a sparser drilling.

Met-Chem traditionally used an automatic and computerized approach to classify blocks that have been interpolated. In this exercise, a rigorous analysis is first performed upstream to make sure that all geology-related works completed in previous steps of the project development, such as holes location/surveying and the QA/QC, respect industry standards. If it is the case, a resource category is automatically allocated to each block after its interpolation. The resource category is dependent on the following:

- The search ellipse size (or a defined ratio of this size), which determines the area of search for selecting the composites;
- The pass used to interpolate the block, which determines the minimum number of holes involved and then the drilling density around that block.

The search ellipse size, determined by geostatistical analysis, plays a key role for the use of an automatic computerized classification approach. However, the resource interpolation of the

KéMag Deposit was performed on a seam by seam basis, whereas the geostatistical analysis was made on a “One Seam” basis.

As previously mentioned, geostatistical analysis based on “One Seam” was done because most of the variograms generated on a single seam basis, except for LRGC, which is the thickest layer, were erratic with extreme nugget effects and no evident structures. Taking this fact into account, Met-Chem elected to use the more conservative resource classification scheme by using the large search ellipse developed by variograms defined on the basis of a “One Seam” model. Figure 14.12 displays a plan view of resource zones, while Figure 14.13 presents a typical cross section with categorized resources.

14.13 Mineral Resources Statement

Mineral Resources are stated using a DTWR of 18 %. Table 14.17 presents the cumulative resources, while Table 14.18 presents the Mineral Resources on a seam basis.

NML is unaware of any legal, political, environmental or other risks that could materially affect the potential development of the Mineral Resources.

Due to the uncertainty attached to Inferred Mineral Resources, it cannot be assumed that all or part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource as a result of continued exploration. Mineral Resources that are not Mineral Reserves have not demonstrated economic viability.

Table 14.17 – Cumulative Mineral Resources – In Situ Grades

Resource by Category	Tonnage (Mt)	TotFe (%)	DTWR (%)	DT Concentrate	
				Fe (%)	SiO ₂ (%)
Measured	1,506.87	31.45	26.97	69.69	2.56
Indicated	876.24	31.95	27.32	69.83	2.51
Measured + Indicated	2,383.11	31.63	27.10	69.74	2.54
Inferred	1,006.84	31.56	26.97	69.31	2.65

Figure 14.12 – Plan View of Resource Zones

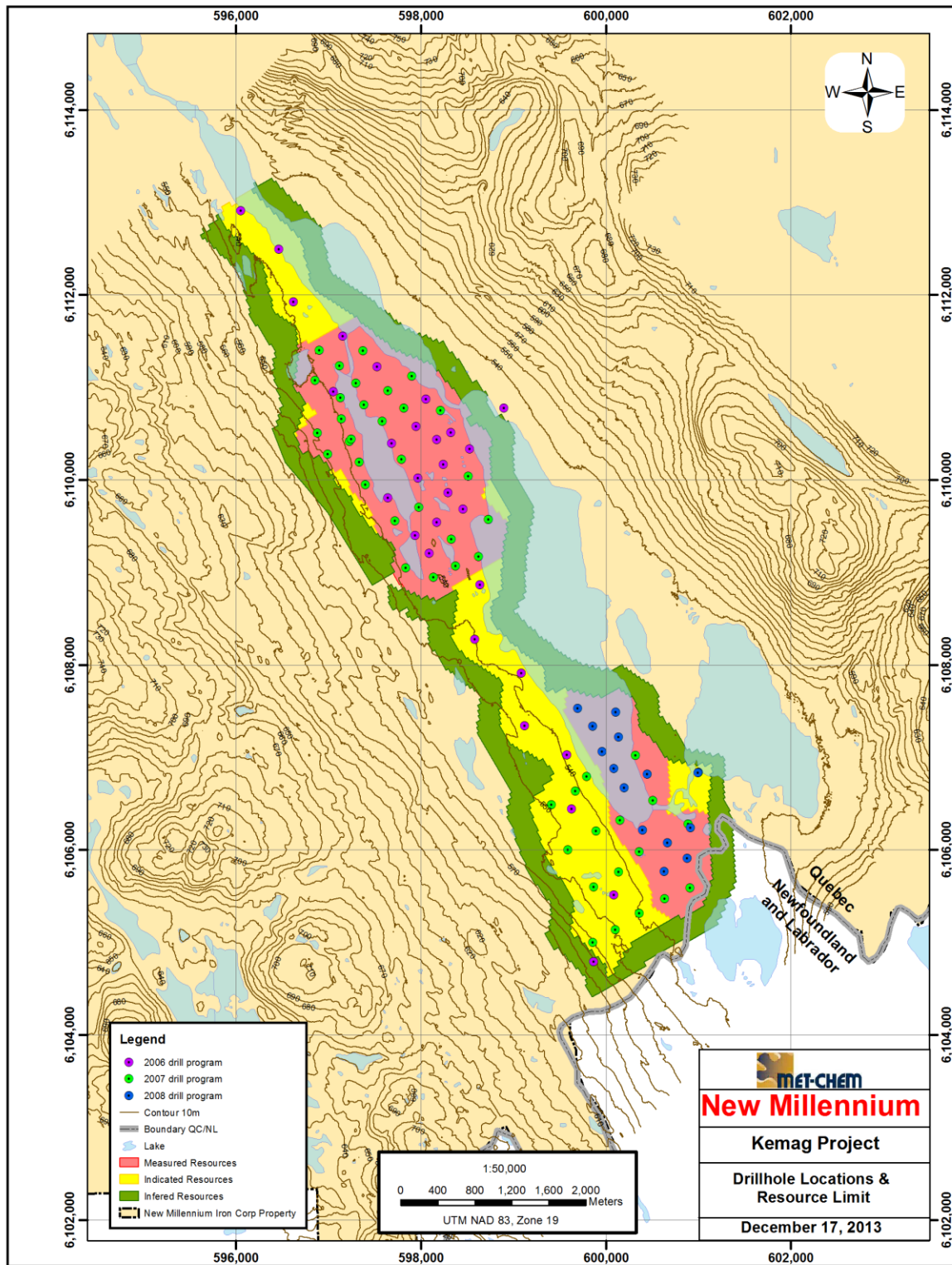


Figure 14.13 – Typical Cross-Section with Categorized Resources

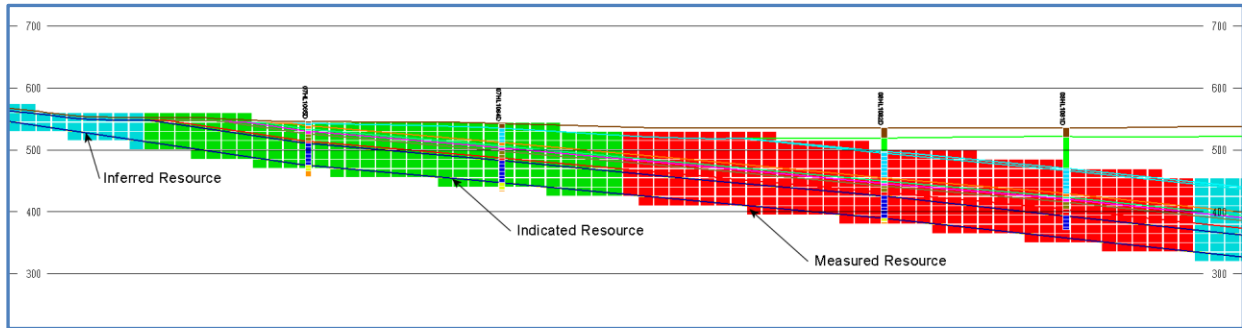


Table 14.18 – Mineral Resources by Seam Basis

	Seam	Tonnage (Mt)	TotFe (%)	DTWR (%)	DT Concentrate	
					Fe (%)	SiO ₂ (%)
Measured	LC	529.11	30.17	28.10	69.82	2.38
	JUIF	60.58	33.54	28.02	69.39	2.75
	GC	3.29	22.16	20.32	69.57	2.31
	URC	84.42	34.20	27.56	70.43	1.82
	PGC	222.24	33.33	31.20	70.25	2.08
	LRC	7.74	33.32	20.34	71.07	1.27
	LRGC	599.49	31.31	24.33	69.27	3.00
	Total	1,506.87	31.45	26.97	69.69	2.56
Indicated	LC	166.36	31.14	29.55	70.32	2.22
	JUIF	46.35	32.75	24.33	69.70	2.47
	GC	2.85	26.25	20.34	69.55	2.72
	URC	59.86	33.79	25.43	70.30	1.87
	PGC	126.28	33.32	29.40	69.80	2.58
	LRC	31.00	34.03	26.54	71.12	1.41
	LRGC	443.54	31.42	26.56	69.51	2.77
	Total	876.24	31.95	27.32	69.83	2.51
Measured + Indicated	LC	695.47	30.40	28.45	69.94	2.34
	JUIF	106.93	33.20	26.42	69.52	2.63
	GC	6.14	24.06	20.33	69.56	2.50
	URC	144.28	34.03	26.68	70.38	1.84
	PGC	348.52	33.33	30.55	70.09	2.26
	LRC	38.74	33.89	25.30	71.11	1.38
	LRGC	1,043.03	31.36	25.28	69.37	2.90
	Total	2,383.11	31.63	27.10	69.74	2.54
Inferred	LC	298.63	30.02	26.76	68.76	2.57
	JUIF	37.54	34.02	27.86	69.57	2.51
	GC	0.07	24.79	18.56	69.6	2.5
	URC	56.87	34.22	27.14	70.49	1.71
	PGC	130.38	33.46	31.03	70.06	2.25
	LRC	8.81	33.46	23.54	70.98	1.44
	LRGC	474.54	31.47	25.96	69.26	2.96
	Total	1,006.84	31.56	26.97	69.31	2.65

15.0 MINERAL RESERVE ESTIMATES

The Mineral Reserve estimate for the KéMag Deposit was prepared by Michael Spleit, P.Eng., Senior Mining Engineer with NML and has been verified by Jeffrey Cassoff, P.Eng., Senior Mining Engineer with BBA Inc. and a Qualified Person. The Mineral Reserves have been developed using best practices in accordance with CIM guidelines and NI 43-101 reporting. The effective date of the Mineral Reserve estimate is June 9th, 2016.

The Mineral Reserves were derived from the Mineral Resource block model that was presented in Section 14.0. The Mineral Reserves are the portion of the Measured and Indicated Mineral Resources that have been identified as being economically extractable and which incorporate mining losses and the addition of waste dilution. The Mineral Reserves form the basis for the mine plan presented in Section 16.0.

Table 15.1 presents the Proven and Probable Mineral Reserves for the KéMag Deposit based on a DTWR cut-off of $\geq 18.0\%$. The Mineral Reserves are included in the Mineral Resources and the reference point is the mill feed.

Table 15.1 – Mineral Reserves

Category	Tonnage (Mt)	DTWR (%)	TotFe (%)	DT Concentrate	
				Fe (%)	SiO ₂ (%)
Proven	328	27.9	30.4	68.8	3.3
Probable	487	27.0	32.0	70.3	2.0
Proven & Probable	815	27.3	31.4	69.7	2.5

The previous Mineral Reserve estimate prepared by Met-Chem in 2012 was 2,384 Mt (1,448 Mt Proven and 936 Mt Probable). The current estimate decreased by 66% due to the change in production level. With the current metallurgical flowsheet, product specifications can be met as long as the average DT concentrate silica of the feed ore does not exceed 2.5% for DR pellets or 4.0% for BF pellets. This constraint can be met given the average silica grade of the stated Mineral Reserves is well under 4.0% and past studies have shown grade blending to be feasible.

15.1 Geological Information

The following section discusses the geological information that was used for the mine plan and Mineral Reserve estimate. This information includes the geological block model, the topographic and lithological surfaces, the iron formation limit and the material properties for ore, waste and overburden.

The mine planning work carried out for the PFS was done using MineSight® Version 10.50. MineSight® is a commonly used commercially available mine planning software.

15.1.1 Resource Block Model

The mine plan that was carried out for the KéMag Deposit is based on the 3D geological block model that was presented in Section 14.0. Each block in the model is 25 m wide, 50 m long and 15 m high. The model is rotated 330° so that the north grid is oriented according to the seam strike direction. The model with the smaller block size was selected because this model served as the basis of the mine plan in the TFS, and therefore calculations of various values had already been made and put into the block model by Met-Chem.

Since each block in the model can be intersected by several rock types, the percent of the rock type as well as the grade items associated with that rock type are stored in each block. The following items that are included in the model were used for the purposes of mine planning:

- Percent of rock type in block;
- DTWR by rock type;
- Percent TotFe by rock type;
- Percent of Fe in the Davis Tube concentrate by rock type;
- Percent of SiO₂ in the Davis Tube concentrate by rock type;
- Density by rock type;
- Resource classification of the block (Measured, Indicated and Inferred).

15.1.2 Topographic Surface

The mine design for the PFS was carried out using a topographic surface based on a two (2) m contour interval. This surface covers the pit area as well as most of the dump footprints. For mine infrastructure outside of this area, a topographic surface based on 50 ft contour intervals was used.

The two (2) m contour surface is based on the digital elevation model (“DEM”) acquired by NML in 2011. This DEM was created with elevation readings done at 5 m spacing, where each reading had a vertical error of ±1 m. The elevation readings were achieved using an automated process run on high-resolution color air photos acquired by NML in 2008.

The 50 ft contours are part of a federal database provided by Natural Resources Canada. This product is based largely on the information shown on 1:50,000 topographic maps and where available, more up-to-date information.

15.1.3 Lithological Surfaces

The surfaces representing the lithological contacts between the different rock types were created in 3D using MineSight software and based on the drilling data and the sectional interpretation of NML geologists. These surfaces were also previously verified by Met-Chem during the TFS to ensure the surfaces are aligned with the contacts in the drillhole logs. Included in these surfaces is the contact between the overburden and Menihek Shale.

Overburden is defined as loose sand and gravels that can typically be excavated without the need for drilling and blasting.

15.1.4 Iron Formation Limit

In order to avoid placing permanent infrastructure on top of potential Mineral Resources, consideration must be given to the fact that the iron formation extends beyond the area that was drilled during exploration. A boundary line on the west side of the KéMag Deposit was generated based on the projection of where the iron formation daylights at surface using the available geological information. The plant site and tailings facilities were intentionally placed outside of the iron formation limit for the purposes of this PFS.

The precise limit of the iron formation will be defined prior to mining, and so to avoid overly conservative estimates of the haul distances in this study for bringing waste to the dumps, an adjusted boundary was considered for waste dumps. At an average slope of 6°, the formation would not reach 15 m of depth (1 mining bench) for approximately 150 m and so the risk of placing the dumps on any resource of a mineable thickness is very low.

As Met-Chem noted, additional drilling or trenching in this area would either increase the resource base or allow for the surface infrastructure to be designed closer to the pit crest as well.

15.1.5 Material Properties

The material properties for the different rock types are outlined below. These properties are important in estimating the Mineral Reserves, the equipment fleet requirements as well as the dump and stockpile design capacities.

a) Density

As was discussed in Section 14.0, the density for each block within the iron formation is a function of the grade of iron. Table 15.2 presents the average in-situ dry density for each rock type in the block model. A density of 2.0 t/m³ was used for the overburden and 2.94 t/m³ for the Menihek Shale (“MS”). Both of these numbers are consistent with similar projects in the region.

Table 15.2 – Density by Rock Type

Rock Type	In-Situ Dry Density (t/m ³)
Overburden	2.00
Menihek Shale	2.94
LC	3.23
JUIF	3.38
GC	3.09
URC	3.41
PGC	3.35
LRC	3.39
LRGC	3.29

b) Swell Factor

The swell factor reflects the increase in volume of material from its in situ state to after it is blasted and loaded into the haul trucks. A swell factor of 30% was used which is a typical value used for open pit hard rock mines.

c) Moisture Content

The moisture content reflects the amount of water that is present within the rock formation. It affects the estimation of haul truck requirements and must be considered during the payload calculations. The moisture content is also an important factor for the process water balance.

Since the Mineral Reserves are estimated using the dry density, they are not affected by the moisture content value.

A moisture content of 2% was used which is typical for similar projects in the region.

In order to raise the level of accuracy in the determination of mine equipment requirements and stockpile designs, more measurements could be conducted to better estimate the density of the overburden and Menihek Shale as well as the swell factor and moisture content of all material types. The current values are based on typical values for the area, and the expected impact of more detailed measurements would be low.

15.2 Economic Pit Optimization

A pit optimization analysis was carried out to establish the Mineral Reserves. The pit optimization analysis uses economic criteria to determine the cut-off grade and to what extent the deposit can be mined profitably.

The pit optimization analysis was done using the MS-Economic Planner module of MineSight® Version 10.50. The optimizer uses the 3D Lerchs-Grossmann algorithm to determine the economic pit limits based on input of mining and processing costs and revenue per block. The pit optimization analysis assumes that the capital for the Project has been spent and analyzes the orebody based on operating costs and revenue.

In order to comply with NI 43-101 guidelines regarding the Standards of Disclosure for Mineral Projects, only ore blocks classified in the Measured and Indicated categories are allowed to drive the pit optimizer. Inferred Resource blocks are treated as waste, bearing no economic value.

Table 15.3 presents the parameters that were used for the pit optimization analysis. All figures are in Canadian dollars unless otherwise specified. The cost parameters that were used are based on the Taconite Feasibility Study with adjustments made to account for the change in production scale. The parameters used are preliminary estimates for developing the economic pit and are not the same as the operating costs subsequently developed for this PFS.

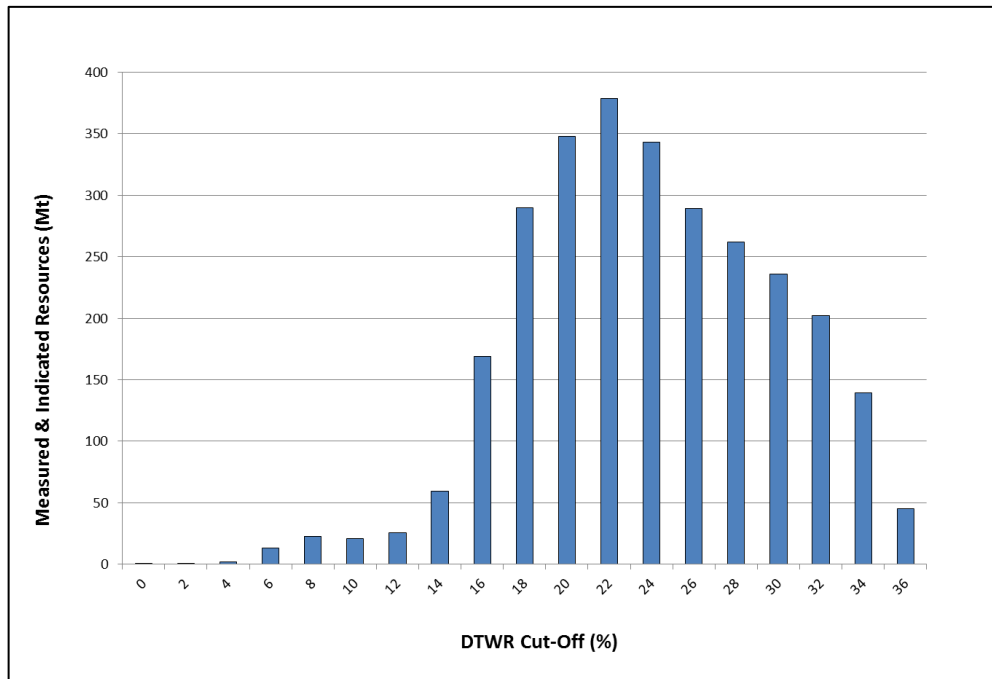
Table 15.3 – Pit Optimization Parameters

Item	Units	Value
Sales Price (62% CFR China)	US\$/t (conc.)	70.00
Pellet Premium	US\$/t (pellet)	30.00
Ocean Freight Costs	US\$/t (pellet)	12.00
Total (US)	US\$/t (pellet)	88.00
Total (CAN)	\$/t (pellet)	110.00
Mining Cost – Waste	\$/t (mined)	1.37
Mining Cost – Ore	\$/t (mined)	1.64
Concentrator Cost	\$/t pellet	13.89
Rail Cost	\$/t pellet	18.77
Pelletizing Cost	\$/t pellet	11.86
Port and Infrastructure Cost	\$/t pellet	4.01
Administration Cost	\$/t pellet	5.06
Mill recovery	%	96.3
Discount Rate	%	8%
Pit Slope	°	45
Annual Production	Mtpy	9
Conversion Factor	Conc./Pellet	1.034

Using the economic parameters presented in Table 15.3, the break-even cut-off grade was calculated to be DTWR \geq 5.6%. The cut-off grade is used to determine whether the material being mined will generate a profit after paying for the mining, processing, transportation and G&A costs. Material that is mined below the cut-off grade should be sent to the waste rock dump. Since the Mineral Resources for the KéMag Deposit were stated at a cut-off grade of DTWR \geq 18%, NML chose to maintain this cut-off for the Mineral Reserves Estimate for consistency.

Figure 15.1 presents a histogram of the grades and tonnages of the Measured and Indicated Mineral Resources for the KéMag Deposit. The deposit contains approximately 311 Mt between the calculated cut-off grade of 5.6% and the resource cut-off grade of 18%, which represents 11% of the total mineralized material that is classified as measured or indicated. A more detailed analysis of the cut-off grade strategy is recommended in the next phase of study.

Figure 15.1 – Grade Tonnage Histogram

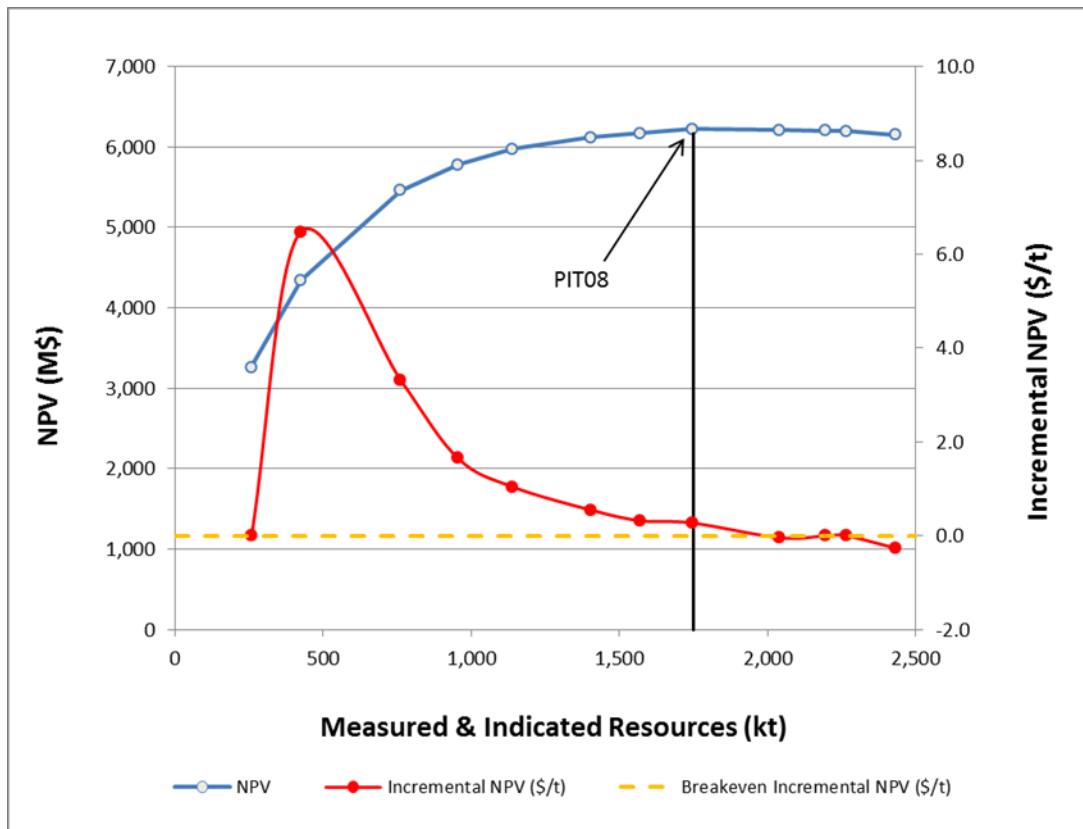


Using the cost and operating parameters, a series of 12 pit shells was generated by varying the selling price (revenue factor) from US \$62 to \$100 /t of concentrate (62% CFR China). The Net Present Value (NPV) of each shell was calculated assuming a selling price of US\$ 70 /t of concentrate, a discount rate of 8% and an annual production of 9 million tonnes of pellets. The pit optimization analysis considered mining dilution and ore loss which is presented in detail in Section 15.3.3. Table 15.4 presents the tonnages and grades associated with each of the pit shells and Figure 15.2 presents the results in a graphical format.

Table 15.4 - Pit Optimization Results

Pit	Revenue Factor	Ore (Mt)	DTWR (%)	Waste (Mt)	Strip Ratio	Pellets (Mt)	NPV (M\$)	Mine Life (y)
PIT-01	0.89	258	31.5	21	0.08	81	3,264	9.0
PIT-02	0.89	424	30.4	38	0.09	128	4,342	14.3
PIT-03	0.91	761	28.8	95	0.13	218	5,461	24.3
PIT-04	0.91	955	28.1	134	0.14	267	5,781	29.7
PIT-05	0.92	1,139	27.7	187	0.16	314	5,973	34.9
PIT-06	0.94	1,402	27.2	310	0.22	380	6,119	42.2
PIT-07	0.94	1,571	27.0	390	0.25	423	6,173	47.0
PIT-08	0.95	1,746	26.8	423	0.24	466	6,221	51.7
PIT-09	0.96	2,039	26.6	712	0.35	540	6,209	60.0
PIT-10	0.98	2,195	26.5	845	0.38	579	6,202	64.3
PIT-11	1.00	2,268	26.4	910	0.40	596	6,196	66.3
PIT-12	1.43	2,434	26.2	1,169	0.48	634	6,152	70.5

Figure 15.2 – Pit Optimization Results



The pit optimization analysis shows that the pit that provides the maximum NPV is PIT-08 (Revenue Factor - 0.95). This pit shell contains 1,746 Mt of Measured and Indicated Mineral Resources with an average DTWR of 26.8% at a strip ratio of 0.24 to 1 and has a mine life of 52 years at the planned production rate.

Mining additional resources beyond the limits of this pit results in a lowering of the average DTWR, an increase in the strip ratio, and provides cash flows that have marginal value in present value dollars.

Since at the start of the PFS it was obvious that there are enough Mineral Resources for a very long mine life and it was clear that the pit optimization may result in an optimum pit with a very long mine life, it was decided to limit the horizon of the PFS to 25 years. The purpose of this limitation is because a financial study cannot be reliably conducted for an extended period of time and because the cash flows generated beyond 25 years have little impact on the internal rate of return (IRR) and payback period of a project.

The pit shell that generates a 25-year mine life is PIT-03, which contains 761 Mt of Measured and Indicated Mineral Resources with an average DTWR of 28.8%. The detailed pit design

would typically use this pit shell as a guide, however, since previous studies have shown that the Menihek Shale unit is acid generating, this unit was avoided in order to minimize the environmental impact.

A second pit optimization analysis was carried out on the resources that would not require mining the Menihek Shale unit. This was accomplished by constructing a down-dip 45 degree plane southwest from the western edge of the Menihek Shale unit and limiting the resources to those above this plane. The plane acts as an approximation of the pit wall of the largest possible pit that would not include the Menihek Shale unit. From this analysis, the pit that generated closest to a 25 year mine life was selected as a guideline for the detailed pit design.

15.3 Ultimate Pit Design

The next step in the Mineral Reserve estimation process is to design an operational pit that will form basis of the production plan. This pit design uses the optimized pit shell as a guideline and 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 open pit design and presents the results.

Since the economic pit limits contain far more material than needed for the 25 year mine life considered in this study, the ultimate pit for this PFS (and thus defining Mineral Reserves) was designed within the economic pit limits. Since previous studies have shown that the Menihek Shale (MS) unit is acid generating, this unit was avoided in order to minimize environmental impact. If the MS is avoided, the remaining tonnage of ore is only slightly more than required to meet the NuTac 25 year mine life production targets.

15.3.1 Geotechnical Pit Slope Parameters

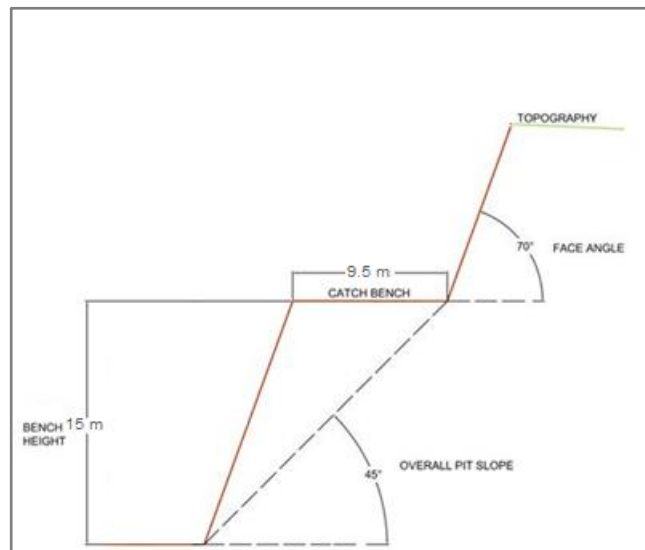
The KéMag Deposit will be developed in taconite rocks which would lead to competent pit walls. Since no geotechnical work has been carried out to date to engineer the pit wall angles, an overall slope of 45° was selected as a conservative approach for this PFS. Since part of the final pit wall does not get established until Year-2 of the operations, the geotechnical analysis to engineer the final pit wall can be postponed to a later date. A change in the pit slope will either increase or decrease the waste stripping within the pit but will not significantly affect the Mineral Reserves. Met-Chem recommended that a geotechnical analysis be carried out before mining begins to determine the final pit wall configuration in this area and the rest of the pit.

The pit will be mined with 15 m high benches. This bench height is well suited for the size of equipment (loaders and drills) that are planned for the mine. Equipment selection is presented in Section 16.0.

The overall slope of 45° at the final pit wall incorporates a 9.5 m catch bench for each bench with a face angle of 70°. The configuration of the final pit wall is presented in Figure 15.3.

The maximum height of the overburden along the final pit wall is 20 m. The maximum overall height of the final wall is 80 m.

Figure 15.3 – Pit Wall Configuration



15.3.2 Haul Road Design

Since the ore body daylights at surface, the ultimate pit does not require the design of a permanent access ramp to the pit bottom. The benches will be mined flat and the pit access will be developed along the floor as the pit wall advances towards the east. The floor of the KéMag Deposit dips at approximately 6° which translates into a grade of 10.5%. Although this grade is not optimal for the haul trucks, the truck manufacturers (Liebherr and Caterpillar) have agreed that their equipment can manage these slopes at a reduced speed.

Temporary ramps will be required in order to maintain access to the benches in the advancing wall. These ramps will either be cut with the loaders or backfilled with mined out waste rock when the ramp is on waste and with ore when on ore. The temporary ramps will be built to have a maximum grade of 8%.

A service road for light vehicles has been established around the perimeter of the ultimate pit. This road is designed to be 5 m wide and will be used primarily to access the ditch network for maintenance.

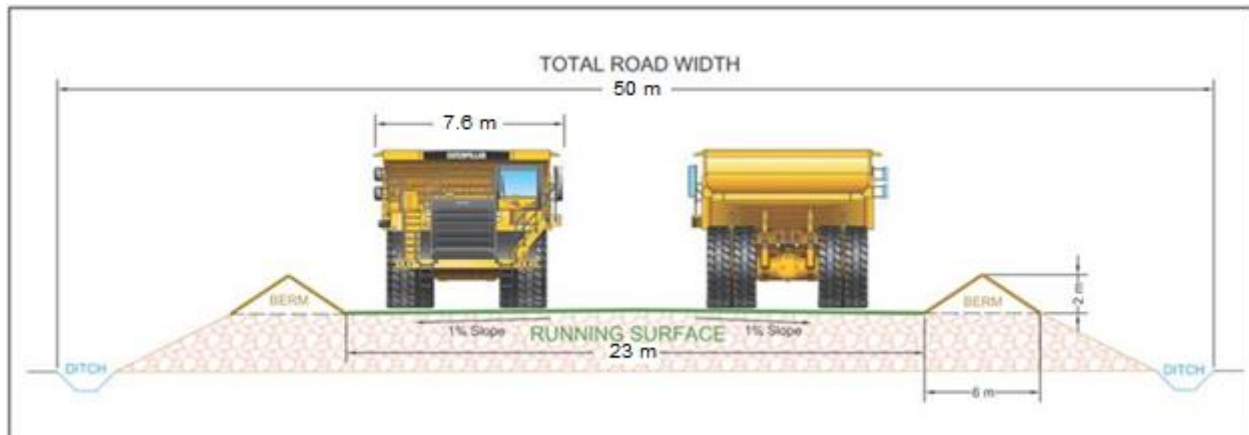
The mine haul roads are designed for a 180-tonne haul truck. For double lane traffic, the industry standard indicates the running surface width to be a minimum of three (3) times the width of the largest truck. The overall width of a 180-tonne haul truck is 7.6 m which results in a running surface of 23 m. The overall width of the haul road must account for safety berms. The following dimensions of the safety berms are based on industry standards:

- The safety berm height should be equal to the radius of the largest truck tire as a minimum, which is 2 m. The safety berm slopes are 34° and will be built in a triangular shape. The width required for the bottom of each safety berm is 6 m.

The overall width of the road including safety berms is 35 m. The haul road corridors have been designed for 50 m. This ensures that there is enough room for the ditches and the road base side slopes if fill material is required for construction.

The maximum road grade is 8% and the road design incorporates a crown of 1%. The safety berms are interrupted every 25 m in length to allow for water to run-off into the ditches. Figure 15.4 presents a typical section of the haul road.

Figure 15.4 – Haul Road Configuration



15.3.3 Mine Dilution and Ore Loss

For a producing mining operation, it is typical for contamination to occur between the ore and waste at the contact boundary. This is due to the nature of the large size of loader and the fact that the rock requires blasting. In order to account for this, the following method was used to estimate mining dilution and ore loss for this PFS.

The following two areas have been identified where mining dilution and ore losses will occur when mining the KéMag deposit:

- Blending of lithological layers within each block in the resource model;
- Dilution and ore losses at the ore/waste contacts.

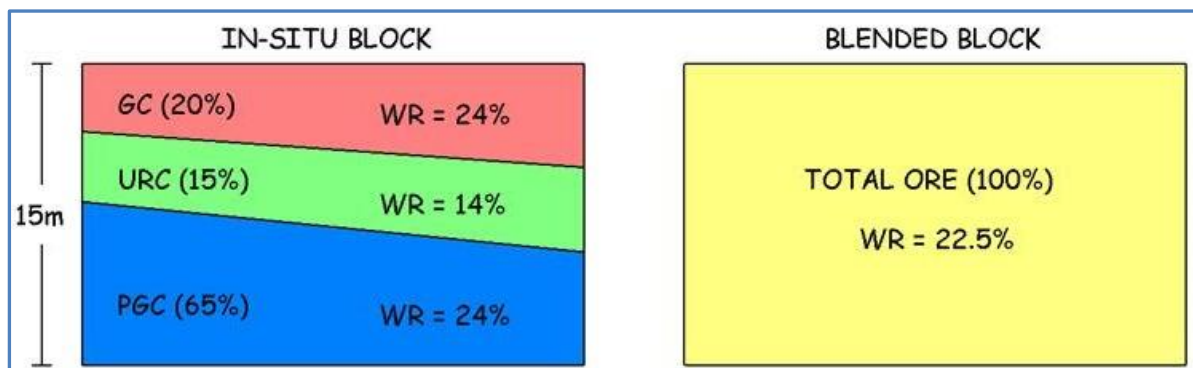
a) Blending of Lithologies

Since the KéMag pit was designed with 15 m high benches that will be drilled, blasted and mined in one pass, it will be difficult to effectively separate the different lithological layers of the ore at the loader face. These layers are often only a few meters thick.

To account for this in the mine plan, an average grade was calculated for each block in the resource model based on the individual grades for each lithology within the block. The cut-off grade criteria for DTWR was then applied on the average grade items for each block to classify it as an ore or waste block.

The blending of lithologies at the shovel face induces a certain amount of dilution since thin zones that would not meet the cut-off criteria on their own are blended with the rest of the block and sent to the crusher as ore. The net result of this type of mining dilution is an increase in ore tonnage with decreased average weight recovery. Figure 15.5 presents a section of a typical block in the resource model. The figure illustrates how the three (3) ore types in the block are diluted to arrive at a weighted average weight recovery of 22.5%. Prior to dilution, only 85% of the block meets the cut-off criteria. After dilution is accounted for, the entire block (100%) is considered as ore.

Figure 15.5 – Blending of Lithologies



b) Mining Dilution at the Ore / Waste Contacts

The second area where mining dilution will occur is at the ore/waste contacts. Due to the fact that the mining operation will incorporate drilling and blasting and that the loading equipment is considerably large, it will be very difficult to perfectly separate the ore and waste at the geological contact. The two main areas where the orebody follows waste contacts are at the top (Overburden and Menihek Shale) and the bottom (Lower Iron Formation):

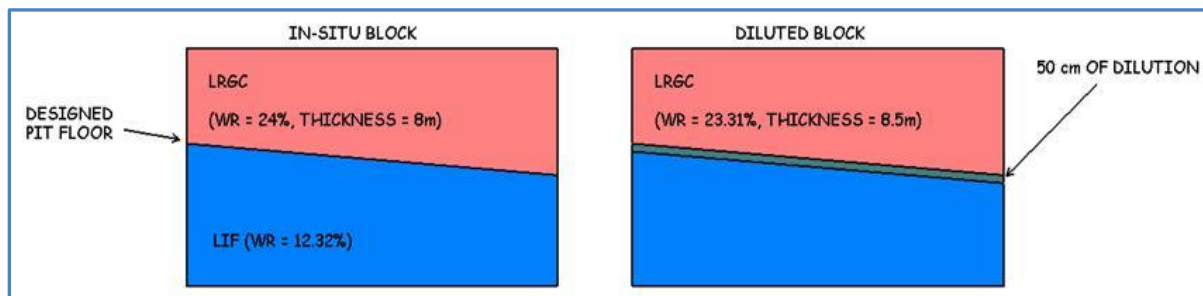
- Upper Contact (Overburden) – The mining dilution effects from the overburden should be negligible because the overburden is a layer of sand and gravel that does not require blasting and is easily identifiable in the field;
- Upper Contact (Menihek Shale) – The Menihek Shale is not an iron formation and is therefore considered purely as waste. The Menihek Shale is clearly distinguishable from the upper mineralized layers because its colour is carbon black. Since this layer may be acid generating, care must be taken such that the Menihek Shale is not blended with the ore and sent to the plant. In order to avoid dilution, it is assumed that the mining operations will target 0.5 m below the Menihek Shale contact and an ore loss will therefore be incurred;

- Lower Contact (Lower Iron Formation) – The Lower Iron Formation can be visually distinguished from the LRGc layer. The LRGc layer has a visible black magnetite banding while the Lower Iron Formation is lighter in colour. However, during blasting, some Lower Iron Formation may mix with the LRGc and be sent to the plant as ore. The Lower Iron Formation contains iron, and does not affect the process in the plant other than the fact that the recovery will be poor. In order to calculate the mining dilution from the Lower Iron Formation, it is assumed that a depth of 0.5 m will be taken from the Lower Iron Formation and sent to the plant. Using the drillhole database, the following grade items were calculated to represent the averages for the Lower Iron Formation:
 - DTWR – 12.32%;
 - TotFe – 24.53%;
 - Fe in the concentrate – 68.88%;
 - SiO₂ in the concentrate – 2.26%.

As discussed above, during the mining operation there will be situations when some of the Lower Iron Formation will be sent to the crusher as ore. There will also be situations when some of the LRGc will remain in the pit floor. Since it is impossible to predict when each of these scenarios will occur, it was assumed that the tonnage increase as a result of mining dilution will be equal to the tonnage decrease as a result of ore losses.

Figure 15.6 illustrates how the weight recovery is adjusted for a typical ore block along the pit floor in order to account for mining dilution.

Figure 15.6 – Dilution Calculation



15.3.4 Lac Harris

A preliminary evaluation determined that approximately 800 Mt (35%) of the Measured and Indicated Mineral Resources are contained below Lac Harris. If Lac Harris were to be left intact, the remaining Mineral Resources still support a 25-year mine life at 9 Mtpy of pellets, but then the MS layer cannot be avoided.

In order to mine the resources that lie underneath Lac Harris, a system of dams and ditches will be constructed. Based on the mine plan that is presented in Section 16.0 of this PFS, a portion of the lake needs to be drained by the start of production.

A dam will be constructed in Lac Harris to isolate the section that needs to be drained for the mine operation. The natural water flow of the Goodwood River will be maintained between Lac de la Frontière and Lac Gillespie. Cofferdams and dykes will retain water to prevent entry into the mine pit. The isolated section of Lac Harris where mine operations will occur will be pumped in the main stream and will flow in the natural Goodwood River.

15.3.5 Open Pit Design Results

The ultimate pit that was designed for the KéMag Deposit is approximately 7.4 km long and 0.5 – 1.0 km wide at surface with a maximum pit depth of 80 m. The total surface area of the pit is roughly 5.5 km². Figure 15.7 presents the final pit design for the KéMag Deposit.

In order to access the mine site, a road will be built on the south side of the KéMag Deposit along the provincial border. The pit was designed with a minimum offset of 50 m from this access road.

The average overburden thickness within the pit is 8.0 m and the maximum is 24.2 m.

The KéMag pit includes 328 Mt of Proven Mineral Reserves and 487 Mt of Probable Mineral Reserves for a total of 815 Mt. In order to access these reserves, 88 Mt of overburden, 0.2 Mt of Menihek Shale and 55 Mt of material that is either sub-grade or Inferred Mineral Resources must be mined. This total waste quantity of 144 Mt results in a stripping ratio of 0.18 to 1.

The Mineral Reserves for KéMag contain an average DTWR of 27.3%, an average TotFe of 31.4%, an average Fe in the concentrate of 69.7% and an average SiO₂ in the concentrate of 2.5%. These numbers account for the mining dilution and ore loss discussed earlier in this Section of this PFS.

Table 15.5 presents the Mineral Reserves for the KéMag Deposit by reserve category and Table 15.6 presents the Mineral Reserves by rock type.

Table 15.5 – Mineral Reserves by Category

Category	Tonnage (Mt)	DTWR (%)	TotFe (%)	Concentrate	
				Fe (%)	SiO ₂ (%)
Proven	328	27.9	30.4	68.8	3.3
Probable	487	27.0	32.0	70.3	2.0
Proven & Probable	815	27.3	31.4	69.7	2.5

The totals may not add up due to rounding errors.

Table 15.6 – Mineral Reserves by Rock Type

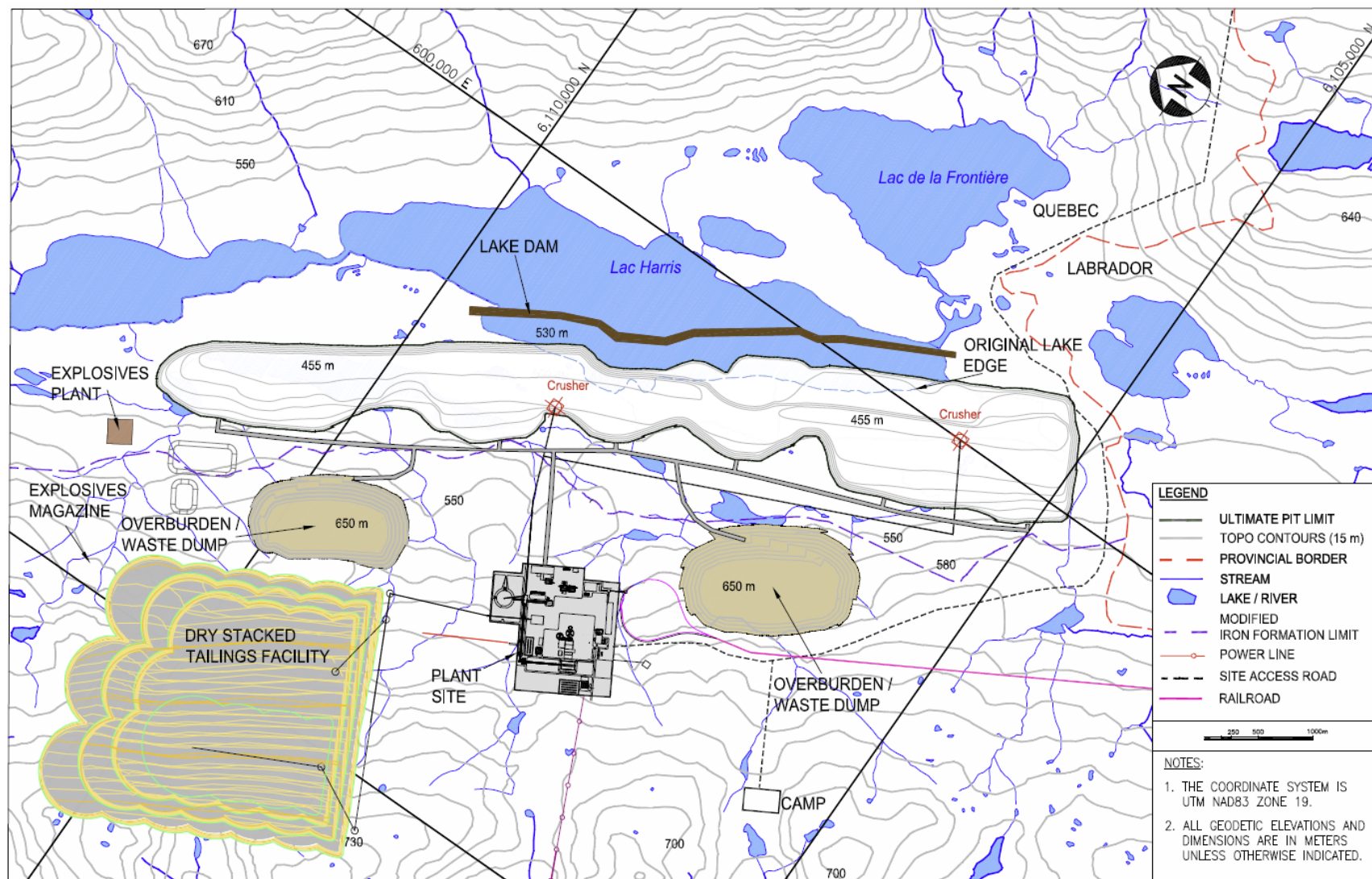
Category	Tonnage (Mt)	% of Total	DTWR (%)	TotFe (%)	Concentrate	
					Fe (%)	SiO ₂ (%)
LC	184.5	22.7%	29.9	30.9	70.1	2.2
JUIF	50.9	6.2%	22.3	33.0	69.7	2.5
GC	37.2	4.6%	14.1	21.7	69.8	2.0
URC	44.7	5.5%	26.5	33.4	70.0	2.2
PGC	130.9	16.1%	31.1	32.7	69.8	2.6
LRC	30.9	3.8%	25.2	33.9	71.0	1.5
LRGC	335.3	41.2%	27.0	31.4	69.3	2.9
Total Reserves	814.5	100.0%	27.3	31.4	69.7	2.5

15.4 Recommendations

The pit optimization results show that the economic cut-off grade is less than 12% DTWR, and higher DTWR cut-offs have only been used in the past in order to ensure higher grade material is sent to the plant for processing as well as to be conservative. However, half of the material below 18% DTWR (approximately 200 Mt) in the ultimate pit is between 16-18%.

Since the current mine plan is based on the use of in-pit semi-mobile crushers, it is more logical to process this slightly lower grade (16-18% DTWR) material. This material is hauled to a dump outside the pit (which thus also incurs a higher mining cost per tonne of product). The higher cost of processing the lower grade ore needs to be taken into account to determine the minimum cut-off grade. For this reason, a study on the resource cut-off grade should be done in the next project phase and the cut-off grade could be lowered for future resource and reserve estimates.

Figure 15.7 – Pit Layout



16.0 MINING METHODS

The mining method selected for the Project is conventional truck and wheel loader. The trucks size was selected so that the fleet requirements are a maximum of ten (10) trucks and the loaders were then sized accordingly to match. The mining equipment will deliver the run of mine ore to one of two (2) semi-mobile crushers. The information on the crushing equipment and systems is discussed in Section 17.0.

Vegetation and topsoil will be cleared using a mining contractor and carried out with a fleet of dozers, small excavators and articulated haul trucks ahead of the mining operation. Suitable organic material will be stockpiled for future reclamation use. Overburden will then be stripped using a fleet of excavators and hauled to the overburden dumps. The ore and waste rock will be mined with 15 m high benches, drilled and blasted, and then loaded with wheel loaders into a fleet of rigid frame trucks that will haul the material to either the waste dumps or the primary crushers.

16.1 Geotechnical Pit Slope Parameters

The geotechnical pit slope parameters are presented in Section 15.3.1.

16.2 Hydrogeology and Hydrology Parameters

The mine dewatering calculations and design were done using data that were collected on the neighboring LabMag Deposit in 2006 and some limited hydrogeological field work conducted at KéMag in 2011-2012. Due to the limited scope of the 2006 hydrogeological study and lack of data at KéMag, a hydrogeological field investigation of KéMag is recommended to verify the mine dewatering calculations.

The mine dewatering plan objective is to minimize the amount of water that infiltrates into the pit and to remove any water that does enter the pit.

A system of periphery wells will be established around the pit limits and pumps will be placed at the bottom of the wells to lower the water table below the elevation of the mining operation. The number of wells, their location and pumping capacity are based on the level of the water table and the recharge rate. Water drawn from these wells will be returned to the local water bodies as it will be clean unless it is needed in the process facilities.

Water that enters into the pit will be collected in sumps that will be established on the lowest point of the pit floor. This water will be pumped from the sumps to the surface and channeled to the site water collection pond. More detail on the site area dewatering plan are presented in Section 18.0.

A preliminary mine dewatering plan was developed using the limited available data from a 2012 field work program. A more detailed mine dewatering plan will be required during the feasibility study phase.

Pumps selected for the mine dewatering plan have a 450 kW power rating and can handle flow rates of 900 m³/h. These pumps are connected to the mine electrical network.

Treated water from the site water collection pond will be used for the following purposes: to provide process water and fresh water to the process plant; hose-down truck cleaning; fire protection; mine/ROM stockpile/road dust control; and crusher draw pocket dust suppression sprays.

The five (5) sources of water that affect the mining operation are surface run-off, rainfall, snowmelt, permafrost melt and groundwater. The quantity for each of these sources of water was estimated for each period of the mine plan in order to calculate the dewatering requirements.

16.2.1 Surface Run-off

In order to limit the surface run-off from entering the pit, a perimeter ditch will be established around the limits of the pit to capture the surface water before it enters into the mining area. Water collected in the ditch system will be directed to the site water collection pond where it will be treated and sampled prior to discharge into the environment. Perimeter ditches will also be established around the tailings stack to capture water run-off.

16.2.2 Rainfall and Snowmelt

The amount of rainfall and snowmelt was estimated using historical meteorological data available for the Schefferville area. The rainfall and snowfall quantity averages 90% of the total mine dewatering requirements.

16.2.3 Groundwater

The amount of groundwater inflow was estimated using data from pumping tests that were carried out as part of the 2006 hydrogeological study for the LabMag Deposit. The groundwater quantity averages 8% of the total mine dewatering requirements.

16.2.4 Permafrost Melt

An additional amount of water is expected to enter the pit when zones of permafrost are encountered. Due to the limited information available on permafrost conditions in the pit, conceptual considerations based on a standard equation for fluid flow (Darcy's Law) and the average thickness of the active layer in the area was used to estimate this quantity. The permafrost quantity averages 2% of the total mine dewatering requirements.

16.3 Dump Design

The PFS for the KéMag Deposit anticipates two (2) waste rock and overburden dumps. The following section presents the design parameters that were used for the waste dumps.

In order to comply with mining regulations, organic material within the pit limits, the dump areas and infrastructure footprints must be stripped and stockpiled for future reclamation use. This material known as topsoil will be placed in stockpiles around the Property. Since the topsoil quantities are small and the stockpiles are temporary, they are not shown on any of the site layout drawings. An average topsoil thickness of 0.3 m has been used for volume estimation purposes.

The waste rock and overburden will be managed in the same dump since stockpiling overburden separately would require very shallow slopes due to the nature of the material and would increase the footprint of the altered land use.

The following parameters were used for the design of the waste rock/overburden dumps. These parameters are based on projects with similar rock types. Since the dumps are relatively large, it is recommended that a geotechnical study be carried out to confirm the proposed dump design criteria prior to deposition:

- Swell factor – 30%;
- Overall slope – 25°;
- Lift slope – 34°;
- Catch bench – 10 m berm per 15 m lift;
- Maximum dump height – 100 m;
- Setback from pit crests – 100 m;
- Setback from mine haul roads – 100 m;
- Setback from other dumps and stockpiles – 100 m;
- Setback from the provincial boundary – 25 m.

The waste dumps will be constructed in five (5) m high lifts, compacted by a bulldozer. The dumps can be seen on Figure 15.7 for the mine plan. Figure 16.1 represents a typical section of the waste dump.

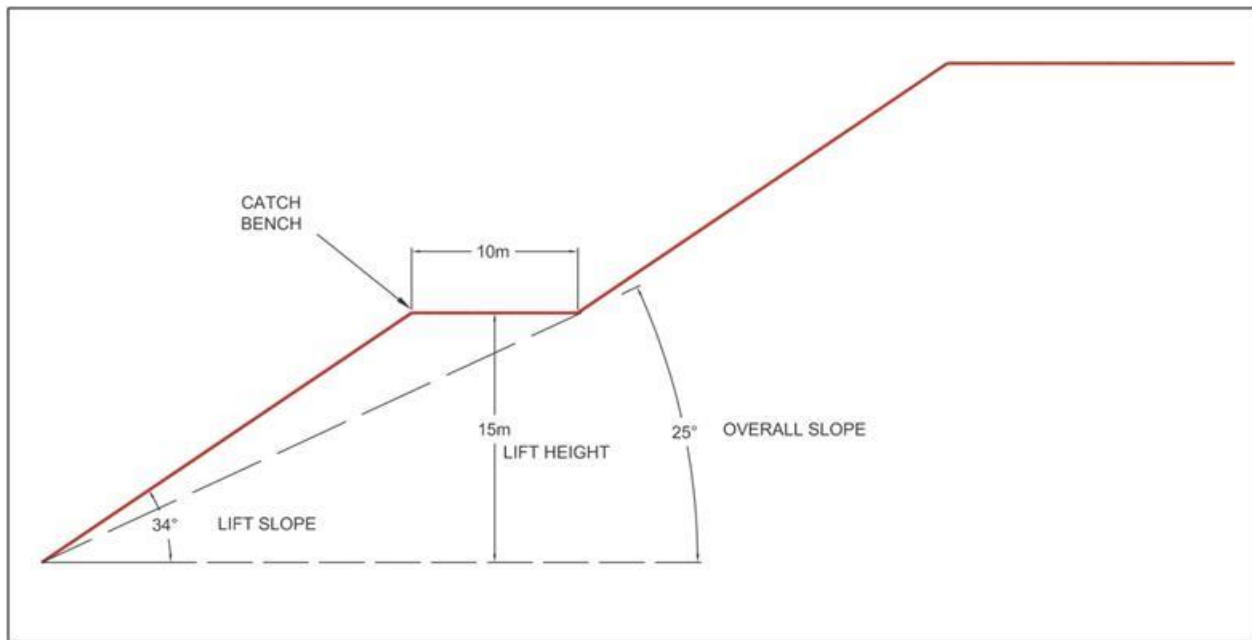
The dumps will have a perimeter ditch around their toes to capture water run-off. The dumps were designed within claims owned by NML and were placed outside of the adjusted iron formation boundary that was discussed in Section 15.0.

The waste dump located on the north side of the plant site was designed to contain approximately 32 Mm³ of material and has a footprint of 77 ha.

The waste dump located on the south side of the plant site was designed to contain approximately 58 Mm³ of material and has a footprint of 107 ha.

The dumps presented in this PFS respect the volumes generated from the mine plan and are used to calculate haul distances for mine fleet estimation. Environmental aspects related to the waste rock are discussed in Section 20.0.

Figure 16.1 – Waste Dump Configuration



16.4 Mine Planning

The following Section discusses the mine plan that was prepared for the KéMag deposit. This mine plan forms the basis of the mine capital and operating cost estimate presented in Section 21.0. The mine plan was established annually for the first five (5) years of production and in four (4) five 5-year periods for the remaining twenty (20) years.

16.4.1 Mine Planning Parameters

a) 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. A total of seven (7) days per year have been accounted for when the mine will be shut down due to severe weather conditions. These conditions may occur during peak rainfall or snowfall periods or at times when the ambient temperature is extremely low.

b) Annual Production Requirements

The mine plan is based on an annual production of 9 Mt of pellets. The pellets include 4 Mt of BF grade pellets and 5 Mt of DR grade pellets. The mine plan incorporates a ramp up of 60% in Year-1 (5.1 Mt of concentrate) and 85% in Year-2 (7.5 Mt of concentrate) before reaching full capacity of 8.7 Mt of concentrate in Year-3.

c) Weight Recovery Adjustment

A small amount of losses are expected in the plant. The DTWR gives an ideal estimate of the recovery, and is adjusted to account for the plant efficiency, which is expected to be 96.3%. The target concentrate grade is 70.0% Fe for BF pellet feed and 70.5% Fe for DR pellet feed. The weight recovery is also adjusted to take into account the change from the DT concentrate Fe to each of the target pellet Fe grades.

In order to correlate the Davis Tube Weight Recovery value in the block model to the expected weight recovery in the plant, the following calculation was performed:

- $\text{MagFe (\%)} = \text{DTFe Concentrate} \times \text{DTWR}$;
- $\text{Weight Recovery for BF Concentrate} = \text{MagFe} \times \text{Plant efficiency} / \text{BF concentrate Fe}$;
- $\text{Weight Recovery for DR Concentrate} = \text{MagFe} \times \text{Plant efficiency} / \text{DR concentrate Fe}$;
- A weighted average of the two (2) weight recoveries was then used based on a 3.96 BF / 5.03 DR split of the total concentrate, which produces the desired split of 4 Mtpy BF / 5 Mtpy DR of the total pellets.

During the pelletizing process, there is a weight gain due to the addition of binders and oxidation. Table 16.1 and Table 16.2 show the breakdown of this weight gain for 100 tonnes of concentrate for each of the two (2) pellet types, along with an assumed 1.5% production loss.

Table 16.1 – BF Concentrate to Pellet Weight Gain

	Concentrate (t)	BF Pellets (t)
Concentrate	100.00	103.28
Bentonite	0.50	0.45
Limestone	3.62	2.06
Production loss		-1.50
Total	104.12	104.29

Table 16.2 – DR Concentrate to Pellet Weight Gain

	Concentrate (t)	DR Pellets (t)
Concentrate	100.00	103.28
Bentonite	0.50	0.45
Limestone	0.93	0.53
Production loss		-1.50
Total	101.43	102.76

d) Blending of Rock Types

In order to minimize the variations of material hardness that is sent to the plant, the different rock types are blended during each period of the mine plan.

e) Blending and Grade Control

The mine plan objectives are as follows:

- Supply a constant run of mine feed;
- Target the highest weight recovery material in each year;
- The average DTWR in a given year should not be less than 25%;
- Campaign mining for BF and DR pellets; the maximum DT silica is 2.5% for DR pellets and 4.0% for BF pellets.

The deposit exhibits a general trend of increasing DTWR as well as silica northwest along the strike. Mining begins in the center of the deposit and then proceeds to mine from the north and south ends of the deposit at roughly equal proportions to ensure sufficient material with lower silica is available in each period for DR pellets. There will typically be four (4) active ore mining faces during the operation to allow for blending.

f) Push-back Strategy

Each push-back consists of several benches in order to distribute the mined overburden over as many periods as possible.

g) Semi-mobile Crusher Relocation

Two semi-mobile in-pit crushers are assumed for the life of mine. The initial crusher will be installed in an area of approximately 2,800 m² that will be mined out in pre-production, which will allow trucks to dump into the crusher at surface level. In Year-3, the second crusher is placed on the opposite end of the pit on the lowest available bench, which reduces truck cycle times. In Year-4, crusher #1 is moved to a lower bench to reduce cycle times as mining progresses to lower benches. The two (2) crushers are relocated once for each of the four subsequent four (4) five-year periods in order to follow the mining progression.

16.4.2 Mine Production Schedule

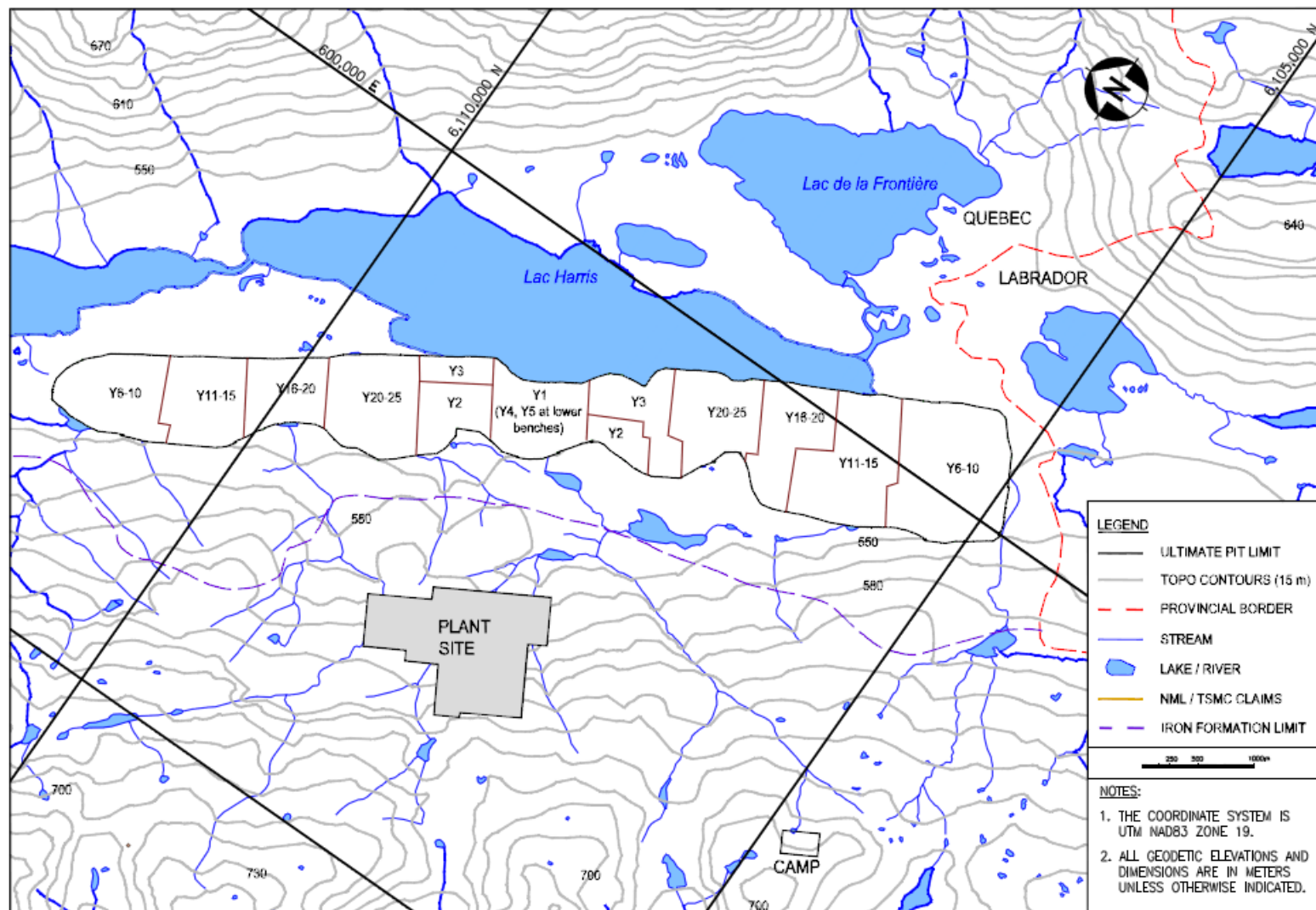
This section presents the mine production schedule that was established for the KéMag Deposit. The mine production schedule, depicted in Table 16.3, meets the objectives that were discussed above. Figure 16.2 presents a plan view showing the pit advance by period. The reason several periods are missing from this figure is because the mining occurs within the same limits as the previous period.

A pre-production phase of one (1) year has been planned for the KéMag Deposit. This period includes clearing and grubbing activities, topsoil and overburden stripping, mine road construction and the development of the pit for ore production.

Table 16.3 – Mine Production Schedule

Description	Units	PRE PROD	Year 01	Year 02	Year 03	Year 04	Year 05	Year 06 - 10	Year 11 - 15	Year 16 - 20	Year 21 - 25	Total
Pellets	Mt	0.0	5.4	7.7	9.0	9.0	9.0	45.0	45.0	45.0	45.0	220.1
Concentrate	Mt	0.0	5.2	7.4	8.7	8.7	8.7	43.5	43.5	43.5	43.5	212.8
Total Ore to Plant	Mt	0.0	18.2	25.5	30.4	30.3	32.3	155.2	166.3	172.0	184.4	814.5
DT Weight Recovery	%	0.0	30.2	30.2	29.8	30.2	28.2	29.4	27.4	26.3	24.8	27.3
SiO ₂ (in concentrate)	%	0.0	3.1	2.2	2.2	2.5	2.3	2.4	2.7	2.2	2.8	2.5
Fe (in concentrate)	%	0.0	69.4	70.0	70.2	69.6	69.8	69.7	69.6	70.1	69.4	69.7
Mag FE	%	0.0	21.0	21.2	20.9	21.0	19.7	20.5	19.1	18.5	17.2	19.1
BF Conc. WR	%	0.0	28.8	29.1	28.8	28.9	27.1	28.1	26.3	25.4	23.7	26.2
DR Conc. WR	%	0.0	28.6	28.9	28.6	28.7	26.9	27.9	26.1	25.2	23.5	26.0
Plant WR	%	0.0	28.7	29.0	28.7	28.8	27.0	28.0	26.2	25.3	23.6	26.1
Ore to Plant by Lithology	Mt	0.0	18.2	25.5	30.4	30.3	32.3	155.2	166.3	172.0	184.4	814.5
LC	Mt	0.0	4.5	3.6	16.9	1.1	0.0	41.0	40.2	37.6	43.1	188.1
JUIF	Mt	0.0	2.8	3.2	4.4	3.0	0.2	9.2	9.2	8.5	11.6	52.1
GC	Mt	0.0	1.9	2.2	1.6	2.2	0.5	7.1	8.3	7.0	7.5	38.4
URC	Mt	0.0	1.8	2.3	1.6	2.8	1.2	9.2	8.6	9.4	9.3	46.1
PGC	Mt	0.0	3.9	5.2	2.9	6.0	4.5	28.9	25.1	26.0	30.9	133.5
LRC	Mt	0.0	0.2	0.5	0.1	0.7	1.8	8.7	9.3	6.0	4.1	31.4
Total Waste	Mt	5.2	12.8	12.9	6.0	7.0	8.5	23.6	20.0	24.6	22.9	143.5
Overburden	Mt	5.2	11.3	6.0	2.0	4.0	7.1	17.2	17.2	18.3	0.0	88.2
Menihek Shale	Mt	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2
Inferred or DTWR<18%	Mt	0.0	1.5	6.9	4.0	3.0	1.5	6.5	2.8	6.2	22.8	55.1
Total Material Moved	Mt	5.2	31.0	38.4	36.4	37.2	40.8	178.8	186.3	196.6	207.3	958.1
Stripping Ratio		n/a	0.70	0.50	0.20	0.23	0.26	0.15	0.12	0.14	0.12	0.18

Figure 16.2 – Pit Advance (Plan View)



The pre-production activities will be carried out by a mining contractor, as is typically done in mining operations. The overburden quantity excavated in the pre-production phase is estimated at 5.2 Mt.

The annual DTWR in the mine plan fluctuates between a low of 24.8% to a high of 30.2%, with an average of 27.3%. As a result, the annual run-of-mine feed to the plant when in full production ranges from 30.3 Mt to 36.9 Mt, with an average of 33.3 Mt.

The annual SiO₂ content in the DT concentrate fluctuates between 2.2% and 3.1%, with an average of 2.5%. The annual total material moved ranges from 31.0 Mt in Year-1 to 41.4 Mt in Years 21-25, with an average of 39.2 Mt per year for the life of mine.

Figure 16.3 presents a chart showing the tonnages mined each year. The tonnages shown are annualized for the five (5) year periods. Figure 16.4 presents the annual DTWR and SiO₂ in the concentrate for the mine plan.

Figure 16.3 – Mine Production Schedule (Production)

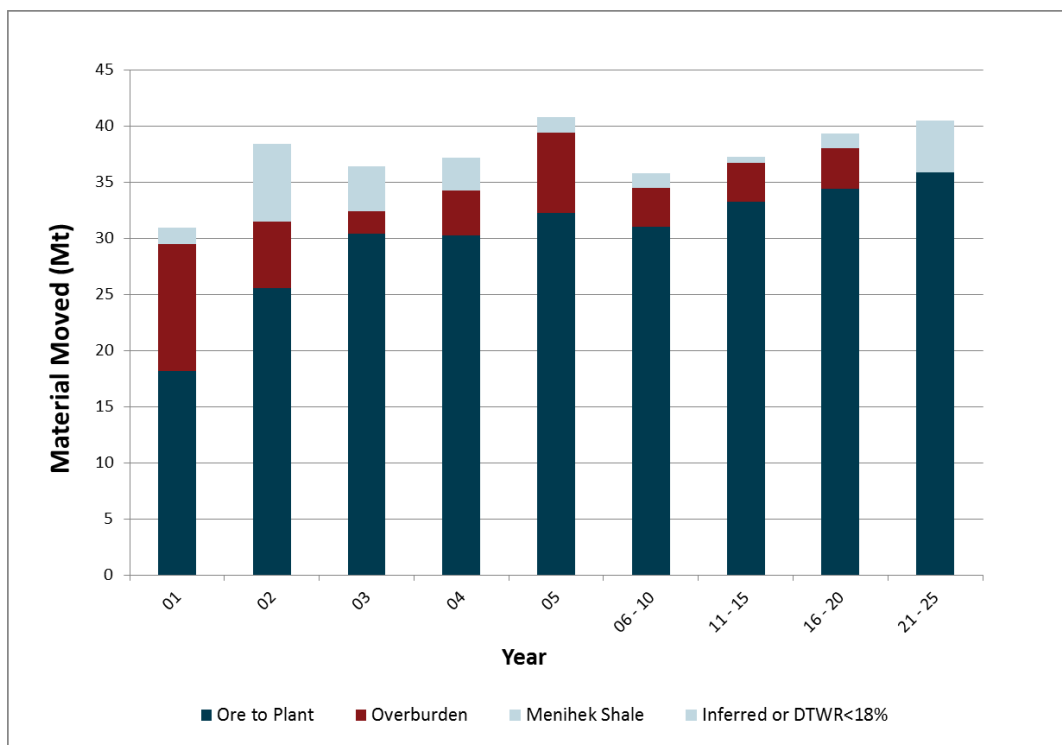
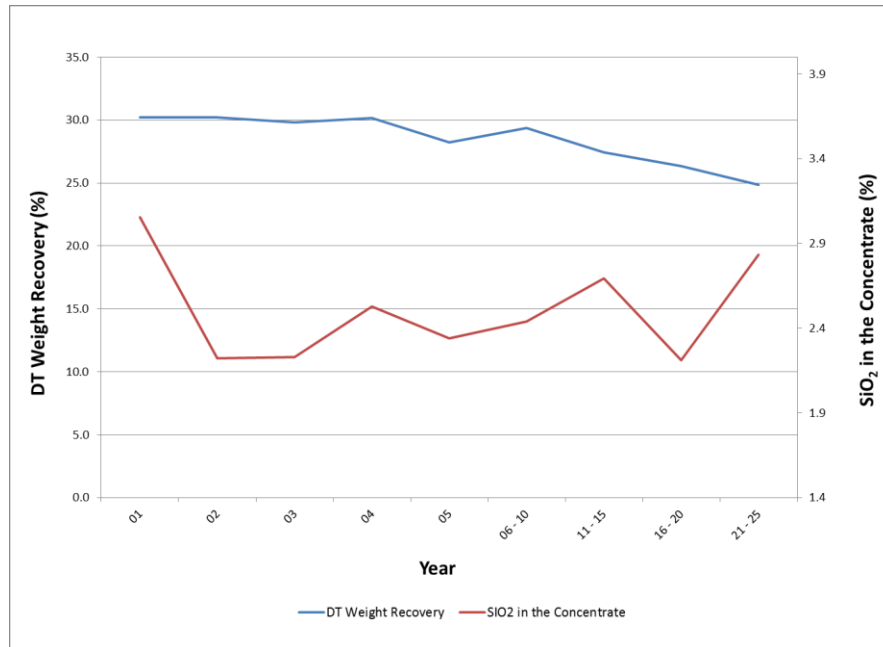


Figure 16.4 – Mine Production Schedule (Grades)



16.4.3 Mine Equipment Fleet

The following section discusses equipment selection and fleet requirements in order to carry out the mine plan. Table 16.4 presents the list of major mining equipment on an annual basis.

Table 16.4 – Major Mining Equipment Fleet

Equipment	Description	Year	Year	Year	Year	Year	Year	Year	Year	Year
		01	02	03	04	05	06 – 10	11 – 15	16 – 20	21 – 25
Haul Truck	Payload – 180 tonne	8	10	10	10	10	10	10	10	10
Wheel Loader	Bucket – 40 tonne	3	3	3	3	3	3	3	3	3
Production Drill	Bit Load – 65 tonne	2	3	3	3	3	3	3	3	3

16.4.4 Haul Trucks

The haul truck selected for the Project is a rigid-frame mining truck with a payload of 180 tonnes. This truck has been selected because it results in a manageable fleet size given the quantities of material and haul distances expected. The standard payload of 180 tonnes has been reduced to 177 tonnes to account for the liners on the truck boxes that are required for this iron ore application. The following parameters were used to calculate the number of trucks required to carry out the mine plan:

- Mechanical Availability – 85%;

- Utilization – 90% (non-utilized time is accrued when the truck is not operating due to poor weather, blasting, shovel relocation and no operator available);
- Nominal Payload – 177 tonnes (105 m³ heaped);
- Shift Schedule – Two (2), 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 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 loader and dump, as well as interference along the haul route);
- Rolling Resistance – 3%

Table 16.5 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 has been validated with mining operations. Talpac® calculated the travel time required for a 180 tonne haul truck to complete each route.

Table 16.5 – Truck Hours (h/y)

Total Hours	8,760	7 days per week, 24 hours per day, 52 weeks per year
Scheduled Hours	8,592	Hours available accounting for weather delays
Down Mechanically	1,289	15% of total hours
Available	7,303	Total hours minus hours down mechanically
Standby	730	10% of available hours (represents 90% utilization)
Operating	6,573	Available hours minus standby hours
Operating Delays	730	80 min/shift
Net Operating Hours	5,843	Operating hours minus operating delays
Working Hours	5,258	90% of net operating hours (reflects job efficiency)

Haul routes were determined for each period of the mine plan based on the centroid of the mining area and the centroid of the dumping location for each material type. Haul productivities (tonnes per work hour) were calculated for each haul route using the truck payload and cycle time.

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 5,258 hours available to work in a full year, as shown in Table 16.5.

A fleet of 8 trucks is required during Year-1. This number increases to a peak of 10 in Year-2 to Year-25. The truck fleet required by year is presented in Table 16.4.

16.4.5 Wheel Loaders

The main loading machine selected for the Project is a wheel loader with a bucket payload of 40 tonnes. This loader is mobile for greater flexibility than a shovel, and will be suitable to handle the production requirements as well as the face heights expected.

The following parameters were used to calculate the number of loaders required to carry out the mine plan:

- Mechanical Availability – 85%;
- Utilization – 85%;
- Bucket Capacity – 40 tonnes (17 m³);
- Shift Schedule – Two (2), 12 hour shifts per day, seven (7) days per week;
- Operational Delays – 90 min/shift (this includes 15 minutes for shift change, 15 minutes for equipment inspection, 40 minutes for lunch and coffee breaks and 20 minutes for refueling);
- Job Efficiency – 70% (42 min/h; this represents lost time due to waiting for trucks, cleaning up the loading area and relocating).

The selected loader can load a 180-tonne haul truck in five (5), 36 second passes for a total load time of 3.0 minutes. Assuming there are trucks available to load, the loader can load 18.3 trucks per hour for a theoretical productivity of 3,292 t/h accounting for mechanical availability, utilization, operational delays and job efficiency. Each loader has 4,026 available work hours in a full year. In order to mine the tonnages presented in the mine plan, three (3) loaders are required throughout the mine life.

The loader fleet required by year is presented in Table 16.4.

16.4.6 Drilling and Blasting

Production drilling will be carried out using a fleet of electric powered rotary drills. The proposed blast pattern is presented in Table 16.6. The drilling and blasting parameters were determined based on benchmarking with taconite operations in Minnesota's Mesabi Iron Range and discussions with explosive suppliers.

The number of drills required was estimated assuming an 85% mechanical availability, 90% utilization and a penetration rate of 20 m/h. Each drill will be able to drill blast patterns totaling approximately 13 Mt per year.

In order to drill the tonnages presented in the mine plan, two (2) drills are required in Year-1, and a peak of three (3) drills are required from Year-2 onwards. The drill fleet required by year is presented in Table 16.4.

Table 16.6 – Blasting Parameters

Parameter	Units	Ore	Waste
Bench Height	m	15	15
Blast hole Diameter	mm	381	381
Burden	m	8.3	8.8
Spacing	m	9.5	10.1
Sub-drilling	m	1.5	1.5
Stemming	m	8.2	8.2
Explosives Density	g/cm ³	1.26	1.26
Powder Factor	kg/t	0.39	0.39

Blasting will be executed under contract with an explosives supplier that will be responsible for the following services:

- Transportation and storage of explosive manufacturing products and blasting accessories to site;
- Manufacturing of bulk emulsion explosives;
- Loading and priming of blastholes.

Two (2) sites have been selected for the contractor to establish the explosives operation. The site selection has accounted for the required minimum distances as specified by the Canadian explosives regulations. Approvals and permits are required from the government regulating bodies prior to construction. These sites are located on:

- Explosives Plant – this site includes the storage facility for raw materials, the offices and garages as well as the emulsion plant and pumper truck loading area;
- Explosive Magazines – this site includes the magazines to store the blasting caps, primers, detonation cord and packaged explosives.

For the fabrication of the bulk emulsion, ammonium nitrate solution will be transported from Sept-Îles to the mine site by rail. The ammonium nitrate solution will be stored in rail cars at a rail siding at site and transported to the explosives plant as required. The explosives plant facilities will be composed of predesigned/prebuilt modules that are easily transported and assembled.

In order to support the explosives supplier, the mine operator is required to build and maintain the access road to the two (2) sites and to supply electric power, communications and diesel fuel for the manufacturing of the emulsion as well as the operation of mobile equipment. The mine operator will mobilize and house the contractor's workforce.

Based on the blasting parameters presented in Table 16.6, the amount of explosives required per year is approximately 13 million kg. In order to manufacture this amount of explosives per year, the following quantities of consumables are required annually:

- Ammonium Nitrate – 11,000 t;
- Diesel Fuel – 1.2 million litres (includes fuel for mobile equipment fleet);
- Water – two (2) million litres;
- Electrical Energy – 0.6 MWh.

During full production there will be roughly three (3) blasts per week each producing approximately 250,000 t of material.

16.4.7 Auxiliary Equipment

The following fleet of support and service equipment was included to carry out the mine plan:

- Two (2) track dozers (433 kW) for construction of the waste dumps as well as pit and road maintenance;
- One (1) wheel dozer (468 kW) to clean up the pits;
- Two (2) road graders (221 kW) for mine road maintenance;
- One (1) wheel loader (266 – 303 kW) equipped with cable reel attachments to manipulate the trailing cable for the drills;
- One (1) large utility excavator (358 – 397 kW), and one (1) small utility excavator (109 – 119 kW) were added to the fleet to establish ditches and sumps for mine dewatering and other activities. The large excavator will be equipped with a 4.6 m³ bucket and the small excavator will be equipped with a 1.2 m³ bucket;
- Two (2) haul trucks with 60-tonne payloads will be used by the utility crew for road maintenance, dewatering and other miscellaneous activities;
- One (1) utility front end loader (283 – 396 kW) will be used as part of the utility crew. This loader will be used for road maintenance, dewatering and other miscellaneous activities;
- Two (2) haul trucks equipped with 90,000-litre tanks will be used as water trucks in the summer and converted into sand trucks in the winter. These trucks are important to maintain the integrity of the roads to allow for a safe and productive operation and minimise dust;
- One (1) track mounted secondary drill capable of drilling 165 mm holes for pre-shearing and secondary blasting;
- One (1) soil compactor for road construction and maintenance.

The remaining support and service equipment includes a fuel/lube truck, mechanic trucks, a tire handler, a large tow truck, a boom truck, a mobile crane, a lowboy, transport busses, pickup trucks and light towers. Table 16.7 provides a summary of the auxiliary equipment.

Table 16.7 – Auxiliary Equipment

Support Equipment	Description	# Units
Track Dozer	433 kW	2
Wheel Dozer	468 kW	1
Road Grader	221 kW	2
Cable Reeler	266 – 303 kW	1
Large Utility Excavator	358 – 397 kW	1
Small Utility Excavator	109 – 119 kW	1
Utility Haul Truck	60 t payload	2
Utility Front End Loader	283 – 396 kW	1
Water / Sand Truck	90,000-litre	2
Secondary Drill	165 mm drill holes	1
Soil Compactor	130 – 160 kW	1
Light Tower	8 kW	8
Service Equipment	Description	# Units
Fuel / Lube Truck	12,000-litre	1
Mechanic Truck	n/a	2
Tire Handler	n/a	1
Boom Truck	22-tonne	1
Small Mobile Crane	75-tonne	1
Large Mobile Crane	100-tonne	1
Tow Truck / Lowboy	180T Chassis	1
Transport Bus	20 person cap.	2
Pickup Truck	440 HP	8

16.4.8 Lead Times for Delivery

The estimated delivery time for the major mining equipment is presented in Table 16.8.

Table 16.8 – Mining Equipment Lead Delivery Time

Equipment	Lead Delivery Time (months)
Haul Trucks	14
Wheel Loader	12
Tracked Dozer	12
Road Grader	6

16.4.9 Mine Dispatch

A mine dispatch system will be installed to manage the truck fleet. The cost to install a mine dispatch system is included in the mine capital cost estimate.

16.4.10 Equipment Simulator

In order for the mine operations to run safely and efficiently, a truck, loader and dozer simulator will be required on site to train the operators. The cost to purchase the simulators is included in the mine Capex.

16.5 Mine Manpower Requirements

The total mine workforce for the Project ranges from 167 employees in Year-1 to a maximum of 191 from Year-20 to 25. This workforce is comprised of management, technical staff and hourly employees. The 13 management and staff employees include the mine superintendent, the maintenance superintendent, the engineering supervisor, two (2) mining engineers, two (2) geologists, two (2) planning technicians, two (2) surveyors and two (2) maintenance planners. Of those 13 employees, the 10 non-management staff employees will work on a two (2) week on, two (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, seven (7) days per week. Each crew will consist of two (2) pit foremen, a maintenance foreman, a drill and blast foreman, a grade control technician (day shift only), a dispatcher, a trainer, equipment operators, a dewatering crew, a power distribution crew, mechanics, electrical technicians, welders, labourers and maintenance attendants. The number of mechanics, electrical technicians and welders was estimated assuming a maintenance ratio of 0.25.

Table 16.9 shows the mine manpower requirement for Year 5.

Table 16.9 – Mine Manpower Requirements (Year-5)

Description	Manager	Staff	Shift
MINE OPERATIONS			
Mine Superintendent	1		
Pit Foreman			8
Drill and Blast Foreman			4
Truck Operators			36
Loader Operators			12
Drill Operators			12
Track Dozer Operator			8
Wheel Dozer Operators			4
Grader Operators			8
Water / Sand Truck Operators			8
Fuel & Lube Truck Operator			4
Labourer			12
Dewatering Crew			4
Dispatchers			4
Trainers			4
ENGINEERING			
Engineering Supervisor	1		
Mining Engineer		2	
Geologist		2	
Grade Control Technician			2
Planning Technician		2	
Surveyor		2	
MAINTENANCE			
Maintenance Superintendent	1		
Maintenance Foreman			4
Maintenance Planner		2	
Mechanic			24
Electrical Technician			4
Welder			4
Wash Bay Attendant			4
Tire Bay Attendant			4
Tool Crib Attendant			4
Sub Total Mine	3	10	178
Total Mine Workforce		191	

17.0 RECOVERY METHODS

The process plant will extract magnetite from the taconite reserves of the KéMag Deposit in the Labrador Trough to produce a concentrate. The operation will mill approximately 35 Mt/y of iron-bearing mineralisation to produce 8.7 Mt/y of magnetite concentrate.

The process plant will include multiple comminution stages combined with conventional magnetite recovery methods. A flotation plant will further reduce the silica to produce a high-grade iron concentrate with low SiO₂ suitable for both BF and DR pellets or to be sold as pellet feed concentrate.

Unless otherwise noted, all weight and throughput is expressed in dry tonnes.

17.1 Process Plant Design Criteria

The process plant is designed to treat approximately 35 Mtpy of taconite ore at 27.3% DTWR and 31.4% Fe grade. It will produce a 1.5% to 2.25% silica concentrate. The magnetite weight recovery is critical, since the concentration process does not recover hematite unless it is associated with magnetite. The resources' weight recovery and the plant performance are used to calculate the plant feed tonnage. In addition, equipment design factors that form part of the design criteria ensure that the process equipment has enough capacity to take care of the expected feed and process variability. The plant has a 25-year design life.

The process plant design is based on test work performed on representative samples, selected from the LabMag and KéMag Deposits, tested in pilot plants from 2005 to 2015 and complemented by bench scale test work and supplier tests for equipment sizing. Minor items included in the design basis have not necessarily been tested and, in such cases, assumptions were made based on industry experience. New test work performed since the Taconite FS was considered in this study for project optimisation.

The design philosophy is driven by the requirement for a robust system with the most effective means of concentrating the ore. The process selected for the NuTac Project consists of the following steps:

- Semi-mobile crushing units located strategically in relation to the pit to minimise haulage distances;
- Conventional secondary crushing and screening with a primary stockpile to allow for maintenance down time and weather-related delays;
- 2-Pass HPGR grinding and screening embedding cobber wet Low Intensity Magnetic Separators ("LIMS") concentration;
- 2 steps of VertiMill regrinding with rougher LIMS separation, fine screening, desliming and finisher LIMS concentration;
- Flotation as needed to further reduce the silica content for low-silica BF- and DR-grade pellet feed;

- Tailings filtration and dry stacking;
- Concentrate dewatering including drying during the winter months for rail transportation.

The overall processing facilities will operate 24 hours per day and seven (7) days per week. There is a complete operation shutdown allowance of 5 days for special maintenance or because of weather conditions (i.e. operation for 360 days per year). Primary crushing and secondary crushing will have an availability of 70 and 85% respectively, and the process plant and the flotation plant will operate at an availability of 92%. The process plant general design basis is shown in Table 17.1. A process plant summary block flow sheet and mass balance is provided in Figure 17.1.

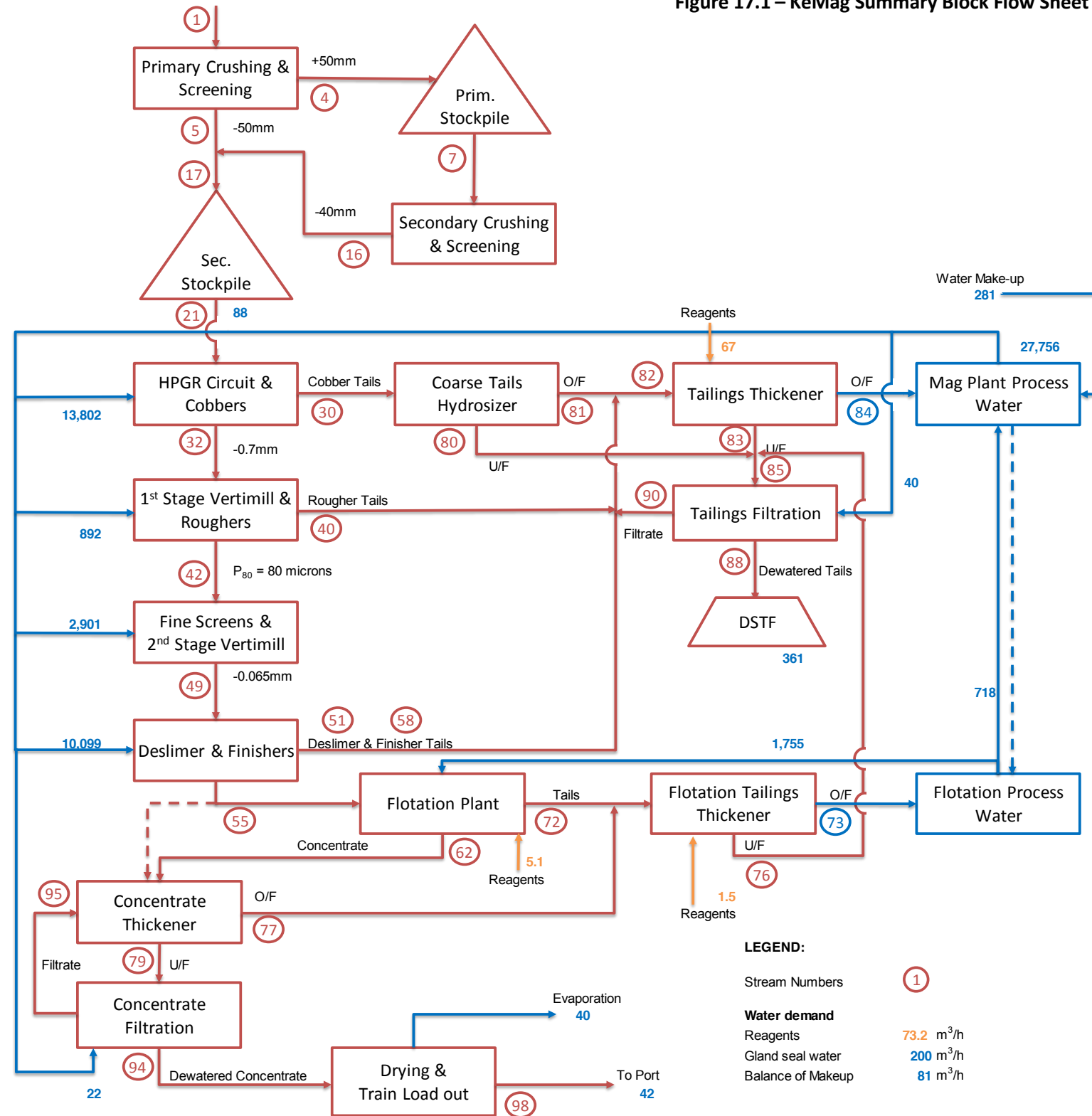
Table 17.1 – Process Plant General Design Basis

Items	Value
Iron Concentrate Production Target (Dry)	8,708,700 t/y
Run-of-Mine Production – Design (Dry)	34,448,300 t/y
Run-of-Mine Humidity	2%
Weight Recovery (Including Flotation)	25.28%
Scheduled Operating Days per Year	360 days
Scheduled Operating Hours per Year	8,640 h
Utilization (Percentage of Scheduled Operation Hours Available)	
Primary Crushing	70%
Secondary Crushing	85%
Primary Grinding and Cobber	92%
Secondary Grinding and Concentration	92%
Flotation	92%
Concentrate & Tailings Handling Systems	92%

17.2 Process Facilities Location Criteria

The processing plant flowsheet and design criteria come from the results of the metallurgical test work program discussed in Section 13.0 of this Report. Blending will ensure a proper quality of feed to the concentrator to produce either BF pellet feed or DR pellet feed concentrate.

Figure 17.1 – KéMag Summary Block Flow Sheet and Mass Balance



FLUX NO.	DESCRIPTION	Units	1	4	5	7	16	17	21	30	32	40
NOMINAL	SOIDS	t/h	5,696	4,392	1,304	3,617	3,617	4,691	4,334	2,509	1,825	547
	LIQUIDS	t/h	116	44	72	37	37	96	88	10,444	3,447	3,406
	SLURRY	t/h	5,813	4,436	1,376	3,653	3,653	4,787	4,423	12,953	5,272	3,953
	SLURRY FLOWRATE	m³/h	1,779	1,326	453	1,326	1,092	1,465	1,354	11,253	3,903	3,589
	SOLID FLOWRATE	m³/h	1,663	1,282	381	1,056	1,056	1,369	1,265	809	457	183
	% UTILIZATION	%	70	70	70	85	85	85	92	92	92	92
	% SOLIDS (PDS/PDS)	%	98	99	95	99	99	98	98	19	35	14
	S.G. SOLIDS	SG	3.43	3.43	3.43	3.43	3.43	3.43	3.10	4.00	2.99	
	S.G. LIQUIDS	SG	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	S.G. SLURRY	SG	3.27	3.34	3.04	3.34	3.34	3.27	3.27	1.15	1.35	1.10
AVERAGE*	SOIDS	t/h	3,987	3,074	913	3,074	3,074	3,987	3,987	2,308	1,679	503
	LIQUIDS	t/h	81	31	50	31	31	81	81	9,609	3,171	3,134
	SLURRY	t/h	4,069	3,105	963	3,105	3,105	4,069	4,069	11,917	4,850	3,637

*Average flowrates at 8,760 hrly

FLUX NO.	DESCRIPTION	Units	42	49	51	55	58	62	72	73	76	77
NOMINAL	SOIDS	t/h	1,278	1,278	32	1,117	129	1,082	36	0	36	0
	LIQUIDS	t/h	932	3,833	4,664	825	8,443	1,376	1,209	2,474	54	1,317
	SLURRY	t/h	2,210	5,112	4,696	1,942	8,572	2,458	1,245	2,474	89	1,317
	SLURRY FLOWRATE	m³/h	1,206	4,108	4,675	1,045	8,486	1,586	1,219	2,474	64	1,317
	SOLID FLOWRATE	m³/h	274	274	11	220	43	210	10	0	10	0
	% UTILIZATION	%	92	92	92	92	92	92	92	92	92	92
	% SOLIDS (PDS/PDS)	%	58	25	1	58	2	44	3	0	40	0
	S.G. SOLIDS	SG	4.66	4.66	2.91	5.08	2.98	5.15	3.62	3.62	3.62	5.15
	S.G. LIQUIDS	SG	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	S.G. SLURRY	SG	1.83	1.24	1.00	1.86	1.01	1.55	1.02	1.00	1.41	1.00
AVERAGE*	SOIDS	t/h	1,176	1,176	30	1,028	118	995	33	0	33	0
	LIQUIDS	t/h	858	3,527	4,291	759	7,768	1,266	1,113	2,276	49	1,211
	SLURRY	t/h	2,034	4,703	4,321	1,787	7,886	2,261	1,145	2,276	82	1,211

*Average flowrates at 8,760 hrly

FLUX NO.	DESCRIPTION	Units	79	80	81	82	83	84	85	88	90	94	95	98
NOMINAL	SOIDS	t/h	1,082	1,631	878	1,586	1,586	0	3,253	3,253	0	1,082	0	1,082
	LIQUIDS	t/h	305	699	9,745	27,373	680	26,757	1,432	361	1,110	81	245	42
	SLURRY	t/h	1,387	2,330	10,624	28,959	2,266	26,757	4,685	3,614	1,110	1,163	245	1,123
	SLURRY FLOWRATE	m³/h	515	1,218	10,035	27,899	1,206	26,757	2,488	1,417	1,110	291	245	252
	SOLID FLOWRATE	m³/h	210	519	290	527	527	0	1,055	1,055	0	210	0	210
	% UTILIZATION	%	92	92	92	92	92	92	92	92	92	92	92	92
	% SOLIDS (PDS/PDS)	%	78	70	8	5	70	0	69	90	0	93	0	96
	S.G. SOLIDS	SG	5.15	3.14	3.03	3.01	3.01	3.01	3.08	3.08	5.15	5.15	5.15	
	S.G. LIQUIDS	SG	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
	S.G. SLURRY	SG	2.69	1.91	1.06	1.04	1.88	1.00	1.88	2.55	1.00	3.99	1.00	4.46
AVERAGE*	SOIDS	t/h	995	1,500	808	1,459	1,459	0	2,992	2,992	0	995	0	995
	LIQUIDS	t/h	281	643	8,966	25,183	625	24,616	1,318	332	1,022	75	226	38
	SLURRY	t/h	1,276	2,143	9,774	26,642	2,084	24,616	4,310	3,325	1,022	1,070	226	1,034

*Average flowrates at 8,760 hrly

LEGEND:

Stream Numbers



Water demand

73.2 m³/h

Reagents

200 m³/h

Gland seal water

81 m³/h

Balance of Makeup

Slurry Stream



Water Stream



Water volume (m³/h)

27,756

The location and layout of the process plant consider a number of criteria, such as the topography to maximize gravity flow, location of overburden and waste dumps, location of tailings' dry stacking, etc.

The locating of the process plant, tailings area and water storage sites consider the following factors:

- Site geometry and terrain;
- Process plant layout;
- 25-year life capacity for Dry Stack Tailings Facility ("DSTF");
- Location of the DSTF relative to the water bodies and topography;
- Site water drainage and water management facilities;
- Earthworks requirement.

The coordinates of the process plant site are shown in Table 17.2.

Table 17.2 – Process Plant Coordinates

Location	Northing	Easting
KéMag process plant	6,107,500	597,000
The Coordinates System is: (UTM) NAD 83, ZONE 19		

17.3 Description and Geometry

The KéMag process plant is located west of the pit on the basement rock. The topography is entirely downward-sloping to the east at a slope of 10% or less. The selected site has substantial length and width and provides sufficient room for the processing facilities and structures. Figure 17.2 shows the general arrangement of the KéMag site.

The tailings will be dry stacked and the storage area will be able to accommodate 25 years of tailings. The tailings will be stacked towards the north-west of the process plant on the slope draining in the same watershed as the plant and the mine.

A site water pond will collect all impacted site water (pit water, tailings stack, plant site and waste dump drainage). The water will be treated and reused as plant process water make-up. If necessary, a fresh water intake will be installed on Lac Gillespie to cover the remaining needs for the process plant. Any excess treated water will be discharged to natural water bodies.

17.3.1 Ore Characteristics

The data used in this PFS for the ore characteristics are the main chemical parameters as calculated by the 25-year mine plan and are shown in Table 17.3.

Figure 17.2 – KéMag General Site Layout

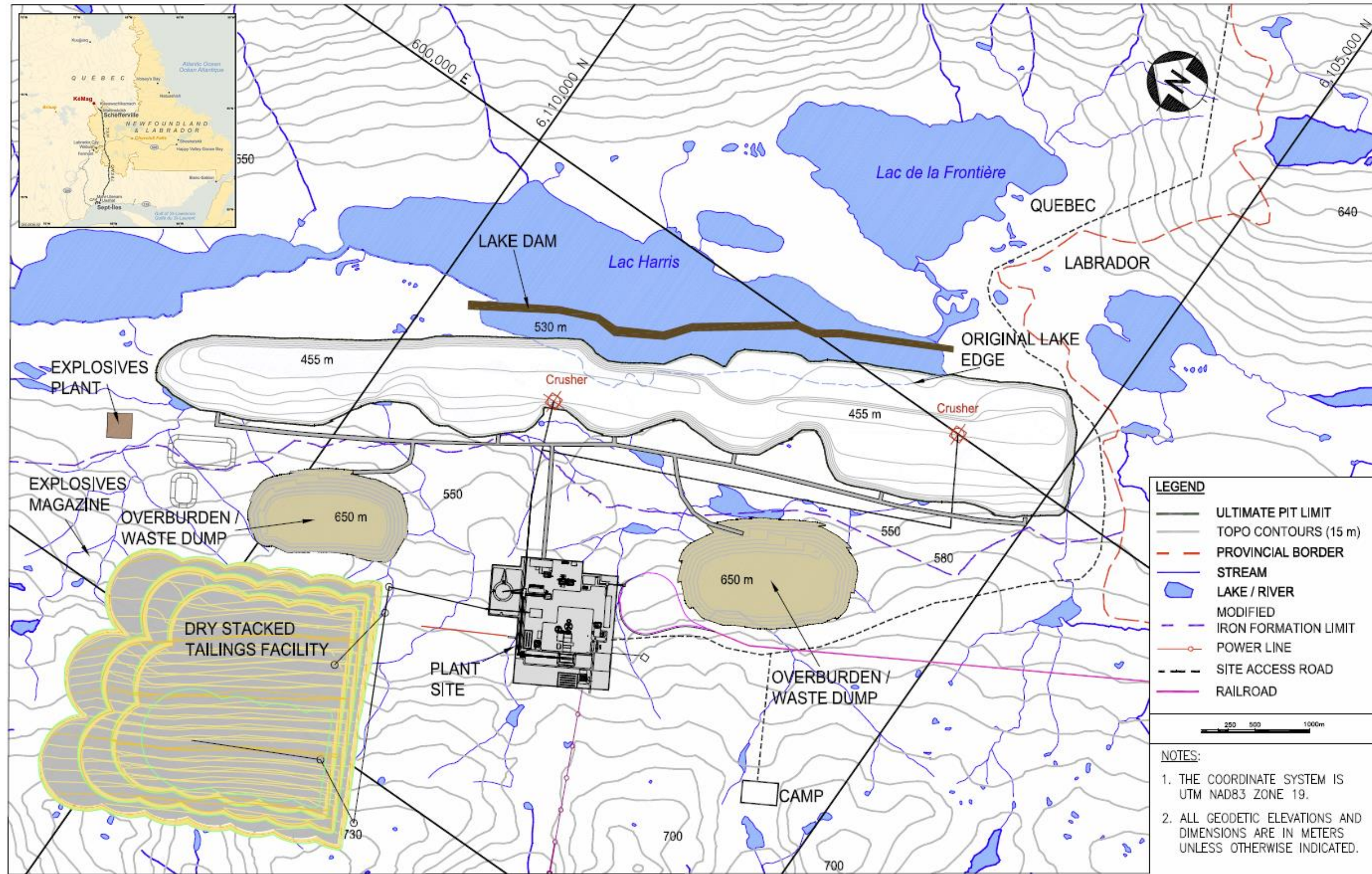


Table 17.3 – Ore Characteristics – KéMag

Item	KéMag	Units
Ore Density	3.41	g/ml
Crushing Work Index	18.1	kWh/t
Ball Mill Work Index, BWI, Closing 75 µm	13.7	kWh/t
Abrasion Index	0.81	g
Typical Chemical Composition of Feed Ore		
Fe	31.4	wt %
Fe _{Mag}	19.1	wt %
SiO ₂	43.3	wt %
Al ₂ O ₃	0.22	wt %
MgO	1.90	wt %
CaO	2.29	wt %
Na ₂ O	0.02	wt %
K ₂ O	0.07	wt %
TiO ₂	0.02	wt %
MnO	1.63	wt %
P	0.01	wt %
S	0.013	wt %
Loss on Ignition	3.36	wt %

17.3.2 Mineralogy

The dominant iron-rich mineral is magnetite, which makes up approximately 96% of the concentrate (by mass). The second iron-rich mineral, hematite, is non-magnetic and is not recovered in the concentrate unless it is associated with a magnetite particle. The mineralogical properties of the ore feed used for the mass balance are shown in Table 17.4.

Table 17.4 – Mineralogical Properties of the Ore Feed Used for the Mass Balance

Mineral	Design Value	Units
Magnetite, Fe ₃ O ₄ (as Davis Tube Weight Recovery)	27.4	wt %
Fe _{Mag}	19.1	wt %
Hematite, Fe ₂ O ₃	13	wt %
Fe _{Hem}	9.1	wt %
Quartz, SiO ₂ (Representing Gangue Materials)	60	wt %
Fe _{Gangue}	3.2	wt %
Feed Fe Grade	31.4	wt %

Depending on the product silica level required at the pellet plant, part or all of the final concentrate will be sent to the flotation circuit. The final concentrate will be thickened, filtered and partially dried, if required, for transport via the existing railway to pellet facilities located at Sept-Îles.

All tailings are dewatered and transported by conveyor to the dry stack tailings facility. The water recovered in the concentrate and tailings dewatering systems will be recycled to the process plant.

17.3.3 Flowsheet Development

NML initiated the NuTac Project flowsheet design in November 2011 and confirmed it by pilot plant test work between 2012 and 2015. The design uses a 2-pass HPGR closed circuit followed by VertiMills for final grinding.

The test work results are discussed in Section 13.0. These results were used for equipment selection and sizing calculations. This process design is based on an average operation of 360 days or 8,640 hours per year, not including the effective plant utilisation.

The proposed process flowsheet utilises industry-proven unit operations in an innovative ore processing circuit arrangement to produce DR and BF pellet feed concentrates. Independent laboratories and suppliers conducted the test work on individual and composite samples. Based on analysis of results, the process flowsheet and mass balance were developed.

The design criteria consist of test work data, vendor information, assumptions based on taconite industry experience from the Minnesota Iron Range and recent similar project information.

17.4 Crushing Systems

The primary crushing circuit uses two semi-mobile in-pit crushing stations. Each plant has a rated capacity of 3,500 t/h, processing a nominal 2,850 t/h of ROM at 2% moisture. The primary crushed ore at -250 mm is conveyed to the primary screening system.

Table 17.5 – Primary Crushing Circuit Nominal Capacity

Items	No	Capacity	Size
Primary Crushers (Semi-Mobile)	2	2,850 t/h ea	<1.5 m
Primary Crushers Product			<250 mm
Primary Screens Surge Bin	1	3,000 t	<250 mm
Primary Screens Oversize	2	2,196 t/h ea	50–250 mm
Primary Screens Undersize	2	652 t/h ea	<50 mm
Primary Stockpile (Total)	1	250,000 t	50–250 mm
Primary Stockpile (Live)		100,000 t	

The crushed ore is screened at 50 mm with double deck screens. The fine fraction is conveyed to the secondary ore stockpile ahead of the HPGR circuit, while the oversize of the two decks is sent to the primary ore stockpile.

The primary ore stockpile will provide buffer storage to allow continued operation during major maintenance on primary crushers or during winter storms. The primary ore stockpile will have a 250,000-tonne storage capacity, of which approximately 100,000 tonnes will be live. The stockpile is not covered and the coarse ore in the dead zone is pushed as required by bulldozers into the reclaim feeders.

The coarse ore stockpiled is reclaimed and directed to two surge bins feeding three (3) cone crushers (Metso MP 1250 units or equal) each having a 930 kW motor. The cone crushers are designed to operate at up to 85% of utilisation. A minimum of two crushers will run at any time, with the third one used as needed to complement production requirements.

The cone crusher product is conveyed to the secondary crusher screens. The secondary screen undersize joins the fine ore from the primary screens and is sent to the secondary ore stockpile, while the oversize returns to the secondary crushing surge bins as a recirculation.

The covered secondary ore stockpile contains -50 mm crushed ore. The stockpile has 60,000 tonnes storage capacity and 16,000 tonnes live capacity, representing 4 hours live storage and 15 hours total storage.

17.5 Concentrator

The concentrator includes multiple grinding and concentration stages to take advantage of the progressive ore liberation, thus reducing the necessary power for size reduction of the ore. The magnetic separation plant incorporates four process steps:

- HPGR and cobber separation;
- Secondary grinding and rougher separation;
- Tertiary grinding and fine screening; and
- Desliming and finisher separation.

The magnetic separation plant uses a large amount of water. The plant is located on the slope above the pit to the west side in an area that allows the tailings to flow back by gravity to the tailings thickener to minimise water pumping. The plant has two parallel processing lines with a common central tailings launder.

The crushed ore is conveyed to the fine ore storage at an elevation higher than the process plant and is upgraded through the four process steps going down the slope towards the tailings thickener.

Following the magnetic separation plant, the concentrate can be further upgraded through the flotation circuit depending on the needed product quality. Finally, the final concentrate is dewatered through the concentrate dewatering system.

All the water from the concentrate and the tailings dewatering systems is recycled to the concentrator to minimise water make-up and conserve heat.

17.5.1 HPGR and Cobber Separation Circuit

High Pressure Grinding Rolls (“HPGRs”) were selected for the primary grinding circuit. The main advantages of the HPGR over other mills are their low energy consumption, high reliability, simplicity and ability to grind dry ore. They also require no grinding media. NML has done extensive pilot scale testing of the HPGRs for grinding its taconite ore, which is a very hard and abrasive material. The three major HPGR suppliers have successfully tested the KéMag and LabMag ore.

The main HPGR maintenance element is the replacement of the worn studded roll liners (tyres). During this operation, the rolls with worn liners are removed from the HPGR and sent for replacement, and rolls with new liners are reinstalled.

The secondary crushed ore, at <50 mm, is reclaimed from the secondary to a 450-tonne HPGR feed bin. The circuit circulating load is also collected onto the conveyors to the HPGR feed bins. Belt feeders feed the combined fresh ore and screen oversize to the HPGR hopper. The HPGRs press the ore twice in two (2) HPGR units in series (4 units are required – 2 lines of 2 HPGRs). The HPGRs are 2.6 m diameter by 2.0 m width, with a design capacity of 6,154 wet tph each and motors of 4.33 MW for each roll (8.66 MW per HPGR). The HPGR variable speed capability controls the level of the HPGR feed hopper at a minimum height for proper choke feeding to prevent the operating gap loss between the rolls.

After pressing, the pressed material is conveyed to the wet screens and cobber magnetic separators (1.2m diameter by 3.6m width) that reject liberated non-magnetic tailings. The cobber tailings are sent to the tailings dewatering system (refer to section 17.5.7). This separation stage rejects on average 78% of the total tailings, or about 58% of the fresh ore feed. This corresponds to 2,510 t/h of coarse tailings sent to the coarse tailings dewatering system for the 2 lines. Screen oversize is recycled to the HPGR pressing. The -0.7 mm HPGR circuit concentrate is sent to the next processing stage.

17.5.2 Secondary Grinding and Rougher Separation Circuit

The secondary and tertiary grinding stages employ VertiMills to further reduce the size of the cobber separation stage concentrate. Four (4) VertiMills model VTM4500 or equivalent (two for secondary grinding and two for tertiary grinding) with 3.3 MW each installed power will continue to apply progressive liberation and separation of the magnetite until the desired product quality is reached. The secondary grinding stage reaches a P_{80} of approximately 80 microns. The target final product size from the tertiary grinding mills is a P_{80} of 38 microns.

The secondary VertiMill regrinds the cobber concentrate and the discharge goes to the rougher pumpbox, where water is added to adjust the rougher magnetic separator feed density.

Rougher magnetic separators process the ore with the concentrate flowing via launders to the stacksizer feed pumpbox, while tailings flow to the tailings launder. The liberated gangue minerals are discarded, which reduces the next milling stage power requirement prior to the final magnetic concentration step.

Approximately 550 t/h of tailings, representing about 18% of the total tailings, are sent to the tailings thickener, and 1,280 t/h of rougher concentrate is sent to the next processing stage.

17.5.3 Tertiary Grinding and Fine Screening

The rougher magnetic separator concentrate is pumped to the stacksizer screens. The stacksizer oversize is collected with launders and pumped to the tertiary VertiMill, which grinds the material in a closed circuit until it can pass the stacksizer screen opening. The VertiMill discharge returns to the stacksizer feed pumpbox. The stacksizer screen undersize is pumped to the deslimer for further processing.

The stacksizer screens have urethane screen panels with 63 micron openings that have a wear life many times longer than previous technologies with wire mesh panels and are less prone to blinding. The Stacksizers have 5 decks in a single unit and allow much larger screening capacity than conventional screens for a smaller footprint.

VertiMill grinding media consumption for secondary and tertiary grinding is estimated at about 12 t/d. A three (3) tonne capacity bucket is used to add the balls to the Vertimills once per day per mill.

17.5.4 Desliming and Finisher Separation Circuit

The stacksizer screen undersize feeds the deslimer (26 m diameter), which removes the very fine particles of tailings produced in the grinding operation. The larger and heavier particles as well as flocculated magnetite settle at the bottom of the tank and are extracted through the underflow at a controlled density and bed level. A pump transfers the deslimer underflow to the finisher magnetic separators.

The finisher magnetic separators are triple-drum units of 1.2 m diameter by 3.6 m width. Four (4) units per line will process the deslimer underflow to provide the final magnetic separation

plant concentrate. After the 1st and 2nd stages of the separator, dilution water is added to the separator for efficient cleaning in the upcoming stage. The finisher concentrate is recovered in the finisher concentrate pumpbox and pumped to the flotation circuit for further processing, or to the concentrate thickener when flotation is not required.

17.5.5 Flotation Plant

The flotation plant can reduce silica in the final concentrate by 50%. The flotation process uses tank type flotation cells, and froth regrinding will be performed in IsaMills. The flotation plant and equipment layout contains two independent parallel lines. The flotation plant can operate at a nominal rate of 1,082 t/h of iron concentrate and produce a 1.50% SiO₂ concentrate.

The flotation circuit may be bypassed at any time, thus increasing the silica level in the final concentrate. When both lines are in operation, the plant produces the lowest achievable silica concentrate. When one line is bypassed, the silica content in the final concentrate is the blend of the concentrate from the magnetic separation plant and the concentrate from the flotation plant.

The conditioning tank receives the magnetic separation plant concentrate, and caustic starch is added as a depressant for magnetite. The rougher flotation cells float silica particles from the conditioned feed using an amine collector added in multiple stages along the cells. The rougher flotation stage comprises five 300 m³ tank cells with 36 minutes total retention time. The first rougher cell froth is discarded directly to flotation tailings. The flotation regrind mill regrinds the rougher cells 2 to 5 froth at a rate of 73 t/h per line. The non-floated material discharged out of the last rougher cell is the final flotation concentrate with more than 70% Fe and low silica.

The froth is reground in IsaMills (IsaMill IM10000 with a 3 MW motor) to a target P₈₀ of <14 microns using 20–25 kWh/t. The IsaMill uses special ceramic grinding beads with 2 mm diameter to efficiently reduce the particle size. The IsaMill product is pumped to a double-drum cleaner magnetic separator (1.2m diameter by 3.6m width each) for rejection of the liberated silica particles to the flotation tailings. The magnetic material is recirculated to the head of the flotation circuit in the conditioner tanks.

The combined flotation tailings tonnage from the first rougher cell froth and the cleaner magnetic separators of both lines are 36 t/h, which is 3.2% of the flotation feed weight when producing DR-grade pellet feed.

17.5.6 Concentrate Dewatering System

The concentrate dewatering system objective is to remove water from the final concentrate economically without losing the material. The operation has two steps: a thickener first removes most of the water from the concentrate coming from the flotation and/or the magnetic separation plant; pressure filtration of the concentrate removes the remaining free water and allows safe handling by conveyors and transportation to the pellet plant at the port

under summer conditions. During winter months, the concentrate also needs partial drying for rail transport. This system is described in section 17.7.

The concentrate is pumped from a central concentrate collection pumpbox to the concentrate thickener. The concentrate thickener operates without flocculant. The material is magnetically flocculated before it enters the thickener. The concentrate thickener is a 40 m diameter, high-rate thickener, with a capacity of more than 1,100 t/h. The underflow (at around 78% solids) is delivered to the concentrate filter feed distributor and flows to one of the two concentrate filter holding tanks. The tanks are equipped with recirculation pumps to keep the content of the tank agitated and prevent solids sedimentation. The thickener overflow joins the flotation tailings thickener by gravity to recover ultra-fine non-magnetic particles in suspension.

Following gravity-settling dewatering, the concentrate is further dewatered through pressure filters. This system operates in batches. Previous dewatering tests on the concentrate showed that pressure filtration can safely reach a filter cake moisture of 7%. Furthermore, this technology is very flexible and provides good process control over the filtration cycle to adapt the operation with changing material conditions.

According to the previous test results, concentrate average pressure filtration rates shall be in a range of 550–650 kg/h.m² at a cake moisture of 7%, with a compressed air drying time of 1.5 minutes. Recessed chamber pressure filtration was selected to achieve high filtration rates with units of large capacity. Three recessed chamber pressure filters, each with a filtration area of 800 m², and corresponding nominal production rate of 440 t/h, are needed. The filtration time is approximately 8 minutes.

The filtered concentrate is conveyed to the drying system or to the storage shed, depending on the time of the year. The concentrate necessitates drying in winter to prevent freezing and allow dumping the concentrate at the port.

17.5.7 Concentrator Utility Consumption

a) Power consumption

The specific power consumption is estimated at 71 kWh/t of concentrate for the concentrator. Other site services will require electrical power such as the mine operation, infrastructure buildings (maintenance shop, offices, camp, explosive manufacturing, water treatment and supply).

b) Water requirement

Water is lost mostly through the concentrate product and the filtered tailings. Water make up will be used to prepare reagents, supply gland seal water to slurry pumps and to complete the process water make up in the magnetic concentration plant. This water will mostly come from treated site water recovered from the mine dewatering as well as runoff of from site infrastructure, waste and tailings pile. The estimated water make up requirement is 354 m³/h (see Figure 17.1) in addition to water entering the plant with the fresh ore feed.

c) Fuel Consumption

The concentrate dryer is designed to use Diesel fuel. This fuel will have a different tax application than that of mobile equipment and must be handled separately.

The fuel consumption for the drying of the magnetite concentrate of NuTac is estimated at 54.5 MW_{thermal} when operating on 4 t/h of diesel fuel.

17.6 Tailings Processing and Handling

NML has selected a tailings dry stacking system to manage the tailings produced from the process plant. Dry stacking reduces risks associated with the construction of large dams and wet tailings management. This requires dewatering of the tailings to a consistency that can be handled either by trucks or conveyors to be delivered to the stack. Filtration tests resulted in acceptable filtration capacity. Using a conveyor system to deliver the filtered tailings to the stack disposal area is the most economical method, considering the preliminary investment and the subsequent sustaining capital and operating costs. If trucks were selected to deliver the tailings to the stacking area, the operating cost would increase very significantly and it would render this option less attractive.

Tailings dry stacking offers some interesting benefits compared with traditional methods of tailings management:

- Minimum risk of dam failure as water accumulation is eliminated;
- Reduced storage area footprint;
- Less fish habitat impact because of the smaller footprint;
- Application of progressive reclamation on final slopes of the stack;
- Potential for co-managing waste rock with tailings.

The Project will produce 8.7 Mtpy of concentrate based on a run-of-mine feed to the crushing system of approximately 34.5 Mtpy. This results in a tailings production of 25.9 Mtpy (75% of the ROM).

Multiple concentration stages produce tailings in the process plant. A summary of the concentrator rejects streams is presented in Thickeners dewater various streams, and the combined tailings streams are filtered to a consistency that can be dispatched to the dry stack facility by conveyors. The main components of the tailings management system are:

- Thickeners and filtration plant for tailings dewatering;
- Overland conveyors and bridge stacker for tailings transportation;
- Tailings stack close to the concentrator with a 25-year storage capacity.

The following sections describe the tailings management systems in more detail.

Table 17.6

Thickeners dewater various streams, and the combined tailings streams are filtered to a consistency that can be dispatched to the dry stack facility by conveyors. The main components of the tailings management system are:

- Thickeners and filtration plant for tailings dewatering;
- Overland conveyors and bridge stacker for tailings transportation;
- Tailings stack close to the concentrator with a 25-year storage capacity.

The following sections describe the tailings management systems in more detail.

Table 17.6 – Tailings Process Streams Summary

Stream	Nominal Solids (t/h)	Nominal Concentration of Solids (C _w %)	Particle Size (µm)	Nominal Flow Rate (m ³ /h)	Fraction of Total Tailings (%)	Fraction of Total Feed (ROM) (%)
Cobber WMS	2,509	19	<3,000	11,253	77.1	57.9
Rougher WMS	547	14	<150	3,589	16.8	12.6
Desliming OF	32	0.8	<20	3,933	1.0	0.7
Finisher WMS	129	1.5	<65	8,486	4.0	3.0
Flotation Tailings	36	2.9	<65	1,206	1.1	0.8

17.6.1 Tailings Thickening System

The cobber magnetic separator tailings stream feeds the coarse tailings hydroseparators with 15 m diameter. It has a very large particle size distribution (<3 mm and F₈₀ = 1 mm). A dense coarse tailings underflow is produced and pumped to the tailings pressure filters feed tanks. Most of the water and the fine particles overflow to the tailings launder that collects all the remaining magnetic separation plant tailings by gravity flow to the tailings thickener.

One tailings thickener serves both process lines and is located outdoors and downstream of the magnetic separation plant at the lower elevation to allow transportation of the fine tailings streams collected by a central launder to flow by gravity. The tailings thickener is a high-rate thickener with 60 m diameter designed to produce an underflow of 70% solids by mass.

Before entering the tailings thickener, coagulant and flocculant are added to the fine tailings to agglomerate the ultra-fine particles and increase the settling speed of the solids. This reduces the thickener size and provides an overflow with less than 100 ppm of solids to be recycled in the process plant to minimize plant water make-up requirement.

The tailings thickener underflow is pumped to the tailings pressure filters feed tanks. The overflow reports to the process water tank by gravity and returns to the magnetic separation plant as process water.

A single flotation tailings thickener dewateres flotation tailings. It is a 26 m diameter, high-rate thickener designed to produce an underflow of minimum 40% solids by mass.

The flotation tailings thickener receives the flotation plant rejects and the concentrate thickener overflow. Before entering the flotation tailings thickener, coagulant and flocculant are added to the feed streams to agglomerate the ultra-fine particles and increase the settling speed of the solids.

Peristaltic pumps transport the flotation tailings thickener underflow to the tailings pressure filters feed tanks. The overflow from the flotation tailings thickener flows to the flotation process water tank, where it supplies the flotation circuit water system. Excess flotation process water is pumped to the magnetic separation plant process water tank.

17.6.2 Tailings Filtration System

The proposed tailings dewatering facility will complete the combined tailings dewatering by pressure filtration to moisture at which the tailings can be dispatched by conveyors and stacked in a storage facility.

The underflow of all the tailings thickeners is stored into two tailings filter feed tanks. The distribution of tailings to each tank is controlled by a distributor located above the tanks.

The storage tanks will be equipped with a recirculation pump to keep the contents of the tank in suspension and prevent coarse solids sedimentation. Each tank will be sized for 60 minutes retention time of the total tailings and will feed pressure filters. A low slurry level in the filter feed tanks is maintained to provide surge capacity, in case maintenance on a filter is required or achievable filtration rate is lower than designed for a short period of time.

The combined tailings filtration test results indicated that an average filtration rate of 520 kg/h.m² provides an 8% cake moisture with a 1-minute cake-blowing time. Recessed chamber pressure filtration was chosen to achieve high filtration rates with units of large filtration capacity, thus reducing the number of filter units required and therefore the capital and operating costs. Pressure filters with a filtration area of 1,625 m² each will be able to process 845 t/h, thereby requiring a total of four (4) units. The estimated cycle time is 7.4 minutes.

The filtrate, the core blow slurry and the wash water are collected by gravity into the filtrate return tank and pumped back to the tailings thickener.

Under each pressure filter, a reversible belt feeder controls the rate of filter cake transfer to the filter cake collecting conveyor or the emergency collecting conveyor. The feeders are sized with wide belts and slow speeds in order to provide a continuous discharge of the tailings filter cake and give an even conveyor loading.

17.6.3 Tailings Transportation System and Dry Stacking Facility

The tailings transportation system takes the dewatered tailings from the filtration plant to the dry stack tailings facility (“DSTF”). The DSTF is designed with a single main line conveying system transporting the filtered tailings. In case of maintenance of the main line conveying system or if the system needs to be moved, an emergency stacking system is used to temporarily store the produced tailings. Once the main system is back on-line, the tailings in the emergency storage are progressively reclaimed and sent to the DSTF with the continuing production. A front-end loader will feed the tailings into a reclaim hopper that will feed the main line conveyor system.

The main line conveyor system includes a string of up to five (5) conveyors to transport the tailings to a mobile bridge stacker. The mobile bridge stacker will advance stack the filtered tailings in sweeps within a maximum radius of approximately 350 m. The sweep radius can be reduced to accommodate smaller sweep requirements where necessary.

The placed loose bulk dry density of the tailings was evaluated at 2.05 t/m³. The DSTF is designed to store the life of mine (“LOM”) tailings production for 25 years. The steady-state tailings production rate is approximately 25.9 Mtpy and the total tailings production over the 25-year LOM is 629.3 Mt.

Tailings will be stored in an above-ground DSTF located adjacent to the plant to minimise the transport distance. The DSTF is bounded by the plant on the southeast, the mine pit on the northeast and the top of the hill on the southwest.

The layout is developed in conjunction with the main line conveyor system to achieve the following objectives:

- Minimise the initial and overall footprint;
- Minimise the catchment area;
- Avoid existing streams and fish habitat as much as possible;
- Maintain the mobile stacker progression rates within practical limitations;
- Minimise the mobile stacker and conveyors costs;
- Maximise evaporative drying of the stacked tailings;
- Maximise density of the placed tailings;
- Minimise erosion;
- Allow progressive reclamation and rehabilitation to manage dust.

To minimise the initial footprint and the upfront costs, a higher lift height was preferred. An individual maximum lift height of 25 m was selected as a practical value. This also minimised the number of lifts required for the conveyor system and system moves. The 307 Mm³ stack will be built in four (4) lifts.

The proposed conveyor and mobile stacker system is able to self-build the starter ramps to achieve the initial 25 m lift height. The advanced stacking method selected will create a uniform surface, with the first lift that will have a varying height considering the variations in the base surface. The additional lifts will have an even thickness of 25 m.

From the geotechnical test work, the friction angle of the tailings was estimated between 35.5° and 37.1°. The angle of repose may be steeper than the friction angle due to the partial saturation of the tailings adding apparent cohesion to the average shear strength. The danger of an increased stack slope due to apparent cohesion is that it is temporary and, as the stack dries, the apparent cohesion is lost and slopes may become unstable. In the current PFS phase, a conservative approach was taken and a stack slope of 30° was used. This may also account for material variability.

Based on the above parameters, safe setback distances for the 25-m lift height were estimated. The mobile stacker minimum setback distance to achieve $FOS \geq 1.3$ for upslope and side slope faces is 13 m. For the downslope faces, the minimum safe setback distance is 16.1 m. The lift minimum setback distances to achieve $FOS \geq 1.5$ for upslope and side slope faces is 21.6 m, while downslope face will require a setback distance of 27.3 m.

17.6.4 DSTF Operation and Water Management

Dust management will be an important aspect of the DSTF operation, as the tailings have a high silica content. The snow cover, as well as moisture from snow melt and summer rainfall, will assist in suppressing dust. However, specific control measures will be necessary. Possible dust control measures include vegetation, surfactant application, water spraying and waste rock cover.

As soon as possible, final stack slopes will be reclaimed to control erosion and to minimize dust. The reclamation material will consist of no-acid generation (“NAG”) overburden material from the mining operations. Progressive vegetation will follow using native species.

The stack surface runoff is expected to be minimal; however, the surface will be graded such that runoff is directed to areas designated for flows. These areas will be armoured with waste rock to reduce erosion.

The surface water management system incorporates many elements to prevent contamination of clean water (upstream diversion channels to divert water around the DSTF) or to collect and manage impacted water (water collection channels downstream of the DSTF, water retention and treatment ponds). The upper stack surface will be graded so that stack runoff surface water reports to engineered areas to prevent erosion. Stack runoff generation is desired to minimise infiltration and avoid excess pore pressure generation within the tailings stack.

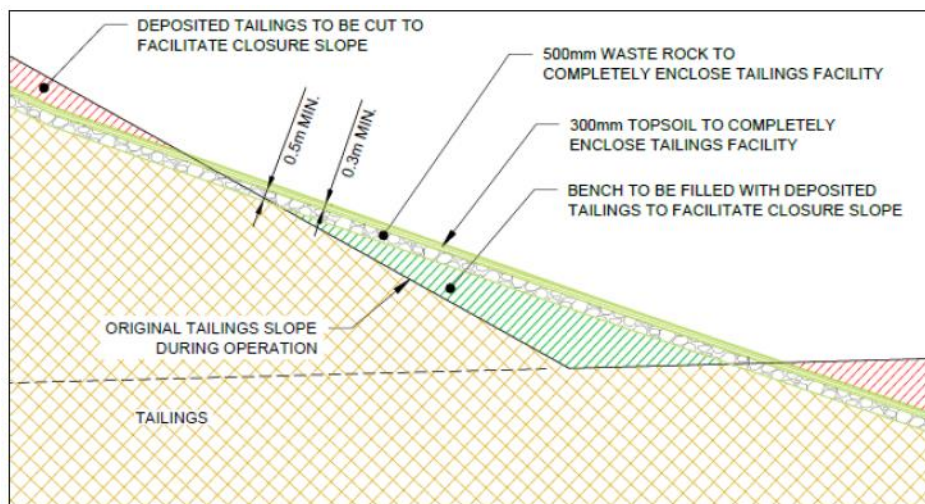
Given the site’s sub-arctic climate, surface water is generally produced from spring snow melt and summer rainfall. An overall site water balance will be developed in the next phase of the Project and will include that of the DSTF.

17.6.5 Progressive Closure

Concurrent reclamation can commence as early as Year 2 and continue every year until the end of the mine life, in an effort to reduce erosion and minimize the environmental impact. The tailings will be placed at the slope angle of 30° (1V:1.7H). The proposed final landform will have a slope of 1V:3H and, before reclamation, the slope will be modified by cut and fill using the deposited tailings material as illustrated in Figure 17.3.

A rock cover as well as a top soil layer will be placed on the modified slope before revegetation.

Figure 17.3 – Typical Tailings Closure Cut and Fill and Reclamation



17.7 Concentrate Drying and Load Out

The concentrate will be transported to the port facilities by train for pelletizing. During warm months, the concentrate dewatering circuit will produce a low enough moisture product for transportation by regular open top rail cars. The rail cars will have hinged covers to prevent blowing away the fine concentrate.

During months with freezing temperatures, the moisture in the concentrate will create a problem with dumping of the concentrate in the car dumper facility. The concentrate will remain in the rail cars for approximately 2 days before it can be unloaded at the port. To prevent freezing, the concentrate will have to be dried to less than 4% moisture. A lower design moisture was used to provide a factor of safety, because frozen concentrate could be very expensive to unload and will create a significant disruption in the operation and railcar availability.

The concentrate filter cake is conveyed either directly to the concentrate storage building in summer or to the drying facility in winter. When drying is needed, the concentrate is taken to a Fluid Bed type dryer. The dryer product has 0.2% moisture. Only 50% of the total concentrate

cake, 550 tph flow is sent to the dryer. The remaining 50% will be bypassed and mixed back with a dried portion downstream of the dryer.

The main burner and freeboard burners are both capable of being LNG, propane or diesel fuel fired. The fuel will be delivered by rail and stored in outside fuel storage tanks. Fuel consumption with material entering at 10°C with 7% moisture content is estimated at 54.5 MW_{thermal}.

In order to recuperate some of the dryer waste heat and utilise it for plant and infrastructure space heating needed during the cold season, a direct-contact economizer (or Heat Recovery Scrubber – HRS) is installed downstream of the dryer dust collector. The HRS is constructed of stainless steel and uses a water spray shower in a packed bed tower to cool the flue gas. It is estimated that about 37.5 MW of heat will be recuperated by this system.

The product is conveyed to the product storage shed. The concentrate is stored in a longitudinal covered stockpile of 150,000 t capacity. A portal reclaimer recovers the concentrate from the storage stockpiles as needed for train loading. There will be separate piles for BF- and DR-grade products. A system of conveyors transports the recovered concentrate to the train-loading system.

The train-loading system has a 2,000 tonne steel-constructed and properly lined surge hopper to regulate the train-loading rate and provide a buffer for the concentrate reclaim system capacity variations. A rapid train-loading system with a capacity of 5,000 to 6,000 t/h will load the concentrate into the railcars at their proper rated tonnage as they continuously move at a fixed speed.

The rail cars used for concentrate transportation will have a specially designed hinged cover to prevent the concentrate from being blown away during train movement to the port. The railcars will be open-top design due to the tested cohesive characteristic of the concentrate that prevents bottom dump cars from discharging efficiently. The cars will be dumped with a rotary car dumper at the port, and the concentrate will be conveyed to the pellet plant concentrate storage.

17.8 Pellet Plant

Outotec completed the engineering and estimating of the pellet plant. The plant capacity is based on tests performed in 2013 at Outotec's facility to fine-tune the design and provide a process guarantee for the pellet plant throughput and pellet quality.

The Project has a single-line pellet plant with 9 Mtpy capacity located in Pointe-Noire. The pellet annual production anticipated is as follows:

- Four (4) Mtpy of low silica BF pellets with 2.5% SiO₂;
- Five (5) Mtpy of DR pellets with 1.8% SiO₂.

The new pellet plant consists of the following systems:

- Concentrate handling and feeding;
- Coarse additives handling and grinding;
- Mixing and green balling;
- Pellet induration;
- Product screening and pellet coating for DRI product;

The pellet plant will be automated. Modern plant design and automatic control elements help to improve plant availability and decrease the production costs.

The pellet plant design assumes an operating time of 330 days per year (7,920 hours). The pelletizing process and plant description are presented in the following sections.

17.8.1 Concentrate Storage and Feed

The concentrate arrives by train from the mine site. The operation of the car dumping and concentrate handling up to the concentrate storage will be managed by a multi-user service provider for ease of coordination. The dumped concentrate will be transported to the concentrate storage shed located before the pellet plant. The new conveyors and the concentrate shed will be built by NML. The storage shed is designed to accommodate multiple products depending on the mix of pellets made. The stockpile has a total capacity of 2 weeks of production or 350,000 tonnes. A shuttle conveyor distributes the different concentrate feed qualities in the storage building and stores them on separate piles.

As needed from the pellet plant, a portal reclaimer recovers the concentrate from the stockpiles. Conveyors transport the concentrate to the pellet plant concentrate feed bins.

17.8.2 Additives Handling and Grinding

The pellet plant needs multiple additives to make the pellets. Each type of pellet has a specific chemistry. Limestone and dolomite are used to adjust the level of fluxes and the split between CaO and MgO desired by the client. A binder or a mixture of binders (bentonite and/or organic binder) is added to the concentrate and additives to give the pellet the proper resistance for transportation to the induration furnace and withstand the constraints of the initial steps of the induration process.

The coarse additives (limestone, dolomite and bentonite) are supplied as bulk material received at the port and transported to the pellet plant additives storage. A dry grinding system pulverises the bentonite and a wet grinding system grinds the limestone and dolomite alternatively. The additive grinding systems run a maximum of 20 h/d for the production of the pellets that need the highest quantity of additives (BF fluxed pellets).

A wet grinding mill grinds limestone and dolomite to a pelletizing fineness (min 85% <45 µm). The mill slurry discharge with a density of 65% solids by weight is pumped to one of the additive storage tanks (one for limestone and one for dolomite).

17.8.3 Mixing and Green Balling

The concentrate stored in the pellet plant feed bins is extracted by belt feeders at a controlled rate on the collecting belt conveyor feeding the pellet feed mixer. Bentonite and/or organic binder is added in the right proportions onto the conveyor feeding the mixer. Limestone and/or dolomite are pumped from the storage tanks and added directly to the pellet feed mixer to adjust the chemistry of the produced pellet type. Additional water may be added at the mixers to obtain a final pellet feed moisture of 8.5 - 8.9% by weight for the subsequent balling process.

Mixing of the pellet feed is done in an intensive drum type mixer. Belt conveyors transport the mixed material to the balling feed bins. There is a total of 14 pelletizing discs for the pelletizing line. Mixed material is added to the pelletizing discs. Each disc is 7.5 m in diameter and has a rim height of 650 mm. The discs have water sprays for optimal moisture adjustments. The discs rotate to produce green balls with a target size of 9 - 16 mm.

A single-deck roller screen for each pelletizing disc controls the size of green pellets coming out of the balling discs. Oversize >16 mm and undersize <9 mm pellets are screened out by the roller screens and recycled back to the balling disc via a recycling conveyor system.

The on-size green balls from the single-deck roller screen are conveyed to the travelling grate. The green balls fall on a double-deck roller screen ("DDRS") for final size control. Off spec pellets are recycled back to the balling discs.

The green pellet bed level and depth across the width and length of the travelling grate is controlled by adjustments of the reciprocating conveyor, the speed of the wide belt and ultrasonic level sensors that vary the speed of the travelling grate to maintain a predetermined bed depth.

17.8.4 Pellet Induration

The pellets are completely heat-hardened and cooled on the travelling grate. The travelling grate process ensures that, during the preheating, firing and after-firing stages, sufficient oxygen is always available in the process gases for complete magnetite oxidation.

The travelling grate consists of a continuously rotating endless chain of pallet cars on rails. The grate has a useful area of 816 m² (4 m wide and 204 m long).

A layer of approximately 8 cm thick >12.5 mm indurated pellets (the hearth layer) is provided to the bottom and side wall areas of the pallet cars as a protection from high temperatures before charging the green pellets, as explained in the previous section. The hearth layer is fed by gravity from a storage bin installed above the feed-end of the travelling grate. The pallet car side layer is fixed at eight (8) cm, and the bottom layer is adjusted by a motorized gate, normally at eight (8) cm as well.

- a) The induration cycle, based on the test work conducted at Outotec’s laboratories in Germany, is summarized in Cooling Air

Ambient air from the cooling fan (“CAF”) is forced through an arrangement of ducts and wind boxes through the bed of hot indurated pellets as a cooling agent for the first and second cooling zones of the indurating furnace.

- b) Updraft Drying

Updraft drying of the green pellet bed uses the second cooling zone off-gas. The up-draft drying fan (“UDDF”) suction extracts the off-gas and maintains the process gas flow and pressure in the up-draft drying zone wind boxes. Ambient air bleed-in dampers control the inlet temperature at the updraft drying fan inlet. Wind box pressure in the updraft drying zone is controlled automatically by a damper that bleeds off excess air to the hood exhaust gas system.

Table 17.7. The Induration Gas Flow diagram is presented in

Figure 17.4.

- c) Cooling Air

Ambient air from the cooling fan (“CAF”) is forced through an arrangement of ducts and wind boxes through the bed of hot indurated pellets as a cooling agent for the first and second cooling zones of the indurating furnace.

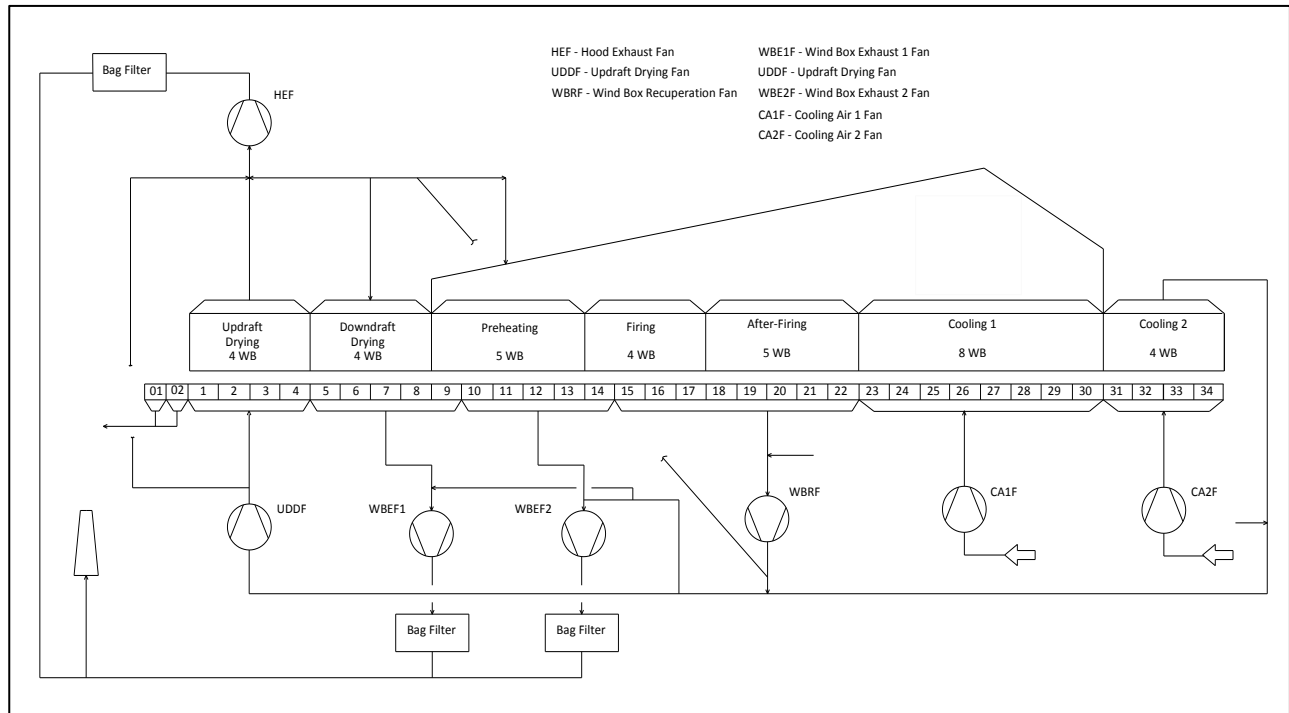
- d) Updraft Drying

Updraft drying of the green pellet bed uses the second cooling zone off-gas. The up-draft drying fan (“UDDF”) suction extracts the off-gas and maintains the process gas flow and pressure in the up-draft drying zone wind boxes. Ambient air bleed-in dampers control the inlet temperature at the updraft drying fan inlet. Wind box pressure in the updraft drying zone is controlled automatically by a damper that bleeds off excess air to the hood exhaust gas system.

Table 17.7 – Induration Cycle

Process Zone	No. of Wind Boxes	Reaction Area (m ²)	Process Gas Temperature (°C)
Updraft Drying	4	96	330
Downdraft Drying	4	96	350
Preheating	5	120	350–1,250
Firing	4	96	1,250
After firing	5	120	950
Cooling 1	8	192	<1,150
Cooling 2	4	96	<550
Total	34	816	N/A

Figure 17.4 – Induration Gas Flow



e) Downdraft Drying

Hot combustion gases from the last section of the firing zone and from the after-firing zone are recuperated by the wind box recuperation fan (“WBRF”) and serve as drying gases in the downdraft drying zone. Ambient air bleed-in dampers control the inlet temperature at the wind box recuperation fan inlet. A bypass duct from the off-gas of the wind box recuperation fan also controls the pressure in the downdraft drying zone and raises the temperature of the humid low temperature gases at the hood exhaust fan inlet.

f) Preheating

The principal preheating zone process gas source comes from the first cooling zone off-gas direct recuperating header and down-comers. The preheat zone temperature profile is controlled by bleeding in lower temperature process gas from the wind box recuperation fan. Bleed-in dampers, installed in the connecting ducts between the wind box recuperation off-gas and the direct recuperating header down-comers, are adjusted to control the gas flow.

g) Firing – After Firing

The first cooling zone off-gas enters the direct recuperation header and down-comers assisted by the suction of the wind box recuperation and wind box exhaust fans. Burners

arranged opposite to each other on the preheating and firing zones longitudinal sides ensure a uniform hot-gas distribution over the width and length of the pellet bed. Burners are self-aspirator type utilising heavy fuel oil. The burners are divided into several zones to control the temperature profile, thus permitting an optimum heat treatment of the pellets.

h) Waste Gas

The off-gases temperature of the downdraft drying, preheating and part of the firing zones is too low for further utilisation as process gas. The gases are removed from the indurating process via two (2) wind box exhaust fans (WBE1F, WBE2F). Baghouses clean the wind box exhaust fans off-gases before release in the atmosphere via a stack.

The hood exhaust fan (“HEF”) draws the humid and low temperature exhaust gas from the updraft drying hood. A baghouse cleans the hood exhaust gas, which is directed to atmosphere via the common waste gas stack.

17.8.5 Product Screening and Pellet Coating

Cooled pellets from the indurating machine are discharged into a surge bin with two (2) outlets. Adjustable gates and a variable-speed product conveyor maintain the surge bin level within the desired values. The product conveyor also receives spillage collected over the length of the indurating machine by the spillage-collecting conveyor and two-way chutes.

Indurated pellets are screened to remove the undersized <5 mm pellet chips and fines from the final product and recover the >12.5 mm pellets to be used as hearth and side layers. The larger pellets are used as hearth layer to avoid clogging of pallet car grate bars and maintain the permeability of the travelling grate pellet bed. Screened >5 <12.5 mm pellets and the excess >12.5 mm pellets not used as hearth layer form the final product. A conveyor and stacking system equipped with a belt scale for production and inventory control transports the product to the storage yard.

In case of a product screen or materials handling failure, the unscreened pellets are directed to an emergency stockpile and later reclaimed to the product screening system.

The <5 mm pellet chips from the screens are discharged onto a pellet chip conveyor sent to the pellet chips stockpile. The chips are sold as pellet feed or sinter fines.

Part of the dolomite slurry coming from the additive grinding is used as coating material for the DR-grade pellets to reduce sticking in the DRI process. The slurry (15–20 % solids by weight) is stored in an agitated slurry tank. From there, a slurry pump feeds the dolomite to the coating spray system positioned on top of the product belt conveyor.

17.8.6 Pellet Plant Utility Consumption

a) Power Requirement

The specific power consumption is estimated at 31.2 kWh/t of finished pellets (see Table 17.8).

Table 17.8 – Typical Electrical Energy Consumption

Electrical Energy	Specific Consumption kWh/t
Total	31.2
Raw material handling, additive grinding, dosing and mixing, green balling, induration, fans and de-dusting, product handling and screening	30.7
Other area (Process and cooling water, plant and instrument air, firefighting)	0.5

b) Fuel Consumption

The burners are designed to use heavy fuel oil (Bunker C) as the fuel source for the indurating machine. The characteristics of fuel oil used in the design of the plant are shown in Table 18.2 of Section 18.3.9.

The estimated fuel consumption for the induration of iron ore pellets from the magnetite concentrate of NuTac is 274 MJ/t or 6.81 l/t of HFO, as shown in The PFS assumes the use of HFO as a thermal energy source. However, NML will favor the utilisation of LNG as a combustion fuel if it becomes available at Pointe-Noire. LNG produces fewer greenhouse gases and other deleterious elements, and the technology is readily available for low NOx emissions burners. In any case, dual-fuel capability burners may be installed if available for future switch to LNG fuel. There is also a planned project to connect the North Shore with a natural gas pipeline that is presently delayed but could supply natural gas in the future if it comes to fruition.

Table 17.9.

The PFS assumes the use of HFO as a thermal energy source. However, NML will favor the utilisation of LNG as a combustion fuel if it becomes available at Pointe-Noire. LNG produces fewer greenhouse gases and other deleterious elements, and the technology is readily available for low NOx emissions burners. In any case, dual-fuel capability burners may be installed if available for future switch to LNG fuel. There is also a planned project to connect the North Shore with a natural gas pipeline that is presently delayed but could supply natural gas in the future if it comes to fruition.

Table 17.9 – Average Thermal Energy Consumption for BF Fluxed and DR Pellets

Thermal Energy		Consumption (/h)	Specific Consumption per t _{pellets}
Total	Mcal	74,318	65.4
	MJ	311,364	274
HFO 1C @ 9,600 kcal/kg	Mcal	74,318	65.4
	kg	7,741	6.81

17.9 Plant Control Systems

17.9.1 KéMag Concentrator Automation and Control

The KéMag concentrator will be controlled, operated and monitored from a Central Control Room (“CCR”) located in the concentrator building. The crushers, the flotation plant, the concentrate dewatering, the tailings dewatering and dispatch equipment and the loadout system will be controlled, operated and monitored from dedicated Local Control Rooms (“LCR”) located in their respective areas.

Control system processors will be able to exchange process data, alarms, interlocks and status of mechanical equipment in real time.

17.9.2 Pellet Plant Automation and Control

The plant automation system monitors and controls all significant variables in accordance with the process requirements. It provides all operating facilities with necessary sequencing, interlocking and safety functions, including alarms for abnormal conditions in the sections of the plant specified in the process and plant description.

The control system structure is based on a Distributed Control System (“DCS”) with modular architecture. Monitoring, optimized control and regulation of the process, supervision of individual equipment and documentation of the production process are done on two levels:

- Level 2 – Operation and Monitoring/Human Machine Interfaces (“HMI”);
- Level 1 – Automation/Process Control Station.

The Levels 1 and 2 control systems will be integrated into a network. The connection between the operator, engineering and process control stations will be an Ethernet TCP/IP structure.

Continuously working stand-alone gas analysers for SO₂ and NO_x provide measurements of the process at the stack. The analysers are complete with all necessary auxiliary instruments, such as power supply units, gas coolers, gas preparation units, filters, pressure reducers, etc., installed in a local analyser cabinet.

18.0 INFRASTRUCTURE

The general layout for the mine site is provided in Figure 17.2. At this point, there has not been a specific site layout developed for the pellet plant and port infrastructure since NML has not been assigned any specific location for construction of its pellet plant. It is expected that the pellet plant will be located in Pointe-Noire, on the former Cliffs' land recently acquired by the Government of Québec. During the feasibility study phase, a specific location will be established and the site layout details will be developed as required.

18.1 Mine Site Infrastructure

18.1.1 Power Supply at Mine Site

The estimated motor-drawn power requirement at the mine site is 95 MW. With respect to required space heating, an additional 30 MW was allocated with the total transmission line capacity thus established at 130 MW.

A new 315 kV aerial power line with 130 MW capacity from the existing Brisay substation will be built by Hydro-Québec ("HQ"). The power is provided to the mine site substation for step down and site distribution. HQ will perform the feasibility study which includes among other aspects, an impact study for interconnection at Brisay substation, conductor optimisation study, LiDAR survey and data analysis for selection and approval for a right-of-way. The mandate will include the environmental impact study (EIS) for the power transmission line.

18.1.2 High Voltage Electrical Distribution Network

The site power feeds a single gas-isolated switchgear ("GIS") in a prefabricated building. This GIS will convert voltage down to 34.5 kV through transformers for site distribution. Redundancy is provided in case of a transformer failure to prevent a complete site shutdown.

All local substations reduce voltage to 4.16 kV from 34.5 kV aerial lines. The 34.5 kV switchgear is installed in the main electrical room.

The power system studies will be performed at the feasibility study level and will aim to:

- Validate adequate transformer loading;
- Propose transformers' off-circuit tap changer settings to obtain optimal nominal bus voltages;
- Ensure that service voltages are within design criteria limits;
- Estimate required protection systems to meet the HQ's power factor constraints;
- Establish minimum electrical equipment rating for adequate operation under normal and contingent conditions;
- Recommend equipment continuous and short-circuit ratings to provide adequate margins for Project growth;
- Run a detailed harmonics analysis and utility requirement regarding filtering equipment;

- Propose a method to start the large motors with an acceptable voltage drop in accordance with the design criteria.

The main transformers are equipped with secondary on-load automatic tap changers. The tap position should control the secondary bus according to the voltage profile.

HQ may impose stringent constraints on the voltage drop at the Point of Client Connection. During large motor start-ups, the voltage drop at the main 315 kV bus was considered. A large motor-starting method validation with the utility is needed during the next study phase.

Pole-mounted overhead lines will distribute power to the following areas:

- Mine;
- Primary crushing stations;
- Dry tailings dispatch conveyors and stacker;
- Site water treatment plant;
- Fresh water pumping station;
- Explosive preparation plant;
- Workers accommodation complex;
- Guardhouse;
- Domestic waste disposal facilities.

18.1.3 Emergency Power Plant

The mine site has diesel generators connected on the 4.16 kV bus to cover the emergency load requirement such as lighting, computer, communications, minimum building heat and water pumping to prevent freezing in winter at the process plant and other critical facilities such as the residential facility. The generators will be furnished, mounted in their own container type walk-in enclosure, to be installed on a concrete slab. The requirement of emergency loads will be detailed during the feasibility study. For the moment, three 1,800 kW 4.16 kV diesel generators are planned to cover the emergency load requirement.

18.1.4 Mine Site Access and Service Roads

The main access road from Schefferville to the mine site will allow heavy traffic to circulate at normal speed as regulated by provincial governments. The existing road from Schefferville to the DSO Project mine site and up to the Goodwood deposit will be used. A new section will be built from Goodwood to the mine site.

a) Mine Haul Roads

Access for mine haul trucks and other large equipment to maintenance facilities, diesel fuel service and primary crushing areas are by mine roadways.

The mine service vehicles will use the heavy vehicle haul roads and therefore a light vehicle road network within the active mining areas is not required. Strict operating

procedures will be in place to safeguard light vehicles and delivery of consumables. An equipment and personnel proximity detection system will be considered for safety reasons.

b) Process Plant Site Access and Service Roads

Plant roads are used for normal operation traffic, which consists of light vehicles and small personnel buses. Site access roads are provided for the main entrance to the facility for delivery of some materials, large personnel buses and light vehicle traffic. Plant roads and access roads have provision for two-way traffic.

Service roads are typically one lane unsealed roadways and are suitable for maintenance vehicles and operational access.

A detailed traffic study will be done during the feasibility study phase to ensure that heavy and light vehicles circulate safely incorporating proper rules. The impact of construction and operation on local community traffic and disturbances will be evaluated. Delivery of material will be preferentially done by the new rail spur to be constructed early in the schedule. New employees and visitors will be directed to the training room for induction training which is compulsory before access to the site is allowed.

18.1.5 Site Water Systems

a) Mine Dewatering

The mine dewatering system is described in Section 16.2.

b) Raw Water Supply

Provision is made to supply raw water from the Goodwood River if needed. Two pumps are installed (one operating and one stand-by) and will be fixed speed with a recirculation line. The water pipeline transports water from the raw water pumping station to the treatment plant polishing pond for make-up when water from the site water treatment plant is insufficient.

c) Process Water System

The main process water pumping station is outside of the concentrator beside the tailings thickener. It consists of an aboveground water tank and two low pressure process water pumps. Each water pump is dedicated to a process plant line to cover its water demand. Pump head was established in function of pressure requirements of consuming process equipment and mainly consists of dilution and make-up water to pump boxes and tanks located on the plant ground floor. The low pressure pumps are horizontal centrifugal type with a dual-suction design.

Each process line has two horizontal centrifugal high pressure booster pumps (1 operating and 1 stand-by) to service equipment located at higher elevation or with higher inlet pressure requirements. Pumps will be variable speed driven to follow variations in water flow rate demand of the plant and for energy conservation.

The main supply of process water is the tailings thickener overflow which flows by gravity into the process water tank. Some additional water comes from the flotation process water pump station. Process water make-up comes from the site water collection pond.

For the flotation plant, the flotation process water pumps are located inside the flotation building beside the flotation process water tank. This system collects the clarified water from the flotation tailings thickener which overflows by gravity to the flotation process water tank.

Two operating pumps (one per line) supply the flotation water system. The excess water is transferred to the concentrator process water tank to maintain the concentrator water balance. The amount of water transferred is controlled by the flotation process water tank level. Fixed speed horizontal centrifugal pumps with control valves maintain the system pressure at the desired setting.

d) Fresh Water and Fire Water Systems

These water systems include:

- A combined fresh and fire water tank;
- Two fresh water pumps (1 operating and 1 standby);
- Fire water pumps (electrical, diesel and jockey);
- A potable water tank and two distribution pumps (1 operating and 1 standby);
- A potable water treatment unit;
- A potable hot water system consisting of an electric boiler, a tank and two distribution pumps (1 operating and 1 standby).

Fresh water is supplied from the site water treatment polishing pond. It is pumped to supply different plant gland seal water system users, reagents preparation and if needed, additional make-up to the process water tank.

Fire water is supplied to the plant fire water distribution network.

The potable water comes from two wells each with its own pump. One well is active and one is standby.

18.1.6 Compressed Air System

Most plant areas need compressed air and in some cases where the buildings are not heated above freezing year round, the air supply needs to have a dew point temperature below -40°C. The crushing systems will need dry air. The planned compressed air systems are described below.

a) Primary Crushing

Each in-pit crusher will be provided with two dedicated air compressors (1 operating and 1 standby) complete with air dryers and air receivers. Compressed air distribution must be dry to prevent pipe freezing during winter operation.

b) Secondary Crushing

Two air compressors (1 operating and 1 standby) are installed in the secondary crushing building complete with two air dryers and one air receiver for the needs of primary and secondary screening; coarse ore reclaim tunnel and secondary crushing areas. Compressed air distribution must be dry to prevent pipe freezing during winter operation.

c) Concentrator

The concentrator requires three different air systems: plant air, instrument air and low pressure flotation air. The compressed air system for the process plant will be centralized in the flotation building since this is the largest consumer.

The concentrator high pressure compressed air is provided by two operating oil free rotary screw plant air compressors and one standby compressor. The compressors feed both plant air and instrument air distribution networks. The plant air also incorporates an air receiver.

The instrument air is dried by two absorption dryers with dew point of - 40° C and is stored into the instrument air receiver before distribution to the users. Both high pressure compressed air systems are designed to operate at 7 bars.

Three (3) air blowers (2 operating and 1 standby) provide the low pressure flotation air necessary for the flotation cells operation. Each blower services the equivalent of one flotation line and all the blowers are connected to a main header and can supply the two flotation lines. The flotation air header pressure is controlled by a pressure damper valve.

d) Concentrate Filtration

A dedicated compressed air supply system is installed to service the concentrate filtration building. The pressure filters require an enormous amount of compressed air for filter cake dewatering. Three (3) air compressors (two operating and one stand-by) pressurize the manifold with 40,000 Nm³/h of air at 7 bars. For each filter, a dedicated 76 m³ air receiver is connected to the compressed air supply manifold and provides the compressed air surge for the core blow and the air-drying steps.

Local instrument air is dried by two absorption dryers with dew point of - 40° C and is stored into the instrument air receiver before distribution to the users.

e) Tailings Filtration

A dedicated compressed air supply system is installed to service the tailings filtration building. The pressure filters require an enormous amount of compressed air for filter cake dewatering. Each filter has a dedicated 76 m³ air receiver connected to the filtering

area compressed air supply manifold. The manifold is pressurized by a set of five 3-stage centrifugal compressors (4 operating and one stand-by) providing 80,000 Nm³/h of air at 7 bars. Each filter air receiver provides the compressed air surge for the core blow and the air-drying step.

Local instrument air is dried by two absorption dryers with dew point of - 40° C and is stored into the instrument air receiver before distribution to the users.

18.1.7 Gas Cleaning Systems

The concentrator design incorporates multiple gas cleaning systems to control and minimize dust emissions and protect the workers and the environment. A short summary of the systems included in the crushing area, the concentrator area, the tailings area and the concentrate drying area follows.

a) Crushing Area

The primary crushers are equipped with baghouse dust collectors. The dust collection systems recover the dust released in the crushing process as well as in the conveyor transfer points. The dust is returned to the conveyors after the last transfer point of the system.

The screening systems of the crusher area are also equipped with baghouse dust collectors to recover dust produced in the screening process. The dust is discharged on the fine ore recovery conveyors and directed to the fine ore stockpile.

The coarse ore storage pile is not covered but should generate a minimal amount of dust since the coarse ore is pre-screened before it is sent to the stockpile and it will contain +50 mm particles only.

The coarse ore reclaim tunnel will have local dust bin vents to recover dust released in the feeder transfer points and send it back to the reclaim conveyor.

The secondary crusher building will be equipped with dust recovery bin vents to control dust emitted from the secondary crusher feed bins. Dust produced by the secondary crushing operation will be recovered by a dedicated baghouse that will dump the recovered dust on the crusher discharge conveyor and it will go to the secondary screens with the cone crusher product.

Finally, the fine ore stockpile will be covered to minimize dust release into the environment and smaller local dust collectors will control dust emissions from the conveyor transfer points and the ore storage.

b) Concentrator Area

The HPGR area with the fine ore reclaim tunnel and conveyor transfer points as well as the HPGRs will produce dust during operation. Dust collecting systems have been designed to recover the released dust which is discharged into the HPGR circuit product

and follows the subsequent concentrator process steps. The other areas of the process plant are wet processes and don't require dust control measures.

c) Concentrator Drying and Load Out Area

The drying system will be a complete design and supply package which will include its dust control systems. The conveyor transfer points will have dust recovery hoods connected to a local baghouse dust recovery system to control the ambient conditions for workers. The dust will be returned to the concentrate product and directed to the concentrate storage shed.

Similar to the fine ore stockpile, the concentrate will be stored into a covered building to prevent dust from escaping in the environment and to protect the concentrate from precipitation to maintain the moisture at the desired level for rail transportation to Pointe-Noire.

The rapid train loading system ("RTLS") will also be equipped with baghouse dust collectors to recover the dust from the transfer points and from the train loading operation. The dust recovered by this system will be discharged into the RTLS surge bin.

18.1.8 Maintenance Workshops and Warehouses

a) Mine Equipment Maintenance Shop and Warehouse

The mine truck and light vehicle garage and warehouse area is designed for the maintenance of heavy mining equipment such as 180-t haul trucks and includes an area for light vehicles maintenance. The workshop combines also the mine truck washing and tire change facility.

The truck and heavy mine equipment maintenance facility is designed as a one way drive through building. The first section is the wash bay. It is isolated from the rest of the maintenance area to control humidity and collect water and dirt washed off the trucks. The three wash stages are completed in the same area: warming stage (with air blowers), washing stage and drying stage. Drainage of washing residue is directed into an underground pit. This pit is provided with a cleanout opening, waste oil traps and sumps.

The next section of the maintenance building is the tire shop area. It incorporates space for tire inspection and change out using tire handlers. There is also a tire mounting and stripping machine and some storage space for tires.

The truck maintenance area is next to the tire change section. There is no separation between the areas. This section will include 3 bays for maintenance. One bay will be used mainly for oil change on truck or loaders and the next two bays will be used as needed for major maintenance or others. The maintenance bays will be serviced by two portal gantry cranes with a lifting capacity of 50 tonnes. One of the bays will have a maintenance pit.

A final section at the end of the maintenance garage will be used for welding and other types of repairs. It will be separated from the previous area to control noise and fumes.

The mobile equipment will circulate between the various areas through large one-way doors for safe access.

The maintenance garage and workshop will have the necessary equipment for efficient maintenance as well as offices for the supervisors and a lunchroom.

A warehouse is attached to the mobile equipment maintenance garage to efficiently provide parts and consumables for equipment maintenance. Forklifts can circulate from the warehouse to the garage for heavy parts transportation.

There will be separate parking areas for heavy vehicles and light vehicle traffic at all the facilities for shift change and any other idle time.

b) Plant Maintenance Shops

The location of the maintenance areas is driven by the general location and proximity to the crushing, screening and processing areas. Maintenance space is provided locally for major maintenance such as crusher liner replacement, mill liner replacement etc. There is an area for fabrication work and some services such as lathes are shared as needed with the mobile equipment maintenance.

There is also a special shop for HPGR liners replacement. This is a specialized job that requires special equipment and heavy lifting capacity. The design takes into account the number of equipment and size in conjunction with estimated maintenance requirements based on overall equipment availabilities. Sufficient clearance is provided for free maneuvering around the equipment. The warehouse is the storage place for all consumables and spare parts for the process plant.

18.1.9 Camps

a) Temporary Construction Camp

Lodging requirements are estimated based on the total construction hours for the project and the planned schedule considering as much pre-assembly and modularization as possible as well as modularization. The mine site construction camp is presently sized at 1,000 rooms considering that 350 beds are planned in the permanent accommodation complex and will be utilized during construction. The temporary construction camp will therefore have 650 rooms.

Camp population will include multidisciplinary construction workers, contractors, management staff, service people, owner's representatives, security and visitors. The camp design includes all required sub-facilities such as catering, recreational rooms and others amenities.

b) Permanent Residential Complex

The accommodation complex will be designed to meet the sleeping, hygiene, dining and recreational requirements for 350 workers. The surroundings will provide a level of comfort intended to optimize individual productivity and minimize the adverse effects of

being separated from home and family for extended periods of time. Interior design, as well as the selection of furnishings, fittings and fixtures, will be considered. The concept will be modular. Each room will be equipped with shower/water, closets and all furniture and related equipment.

The residential complex proposes 25 units per sleeping quarter wing for a total of 350 individual rooms. The complex allows flexibility for multiple shifts and fly in – fly out timelines.

Electrical heating, ventilation and make-up air is provided by air-handling units. Ventilation rates satisfy construction code requirements. The central kitchen is used to prepare all meals that are served in the central dining area for the operation personnel.

Fresh water is provided by two (2) water wells located south of the complex. Single and double gates with galvanized steel fence also limit access to the complex.

A dedicated water treatment plant, including a 6.5 m diameter fire water tank provides potable and heated water for workers and complex utilities. A 250 m² helipad is also annexed to the complex. A helicopter hangar is located at the Schefferville airport.

No airstrip has been developed as part of this study. Flight services will be provided from the existing Schefferville commercial airport.

18.1.10 Heating, Ventilation, and Air Conditioning

The concentrator and site operation buildings such as the mine dispatch, maintenance workshops and main offices are heated from the concentrate drying heat recovery system. When the dryer is not operating or when it has insufficient capacity, electrical power supplies the required heat to the glycol loop distribution system. The electrical supply system has 30 MW of extra capacity to support accessory loads such as supplemental heating. This includes heating of the camp and remote facilities such as the explosives preparation plant, the fresh water pumping station and the water treatment plant.

18.1.11 Mine Diesel Fuel Supply, Storage and Distribution

Fuel is delivered by railcar from Sept-Îles. The mine site will have a centralised storage for the diesel fuel. Three diesel storage tanks, 750 m³ capacity each, provide sufficient capacity for 14 days of mine and concentrate dryer operation. The containment area is about 850 m³ or slightly more than one tank capacity.

From the central storage system, fuel is distributed to the different users. Two vehicle refuel stations are provided. One is dedicated to mine trucks and one for light vehicles. A tank truck supplies fuel to diesel powered mining equipment located in the pit. The mine operation requires approximately 40,000 litres of fuel per day.

An emergency power plant diesel fuel day tank provides fuel for diesel generators. It is refilled from the main storage as needed. The diesel day tank is a self-contained prefabricated tank that meets all the latest design codes for safety and spillage control. It is located adjacent to

the emergency diesel generators. At a capacity of 4.5 MW, the daily diesel generators consumption is approximately 27,000 litres.

The concentrate dryer will operate seasonally. A dryer diesel fuel day tank provides fuel for regular operation. It is refilled from the main storage as needed. The daily fuel consumption for the concentrate dryer is estimated at 100,000 litres during winter. The day tank capacity is 120,000 litres double wall prefabricated tank that meets all the latest design codes for safety and spillage control. The day tank is located adjacent to the dryer building.

18.1.12 Water Treatment Plant

The run-off water from all site impacted areas (plant area, waste dumps, and dry tailings storage facility) is collected by gravity in a site water collection pond. In addition, mine sump water is pumped into the site water collection pond. From this pond, water flows by gravity in a polishing pond 40 metres by 60 metres. An underground pipe installed under the dams separating the two ponds allows the water flow from one pond to the other. The water flow is controlled by a sluice gate installed on the dam separating the two ponds.

A pH analyzer, which is installed on this same dam, provides information regarding water treatment needs. If required, a lime solution is injected into the pipe connecting the two ponds.

At the end of the polishing pond, a polished water pit and a pumping station are provided to return the water as needed to the processing plant. The excess water is discharged in the natural water bodies at levels meeting or below allowable limits.

18.1.13 Sewage Treatment Plant

The sewage water treatment plant is designed to meet all environmental laws, regulations and norms. All equipment will operate 24 hours per day, 365 days per year.

The Bio-discs process is proposed for the sewage water treatment plants. The design will handle the following operating conditions:

- Average flow of 70 m³/d (based on a maximum operating requirement of 350 persons and an average water consumption of 200 litres/persons/day);
- A maximum flow of 220 m³/d;
- The operation of the plant will allow an incoming peak flow of domestic sewage water of 13.4 m³/h. The peak flow will be considered for one hour, twice a day in the morning and in the evening.

18.1.14 Sanitary Waste Disposal

There is no domestic waste disposal site. Uncontaminated solid waste generated during construction and operations is sent to the Schefferville land fill area. Therefore, no sanitary landfill is considered.

18.1.15 Contaminated Waste

A number of oil spill containment areas are incorporated into the infrastructure design where mineral oils and lubricant are frequently used. The containment areas consist of sumps with low-capacity oil skimmers or high-demand oil separators. The oil-contaminated materials are disposed in an offsite contaminated waste treatment facility.

It is proposed to transport all contaminated waste products to an off-site recycling facility. Approaches could be recommended to an offsite contaminated waste disposal contractor who manages a facility near the city of Schefferville or Sept-Îles. This facility is able to destroy contaminated wastes by incineration and/or safely store contaminated wastes for future safe disposal.

18.1.16 Communications

a) Voice and Data Communications

A series of communication tower will be erected to link the mine site to the existing high capacity data communication center in Labrador City.

The mine site network communication requirements are met via a Local Area Network (“LAN”) connected to Wide Area Network (“WAN”) in Labrador City. The WAN network communication enables contact with global internet and telephone service whereas the LAN network communication fulfills all telephone and information technology needs inside the plant. In addition, a Voice Radio System is provided to enable communication among individuals working in different areas.

To ensure system reliability, redundant communications systems are installed at the process plant. The LAN network communication is based on Ethernet protocol. It consists of fiber optic and copper cables. Telephone service is provided in all offices, control rooms, electrical rooms, and accommodation complex.

Telephone service is based on Voice over Internet Protocol technology. Communication servers are provided for call management and specific applications such as Auto-Attendant functions. Computer and internet facilities are provided in all offices, control rooms, electrical rooms, and accommodation complex.

A Public Address (“PA”) system, a Close Circuit Television, and an IP Access Control System are installed in all buildings and accommodation.

b) Radio Networks

A digital multichannel two way voice radio system is designed for continuous operation, 24 hours a day, and 365 days a year.

The radio network covers the following areas:

- Mine;
- Primary crusher;

- Secondary crusher;
- Process plant building;
- Remote pump houses;
- Tailings area.

18.2 Railway

The concentrate will be transported by rail from the mine site to the pellet plant located at the port in Pointe-Noire. This will require the construction of a new railway line from the plant site to the TSH line south of the Howells River bridge and near the Menihék power plant south of Schefferville. The trains will go through four different rail sections: the new rail spur from the mine site to TSH line, TSH down to Emeril junction, QNS&L down to Arnaud junction and finally through the CFA line to Pointe-Noire.

18.2.1 New Railway Construction

The new railway line will be located on the west side of the Howells River valley following the ridge of the mountain. On the southern part of the new extension, the rail line will go through lower land areas where the soil will be boggy. Multiple small streams are crossed along the route but no major river is crossed.

North of Menihék Dam, the new railway will connect with the existing TSH railway. It is estimated that approximately 80 km of new railway is required and possibly one siding.

A railway loop, located at the mine site, will be designed to load the concentrate from a rapid train loading station. In addition, railway sidings will be constructed at site to receive materials and supplies.

18.2.2 Existing Railway

The TSH railway from Emeril to Schefferville is progressively being upgraded and will handle the required tonnages expected from the DSO project as well as the NuTac Project. The train service for the new spur line could be contracted out to TSH or others for operation and maintenance. TSH, in its operating days with IOC, handled 13 Mt of ore in the summer season.

The QSN&L line has the capacity to handle the predicted new tonnages from the NuTac Project. No work would be required to update this line as there are 12 sidings already situated along the railway able to handle in excess of 290 cars each.

18.2.3 Port Facilities

The Government of Québec (GoQ) recently acquired all of Cliff's assets located near Sept-Îles and at Pointe-Noire. The Project will use the services of the new operation company that will be formed to operate and manage the GoQ assets for the benefit of multiple users.

The concentrate train is transported to Pointe-Noire via the CFA rail section. At Pointe-Noire, the existing car dumper at the Bloom Lake yard is used to unload the railcars and bring the

concentrate into a new covered pellet feed storage shed ahead of the pellet plant. At the time of Project construction, an assessment of the car dumper capacity and utilisation will be done.

The current dumper has a quoted capacity of 6,000 tph. With the DSO at 6 Mtpy and NuTac at 9 Mtpy, the dumper has sufficient capacity to handle the volumes. However, if the car dumper is found to have insufficient capacity to handle the additional tonnage from the NuTac Project, then upgrades to the existing system or a new installation will be planned.

18.2.4 Train Size

The planned train size is 240 ore cars each capable of transporting 100 tonnes resulting in each train carrying 24,000 tonnes of wet concentrate. To transport the annual production of concentrate, a total of 385 trains will be needed. This is slightly more than one train each day.

The train cycle is about 4 days from the mine site to Pointe-Noire and back including loading and unloading. Therefore a total of 5 trains are required to transport the concentrate plus 5% spare cars and locomotives. Some yard operations equipment will also be required. A yard switcher (by TSH) and snow cleaning equipment is also required. Any other track maintenance equipment is provided by TSH.

18.3 Pellet Plant Infrastructure

This study considers that some of the existing infrastructure at the port from the former Wabush pellet plant at Pointe-Noire can be reused to reduce the capital cost investment.

18.3.1 Power Supply

The estimated motor-drawn power at the pellet plant is 35 MW excluding HVAC and lighting requirements. It is assumed that the existing power lines and substation that supplied the Wabush pellet plant and port facilities are available for the new pellet plant. A new short connection will be built from this sub-station to supply the main feed to the new NML pellet plant.

A 161 kV GIS will feed and protect the two main transformers stepping down the voltage from 161 kV to 34.5 kV. The 34.5 kV switchgear is installed in the main electrical room.

Voltage drop at the point of client connexion will have to meet HQ requirements. The voltage drop at the main 161 kV bus will be studied to validate the large motors starting method during the feasibility study phase.

18.3.2 Emergency Power Plant

The pellet plant is equipped with one 1,800 kW 4.16 kV diesel generator to cover the emergency load requirement. The generator is supplied mounted in its own container type walk-in enclosure to be installed on a concrete slab.

There are emergency generators that are currently available that were associated with the Cliffs' plant. The three generators were located at the pellet plant, the administration offices

and the maintenance facility. A study will be conducted during the feasibility study phase to determine the suitability of these generators for NuTac's operations.

18.3.3 Access and Service Roads

Pointe-Noire is a well-developed industrial and port area and as such, is well-served in all aspects of infrastructure. A provincial highway (HWY 138) runs alongside the area and a two way paved road serves the area (*Chemin de la Pointe-Noire*) leading all the way to the Alouette aluminum smelter. A municipal road runs along the south edge of the area (*rue Alban Blanchard*). These roads can be used in all weather conditions by the largest vehicles although some limitations in weight may apply in the spring break-up.

The main access to the facilities is from the existing Chemin de la Pointe-Noire with possibly a short branch to the pellet plant depending on its final location.

The on-site roads provide access to all facilities including the water treatment pond and access along the site security fence. These roads around the facilities have two lanes, each 3.5m wide for a total width of 7m, and are paved. New road base construction utilize CBR 60 % material and include 1.0 m shoulders.

The other on-site roads have one 4 m wide lane with passing areas and are gravel roads.

All new on-site main roads are provided with 11 m galvanized steel pole-mounted Cobra type 250 watt HPS Roadway light fixtures, spaced at 50 m apart to meet the local regulations for roadway lighting. Traffic lights are provided at cross-roads and restrictive entrances. In general, traffic speeds are restricted to 50 km/h and 30 km/h close to the facilities.

Asphalt paved areas are available for parking at the main gate and all auxiliary buildings. A bus station with a covered drop-off and collection area is provided.

The pavement structure will be in accordance with the recommendations provided by the Geotechnical Consultant.

18.3.4 Pellet Plant Water Systems

Water is supplied from the existing site treatment plant and from the existing City of Sept-Îles municipal system. Site run-off and drainage will report to the settling pond. Treated water will be supplied to the pellet plant and yard facilities. Part of the treated water is distributed to the fire water tank and gland seal water tank. The municipal system will provide potable water and cooling water make-up.

a) Cooling Water

Cooling water supplies various consumers and the returned hot water from these consumers is collected in the cooling water tank. The hot water is routed through the heat exchangers and cooled for re-use. A small amount of make-up water is added to replace water lost in the cooling system.

b) Fresh Water and Fire Water

Treated surface water run-off supplemented by city water provides make-up for the fresh/fire water tank from where it is distributed to the various users.

A buried fire water loop runs around the pellet plant building to distribute water should a fire occur. Specific pellet plant equipment will be protected directly by distribution pipes for automatic fire suppression locally. The fire water is distributed by an approved pump system with proper redundancy to ensure it activates efficiently in case of a fire.

Two fresh water pumps (one operating and one standby) will supply all pumps requiring gland flushing as well as water for the process needs such as moisture adjustment of the pellet feed and de-dusting systems.

c) Glycol Cooling

Glycol is supplied for motor and bearing cooling for the outside process fans. The hot glycol is returned to the glycol collecting tank. The heated glycol is pumped through the fin fan coolers for cool down and is recirculated into the glycol cooling system.

d) Potable Water

The potable water is supplied from the existing municipal water system. A potable hot water system will be installed for showers and other requirements.

18.3.5 Compressed Air System

The pellet plant compressed air system will supply plant air (bin blasters, pneumatic tools, etc.) and instrument air for operation. The system pressure is designed for 7 bars. Two compressors feed the compressed air system. Instrument air is required for pneumatic valves, instruments, cleaning of baghouse filters and for instrument functions. The required air is dried in absorption dryers. Table 18.1 shows the estimated compressed air consumption at the pellet plant. The design and supply of this system is included in the pellet plant supply contract.

Table 18.1 - Estimated Compressed Air Consumption

Description	Consumption (m ³ /h)	Pressure (bar)	Dew point Temperature (°C)	Purpose
Plant Air	500	6	-2	Cleaning, pneumatic tools
Instrument Air	1,040	6	-40	Cleaning of baghouses, field instruments

18.3.6 Gas Cleaning Systems

The pellet plant needs large gas cleaning systems described below. The design and supply of these systems is included in the pellet plant supply contract.

a) Process Gas De-dusting

The process gases are made of the various pellet plant exhaust gases. Three fans (the wind box exhaust fans 1 and 2 and the hood exhaust fan) draw the gases through baghouse dust collectors (one per fan) to remove the dust contained. The baghouse dust is discharged through double pendulum valves positioned under every row of dust hoppers and transported by collecting chain conveyors to the dust slurry tank. The dust is mixed with process water and pumped back as moistening water in the pellet feed mixer.

b) Plant De-dusting

The ambient atmosphere in the pellet plant is kept at low dust levels to maintain clean working conditions and facilitate plant maintenance. All the pellet plant areas where dust may arise are covered with hoods connected to the plant de-dusting system.

The induration machine feed and discharge stations are de-dusted together with the screening section by a central de-dusting system. This system is similar to the process gas system and consists of a de-dusting fan, a baghouse dust collector and a separate exhaust stack. The dust from the baghouse collector is discharged through double pendulum valves to a chain conveyor and conveyed to the slurry tank. In the slurry tank, the dust is mixed with process water and pumped back as moistening water in the pellet feed mixer.

All dust recovered from the different gas cleaning systems is returned to the main process. By implementing this concept, no iron units are lost in the induration process, with the exception of a very small quantity of dust in the clean gases of the stacks.

18.3.7 Maintenance Workshop

The maintenance workshop and main warehouse are sized to support the balling and pelletizing areas. They also include stores and sanitary facilities.

At the moment, the concentrate unloading and the pellets storage and ship loading services will be outsourced from the new multi-user company that will manage the recently acquired assets from Cliffs by the Government of Québec. They will be responsible for the operation and maintenance of facilities.

There will be no vehicle maintenance garage at Pointe-Noire facilities. The maintenance will be performed by local businesses in Sept-Îles.

The existing railway equipment shop will be leased to maintain and repair NML's railway fleet.

18.3.8 Heating, Ventilation and Air Conditioning

Space heating requirements will be provided by an indurating machine heat recovery system. The balance of heat in the peak of cold season or when the indurating machine is idling will come from the electric power line capacity allocated for this purpose. The design and supply of these systems for the specific scope of the pellet plant building is included in the pellet plant supply contract.

18.3.9 Fuel Storage and Distribution

The pellet indurating burners are designed to use heavy fuel oil (Bunker C) as the fuel source for the indurating machine. The characteristics of fuel oil used in the design of the pellet plant are given in Table 18.2.

The estimated HFO fuel consumption for the induration of iron ore pellets from the magnetite concentrate of NuTac is 274 MJ/t or 6.81 l/t of pellets.

The design presently assumes that the three existing heavy fuel oil storage tanks, 20,000 m³ capacity each, will be reused. They will provide sufficient capacity to receive Bunker C shipments of 250,000 barrels. One shipment can support the pellet plant operation for eight months.

Table 18.2 – Fuel Oil Characteristics

HFO Bunker C	Unit	Min	Max	Value
Density @ 15 °C	kg/l	0	1.01	0.973
Pour Point	°C	0	0	6
Sulphur	wt %	0	1.5	1.31
Nitrogen	ppm	0	0	3.63
Flash Point	°C	65	0	104.0
Viscosity @ 50 °C	cSt	150	650	54
Water & Sediment	% vol.	0	1.0	0.10
Heat Value	MJ/l	0	0	41.95
Vanadium	mg/kg	0	0	19
Silica	mg/kg	0	0	89
Sediment by Hot Filtration	wt %	0	0.1	0.02
Compatibility/Stability		0	2	1
Ash	wt %	0	0.1	0.063
Carbon Residues	wt %	0	0	9.33

The Project favours the utilisation of liquid natural gas (LNG) as a combustion fuel if it becomes available at Pointe-Noire. LNG produces less greenhouse gases and other deleterious elements relative to HFO, and the technology is readily available for low NO_x emissions burners. In any case, dual fuel capability burners could be installed if available for future switch to LNG. There is also a project to connect the North Shore with a natural gas pipeline that is delayed but could be realised one day if enough clients can be secured.

18.4 Pellet Stockpiling and Ship loading

18.4.1 Pellet Storage and Ship Loading

The final pellet product, received from the screening area of the pellet plant, is transported to the storage yard facility by a conveyor system. NML plans to use the multi-user facilities acquired from Cliffs by the Government of Québec. The pellet plant will produce 1,100 t/h of pellets that will be stored at the old Wabush Mines storage yard in Pointe-Noire. Upgrades to the storage yard equipment have been planned to accommodate the NuTac requirements and provide efficient equipment to replace the old Cliffs equipment.

One product sampler is installed at the discharge end of the reclaim conveyor for sampling and analysis of the product that is being shipped. The capacity of the reclaiming system is 8,000 t/h to match the ship loader rate.

The ship loading and jetty facilities have been developed and will be operated by the Sept-Îles Port Authority ("SIPA").

18.4.2 Storage and Ship Loading of Pellet Chips

The pellet chips (<5 mm) produced by the product screens will be transported and stored in a dedicated pile at the end of the pellet storage yard. The pellet reclaimer will also be utilised for reclaiming and ship loading pellet chips.

18.4.3 Communications

a) Voice and Data Communications

The pellet plant network communication requirements are met via a Local Area Network ("LAN") connected to Wide Area Network ("WAN") via a service provider located in Sept-Îles. The WAN network communication enables contact with global internet and telephone service whereas the LAN network communication fulfills all telephone and information technology needs inside the plant. In addition, a Voice Radio System is provided to enable communication among individuals working in different areas.

To ensure system reliability, redundant communications systems are installed at the process plant. The LAN network communication is based on Ethernet protocol. It consists of fiber optic and copper cables. Telephone service is provided in all offices, control rooms, electrical rooms, and accommodation complex.

Telephone service is based on Voice over Internet Protocol technology. Communication servers are provided for call management and specific applications such as Auto-Attendant functions. Computer and internet facilities are provided in all offices, control rooms, electrical rooms, and accommodation complex.

A Public Address ("PA") system, a Close Circuit Television, and an IP Access Control System are installed in all buildings.

b) Radio Network

A digital multichannel two way voice radio system is designed for continuous operation, 24 hours a day, and 365 days a year.

The radio network covers the pellet plant operation and port facilities.

18.5 Fire Alarm and Detection Systems

In the absence of any specific requirements from the insurance underwriters, the fire alarm and detection system will be designed to meet the National Building Code requirements.

The fire alarm system will be of the addressable type and include the following devices:

- Intelligent addressable detectors (smoke, heat and combined fire detectors);
- Manual pull stations;
- Audible horns, including strobes where required in noisy process areas.

The main fire alarm panel will be installed in the guard house and a remote annunciation panel is provided in the concentrator and pellet plant Central Control Rooms. Any remote fire alarm panels will be installed locally, for interconnected distant areas, on a communication loop with the main fire alarm and the annunciation panels.

19.0 MARKET STUDIES AND CONTRACTS

19.1 Introduction

As shown by the actions of leading companies in NML's mining, iron and steel product groups, adjustments are being made to strategies developed for a market underpinned for a decade by strong growth in China and a tight supply/demand balance for commodities -- conditions that no longer exist.

The TFS, which NML and Tata Steel commenced in 2011 and for which the techno-economic results were published in 2014, showed project alternatives too large in scale and capital intensity for today's changed marketplace, yet produced state-of-the-art mining, beneficiation and environmental guidelines transferrable to other taconite development scenarios and therefore of significant ongoing value.

Concurrently with the TFS, which involved only NML's KéMag and LabMag Deposits, NML successfully explored five other deposits and announced the addition of significant NI 43-101 compliant resources to its taconite holdings. This investment resulted in NML having more options for taconite development and project optimization given the location and connectivity of the expanded resource base.

The NuTac initiative has involved a holistic study of NML's seven NI 43-101 compliant taconite deposits in order to analyze more project options, lower development risk and cost, and facilitate market entry. The uniformity of NML's taconite ores means that the mining and processing techniques resulting from NML's earlier studies are transferrable to all the deposits. There are of course site specific environmental and transportation cost variances, but each deposit is a long-life resource featuring simple geology with a readily upgradable iron content as well as low alumina and low phosphorus mineralogy.

The market potential discussed herein thus applies to all the deposits.

A NuTac project would be a competitive new producer of pellets in terms of cost and product quality, with the ability to supply high quality grades for both the blast furnace (BF) and direct reduced iron (DRI) production routes for steelmaking, and to a diversified portfolio of customers across Europe, the Americas, the Middle East/North Africa ("MENA") and Asia.

There is also the option to produce a high Fe, low gangue concentrate/pellet feed should market conditions warrant.

It is acknowledged that the steel and iron ore industries are presently in a period of adjustment as the rate of economic growth in China slows, measures are taken globally to reduce excess steelmaking capacity, and increased production from expansions and new projects in Australia and Brazil continues to oversupply the fines segment of the iron ore market. However, as demonstrated through the steadiness of the pellet price premium structure, the pellet supply side capacity is more limited.

NuTac is a pellet supply opportunity underpinned by changes in ironmaking production and practices that continue to structurally increase the consumption of pellets globally even through periods of market volatility. These trends are closely monitored by NML's marketing advisors, Dr. Joseph J. Poveromo, President, Raw Materials and Ironmaking Global Consulting, Bethlehem, Pennsylvania, USA, and Mr. R. C. A. Barrington, Director, Papillon Mineral Services Ltd., Camberley, UK, and Chief Advisor, International Iron Metallics Association. Their views on NuTac's market positioning aspects are reflected in this chapter.

Supplementing the market attraction of NML's resources and the high-quality products they will yield is the rail and port infrastructure system readily available to connect the resources to global markets. The rail network in place is linked to established material handling facilities and a new deep-water dock at the Port of Sept-Îles, Québec, which has been designed with the capability to load all vessel sizes up to and including Chinamax class.

First production from NuTac would be in the post-2020 timeframe in view of the periods required for environmental assessment, construction and ramp-up. In this regard, NML has since inception built and maintained strong relations with the potentially concerned regulatory authorities, communities and other stakeholders.

19.2 Market Context and Opportunity

Steel today is produced via two routes: 1) the long-established blast furnace (BF)/ basic oxygen furnace (BOF); and 2) the electric arc furnace (EAF). The BF route uses iron ore fines in the form of a baked sinter produced at the steel mill, and/or forms of iron ore that are directly charged into the BF – lump and pellets. The EAF process primarily has historically relied mainly on steel scrap, but is now increasingly supplemented by direct reduced iron (DRI), which in turn is produced in modules of varying capacities charged with iron ore lump and/or pellet. In this regard, the world's supply of DR-grade lump is virtually exhausted and pellets are filling the void.

The demands of the BF/BOF and EAF/DRI processes give rise to three product market segments for iron ore: 1) fines (including concentrates), which are the dominant input; 2) lump and 3) pellets.

These markets are further segmented geographically into "seaborne (via ocean vessel)" and "domestic (via rail and lake or river system)" markets. Several regions of the world, such as the North American Great Lakes, Scandinavia and Central Europe, are effectively closed circuits because of natural transportation cost advantages from mine to steel mill.

Here is a general snapshot of the market today:

- World crude steel production 1.6 billion tonnes
- World iron ore demand 2.0 billion tonnes
- Seaborne iron ore demand 1.4 billion tonnes

Whereas global crude steel demand grew significantly over the period 2000 to 2014, fueled by infrastructure and housing construction in China, the industry is expected to return to a lower, more historical rate of growth as China's economy shifts progressively from being capital investment to consumer demand led. While this trend, coupled with the growing Chinese scrap reservoir and thus higher scrap consumption in steel production in the medium-to-long term, is expected to moderate iron ore demand, there are also growing changes in the way steel is made with focus on cleaner and optimized primary ironmaking operations. As a result, the following technical and environmental developments are structurally increasing the use of pellets globally:

- Productivity improvement in BF operations with pellets as a higher quality alternative to lump or sinter, or as a low-silica input that reduces slag volumes and, in turn, coke consumption;
- Addressing environmental concerns as BF operations and sinter plants come under pressure for emissions, a noteworthy development in China, where domestic pellet plants could also be affected;
- New demand from DRI-based EAF steelmaking, especially in the Americas and MENA, where cheap natural gas makes DRI production attractive.

Accordingly, our and other market analysis shows pellet usage increasing as a percentage of the total iron ore mix over the next ten years.

Given the concerns over current iron ore market conditions, in which supply from major producer expansions and new projects has overwhelmed still-growing demand, causing a significant drop in the reference price for iron ore fines and resulting in smaller producers and projects being displaced or deferred, it is important to place the new supply in context in order to differentiate the market fit of NML's taconite resources.

Australia and Brazil dominate the internationally traded iron ore market, although Australia's role in the pellet segment is very minor. While Canada's overall iron ore market share is relatively small at 2-3%, Canadian producers nevertheless play a leading role in servicing the high quality segment and especially in the supply of pellets, with a long and successful record of responding to changing steelmaker operating needs through the development of new pellet grades. In this regard, NML's resources have inherently good properties and are similarly adaptable, and therefore well positioned technically and geographically to be a new source for growing pellet demand.

In contrast to the fines segment, there has been more limited investment in new pelletizing capacity and little is foreseen in the period to 2020. Thus, the group of suppliers able to service the seaborne iron ore market with both BF and DR-grade pellets remains relatively small.

Globally, the primary market entry potential for NuTac is in the Americas, Europe and MENA. Other market potential could evolve in China and Asia ex-China.

Through the global marketing efforts for its projects over a number of years, NML has established relationships with principal iron and steelmakers in each of the above geographical areas.

19.3 Products

The ability of a producer to supply fines, lump and/or pellets depends on the mineralogy of its resource base. Some ores require more beneficiation than others in order to remove impurities and generate sufficient iron (Fe) content per tonne for a saleable product. As with most North American ores, NML's taconites must undergo concentration and pelletizing to be transformed into saleable products. This upgrading is done with well-established technologies and NML can access the most modern equipment available to maximize production efficiency and reduce operating cost. Investment in extensive test work has confirmed the ability of our taconite properties to produce high-quality, commercial grade pellets.

The expected product specifications available from the KéMag deposit are shown at the end of this chapter and are representative of pellet quality from NML's other deposits. The high iron content, low combined silica and alumina, and very low phosphorus content are noteworthy. Pellet sizing will be optimized for both BF and DR applications.

NuTac's assumed sales total 9.0 Mtpy of pellets split as follows:

- 4.0 Mtpy BF-grade;
- 5.0 Mtpy DR-grade.

19.4 Pricing

It is well known that the global pricing mechanism for iron ore shifted in the late 2000s from the historical, annually negotiated benchmark system to shorter term settlements based upon a delivered price to China with adjustments for ocean freight and quality to arrive at a netback at the supplier's loading port. Since iron ore sales are denominated in USD, that currency's relationship with the seller's local currency also plays a role in the revenue calculation.

Today, the FOB Sept-Îles price expressed in CAD is a function of the 62% Fe CFR China fines price as a baseline reference, a deduction for the Eastern Canada-to-China ocean freight rate, an adjustment for the iron content differential from the 62% Fe reference, and, in the case of pellets, premiums for the BF and DR grades, respectively, along with the USD:CAD exchange rate.

The period since mid-2012, has seen extreme price volatility, making it difficult to predict even very short-term prices, as evidenced by the frequently changing forecasts from financial sector analysts. With regard to the long-term price for iron ore, there are numerous views among industry analysts and forecasting services, resulting in a wide range of predictions.

For purposes of the NuTac analysis, a more balanced, post-2020 demand/supply scenario is assumed given the Project's timing, with these resulting price drivers:

- Fines/tonne - 62% Fe CFR China USD 70.00
- BF Pellet Premium USD 30.00
- DR-grade premium BF price + 7.5%
- USD:CAD USD 0.80:CAD 1.00

The respective pellet price realizations, FOB Sept-Îles, are as follows:

- BF-grade (66.3% Fe) 118.06 CAD/tonne
- DR-grade (67.9% Fe) 130.14 CAD/tonne

It should be noted that iron ore pricing mechanisms continue to evolve. At time of writing of this report the industry is seeing the emergence of higher Fe price indices that are more aligned with the NuTac product grades, thereby requiring less adjustment than with use of the 62% Fe reference. As NuTac advances to its next stages, these higher Fe indices are expected to become more established and accepted.

19.5 Conclusion

NML's taconite resource base offers significant potential for the development of a new, medium term source of supply to the growing pellet market. As well, any of the deposits represent a mineral inventory opportunity for the longer term.

The NuTac initiative has produced the design of a state-of-the-art pellet project sized for market entry using NML's resources and their connection to global markets via existing rail and port infrastructure.

Other important attributes, including the location of the resources in Canada's premier and well established iron ore district, the Labrador Trough, and NML's standing in the communities where the operating sites are located, enhance NuTac's marketability.

Figure 19.1 – Physical Properties of BF Grade Fluxed Pellet

SGA Studiengesellschaft für Eisenerzaufbereitung GmbH & Co. KG

Pellet test No.:	A 7228 - No. 19	
Physical properties		
<u>Crushing strength, ISO 4700</u>		
Mean	[daN/p]	275
Portion <150 daN/P	[% <150daN/p]	9,5
<u>ISO-tumbler test, ISO 3271</u>		
Strength >6.3 mm	[%]	95,5
Abrasion <0,5 mm	[%]	4,0
Chemical analysis		
Fe _{tot}	[%]	66,42
SiO ₂	[%]	2,44
Al ₂ O ₃	[%]	0,13
CaO	[%]	2,04
MgO	[%]	0,15
P	[%]	0,005
S	[%]	<0,01
Na ₂ O	[%]	0,010
K ₂ O	[%]	0,010
Mn	[%]	0,135
TiO ₂	[%]	0,017
V	[%]	0,004
L.O.I	[%]	0,04
Basicity CaO/SiO ₂	[]	0,84
Metallurgical properties		
<u>Reduction under load RUL, ISO 7992</u>		
Reducibility R ₄₀	[%/min]	1,35
dp ₈₀	[mmWG]	2
<u>Reducibility, ISO 4695</u>		
Reducibility R ₄₀	[%/min]	1,12
<u>Swelling index, ISO 4698</u>		
Volume increase by buoyancy method	[%]	16,3
<u>Static Disintegration, ISO 4696-1</u>		
Strength >6.3mm	[%]	93,8
Index <3.15mm	[%]	5,0
Abrasion <0.5mm	[%]	4,3
<u>Dynamic Low Temp. Disint. LTD, ISO 13930</u>		
Strength >6.3mm	[%]	84,9
Index <3.15mm	[%]	8,0
Abrasion <0.5mm	[%]	6,4
Physical, chemical and metallurgical properties of KéMag BF grade fluxed pellet (Pot grate Test No. 19, August 2012)		

A7228_NML_KeMag-Pelletizing-2012_results.xlsm (KeMag-BF)

Figure 19.2 – Physical Properties of DR Grade Pellet

SGA Studiengesellschaft für Eisenerzaufbereitung GmbH & Co. KG		A 7228 - No. 5	
Pellet test No.:			
Physical properties			
<u>Screen analysis</u>			
+16 mm	[%] [cum.%]	0,1 / 0,1	
+12.5 mm	[%] [cum.%]	43,0 / 43,1	
+10 mm	[%] [cum.%]	55,4 / 98,5	
+ 8 mm	[%] [cum.%]	1,2 / 99,7	
<u>Crushing strength, ISO 4700</u>			
Mean	[daN/p]	310	
Portion <150 daN/P	[% <150daN/p]	7,2	
<u>ISO-tumbler test, ISO 3271</u>			
Strength >6.3 mm	[%]	96,3	
Abrasion <0,5 mm	[%]	2,8	
Chemical analysis			
Fe _{tot}	[%]	67,92	
SiO ₂	[%]	1,78	
Al ₂ O ₃	[%]	0,12	
CaO	[%]	0,68	
MgO	[%]	0,12	
P	[%]	0,004	
S	[%]	<0,005	
Na ₂ O	[%]	0,019	
K ₂ O	[%]	0,008	
Mn	[%]	0,124	
TiO ₂	[%]	0,016	
V	[%]	0,004	
L.O.I	[%]	0,03	
Basicity CaO/SiO ₂	[]	0,38	
Metallurgical properties			
<u>Sticking test, ISO 11256 (on coated pellets)</u>			
Clustering index CI	[%]	4,0	
<u>Disintegration and Metallisation, ISO 11257</u>			
<u>"MIDREX-LINDER-Test"</u>			
Red.-disint. index (RDI _{DR}) <3.15 mm	[%]	3,0	
Metallisation	[%]	95,5	
Fe _{met} / Fe _{tot}	[%]	89,51	93,73
<u>Reducibility, ISO 11258</u>			
Reducibility R ₄₀ / R ₉₀	[%/min]	1,23	0,23
Metallisation	[%]	88,1	
Fe _{met} / Fe _{tot}	[%]	81,25	92,27
Physical, chemical and metallurgical properties of KéMag DR grade pellet (Pot grate Test No. 5, August 2012)			

A7228_NML_KeMag-Pelleteizing-2012_results.xlsm (KeMag-DR)

20.0 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

The NuTac-KéMag Project (“Project”) is a variant of the Taconite Project (“TP”), which anticipated mining either the KéMag or LabMag deposits (see Figure 20.1), concentration at the mine site and a slurry pipeline (“ferroduct”) to transport the concentrate mixed with water from the process plant to a pellet plant at Pointe-Noire, Sept-Îles, Québec, where stockpiling and shiploading of saleable products would also take place.

The TP feasibility study focused on the techno-economic aspects of each of the KéMag and LabMag deposits, but did not reach the decision-making stage that would give rise to submission of a formal Project Description and trigger the environmental assessment (“EA”) process. However, the environmental studies that were part of the TP feasibility study provide a valuable foundation, data and applicable jurisdictional experience for the sequence of steps that the Project must undergo in order to obtain the necessary permits for construction and operations.

In addition, the now actively producing and shipping direct shipping ore (“DSO”) project owned by Tata Steel Minerals Canada (“TSMC”), in which NML is a minority investor, provides very recent experience with environmental and community activities involved in the development and construction of a project in the same Schefferville/Menihek region.

20.1 Applicable Environmental Assessment Regimes and Permitting

20.1.1 Environmental Assessment

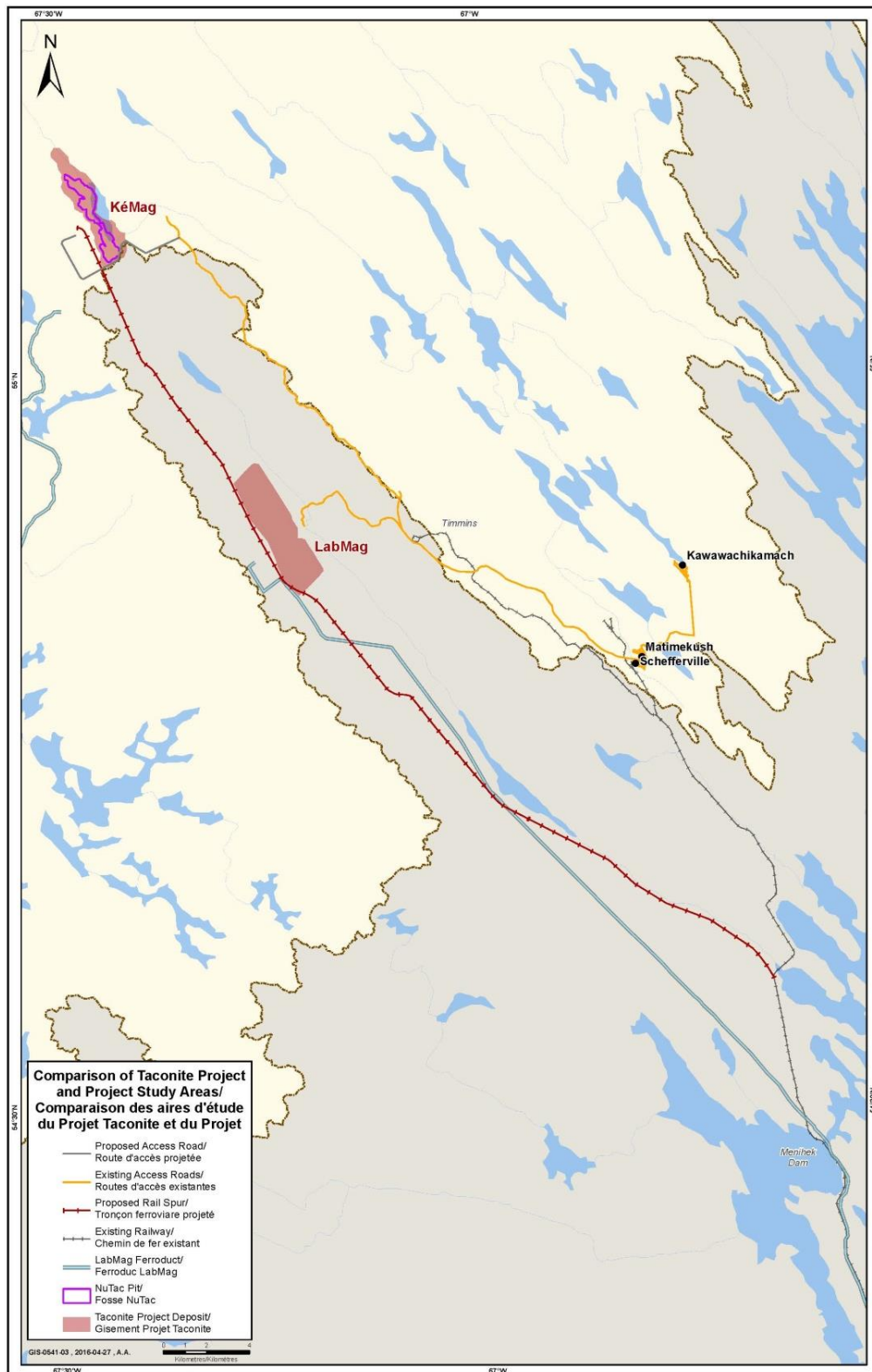
The Project is expected to trigger the regimes of environmental assessment (“EA”) of general application established by the *Canadian Environmental Assessment (“CEA”) Act 2012*, the *Loi sur la qualité de l’environnement (“LQE”)* (Chapter I, Division IV.1) of the Government of Québec (“GoQ”) and the *Environmental Protection Act (“EPA”)* of the Government of Newfoundland and Labrador (“GoNL”), in addition to the regime of Section 23 of the *James Bay and Northern Québec Agreement (“JBNQA”)* (LQE, Chapter II, Division III).

Table 20.1 shows how each regime may apply to the principal infrastructure of the KéMag Project. It is assumed at this stage that the transmission line to the mine site would be built and operated by Hydro-Québec, which would thus be responsible for the assessment of its environmental effects.

Table 20.1 - Environmental Assessment Regimes Applicable to Principal Infrastructure

EA Regime	Principal Infrastructure
CEA Act 2012	Mine site, rail spur, pellet plant
JBNQA Section 23	Mine site, rail spur in Québec
GoNL EPA	Rail spur in Labrador
GoQ LQE, Chapter 1, Division IV.1	Pellet plant

Figure 20.1 – Comparison of Taconite Project and Project Study Areas



The implementation of the applicable regimes would be harmonized to the extent possible. It is presently assumed that a single Project Description and a single Environmental Impact Statement (“EIS”) would be prepared and organized in a manner to facilitate review by the respective jurisdictions.

20.1.2 Permitting

Once the regulatory authorities release the Project from further EA, applications for the various permits required for site-preparation and construction can be filed, followed by applications for permits for the start of operations. In order to expedite the start of construction, preparation of the permit applications can begin before completion of the EA.

Since the Project will possibly involve tailings disposal in fish-bearing water, an amendment to Schedule 2 of the *Metal Mining Effluent Regulations* (“MMER”) may be required, in which case it must be shown that there is no viable alternative and a fish habitat compensation plan must be submitted.

Representatives of Environment Canada and Fisheries and Oceans Canada have advised that the process of obtaining an amendment to Schedule 2 can take up to 18 months. Until the amendment is completed, no work affecting the waterbodies/watercourses in question can be undertaken. Other work can be carried out, but overall the Project will not proceed unless the required amendment is obtained.

In addition to the compensation plan needed to obtain the MMER Schedule 2 amendment, a fish habitat compensation plan must be submitted for any other work that may do harm to fish that are part of or support a commercial, recreational or Aboriginal fishery. A complete fish habitat compensation plan must be accompanied by a letter of credit to guarantee its implementation.

The principal permits that would be potentially required are listed below. The list will be revisited as project design and baseline data analysis progress.

a) Government of Canada

- Decision under CEA Act 2012, art. 52 – determination if project is likely to cause significant adverse environmental effects and, if so, whether the effects are justifiable;
- Authorization under *Fisheries Act*, art. 35(2) – work that may result in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery;
- Amendment of Schedule 2 of *Metal Mining Effluent Regulations*;
- License and permit under *Explosives Act*, art. 7(1) – license for explosives factory and permit for transportation of explosives;
- Approval under *Transportation of Dangerous Goods Act, 1992*, art. 7 – emergency response assistance plan to import, offer to transport, handle or transport dangerous goods;

- Authorization under *Radiocommunication Act*, art. 5(1) – radio station establishment/operation;
 - Certificate of Fitness and approval under *Canada Transportation Act*, arts. 90(1) and 98(2) respectively – railway and railway line construction/operation;
 - Agreement with competent minister or permit under *Species at Risk Act*, art. 73 – activity affecting a listed wildlife species, any part of its critical habitat or the residences of its individuals.
- b) Government of Québec
- Certificate of Authorization under *Loi sur la qualité de l’environnement* (“LQE”), art. 22 – activities that may result in a change in the quality of the environment;
 - Authorization certificate under LQE, art. 31.1 – environmental impact assessment and review of certain projects;
 - Release from LQE, art. 188 – projects automatically subject to environmental and social impact assessment and review procedure contemplated in articles 187 to 204;
 - Depollution attestation under the LQE, art. 31.11 (see *Règlement sur les attestations d’assainissement en milieu industriel*) – emissions of a metal ore mining establishment with a mining capacity greater than 2,000,000 metric tonnes per year of ore or mine tailing processing capacity greater than 50,000 metric tonnes per year (operations involving ore beneficiation are included in ore processing operations);
 - Authorization under LQE, art. 32 – establish waterworks or install devices for waste water treatment;
 - Authorization under LQE, art. 48 – install atmospheric depollution equipment;
 - Certificate of competence under *Loi sur les chemins de fer*, art. 7 – rail transportation activities;
 - Authorization under *Loi sur les espèces menacées ou vulnérables*, art. 17 – activity carried out in threatened/vulnerable plant species habitat;
 - Wildlife management permit under *Loi sur la conservation et la mise en valeur de la faune*, art. 26 – disturbance to beaver dam, eggs, nest or den;
 - Authorization under *Loi sur la conservation et la mise en valeur de la faune*, art. 128.6 – activity carried out in wildlife habitat pursuant to *Règlement sur les habitats fauniques*;
 - Lease under *Loi sur les mines*, art. 100 – mining lease (the application must be accompanied by, among other things, a closure and rehabilitation plan (discussed in Section 20.8) and a scoping and market study on processing in Québec);
 - Approval under *Loi sur les mines*, art. 241 – tailings storage site;

- Authorization under *Loi sur les mines*, art. 232.2 – land rehabilitation and restoration work;
 - Lease under *Règlement sur la vente, la location et l’octroi de droits immobiliers sur les terres du domaine de l’État*, art. 39 – occupation of Crown land;
 - Forestry permit under *Loi sur l’aménagement durable du territoire forestier*, art. 73 – forest development activities (related to timber felling, construction of infrastructure) by mining rights holder;
 - Certificate of authorization (in accordance with LQE, art. 22) under *Règlement sur les carrières et sablières*, art. 2 – pit or quarry operation;
 - Approvals under *Loi sur le régime des eaux*, arts. 57 and 71 – construction/ maintenance of reservoirs for storage of water from waterbodies/ watercourses and construction/maintenance of dams and other water-retaining works respectively;
 - Authorization under *Règlement sur la sécurité des barrages*, arts. 57 to 63 – dam construction;
 - Authorization under LQE, art. 46 s) (*Règlement sur le captage des eaux souterraines*, art. 31) – wells (groundwater extraction for industrial water supply) if collection exceeds 75 m³ per day;
 - Permits under *Règlement d’application de la Loi sur les explosifs*, arts. 3, 4 and 6 respectively – possess, purchase, store and transport explosives;
 - Approval under *Loi sur le Bâtiment* (Code de Construction), art. 8.08 – installation of petroleum equipment (storage of petroleum products);
 - Certificate of conformity under *Loi sur le Bâtiment* (Code de Construction), art. 8.12 – installation of high-risk petroleum equipment;
 - Maintaining a register, certificate of conformity and permit under *Loi sur le Bâtiment* (Code de sécurité), arts. 114, 115 and 120 respectively – installation and operation of petroleum equipment (including high-risk petroleum equipment).
- c) Government of Newfoundland and Labrador
- Release under *Environmental Protection Act*, art. 56 or 67 for registered undertakings, and approvals under art. 78 for activities;
 - Approval under *Rail Service Act, 2009*, art. 4 for rail service purchase, operation or construction, and permit under art. 12 for operation;
 - License under *Lands Act*, art. 6 – Crown land occupancy;
 - Permit under *Quarry Materials Act, 1998*, art. 5 – dig for, excavate, remove and dispose of quarry materials;

- Permit under *Forestry Act*, art. 27 – cut timber on or remove timber from Crown lands or public lands;
 - Permit under *Endangered Species Act*, art. 19 – activity affecting a designated species, the residence of a specimen of a designated species or critical or recovery habitat;
 - Approval under *Wild Life Regulations*, art. 31 – take away, destroy or interfere with a beaver dam, beaver house or food stored by a beaver.
- d) Kativik Regional Government
- Certificate of conformity under *Règlement relatif à l'application de la Loi sur la qualité de l'environnement*, art. 8. – to attest that project does not contravene any by-law of a municipality or Regional County Municipality.
- e) MRC de Caniapiscau
- Certificate of conformity under *Règlement relatif à l'application de la Loi sur la qualité de l'environnement*, art. 8. – to attest that project does not contravene any by-law of a municipality or Regional County Municipality.
- f) MRC des Sept-Rivières
- Certificate of conformity under *Règlement relatif à l'application de la Loi sur la qualité de l'environnement*, art. 8. – to attest that project does not contravene any by-law of a municipality or Regional County Municipality;
 - Permit under *Règlement relatif aux permis et certificats, aux conditions préalables à l'émission de permis de construction, ainsi qu'à l'administration des règlements de zonage, de lotissement et de construction numéro 06-92* – construction permit.

20.2 Baseline Data Collection and Environmental Impact Statement Status

The study areas of the Project overlap to a large degree with those of the TP (Figure 20.1). The mine site study areas are virtually the same, and the corridor for the new rail spur roughly parallels part of the LabMag ferroad corridor (~4 km apart at widest interval).

The existing access road from Schefferville to Goodwood constructed for TSMC's DSO project would be used, and a new road would be built from Goodwood to the Project mine site.

The pellet plant site for the Project at Pointe-Noire is proposed to be on land historically used for iron ore operations that belonged to by the Wabush Mines Joint Venture and Cliffs Quebec Iron Mining, and make use of existing infrastructure, all of which was acquired by the GoQ in March 2016 and is now managed by a special purpose entity called *Société ferroviaire et portuaire de Pointe-Noire*. Where possible, the Project would make use of existing infrastructure.

Intensive field seasons to collect biophysical baseline data for the TP were conducted in 2005-2006 and 2011-2012.

In spring 2015, a preliminary assessment was conducted of potentially outdated and missing biophysical data for the TP, based on an assumed timeline of tabling the TP EIS in spring 2017. The results identify some of the biophysical baseline data to be collected for the Project.

The biophysical baseline data for the KéMag mine site collected under the TP is directly relevant to the Project mine site, while the biophysical baseline data for the relevant portion of the LabMag ferroduct corridor and the pellet plant provide very useful regional data for the Project EIS.

The socio-economic environment of the Project is identical to that of the relevant study areas of the TP.

A list of likely stakeholders for the TP was prepared and can be adapted to the Project.

The research instruments (e.g., questionnaires, interview guides) for the TP's primary socio-economic data and compilation of data from secondary sources are virtually complete and are adaptable to the Project.

The archaeological and preliminary visual impact assessments for the KéMag mine site and pellet plant study areas are complete, as is the archaeological assessment for the relevant portion of the LabMag ferroduct corridor.

Drafting of the EIS for the TP had started. Chapters for the technical project description, legal and regulatory context, EA methodology and biophysical and secondary socio-economic baseline data were prepared and are to a large degree adaptable to the Project EIS.

20.2.1 Project Description

As previously discussed, the Project Description activates the various EA regimes.

A draft of the Project Description for the TP was submitted to the CEA Agency, the Major Projects Management Office and, because of the inter-provincial nature of the LabMag ferroduct, to the National Energy Board, all in March 2013. Relatively minor comments were received and addressed in a revised draft, which is also to a large degree adaptable to preparation of the Project Description.

20.2.2 Sustainability Assessment

A sustainability assessment tool prepared for the TP by SLE and could be adapted to the Project.

The tool could be applied to the Project at various stages of its design, starting with the feasibility study stage and then following the various stages of the public participation process. That approach would demonstrate to the concerned governments and the public how their input was taken into account. The results of the sustainability assessment would be included in the EIS. The sustainability tool would be applied throughout the construction, operation and decommissioning/rehabilitation phases.

20.2.3 EIS Submission Timetable

The Project Description could be submitted prior to initiating the collection of the remaining baseline data. The biophysical and secondary socio-economic baseline data would be collected within 12 months. The collection of the primary socio-economic data would start after tabling the Project Description and would be coupled with the public participation process (see Section 20.5.2).

The timelines for issuing EA guidelines vary according to the regulatory agency. Based on recent EAs, the CEA Agency's guidelines should be received within 60 days of the decision to require an EA (which would follow a regulatory 45-day period for the review of the Project Description) following receipt of a satisfactory Project Description.

The timeline for the issuing of the Kativik Environmental Quality Commission ("KEQC") guidelines is expected to be longer. Based on recent EAs of similar projects, a six-month timeline from tabling the Project Description appears probable.

The timeline for the issuing of the GoNL guidelines is expected to be roughly similar to that of the KEQC.

The GoQ is expected to issue generic guidelines for the components south of the 55th parallel of latitude assessed pursuant to the regime of general application within one month of the tabling of the Project Description.

Delays in receipt of the guidelines should not materially delay the completion of the EIS, since analysis of other recent guidelines for mining and rail projects permits confident predictions of the contents of the guidelines for NuTac.

Taking into account the involvement of the stakeholders in the preparation of the EIS, it is estimated that the EIS would be tabled 15-18 months following the submission of the Project Description.

Table 20.2 provides the tentative timeline for the tabling of the EIS.

Table 20.2 – Timeline for EIS Tabling

Activity	Months
Project Description Tabling	0
Guidelines from CEA Agency, KEQC, GoQ, GoNL	6
Completion of Baseline Studies	12
EIS Tabling	15 to 18

20.2.4 Post-EIS Submission Timetable

The CEA Act 2012 provides a "government" timeline (i.e., the government "clock" is stopped when the government is awaiting information from the proponent) of 365 days for EAs

(including the Minister’s decision), unless there is a panel review, in which case the timeline is 24 months (also including the Minister’s decision). It is not anticipated that the Project would be subject to a panel review.

The timeline for EAs under the JBNQA regime is estimated to be longer than that under the CEA Act 2012 in terms of “government” time following the tabling of an acceptable EIS.

The timeline for EAs under the GoQ regime of general application can be estimated to be roughly 15 months of “government” time following the tabling of an acceptable EIS. At this stage, NML assumes that the timeline pursuant to the GoNL regime would be roughly the same as that for the GoQ regime.

The tentative timeline for releases from EA is presented in Table 20.3.

Table 20.3 – Timeline for EA Releases

Activity	Month
EIS Tabling	0
Receipt of Questions from Regulators (CEA Agency, KEQC, GoQ, GoNL)	6
Submission of Responses to Questions on EIS	9
Acceptance of EIS by Regulators	12 to 15
Public Hearings (KEQC, BAPE)* and CEA Agency EA Report	18 to 21
Issuing of EA Releases and Conditions of Release	21 to 24

*Assumes no hearing pursuant to the GoNL EPA

20.3 General Socio-Political and Institutional Setting

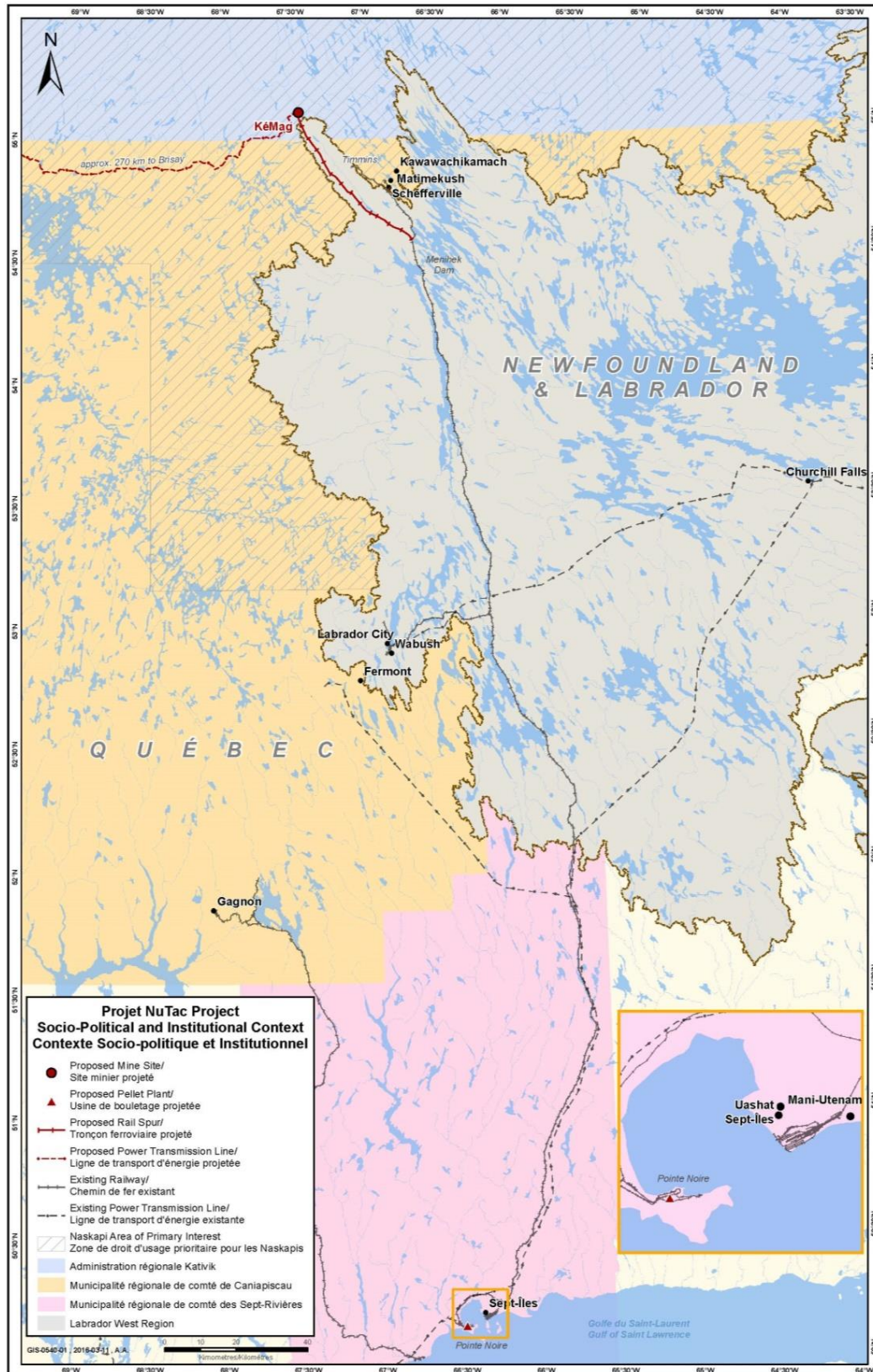
Figure 20.2 shows the location of the Project within the general socio-political and institutional context.

The KéMag Deposit is entirely located in Québec north of the 55th parallel of latitude, in the "Region" defined in Section 23.1.8 of the JBNQA.

Furthermore, it is located within the "Territory" defined in Section 1.16 of the JBNQA. More specifically, it is located in the Naskapi Area of Primary Interest defined in Paragraph 24.13.3A. Within that area, the Naskapi can fully exercise their rights to hunt, fish, trap and operate outfitting camps, as provided for in Section 24 of the JBNQA and Section 15 of the *Northeastern Québec Agreement* ("NEQA").

Under Paragraph 24.13.7B(b) of the JBNQA, the Inuit have a restricted right to hunt caribou in the immediate vicinity of the Deposit. Based on our knowledge to date, the Inuit have never exercised that right.

Figure 20.2 – Socio-Political and Institutional Context



The mine site is located on Category III lands as defined in Sub-section 1.6 of the JBNQA. Category III lands are public lands, and any duly authorized proponent has the right to develop lands and their resources. The hunting, fishing and trapping rights of the beneficiaries of the JBNQA and of the NEQA are subject to that right, but the proponents are subject to the environmental protection regimes, an explicit purpose of which is to protect the right to harvest.

Under Schedule A of Chapter II of the LQE, the proposed mine site is automatically subject to the environmental and social impact assessment and review procedure contemplated in articles 187 to 204 of the LQE, as well as to the *Règlement sur l'évaluation et l'examen des impacts sur l'environnement et le milieu social dans le territoire de la Baie James et du Nord québécois*. That procedure is the Québec legislative expression of the regime instituted in Section 23 of the JBNQA.

The proposed mine site would also be subject to federal EA pursuant to article 16(a) of the *Regulations Designating Physical Activities*, in the light of the planned rate of production.

The mine site is situated adjacent to the northern limit of the Région administrative de la Côte-Nord in the Province of Québec and, therein, the northern edge of the Municipalité régionale de comté ("MRC") de Caniapiscau.

Three of the communities that would be directly affected by the mine site are located in the MRC de Caniapiscau and ~50 km south-east of the site: the Ville de Schefferville; the Naskapi community of Kawawachikamach; and the Innu reserves of Matimekush and Lac John, which for present purposes are treated as a single community.

The Innu of Uashat and Mani-Utenam, also treated as a single community herein, represented by ITUM in the MRC des Sept-Rivières on the North Shore, also use the area of the Deposit.

The Project area is covered by the Saguenay Beaver Reserve registered traplines, the majority of which belong to Innu from Matimekush-Lac John and Uashat mak Mani-Utenam.

The proposed pellet plant would be located in the Ville de Sept-Îles, which forms part of the MRC des Sept-Rivières. At the planned production rate, it would be subject to federal EA pursuant to article 16(b) of the *Regulations Designating Physical Activities*, as well as to provincial EA pursuant to article 2n.8) of the *Règlement sur l'évaluation et l'examen des impacts sur l'environnement*.

Along with the Ville de Sept-Îles, the Innu of Uashat mak Mani-Utenam would be directly affected by the pellet plant at Pointe-Noire.

The majority of the rail spur would be located in Labrador West, a sub-division of one of the nine regions that comprise the Province of Newfoundland and Labrador.

The proposed rail spur, being more than 32 km long in a new right-of-way, would be subject to federal EA under article 25(a) of the *Regulations Designating Physical Activities*. The portion of the spur in Québec would also be subject to EA under Section 23 of the JBNQA, since railways

are automatically subject to EA under Schedule A of Chapter II of the LQE. The section in Labrador would be subject to EA under the GoNL legislation, since article 35.(4)(g) of the *Environmental Assessment Regulations, 2003* stipulates that the construction of a new railway line must be registered.

The nearest Labrador-based communities are the municipalities of Labrador City and Wabush, both of which are located ~250 km south of the Project area.

20.4 General Environmental Setting

The Project area is located in the Taiga Shield ecozone (NRCan, 2016), which has a continental subarctic climate characterized by long cold winters and short cool summers.

Historical and present-day data are available from Environment Canada's "Schefferville A" meteorological station, which is located near the Schefferville airport, ~55 km south-east of the KéMag mine site. Section 5.2 presents historical data and daily mean temperature averages.

Ambient air quality baseline data were collected at the LabMag site (~30 km south-east) in 2006; they are generally representative of conditions at the KéMag site. The results show that the ambient air corresponds to a non-industrialized area, as the parameters measured generally met the applicable standards, often by significant margins.

Baseline ambient noise data were collected at the KéMag mine site in 2011 via 24-hour monitoring (SLE, 2011a). The results show that the ambient noise levels correspond to a non-industrialized area.

The terrestrial ecosystem mapping (SLE & GHI, 2013) indicates that the soils in the mine site area are primarily composed of morainal till. Organic terrain with peat material underlies some of the areas adjacent to the lakes, while sandy alluvial plains characterize several streams and their riparian zones. Patches of bedrock are exposed across the site; bedrock is commonly found within 0.5 m of the surface, the exceptions being in areas adjacent to the Goodwood River, where depths of more than 10 m are seen where the pit will be located. The proposed rail spur corridor is generally characterized by a till veneer with locally exposed bedrock. Bedrock exposure decreases southward towards Menihek Dam. Congruently, there is an increase in the thickness and coverage of morainal deposits (Gartner Lee & GHI, 2007).

Soil quality analyses were conducted during the geochemical characterization of the KéMag mine site on 18 samples. The results were compared to the MDDELCC's industrial criteria and background levels of its "*Politique de protection des sols et de réhabilitation des terrains contaminés*" (Soil Protection and Rehabilitation of Contaminated Lands Policy) for the Labrador trough. The results show that the site has not been contaminated by anthropic (i.e., human) activity.

A hydrogeological reconnaissance of the KéMag mine site conducted in 2011 identified an artesian borehole near Lac Harris and two springs at the northern extremity of the site (SLE, 2011). A preliminary hydrogeological characterization of the mine site was done in 2012. The

results were compared with the MDDELCC's "*Aux fins de consommation*" (drinking water ("DW")) and "*Résurgence dans les eaux de surface ou infiltration dans les égouts*" (Seepage into Surface Water or Infiltration into Sewers ("SSWISS")) criteria. Given that the site has not been contaminated by anthropic activity, the results suggest that concentrations exceeding the criteria are representative of the biophysical context of the area. The hydrogeological modelling has yet to be done.

The Goodwood River is the principal watercourse in the mine site area. It is fed by several streams on both sides of the valley and flows through a series of elongated lakes surrounded by large wetlands. It is part of the Caniapiscau River watershed, which flows northerly to Ungava Bay over a distance of 800 km.

Lac Harris is the principal waterbody at the KéMag mine site. It measures ~5.3 km by ~1.5 km (~386 ha) and its maximum depth is ~5.1 m. Lac Harris and the adjacent Lac de la Frontière (~174 ha), located upstream, constitute the head of the watershed.

Lac Harris would be directly affected by the Project. The other directly affected lakes would be Gillespie A (~155 ha), des Foreurs (~50 ha) and Otta (~6 ha). Figure 20.3 shows the waterbodies in question.

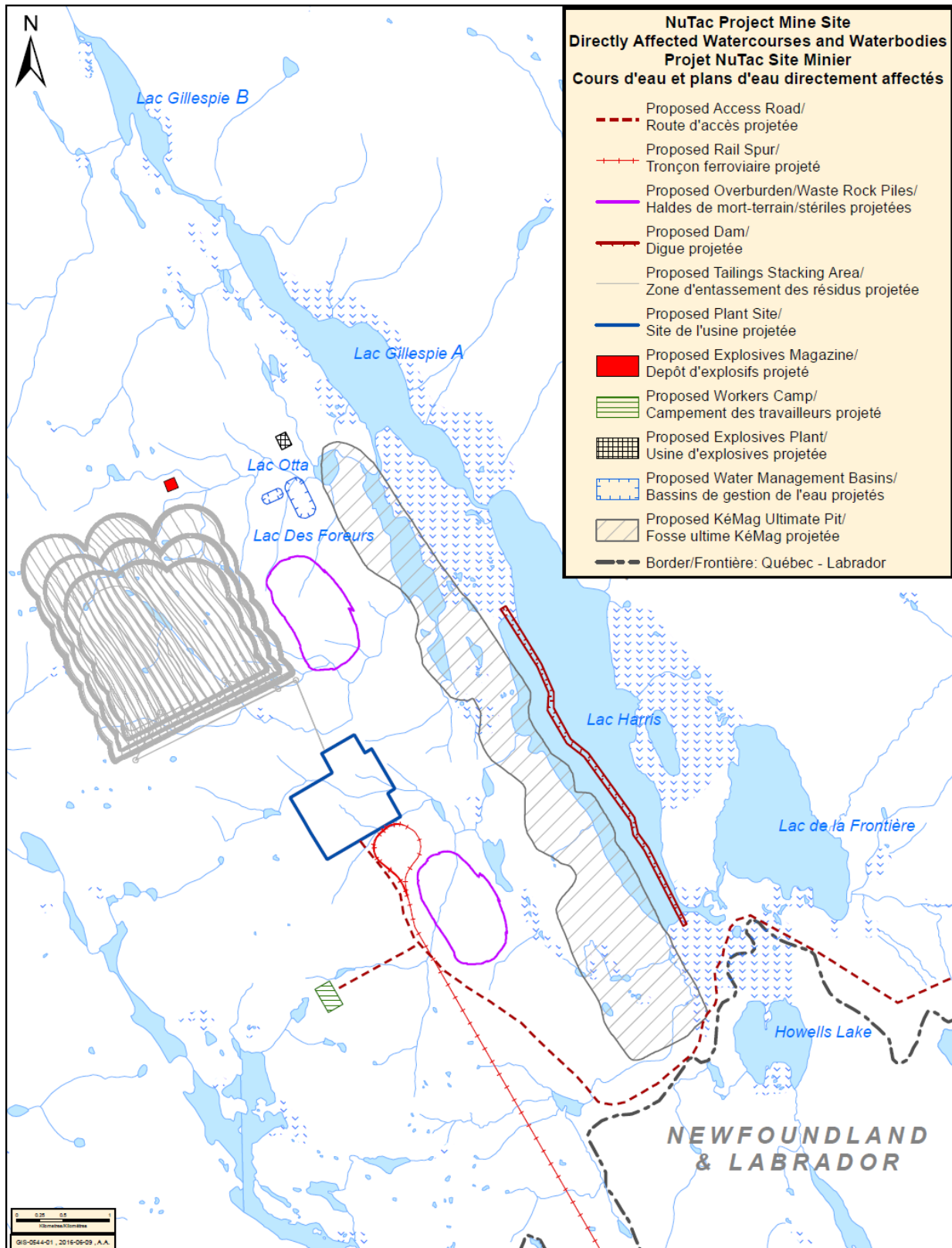
The 2011 aquatic field program (SLE, AMEC & GHI, 2011) showed that the lakes are shallow and clear. With the exception of Gillespie A, which has a largely fine and sandy substrate, lake substrate is dominated by boulders and cobble. Water quality is similar in the lakes that would be directly affected, with temperatures ranging between 4°C to 8°C, near-neutral pH, low conductivity and fairly high dissolved oxygen.

Surface water and sediment quality sampling was carried out in Harris, Gillespie A, des Foreurs and Otta lakes for their general physico-chemical parameters (e.g., suspended matter, ions, hardness), metals and polycyclic aromatic hydrocarbons ("PAHs") (water quality testing for PAHs involved only Lac Harris). The results (SLE, AMEC & GHI, 2011) were compared to the MDDELCC criteria (protection of aquatic life: chronic effect) and the Canadian Council of Ministers of the Environment ("CCME") guidelines for the protection of aquatic life, including Interim Sediment Quality Guidelines ("ISQG") and Probable Effects Levels for protection of aquatic life-freshwater ("PEL").

Lac Lespinay (north-east of Lac Harris) was sampled in 2012 as the control lake for surface water and sediment quality (SLE, AMEC & GHI, 2012). Additionally, in 2011 and 2012, surface water was collected in four streams and analyzed for most of the water quality parameters measured in the lakes (SLE, AMEC & GHI, 2011; 2012).

Hydrological field investigations conducted on the mine site in 2011-2012 included the installation of hydrometric stations (SLE, 2014).

Figure 20.3 – Directly Affected Watercourses and Waterbodies



The KéMag Deposit and the proposed rail spur corridor are located predominantly in the Mid-Subarctic Forest ecoregion of the Taiga Shield ecozone, while a small part of the Deposit lies in the High Subarctic Tundra. Extensive mosaics of fens and bogs are commonly observed in the Mid-Subarctic Forest ecoregion. The High Subarctic Tundra ecoregion contains small areas of wetlands on thin organic soils, usually located in depressions and around lakes. Black spruce (*Picea mariana*), White spruce (*Picea glauca*) and tamarack (*Larix laricina*) are the dominant tree species (SLE, 2015a,b).

Large-leaved avens (*Geum macrophyllum* var. *perincisum*), a species likely to be designated threatened or vulnerable in Québec (no designation federally), was observed during the 2012 inventory in the KéMag Deposit area. Three other plant species likely to be designated threatened or vulnerable in Québec are potentially present in that area: Allen's buttercup (*Ranunculus allenii*), Sickle leaved fork moss (*Kiaeria falcata*) and Compact rustwort (*Marsupella condensate*) (SLE, 2015a). No plant species with special status was observed during the 2006 and 2012 inventories in the northern part of the LabMag ferroad corridor (SLE, 2015b).

Aerial surveys specifically targeting caribou were conducted annually from 2009 to 2012 in an area encompassing a large radius centered near Schefferville, including the KéMag Deposit and the rail spur corridor (D'Astous and Trimper, 2009, 2010; GHI 2011, 2012). The 2009 survey noted the presence of migratory caribou (*Rangifer tarandus caribou*), as did an aerial winter land-use survey in 2006 (Minaskuat, 2008a).

The caribou population in the Schefferville region has declined considerably since around 2006 (Clément 2009a,b). Forest ecotype (sedentary) caribou was not observed during any of the aerial surveys; its range (ÉRCFQ, 2013; GoNL, 2013; Environment Canada, 2012) lies outside the Schefferville region.

Incidental observations of other species of large fauna during aerial surveys conducted in 2003, 2006 and annually from 2009 to 2012 include moose (*Alces alces*), albeit sparingly, and Black bear (*Ursus americanus*) (D'Astous and Trimper 2009, 2010; GHI, 2011, 2012; Girard, 2003; Minaskuat, 2008a).

Only bats of the genus *Myotis* were identified in the LabMag Deposit area, situated ~20 km south-east of the KéMag Deposit (Brunet and Duhamel, 2005). These species are designated as endangered federally but are not at risk pursuant to GoQ legislation. There were no sampling points for bat surveys in the northern part of the LabMag ferroad corridor (Brunet, Duhamel and Léger, 2008).

Field work confirmed the presence of six small mammals in the KéMag Deposit area in 2012 (SLE, 2015a): Common shrew (*Sorex cinereus*), American water shrew (*Sorex palustris*), Northern bog lemming (*Synaptomys borealis*), Southern red-backed vole (*Myodes gapperi*), Meadow vole (*Microtus pennsylvanicus*) and Meadow jumping mouse (*Zapus hudsonius*).

Inventories carried out in 2006 in the relevant portion of the LabMag ferroad corridor confirmed the presence of four additional small mammal species (Genivar, 2011): Heather vole

(*Phenacomys ungava*), Rock vole (*Microtus chrotorrhinus*), Common vole (*Microtus arvalis*) and Pygmy shrew (*Sorex hoyi*). The literature and 2005-2006 field work in the LabMag Deposit area show the potential presence of three additional species in the KéMag Deposit area and the rail spur corridor (SLE, 2015b): Star-nosed mole (*Condylura cristata*), Ungava collared lemming (*Dicrostonyx hudsonius*) and Woodland jumping mouse (*Napaeozapus insignis*).

According to the literature, 18 and 23 species of furbearers are potentially present in the area of the KéMag Deposit and the northern part of the LabMag ferroduct corridor respectively, while 15 and 20 species of furbearers were inventoried therein respectively (SLE, 2015a,b). Many of them are hunted/trapped by the Naskapis and the Innu, including Snowshoe hare (*Lepus americanus*), porcupine (*Erethizon dorsatum*) and American marten (*Martes americana*) (Clément 2009a; Weiler 2009a,b). No furbearing species at risk are potentially present in the area.

Although the distribution of wolverine (*Gulo gulo*) overlaps with the Project site, this species has not been spotted in Québec or Labrador since 1978 and 1950 respectively (COSEWIC, 2003). Analyses conducted on the hairs found on the baiting stations installed as part of the 2006 LabMag baseline data collection were negative for wolverine (Genivar, 2011). The wolverine Eastern population (Québec and Newfoundland and Labrador) is listed as endangered pursuant to federal and GoNL legislation and threatened under the GoQ legislation.

Many bird species were surveyed in 2011-2012 in the vicinity of the KéMag Deposit: 24 species of waterfowl and aquatic birds, 39 species of terrestrial birds and eight raptor species. Of those numbers, 16 aquatic, 32 terrestrial and four raptor species were considered potentially or confirmed breeding birds (SLE, 2015a). Bird species observed in the northern section of the LabMag ferroduct corridor in 2006 did not reveal any new species that were not already present in the KéMag Deposit area (Minaskuat, 2008a,b).

Six at-risk bird species were observed during inventories at the KéMag Deposit area and in the northern portion of the LabMag ferroduct corridor (SLE, 2015a,b).

According to the Atlantic Canada Conservation Data Centre, Barrow's goldeneye (*Bucephala islandica*) (not observed during surveys) might use the northern part of the LabMag ferroduct corridor (SLE, 2015b). It is designated at the federal level (special concern) and pursuant to the GoQ and GoNL legislation (vulnerable).

The northern limit of the ranges for reptiles is south of the Project area; no reptiles were observed during field work. The literature identifies three amphibian species as potentially present in the Schefferville region (SLE, 2015a): American toad (*Anaxyrus americanus americanus*), Wood frog (*Lithobates sylvatica*) and Mink frog (*Lithobates septentrionalis*). Of them, only Wood frog was observed at the KéMag Deposit during the 2012 survey, while all three were observed during the 2005-2006 field work at the LabMag Deposit and in the northern section of the ferroduct corridor (Brunet and Duhamel, 2005; Genivar, 2011). None of them is at risk either provincially or federally.

Nine species of fish were captured during the 2011 and 2012 surveys in the KéMag Deposit area, the dominant ones being Brook trout (*Salvelinus fontinalis*) and Lake chub (*Couesius plumbeus*) (SLE, 2015a). No at-risk fish species (either federally or provincially) was inventoried, nor potentially inhabits the area.

There are no protected areas in or adjacent to the Project area.

An archaeological study of the KéMag mine site conducted in 2007 consisted of two components (Arkéos inc., 2008): a pre-drilling archaeological inspection of drill and field camp sites; and an archaeological potential study. All the test-pits were negative, except for two sites (known as GgDu-1 and GgDu-2, located on the shores of Lac Gillespie and Lac Harris respectively), which revealed traces of human occupation. Those sites were protected from drilling or any other activity. In 2013, a complete on-site field survey of those sites was conducted (Artefactuel, 2013). The zones were sampled extensively, and no archaeological material was found. Artefactuel (2013) concluded that the zones in question do not have any archaeological potential and no longer need to be protected for archaeological purposes.

The 2007 potential study identified three other areas of archaeological potential in the immediate Project area: one on western shore of Lac Harris and two on the western shores of Lac Gillespie A and Lac Gillespie B. Arkéos inc. (2008) recommended that an archaeological field survey be conducted on them before any drilling or mining activity occur thereon.

Literature reviews and biophysical baseline data collection were carried out for the TP pellet plant location at Pointe-Noire. Given that the NuTac pellet plant is proposed to be on a brownfield site a few kilometres away, the TP biophysical environment is not summarized for the pellet plant component as part of the PFS.

20.5 Aboriginal Groups and Public Participation

20.5.1 Status of Land-Claims Settlements/Negotiations in Potentially Affected Areas

Based on land claims and currently available land use data, the potentially concerned Aboriginal groups for NuTac are Naskapi Nation of Kawawachikamach (“NNK”), Nation Innu Matimekush-Lac John (“NIMLJ”), Innu Takuaihan Uashat mak Mani-Utenam (“ITUM”), Inuit of Kuujuaq, Innu Nation and NunatuKavut Community Council (“NCC”).

In April 2016, the Supreme Court of Canada rendered the *Daniels decision* respecting Métis and non-status Indians. This is a very recent decision and its implications on the Project as it relates to the North Shore Métis should be evaluated going forward.

It is proposed to enter into a Memorandum of Understanding (“MOU”) with each of the Aboriginal groups that may be affected by the Project as soon as practicable.

The MOUs would serve to reassure the Aboriginal groups that NML intends to provide a mechanism of communication and consultation leading to the negotiation of Impact and Benefits Agreements (“IBAs”) with the aboriginal groups.

It is noteworthy that TSMC's DSO project has over the past few years concluded IBAs or similar agreements with five of the six Aboriginal groups that would be concerned by the Project.

20.5.2 Public Participation Process

The target communities for public participation have been grouped by local and regional study areas for the potentially directly and indirectly affected communities respectively, as follows:

- Local Study Area 1 (Schefferville-Menihek area): Kawawachikamach, Matimekush-Lac John, Ville de Schefferville;
- Local Study Area 2 (Sept-Îles area): Uashat/Mani-Utenam, Ville de Sept-Îles;
- Regional Study Areas: Kuujuaq, Sheshatshit, Happy Valley Goose Bay/North West River, Labrador City/Wabush.

A preliminary draft of a public participation process has been prepared for the TP and can be adapted to the Project. Its thrust is to create spaces for respectful and productive dialogue with the interested parties in order to:

- Exchange on the issues raised by the Project;
- Share in an open, mutual and inclusive way the limits, needs, expectations and concerns of all parties, including NML;
- Gradually build a common understanding of the Project;
- Propose and develop a better Project, one that is economically feasible, socially acceptable and environmentally responsible.

The major steps of the process are the following: internal preparation; tabling the Project Description; consultation on the EIS; public hearing (if any); and post-authorization follow-up. Objectives and activities for each major step have been detailed.

The preparation of some of the tools that would be employed as part of the public participation process has started under the TP, and that work can be adapted to the Project. The tools include a micro website, questions and answers, a Project Description synopsis, a summary of the EA processes, a summary of the public participation process, fact sheets and posters, evaluation forms, etc.

20.5.3 Social Acceptability and Social Initiatives

Open-mindedness, transparency, respect, trust and accountability are keys to gaining social acceptability. The public participation process and the initiatives described below are some of the measures designed to enhance the efficient attainment of social acceptability.

From the outset, NML has striven to create and maintain a harmonious relationship with all the Aboriginal and other groups that may be affected by its activities.

The most important achievements to date include:

- Scholarship program for secondary students in several Aboriginal communities;

- Financial support for the Inuit Youth Mining Education Strategy;
- Summer employment of Native students and training in geological exploration techniques;
- Popular-language summaries of technical reports;
- Information/consultation sessions with local governments and populations;
- Toll-free telephone number for questions and complaints;

NML is committed to ensuring the sustainable development of its activities. It is also committed to ensuring that its activities will drive the socio-economic regeneration of the entire area and to structuring the Project in such a way as to provide the concerned Aboriginal groups with the opportunity to continue to live sustainably in their traditional lands for generations to come.

20.6 Anticipated Impacts

The Project is expected to impact positively as follows:

- Contribution to labour market through hiring of employees and awarding of contracts for construction and operations;
- Contribution to GDP of various governments;
- Contribution to government revenues through royalties and taxes;
- Indirect and induced economic impacts locally, regionally and nationally, especially with respect to renewal of the Schefferville/Menihek region and industrial activity and logistics in Québec's North Shore Region;
- Contracts, training and jobs to local and regional Aboriginal groups;
- Benefits through IBAs to their Aboriginal signatories;
- Contribution to revenues of Tshiuetin Rail Transportation Inc., owned collectively by NNK, NIMLJ and ITUM (other Aboriginal-owned companies from which services would be sought include Air Inuit, Pétroles NaskInnuK, Naskapi Heavy Machinery, etc.).

At the same time, NML has mitigation plans for other expected Project impacts as discussed below.

A mine development on a greenfield site, as proposed by the Project, involves the removal of natural habitat and the transformation of land to an active industrial site for the duration of the mine. The Project layout seeks to avoid sensitive areas, such as watercourses, waterbodies and wetlands, as much as possible.

The rail spur would also be built on a greenfield site with a corridor over ~80 km by ~100 m. Its routing is aimed at servicing not only the Project's installations, but also the potential future development of other deposits in the area.

Further foreseeable impacts, such as on the physical, biological and social environments, have been preliminarily assessed and are subject to modification as the Project evolves in the feasibility study phase and the EIS is prepared. Many of the impacts would occur primarily during construction and/or operations and would diminish significantly or cease after decommissioning.

It is anticipated that all the potentially adverse impacts can be mitigated to a satisfactory degree. Doing so would require the implementation of large-scale and long-term mitigation, compensation, monitoring, follow-up, contingency, adaptive management and progressive/final rehabilitation/closure measures.

Some of the standard mitigation measures that would be applied are described in other sections (e.g., water management at the mine and pellet plant sites in Sections 16.2, 18.1.5, 18.1.12 and 18.3.4; sewage, sanitary and contaminated waste management in Sections 18.1.13 to 18.1.14; and air emissions and dust control in Sections 16.4.7, 17.6.4, 18.1.7 and 18.3.6).

The pellet plant would be built on the already industrialized Pointe-Noire site and would use some of the existing infrastructure and facilities, thus reducing its potential negative impacts. Some of the biophysical ecosystem components that could be affected include groundwater and surface water quality, local hydrology, ambient air quality and acoustics.

In terms of the social environment, it is expected that most of the pellet plant workers would come from the Sept-Îles area, and there would not, therefore, be a large work force predominantly from the outside with the risk of associated social impacts as in lesser developed areas.

20.7 Geochemical Characterization of Waste Rock and Tailings

A preliminary waste rock and tailings characterization program was undertaken in 2014 to evaluate the metal-leaching and acid-generation potential of these materials from the KéMag Deposit. The program included static acid base accounting tests, trace metal content and static leaching tests (SNC-Lavalin Inc., 2015).

Some samples of waste rock from the Menihék Shale unit showed a potential for acid generation and metal leaching, but most of them were neutral and not leachable. At this stage, it is assumed that very little or no waste rock will be mined as part of the Project. Nonetheless, further sampling/analysis would be conducted and a waste rock management program would be developed and implemented. Section 16.3 discusses the design of the waste rock piles.

A composite sample of process tailings produced from metallurgical tests was tested. The results showed that it was non-acid generating, while the potential for metal leaching was uncertain. Further characterization of the tailings would be carried out. Section 17.7 discusses the tailings disposal concept and operation.

20.8 Rehabilitation and Closure

A rehabilitation and closure plan is a requirement under the GoQ *Loi sur les mines*. It must be approved before the mining lease is issued, and a financial assurance to fully implement the plan must be provided in three payments in the first two years following the approval of the plan.

Three stages of rehabilitation/closure activities would occur over the life of the mine: progressive rehabilitation, rehabilitation/closure and post-closure monitoring.

Progressive reclamation would involve activities to reclaim, where possible, some parts of the tailings stacking areas, exhausted borrow pits, etc. Rehabilitation/closure would involve all activities after mining operations in accordance with the approved plan. Finally, monitoring would ensure that rehabilitation/closure has been done successfully. Once all these steps are completed to the satisfaction of the GoQ, the land could be returned to the Crown.

20.8.1 Proposed Approach

Rehabilitation/closure planning should be integrated early into the engineering of the Project, and its measures should be implemented progressively in order to reduce the mine's footprint and allow for the rapid re-establishment of biodiversity. Once the final layout and activities are known, a detailed plan will be prepared incorporating the following:

- Rehabilitate tailings stacking areas;
- Rehabilitate waste rock piles;
- Remove from the site all surface and buried pipelines;
- Remove power transmission lines, poles, substations, transformers and associated electrical infrastructure within Property boundaries;
- Remove buildings and other structures, including their foundations;
- Rehabilitate and secure open pits and quarries;
- Assess surface workings;
- Stockpile overburden, till and topsoil for use during progressive rehabilitation or final rehabilitation/closure;
- Reclaim roadways and other civil engineering works;
- Remove machinery, equipment and storage tanks;
- Rehabilitate landfill sites and other waste management areas; and
- Complete any other work necessary for final rehabilitation and closure.

20.8.2 Post-Closure Monitoring

The detailed post-closure monitoring program would be developed once the Project has been well defined and the specific rehabilitation/closure activities are known. It would span at least

five years after the final activities are completed. It should include at least the following aspects:

- Quality of all effluents;
- Stability of revegetation;
- Slope of the open pit, tailings pile, etc.;
- Inspection of any dam, ditch, etc.;
- Soils stability (control of erosion);
- Monitoring of surface water and groundwater quality.

20.8.3 Cost Estimate for Rehabilitation and Closure

A cost estimate for closure and rehabilitation is provided in Section 22.2.1.

21.0 CAPITAL AND OPERATING COSTS

21.1 Capital Costs

The NuTac capital cost estimate (NuTac Capex) is based on the capital cost prepared for the Taconite Project. The TP Capex was finalized in February 2013 and was prepared by a number of consultants under the supervision of Innu SNC-Lavalin Limited Liability Partnership (ISLLP).

The Taconite Project Capex is based on a higher concentrate and pellet production and on the concentrate transportation in a buried slurry pipeline.

NML has prepared the current NuTac Capex with cost adjustments based on design improvements adopted. The NuTac Capex is shown in Table 21.1. The main changes in the Project scope include:

- the reduction of capacity from 23 Mtpy of pellets and concentrate to 9 Mtpy of pellets;
- two smaller semi-mobile in-pit crushers instead of one fixed crushing plant with two gyratory crushers and conventional truck hauling;
- management of tailings by filtration and dry stacking method in lieu of conventional tailings dams;
- use of the existing railway system with an extension of 80 km in lieu of a slurry pipeline;
- re-use of as many of the existing port facilities rather than construction on a greenfield site (port terminal handling contracted to a common service provider); and
- pellet plant built on former Cliffs land now belonging to Government of Québec.

NML obtained additional pricing from suppliers to verify current pricing to February 2016.

The NuTac Capex was developed on the assumed basis of a number of EPCM contractors that will provide the design, procurement and construction management activities for their respective areas of the Project. All EPCM contractors would be managed by the Owner's Team.

This NuTac Capex qualifies as an American Association of Cost Engineers ("AACE") Class IV estimate. The intended accuracy of this PFS is $\pm 25\%$. Although some individual elements of the estimate may not achieve the target level of accuracy, and others may exceed the level of accuracy, the sum of all estimate elements falls within the parameters of intended accuracy.

Table 21.1 shows a high level summary of the estimated direct and indirect capital costs.

Table 21.1 – NuTac Capex Summary ('000s)

Cat	Area	Direct	Indirects / Contingency	Total Cost
1000	Mine Area	149,793	Incl	\$149,793
2000	ROM Crushing, Storage and Reclaim	162,607	65,043	\$227,650
3000	Concentration (Grinding, Separation & Upgrade)	372,596	149,038	\$521,634
4000	Tailings Disposal and Water Management	152,919	61,168	\$214,087
5000	Train Load out, Concentrate Drying and Rail	284,286	113,714	\$398,000
	Rail Cars	108,000	Incl	\$108,000
6200	Pellet Plant (Outotech Package)	618,550	204,121	\$822,671
8100	Infrastructure and Utilities – Mine Site	188,304	75,322	\$263,626
	Powerline to Mine Site	303,000	Incl	\$303,000
8200	Infrastructure and Utilities – Pellet Plant and Port	84,569	27,908	\$112,477
	Owner's cost	0	98,628	\$98,628
	Total Costs	2,424,624	794,941	3,219,566

21.1.1 Basis of Estimate

The capital cost estimate covers the facilities included in the scope of work described in the previous sections.

The estimated capital cost is based on the following key assumptions:

- The estimate is expressed in Q1-2016 Canadian dollars;
- Exchange rates as shown in Table 21.2;
- The proposed construction work week is on the basis of 60-hours with rotations of 21 days in followed by seven (7) days out [travel during the seven (7) days out];
- Allowance for industrial dispute or lost time arising from industrial actions is excluded;
- Environmental permitting is included in owner's cost;
- All taxes and duties are included;
- Escalation is excluded;
- No allowance is made for acceleration or deceleration of the Project schedule;
- Project insurance is included in Owner's cost;
- Marketing, legal and costs for financial consulting are included in Owner's cost.

The Project schedule is presented in Section 24.0 and the NuTac Capex associated with the schedule is based on an advance period whereby the design concepts are frozen and basic engineering commences. The work would then continue through its life-cycle until the end of construction and commissioning.

21.1.2 Currency

The NuTac Capex base currency is Canadian dollars and consists of items quoted in various foreign currencies that have been converted into Canadian dollars using exchange rates as of February 2016.

The vast majority (84%) of pricing for labour, equipment and bulk materials are based on Canadian sourcing and dollars. Table 21.2 shows the currency exchange rates and the estimated percentages content in different currencies and the percent content of costs for each of the listed currencies.

The impact of currency exchange difference between the TP Capex base date of February 2013 and the NuTac Capex of February 2016 is a relative increase of 3.8% because of the Canadian Dollar devaluation.

Table 21.2 – NuTac Currency Exchange Rates and Percent Content

Currency Code	Currency Name	Canada	Percent Content
CAD	Canadian Dollar	1.00	84%
USD	US Dollar	1.35	10%
EUR	Euro	1.50	6%

21.1.3 Cost Estimation Methodology

a) Cost Scaling

Each of the Project element included in the Taconite Project estimate has been adjusted to reflect the NuTac Project scale where the project concepts remained similar. Where multiple lines were necessary to perform a process step, the cost was adjusted linearly with the proportional number of lines and equipment required. The buildings were scaled by comparison of footprint area.

When a single operation line was sufficient, the new cost was scaled down using a production capacity factor as in equation 1 below.

$$C_{NuTac} = \left(\frac{P_{NuTac}}{P_{TP}} \right)^{0.65} \times C_{TP} \quad \text{Eq. 1}$$

Where

C_{NuTac} = New cost for the NuTac Project

P_{NuTac} = Production capacity for the NuTac Project

P_{TP} = Production capacity for the TFS

C_{TP} = Estimated cost from the TFS

The cost developed by ISLLP during the TFS incorporated material take-offs, labour crew rates based on the Québec Labour collective agreement for North of 55th parallel, man-hours and productivity factors for local conditions.

b) Mine Equipment

A new 25-year mine plan was developed for the NuTac Project to determine the mining rates as well as the mine sequence. This was used to evaluate the required amount of equipment to meet the production schedule. New quotes for the major mining equipment were received and used to develop the mine equipment estimate. The mine equipment costs are capitalised.

c) Power Transmission Line

The capital cost for the high-voltage transmission line from Hydro-Québec's grid to the mine site was estimated using a cost of 1.5 M\$/km less the applicable credits for the subscribed power capacity.

d) Product Handling

i) Train Spur Line and Concentrate Loadout

The cost of constructing the new rail spur connection between TSH and the KéMag mine site was estimated using a factor of \$4 Million per kilometer. This rail line is 80 kilometers long.

In addition to the rail spur, a rapid train loading system will be needed to load the railcars with concentrate. The rail loop and rail loading system will include the concentrate storage shed and the concentrate reclaim system. There will also be sidings at the mine to receive the bulk commodities and the general freight required during operation.

The concentrate transportation will require five (5) complete sets of railcars and the locomotives to haul the concentrate to the port. These have been priced based on recent experience in the DSO project with the appropriate escalation.

The rolling stock is capitalized for the economic evaluation although leasing is preferred.

ii) Port Infrastructure

With the recent acquisition by the Government of Québec of the Cliffs assets in Pointe-Noire, NML assumed that the existing systems will be available to unload the railcars and to store the pellets prior to ship-loading. An allowance is included in the estimate to upgrade some of the systems in the existing yard and tie-in the existing rotary car dumper to the pellet plant concentrate storage and the new pellet plant to the storage yard. The allowance also considers yard upgrades to provide an efficient link to the new multi-user dock.

Use of existing facilities, possibly upgraded in some cases, and on a leased basis, such as buildings, repair shops, fuel storage, power supply, water supply, sewage treatment facility, water run-off treatment, will further reduce Capex costs.

iii) Ship Loading

The ship loading does not need any investment. This will be provided as a multi-user service. The ship loading will be done through the new multi-user dock for which NML is a partner and invested \$38 Million.

e) Indirect Costs

The lumped indirect costs for the NuTac Project have been estimated using the same proportion as in the TP Capex. The indirect costs are included in each Project area cost as applicable. A factor of 40% of the total direct cost was used for the mine construction activities and will cover the following costs:

- Construction field indirect costs;
- Construction camp;
- Freight to site, domestic and off-shore;
- Employee training and start-up;
- Vendor representatives;
- Spare parts and first fills;
- EPCM services;
- Contingency.

A factor of 33% of the total direct cost was used for the pellet plant and port construction activities as this will not be a camp construction.

21.1.4 Owner's Cost

The owner's cost are estimated at 3.5% of the total direct and indirect capital expenses for the project. This is included as a separate element. It excludes the feasibility study and

environmental studies as well as the EA releases related cost to be incurred in the next project phase.

21.1.5 Sustaining Capital

The sustaining capital includes multiple elements as follows:

- The on-going investment required for renewal of fixed processing equipment and buildings;
- The addition of new equipment for mine operation and renewal of equipment when they reach their useful life;
- The construction of the dam in Lac Harris for pit operation; and
- The addition of new equipment for tailings stacking operation.

The renewal of fixed processing equipment and building is calculated using a factor of 4% of mechanical equipment capital cost and 1% of building cost respectively each year. This represents a design life of 25 years in the case of the mechanical equipment while buildings mainly require general maintenance.

The mine equipment sustaining capital is calculated directly from the expected life of equipment where they are replaced. In addition, during the first years of operation, some additional units are added to the fleet to increase the mine capacity.

A dam will be built during the first 2 years of operation to protect the pit from the water in Lac Harris. The estimated cost of the dam is \$50 million.

Finally, the tailings stacking operation will necessitate some conveyors addition during the first few years of operation to increase the footprint of the storage facility to provide 25 years of storage capacity. This will be done progressively during the first 6 years of operation.

21.2 Operating Costs

Period-wise estimated unit cost variations, vis-à-vis the concentrate production, are shown in Figure 21.1. The Project achieves the full production capacity in Year 3 after the initial ramp-up in Years 1 and 2, when the production is 60% and 85% respectively.

Opex per tonne produced is higher during the early years when ramp-up to nameplate capacity is being achieved.

The summary of estimated annual operating costs by area is outlined in Table 21.3 for a life of mine period of 25 years.

The summary analysis of the Opex is presented in the following sections.

Figure 21.1 – Summary of Estimated Opex by Year

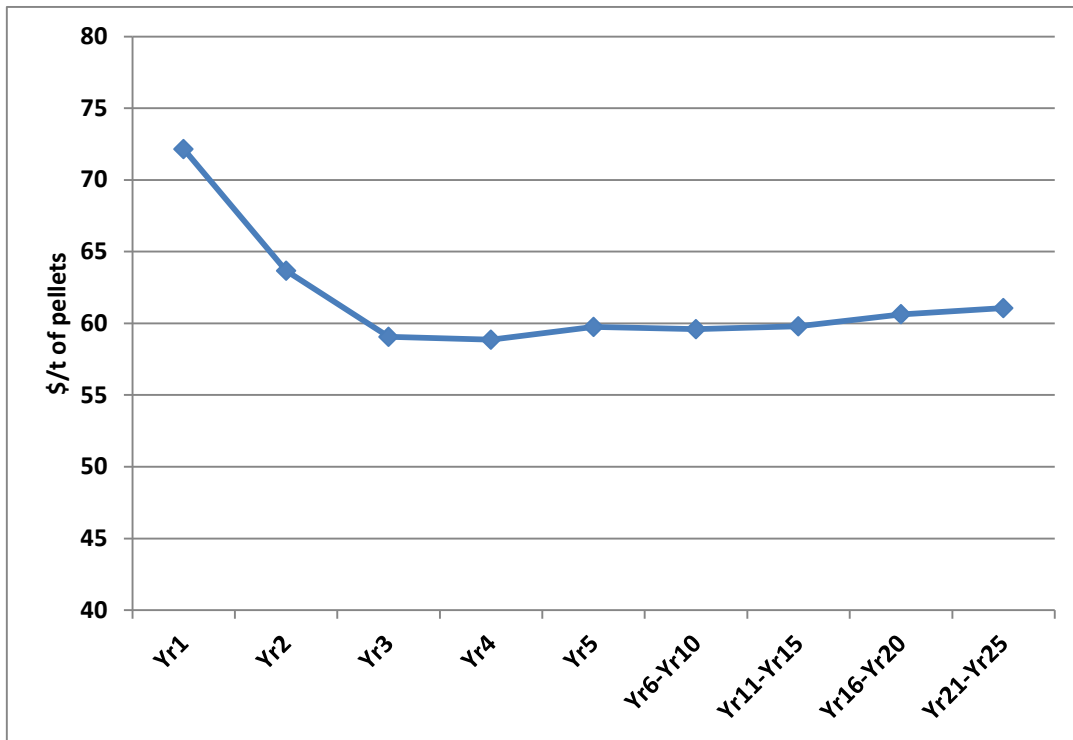


Table 21.3 – Summary of Estimated Opex by Area

Areas	Description	Unit Costs (\$)	Units
1000	Mine	8.46	per tonne of pellets
2000/3000/4000	Crushing, concentration and tailings management	11.27	per tonne of pellets
5000	Concentrate drying and Loadout	3.16	Per tonne of pellets
5000	Concentrate transportation	16.91	per tonne of pellets
6100/6200	Pelletizing plant	12.43	per tonne of pellets
6300/6600	Port operation	3.40	per tonne of pellets
8000	G&A and infrastructure	4.82	per tonne of pellets
Unit Cost for Pellets		60.45	per tonne of pellets
Note: IBAs cost not included in unit costs			

21.2.1 Accuracy of the Opex

The Opex presented is based on the estimated consumption of consumables, reagents, power and manpower, developed for the NuTac Project scale and mix of products. Maintenance

supplies cost factors were used for buildings. Vendor data were used where applicable for wear parts on major equipment, e.g. crushers, HPGRs, and grinding mills.

The Opex accuracy level is Class IV but it was developed with the previous TFS details and should have an accuracy close to $\pm 15\%$. The Opex has been updated with the latest flowsheet and equipment.

21.2.2 Basis of Estimate

The Opex was developed based on the following key assumptions:

- Production capacity of 9 Mtpy of pellets, of which 4 Mtpy will be BF pellets and 5 Mtpy will be DR pellets. The ratio of pellets/concentrate is 9:8.7 where 8.7 Mtpy of concentrate will produce 9 Mtpy of pellets;
- An assumed ramp up to 5.3 Mt pellets production in Year-1 followed by an increase in production to 7.7 Mt in Year-2 to finally reach the full capacity of 9 Mtpy of pellets in year-3 and subsequent years;
- A 25-year mine plan that delivers the necessary ROM ore to meet the above production requirements;
- Life-of-mine based on 25 years of operation, utilizing best practices for an owner-operated mining and processing operation;
- Electrical power will be provided by the local power authority from the national grid at a rate of \$0.0466 per kWh (L rate from HQ);
- Bunker C fuel oil price is based on an oil barrel price of \$60 USD and a long-term currency exchange rate (1.25 CAD/USD). This comes to \$0.52 CAD per litre at the pellet plant;
- Diesel fuel price for the mine operation is estimated at \$1.00 CAD per litre delivered at mine site.

The following criteria were used for the Opex:

- Salaries are based on averages in the same geographic area for similar projects. The costs represent the full cost of employment to the Project and include local taxes and all benefits;
- Annual working hours at the mine site include vacation and sick leave and are estimated at 1,957 hours for each employee with a working schedule of two (2) weeks in and two (2) weeks out for the mine site and process plant based employees. At Sept 1les, the employees will be working normal 40 hour work weeks with no fly-in/fly-out schedules;
- The Opex for the railway transportation was based on best available information for long-term contracts for the new spur section, the TSH Line, the QNS&L Line, and the CFA line based on contracted services to a single service provider;
- Consumption data were obtained from equipment suppliers and test work;

- Camp accommodation and transportation costs for the workforce are calculated based on previous quotes from the TP FS as well as similar contractor-operated camp operations.

21.2.3 Escalation, Currency Exchange and Contingency

The base date of the Opex is Q1-2016. All escalation beyond that date is excluded. The Capex was used to factor operating supplies, and maintenance of buildings and of fixed equipment was updated in Q1-2016.

No escalation has been applied to the operating cost, or to the financial model for the Project.

The currency exchange rates applied is based on the long term commodity price evaluated for the product sales and is assumed to be 0.80 USD/CAD.

No allowances for contingency have been included in the Opex.

21.2.4 Summary of Operating Costs by Area and Cost Item

a) Mining Operating Costs

Mining operating costs were estimated on the assumption that mining operations will be carried out by the Owner. NML developed a “bottoms-up” operating cost estimate for the mining operation to suit the new mining operation and life of mine (“LOM”) production quantities. The mining operating costs include:

- Mining fleet and mobile equipment operating and maintenance costs;
- Electricity cost and explosives costs, for all mining activities;
- Mobile equipment operating labour;
- Consumption of fuel and lubricants, where not already included in hourly operating costs for equipment;
- Buildings maintenance.

The mine Opex includes the following sub-areas:

- Mine pit;
- Mine waste disposal;
- Mine installations and explosives production and handling.

The mine Opex was estimated for each period of the mine plan. This cost is based on operating the mining equipment, the manpower associated with operating the mine, the cost for explosives as well as dewatering, road maintenance and other activities.

Operation and maintenance costs of mine site services and buildings such as central workshops, fuel handling and other facilities are included in the G&A and Infrastructure.

In order to determine the operating cost, the following assumptions were used;

- Diesel Fuel Price – \$1.00 /litre;
- Electricity – \$0.0466/kWh;
- Explosives Cost - \$0.29 /t of ore + waste plus a fixed annual cost of \$2.9 M (based on supplier pricing scale down).

The mine Opex (overburden, waste and ore) was estimated to average \$8.46/t of pellets or \$1.95/t mined for the life of the mine.

The mine Opex, based on unit operations, is as provided in Table 21.4.

Table 21.4 – Summary of Mining Opex

Category	Costs \$/t Mined	Costs \$/t Pellets	Percent of Total Costs
Loading	0.26	1.11	13%
Hauling	0.50	2.17	26%
Drilling and Blasting	0.44	1.92	23%
Support & Service	0.16	0.67	8%
Manpower	0.57	2.45	29%
Other	0.03	0.14	2%
Total	1.95	8.46	100%

b) Beneficiation Plant Operating Cost

The beneficiation plant includes the following sub-areas:

- ROM, crushing, storage and reclaim;
- Concentration (grinding/magnetic separation/flotation/concentrate dewatering);
- Tailings dewatering and disposal, and water management.
- The average operating costs for the beneficiation plant are outlined in The crushing and grinding consumables include primary and secondary crusher liners, HPGR tyres grinding mill liners, grinding media consumption and screen decks change out from crushing to final product control size;
- HPGR consumables is based on changing the grinding roll tyres after 6,000 hours life for the four (4) HPGR units or approximately five (5) sets of tyres per year;

Table 21.5. The costs are based on the following:

- The power cost is based on the annual operating time and average loading rates of the equipment;

- The crushing and grinding consumables include primary and secondary crusher liners, HPGR tyres grinding mill liners, grinding media consumption and screen decks change out from crushing to final product control size;
- HPGR consumables is based on changing the grinding roll tyres after 6,000 hours life for the four (4) HPGR units or approximately five (5) sets of tyres per year;

Table 21.5 – Summary of Beneficiation Plant Opex

Costs Items	Unit Costs (\$/t Pellets)
Power	3.199
Crushing & Grinding consumables	3.574
Magnetic separation consumables	0.045
Reagents	0.785
Filtration consumables	0.539
Equipment maintenance parts	0.785
Building maintenance	0.162
Labour	2.080
Others	0.100
Total	11.27

- The grinding media consumption is based on a calculation of wear rates from similar application in hard and abrasive iron ore operations on a grams per kWh/t basis;
- Reagents include the flocculant and coagulant for thickeners operation as well as flotation reagents such as amine, starch and lime;
- Flotation regrind consumables are included in the general Crushing & Grinding consumables costs;
- The operating spares for the filters and baghouses are based on typical wear and change-out rates provided by manufacturers;
- Equipment maintenance parts and building maintenance are factored from mechanical equipment capital cost and building cost;
- The labour cost includes operating labour and maintenance labour;
- “Others” include administration supplies, safety supplies, operator supplies and miscellaneous general items.

The laboratory supply costs are covered in this area although the analytical services will be provided in a common laboratory for all operating areas, including geology, water treatment, etc.

c) Concentrate Drying and Loadout Cost

The concentrate will be dried in winter to prevent freezing and then loaded as needed in the railcars. This Opex includes the following:

- Concentrate drying during winter;
- Train loadout system at the mine site;
- Maintenance of dryer systems and loadout equipment.

The Opex for the concentrate drying and loadout costs is outlined in Table 21.6.

Table 21.6 – Summary of Concentrate Drying and Loadout Opex

Cost Items	Unit Costs (\$/t Pellets)
Power	0.096
Diesel for Concentrate Drying	2.697
Equipment Maintenance	0.091
Building Maintenance	0.017
Labour	0.250
Others	0.012
Total	3.16

The cost of drying the concentrate is incurred only during winter months when it is required to reduce moisture in the concentrate to minimize concentrate freezing in the railcars during haulage to port. The operation is planned for 7 months and therefore the impact on Opex is reduced during summer. The cost presented is the yearly average drying cost.

Labour cost includes labour required for dryer and loadout operation and maintenance.

“Others” include administration supplies, safety supplies, operator supplies and miscellaneous general items.

d) Concentrate Transportation Cost

The concentrate will be hauled by rail and this includes the following items:

- Rail haulage of concentrate to Pointe-Noire;
- Maintenance of railway equipment.

The Opex for the rail transport system is outlined in Table 21.7.

Table 21.7 – Summary of Concentrate Transportation Opex

Cost Items	Unit Costs (\$/t Pellet)
Rail Haulage to Port	16.784
Rail Equipment Maintenance	0.131
Total	16.92

Rail haulage will be done under a contractual agreement with a single service provider. The service provider will manage transportation with the various rail owners. This cost includes all the cost for track maintenance and operation such as fuel and labour. It excludes the maintenance of railcars which will be performed by NML.

e) Pellet Plant Operating Cost

The pellet plant facilities include the following areas:

- Concentrate feed preparation;
- Pellet plant;
- Additives handling and storage.

The operating costs for the pellet plant are outlined in Table 21.8.

Table 21.8 – Summary of Pellet Plant Opex

Cost Items	Unit Costs (\$/t Pellets)
Power	1.491
Fuel (Bunker C)	3.532
Additives	1.224
Equipment maintenance parts	2.904
Building maintenance	0.115
Labour	2.495
Others	0.666
Total	12.43

For the pellet plant, the various cost sectors are separated similarly to the beneficiation plant. However, the “Others” include the costs of some contractor services for specialized maintenance as well as diesel fuel for site services.

f) Port Terminal Operating Cost

The port area facilities include the following areas:

- Car dumping;
- Materials handling and storage of concentrate;

- Pellet handling and storage;
- Pellet reclaim, delivery to a common ship loading facility (multi-user dock);
- Ship-loading and associated operations (tug boats).

The port terminal operating costs are estimated at 3.40\$/t of pellets. These services will be provided by third parties on a contractual basis. These elements will be used by multiple companies and a contractor will manage the operation on behalf of the Government of Québec which recently acquired these facilities from Cliffs and/or the Port of Sept-Îles for the dock and ship loading.

g) General and Administration and Site Infrastructure Opex

Site Infrastructure includes the following areas:

- Infrastructure and utilities (Schefferville);
- Infrastructure and utilities (Sept-Îles).

G&A – Sales, engineering and administration include:

- Management labour;
- Administration cost;
- Fly In Fly Out cost;
- Catering;

The Opex for the site infrastructure area are outlined in Table 21.9.

- The main electrical loads in this area are the service buildings;
- The labour cost includes operating management, engineering, warehouse, and similar services;
- Maintenance includes a buildup of site service equipment maintenance costs covering spare and replacement parts, lubricants and tires;
- Substation, pump house, camp and other site infrastructure maintenance;
- “Others” include operating supplies and allowances for safety supplies, operator supplies and miscellaneous general items. It also includes operating costs for community relations, external consultants, travel expense allowance, recruitment, municipal taxes and training.

Table 21.9 – Summary of General and Administration Opex

Cost Items	Unit Costs (\$/t Pellets)
Power	0.603
Equipment maintenance parts	0.082
Building Maintenance	0.087
Labour	1.729
Fly in/Fly out (all mine site labour)	0.404
Catering (all mine site labour)	0.745
Others	1.171
Total	4.82

h) Electrical Power Operating Costs Estimate

The distribution of the electrical power by area is outlined in Table 21.10. The power cost is already included in the various operating areas previously described.

Table 21.10 – Power Distribution by Area – Year-4

Area	Consumption (MWh)	Costs (\$)
Mine	16,264	757,884
Concentrator	562,794	26,226,207
Concentrate Transportation	18,598	866,648
Pellet Plant	288,472	13,442,805
Port	-	
G&A and Infrastructure	113,880	5,306,808
Total	1,000,008	46,600,352

21.3 Manpower

The mine and process plant operations are based on 24 hours a day, 360 days a year to produce 8.7 million dry tonnes of magnetite concentrate. To allow for process disruptions, planned maintenance and other unforeseen events, an overall availability of 92% has been applied to the design of the plant and to estimate steady state flow rates.

The concentrate will be shipped to the port where it is received and pelletized. The pellets are stockpiled prior to shipment to the international market. The marine facility is a multi-user export terminal managed by others.

The organizational structure for the operation phase is designed to support the successful operation of an iron ore mine and beneficiation plant in a remote location, a railway transportation, a pelletizing facility and associated material handling facilities while producing cost-effective, high quality iron ore concentrate and pellets. An organization chart is provided in Figure 21.2 to depict the main operation areas.

The estimated overall operating labour cost for Year-4 is outlined in Table 21.11. The labour cost is already included in the various operating areas previously described.

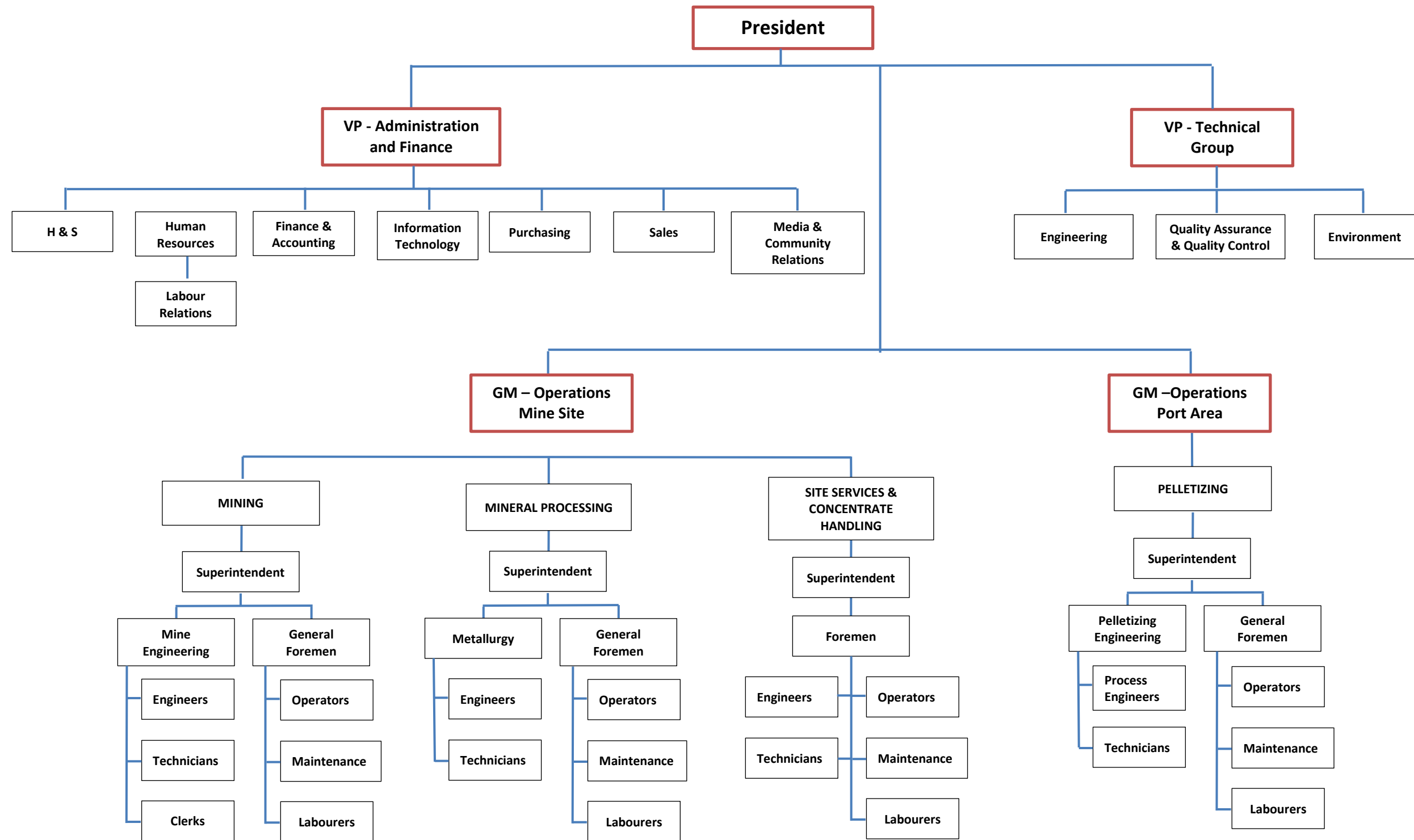
NML will try to use as many local persons from Schefferville and the nearby First Nations' communities to work at the mining operation to maximize the positive impact on the local economy. This will also reduce the G&A cost by reducing the Fly-In Fly-Out and catering costs.

This will also be the case at the pellet plant with the First Nation community in Sept-Îles.

Table 21.11 – Estimated Operating Labour Costs – Year-4

Area	Number of Employees	Costs (\$)
Mine	187	21,196,090
Concentrator	148	18,320,456
Concentrate drying and loadout	20	2,204,608
Concentrate transportation	Third party	
Pellet plant	169	21,970,000
Port	Third party	
G&A and infrastructure	110	15,225,322
Total	634	78,916,476

Figure 21.2 – Operation Organizational Structure by Facility and Services – Overall



22.0 ECONOMIC ANALYSIS

The economic/financial assessment of the KéMag Project is based on Q1-2016 price projections and cost estimates in Canadian currency.

No provision is made for the effects of inflation. The evaluation is carried out on a 100% equity basis. Current Canadian tax regulations are applied to assess the corporate tax liabilities while the recently adopted regulations in Quebec (originally proposed as Bill 55, December 2013) are applied to assess the mining tax liabilities. The financial indicators under base case conditions are presented in Table 22.1.

Table 22.1 –Financial Results (100 % Equity)

Financial Indicators	Results	Units
Before-tax NPV @ 8 %	1,319.5	\$M
After-tax NPV @ 8 %	482.6	\$M
Before-tax IRR	12.2	%
After-tax IRR	9.8	%
Before-tax Payback Period	7.1	Years
After-tax Payback Period	7.6	Years

A sensitivity analysis reveals that the Project's viability is not significantly vulnerable to variations in capital and operating costs, within the margins of error associated with study estimates. However, the Project's viability remains vulnerable to the larger uncertainty in future sale prices and the USD/CAD exchange rate.

22.1 Methodology

The financial assessment is based on estimates of capital and operating costs, a Project execution schedule as well as a production schedule, which combined with price forecasts, enables the projection of revenues over the operating life of the Project. The operating life is expected to run over a 25-year period.

Cash flows are developed on an annual basis in a Microsoft Excel model. Financial results are derived on both a before-tax and after-tax basis. Taxation is based on current federal and Quebec corporate tax rules as well as on the Quebec mining tax legislation (Bill 55, December 2013).

The financial assessment assumes 100% equity financing. No provision is made for the effects of financial leverage or inflation.

22.2 Summary of Input Data

22.2.1 Base Case Assumptions

The base case assumptions are listed below:

- All capital cost estimates are expressed in constant Q1-2016 Canadian currency;
- A long-term average exchange rate of USD 0.80 to CAD 1.00 is assumed to convert the USD price projections into CAD. This exchange rate is also used to estimate operating cost for supplies such as Bunker C;
- As described in Chapter 21.0 documenting Capex estimation, current exchange rates as of Q1-2016 are used to convert estimates initially priced in either USD or EUR. The financial analysis uses the estimates in Canadian dollars determined in Chapter 21.0;
- The analysis is performed on the basis of 100% equity financing;
- The FOB Pointe-Noire price forecasts for the two (2) products are:
 - Type BF pellets – USD 94.45/t (CAD 118.06/t);
 - Type DR pellets – USD 104.11/t (CAD 130.14/t);
- These prices were determined through the market study described in Chapter 19.0 and represent the views of NML's independent marketing advisors, Dr. Joseph J. Poveromo, President, Raw Materials and Ironmaking Global Consulting, Bethlehem, Pennsylvania, USA, and Mr. R. C. A. Barrington, Director, Papillon Mineral Services Ltd., Camberley, UK, and Chief Advisor, International Iron Metallics Association;
- Project NPVs are determined at a discount rate of eight percent (8%), the base case, and at two (2) additional rates of ten percent (10%) and twelve percent (12%), meant to represent typical costs of equity capital;
- Working capital requirements are based on 45 days of receivables and 30 days of payables. Benefit Agreement payments as described in Section 22.3 of this Report are not considered as payables. Working capital levels fluctuate over the operating life as sales and operating expenses increase or decrease. The remaining working capital is recovered at the end of operations;
- Closure costs of \$100 million are set aside during the first 2 years of operation as required by Québec regulation. Fifty (50) percent of the closure costs are set aside in Year 1 and the remaining fifty (50) percent are set aside in Year 2. These amounts are deducted directly from the cash flow and no closure bonds have been modeled.

22.2.2 Revenues

Annual revenue projections are based on the pellet production schedules documented in Table 22.2 below and the price forecasts given above. At full production, the expected annual production rate is 9 Mt of pellets: four (4) Mt of BF-type pellets and five (5) Mt of DR-type

pellets. The production schedule provides for a ramp-up over the first two (2) years of production. Full production is reached in the third year of operation and maintained until the final year of life. Table 22.3 provides life-of-mine revenues associated with the two (2) mine products.

Table 22.2 – Iron Ore Shipments per Year

Year	BF Pellets (tonnes)	DR Pellets (tonnes)
1	2,400,000	3,000,000
2	3,400,000	4,250,000
3	4,000,000	5,000,000
4	4,000,000	5,000,000
5	4,000,000	5,000,000
6	4,000,000	5,000,000
7	4,000,000	5,000,000
8	4,000,000	5,000,000
9	4,000,000	5,000,000
10	4,000,000	5,000,000
11	4,000,000	5,000,000
12	4,000,000	5,000,000
13	4,000,000	5,000,000
14	4,000,000	5,000,000
15	4,000,000	5,000,000
16	4,000,000	5,000,000
17	4,000,000	5,000,000
18	4,000,000	5,000,000
19	4,000,000	5,000,000
20	4,000,000	5,000,000
21	4,000,000	5,000,000
22	4,000,000	5,000,000
23	4,000,000	5,000,000
24	4,000,000	5,000,000
25	4,000,000	5,000,000

Table 22.3 – Life-of-Mine Revenues

Products	LOM Revenues (\$M)
Type BF Pellets	11,546.5
Type DR Pellets	15,909.9
Total	27,456.4

22.2.3 Operating Costs

Annual operating cost estimates are based on the mine production schedule in Table 16.3 and the operating cost estimates documented in Section 21.2 of this Report. Table 22.4 provides a summary of operating costs associated with the Project. The production costs include the Benefit Agreement payments as described in Section 22.3 of this Report.

Table 22.4 – Summary of Production Costs

Operating Costs	Unit Costs (\$)	Units
Average Production Cost	62.41	\$/t pellets
Average Annual Production Cost	561.7	\$/M/year
Total LOM Production Costs	13,733.0	\$/M

The production costs include the Benefit Agreement payments.

22.2.4 Capital Costs

Initial Capex and sustaining capital costs are documented in Section 21.1 of this Report. Table 22.5 summarizes the Capex of the Project.

Table 22.5 – Capex Summary

Capital Items	Costs (\$M)
Initial Capital Cost	3,219.6
Initial Working Capital	79.8
LOM Sustaining Capital Costs	537.3

22.3 Royalties, Benefit Agreement and Taxation

22.3.1 Royalties

No royalty agreement applies to the Project.

22.3.2 Benefit Agreements

Benefit Agreement payments apply to the concentrate production from the KéMag Property. These are accounted for in the financial model but the terms of the agreements are not yet negotiated so the values are only assumptions at this time and remain confidential.

22.3.3 Taxation

A tax model incorporating corporate and mining taxes was developed by a fiscal expert.

Corporate taxes are levied both by the federal and provincial/territory governments in Canada. Generally, provincial corporate income taxes are levied on federal taxable income pro-rated to the particular province or territory. However, Alberta and Quebec have particular rules for determining taxable income that differ slightly from the federal rules. Thus, these provinces collect their own corporate taxes.

In the present case however, those rules that differ in Quebec have no impact on the determination of provincial taxable income. Therefore, Quebec corporate taxes are based on federal taxable income. Mining taxes are levied by each province/territory in Canada. Thus, Quebec mining taxes are levied on taxable income associated with mineral products extracted in Quebec.

The fiscal conditions listed below are assumed to apply.

For federal and Québec provincial corporate income taxes:

- Federal income tax rate of 15% throughout the Project's life;
- Quebec provincial income tax rate of 11.9% throughout the Project's life;
- Depreciation at a rate of 25% per year on a declining-balance basis for all depreciable assets, including mining assets, concentrator, pellet plant, power supply assets and port installation assets (as per the 2013 Federal Budget);
- Canadian development expenditures depreciated at a rate of 30% per year on a declining-balance basis;
- Canadian exploration expenditures allowable at a rate of 100%;
- Deductibility of mining taxes.

For Quebec mining taxes (based on Bill 55, December 2013):

- A minimum annual royalty payment based on the value of output at the pit's mouth; the rate is one percent (1%) for output valued at less than \$80 M plus four percent (4%) of any excess; this minimum payment is considered a pre-payment of the "regular" mining tax;
- The "regular" mining tax includes a basic tax of 16% of taxable income for a "profit margin" of up to 35% (taxable income divided by sales), a tax of 22% on the fraction of

the "profit margin" between 35% and 50%, and a tax of 28% on the fraction of "profit margin" in excess of 50%;

- Annual processing allowance of ten percent (10%) (20% if ore is processed beyond the beneficiation stage) of the original cost of processing assets located in Quebec, not to exceed the greater of 75% of the profit for the year, as calculated immediately before this deduction, and 30% of the value of output at the pit's mouth determined before the deduction of the processing allowance;
- Exploration and development expenditures allowable at a rate of 100%;
- Depreciation at a rate of 30% per year on a declining-balance basis for all depreciable assets, including mining assets, concentrator, pellet plant, power supply assets and port installation assets.

22.4 Residual Value

For the purpose of this financial evaluation, it is assumed that any proceeds realized from the sale of fixed assets at the end of the Project's life are negligible. Therefore, the net residual value consists only of the recovery of working capital.

22.5 Financial Model and Results

Table 22.6 presents the financial analysis results on a before-tax basis and Table 22.7 summarizes the financial analysis results on an after-tax basis. The first five (5) lines of Table 22.6 (i.e., total revenue to total sustaining capital) are not reproduced in Table 22.7 because they are identical. Table 22.8 presents the cash flow statement of the Project.

The NPVs given in the tables above are based on the mid-year convention rather than the more common end-of-year convention. Some financial experts favour the mid-period convention for projects in which cash flows occur more or less continuously through time, as is the case for industrial projects. Using this convention, cash flows are assumed to occur in the middle of each year and are discounted as such. A net present value determined in this manner is greater than that obtained using the conventional method. The ratio of the larger value over the lesser value is simply $(1+i)^{0.5}$, in which "i" represents the annual discount rate. This relationship is exact as long as all cash flow components follow the same convention. The internal rate of return is not affected by this issue.

Table 22.6 – Before-tax Financial Indicators

Before-tax Financial Indicators	Units	Result
Total LOM Revenue	\$M	27,456.4
Total LOM Operating Costs*	\$M	13,733.0
Initial Capital Cost	\$M	3,219.6
Total LOM Sustaining Capital	\$M	537.3
Closure Costs	\$M	100.0
Total Cash Flow	\$M	9,866.5
Net Present Value @ 8%	\$M	1,319.5
Net Present Value @ 10%	\$M	565.8
Net Present Value @ 12%	\$M	34.7
Internal Rate of Return	%	12.2
Payback Period	Years	7.1

* Includes Benefit Agreement payments

Table 22.7 - After-tax Financial Indicators

After-tax Financial Indicators	Units	Result
Total LOM Corporate Taxes	\$M	2,358.6
Total LOM Mining Taxes	\$M	1,147.1
Total Cash Flow	\$M	6,360.9
Net Present Value @ 8%	\$M	482.6
Net Present Value @ 10%	\$M	-44.5
Net Present Value @ 12%	\$M	-417.1
Internal Rate of Return	%	9.8
Payback Period	Years	7.6

22.6 Sensitivity Analysis

A sensitivity analysis was carried out to assess the impact of changes in market prices (across-the-board variations in both pellet product prices), total pre-production capital cost and operating costs on the Project's NPV @ eight percent (8%) and IRR. Each variable is examined one-at-a-time. An interval of $\pm 30\%$ with increments of ten percent (10%) was used for all three (3) variables.

The before-tax results of the sensitivity analysis are shown in Figure 22.1 and Figure 22.2. The variations in NPV 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 NPV is more sensitive to variations in operating expenses than it is to capital expenditure, as shown by the steeper curve. As expected however, the NPV is most sensitive to variations in prices. Across-the-board reductions of about 16.3% in prices result in break-even conditions, i.e., a net present value of zero. Figure 22.2, showing variations in internal rate of return, provides similar conclusions. In contrast with Figure 22.1 which shows linear variations in NPV for the three (3) variables studied, variations associated with internal rate of return are not linear. Due to the different timing of pre-production capital expenditure versus operating costs over the mine life, the internal rate of return is more sensitive to negative variations in capital expenditure. The rate of return is reduced to eight percent (8%), i.e., break-even conditions (shown by the horizontal dashed line), for the same across-the-board reductions in prices as noted above in the case of the net present value.

The after-tax results of the sensitivity analysis are shown in Figure 22.3 and Figure 22.4. The same conclusions about the sensitivity of the project's viability to variations in capital expenditure, operating costs and prices can be drawn here. On an after-tax basis, however, break-even conditions are reached at across-the-board reductions in prices of 8.5%. As well, it can be seen that the project breaks-even for variations in capital expenditure and operating expenses of about +30%.

USD/CAD exchange rate variations can affect the project's viability significantly. The base case uses a long-term exchange rate of 0.80 USD per CAD. The sensitivity to the long-term exchange rate is similar to the sensitivity in price because the long-term exchange rate and the price are multiplied together in the revenue calculation. However, project vulnerability to the long-term exchange rate is in the opposite direction (i.e. for an exchange rate heading towards parity).

A separate exchange rate of 0.74 USD per CAD that represents the exchange rate as of February 2016 is used to adjust the foreign content associated with the capital cost estimate. As shown in Table 21.2, the Capex is based primarily on Canadian dollars (84%) with only 10% in US Dollars and 6% in Euros. Therefore, the Capex is not significantly vulnerable to fluctuations in the exchange rates used. Sensitivity of the financial results to variations in the total Capex are included in Figure 22.1 to Figure 22.4.

Figure 22.1 – Sensitivity of the Before-Tax Net Present Value

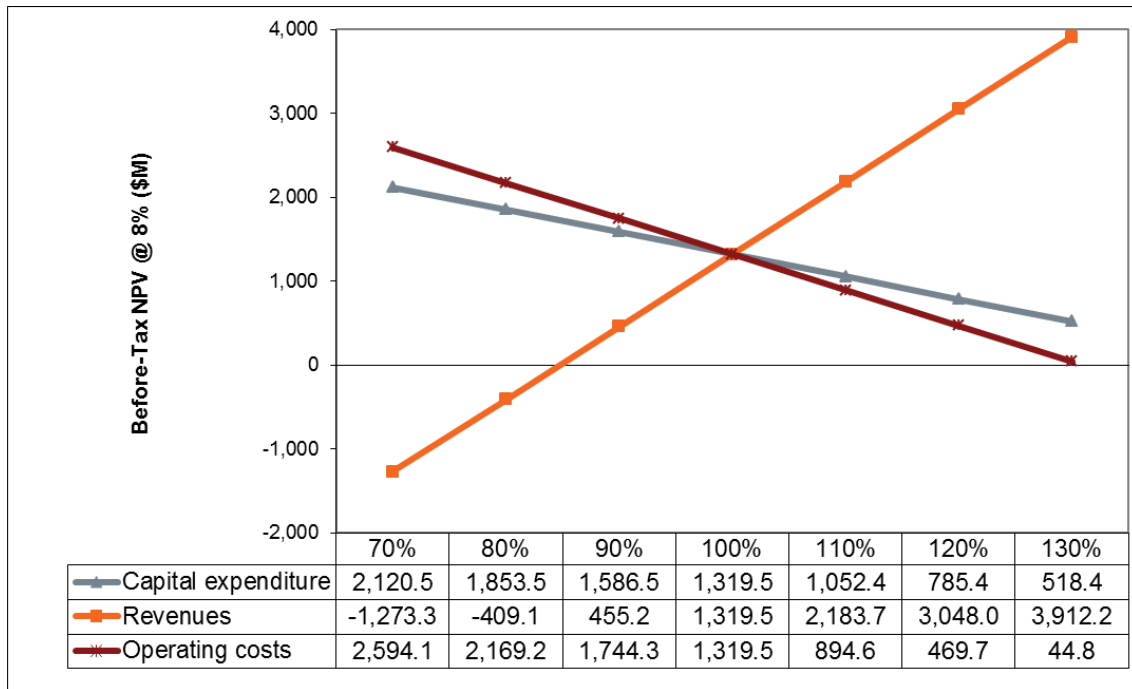


Figure 22.2 – Sensitivity of the Before-Tax Internal Rate of Return

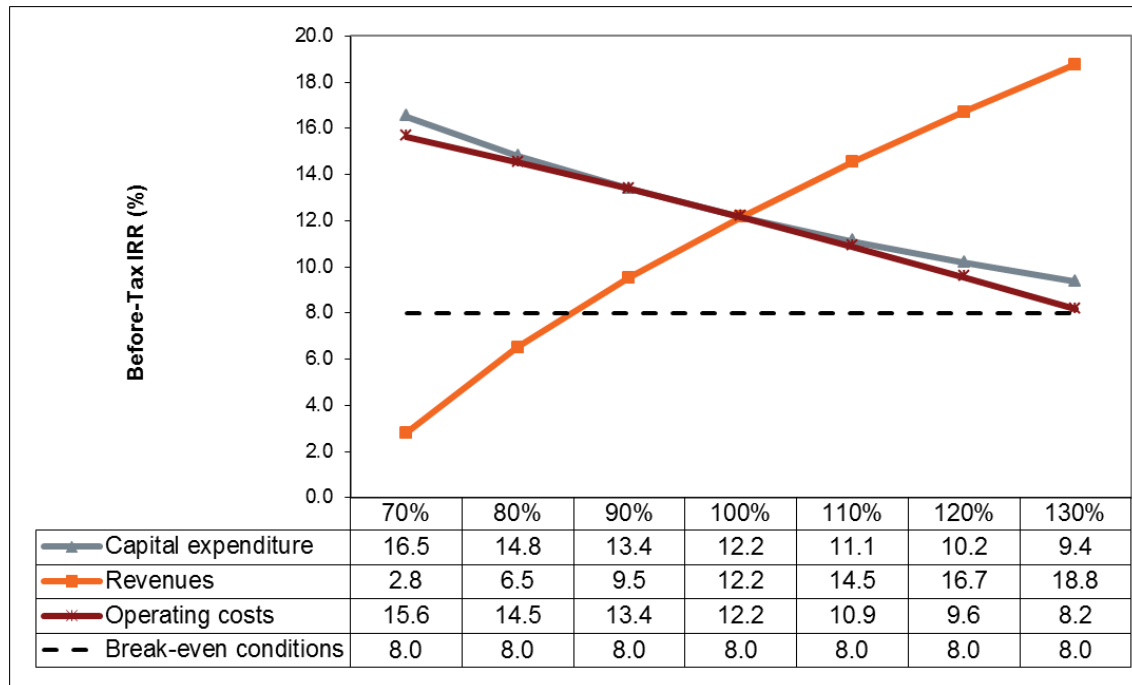


Figure 22.3 – Sensitivity of the After-Tax Net Present Value

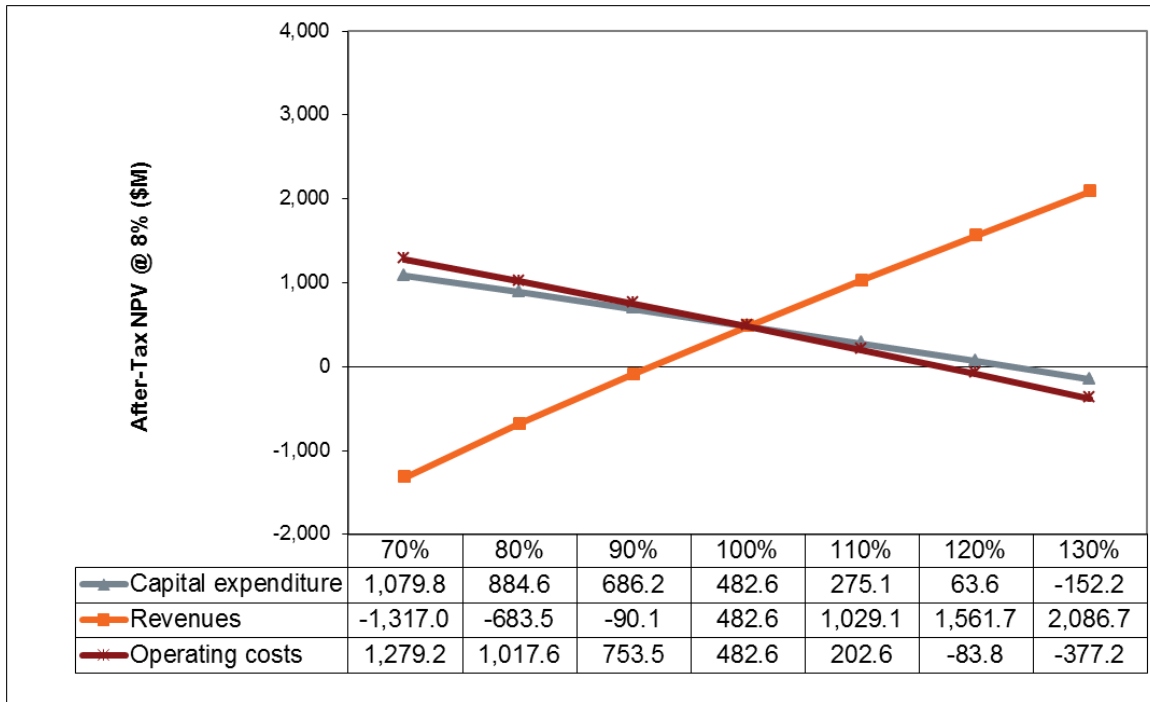
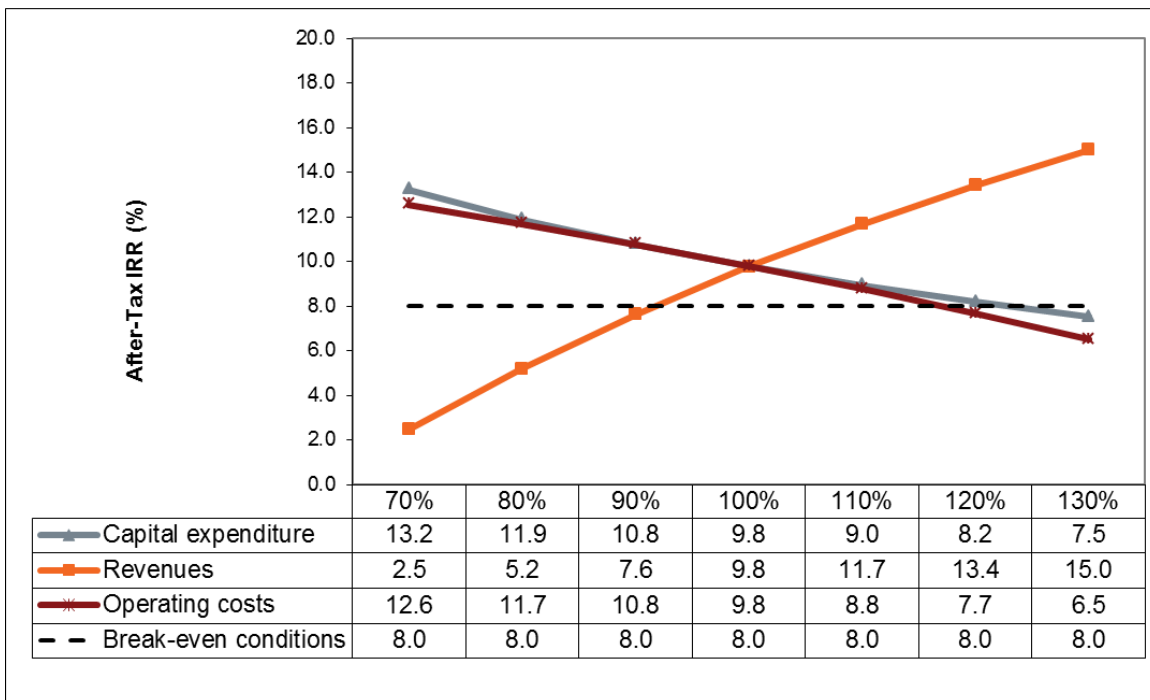


Figure 22.4 – Sensitivity of the After-tax Internal Rate of Return



23.0 ADJACENT PROPERTIES

The Property is contiguous with licenses held by Tata Steel Minerals Canada along its north and northeastern boundaries, and the Howell's Lake Deposit abuts the Property on the southwest. The southwest Property boundary follows the provincial boundary with Newfoundland and Labrador.

With the exception of the DSO claims to the east held by Tata Steel Minerals Canada, the Property is surrounded by claims held by NML.

The reader is advised that the information provided in this Section was publicly disclosed, derives from an Internet search and is mostly drawn from the Registry of Ministère des Ressources Naturelles and various published maps and reports. The Qualified Person has not attempted to verify the data and results. The presence of iron formation in adjacent properties is not necessarily indicative of the mineralization on the Property that is subject of the present Technical Report.

24.0 OTHER RELEVANT DATA OR INFORMATION

The schedule expressed in this section is defined in relative duration as the start of a specific activity is contingent on meeting a number of pre-requisites such as financial support and/or permits, etc. Those timelines must be taken as such. The duration of the various activities is the best estimate that can be made at the moment from the work completed to date and in comparison with projects of similar scale and scope.

24.1 Project Execution Plan

Experience gained analyzing worldwide mining projects over the past 20 years shows that a small number of key factors greatly affect the outcome of a successful or unsuccessful project. In the past years, many major projects have exceeded budget and schedule expectations, many times by over 50%.

The major reasons for these overruns and delays are noted as follows:

- Owner's project execution plan;
- Environmental approval and permitting;
- Strength of committed owner's team, and dependence on contractors personnel;
- Adequate and timely funding;
- Very optimistic project estimates presented at the project pre-approval stage, usually prepared to obtain project approval and funding and causing major overruns and delays in decision making as a result of depleted funds;
- Minimum project pre-planning (Front End Planning) amounting to delays in schedules and cost overruns;
- Underestimating the complexity of the project (weather, materials and labour availability, access to site, etc.);
- Team members (owners, contractors, engineers, etc.) not having the same vision.

Taking these factors into consideration, there are a few options available to overcome them. One option is to contract the Project to one major design contractor that has a share of the Project and has a stake in the success. Another option is to develop a strong owner's management team that would lead a series of sub-consultants and sub-contractors, each responsible for an area of the Project.

For the purposes of the PFS, NML has assumed its execution strategy on the basis of a strong owner's management team, as further described in the following sub-sections.

24.1.1 Execution Strategy

A project has a number of distinct phases starting with early development work to start-up and commissioning. Each project phase is important for a successful project. For all phases, pre-planning is paramount – it must be done, done right and done successfully.

To this end, NML will assign a Project Team (“Team”) to lead the Project. The Team will consist of a highly qualified and successful Project Director who will have overall responsibility for the development and construction of the Project. He will report to an Owners’ management team that will provide direction and assistance to ensure that the Project is well funded and makes the decisions required to maintain the success of the Project.

The Project Director will lead a team of Project Managers who will be responsible for areas of work under their mandate. Each Project Manager will be brought on board at the appropriate time, but early enough to participate in the pre-planning of their particular mandate.

The environmental approval and permitting, being on the Project’s critical path, will require a strong in-house team to lead this effort supported by outside specialists as required.

Government and public relations, being corporate responsibilities, will be coordinated with and supported by all Project Team members to avoid potential conflicts and delays.

An experienced procurement team will carry out the procurement activities for the Project. Where possible, experts will be sub-contracted to undertake specific duties.

An experienced Owner’s team of cost engineers and scheduling specialists will conduct estimating, cost control, and planning and scheduling activities to maintain the budget and schedule within Project constraints. This function can also be supported by sub-contracted experts as required.

Led by the Project Team, the detailed engineering will be sub-contracted to companies with experience in northern environments and iron ore and pelletizing sectors, and located in Montréal where the NML Project Office will be.

24.2 Feasibility Study and Environmental Impact Study

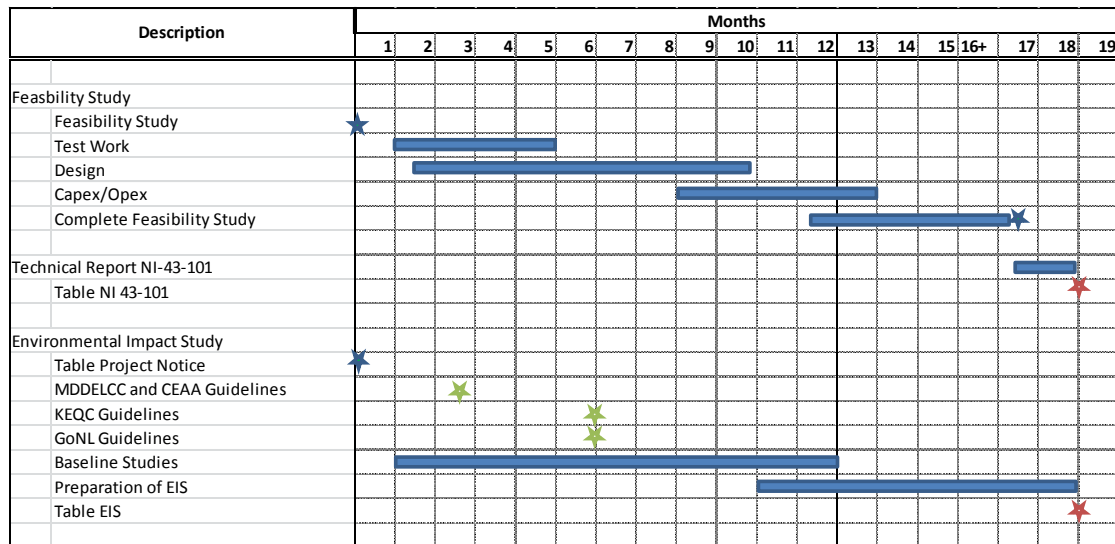
The next step of the NuTac Project is the tabling of the Project Description, followed by the initiation of the feasibility study and preparation of the environmental impact study (“EIS”), which will be embedded in a process of consultations with the Aboriginal and non-Aboriginal communities. The feasibility study will focus on the outstanding work required to confirm the process flowsheet by way of further test work, and to prepare a Class III Capex and Opex.

The required test work will focus on the concentrate freezing issues in winter, determining the dry stack geotechnical engineering for northern climate conditions, and providing the final design parameters for the current flowsheet. Critical elements such as the final design of the HPGRs and the dewatering systems for tailings and concentrate, including concentrate drying, will also be validated.

The EA process will officially commence with the submission of a Project Description to the relevant regulatory authorities, in order to receive the guidelines for the EIS. The drafting of the EIS can start before the guidelines are received, since analysis of recent guidelines for relevant projects provides insights into what will be required.

The schedule of activities depicted in Figure 24.1 shows the major activities that occur during the preparation of the FS and EIS.

Figure 24.1 – NuTac Feasibility Study and EIS Schedule



24.3 EA Releases and Engineering

The next stage in the Project evolution is the awarding of EA releases from the relevant regulatory authorities. During this phase, NML’s EA team will respond to questions on the EIS and follow up until receipt of the releases, which is scheduled to be 21 to 24 months following the tabling of the EIS.

During this stage, the public participation process will be continued from the EIS phase, and following the planned IBA MOUs during the EIS stage, IBAs with the relevant Aboriginal groups would be negotiated.

As shown below, if funding is available, basic engineering activities could be started during this EA releases phase.

24.3.1 Basic Engineering

Ideally, upon completion and approval of the feasibility study, and while the EA process unfolds, the basic engineering functions should commence. It is important at the early stages to minimize any potential risk factors that could impact the schedule or financial parameters of the Project.

Therefore, it is assumed that a number of activities would be completed during this early phase. These activities would include but not be limited to the following:

- Locate the plant facilities (pellet plant mainly) in negotiation with the Government of Québec which is the new owner of all the Cliffs' assets in Pointe-Noire if it has not been finalized during the FS;
- Conduct geotechnical and survey work, where needed, for mine, rail and pellet plant;
- Prepare and issue bid documents for major process equipment;
- Receive bid documents, perform bid analysis and prepare purchase orders with termination clauses in order to receive vendor equipment drawings;
- Perform engineering of early works that need to be done when approvals are received (rail spur construction, temporary construction camp, site preparation).

24.3.2 Detailed Engineering

Detailed engineering services will be provided by those firms with the best expertise in particular areas. A contract for one overall EPCM group is not envisioned at this time. It is assumed that design engineering sub-contracts would be given as follows:

- Mine design and engineering;
- Crushing and conveying;
- Plant facilities, including concentrate filtering and drying;
- Tailings dry stacking, including filtration, conveying and stacking;
- Infrastructure (office, warehouse, maintenance facilities) and roads;
- Railway design;
- Pellet plant and services;
- Power transmission lines.

NML would also consider partnerships with Key Technology Suppliers for major process equipment supply on one side and for all electrical equipment (and instrumentation) by another technology provider, including modularization of electrical rooms, etc.

Modularization is key to reducing the work force on site and the many costs and risks that are associated with large on-site construction forces.

Aside from specific partnerships, the procurement and contracting strategy will be based on the list of remaining commitment packages. The bidders list will be expanded to selected approved bidders for a specific commodity and award will be based on the lowest life cycle cost estimated bid that meets the technical requirements. If applicable, preference will be given to bidders that have Aboriginal affiliations or have offices or facilities located in Québec or Newfoundland and Labrador. Specialized lots will be awarded on a turn-key basis while construction lots will be awarded on a unit rate basis. Since the Project definition will be advanced, quantities should not vary significantly from the engineering estimates.

Major equipment, specialized equipment and expensive, or long lead items will be contracted for early and supplied to the installation sub-contractors.

24.3.3 Site Conditions and Constraints

The weather conditions on site, as well as the working calendars and holidays, have an impact on the Project schedule.

The working calendar is based on a six (6) day/week - 10 hours/day calendar. There will be two (2) breaks of two (2) weeks one for summer vacations and another during the holidays season (Christmas) as well as allowance for non-working periods on statutory holidays. The manpower rotation will be three (3) weeks in, one (1) week out and for technical positions; an overlap will be foreseen for transiting from one person to another.

A seasonal work calendar is considered for some specific type of work, with non-working period from mid-October to mid-April for major concrete works. Alternatively, special weather control measures may be taken to allow working in winter with temporary protection shelters that can be easily relocated to maintain schedule. Temporary power will be used during the construction period. A camp will be built before starting early works.

24.3.4 Construction Execution Plan

The Project will be managed and constructed with different construction management teams, which will all be supported and directed from the Project construction head office. There will be a construction management team with the required technical and management expertise that will be assigned to fulfil all the responsibilities for proper execution of the Project.

Construction managers for each location will be assisted by a site engineering team, discipline technicians, area superintendents, health and safety officers, labour relations coordinator, construction planners and progress monitors, cost controllers, estimators, contract administrators, material controllers, warehouse administrator and secretarial and clerical workers.

The mine site camp and each construction management office will be autonomous and will have all the required services to support the workforce in line with the planned and estimated size at their peak manpower requirement.

Piping should either be integrated into the equipment skids or be part of pipe-rack modules that will be transported to site.

Electrical and instrumentation will be integrated into the different parts of the process buildings using prefabricated electrical and control rooms and set in place once delivered to site. Building structural grounding loops will be executed using smaller contracts.

The objective of this approach is the reduction of the manpower requirements on site, thereby significantly reducing the site indirect costs, improving site safety records and maintaining the Project schedule.

24.4 Logistics Study

The basis of the Project Capex and design engineering is the maximum utilization of modular structures. Where possible, modules will be prepared at the manufacturer's plant or at suitable assembly locations and sent to site.

From the Port of Sept-Îles, the modular structures can be transported to the mine site via the existing QSN&L railway but must travel through two tunnels that can accept standard container size modules. The QSN&L railway terminates at Emeril Junction and the TSH railway continues to Schefferville and will be linked to the site by a new rail spur.

There are two (2) main constraints on the Menihek Dam to transport wide modules and containers by rail, located between Emeril Junction and Schefferville: the superstructure of the spillway sluice gates and the sluice gates themselves in a lifted position on the upstream side of the dam, and the close proximity of the powerhouse building to the track on the downstream side of the dam. The limitations allow normal width loads to go through up to 4.2 m (13 feet 9 inches) when well centered on the rail cars.

Pre-fabricated structures, skid-mounted equipment and large modules will arrive at the port of Baie-Comeau or the port of Goose Bay and will then be transported to Emeril Junction near Labrador City by truck, where they will be loaded onto rail cars destined for the NuTac Project site.

A preliminary study prepared in 2016 reviewed different options of getting across the Menihek Dam width constraint. An option with a system shifting the load on the rail car to clear the obstacles on the dam was studied and a conceptual technical solution with its associated costs was developed jointly with a specialized logistics and lifting company, and was identified as the most efficient and economical. This concept will allow passing modules of 6 to 8 m wide depending on weight and up to 100 tons. If confirmed feasible, this concept will provide for transportation of modules by rail to the NuTac Project site. It will support the overall modular construction strategy for the NuTac Project.

In the course of the FS, the proposed solution will be further studied with inclusion of rail siding revamp on both sides of Menihek Dam, as well as Capex and Opex. The Menihek Power Station operator (NALCOR) will be approached to approve the whole operation and its schedule.

24.5 Project Schedule

A Project master schedule has been developed to cover the major Project milestones. It contains engineering, procurement, construction and pre-operational testing and commissioning activities at a level of detail commensurate with the progress of scope definition. It encompasses the WBS structure and master scope document developed in the Pre-Feasibility Study and is consistent with the contracting plan.

24.5.1 Schedule Assumptions

The Project schedule is based on the following assumptions:

- NML Board approval to proceed;
- The tabling of the Project Description and NuTac FS will commence at about the same time;
- The completion of the NI 43-101 Report based on the FS and the subsequent tabling of the EIS;
- While awaiting EA releases, the Project basic engineering will proceed;
- The design criteria, process and scope of work will be frozen prior to the start of basic engineering;
- The geotechnical and hydrological surveys will be completed prior to the start of basic engineering;
- Major equipment package bid/award duration is ten (10) weeks;
- Resources are available for engineering and construction management personnel.

24.5.2 Project Schedule / Construction Sequence

As outlined earlier, the construction flow is the following:

- Mobilization of EPCM team;
- Start construction of temporary camp;
- Start construction of the railway extension and rail loops at the mine site;
- Mobilization of site preparation sub-contractor;
- Site preparation;
- Civil works;
- Concrete construction;
- Structure erection;
- Architectural installations and finishes;
- Mechanical completion;
- Electrical and instrumentation installation;
- Pre-operational verification;
- Commissioning assistance.

24.5.3 Duration of the Project Schedule

- 18 months for FS and tabling of EIS;
- Basic engineering and EA releases: months 19 to 42;

- Detailed engineering and procurement activities: months 43-67;
- Construction activities: months 46 to 78;
- Pre-commissioning: months 71 to 80;
- Commissioning: months 75 to 84;
- Total: 57 months from EPCM contracts award to the 1st ore processing.

24.5.4 Major Milestones

The major milestones have been tabulated in Table 24.1 showing the Project activities through its cycle while Figure 24.2 represents the Project road map. The major milestones commence at Month 18 following completion of the FS and EIS tabling. As shown in Table 24.1, the Project is expected to be in commercial production in 84 months, or 7 years following the start of feasibility study and EIS preparation.

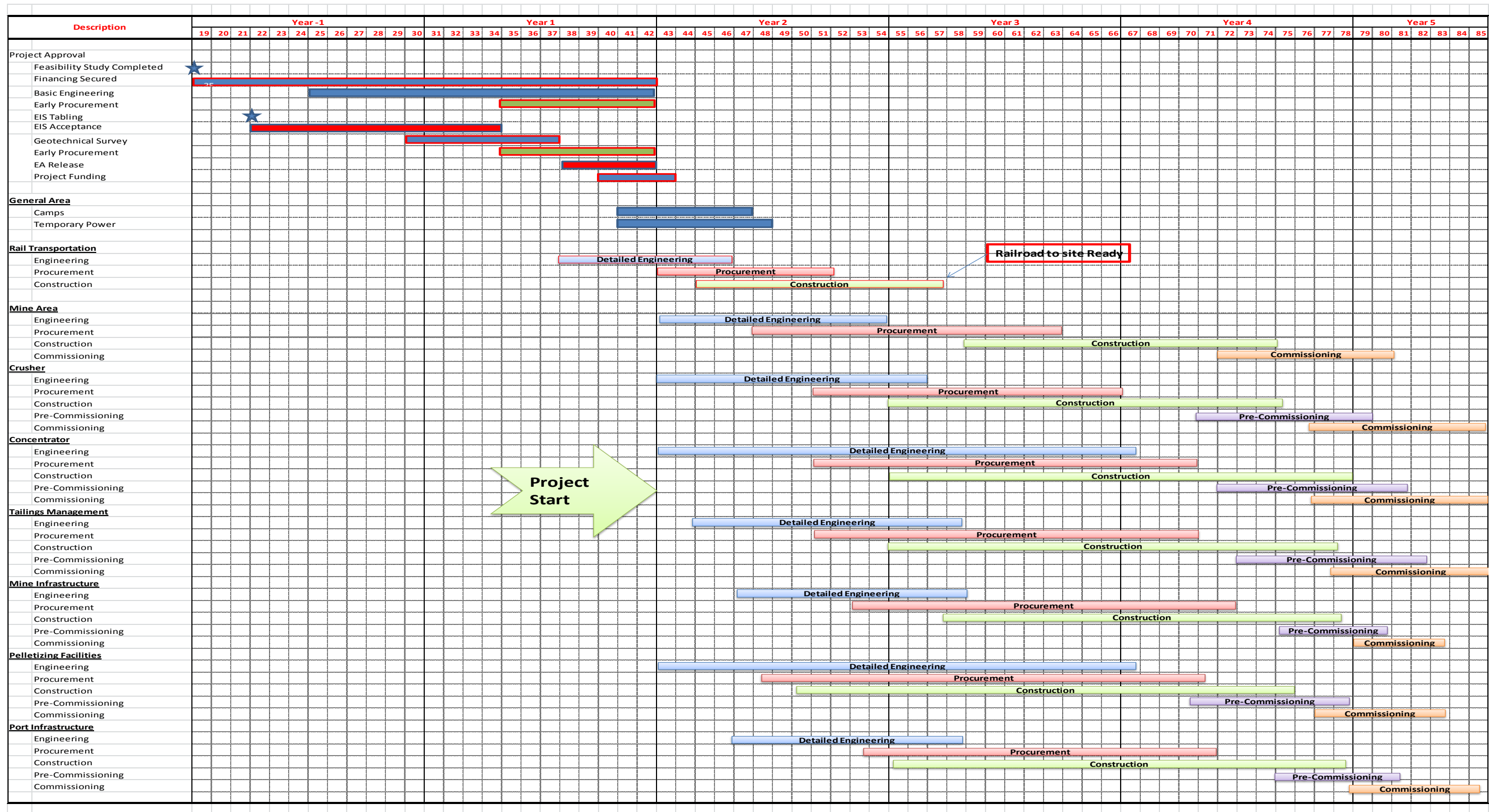
The actual schedule is dependent on raising funds in three stages:

- Stage 1 – An amount of \$25 million to cover public consultations and preparation of the EIS and feasibility study;
- Stage 2 – An amount of \$100 million to cover basic engineering, purchase of vendor’s documents and geotechnical testing and site surveying work;
- Stage 3 – Partner approval and final decision to provide Project funding.

Table 24.1 – Major Milestones

Description	Duration	Month from Project Description
Stage 1 Financing Secured		-2
Start of FS and Tabling of Project Description		0
Final FS Study and NI 43-101	18	18
Tabling of EIS	18	18
Project Approval	1	19
Stage 2 Financing Secured	3	21
Start Basic Engineering	10	24
EIS Acceptance		34
Geotechnical Survey Completed	8	37
Procurement Start	8	37
EA Releases		42
Stage 3 Approval and Full Project Funding	4	43
Start Detailed Engineering	18	43
Start Construction	32	46
End of Construction		78
Plant Commercial Operation Start	7	85

Figure 24.2 – Master Schedule Road Map



25.0 INTERPRETATION AND CONCLUSIONS

The Project is technically feasible; ore can be mined, treated and delivered into export vessels by incorporating proven processes and technologies.

Based on a 25-year cash-flow, the IRR before taxes is 12.2% assuming 100% equity.

However, it may be noted that the Project has a residual value, not factored in the above analysis, the Project having a potential to generate revenues for more than 45 extra years based on the actual resources.

25.1 Project Highlights

The geology and the mineral reserve are now well established and the mine can supply a consistent quality ROM ore to the concentrator at the controlled grade for over 25 years. Very little waste will be mined, thus avoiding potential ARD issues.

The mineral is similar to the Minnesota Iron Range taconites, having been deposited in the same geologic age. The Minnesota taconites have been mined successfully beginning in the 1950's. This experience has guided NML's development from exploration, through mining, processing and logistics.

The NML process has been developed with the experience noted above and optimized using the latest available proven equipment. After extensive test work and conducted by world-renowned test laboratories along with NML's experienced process engineers, some refinements and confirmation of certain processing steps may still be possible to further optimize the efficiency of the process. These improvements, refinements and optimizations can be detailed during the feasibility study and basic engineering phase.

As an alternate to the conventional disposal of tailings, NML has proposed a tailings dry stacking methodology to manage its tailings. This solution is best suited for meeting environmental requirements while maintaining economic viability and safety due to the elimination of dams breach risks.

The concentrate will be transported to the Port of Sept-Îles by existing railways with an additional requirement of about 80 km of new track to the mine site from the existing rail.

Pelletizing tests by German and other laboratories along with an equipment supplier confirmed the capability of achieving high pellet plant throughput and is based on existing operating pellet plants.

An existing new multi-user dock at Pointe-Noire, with a capacity of 50 Mtpy and capability of handling ships up to Chinamax (+350,000 DWT) vessels is currently available. NML has invested \$38 M in this new dock to obtain the rights to ship 15 Mtpy of product at preferred rates.

The market study indicates a growing future pellet demand, and both the market trends and forecasts indicate a continuation of a pellet premium for both BF and DR pellets.

The Project is expected to trigger several regimes of EA. The EIS is expected to be submitted to the relevant government bodies following the conclusion of a future feasibility study. The Project also potentially affects several Aboriginal groups.

A constructability strategy of using light structures, skid-mounted equipment and modularization to the maximum extent allowed by the transportation routes will lower the risk of cost and schedule overruns.

During the construction phase, the Project will create on average 460 construction jobs over 36 months and 170 management and engineering jobs spread over 42 months. The construction labour force will peak at 700 labourers and 250 EPCM employees in the summer of the last full year of construction at all sites. During the operation of the Project, 628 direct employees will be necessary and numerous indirect jobs will be created through the development of secondary and tertiary industries that will support the operation and maintenance of the Project. This is a major component of the economic development of the Schefferville/Menihek and Sept-Îles regions.

25.2 Risk Evaluation

NML conducted a risk review with the objective to identify risks, mitigation measures and action plans that could be addressed during the feasibility study phase to minimize the overall Project risk.

The risk review identified critical areas where the Project was in serious jeopardy of not proceeding and areas affecting the Capex or Opex and areas where the Project could derail once the Project is started. The risk review considered the following areas:

- Geotechnical and Hydrology;
- Engineering;
- Infrastructure;
- Mining;
- Public Perception;
- Logistics;
- Health, Safety and Environment;
- Financial;
- Construction;
- Operations.

The risk review with proposed mitigations was tabulated and evaluated for the Project.

25.2.1 Key Project Concerns

- The requirement to drain a part of Lac Harris to support the mining operation up to and beyond the 25 year mine life. This requires regulatory and social acceptance;

- The time duration of obtaining the environmental releases for the Project;
- Lack of detailed geotechnical assessment could result in unexpected soil conditions and have an impact on the Capex. An investigation will be completed before the start of basic engineering and the finalization of the Project investment budget.

The project is designed to maximize modularization and pre-fabrication which reduce project risk by reducing field manpower and its associated high hourly costs, camp costs and Fly-in Fly-out costs and schedules.

25.3 Conclusion and Next Phase

Early identification of constructability techniques to maximize pre-casting of concrete and pre-assembly of steel, equipment and components as a shipping unit, as well as any other way of reducing the installation time on site, is paramount for a successful project.

Early in the Project's next phase – the feasibility study, an experienced constructability engineering team should review the design layouts, specifications, objectives, and site conditions to work with the design engineers to establish possible guidelines to standardize buildings and foundations as well as any other criteria to minimize labour costs and impact on schedules.

The constructability team should also work very closely with the logistics group to determine the ideal transportation and construction philosophy for the engineering team.

In summary, during the next phases of the Project development, the following constructability activities should be considered:

- Establish the Project execution strategy based on recent successful projects;
- Incorporate an analysis of operations and maintenance into the facility design;
- Review site conditions and access;
- Design development considering construction details and strategy;
- Design quality control;
- Standardize, modularize, coordinate and involve suppliers, consultants and subcontractors;
- Complete the 3D model of the plant and facilities; and
- Refine the scheduling strategy.

26.0 RECOMMENDATIONS

Based on the Project’s economic demonstration using conservative market conditions and product values, it is recommended to follow the PFS schedule and proceed to the feasibility study phase. It is also recommended to execute any outstanding test work and field surveys that are required to support basic and detailed engineering. Despite current market conditions and forecasts, advancing the next phase will prepare the project for any eventual favorable market condition improvements and cut about four (4) years on the schedule compared to waiting for the market to improve before starting the next phase. Table 26.1 presents the budget estimate for the next Project phase up to EA releases.

Table 26.1 – Cost Estimate of Next Phase

	\$ Millions
NuTac Feasibility Study	5.60
Powerline FS (Hydro-Québec)*	6.00
EIS preparation	7.80
EA releases	2.41
Others**	3.55
Total	25.36

* Includes powerline EIS/EA done by Hydro-Québec

** Test work, geotechnical investigations, contingency

Topographical surveys should be done during the feasibility study for detailed engineering activities. However, it can also be done between the FS completion and prior to final project environmental assessment releases.

At this stage, there are areas of lesser definition that will be worked on before or during FS engineering. The main areas of lesser definition are:

- Mine dewatering (hydrogeology);
- Detailed logistic survey and transportation of materials and modules to mine site and specifically over the Menihék Dam.

A number of key activities should now be undertaken to ensure there is a smooth transition of the project to the FS and EA phase. These key activities can be summarized into the following:

- Prepare the Project Description and public participation process to initiate the EA process;
- Plan collection of the missing environmental and social information required to complete the EIS;
- Secure financing of the next phase (FS and EA);
- Initiate FS and EA process once financing is available.

26.1 Mining and Geology

A change in the pit slope will either increase or decrease the waste stripping within the pit but not significantly affect the Mineral Reserves. For the 25-year mine plan, very little waste is extracted so this will have no impact on the mining operation during this period. The final pit wall will be reached after the initial 25-year plan.

A technical analysis to determine the final pit wall slope should be carried out during operation for proper mine design and planning when this becomes an important factor.

26.2 Process

26.2.1 Concentrator

Some areas of the flow sheet and the process plant design need to be confirmed for final detailed engineering. In the FS, the following specific elements should be included:

- Detailed topographical survey at mine site to locate plant and infrastructure;
- Geotechnical survey to establish ground bearing capacities, construction and concrete aggregate borrow pits location and grounding requirements;
- Optimize the location and refine the construction estimates following a detailed survey of the site selected and topographical data.

The following recommended additional test work should also be performed during the feasibility study phase:

- The 2-pass HPGR flowsheet was only tested once at SGA. Because this flowsheet is new, it should be assessed by HPGR manufacturers and retested to confirm the circuit design parameters and HPGR size selection;
- An option for using IsaMills to replace the Vertimills was tested. The results indicated a higher energy could be needed for Vertimills grinding. The Vertimills' required power should be validated through a pilot scale test to confirm the final selection;
- Testing of the final concentrate properties for drying and material handling was done at the PFS level. However, a verification of additional testing necessary to complete the detailed engineering should be done with Jenike & Johanson;
- Supplemental tests may be needed to complete the tailings dewatering and dry stacking design. A verification of possible missing design data and the need for a final validation of certain critical design aspect should be done during the feasibility study phase;
- Pellet feed samples for pellet plant suppliers (Outotec, Metso, Danieli) may be needed. It should be identified early during FS to plan for a large bulk sample pilot plant test for its production. This will allow pellet plant suppliers to test, design and provide performance guarantees for pellet plant supply.

- Production of test samples for concentrator equipment suppliers may be needed where detailed engineering data is insufficient;

Following test work, flow sheets and mass balance can be updated taking into account the new data acquired through additional testing of the concentration process.

26.2.2 Rail Transport System

During FS, the new rail spur will necessitate site investigation work to better evaluate the construction cost:

- Optimize the new railway extension route to the mine site following a topographic survey of the rail corridor;
- Transport corridor geotechnical survey to assess the ground conditions for earthwork;
- Refine the inventory of water course crossings for detailed engineering.

26.2.3 Pelletizing

The pellet plant cost is already detailed to an FS level. However, the plant location will change and the ground conditions of the new site will need to be investigated. In addition, some tests could be required by the pellet plant suppliers for final design and performance guarantees. The following specific activities should be included in the FS work:

- Gather topographical and geotechnical surveys at Pointe-Noire on the new pellet plant site to better define civil works costs;
- Investigate the cost and benefits of using natural gas instead of bunker C as the fuel source including flexibility in fuel switching between those two sources. This is mainly related to the availability of a steady LNG supply. Note that GoQ is currently financially supporting a LNG trial for Arcelor-Mittal at their Port Cartier pellet plant;
- If Bunker C is maintained, a boiler house is required at the pellet plant to provide heating of the HFO and for purging/cleaning burners. Existing facilities, owned by GoQ needs evaluation to refurbish and modify if required, to meet the NML new requirements. Therefore, the impact on the sizing of a boiler is required for the HFO system including tank farm, day tank, furnace HFO pumping and burner purging;
- Process Gas and Plant De-dusting (Bag Filter vs ESP's). Baghouses are a challenge to operate and maintain in installations for cleaning of dry gases. The temperature and moisture of the waste gases and plant de-dusting will vary considerably, especially during shutdowns/start-ups. Investigate the available technologies to see if there is a better solution than the existing electrostatic precipitators currently used in local areas and other similar pellet plants. The pellet plant is designed with baghouses at the moment.

26.2.4 Export Terminal

- Review the existing facilities and infrastructure currently available at Pointe-Noire to determine suitability to proposed NuTac operational requirements and necessary upgrades.

26.3 Opportunities

26.3.1 Product Screening

At the pellet plant, consider re-designing the proposed layout, chute arrangement and multi stage [six (6) decks] product screening. It may well be worth the while to look at designing a product screening system, where the bigger pellets can be segregated naturally and/or plowed-off the product conveyor. The remaining portion (after hearth layer has been removed) of the product can possibly be segregated naturally and only the portion containing fines would be screened at five (5) mm. This would reduce the screening area size considerably.

NML should also investigate the possibility of selling their pellets without any screening as it is done by Arcelor Mittal in nearby Port-Cartier since the start of the plant in 1978. NML double-deck screening of green balls, at the discs and at the feed end of the machine, results likely in better size distribution and fewer fines in the product than Arcelor Mittal. This coupled with a segregation bin for the hearth layer would result in a substantial saving in Capex by doing away with the screening houses. It would also do away with the chip handling, stockpiling, reclaiming to the ship loading system.

27.0 REFERENCES

- Frarey, M. J. and Duffell, S., 1964, *Revised Stratigraphic, Nomenclature for the Central Part of the Labrador Trough.*, Geological Survey of Canada, paper 64-25, 13 p.
- Geostat Systems International Inc., *Estimation of the Mineral Resources of the KéMag Iron Ore Deposit, New Millennium Capital Corp., Technical Report*; March 2007.
- SGS Geostat Ltd, *Update of the KéMag mineral resources*; September 2008.
- Neal, H.E. (Buzz) , and Risto, Rick , *Amended Technical Report on the Howells River Iron Ore Project, Labrador, for New Millenium Capital Corp.*, Amended June 21, 2004, Toronto, Canada: Watts, Griffis and McOuat Limited.
- Neal, H.E. (Buzz), *Audit of Analytical and Metallurgical Testing of LabMag Iron Ore Project Drill Core* by Midland Research Center for LabMag Services Inc., May 20, 2005, Toronto, Canada: Watts, Griffis and McOuat Limited.
- Wardle, R.J. and Bailey, D.G., 1981, *Early Proterozoic sequences in Labrador. In Proterozoic Basins of Canada. Edited by F.H.A. Campbell.*, Geological Survey of Canada, Paper 81-10, pages 331-359.
- Met-Chem Canada Inc., *NI 43-101 Technical Report on the Feasibility Study on the KéMag Taconite Project*; May 2014
- Met-Chem Canada Inc., *Technical Note, Database Validation and Resource Estimate for the LabMag and KéMag deposits, for New Millennium Iron Corp. and Tata Steel Minerals Canada*; August 2013.
- BBA Inc., *KéMag Iron Ore Project, Pre-Feasibility Study Report*, February 2009.
- Metso Minerals, *Dewatering of Iron Ore Concentrates and Flotation Tail - LabMag GP Project, Canada*; March 2007.
- Studiengesellschaft für Eisenerzaufbereitung, *Report about Fine Roller Press Grinding to < 0.15, < 0.1, < 0.065 mm and Final Upgrading via Regrinding and Cleaner Magnetic Separation of a Bulk Sample from the KéMag Iron Ore Deposit (Quebec, Canada) for New Millennium Capital Corp.*; October 2010.
- Studiengesellschaft für Eisenerzaufbereitung, *Report about Pilot Plant Testwork with Samples from the KéMag Iron Ore Deposit, Canada for New Millennium Capital Corp.*; June 2012.
- Coleraine Minerals Research Laboratory, *Pilot Plant Testing of New Millennium Ore*; February 2013.
- Metso Corporation, *Test Plant Report – 20122859: Special Jar Mill Grindability Test - Iron Ore*; July 2013
- Studiengesellschaft für Eisenerzaufbereitung, *Report about HPGR Testwork with a Sample from the LabMag Iron Ore Deposit, Canada for New Millennium Capital Corp.*; September 2013.

Studiengesellschaft für Eisenerzaufbereitung, *Report about Pilot Plant Testwork with a sample from the LabMag Iron Ore Deposit (Canada) for New Millennium Capital Corp.*; September 2013.

Metso Corporation, *Test Plant Report – 20122859: Special Jar Mill Grindability Test – Iron Magnetic Concentrate*; September 2013

Outotec GmbH, *Test Report Taconite Pelletizing Plant Project Made on Behalf of New Millennium Iron Corp. (Montreal, Quebec - Canada)*; October 2013.

Metso Corporation, *Test Plant Report – 20145985: Special Jar Mill Grindability Test - Iron Ore*; November 2013

Derrick Corporation, *Fine Screening Test Results with Magnetite Concentrate*; December 2013.

SGS Minerals Services, *An Investigation into Flowsheet Development to Upgrade a LabMag Iron Concentrate, prepared for New Millennium Iron Corp., Project 14227-001 – Final Report*; October 2014.

Studiengesellschaft für Eisenerzaufbereitung, *Report on Pilot Scale Processing of a Crude Ore Sample from the LabMag Iron Ore Deposit (Canada) for New Millennium Capital Corp.*; February 2015.

SGS Minerals Services, *An Investigation into Pilot Plant Operations to Upgrade a LabMag Iron Concentrate, prepared for New Millennium Iron Corp., Project 14227-002 – Final Report*; March 2015.

SGS Minerals Services, *An Investigation into Pilot Plant Operations to Upgrade a LabMag Iron Concentrate and Evaluate Final Concentrate Washing Methods, prepared for New Millennium Iron Corp., Project 14227-003 – Final Report Rev 1*; July 2015.

Paterson & Cooke USA Ltd, *Taconite Project Tailings Dewatering Test Work*; September 2015.

Paterson & Cooke USA Ltd, *Taconite Project Tailings Dewatering & Dry Stacking Study – Prefeasibility Study*; March 2015.

Gagnon, R., *Excel spreadsheet “Testwork results summary_2016-04.xlsx” summarizing taconite testwork results between 2005 and 2015*; April 2016, New Millennium Iron Corp.

Gagnon, R., *Excel spreadsheet “Summary of HPGR runs and Sizing.xlsx” summarizing taconite testwork results between 2006 and 2015*; May 2016, New Millennium Iron Corp.

Arkéos inc. 2008. *Projet KéMag – Programme de forage – Printemps 2007. Inventaire archéologique préalable aux forages et étude de potentiel archéologique, lac harris, Nouveau-Québec. Préparé pour New Millennium Capital Corp. et Paul F. Wilkinson & Associates Inc. Montréal, Québec.*

Artefactuel. 2013. *Projet Taconite 2013 – Inventaire des sites S-1 (GgDu-1) et S-2 (GgDu-2), près du Lac Harris, Nouveau-Québec. Préparé pour New Millennium Iron Corp. Québec, Québec.*

Brunet, R. et R. Duhamel. 2005. Échantillonnage 2005 : herpétofaune, micromammifères et chiroptères. LabMag Iron Ore Project – Contrat LGP-08-108 (préliminaire). Préparé pour LabMag GP Inc. et NML. Rock-Forest, QC.

Brunet, R. R. Duhamel et J. Léger. 2008. Synthèse des résultats d'inventaires fauniques-2006 (version préliminaire). Préparé pour LabMag GP Inc. et NML. Rock-Forest, QC.

Clément, D. 2009a. Projet de minerai de fer à enfournement direct. L'utilisation innue du territoire et de ses ressources. Préparé pour New Millennium Capital Corp.

Clément, D. 2009b. Projet de minerai de fer à enfournement direct. L'utilisation innue du territoire et de ses ressources II. Préparé pour New Millennium Capital Corp.

Consulair. 2008. Rapport d'échantillonnage de l'air ambiant Site Howells River. Submitted to LabMag GP Inc.

COSEWIC [Committee on the Status of Endangered Wildlife in Canada]. 2003. COSEWIC assessment and update status report on the wolverine *Gulo gulo* in Canada. Ottawa, ON. vi + 41 pp.

D'Astous, N. et P. Trimper. 2009. Inventaire du caribou dans la région de Schefferville au printemps, mai 2009. Préparé pour New Millennium Iron Corp. et Labrador Iron Mines Ltd.

D'Astous, N. et P. Trimper. 2010. Inventaire du caribou mené au printemps dans la région de Schefferville, avril-mai 2010. Préparé pour New Millennium Capital Corp. et Labrador Iron Mines Ltd.

Environment Canada. 2012. Recovery Strategy for the Woodland Caribou (*Rangifer tarandus caribou*), Boreal population, in Canada. *Species at Risk Act Recovery Strategy Series*. Ottawa, ON. xi + 138 pp.

ÉRCFQ [Équipe de rétablissement du caribou forestier du Québec]. 2013. Plan de rétablissement du caribou forestier (*Rangifer tarandus caribou*) au Québec – 2013-2023. Produit pour le compte du ministère du Développement durable, de l'Environnement, de la Faune et des Parcs du Québec.

Gartner Lee Limited & GHI [Groupe Hémipshères Inc.]. 2007. LabMag Iron Ore Project Labrador Study Area Terrestrial Ecosystem Mapping. Prepared for LabMag GP Inc.

Genivar. 2011. Projet LabMag – Inventaires fauniques 2006: Insectes, herpétofaune, micromammifères, chiroptères, cougar et carcajou. Rapport d'inventaire. Préparé pour LabMag GP Inc. Sherbrooke, QC.

Girard, N. 2003. Field Work Report: Avifauna, Terrestrial Wildlife and Flora. Prepared for LabMag GP Inc.

GoNL [Government of Newfoundland and Labrador] (Department of Environment and Conservation). 2013. Wildlife Species at Risk: Mammals. Available at: http://www.env.gov.nl.ca/env/wildlife/endangeredspecies/_mammals.html. Accessed June

2013.

GHI [Groupe Hémipshères Inc]. 2011. Projet de minerai de fer à enfournement direct. Inventaire printanier du caribou dans les environs du secteur DSO3 – avril 2011. Préparé pour Tata Steel Minerals Canada.

GHI. 2012. Direct-Shipping Ore Project. Spring Monitoring of Caribou in the Vicinity of the DSO3 Sector, April 2012. Prepared for Tata Steel Minerals Canada.

MDELCC. 2006. Traitement des plaints sur le bruit et exigences aux entreprises qui le génèrent [Note d’instruction sur le bruit]. Available at: <http://www.mdelcc.gouv.qc.ca/publications/note-instructions/98-01/note-bruit.pdf>. Accessed June 6, 2016.

Minaskuat Limited Partnership. 2008a. LabMag Iron Ore Project. Winter Land Use Surveys. Prepared for LabMag GP Inc. Happy Valley-Goose Bay, NL.

Minaskuat Limited Partnership. 2008b. Waterfowl Breeding Pair Surveys. Presented to LabMag GP Inc. Happy Valley-Goose Bay, NL.

NRCan [Natural Resources Canada]. 2016. Forest Classification. Available at: www.nrcan.gc.ca/forests/measuring-reporting/classification/13179. Accessed: March 15, 2016.

SENES Consultants Inc. 2012. ML/ARD Assessment for LabMag Project, July 2012.

SLE [SNC-Lavalin inc., Environment & Water Division]. 2011a. KéMag Iron Ore Project. 2011 Baseline Noise at Mine Site. Field Report. Submitted to New Millennium Iron Corp./Tata Steel Minerals Canada. Lévis, QC.

SLE [SNC-Lavalin inc., Environment & Water Division]. 2011b. LabMag and KéMag Iron Ore Projects. 2011 Hydrogeological Investigations – Field Report. Prepared for New Millennium Iron Corp./Tata Steel Minerals Canada. Lévis, QC.

SLE. 2013. Taconite Project. 2012 Hydrogeological Investigations - Field Report. Prepared for New Millennium Iron Corp./Tata Steel Minerals Canada. Lévis, QC.

SLE. 2014. Taconite Project. KéMag Iron Ore Project. 2012 Hydrology Field Report. Submitted to New Millennium Iron Corp./Tata Steel Minerals Canada. Lévis, QC.

SLE. 2015a. Rapport préliminaire. Projet de minerai de fer KéMag. Étude d’impact sur l’environnement et le milieu social - Description du milieu biologique. Préparé pour New Millennium Iron Corp./Tata Steel Minerals Canada. Lévis, QC.

SLE. 2015b. Rapport préliminaire. Projet de minerai de fer LabMag. Étude d’impact sur l’environnement et le milieu social - Description du milieu biologique. Préparé pour New Millennium Iron Corp./Tata Steel Minerals Canada. Lévis, QC.

SLE, AMEC & GHI. 2011. Taconite Project. KéMag Taconite Iron Ore Project. 2011 Aquatic Program Field Report. Prepared for New Millennium Iron Corp./Tata Steel Minerals Canada. Lévis, QC.

SLE, AMEC & GHI. 2012. LabMag & KéMag Iron Ore Projects. 2012 Mine Site Aquatic Program Field Report. Prepared for New Millennium Iron Corp./Tata Steel Minerals Canada. Lévis, QC.

SLE & GHI. 2013. Taconite Project. KéMag Iron Ore Project. 2012 Terrestrial Ecosystem Mapping Field Report (Including LabMag Partial Mine Site). Prepared for New Millennium Iron Corp./Tata Steel Minerals Canada. Lévis, QC.

SNC-Lavalin Inc. 2015. Final Report – KéMag Taconite Iron Ore Project Geochemical Characterization. Prepared for New Millennium Iron Corp./Tata Steel Minerals Canada. Lévis, QC.

Weiler, M.H. 2009a. Direct-Shipping Ore Project. Naskapi Land Use in the Schefferville, Québec, Region. Prepared for New Millennium Capital Corp.

Weiler, M.H. 2009b. Direct-Shipping Ore Project. Naskapi Land Use in the Schefferville, Québec, Region. Report II. Prepared for New Millennium Capital Corp.