AMENDED PRELIMINARY ECONOMIC ASSESSMENT (PEA) FOR SPECIALTY ALUMINA PRODUCTION FROM THE WHITE MOUNTAIN ANORTHOSITE DEPOSIT, WEST GREENLAND

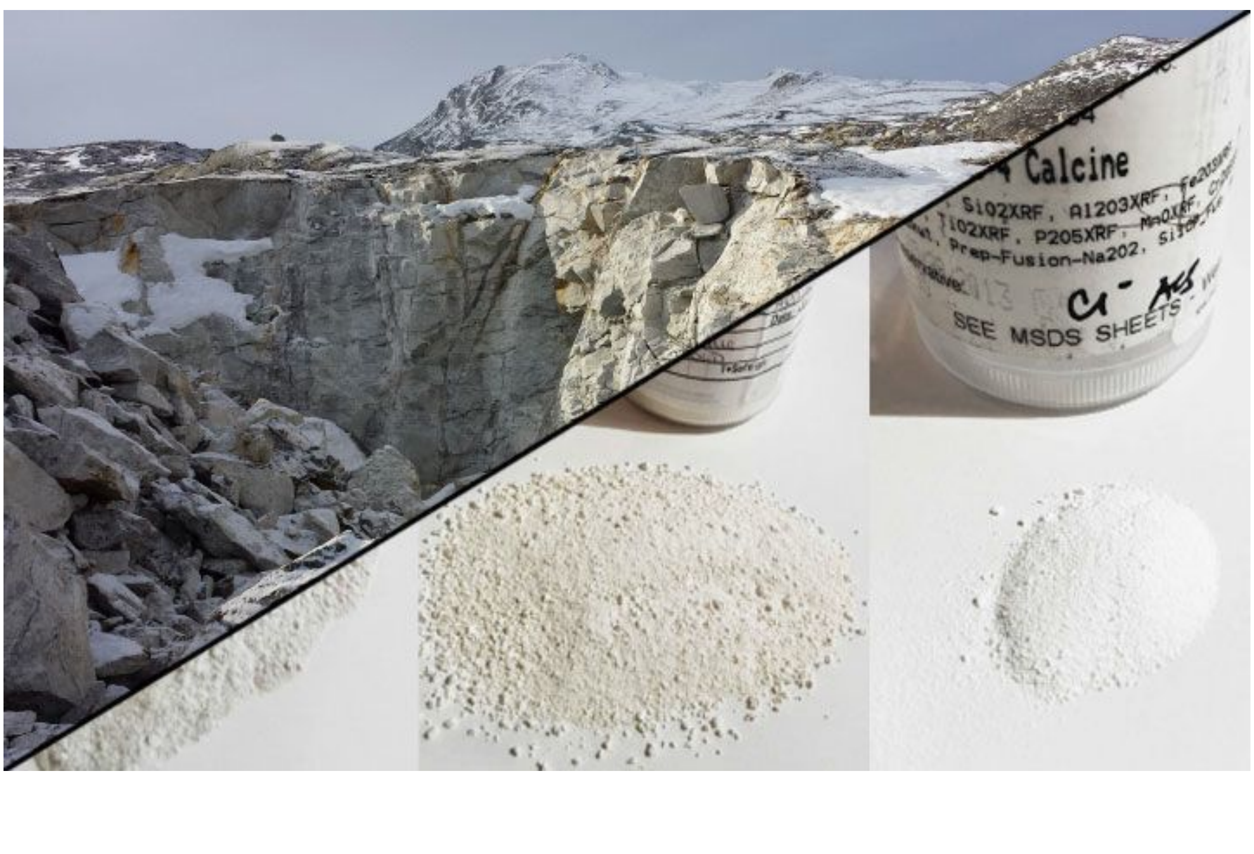
Original Report Date: March 30, 2015
Effective Amended Date: December 9, 2015

Prepared for

Hudson Resources Inc.
Suite 1460 - 1066 West Hastings Street
Vancouver, British Columbia, V6E 3X1
Canada

Prepared by

Dr. Michael Druecker, Ph. D., CPG
Ronald G. Simpson, B.Sc.,P.Geo
Don Hains, P.Geo.
John Goode, P.Eng



DATE AND SIGNATURE PAGE

The effective amended date of this Technical report, entitled "Amended Preliminary Economic Assessment for Specialty Alumina from the White Mountain Anorthosite Deposit, West Greenland" is December 9, 2015. The original date of the report was March 30, 2015.

Michael D. Druecker, Ph.D., CPG

Ronald G. Simpson, P.Geo.

Don Hains, P.Geo

John Goode, P.Eng

Certificate of Author – Ronald G. Simpson, P.Geo.

I, Ronald G. Simpson, P.Geo, residing at 1975 Stephens St., Vancouver, British Columbia, V6K 4M7, do hereby certify that:

1. I am president of GeoSim Services Inc.
2. This certificate applies to the Technical Report entitled "Amended Preliminary Economic Assessment for Specialty Alumina from the White Mountain Anorthosite Deposit, West Greenland", dated December 9, 2015.
3. I graduated with an Honours Degree of Bachelor of Science in Geology from the University of British Columbia in 1975. I have practiced my profession continuously since 1975. My relevant experience includes 37 years' experience in mining and mineral exploration and 25 years' experience in mineral resource estimation.
4. I am a member in good standing of the Association of Professional Engineers and Geoscientists of British Columbia (Registered Professional Geoscientist, No. 19513) and a Fellow of the Geological Association of Canada. I am a "qualified person" for the purposes of National Instrument 43-101 ("NI 43-101") due to my experience and current affiliation with a professional organization as defined in NI 43-101.
5. I have visited the property between the dates of September 7 and 9, 2010. However, that was before exploration of the calcium feldspar anorthosite commenced.
6. I am independent of the issuer applying all of the tests in section 1.5 of NI 43 101.
7. I have had prior involvement with a previous Technical Report prepared for Hudson Resources Inc. dated January 30, 2013 titled "Technical Report on the White Mountain Project, West Greenland".
8. My prior involvement with the Property that is the subject of this Technical Report was as co-author of a previous Technical Report dated January 30, 2013
9. I am responsible for the preparation of Section 14 of the Technical Report.
10. I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
11. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading
12. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

DATED the 15th day of December, 2015

Ronald G. Simpson, P.Geo.

PROFESSIONAL
PROVINCE OF
R. G. SIMPSON
BRITISH COLUMBIA
GEOSCIENTIST

Certificate of Author – Michael D. Druecker, Ph. D., CPG

I, Michael D. Druecker, Ph. D., CPG do hereby certify that:

1. I am an independent consulting geologist and a citizen of the United States of America residing at 14010 Kimberley Ln, Houston, TX, USA 77079.
2. I am a graduate of the Geology and Geophysics (B.Sc., 1975) program of the University of Hawaii and also hold a M.Sc. (Geology-Petrology, 1980) from the Colorado School of Mines and a Ph.D. (Geology-Geochemistry, 1986) from the University of Iowa.
3. I am a Certified Professional Geologist (CPG), in good standing, with the American Institute of Professional Geologists, a member of the Society of Mining, Metallurgy, and Exploration, and a core member of the Prospectors and Developers Association of Canada.
4. I have been practicing my profession related to mining and mineral exploration for over 35 years in a wide variety of locations in North, South, and Central America. Specific to some of content of this report is my position as Project Manager of the Sarfartoq Project in Greenland in 1989 and Senior Project Geologist for industrial mineral and specialty metal exploration/property evaluations in the US and Mexico from 1990-91 during my tenure with Hecla Mining Company in Coeur d'Alene, ID.
5. I have read the definition of "Qualified Persons" set out in NI 43-101 and as a result of my experience, education and registration; I am a Qualified Person as defined in NI 43-101. I visited the project six times during the last 5 years, from May 30, 2010 to June 5, 2010 from August 15, 2010 to September 9, 2010 from May 4, 2011 to May 17, 2011 from June 21, 2011 to June 23, 2011 from August 7, 2011 to August 24, 2011 and from August 9, 2012 to August 21, 2012.
6. I am responsible for Sections 1 - 12, 15, 19, 23 – 27 as lead author for the technical report entitled "Amended Preliminary Economic Assessment for Specialty Alumina from the White Mountain Anorthosite Deposit, West Greenland" for HUDSON RESOURCES INC. dated on December 9, 2015.
7. I have intimate knowledge of the property, and the results reported herein, which were gained while present at the property on six visits for several weeks between May 2010 and August, 2012.
8. As at the date hereof, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the report not misleading.
9. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
10. I have read National Instrument 43-101 and Form 42-101F1, and this Technical Report has been prepared in compliance with that instrument and form.
11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated the 15th day of December, 2015

Michael D. Druecker, Ph. D., CPG

Certificate of Author – Don Hains, P.Geo

I, Donald H. Hains, do hereby certify that:

1. I reside at E1/2Lot 6, Conc. 1 EHS, Mulmur Twp., Ont. L0N 1S8.
2. I am President of Hains Engineering Company Limited, a company holding a Certificate of Authorization from Professional Engineers Ontario to practice engineering.
3. I am a graduate of Queen's University, Kingston, Ontario with a B.A. (Hons) degree in Chemistry (1974).
4. I am a graduate of Dalhousie University, Halifax, Nova Scotia with a Master of Business Administration in Finance and Marketing (1976).
5. I am a registered Professional Geoscientist (Practising Member No. 0494) in Ontario and am registered with the Association of Professional Geoscientists of Ontario.
6. I have read the definition of "qualified person" set out in the National Instrument 43-101 and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101. My specific experience relevant to the subject property includes the following:
    - Exploration, process development, market analysis and feasibility studies related to the Warren Twp., Ontario anorthosite deposit, 1994-2010
    - Geological review, process development and market analysis related to the Gudvangen anorthosite deposit, Norway, 2010
    - Co-author of High Alumina Rocks in Ontario: Resources and Process Technology, Ontario Ministry of Northern Development and Mines, Industrial Minerals Background Paper No. 10, 1991
    - Industrial research and product development with Fibreglass Canada
7. I visited the property April 9, 2013.
8. I am responsible for those portions of sections 1 - 3, 16, 17.1 – 17.3, ,18.1 – 18.4, 20.1 – 20.8, 21.1, 21.2, 21.4 – 21.7 and 22 of this report entitled "Amended Preliminary Economic Assessment for Specialty Alumina from the White Mountain Anorthosite Deposit, West Greenland" for HUDSON RESOURCES INC. dated on December 9, 2015.
9. I have read NI 43-101, Form 43-101F1 and CP 43-101 and have prepared the technical report in compliance with NI 43-101, Form 43-101F1 and generally accepted Canadian mining industry practice.
10. As of the date of the technical report, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.
11. I have no personal knowledge as of the date of this certificate of any material fact or change, which is not reflected in this report.
12. Neither I nor any affiliated entity of mine, is at present, or under agreement, arrangements or understanding expects to become, an insider, associate, affiliated entity or employee of Hudson Resources Inc or any associated or affiliated entities.
13. I am independent of the issuer applying all of the tests in section 1.5 of NI 43 101.
14. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated the 15th day of December, 2015

Donald H. Hains, P. Geo.

PROFESSIONAL GEOSCIENTIST
DONALD H. HAINS
PRACTISING MEMBER
0494
ONTARIO

Certificate of Author – John Goode, P.Eng

I, John R. Goode, P.Eng., do hereby certify that:

1. I am an independent metallurgical engineer, the principal of J.R. Goode and Associates, a citizen of Canada, and resident at Suite 1010, 65 Spring Garden Avenue, Toronto, Ontario, Canada, M2N 6H9.
2. I graduated in 1963 with the Honours Degree of B.Sc.(Engineering) in Metallurgy from the Royal School of Mines, Imperial College, London University, UK.
3. I am a member in good standing of Professional Engineers Ontario; a Fellow of both the Canadian Institute of Mining, Metallurgy and Petroleum and the Australasian Institute of Mining and Metallurgy; a member of the Society for Mining, Metallurgy, and Exploration, the Geological Association of Canada, and the Prospectors and Developers Association of Canada.
4. I have been practicing my profession as a metallurgist for over 50 years covering a wide variety of roles, locations, and commodities.
5. I have read the definition of "Qualified Persons" set out in NI 43-101 and as a result of my education, experience, and registration I am a Qualified Person as defined in NI 43-101.
6. I have not visited the White Mountain project site.
7. I am responsible for the hydrometallurgical parts of Sections 1 - 3, 13, 17.4 – 17.5, 18.5, 20.9, 21.1, 21.3 – 21.5, 21.8, 22, and 26 as a co-author for the Technical Report entitled "Amended Preliminary Economic Assessment (PEA) for Specialty Alumina from the White Mountain Anorthosite Deposit, West Greenland" for HUDSON RESOURCES INC. dated on December 9, 2015.
8. As of the date hereof, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the report not misleading.
9. I am independent of the issuer applying all of the tests in section 1.5 of NI 43-101.
10. I have read National Instrument 43-101 and Form 42-101F1, and this Technical Report has been prepared in compliance with that instrument and form.
11. I consent to the filing of the Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated the 15th day of December, 2015

LICENSED PROFESSIONAL ENGINEER
J. R. GOODE
PROVINCE OF ONTARIO

J.R. Goode

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 SUMMARY

1.0 Overview

Hudson Resources Inc. (Hudson) commissioned the authors, Dr. Michael Druecker, Ph. D., CPG, Ronald G. Simpson, B.Sc.,P.Geo, Don Hains, P.Geo., and John Goode, P.Eng to prepare a Technical Report (the Report) on its wholly owned White Mountain (Naajat) Anorthosite project on the central west coast of Greenland. The Report incorporates a previously reported mineral resource estimate for the Project, which was completed by Druecker and Simpson (Technical Report on the White Mountain Project West Greenland, dated January 30, 2013).

The PEA is preliminary in nature and there is no certainty that the preliminary assessment and economics will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

1.1 Introduction

Hudson Resources Inc. (Hudson) is a Canadian mineral exploration company focused on developing the White Mountain (Naajat) Anorthosite project on the central west coast of Greenland. The Company has a 100% interest in this 95 sq. km. exploitation licence. The project is located at latitude 66°33'N (approximately the Arctic Circle) and longitude 52°10'W. The reference grid used throughout the exploration program is WGS84 UTM 22N. The exploitation license grants Hudson the exclusive mining rights for 30 years, renewable for an additional 20 years. The Company has currently been granted the exploitation licence to produce 200,000 tonnes of crushed, ground and magnetically separated anorthosite annually. Additional permitting will be required in the event the Company decides to proceed with the project as proposed in this report.

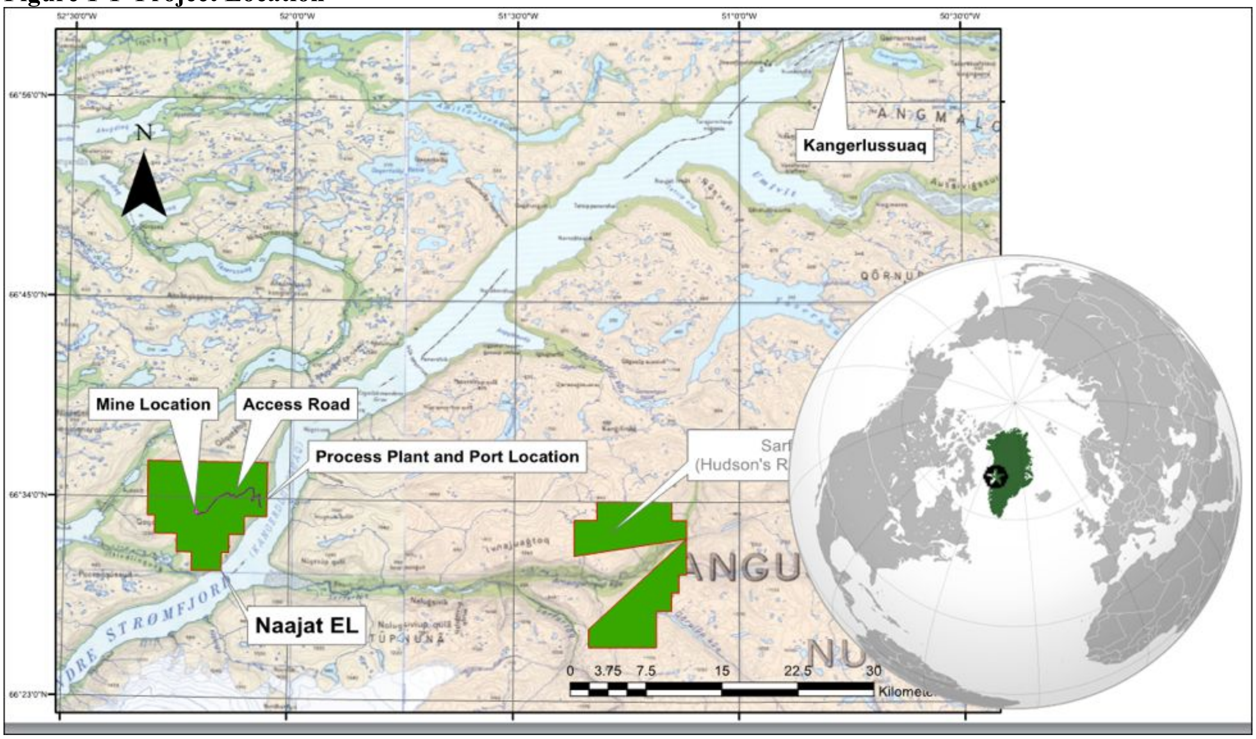
Hudson has been exploring in Greenland for the past 10 years. Between 2003 and 2008, the Company was primarily focused on the Garnet Lake Diamond Project. From 2009 to 2012, the focus was on the Sarfartoq Rare Earth Elements (REE) Project. The Naajat Exploration Licence (EL) was previously drilled for diamonds in 2007. Drill results from that program confirmed the large volume potential of the anorthosite body.

With 30% of the White Mountain mineral resource composed of alumina, there is the potential for it to be a source material for the production of alumina. The purpose of this report is to determine, on a preliminary basis, the economic potential of the project to produce a specialty calcined alumina.

1.2 Geology and Mineralization

Hudson's properties, located in Western Greenland, consist of exposed glacially scoured crystalline basement rocks, which are predominantly granulite-facies orthogneisses intruded by diorite dykes. Cutting approximately NE/SW across the Hudson properties, lies the boundary between the approximately 3 Ga Meso-Archaean N. Atlantic Craton to the south (Garde et al., 2000) and Archaean rocks affected by the 1.9 – 1.8 Ga Palaeoproterozoic Nagssugtoqidian Orogen (Willigers et al., 2002, Connelly et al., 2006 and refs. therein).

Figure 1-1 Project Location



The Archean (~3000 Ma) calcic White Mountain anorthosite has been preserved as a nearly un-deformed "island" within the southern margin of this Palaeoproterozoic Nagssugtoqidian Nagssugtoqidian fold belt. Project geology shows the anorthosite cut by minor northerly striking, un-deformed mafic dikes (Kangamiut ~2000 Ma) with near vertical dips and less than 25 meters thickness.

1.3 Exploration History

There are reports of Kryolitfabriken Øresund A/S (KØ) exploring the Anorthosite in the late 1970's and early 1980's. KØ are the Danish company that mined cryolite at Ivigtut in south Greenland until 1987 when the deposit was depleted. KØ was following up on earlier work on Norwegian anorthosites with respect to exploring ways for extracting the alumina from calcium rich feldspars using HCL leaching. They concluded that the Greenland anorthosite samples at Qaqortorssuaq (White Mountain) were superior to the Norwegian samples samples due to their leaching characteristics. There are no reports of further work.

In 1995 and 1996, Inco Limited explored a wide area generally north of the Naajat EL but including sampling locations on the licence area. They were looking for nickel but sampled some of the anorthosites. No further work was recommended after two years of work.

1.4 Resource Estimate

In January 2013, Hudson released the mineral resource estimate for the White Mountain project. The following table presents the mineral resource estimate for the Grid 3 area restricted to blocks containing less than 2.5% Na_2O based on the co-relation between low sodium and high aluminum in the anorthosite.

Table 1-1 Mineral Resource Estimate

Class	Max % Na_2O	Tonnes (000's)	% SiO_2	% Al_2O_3	% Fe_2O_3	% CaO	% MgO	% Na_2O	% K_2O
Indicated	2.50	27,384	49.2	30.0	1.26	14.95	0.55	2.35	0.29
Inferred	2.50	32,724	49.4	30.1	1.22	15.01	0.52	2.34	0.26

Notes:
1. The Qualified Person for the estimate is Mr Ronald G. Simpson, P.Geo. of Geosim
2. Mineral resources have an effective date of January 30, 2013
3. Resources have been classified in accordance with 2014 CIM definitions for Mineral Resources
4. Indicated Mineral Resources are drilled on approximately 100 x 100 metre drill spacing with extrapolation beyond the drill limits limited to 50m
5. Mineral Resources are restricted to blocks containing less than 2.5% Na2O
6. Mineral Resources are not mineral reserves and do not have demonstrated economic viability.

The target area is a very small portion of the anorthosite body, with no overburden or stripping required. The estimated resource was confined to an area mapped as >90% anorthosite.

1.5 Mining Operations (Greenland)

A pit plan for mining the indicated mineral resource has been developed using the Lerchs-Grossman optimization algorithm. The pit plan provides for 10.5 million tonnes of production from indicated resources and 187,000 tonnes of inferred resources, which is considered as waste.

At the proposed mining rate of 400,000 tonnes per annum for the alumina project, indicated resources are sufficient for 26.25 years of mine life. Infill drilling can readily convert inferred resources to indicated resources, thus considerably expanding the potential size of the pit and potential mine life.

It is noted that exploration has been limited and that the deposit extends a considerable distance from the currently explored area. The exploration potential for the project is excellent.

The scope of the Preliminary Economic Assessment (PEA) study includes the following:

- Conventional open pit mining at 400,000 tpa
- Two stages of crushing to produce a -25 mm (1 inch) product
- Outdoor storage area for material at the port in Greenland
- Ship loading and port facilities in Greenland
- All infrastructure including accommodations, truck shops, power, sewage, water, etc.
- Transportation by bulk ship to North America for hydrometallurgical processing to alumina

1.6 Alumina Production (North America)

The PEA assumes that the anorthosite feedstock will be bulk shipped to a location, yet to be determined, in North America. Examples of two locations that meet the project criteria are Bécancour, Quebec and Houston, Texas. The project design is based on a basic flowsheet for alumina recovery from anorthosite that was originally pioneered and tested by Alcan International Limited in the 1980's. Hudson has further refined and developed and extensively tested the process at SGS Lakefield on a bulk sample of White Mountain anorthosite leading to a flowsheet for the production of high quality smelter grade alumina (SGA) and, subsequently, high purity specialty calcined alumina.

The process includes:

- Alumina process plant established near source of natural gas and industrial chemicals
- Final site location will also depend on nearby demand for co-products of amorphous silica (AS) and calcium silicate (CS)
- Grinding of anorthosite prior to entering leach reactor
- Filtering and cleaning AS produced in leach reactor for sale and for use in acid regeneration on site
- Production of aluminum chloride hexahydrate (ACH) from leach filtrate by HCl sparging
- Two stages of calcination to purify and produce high quality/purity specialty calcined alumina
- HCl acid regeneration for recovery of the HCl and production of a calcium silicate industrial mineral product

As the basis for this PEA, under the direction of John Goode, the alumina production process was modeled using Aspen Plus, a leading chemical process simulation software package, by Dr. Mike Dry, of Arithmetek Inc. The capital and operating costs were generated using the modeling software.

1.7 Environmental, Permitting and Social Considerations

Hudson has been granted an exploitation permit to produce 200,000 tonnes of anothorsite annually to be sold as feedstock for an industrial mineral application. Permitting for production of coarse material for alumina production will likely require additional studies and permits.

The anorthosite is amenable to a simple, low cost dry process with no beneficiation required for the alumina feedstock. Any dust or fines produced during the crushing process can be safely disposed of on land or in water in Greenland. There are no metals of toxic elements in the anorthosite. Batch and column leach test work indicates any leachate will conform to Greenland Water Quality Guidelines (GWRC). Leach test data is compiled in the EIA which has been approved by the Greenland authorities in support of subaqueous tailings disposal.

1.8 Capital and Operating Cost Estimates

Capital and operating costs have been developed based on the proposed flow sheet and estimates for major equipment. Capital and operating costs are estimated to a level of accuracy of ±30%, plus a contingency allowance. Where design information has not been developed into drawings, a conceptual scope was developed. This preliminary design information was then used to develop material take offs, which were priced at current day rates for the mine, port, and access road. For some components, percentages were used. As noted above, capital and operating costs for the hydrometallurgical plant were obtained from the Aspen modeling software, which where then reviewed and, in many cases, increased based on other available data.

The PEA is preliminary in nature and there is no certainty that the preliminary assessment and economics will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

The PEA conclusions are as follows:

- Net Present Value of $205M at a 10% discount rate, after-tax
- Internal after-tax rate of return (IRR) of 23.5% and a 3.9 year payback assuming a 20 year mine life
- Initial capital costs of $184 million which includes a contingency of $33M and working capital of $17M, for a 1,100 tonne per day open-pit mine in Greenland and an off-shore processing facility in North America
- Revenue of $287/t of mined rock, based on an average specialty alumina, amorphous silica and calcium silicate selling prices of $850/t, $75/t and $75/t, respectively, of finished product, ex-plant

1.9 Conclusions & Recommendations

Based on the results of the PEA, it is recommended that Hudson should continue with the next phase of the Project in order to identify opportunities and further assess the viability of the Project.

2 INTRODUCTION AND TERMS OF REFERENCE

2.0 Introduction

Dr. Michael Druecker (Druecker) was retained by Hudson Resources Inc. (Hudson), as the lead author, to prepare an independent Technical Report on the White Mountain Project, in West Greenland. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects. Druecker has visited the Company projects on multiple occasions in 2010 and 2012, with the latest visit to the White Mountain Project in 2012 from August 9th to August 21st. Druecker also managed and was responsible for the work undertaken by Ted Dickson, who produced the report titled ""Nonmetallurgical Alumina Market Study" as the basis for Section 19 - Market Studies and Contracts.

Geosim Services Inc. (Geosim) was retained by Hudson, as one of the authors, to prepare the January 2013 43-101 compliant Independent Resource Estimate of the drill hole grid 3 zone on the White Mountain Anorthosite Project. Simpson last visited the projects in September 2010. However, that was before exploration of the calcium feldspar anorthosite commenced.

Hains Engineering Company Limited (Hains) was retained by Hudson to prepare the technical and economic analysis with respect to developing the White Mountain deposit for the production of ground anorthosite to be used as a feedstock for the production of alumina. Site visits were carried out by Mr. Don Hains, P. Geo. and Mr. Bruce Brady, P. Eng. of Hains Engineering in May 2013

John R. Goode, P.Eng., of J.R. Goode and Associates (Goode) was retained by Hudson, as one of the authors, to manage the program of testwork undertaken by SGS Canada Inc. (SGS) at its Lakefield facility in Ontario. In this capacity, Goode visited the SGS laboratory on numerous occasions. Goode also managed and was responsible for the work undertaken by Dr. Mike Dry of Arithmetek Inc. (Dry) which was aimed at mathematically and chemically modeling the hydrometallurgical process developed by Goode and SGS and developing the capital and operating costs related to those processes.

Hudson is a Canadian mineral exploration company that is a reporting issuer in British Columbia and Alberta. The common shares of Hudson trade on the TSX Venture Exchange (symbol:HUD) and on the OTCQX exchange in the US (symbol:HUDRF). The Company is under the jurisdiction of the British Columbia Securities Commission.

This report was prepared using published information, unpublished company reports, and data generated by Company consultants. Where possible, references are included in the context of the report and a list of such references is included in Section 27.

2.1 Terms of Reference

Units of measurement used in this report conform to the SI (metric) system. Any currency in this report is United States dollars (US$) unless otherwise noted.

µ	micrometres
°C	degree Celsius
°F	degree Fahrenheit
µg	microgram
A	ampere
a	annum
bbl	barrels
Btu	British thermal units
C$	Canadian dollars
cal	calorie
cfm	cubic feet per minute
cm	centimetre
cm^2	square centimetre
d	day
dia.	diameter
dmt	dry metric tonne
dwt	dead-weight ton
ft	foot
ft/s	foot per second
ft^2	square foot
ft^3	cubic foot
g	gram
G	giga (billion)
Gal	Imperial gallon
g/L	gram per litre
g/t	gram per tonne
gpm	Imperial gallons per minute
gr/ft^3	grain per cubic foot
gr/m^3	grain per cubic metre
hr	hour
ha	hectare
hp	horsepower
in	inch
in^2	square inch
J	joule
k	kilo (thousand)
kcal	kilocalorie
kg	kilogram
km	kilometre
km/h	kilometre per hour
km^2	square kilometre
kPa	kilopascal
kVA	kilovolt-amperes
kW	kilowatt
kWh	kilowatt-hour
L	litre
L/s	litres per second
m	metre
M	mega (million)
m^2	square metre
m^3	cubic metre
min	minute
MASL	metres above sea level
mm	millimetre
mph	miles per hour
MVA	megavolt-amperes
MW	megawatt
MWh	megawatt-hour
m^3/h	cubic metres per hour
opt, oz/st	ounce per short ton
oz	Troy ounce (31.1035g)
ppm	part per million
psia	pound per square inch absolute
psig	pound per square inch gauge
RL	relative elevation
s	second
st	short ton
stpa	short ton per year
stpd	short ton per day
t	metric tonne
tpa	metric tonne per year
tpd	metric tonne per day
US$	United States dollar
USg	United States gallon
USgpm	US gallon per minute
V	volt
W	watt
wmt	wet metric tonne
yd^3	cubic yard
yr	year

3 RELIANCE ON OTHER EXPERTS

The authors have prepared this report and the information, conclusions and opinions contained herein are based on:

- Information available to the authors at the time of preparation of this report
- Assumptions, conditions and qualifications as set forth in this report
- Data, reports and other information supplied by Hudson
- Information collected during site visits

Literature sources were consulted and where used, are cited accordingly as references.

The authors have not verified the legal details of the property, title, sale and ownership agreements; instead they have relied on information provided by Hudson.

Dr. Michael Druecker is responsible for section 19, “Market Studies and Contracts”. Since specialty alumina, amorphous silica and calcium silicate, are industrial minerals, as opposed to commodities, there are no public exchanges where prices are quoted. Dr. Druecker relied on a report prepared by Ted Dickson of TAK Industrial Mineral Consultancy, titled “Nonmetallurgical Alumina Market Study” dated January 2015 (“TAK Report”). Mr. Dickson has over 25 years experience in the industrial minerals industry. He obtained a BSc in geology from Edinburgh University and an MSc in Mineral Exploration from the Royal School of Mines in London (with a thesis on the “Economic Geology of British Clays”). After twelve years with Industrial Minerals magazine and 5 years with Cluff Resources, he has spent the last 14 years as an independent consultant, specialising in the markets for industrial minerals. Based on Mr. Dickson’s extensive experience and Dr. Druecker’s previous experience with Hecla Mining Company as Senior Project Geologist for industrial mineral and specialty metal exploration and property evaluation, Dr. Druecker believes that it is reasonable to rely upon the TAK Report. The TAK Report addresses significant differences in pricing based on quality and specifications of the final product and the associated pricing risks. Dr. Druecker assessed that Mr. Dickson’s proposed pricing for the PEA fairly represented the market for the three products. In support of this, there are indicative prices available for private transactions completed between buyers and sellers in various trade publications which Dr. Druecker used to help confirm the pricing used in the PEA.

4 PROPERTY DESCRIPTION AND LOCATION

This section of the report is largely derived from the NI 43-101 Technical Report on the White Mountain property prepared by Druecker and Simpson in January 2013. The January 2013 Technical Report remains current. In June, 2013, Hudson applied for and received a small increase in the licence area to accommodate port facility requirements. This change in the property boundaries is detailed below. The change does not affect the validity or currency of the 2013 Technical Report. In September 2015, the Naajat Exploration Licence (White Mountain) was converted to an Exploitation Licence.

4.1 Location, property dimensions

The White Mountain Project is located in west Greenland approximately 80 kilometres to the west-southwest of the international airport at Kangerlussuaq. Access to the project is possible by boat on Sondre Stromfjord, or by a 25-minute helicopter flight from Kangerlussuaq (Figure 4-1).

Sondre Stromfjord is a large deep-water fjord and is navigable by boat from the coast up to its terminus at Kangerlussuaq. The coast is usually ice-free for most of the year. The center of the property is located 120 km north-northeast of the village of Maniitsoq and 80 km southeast from the town of Sisimiut.

The Property occupies an area of approximately 100 sq. km. after inclusion of the 5 sq. km area applied for on June 13, 2013. Property boundaries are demarcated by geodetic (WGS84 datum) points in latitude and longitude referenced to Map Sheet EPSG 4326 issued by the Geological Survey of Denmark and Greenland. The property coordinates are detailed in Table 4-1 and the property location is illustrated in Figure 4-1

Table 4-1 Property coordinates - Naajat Licence 2001/06

Polygon Point	Latitude North	Longitude West
1	52º 19' W	66º 36' N
2	52º 3' W	66º 36' N
3	52º 3' W	66º 33' N
4	52º 6' W	66º 33' N
5	52º 6' W	66º 32' N
6	52º 8' W	66º 32' N
7	52º 8' W	66º 31' N
8	52º 9' W	66º 31' N
9	52º 9' W	66º 30' N
10	52º 13' W	66º 30' N
11	52º 13' W	66º 31' N
12	52º 15' W	66º 31' N
13	52º 15' W	66º 32' N
14	52º 18' W	66º 32' N
15	52º 18' W	66º 33' N
16	52º 19' W	66º 33' N

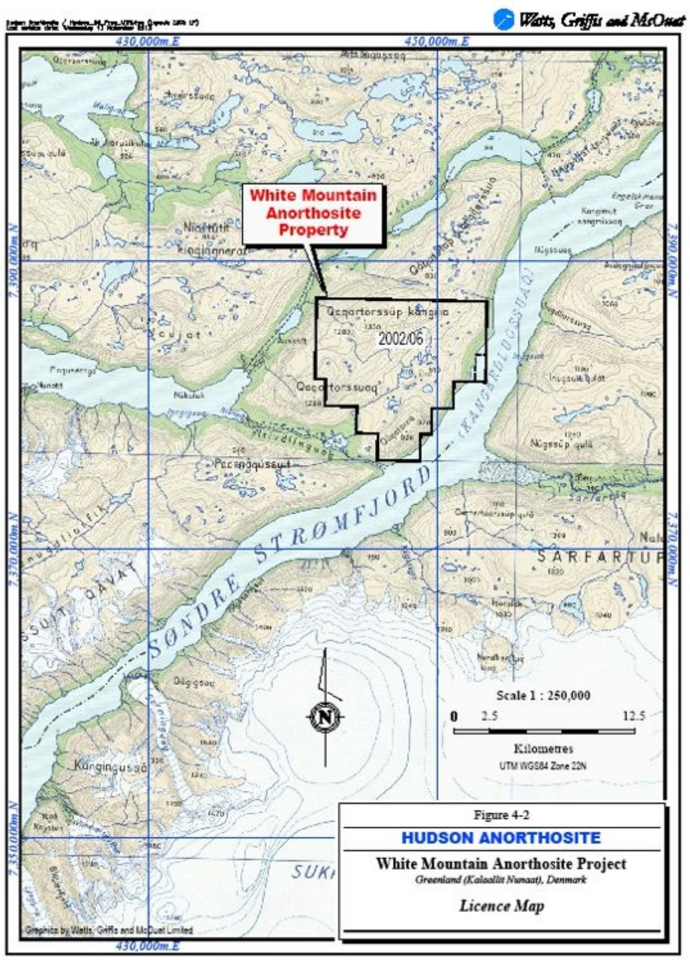
Source: MLSA, Hudson Resources Inc., Licence 2002/06 and extension

4.2 Land Tenure

Hudson holds a 100% interest in the Naajat claims as Licence 2002/06. The licence is in good standing. In accordance with Greenland law, there is no ownership of surface rights. Application to convert the Licence EL 2002/06 to an exploitation licence has been approved by the Mineral Licence and Safety Authority (MLSA) formerly the Greenland Bureau of Mining and Petroleum (BMP).

Hudson's Naajat mineral claim (EL 2002/06), originally comprising 851 km^2 in Western Greenland, was approved by the Greenland mineral authorities on July 15, 2002. In December 2003, Hudson reduced the area to 325 km^2 based on the results of the 2003 exploration program. In December 2004, Hudson reduced the area to 243 km^2. In December 2006, Hudson renewed the license for an additional five-year period and the license area was reduced to 190 km^2. In December 2011, Hudson renewed the licence period into years 11 and 12 and reduced the area to 95 sq. km. In 2013, Hudson renewed the licence, including the addition to the licence area of 1 sq. km. for an area on the fjord incorporating the proposed port area and the access road from the port to the quarry site. In September 2015, the approval was granted to convert the licence to an exploitation licence.

Figure 4-1 Local Property Location



4.3 Obligations to retain the property

In Greenland, a license covers exploration for all mineral resources except hydrocarbons and radioactive elements, unless otherwise indicated in the license. A first license period is between 1 and 5 years. At expiration the licensee is entitled to be granted a new 5 year license for the same area and mineral resources, provided the MLSA has received an application for this no later than December 31 in year 5. The new license period will count as years 6-10. At expiration of the second license period, the licensee may be granted a new 2-year license for the same area and mineral resources.

There is a fixed fee to be paid at the granting of the license at each period (DKK 25,000). During years 6-10 there is an annual fee per license (DKK 25,000) which is indexed to the Danish CPI. The licensee is obligated to spend exploration expenses per calendar year (adjusted for inflation) as follows:

Years 1-2: DKK 100,000
Years 3-5: DKK 200,000
Years 6-10: DKK 400,000

An amount per km^2 per calendar year as follows:

Years 1-2: DKK 1,000 per km2
Years 3-5: DKK 5,000 per km2
Years 6-10: DKK 10,000 per km2

The rules have recently changed and expenditures for periods beyond year 10 double every two year period. Hudson reports that the company has sufficient exploration expense credits to maintain the property for at least another two years without incurring additional costs. These requirements are no longer applicable once an exploitation licence has been granted.

The license period, fees and obligations are well explained and available on the MLSA website:

http://www.govmin.gl/minerals/terms-rules-laws-guidelines

4.4 Project Permitting

Advancement of the project to the Exploitation Licence stage to permit mining activity requires the following:

- Submission of a request for an exploitation licence, including documentation with respect to the commercial viability of the project,

- Submission of a bankable “feasibility” study. The study shall contain a description and an evaluation of the deposits with respect to geology and a specification of the assumptions as regards exploitation technology, economics, environmental matters and other matters which form the basis for the licensee's declaration. The study is specific to the needs of the Greenland government, remains confidential, and should not be regarded as conforming to 43-101 disclosure. Due to the commercially sensitive nature of the data when negotiating long-term purchase agreements, Hudson has chosen up to now to refrain from publishing a preliminary economic assessment, pre-feasibility, or feasibility technical report with respect to the proposed mining operation on which the exploitation licence was granted. As such, as per part 4.2(6) in the Companion Policy NI 43-101 CP to National Instrument 43-101, the reader is cautioned that where projects are put into production without first establishing mineral reserves supported by a technical report and completing a feasibility study such projects have historically had a higher risk of economic or technical failure,

- The licensee's proposal for delineation of the exploitation licence area based on the deposit or deposits in question,

Exploitation licences are granted for a period of thirty years from signing by the Government of Greenland. Approval of an exploitation licence is contingent on agreement with the MLSA with respect to the following:

- Development timetable for commencement of production,
- Submission and approval of a mine closure plan,
- Submission of an Environmental Impact Assessment (“EIA”) and Social Impact Assessment (“SIA”)

A 2.5% production royalty has recently been implemented by the Greenland government. This amount has been incorporated into the financial model of the mine.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

5.1 Accessibility

The property can be accessed year round by helicopter from the community of Kangerlussuaq, approximately 80 km east northeast of the property and by boat from several communities when the fjord is typically ice free from March to November. Kangerlussuaq Airport is Greenland's most important transport hub. Up to seven flights arrive every week from Copenhagen in the summer (four a week year round) and connect to internal flights operated by Air Greenland to the capital Nuuk, and Ilulissat amongst other locations. Flights are also available to and from Iceland.

During the summer months (May to September), the property can be accessed by small boat or barge from Søndre Strømfjord. Small boats can be rented in Kangerlussuaq; however, a larger craft and crew must be chartered from a bigger community, such as Nuuk, if needed. The fjord is typically ice free from the open ocean to the project site from March through to December but varies from year to year.

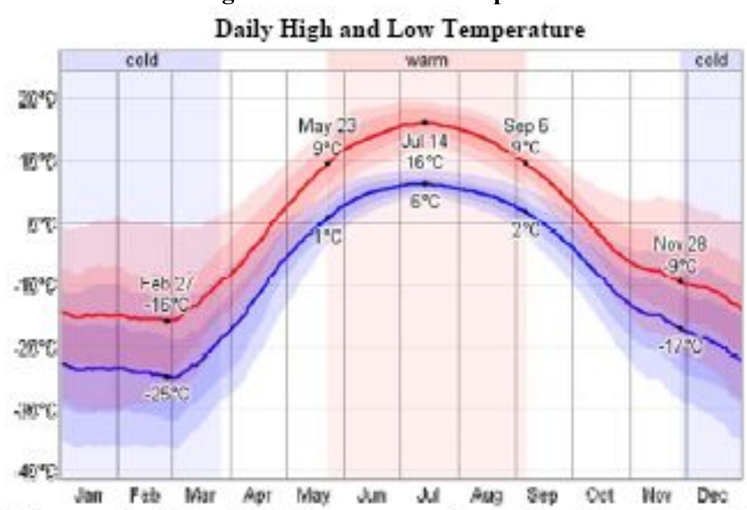
There is no road to any of the communities outside the Kangerlussuaq area, but there have been discussions for several years about building a 170 km long road from Kangerlussuaq to Sisimiut.

5.2 Climate

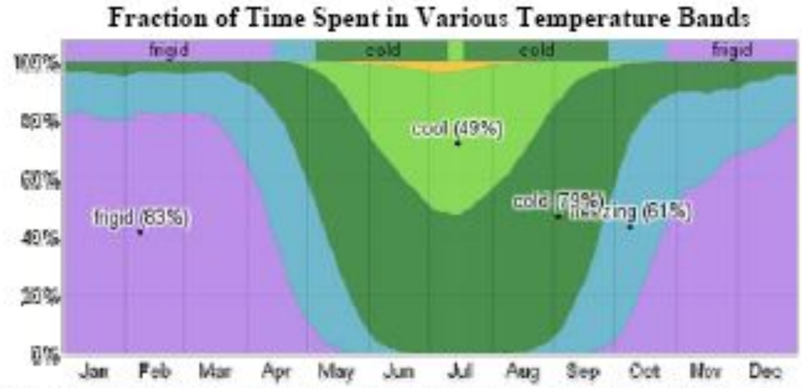
The climate is classified as polar continental and the temperature varies from -35 C to 20 C. Precipitation is sparse throughout the year. Although snow can fall in summer, the area is usually ice and snow free from May to late September. Weather data for Kangerlussuaq (http://weatherspark.com/averages/27554/Kangerlussuaq-S-ndre-Str-mfjord-Kitaa-Greenland) for the period from 1974 through 2012 show the following:

Temperature

Figure 5-1 Climate - Temperature



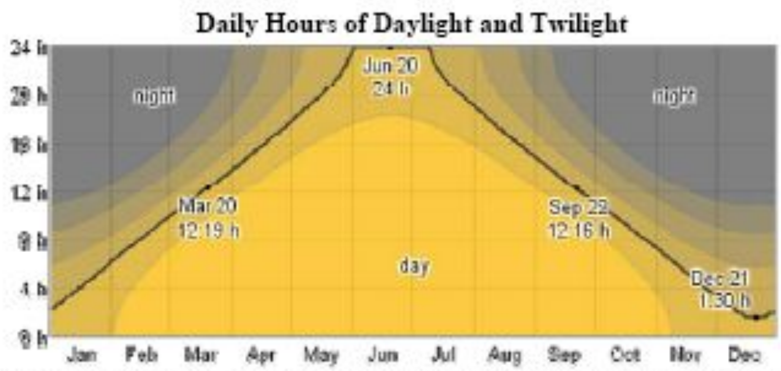
The daily average low (blue) and high (red) temperature with percentile bands (inner band from 25th to 75th percentile, outer band from 10th to 90th percentile).



The average fraction of time spent in various temperature bands: frigid (below -9°C), freezing (-9°C to 0°C), cold (0°C to 10°C), cool (10°C to 18°C), comfortable (18°C to 24°C), warm (24°C to 29°C), hot (29°C to 38°C) and sweltering (above 38°C).

Sunlight

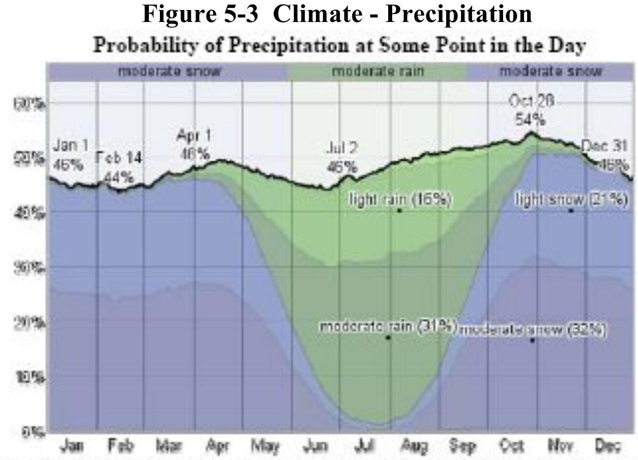
Figure 5-2 Climate - Sunlight



The number of hours during which the Sun is visible (black line), with various degrees of daylight, twilight, and night, indicated by the color bands. From bottom (most yellow) to top (most gray): full daylight, solar twilight (Sun is visible but less than 6° from the horizon), civil twilight (Sun is not visible but is less than 6° below the horizon), nautical twilight (Sun is between 6° and 12° below the horizon), astronomical twilight (Sun is between 12° and 18° below the horizon), and full night.

Precipitation

Figure 5-3 Climate - Precipitation



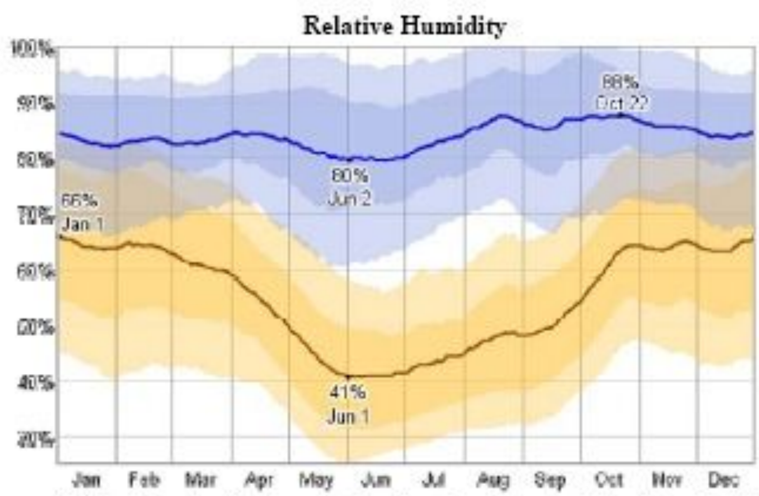
The fraction of days in which various types of precipitation are observed. If more than one type of precipitation is reported in a given day, the more severe precipitation is counted. For example, if light rain is observed in the same day as a thunderstorm, that day counts towards the thunderstorm totals. The order of severity is from the top down in this graph, with the most severe at the bottom.

Probability that snow will be reported at least once in a given day. The season is defined as the period during which the probability is greater than one third the maximum probability.

The probability that there is snow on the ground. The season is defined as the period during which the probability is greater than one third of the maximum probability.

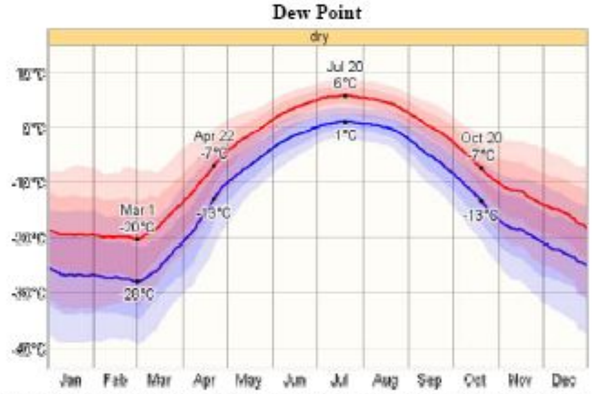
Humidity and Dew Point

Figure 5-4 Climate - Relative Humidity



The average daily high (blue) and low (brown) relative humidity with percentile bands (inner bands from 25th to 75th percentile, outer bands from 10th to 90th percentile).

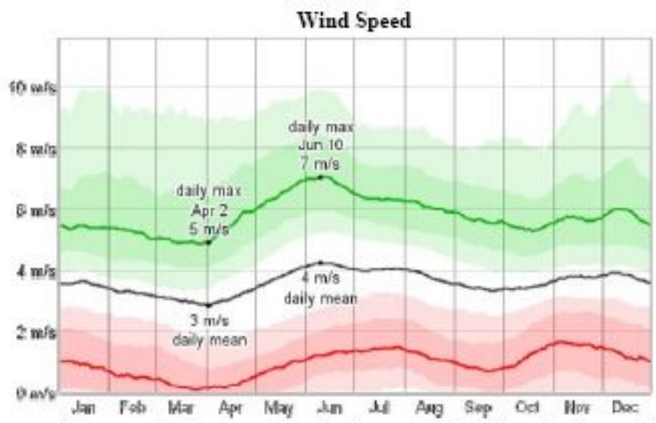
Figure 5-5 Climate - Dew Point



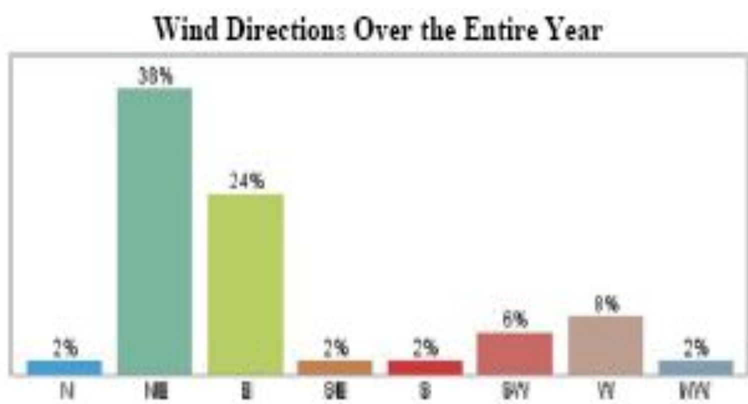
The daily average low (blue) and high (red) dew point with percentile bands (inner band from 25th to 75th percentile, outer band from 10th to 90th percentile).

Wind Speed and Direction

Figure 5-6 Climate - Wind



The average daily minimum (red), maximum (green), and average (black) wind speed with percentile bands (inner band from 25th to 75th percentile, outer band from 10th to 90th percentile).



The fraction of time spent with the wind blowing from the various directions over the entire year. Values do not sum to 100% because the wind direction is undefined when the wind speed is zero.

Weather data for Sisimiut and Maniitsoq, the closest communities on the coast, show somewhat similar seasonal patterns in terms of temperature, precipitation and wind speed. However, temperatures are slightly cooler on the coast and precipitation slightly higher.

The weather data indicate reasonably benign operating conditions during the proposed operating season from early March to mid-December. No problems are anticipated with mining activities due to weather. The wind speed and wind direction data indicate relatively sheltered and calm conditions for ship loading operations.

5.3 Local resources and infrastructure

As the Property is located on the Arctic Circle there are certain limitations for various activities. Exploration techniques such as prospecting, heavy mineral sampling and geological studies are limited to the summer months (May to September) when the snow cover has melted. Activities such as ground or airborne geophysics and drilling can be conducted year round. Mining activities can be undertaken on a year round basis but are typically confined to the mid-March to mid-November time frame due to navigational limitations on shipping.

Power for operations in the field must be generated locally. Drilling, augering and water supply and drainage are supported by diesel and gasoline powered generators. Camp power is provided by diesel generators and transportation power is provided by diesel in the case of excavators, haul trucks and other mobile equipment. Fuel is typically delivered by coastal tanker or barge in 200 litre drums or 1,000 litre containers, and can also be offloaded to receiving tanks in larger quantities via hose lines.

At the time of writing this report, Hudson had constructed approximately 4 km of the 10 km of road from the port site to the quarry site and blasted a significant laydown area at the port site.

5.4 Physiography

The White Mountain project area has a gently rolling terrain in an east-west direction and gradually rises to the north until it forms a large, reasonably steep ridge reaching an elevation of approximately 1,000 m. The area underlain by the anorthosite is less rugged and slightly more vegetated due to its lower elevation. The proposed quarry site is at approximately 450 m elevation and will be benched into the face of the hill to a top elevation of approximately 560 m. Hudson’s exploration camp has easy access to the site from the north side of the fjord.

5.5 Vegetation and wildlife

The area is host to subarctic vegetation, with till-covered areas blanketed by grasses and ground shrubs (Labrador tea, dwarf willow and birch) and flowering plants. Wildlife is plentiful in the general region, and includes caribou (reindeer), muskox, arctic hare, ptarmigan and other land and sea birds. The majority of the wildlife is concentrated in the Sarfartoq Valley across the Sondre Stromfjord and outside of Hudson’s Naajat exploration license.

5.6 Seismicity

There is no significant seismic activity recorded in this region.

6 History

The Sarfartoq region has been the focus of several sustained exploration programmes over the past 50 years. Early stage generative diamond exploration was conducted by subsidiaries of De Beers and Rio Tinto in the early 1970's. Later, in the 1980's work was conducted on the carbonatite looking for niobium and tantalum. The 1990's saw a sustained generative campaign on diamond exploration as a result of the discovery of the Canadian diamond mines in the Canadian arctic. In certain areas, Hudson's exploration licences overlap areas previously held by Platinova A/S, Monopros Ltd. (DeBeers), Dia Met Minerals Ltd. (Subsequently BHP), Aber Resources, and Metalex Ventures Ltd.

There are reports of Kryolitfabriken Øresund A/S (KØ) exploring the anorthosite in the late 1970's and early 1980's. KØ is the Danish company that mined cryolite at Ivigtut in south Greenland until 1987 when the deposit was depleted. KØ was following up on earlier work on Norwegian anorthosites with respect to exploring ways for extracting the alumina from calcium rich feldspars using HCL leaching. They concluded that the Greenland anorthosite samples at Qaqortorssuaq (White Mountain) were superior to the Norwegian samples in this respect. There are no reports of further work.

In 1995 and 1996, Inco Limited explored a wide area generally north of the Naajat EL but including sampling locations on the licence area. They were looking for nickel but sampled some of the anorthosites. No further work was recommended after two years of work.

Hudson undertook exploration work in the property in 2007 as part of a diamond exploration program. Drilling identified significant intersections of anorthosite.

Drill core from this program was re-evaluated in 2011/12 for its anorthosite content and a follow-up drill program completed over the White Mountain property and a bulk sample program completed in 2012. A resource estimate on the Naajat EL was prepared by Druecker and Simpson (2013), (see Table 1-1). This estimate is NI 43-101 compliant and is current.

7 Geological Setting and Mineralization

Hudson's White Mountain Project is located at the head of the Itivdleq fiord next to Sondre Stromfjord in central West Greenland. This Archean (~3000 Ma) calcic anorthosite has been preserved as a nearly un-deformed "island" within the southern margin of the Proterozoic (~1900-1800 Ma) Nagssugtoqidian fold belt. Project geology shows the anorthosite cut by minor northerly striking, un-deformed mafic dikes (Kangamiut ~2000 Ma) with near vertical dips and less than 25 meters thickness. These dikes represent less than 1% of the surface area within the anorthosite. Marginal to the anorthosite body, Proterozoic gneissic basement rocks of amphibolite facies show strong dynamic shear metamorphism outward from the contact.

7.1 Regional Geology

The rocks forming the northern part of the Archean block in West Greenland are cut by swarms of mafic dykes. Towards the north the dykes, together with their country rocks, are progressively deformed and metamorphosed resulting in a reorientation and parallelization of dykes and country rock structures. These changes formed the basis to help distinguish the Nagssugtoqidian complex from the Archean complex in West Greenland.

The Nagssugtoqidian fold belt is mainly composed of reworked Archean basement of amphibolite facies gneisses of granodioritic composition. These gray coloured amphibolite gneisses are composed of plagioclase (An_{15-25}), microcline, quartz, biotite, hornblende with minor amounts of garnet. Basic to intermediate intrusives are found in the southern portion of the fold belt as deformed and metamorphosed dykes and sheets. The younger north-northeast striking (Kangamiut) dyke swarm is gabbroic (diabase) in composition. South of the Nagssugtoqidian boundary, the northern portion of the Archean block is composed of mostly granulite facies gneisses of granitic and syenitic composition.

Figure 7-1 illustrates the geology of West Greenland and the mineral occurrences found in the region.

7.2 Local Geology

Adjacent to the Sondre Stromfjord several small ultrabasic bodies and a large mass of anorthosite are present. These ultrabasic rocks range from dunites, peridotites, pyroxenites (hornblendites) to serpentinites. While the outer margins of these ultrabasic lenses are nearly always sheared and metamorphosed, the central portions often retain their original textures and mineral composition. The large mass of anorthosite known as White Mountain (Qaqortorsuaq) is a high purity, calcic anorthosite that is the subject of this report and described in the following section. Figure 7-2 illustrates the geology of the White Mountain area.2

Figure 7-1 Regional geology and selected mineral occurrences

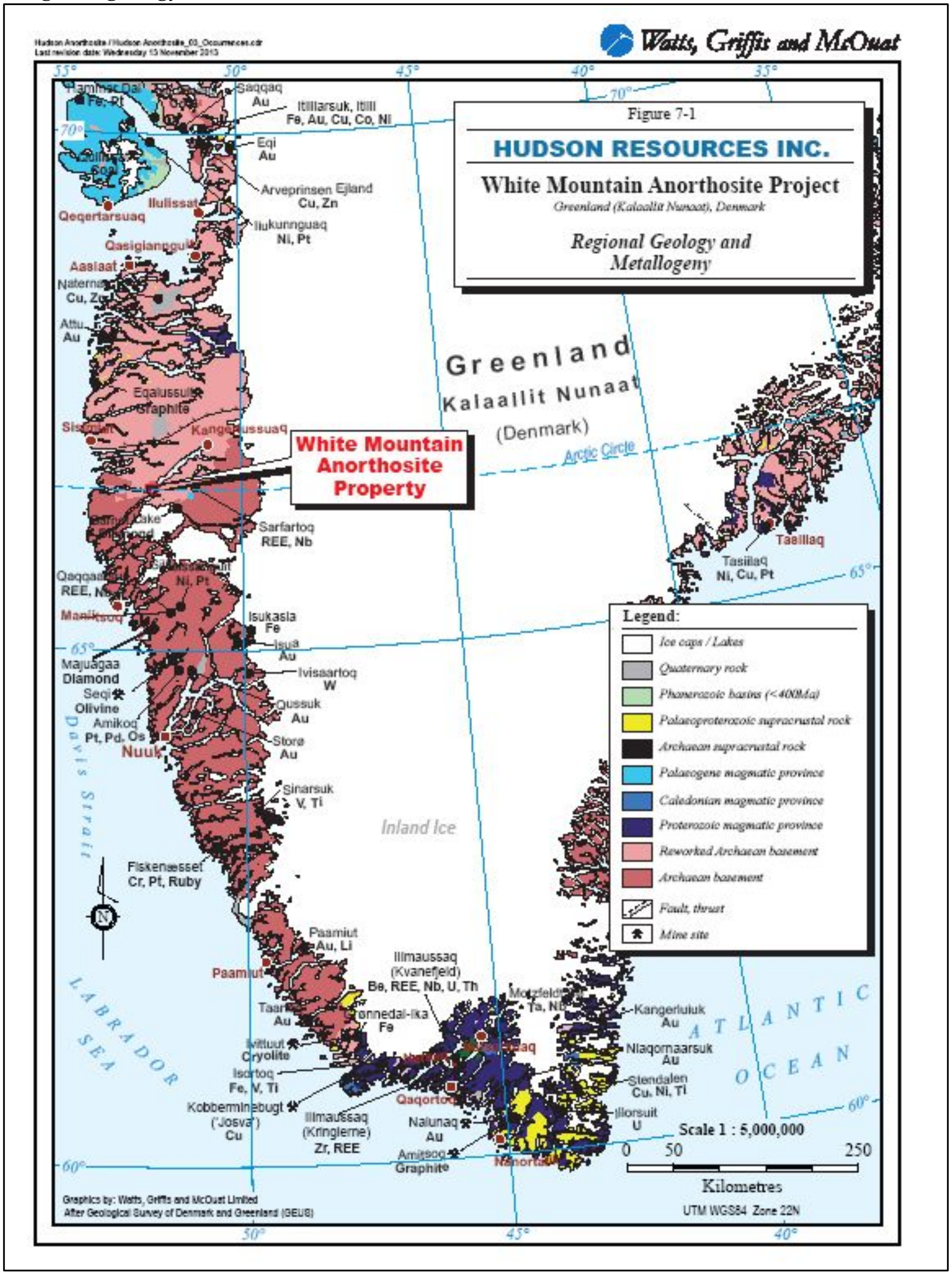
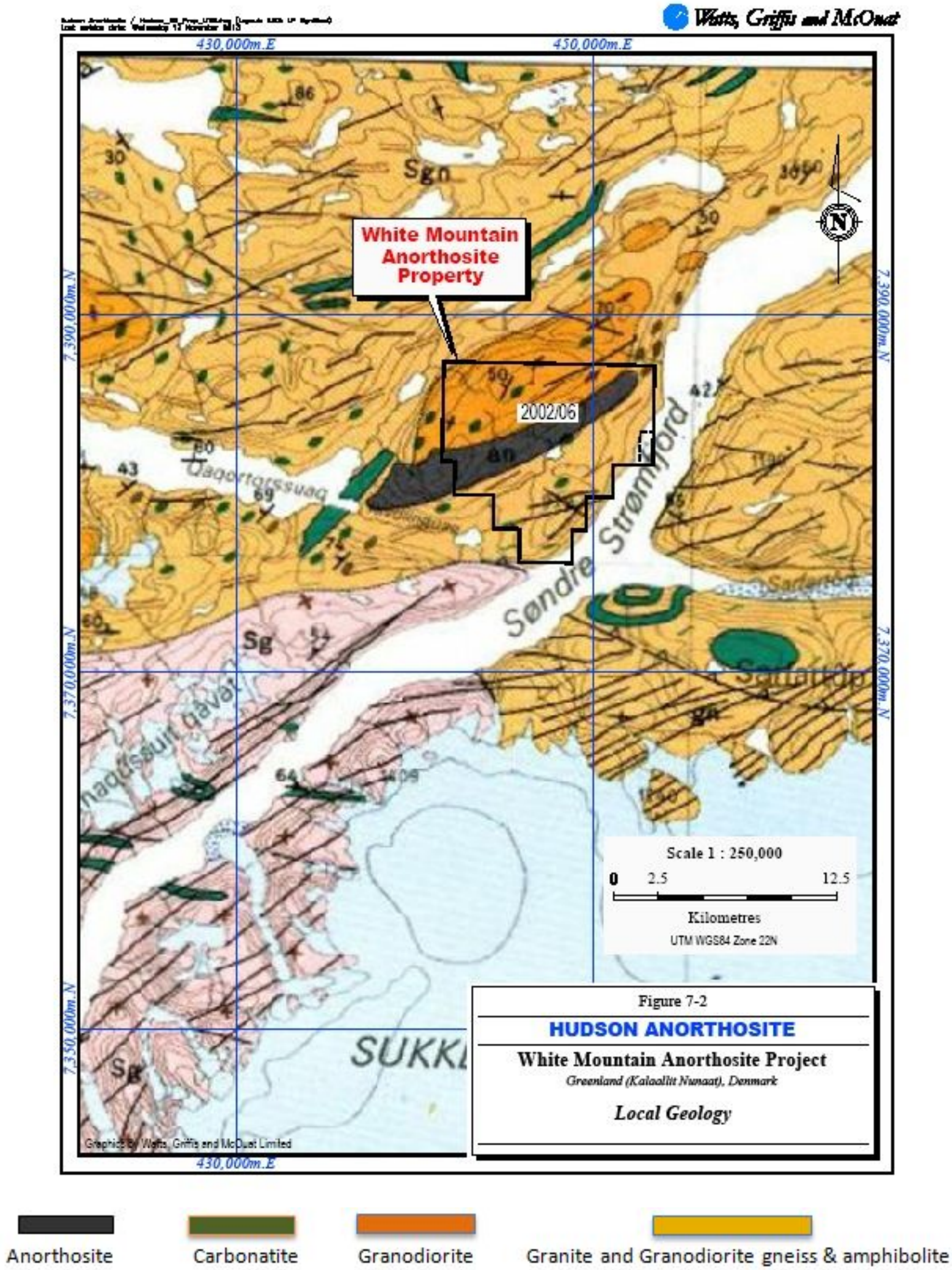


Figure 7-2 Local geologic setting



7.3 Property Geology

Hudson's White Mountain Property is host to a weakly metamorphosed, calcic anorthosite layered intrusion composed of nearly monomineralic high-calcium plagioclase (bytownite, An_{80-85}) with extensive preservation of both primary igneous textures and minerals. Occasional zones of cataclastic "crush" textures within calcic plagioclase and minor amounts (less than 1%) of clinozoisite and muscovite have been noted in the field and during petrographic examination. Within the project area, the calcic anorthosite is lenticular in shape with an east-northeast trend, covering a surface area of over 20 square kilometers.

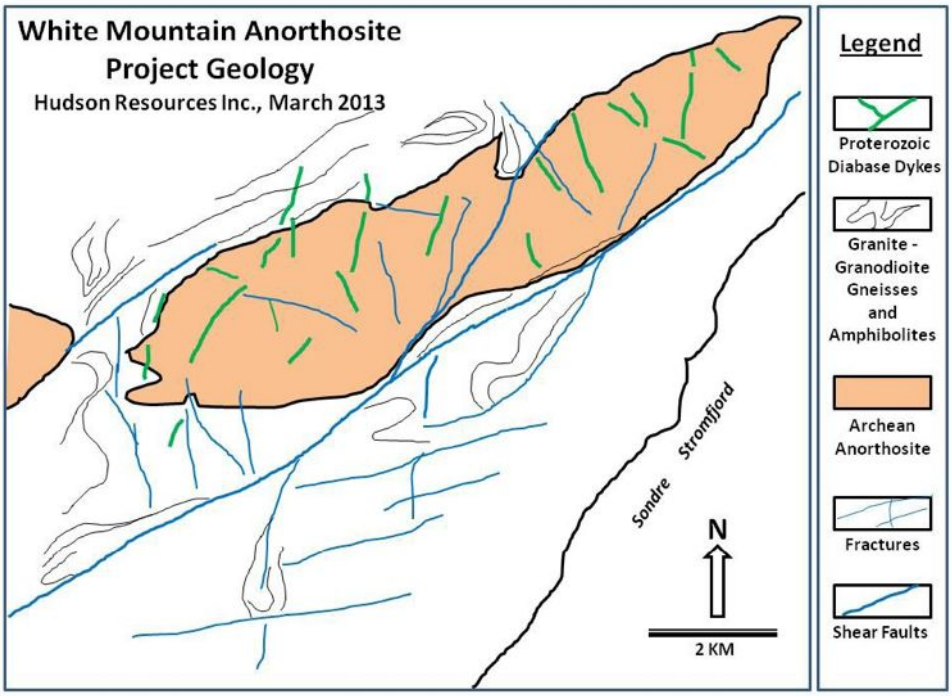
Mapping and field investigations in 2012 by Hudson technical staff have shown the calcic anorthosite within the property to be an elongate layered body with a strong east-northeast structural trend and a north-northwest (25-40 degree) dipping plunge (Figure 7-3). The southern margin of the anorthosite shows strong shearing (dynamic) in contact with Proterozoic gneisses containing deformed mafic (Kangamiut) dikes. To the north, the anorthosite is in a more gradational (regional) contact with an enclave of overlying, weakly deformed Archean mafic gneisses. The anorthosite appears to be the central portion of an Archean "island" block cut by un-deformed mafic dikes with only minor Proterozoic (Nagssugtoqidian) deformation.

Deformation within the anorthosite body is confined to narrow orthogonal shear zones (shear couples) composed of pinch and swell (1-10 meter wide) gneissic foliation/banding of intermediate composition. Occasionally, when these shear foliations intersect wide (+20 meter) un-deformed mafic dikes, schlieren and/or deformed amphibolite lenses occur along narrow (1-2 meter) crossing fractures (Figure 7-4). In general, the north-northeast trending mafic (Kangamiut) dikes show little to no deformation within the anorthosite (Figure 7-5). Considering all the above, greater than 90 percent of the exposed anorthosite body is composed of nearly pure high calcium (bytownite) plagioclase with only minor zones of mafic dikes, shear induced amphibolite foliation, weak to moderate plagioclase crushing, and very minor isochemical recrystallization of bytownite to clinozoisite.

7.4 Mineralization

Mineralization on the property consists of anorthosite with minor muscovite (2%) and clinozoisite (3%). Rutile, pyrite and biotite are present in extremely small amounts (<<1%) Thin section petrographic analysis (Le Couteur, 2012) indicates the anorthosite is composed of approximately 95% plagioclase. The rock is hard, massive and has an off-white colour with some vaguely defined patches having a faint brownish cast. The plagioclase varies in grain size up to about 30 mm across. The brownish-tinged patches appear to be large single crystals. The rock is described as coherent but crazed with fine fractures radiating in all directions, indicating the impact of tecto-morphism activity. Pale yellow clinozoisite grains up to 8 mm across, but typically less than 2 mm, account for about 2% of the rock mass. The clinozoisite grains are scattered throughout the rock mass, with some strung along fractures or present a fine veinlets. Pale-yellowish silvery muscovite up to 10 mm across is present at about 2% of the rock mass. Small (<0.1 mm) re-brown biotite plates can be observed in the coarsest transparent plagioclase.

Figure 7-3 Project geology



Source: Druecker and Simpson, 2013

Figure 7-4 Deformed amphibolite folia, shear induced lenses in anorthosite

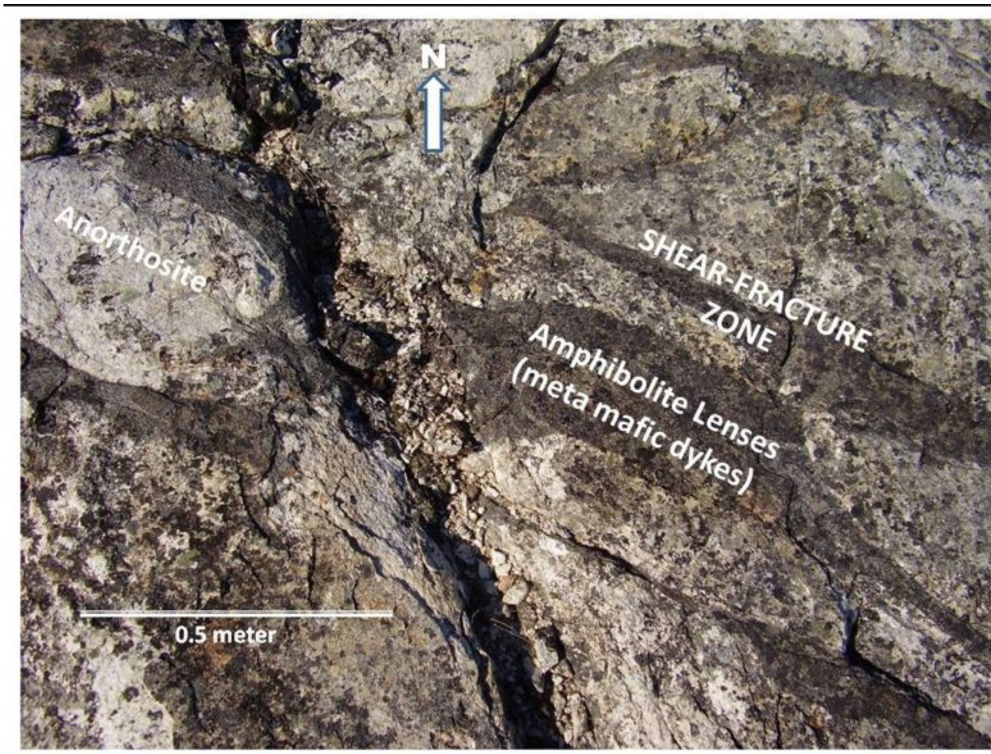
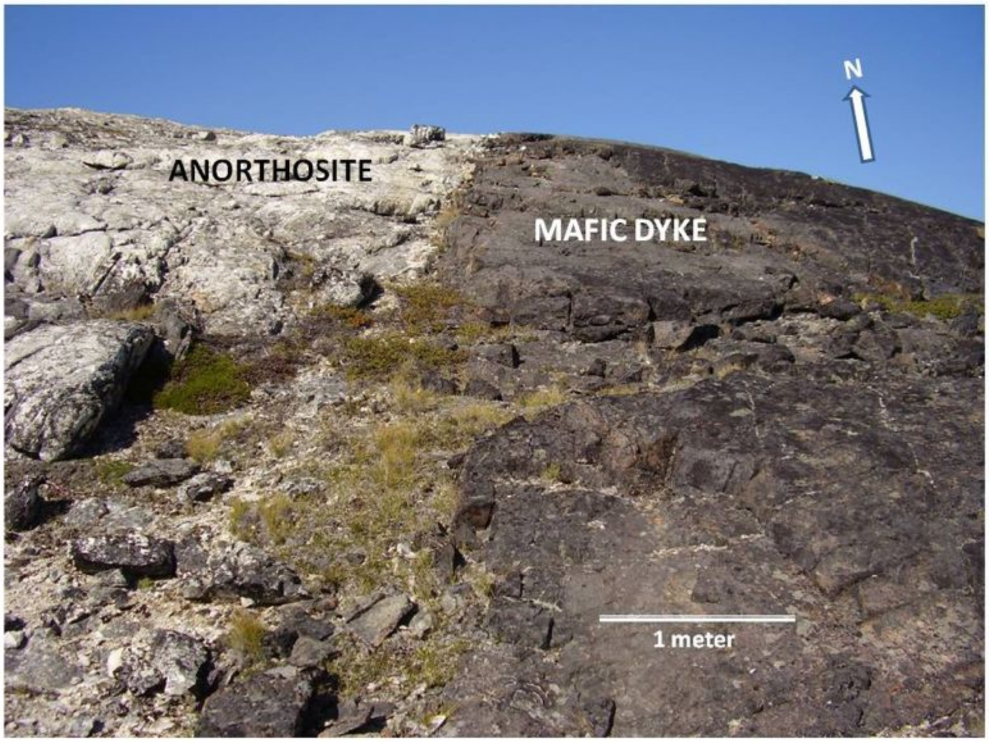


Figure 7-5 Contact of NNE trending, un-deformed mafic dyke cutting anorthosite



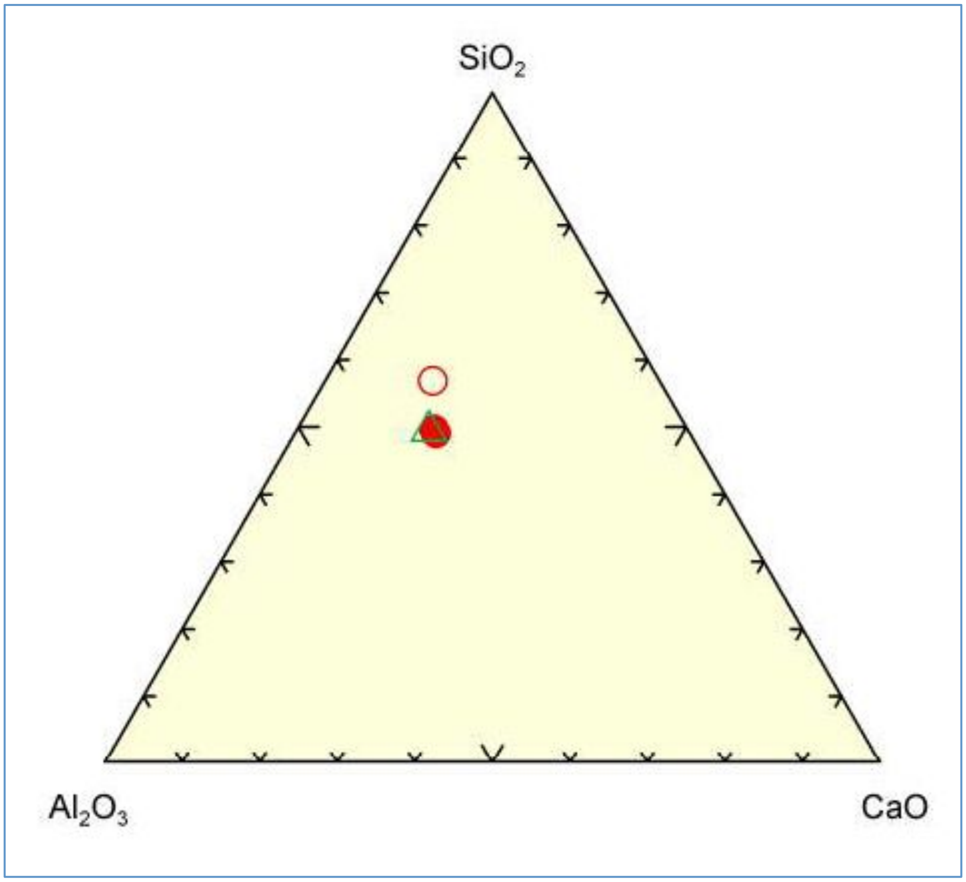
Chemical assays of various size fractions of the anorthosite were made by the Saskatchewan Research Council (SRC) and compared with EDX (Energy Dispersive X-ray) scans of two thin sections prepared for the petrographic analysis. Al_2O_3, CaO and SiO_2 account for 89% to 98% of the oxides. The levels of Fe_2O_3 and TiO_2 are low and the Al_2O_3 content high in the White Mountain anorthosite. Table 7-1 illustrates the chemical composition of the White Mountain anorthosite in comparison to reported literature values for 100% anorthosite. Figure 7-6 provides a graphical representation of the White Mountain anorthosite composition in comparison to reported literature values for the major oxides.

Table 7-1 SRC and Literature analyses for anorthosite (values in wt%)

Sample	Na_2O	MgO	Al_2O_3	SiO_2	K_2O	CaO	TiO_2	Fe_2O_3	Total
Scan section 1	2		31	47	1	17		2	100
Scan section 2	2		32	48		18			100
SRC average	2.31	0.41	31.81	46.97	0.28	16.27	0.04	0.8	98.9
Reference	3.15	2.12	25.86	50.28	0.65	12.48	0.64	3.26	98.4

Source: Le Couteur, 2012

Figure 7-6 Observed vs theoretical anorthosite comparison



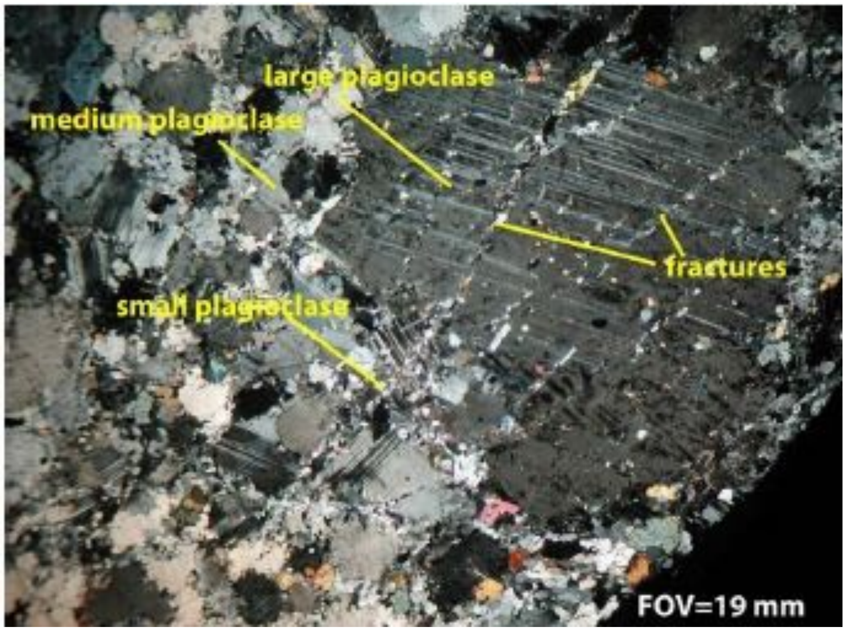
Comparison of major oxides in 2 EDX scans (solid red dots), SRC average value (green triangle), literature value for anorthosite (red circle)

Source: Le Couteur, 2012

Thin section analysis of the anorthosite (Le Couteur, 2012) shows the following with respect to the major minerals in the rock:

Plagioclase (95%) Fresh plagioclase is the predominant mineral and the rock has a distinctive texture in which the plagioclase occurs in three separate sizes (Figure 7-7). The coarsest type (20-25%) forms rounded tabular grains that in thin section are up to at least 25 mm long. These float in a matrix of finer grained plagioclase (60-70%), equant grains generally from 1 to 4 mm across that form a mosaic texture (Figure 7-8), with some suturing of the contacts (Figure 7-9). The third variety of plagioclase (10-15%) are much smaller grains, typically 0.1 to 0.3 mm across, and are equant polygonal grains that form one to three grains deep along the contacts (Figure 7-9) of the medium and coarse grains and also in linear bands (Figure 7-10) that traverse the rock and are up to 2 mm wide but mostly <0.2 mm wide. Fine plagioclase is the main constituent of the grains that encircle larger plagioclase (Figure 7-8) and also the linear zones (Figure 7-10), but in both these situations it is accompanied by lesser amounts of clinozoisite and muscovite. The linear zones appear to be healed fractures and in one large crystal a lateral offset of plagioclase twin lamellae of 0.15 mm was measured (Figure 7-10)

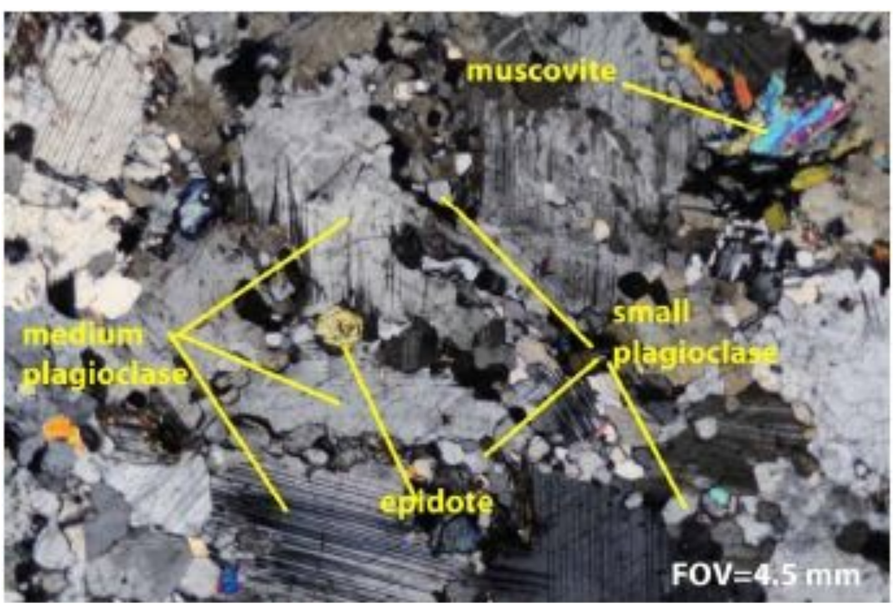
Figure 7-7 Micrograph showing three sizes of plagioclase



Bright coloured grains are clinozoisite and muscovite. Linear fractures marked by small plagioclase, clinozoisite and muscovite

Analyses of the coarse and the medium plagioclase indicate it is the calcic variety **bytownite**, with composition An_{90}

Figure 7-8 Medium plagioclase crystal

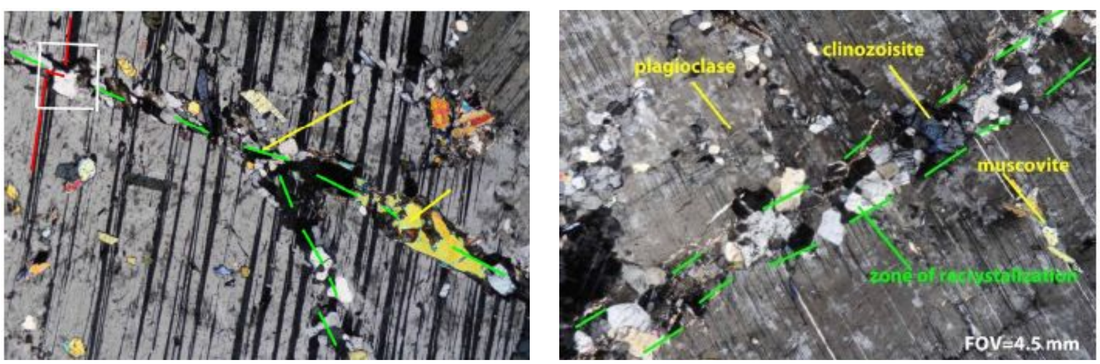


Small plagioclase, clinozosite and muscovite at grain margins

Figure 7-9 Medium and small plagioclase crystals

Medium plagioclase showing sutured margin with surrounding plagioclase grains

Figure 7-10 Medium and small plagioclase crystals

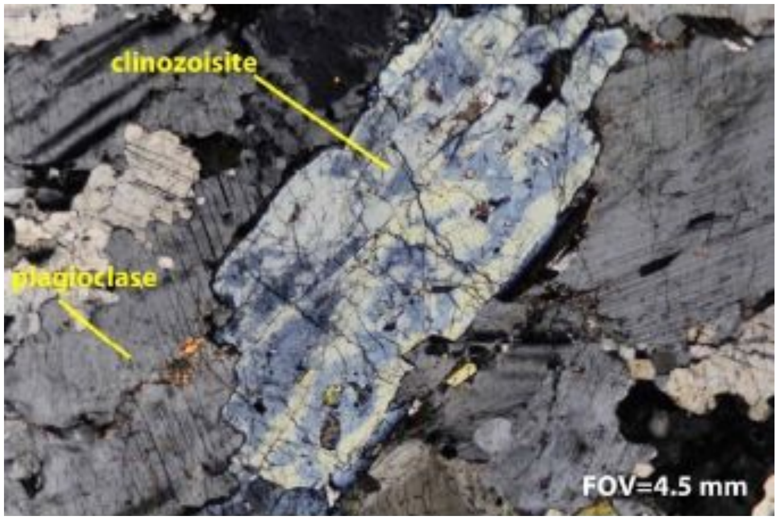


Part of a large plagioclase with a fracture showing offset of twin lamellae (red lines) and growth of small plagioclase, clinozoisite and muscovite along fractures (green lines)

A fracture zone (green lines) in a large plagioclase filled with small plagioclase and clinozoisite

Clinozoisite (3%) A pale yellow-green member of the Epidote Group, it typically forms subhedral crystals, with some euhedral crystals that have rhombic cross sections and prismatic long sections, and are up to 4 mm long but typically are <1 mm. Under crossed polarizers they may show patchy concentric zoning. This mineral is closely associated with the finest-grained plagioclase, circling medium-grained plagioclase (Figures 7-8, 7-10) and forming part of the fracture fillings (Figures 7-8, 7-11)

Figure 7-11 Coarse clinozoisite crystal

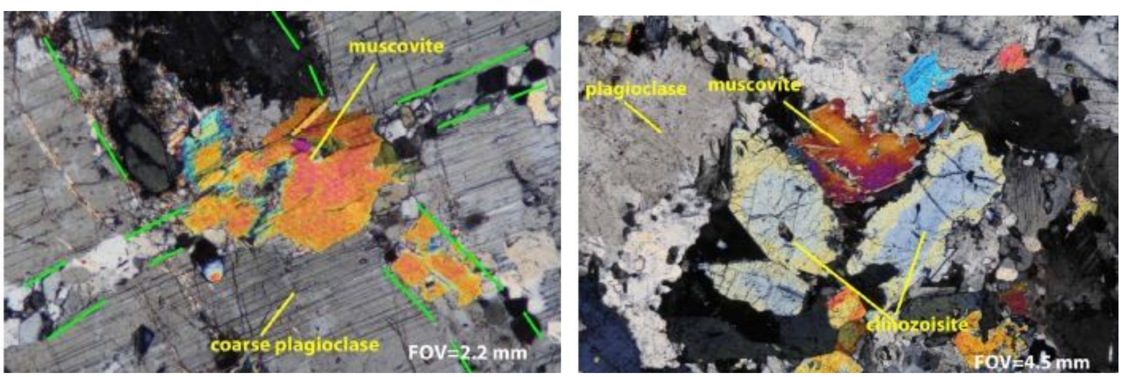


A coarse crystal of clinozoisite shows patchy zoning

Analyses indicate it is the low-Fe variety **clinozoisite** in the epidote-clinozoisite continuous solid solution series.

Muscovite (2%) Muscovite typically forms shapeless grains (Figure 7-12) to 2 mm across associated with clinozoisite and the fine-grained plagioclase.

Figure 7-12 Muscovite

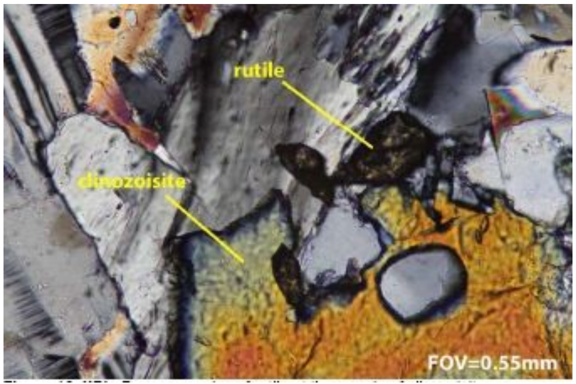


A coarse muscovite at the intersection of two fractures in a large plagioclase.

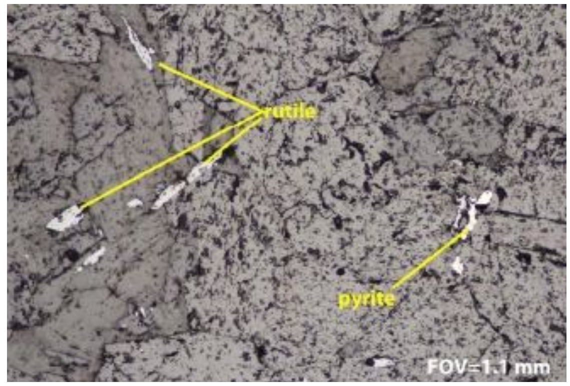
Clinozoisite associated with muscovite

Rutile (<<1%) About 20 grains of rutile (Figure 7-13) were observed closely associated with muscovite and epidote. These grains are barely translucent, pale brown in thin section and moderately grey-reflective in reflected light. They are smaller than 0.2 mm and vary from shapeless to elongate and subhedral laths.

Figure 7-13 Rutile and pyrite



Brown granules of rutile at the margin of clinozoisite

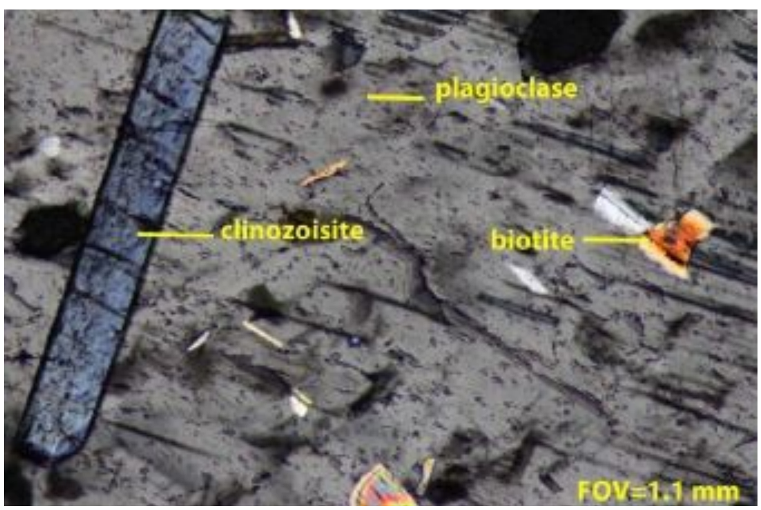


Slivers of rutile, irregular pyrite grain

Pyrite (<<1%) One elongate grain of pyrite (Figure 7-13) was noted associated with rutile-epidote-muscovite.

Biotite (<<1%) Rare red-brown biotite (Figure 7-14) flakes <0.05 mm were observed as inclusions in coarse plagioclase

Figure 7-14 Biotite



Flecks of biotite and a prism of clinozoisite in coarse plagioclase

The anorthosite exhibits an unusual texture with three sizes of plagioclase. This, combined with the presence of linear fracture zones filled with rounded grains, rare bending of plagioclase twin lamellae and the presence of epidote and muscovite in the fractures and also surrounding feldspar grains are interpreted by Le Couteur as evidence of considerable metamorphic modification of the anorthosite.

The high Al content in the anorthosite is attributed to substitution of Ca for Na, necessitating a substitution of Al for Si to preserve charge neutrality. Geochemically, there is little change in the distribution of the major oxides with grain size (Table 7-2, Figure 7-15). However, the minor oxides such as TiO_2, MnO, Fe_2O_3 do show an increase in content with decreasing grain size. The petrographic examination indicates that much of the Fe is present in clinozoisite (2 to 7% Fe_2O_3) and perhaps in trace pyrite and biotite. The Ti is carried by both rare granules of rutile (but 100% TiO_2) and by larger amounts of muscovite (but only 1% TiO_2). The behaviour of MnO is similar to Fe and Ti and is suspected to be contained mainly in clinozoisite. All of these minerals are present in the fracture zones and along the contacts of the large and medium-sized plagioclase and it seems possible that when crushed the rock might preferentially break along plagioclase grain boundaries and also along the healed fractures, partly because of the small smear of weak muscovite. If so, the finer size fractions might be expected to have a higher content of clinozoisite, muscovite, rutile and pyrite broken free or rubbed off the larger grains and would be reflected by higher Ti and Fe in the fines. This aspect has been demonstrated in process test work and is favourable for use of the anorthosite in the manufacture of alumina.

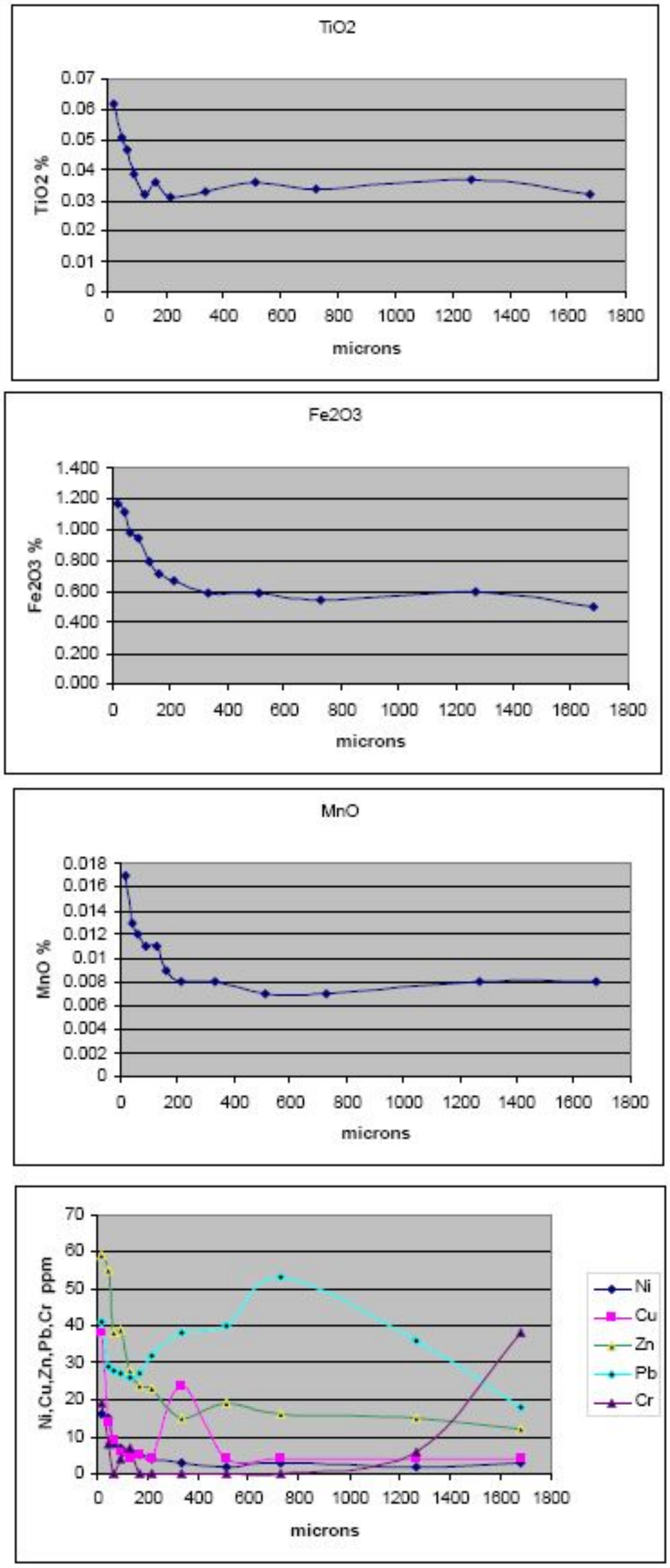
Trace metals (Ni, Cu, Cr, Zn and Pb) also show higher values in the <200 mesh fraction, but also other features that may be due to contamination during crushing (eg. Cr, Cu). Pb may be present in substitution for Ca^{2+} in the plagioclase.

Table 7-2 XRF analyses of size fractions

Sizes	mesh (US)	10	10-20	20-30	30-40	40-60	60-80	80-100	100-140	140-200	200-270	270-400	-400
Sizes	microns	1680	1267	726	511	337	215	165	128	90	64	45	19
TiO2	Wt %	0.032	0.037	0.034	0.036	0.033	0.031	0.036	0.032	0.039	0.047	0.051	0.062
Cr	ppm	36	6	<4	<4	<4	<4	<4	7	4	<4	6	19
MnO	Wt %	0.008	0.008	0.007	0.007	0.008	0.008	0.009	0.011	0.011	0.012	0.013	0.017
Fe2O3	Wt %	0.500	0.593	0.542	0.590	0.590	0.668	0.711	0.794	0.943	0.985	1.114	1.170
Ni	ppm	3	2	3	2	3	4	5	6	7	8	15	16
Cu	ppm	4	4	4	4	24	4	5	4	6	9	14	38
Zn	ppm	12	15	16	19	15	23	24	28	39	38	55	59
Pb	ppm	18	36	53	40	38	32	27	26	27	28	29	41
Co	ppm	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Sc	ppm	5	6	4	6	5	5	4	5	4	4	5	4
V	ppm	7	6	4	6	5	6	6	7	8	7	7	9
Ga	ppm	17	19	19	18	17	19	17	18	19	18	19	18
As	ppm	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Rb	ppm	2	3	3	3	4	4	4	3	4	4	4	5
Sr	ppm	167	182	179	178	176	178	172	175	181	181	181	187
Y	ppm	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
Zr	ppm	14	15	15	15	16	15	18	17	17	18	19	22
Nb	ppm	3	2	1	2	2	2	1	2	2	2	2	3
Mo	ppm	1	2	1	1	1	2	2	2	1	1	2	2
Sn	ppm	4	5	8	6	5	5	3	4	5	5	7	9
Sb	ppm	9	10	11	8	7	8	7	7	6	9	9	9
Cs	ppm	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Ba	ppm	51	55	51	57	67	67	68	60	61	60	59	92
La	ppm	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	10
Ce	ppm	<4	<4	<4	4	<4	<4	7	4	<4	4	<4	28
Th	ppm	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13	<13
U	ppm	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2

Source: Le Couteur, 2012

Figure 7-15 Major oxide and trace element variation by crush size



Source: SRC, 2012

8 Deposit Types

Metamorphosed calcic anorthosites form one of the most distinctive rock units in the Archean gneiss complex of West Greenland. These anorthosites are of special interest because of their unusual composition with extremely calcic plagioclase, low-levels of extraneous mineral contaminates, and extensive preservation of primary igneous textures and minerals. These unique mineral-chemical attributes are directly linked to their potential use in various industrial mineral applications, in particular, their use as an alternative source of raw material for the aluminum industry (Knudsen, C., Wanvik J. & Svahnberg H., 2012).

Similar high calcic anorthosites have been studied and explored for in the Sognefjord-Voss area of western Norway (Jan Egil Wanvik, 2000) and in the Shawmere area of Ontario (Dolan, Hains and Ash, 1991). During World War II, the Norwegian anorthosites were studied for their potential use in various industrial mineral applications. Unlike the Greenlandic anorthosites, the calcic anorthosites of Norway are Proterozoic (1700 Ma) in age, and tend to be composed of plagioclase with a lower anorthite (An_{65-75}) content.

The Shawmere anorthosite complex is of Archean age (~2700 Ma). It has a high anorthite content (>An_{85}, bytownite) and has been evaluated for the production of alumina and as a source of alumina for production of aluminum chemicals and in the manufacture of E-glass (Veldhuyzen, 1994, Hains, 1995).

9 Exploration

Exploration activities by Hudson other than drilling in 2012 consisted of project scale geologic mapping, portable x-ray fluorescence grid survey, and chip channel geochemical/assay sampling at one selected site. Included as part of Hudson's exploration database over the White Mountain project is a regional airborne magnetic survey conducted by Fugro Airborne Surveys Corp. of Mississauga, Canada for Hudson, and completed in July of 2004. This survey was flown with a helicopter using the DIGHEM system with a high sensitivity, horizontal gradient cesium magnetometer at 100 meter line spacing.

Project scale mapping of the geology over the White Mountain anorthosite within the concession boundaries was initiated in the summer of 2012, consisting of both wide spaced (+100 meter) grid mapping and more detailed follow-up traverse mapping. The preliminary geological map of the White Mountain anorthosite is presented in Figure 7-3 in Section 7.3 Property Geology.

9.1 Portable X-Ray Fluorescence Grid Survey

Concurrent with the geologic field and photo mapping, a total of 817 averaged x-ray fluorescence (XRF) analytical readings were taken with a field portable, hand held XRF instrument (Delta-50 Premium by Innov-X Technologies Canada). At each grid station site a series of three 60 second XRF readings were recorded and averaged. Each XRF reading records the values of the major (Si, Al, K, Ca, Fe, Mn) and minor (P, S, Cl, Ti) elements as oxides, and over 21 trace element values as parts per million (ppm). Quantitative XRF analysis is possible with attention paid to both the ambient site conditions (moisture and temperature) and proper positioning of the detector window on the exposed rock sample. In some cases, ideal conditions may not be attainable, and only a semi-quantitative XRF analysis is possible. During the XRF grid sampling, readings that appeared spurious (high totals or excessive loss (LOI) were repeated on a different sample exposure. Following this QA/QC field procedure kept significant sample reading errors to a minimum, and helped to assure accurate XRF data recording.

Figure 9-1 shows the above referenced XRF grid (black crosses) over a color fill digital image of the calculated vertical magnetic gradient (CVG) from the airborne magnetic survey discussed above. The mapped anorthosite is outlined in black, and corresponds well to the area of a nearly flat, plateau-like magnetic susceptibility enclosed by strong magnetic banding and/or foliation. Areas with no XRF stations represent zones with lakes and/or glacial till cover.

Figure 9-1 White Mountain Anorthosite – XRF Grid Stations over CVG Magnetics

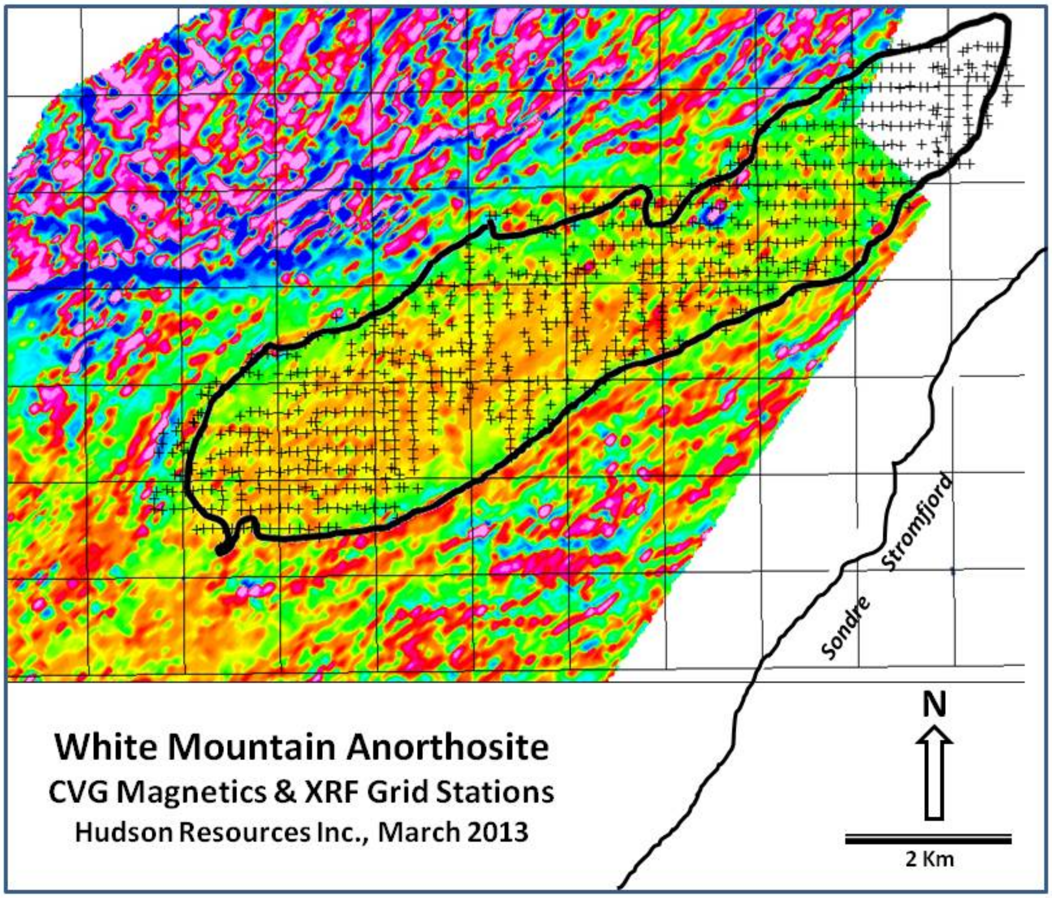
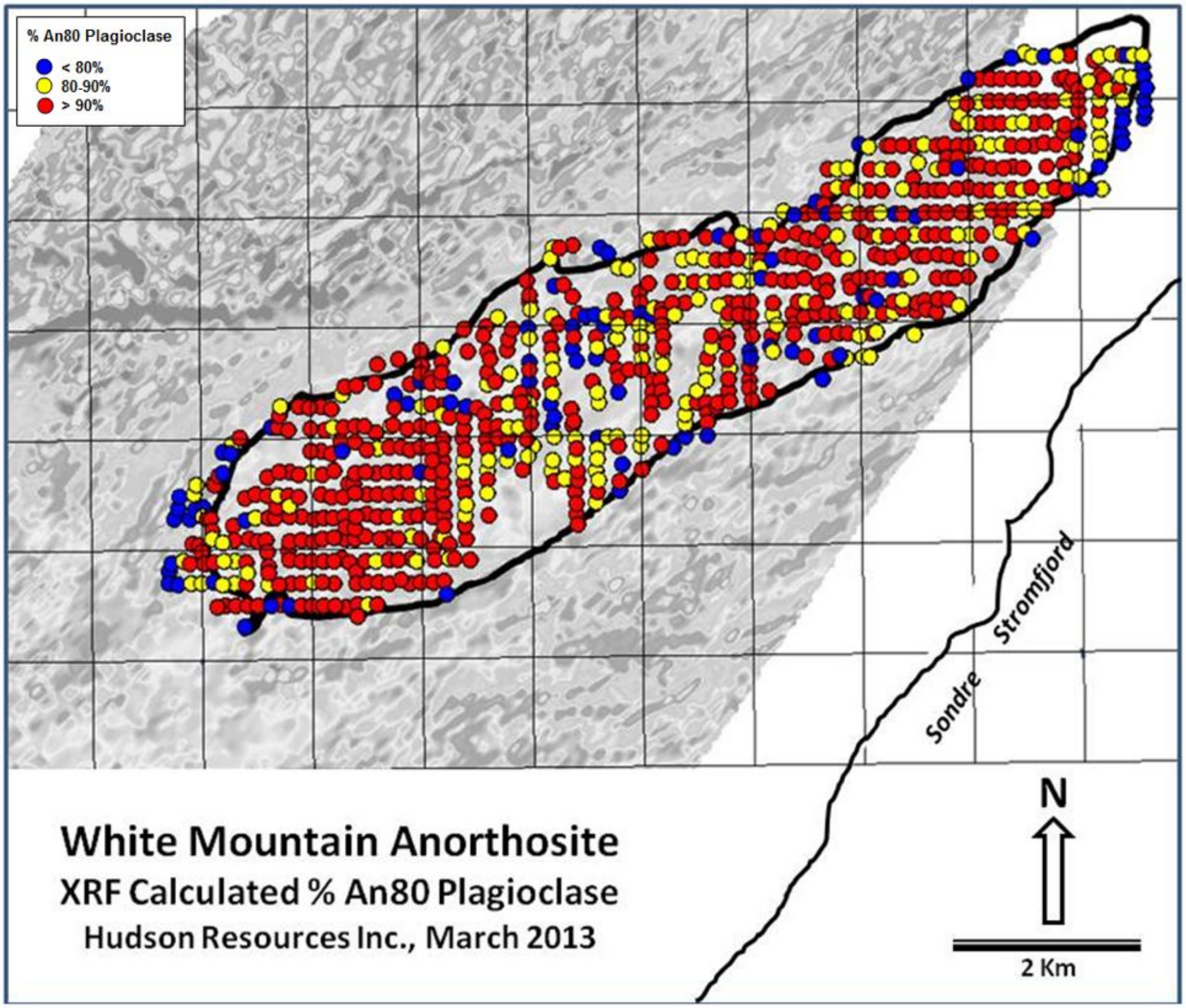


Figure 9-2 shows the percent ranges of An80 plagioclase as calculated from the XRF analytical readings at each grid station. Each coloured dot represents an average of three readings. Plagioclase percent was calculated using a formulation ratio (Ca, Al, Si) that compares percent difference of the site reading and the ideal formula of An80 plagioclase (bytownite). XRF readings taken on anorthosite samples with laboratory quantitative analytical results show percent error differences of usually less than 5%, and confirm the quantitative to semi-quantitative readings of the field portable XRF unit. The high purity nature of the calcic anorthosite at White Mountain over an extensive (+20 kilometers) area is clearly seen in Figure 9-2 with over 85 percent of the XRF sample site readings returning a calculated An80 plagioclase of over 90 percent.

Figure 9-2 White Mountain Anorthosite – XRF Calculated % An80 Plagioclase.



9.2 Geochemical Surface Sampling

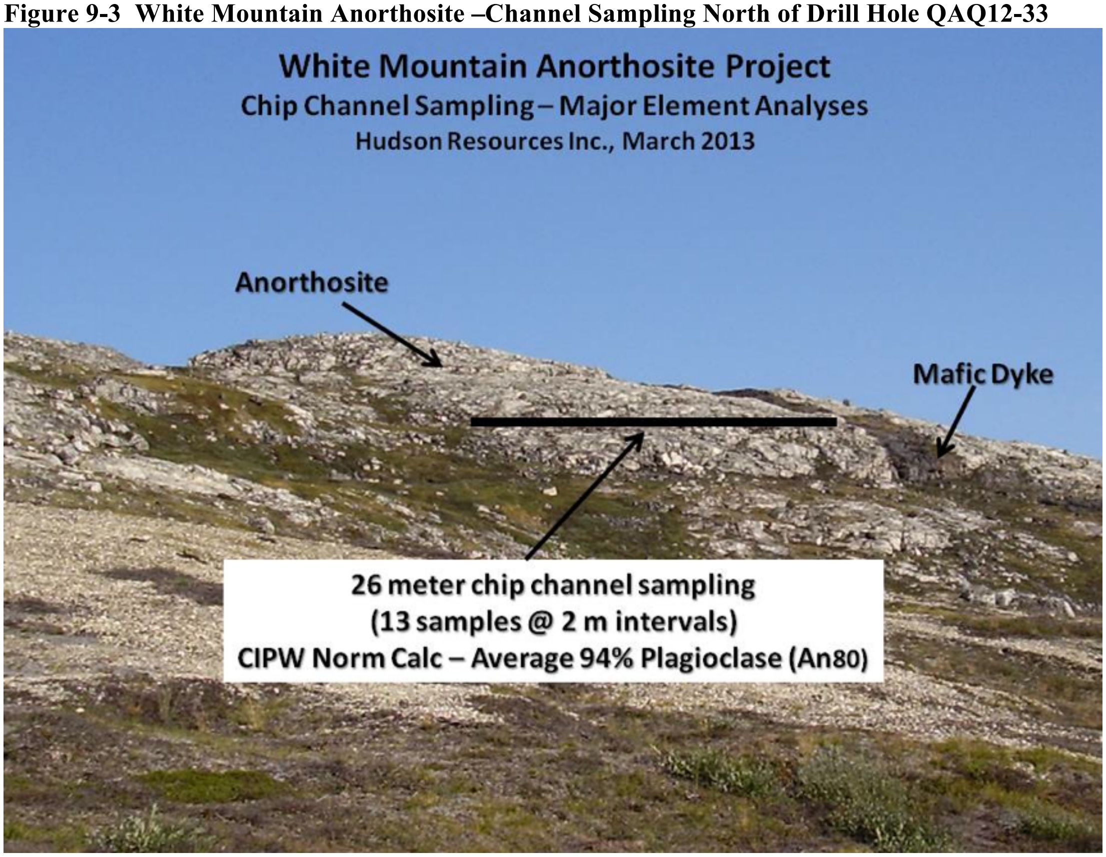
In addition to the extensive field readings with the portable XRF unit on exposures of the White Mountain Anorthosite, a few dozen surface geochemical samples were collected at various priority sites. In total, 23 grab samples and 13 chip channel samples were collected for laboratory analysis for both major and trace elements. At priority area drill hole grid 3 located in the southwestern portion of the anorthosite, 26 meters of contiguous chip channel sampling was completed. A total of 13 chip channel samples at 2 metre intervals were collected along an east to west vertical joint face of the exposed anorthosite (see Table 9-1 and Figure 9-3). Laboratory analytical results returned an average over 26 meters of 49.52% SiO_2, 30.65% Al_2O_3 , 1.22% Fe_2O_3, 14.77% CaO, 0.41% MgO, 2.50% Na_2O, 0.32% K_2O and 0.08% TiO_2. The low level of contaminates such as iron, magnesium and titanium is characteristic of this high purity calcic anorthosite. In addition, the total alkalis (sodium and potassium) are under 3% in the whole rock analysis. Inputting these oxide results into a CIPW Norm calculator, the 26 meter zone is calculated to contain about 94% plagioclase with an anorthite content of An_{80}.

It is also important to point out in Figure 9-3 that this chip channel sampling was done just to the west of an un-deformed mafic dyke approximately 4 meters in width and trending north-south. Little to no contamination from the dyke material is evident in either field observations during mapping or in the analytical results with regard to iron and/or magnesium in Table 9-1.

Table 9-1 White Mountain Anorthosite – Chip Channel Sampling Analytical Data

ID	UTM_	UTM_I	SiO2%	Al2O3%	Fe2O3%	CaO%	MgO%	Na2O%	K2O%	TiO2%
L975967	446396	7382007	47.80	31.70	1.16	15.50	0.29	2.31	0.25	0.06
L975968	446395	7382020	51.50	29.10	1.71	13.70	0.63	2.50	0.46	0.17
L975969	446393	7382018	49.30	32.00	0.91	15.55	0.23	2.53	0.27	0.05
L975970	446390	7382021	48.20	31.70	1.45	15.85	0.43	2.37	0.31	0.07
L975971	446390	7382020	47.30	32.10	0.94	15.80	0.24	2.48	0.25	0.05
L975972	446386	7382019	49.50	30.00	1.22	14.10	0.44	2.66	0.40	0.11
L975973	446389	7382024	47.90	31.50	0.96	15.35	0.27	2.43	0.23	0.05
L975974	446384	7382024	55.70	26.30	1.44	11.15	0.51	3.43	0.38	0.12
L975975	446382	7382019	48.20	32.20	0.99	15.45	0.27	2.61	0.25	0.05
L975976	446380	7382018	52.50	29.20	1.06	13.80	0.32	2.36	0.48	0.07
L975977	446379	7382019	49.50	28.40	1.94	13.95	1.12	2.26	0.40	0.15
L975978	446376	7382020	47.70	32.20	1.07	16.10	0.32	2.26	0.22	0.05
L975979	446373	7382019	48.70	32.10	1.01	15.75	0.29	2.35	0.22	0.05
Average			49.52	30.65	1.22	14.77	0.41	2.50	0.32	0.08

Figure 9-3 White Mountain Anorthosite –Channel Sampling North of Drill Hole QAQ12-33



10 Drilling

Druecker and Simpson (2013) provide full details on drilling activity on the property.

Drilling on the property has encompassed three grids (Figure 10-1). While anorthosite has been intercepted in all three grids, the focus of the current work is on Grid 3.

Drill hole locations for the 14 holes used in the 2013 resource estimate and in development of the mine plan for this report are detailed in Table 10-1. Elevations are given in height above sea level and height above ellipsoid (HAE) based on data from a Trimble hand-held GPS.

Table 10-1 Drill hole locations - 2012 drill program, grid 3

Hole ID	Northing	Easting	Elevation (masl)	H.A.E.[1]	Depth (m)
QAQ12-31	7381917.190	446151.323	505.584	535.861	100.65
QAQ12-33	7381926.650	446357.258	486.878	517.164	100.65
QAQ12-34	7381909.596	446449.455	483.679	513.971	51.85
QAQ12-35	7382000.861	446550.553	479.742	510.035	49.8
QAQ12-36	7382187.481	446443.678	525.712	555.678	100.65
QAQ12-37	7381990.705	446346.782	495.550	525.833	50.4
QAQ12-38	7382108.251	446347.996	519.043	549.322	76.25
QAQ12-39	7381997.913	446450.240	495.550	521.173	51.85
QAQ12-40	7382093.259	446544.233	481.430	511.719	51.85
QAQ12-41	7382094.261	446450.958	505.042	535.327	100.65
QAQ12-42	7382197.232	446547.564	509.950	540.235	100.65
QAQ12-43	7382203.750	446346.798	542.158	572.433	100.65
QAQ12-44	7382298.212	446342.171	573.313	603.585	51.85
QAQ12-45	7382312.892	446539.783	549.995	580.275	100.65

1) Height Above Ellipsoid

The drill data available as of this report indicate high quality anorthosite extends over a strike length of at least six kilometres. The 2012 drill program consisted of 45 holes drilled at 90^0 azimuth to a depth of 50 m to120 m. Druecker and Simpson report the following significant drill intercepts (Table 10-2) from the 2012 drill program:

Figure 10-1 Hudson drill hole locations

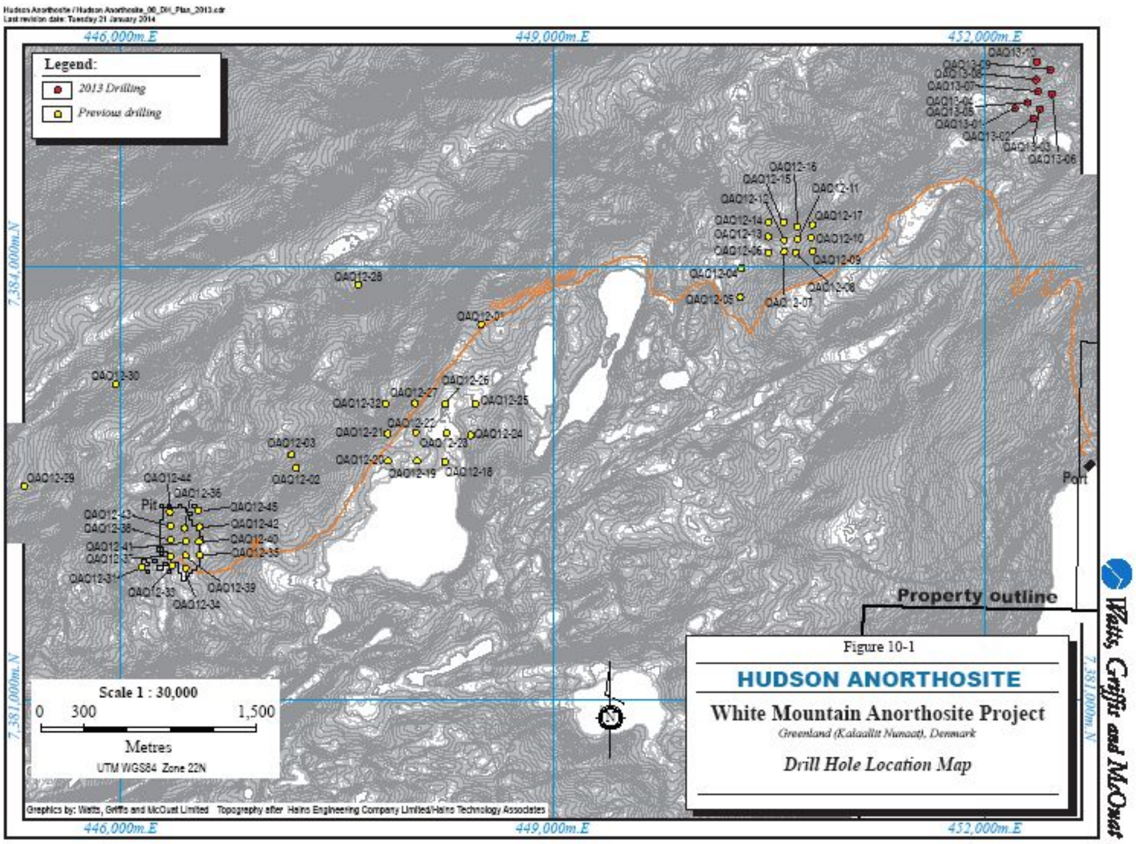


Table 10-2 Selected significant drill intercepts - 2012 drill program, grid 3

	Interval		Width	SiO2	Al2O3	Fe2O3	CaO	MgO	Na2O	K2O	TiO2	MnO	P2O5	SrO	BaO	Ni	Pb
Drill_Hole	From	To	m	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	wt%	ppm	ppm
QAQ12-31	6	94	88	49.218	30.370	1.139	15.278	0.586	2.334	0.207	0.088	0.014	0.032	0.033	0.014	10.860	2.737
QAQ12-33	2.87	20	17.13	48.357	31.871	0.983	16.000	0.269	2.266	0.217	0.046	0.010	0.015	0.029	0.010	1.571	2.333
QAQ12-33	28	34	6	47.800	30.767	0.937	15.333	0.273	2.520	0.397	0.043	0.010	0.010	0.037	0.010	1.333	2.667
QAQ12-33	36	40	4	47.700	31.000	1.160	15.800	0.370	2.250	0.640	0.055	0.020	0.030	0.040	0.045	3.000	3.000
QAQ12-33	48	56	8	48.150	30.950	1.150	15.475	0.305	2.423	0.383	0.058	0.013	0.020	0.030	0.015	1.250	3.500
QAQ12-34	12	24	12	48.167	31.033	1.198	15.658	0.443	2.248	0.183	0.075	0.013	0.012	0.028	0.010	6.000	3.000
QAQ12-34	36	46	10	49.120	30.900	1.300	15.440	0.500	2.368	0.276	0.080	0.016	0.018	0.032	0.014	5.000	2.000
QAQ12-35	2.4	48	45.6	47.565	31.470	1.077	15.954	0.350	2.153	0.146	0.057	0.012	0.014	0.027	0.013	2.773	2.000
QAQ12-36	22	50	28	49.764	30.529	1.219	15.264	0.454	2.316	0.209	0.076	0.014	0.020	0.030	0.011	5.462	2.500
QAQ12-36	78	94	16	48.550	31.625	0.869	15.150	0.246	2.378	0.189	0.044	0.010	0.016	0.030	0.010	2.125	2.000
QAQ12-38	8	46	38	49.126	30.121	1.254	14.861	0.445	2.396	0.188	0.077	0.015	0.024	0.032	0.011	4.684	2.500
QAQ12-39	6	50	44	49.105	30.295	1.125	15.298	0.406	2.284	0.194	0.062	0.012	0.015	0.026	0.011	3.600	3.000
QAQ12-40	5.15	34	28.85	49.093	31.050	1.091	15.811	0.369	2.284	0.178	0.061	0.014	0.018	0.029	0.012	3.286	2.000
QAQ12-41	20	50	30	48.447	30.967	1.143	15.377	0.416	2.221	0.209	0.057	0.013	0.017	0.028	0.016	4.571	
QAQ12-41	80	100.65	20.65	48.490	30.470	1.347	14.845	0.461	2.297	0.385	0.068	0.017	0.025	0.034	0.029	5.300	3.250
QAQ12-42	2	28	26	49.269	30.654	1.100	15.408	0.373	2.245	0.188	0.060	0.011	0.018	0.028	0.012	3.083	
QAQ12-42	62	78	16	48.975	31.025	0.994	15.331	0.343	2.383	0.238	0.058	0.010	0.019	0.031	0.011	3.375	2.000
QAQ12-43	40	100.65	60.65	49.257	30.570	1.206	15.275	0.423	2.253	0.160	0.079	0.014	0.023	0.027	0.011	4.333	2.333
QAQ12-44	1.6	26	24.4	48.375	31.708	0.991	15.817	0.314	2.254	0.147	0.057	0.011	0.017	0.026	0.010	1.182	2.500
QAQ12-45	8	22	14	48.600	31.329	1.200	15.600	0.434	2.236	0.154	0.073	0.016	0.015	0.024	0.010	4.857	3.333
QAQ12-45	24	34	10	49.360	30.620	1.138	15.200	0.382	2.436	0.186	0.072	0.014	0.024	0.030	0.010	3.600	3.600

A channel sampling and drill program in 2013 was conducted to delineate a potential resource closer to the port. The drill program consisted of 10 holes totaling 575.4 m. Holes varied in depth from 50.8 m to 70.15 m. Table 10-3 summarizes the 2013 drill program.

Table 10-3 2013 drill program summary

Hole ID	Easting	Northing	Elevation	H.A.E.	Depth	Azimuth	Dip
QAQ13-02	452333.860	7385031.017	363.710	394.154	51.85	0	90
QAQ13-01	452207.411	7385098.408	385.397	415.833	51.85	0	90
QAQ13-03	452380.428	7385094.416	368.211	398.655	51.85	0	90
QAQ13-04	452295.290	7385140.071	381.176	411.614	70.15	180	45
QAQ13-05	452295.290	7385140.071	381.176	411.614	51.85	0	90
QAQ13-06	452464.977	7385202.399	391.502	421.945	50.8	0	90
QAQ13-07	452368.542	7385218.212	391.323	421.761	51.85	0	90
QAQ13-08	452354.798	7385298.160	410.028	440.463	70.15	125	60
QAQ13-09	452452.016	7385367.332	419.447	449.884	64.05	305	60
QAQ13-10	452359.902	7385423.997	432.282	462.712	61	0	90

60 channel samples were collected, of which 28 assayed >30% Al_2O_3 and less than 2.5% Na_2O.

10.1 Bulk Sampling

In 2012, a bulk sample totaling approximately 120 tonnes of anorthosite was collected from surface at the southern portion of Grid 3. The sample was processed at the SRC in Saskatoon and the final product was shipped to Owens Corning for testing in one of their furnaces in Q2 of 2014.

Figure 10-2 Blasting Operation: 2012 Bulk Sample

Figure 10-3 Sample Verification by XRF: 2012 Bulk Sample

Figure 10-4 Bulk Bag Filling Operation: 2012 Bulk Sample

Figure 10-5 Blasted Material Ready for Loading: 2012 Bulk Sample

11 Sample Preparation, Analyses and Security

11.0 Sampling

For core logging, Microsoft Excel spreadsheets were used in order to record sample intervals, geology and other parameters. The geologist marked the core for splitting both at the ends of the sample interval and along the length of the core, indicating the splitting location, using a pencil. A hand splitter was utilized and the core was split in two pieces, with one-half put back in the core box and the other half sent for analysis. In general, the core had extremely good recoveries. A sample tag was left in the box.

In 2012, 101 blanks and 98 duplicates were inserted at regular intervals when preparing the split drill core samples (approx. one standard per 25 samples). The blanks consisted of local unmineralized and unaltered granitic gneisses from the Garnet Lake area. The analytical results were reviewed and assessed using the blanks, and the duplicates. At this time, the Company does not have a suitable standard that can be included. ALS Minerals includes standards in the ordinary course of analyzing the samples.

Split core is stored on site at Hudson's Sarfartoq camp.

The bulk sample was collected from the Grid 3 area based on the large area of clean material. The material was in-situ and was excavated using explosives and an excavator owned by Hudson.

11.1 Sample Interval

Drill core was sampled every two meters.

11.2 Chain of Custody

The core boxes were covered (wooden top) and bound with strong fiber tape, then transported by helicopter to the core shack at the Company's secure project campsite. At the core shack the core boxes were laid out, numbered and labeled, and two-meter sample intervals were marked over the drill core.

Sample numbers and intervals were recorded and entered onto paper and digital forms. All core boxes and select core sample intervals were digitally photographed and archived. The drill core was then split in half with a manual mechanical splitter and the half split, two-meter interval was placed in sample bags, labeled, marked with a unique in-sequence sample ID number, and sealed. The drill core was logged by Hudson geologists and consultants using paper and digital log forms that noted lithology, alteration, structure, recovery, specific gravity and mineralization.

Sample bags were then placed in large plastic containers or rice bags that were brought by helicopter to the Kangerlussuaq airport where they were flown to Copenhagen and then to the ALS Minerals lab in Vancouver. All sampling information is kept in ticket books, and paper and digital log forms for easy cross-referencing at the Company campsite office in Greenland and the corporate office in Vancouver.

The primary laboratory used for analytical work in 2012 was ALS Minerals in Vancouver. They are corporately accredited to ISO 9001A:2000.

11.3 Sample Preparation

Preparation of samples for analytical work was not performed by Hudson. Once diamond drill core samples were put into sample bags no other sample preparation steps were conducted by employees, consultants, officers, directors, or associates of the Company. Sample security was more than adequate at the project site.

At the laboratory the drill core samples were crushed to 70% 2mm or better which is a standard preparation procedure for samples where a representative split was pulverized. The sample was then split using a riffle splitter and pulverized to 85% passing 75 micrometres or better.

11.4 Laboratory Method

All of the core samples were analyzed using various methods depending on the element. A total of 56 elements and/or oxides were reported for each assay. For the purposes of this resource, it is important to ensure that there are no deleterious elements included in the anorthosite. An example of the report is included below.

Figure 11-1 Example of ALS Minerals Assay Suite used in Anorthosite Sampling

ALS Minerals

ALS Canada Ltd.
2103 Dollarton Hwy
North Vancouver BC V7H 0A7
Phone: 604 984 0221 Fax: 604 984 0218 www.alsglobal.com

To: HUDSON RESOURCES INC.
1460 - 1066 W. HASTINGS ST.
VANCOUVER BC V6E 3X1

Page: 1
Finalized Date: 7-APR-2012
Account: HUDSRE

CERTIFICATE VA12068019

Project:
P.O. No.:
This report is for 2 Pulp samples submitted to our lab in Vancouver, BC, Canada on 27-MAR-2012.
The following have access to data associated with this certificate:

J. CAMBON	JIM CAMBON	J. CAMBON

SAMPLE PREPARATION

ALS CODE	DESCRIPTION
WEI-21	Received Sample Weight
LOG-24	Pulp Login - Rcd w/o Barcode
SPL-34	Pulp Splitting Charge
LOG-22d	Sample login - Rcd w/o BarCode dup

ANALYTICAL PROCEDURES

ALS CODE	DESCRIPTION	INSTRUMENT
TOT-ICP06	Total Calculation for ICP06	ICP-AES
ME-4ACD81	Base Metals by 4-acid dig.	ICP-AES
ME-ICP06	Whole Rock Package - ICP-AES	ICP-AES
C-IR07	Total Carbon (Leco)	LECO
S-IR08	Total Sulphur (Leco)	LECO
ME-MS81	38 element fusion ICP-MS	ICP-MS
ME-MS42	Up to 34 elements by ICP-MS	ICP-MS
OA-GRA05	Loss on Ignition at 1000C	WST-SEQ

To: HUDSON RESOURCES INC.
ATTN: J. CAMBON
1460 - 1066 W. HASTINGS ST.
VANCOUVER BC V6E 3X1

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

Signature:
Colin Ramshaw, Vancouver Laboratory Manager

12 Data Verification

Mike Druecker, one of the authors of this PEA, has visited the project on many occasions. Each time he examined geological, geochemical and geophysical data, the surface geology, recent drill core, and the procedures used by Hudson personnel in preparing the drill core samples to be sent to the analytical laboratory for analysis. Original geochemical analytical certificates were examined at the campsite in Greenland and the corporate office in Vancouver. Everything was found to be in order.

Split core samples, drill logs, assay intervals, and geotechnical data from the 2012 drilling programs were reviewed and examined on site by Druecker for consistency in lithology, alteration and mineralization. The results of this field and data inspection, and of the assay verification program, indicate that the geological and geochemical data, and the analytical data of the 2012 drilling at the White Mountain project are acceptable.

12.1 Standards

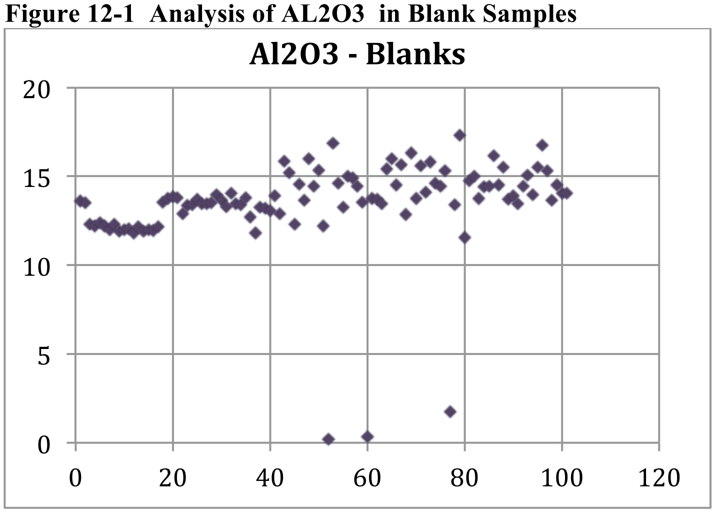
ALS Minerals includes standards in the ordinary course of analyzing the samples. The main standard used was SY-4, which contains the following key elements:

SiO2 %	Al2O3 %	Fe2O3 %	CaO %	MgO %	Na2O %	K2O %
50.2	20.3	6.27	8	0.51	7.45	1.61

12.2 Blanks

The blanks consisted of local unmineralized and unaltered granitic gneisses from the Garnet Lake area. Each of the 101 blanks was outside the mineral make-up of the anorthosite. The anorthosite contains at least 25% Al_2O_3, as a result, the following graph demonstrates that the blanks were not the target material.

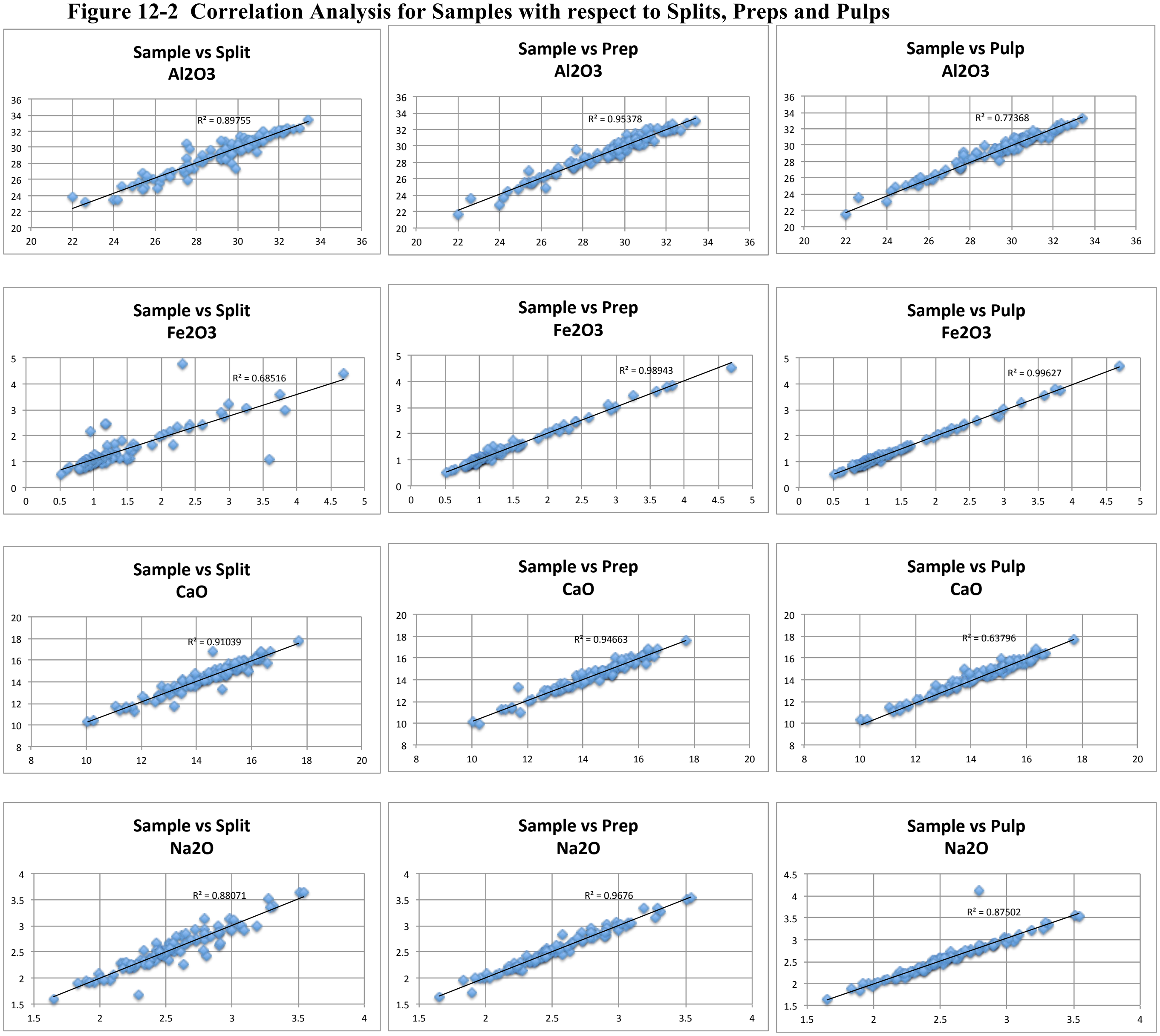
Figure 12-1 Analysis of AL2O3 in Blank Samples



12.3 Field Duplicates

Duplicates were collected at the same frequency as both standards and blanks. For each of the 98 designated duplicate samples collected in 2012, the split core was re-split into quarters and both quarters were sent to the lab. From the duplicate quarter, one field duplicate and two laboratory duplicates (split and pulp) were obtained. A selection of the most important elements was used for the analysis: aluminum oxide, iron oxide, calcium oxide and sodium oxide. Regression analysis was completed and the samples showed acceptable correlation in each element.

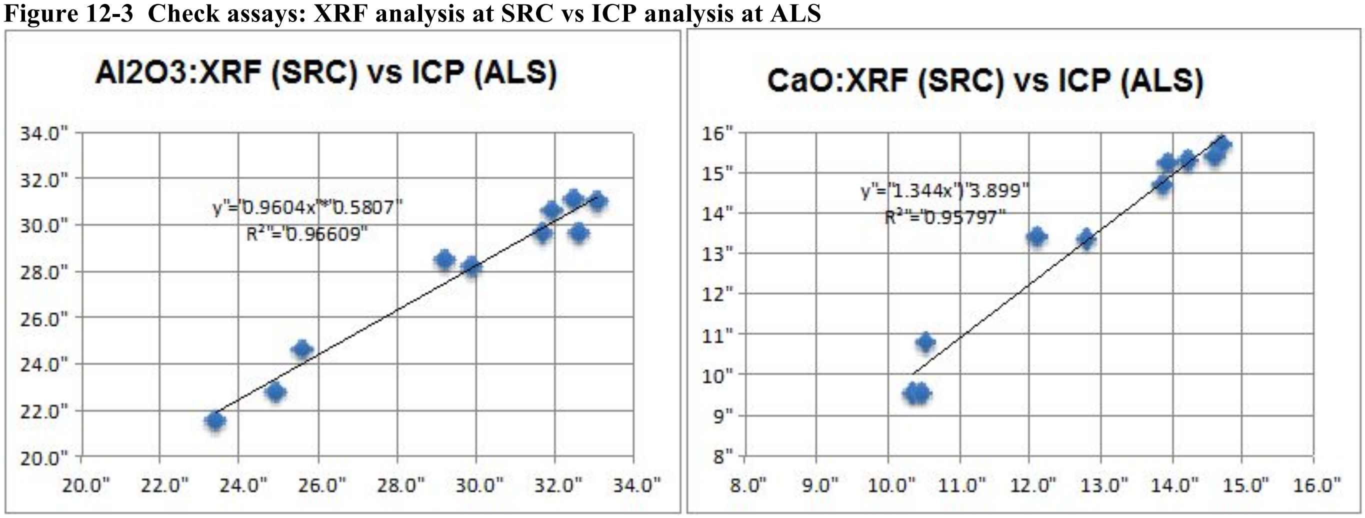
Figure 12-2 Correlation Analysis for Samples with respect to Splits, Preps and Pulps



12.4 Check Assays

In 2012, Hudson analysed samples at ALS in North Vancouver and the SRC Geoanalytical Laboratories in Saskatoon, Saskatchewan. Certain samples were sent to each lab. In the case of these 10 samples, original drill results assays by ALS are compared with the assays for samples after magnetic separation at the SRC. The correlation is in line with expectations.

Figure 12-3 Check assays: XRF analysis at SRC vs ICP analysis at ALS



12.5 Core Recovery

Core recovery averaged 99.5% in all holes.

12.6 Site Visits

Dr. Michael Druecker (Druecker) was originally retained by Hudson Resources Inc. (Hudson), to prepare an independent Technical Report on the Sarfartoq Project, in West Greenland. Later, Druecker was retained to prepare this independent technical report on the White Mountain Project. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects. Druecker visited the project on multiple occasions between 2010 and 2012. These included: May 30, 2010 to June 5, 2010 from August 15, 2010 to September 9, 2010 from May 4, 2011 to May 17, 2011 from June 21, 2011 to June 23, 2011 from August 7, 2011 to August 24, 2011 and from August 9, 2012 to August 21, 2012.

Geosim Services Inc. (Geosim) was retained by Hudson to prepare a 43-101 compliant Independent Resource Estimate of the drill hole grid 3 zone on the White Mountain Anorthosite project. Simpson last visited the project in September, 2010. However, that was before exploration of the calcium feldspar anorthosite commenced.

Hains Engineering Co. Ltd. (Hains) was retained by Hudson to prepare an independent technical report for anorthosite production to be used as feedstock for the manufacture of alumina. Hains visited the White Mountain property on April 19, 2013. During the site visit, Hains observed the geology and mineralization of the deposit and examined drill core retained on site.

12.7 Conclusions

ALS, together with sample assays by the SRC Geoanalytical Laboratories in Saskatoon, Saskatchewan, have provided Hudson with consistent and quality assays and will continue to be used in the future. Results for the blanks and duplicates are rarely incongruous and there have been no sample mix-ups or loss of samples.

13 Mineral Processing and Metallurgical Testing

Hudson has undertaken mineral processing and metallurgical test work on the anorthosite with respect to two major product applications: 1) use of anorthosite as a raw material used for the production of glass fibre (ie. structural fiberglass), and 2) use of anorthosite as a source of metallurgical and chemical grade alumina. Test work related to both potential applications has primarily been undertaken at the SGS Canada Inc. facilities in Lakefield, Ontario and the Saskatchewan Research Council (SRC) in Saskatoon, SK. Work involved both preliminary studies to establish potential flow sheets, as well as large scale bulk sample processing for customer trials. For the purposes of this report, only test work related to the production of alumina has been described.

13.1 Test work for Greenland production of alumina Feedstock

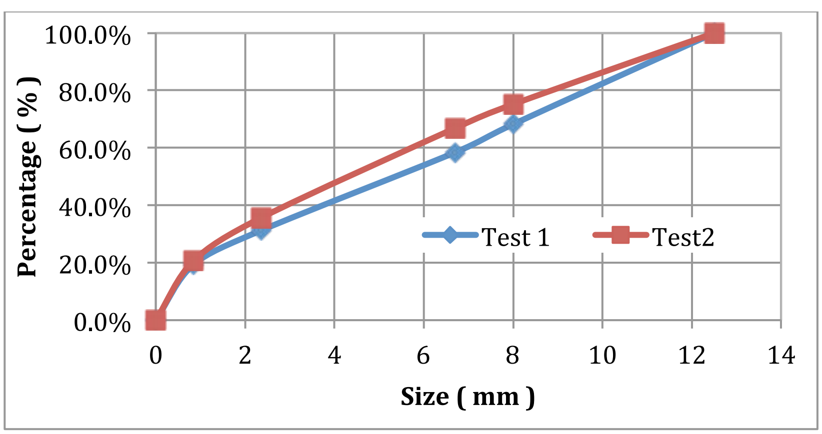
Mineral processing test work to determine the potential of the anorthosite as alumina feedstock has concentrated on determining the behaviour of the anorthosite during crushing and grinding. Key properties of interest are the following:

- Chemical composition of crude anorthosite
- Crushing behaviour of anorthosite; i.e. particle size distribution of crushed material
- Energy requirements for grinding; i.e. Bond Work Index
- Chemical composition of anorthosite by particle size
- Energy requirements for grinding and wear rate of grinding media

13.1.1 Crushing Tests

120 tonnes of blasted material was sent to Denmark for two-stage crushing tests. The bagged material was then sent to the SRC in Saskatchewan for further processing in order to produce product for magnetic separation. Using a mobile jaw and cone crusher, the test sample produced the following size distribution as seen in Figure 13-1. This is the product that will be shipped from Greenland to North America for further processing.

Figure 13-1 Two Stage Crushing Particle Size Distribution



Assays were completed on all screen size fraction to ensure that the aluminum distribution was consistent across all sizes. Tests confirmed that they were.

Table 13-1 Assay by Screen Fraction

Samples	Mesh	µ	Na_2O Wt%	MgO Wt%	Al_2O_3 Wt%	SiO_2 Wt%	P_2O_5 Wt%	K_2O Wt%	CaO Wt%	TiO_2 Wt%	MnO Wt%	Fe_2O_3 Wt%	S Wt%	LOI Wt%	Sum Wt%
hud +10	+10	2000	Not enough sample, traces only												
hud 10-20	+20	841	2.09	0.36	32.2	47.2	0.03	0.23	16.4	0.04	0.01	0.61	0..01	0.9	100.07
hud 20-30	+30	595	2.08	0.35	32.2	47.4	0.03	0.21	16.4	0.04	0.01	0.56	<..01	0.7	99.88
hud 30-40	+40	420	2.25	0.44	32.0	47.0	0.02	0.26	16.4	0.03	0.01	0.63	0..01	0.5	99.53
hud40-60	+60	250	2.24	0.45	32.1	47.2	0.02	0.29	16.1	0.04	0.01	0.61	<..01	0.7	99.84
hud 60-80	+80	177	2.24	0.48	32.2	47.2	0.02	0.29	16.1	0.03	0.01	0.70	0..01	0.7	99.96
hud 80-100	+100	149	2.20	0.50	31.9	47.2	0.03	0.33	16.2	0.04	0.01	0.77	0..02	0.4	99.56
hud 100-140	+140	105	2.41	0.48	32.2	46.9	0.02	0.30	16.1	0.03	0.01	0.82	0..03	0.9	100.17
hud 140-200	+200	74	2.58	0.44	31.9	46.6	0.02	0.33	16.3	0.04	0.01	0.92	0..06	0.9	100.03
hud 200-270	+270	53	2.31	0.35	31.4	46.9	0.02	0.28	16.4	0.03	0.01	0.94	0..07	0.9	99.55
hud 270-400	+400	37	2.39	0.34	31.0	46.7	0.02	0.29	16.1	0.05	0.01	1.07	0..10	1.0	99.05
hud -400	-400	18.5	2.62	0.36	31.0	46.4	0.03	0.31	16.6	0.06	0.02	1.17	0..16	1.2	99.86

13.1.2 Bond Work Index

Bond work index data were determined from grinding tests. The calculated Bond Work Index for the anorthosite was determined to be as follows:

BOND'S WORK INDEX FORMULA

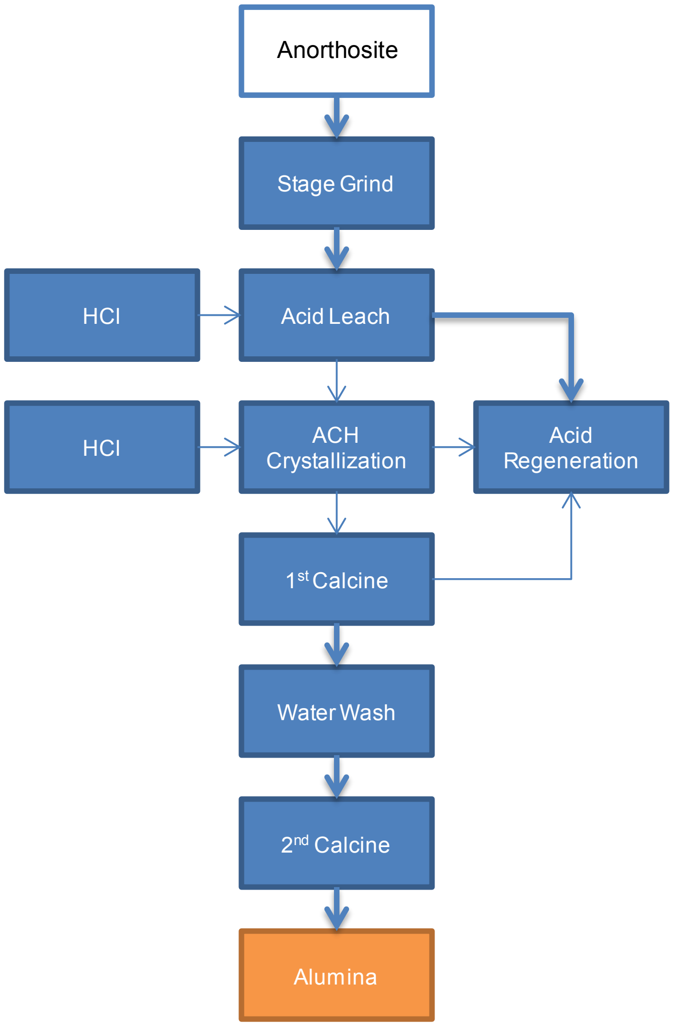
$$Wi = \frac{44.5}{P_1^{0.23} \times Gbp^{0.82} \times \left(\frac{10}{\sqrt{P_2}} - \frac{10}{\sqrt{F_2}}\right)}$$

P_1=Sieve Size Tested	74	µm
Gbp= Average of Last 3 Net Product per Revolution of Mill	1.012	g/rev
P_2 =80% Passing Size of Product	60	µm
F_2 = 80% Passing Size of Test Feed	2750	µm
WORK INDEX (Wi)	14.88	kWh/tonne

13.2 Alumina production test work

High grade (>An_{80}) anorthosites are readily leachable by mineral acids such as HCl. Various processes have been proposed (see inter alia Dolan, Hains and Ash, 1999) for the recovery of alumina and co-product silica from anorthosites using acid leaching processes. The alumina can be recovered as smelter grade aluminum oxide or as aluminum chloride for use in various applications. The silica co-product is amorphous, has pozzolanic properties, and can be used in a number of applications. The recovered acid process produces a calcium silicate residue that has numerous industrial mineral applications.

Figure 13-2 Anorthosite Processing Flow Sheet



Hudson has undertaken various test programs at SGS Canada Inc. with the aim of producing a smelter grade alumina (SGA) and later a high purity alumina product. Leaching tests have been conducted at selected process parameters (time, temperature, acid strength, etc.). Design aspects are discussed in greater depth in Section 17 – Recovery Methods.

SGS produced a report titled "An Investigation into Bench Scale Flow Sheet Development of The White Mountain Anorthosite Deposit". The bulk of this work was designed to produce SGA. It was later determined that by adjusting the final calcination temperature, a high purity specialty grade alumina was produced. The following is a summary of the SGS work. Due to confidentiality requirements, certain results have been omitted from this report.

13.2.1 Executive Summary

Hudson Resources is developing a flowsheet for producing smelter grade alumina (SGA) from the White Mountain anorthosite deposit. A conceptual flowsheet has been developed based on bench scale testing, Figure 13-2. This flowsheet consists of:

- Stage grinding of the anorthosite ore;
- Hydrochloric acid leaching (AL) of the ground anorthosite;
- Crystallization of aluminum chloride hexahydrate (ACH) from the AL pregnant leach solution (PLS);
- Two stage calcination of the ACH crystals with an intermediate water wash to remove sodium and produce a final SGA product;
- Acid regeneration and recycling

Acid leaching of -200 mesh rock using excess hydrochloric acid as a solution resulted in 92% aluminum extraction and a final residue grade of 83.6% SiO_2 with 10.3% loss on ignition (LOI). The injection of HCl gas into the leach solution resulted in crystallization of 94 to 98% of the aluminum as aluminum chloride hexahydrate (ACH). The ACH was calcined at 400°C and then water washed to remove the sodium present with essentially no aluminum lost to the water wash residue. The water washed residue was calcined above 900°C for 2.5 hours to produce an alumina product which met all chemical specifications for SGA other than SiO_2, had less than the maximum alpha alumina content, and was within the specified BET surface area range. The SiO_2 is attributed to contamination by the glass fiber insulation used during the low temperature calcination tests. Other tests demonstrated the production of a calcined alumina meeting specifications for high-purity, alpha-alumina.

13.2.2 Test work Summary

Sample Characterization and Preparation

SGS Minerals Services, Lakefield Ontario location received 45 kg of anorthosite from the White Mountain deposit in Greenland in November 2012. The anorthosite was blended, crushed to 100% passing 10 mesh, and split into 2 kg test charges.

A head sample of the anorthosite was cut from a test charge and analyzed for whole rock analysis (WRA) and an inductively coupled plasma ICP scan. The LOI % was determined along with WRA. The analytical results are included as Table 13-2. The anorthosite composition is primarily silicon, aluminum and calcium.

Table 13-2 Anorthosite Analysis

SiO_2 %	48	Be g/t	0.1
Al_2O_3 %	32.3	Bi g/t	< 20
Fe_2O_3 %	1.17	Cd g/t	< 2
MgO %	0.45	Co g/t	< 4
CaO %	16.2	Cu g/t	6.2
Na_2O %	2.03	Li g/t	< 5
K_2O %	0.12	Mo g/t	< 5
TiO_2 %	0.05	Ni g/t	< 20
P_2O_5 %	0.02	Pb g/t	< 20
MnO %	0.01	Sb g/t	< 10
Cr_2O_3 %	0.01	Se g/t	< 30
V_2O_5 %	0.01	Sn g/t	< 20
LOI %	0.86	Sr g/t	191
Sum %	101.2	Tl g/t	< 30
Ag g/t	< 2	U g/t	< 20
As g/t	< 30	Y g/t	8.2
Ba g/t	55.6	Zn g/t	106

The anorthosite was stage ground in batches in a 2 kg ball mill to achieve the desired particle size.

Acid Leaching

Three series of acid leach tests were performed. All leaches were performed in glass reaction kettles equipped with a lid and condenser. A pulp consisting of ground anorthosite and acidic solution was agitated with a pitch blade Teflon impeller/mechanical overhead mixer and heated via an electric heating mantle. The three series were: Phase I Scoping Tests, Phase II Scoping Tests and bulk Filtrate Production, and Calcium Level Testing.

Phase I Scoping: Initial Acid Leach Tests

The initial series of acid leaches consisted of six leaches; the first five were 2 L scoping tests and the sixth was a bulk bench test consisting of five 4 L bench tests. The HCl strength and dosage were tested in addition to a single nitric acid (HNO_3) leach.

Maximum aluminum extraction in this series was 94% and achieved in test AL4. Comparison of tests AL2 and AL3 indicates that increasing the acid dosage of the stoichiometric requirement of HCl resulted in slightly lower aluminum extractions (93% vs. 91%) with all other conditions constant. Comparison of tests AL1 and AL2 indicates that decreasing the HCl solution strength resulted in a slight decrease in aluminum extraction (91% vs. 90%) but the acid consumption was decreased. The nitric acid leach (test AL5) only achieved 67% aluminum extraction therefore no further HNO_3 tests were performed.

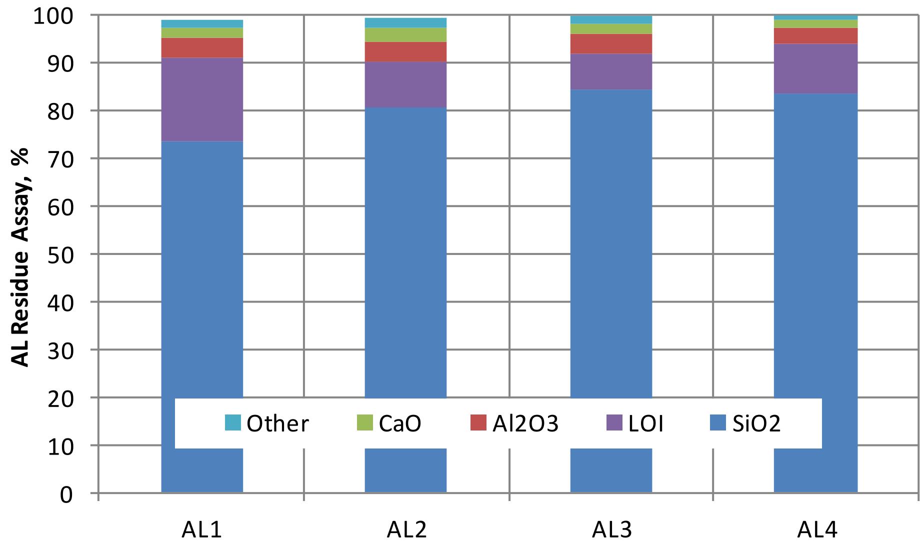
The acid leach residue assays are included as Table 13-3. The HCl leach residues ranged in direct SiO_2 grade from 73.7% to 84.3%.

Table 13-3 Phase I AL Tests – Residue Assays

%	AL1	AL2	AL3	AL4	AL5	AL6
SiO_2	73.7	80.6	84.3	83.6	68.8	78
Al_2O_3	4.17	4.44	4.23	3.58	15.4	4.51
Fe_2O_3	0.8	1.01	0.77	0.54	1.02	0.66
MgO	0.17	0.32	0.18	0.12	0.31	0.15
CaO	1.99	2.78	2.13	1.67	7.48	2.24
Na_2O	0.35	0.3	0.29	0.3	1.13	0.32
K_2O	0.18	0.16	0.16	0.16	0.14	0.14
TiO_2	0.05	0.06	0.07	0.08	0.07	0.07
P_2O_5	<0.01	0.12	<0.01	<0.01	<0.01	<0.01
MnO	<0.01	0.02	<0.01	<0.01	0.01	0.01
Cr_2O_3	0.08	<0.01	0.01	<0.01	0.02	<0.01
V_2O_5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
LOI	17.5	9.51	7.7	10.3	6.03	14.3
Sum	99	99.3	99.9	100.4	100.5	100.4
Cl	-	-	0.22	0.42	-	2.4

The composition of the leach residues is shown graphically in Figure 13-3. The plot shows that the direct SiO_2 grade produced in HCl leaching varies noticeably throughout the series; the combined SiO_2 and LOI fraction is essentially constant throughout the series.

Figure 13-3 Phase I AL Residue Compositions

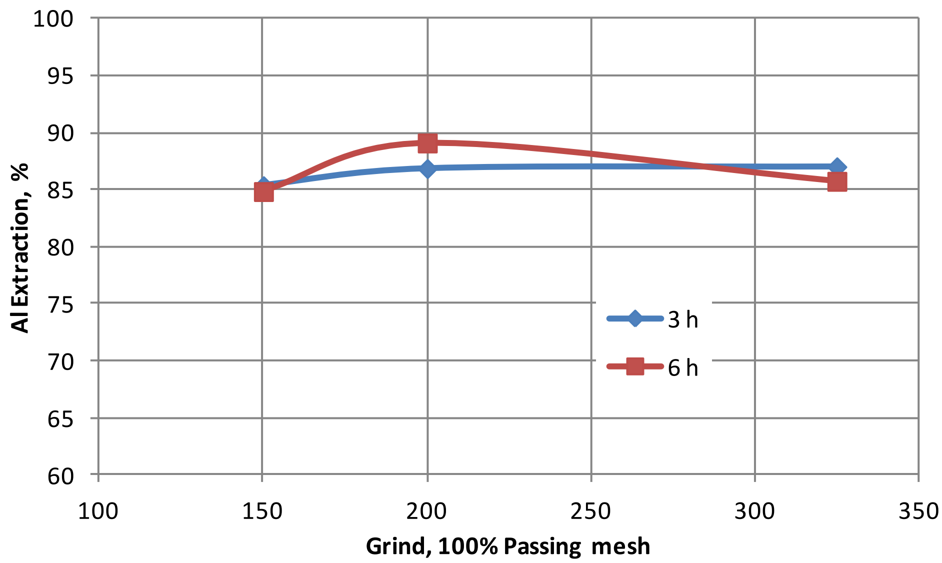


Phase II Scoping: Optimization and Liquor Production Tests

During the second phase of acid leach scoping tests, thirteen 4 L leach tests were performed. The primary purpose of the series was to produce significant quantities of filtrate for downstream testing with the optimization of leach conditions a secondary, but important purpose of the testing. Throughout the series, three grind sizes were tested, 100% passing: 150 mesh, 200 mesh, and 325 mesh. The feed for tests AL17 and AL18 was a composite of remaining ground sample consisting of various particle sizes. The effect of 30% HCl and 37% HCl was tested as was leach time and effect of an inert environment (argon or nitrogen blanket was maintained to prevent oxidation of the pulp).

The effect of grind size on aluminum extraction is plotted in Figure 13-4 and shows that at the constant conditions tested, reducing the particle size from -150 to -200 mesh results in slightly increased aluminum extraction, but further size reduction from -200 to -325 mesh resulted in slightly lower aluminum extractions. No clear conclusion can be made that increasing the leach time from 3 hours to 6 hours results in a statistically significant change in aluminum extraction.

Figure 13-4 Effect of Grind Size



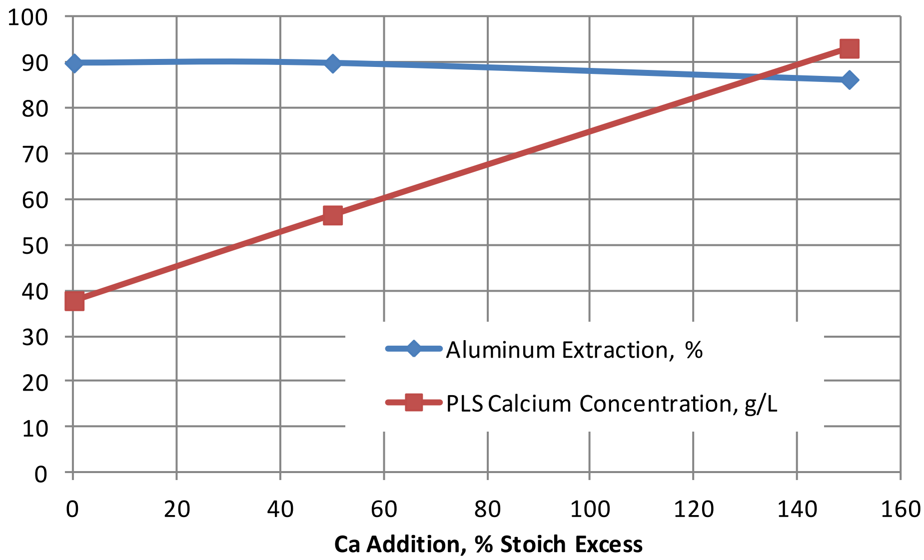
During the Phase II testing, the effect of the leach environment in the resulting iron oxidation state was tested. This was of interest because iron is a contaminant in SGA and the oxidation state affects the downstream processing needed to meet specifications. Seven of the leaches were performed under natural atmospheric conditions while six were performed under an inert gas blanket, where argon or nitrogen was pumped into the freeboard space in the reactor.

Calcium Level Tests

The flowsheet includes partial recycle of ACH filtrate back to the leach circuit to increase chloride content. This recycle will increase the calcium concentration in the leach. To determine the effect of increased calcium during leaching, a series of acid leach tests was performed with excess reagent grade calcium chloride added to simulate a recycle stream.

The effect of calcium addition on the extraction of aluminum and the calcium concentration of the filtrate is plotted in Figure 13-5. Test AL15 is referenced as the 0% excess calcium test. The plot indicates no negative on impact on aluminum extractions by increasing the calcium excess to 50%, but the extractions do start to decrease when the addition is increased to 150% excess. Under the conditions tested, the calcium concentration in the filtrate increases linearly with increased excess calcium addition.

Figure 13-5 Effect of Ca Level on Al extraction and PLS Ca Content



Additional Re-Leach/Wash Tests

The wet residue from AL22 was slurried with HCl and then filtered and washed. The washed wet residue was re-slurried in deionized water (DI) and then filtered and washed. The re-leach improved the overall aluminum extraction from 81% to 92%, while the additional water wash increased overall aluminum extraction to 93%. The SiO_2 grade after LOI was increased from 81.3% to 91.7% and then 93.2% by re-leach and re-wash, respectively.

Solution Treatment

Scoping test programs were performed on the acid leach PLS to determine if impurities could be selectively separated from aluminum. Testing consisted of hydrolysis tests to precipitate an aluminum hydroxide product; iron treatment tests (iron solvent extraction (SX) and iron reduction); and aluminum chloride hexahydrate crystallization tests.

Hydrolysis Testing

Scoping tests were performed on as-produced and pre-treated AL PLS to evaluate the selectivity possible with the use of hydrated lime and limestone. These tests were 'titration' style tests where the neutralizing reagent was added stepwise to achieve various target pH values, with intermediate samples taken at each step. The filtrate from each intermediate sample was analyzed along with the final filtrate and precipitate. The precipitation curves showed only limited selectivity between aluminum and iron.

Iron Solvent Extraction

Solvent Extraction (SX) testing was performed to determine if iron could be selectively removed from the AL PLS without aluminum co-extraction. Four scoping and one production test were performed. All tests consisted of contacting the aqueous AL PLS with an organic solution and then the loaded organic was separated from the raffinate by gravity. The results show that both TBP and Alamine 336 could extract essentially all of the iron with negligible aluminum losses.

Iron Reduction

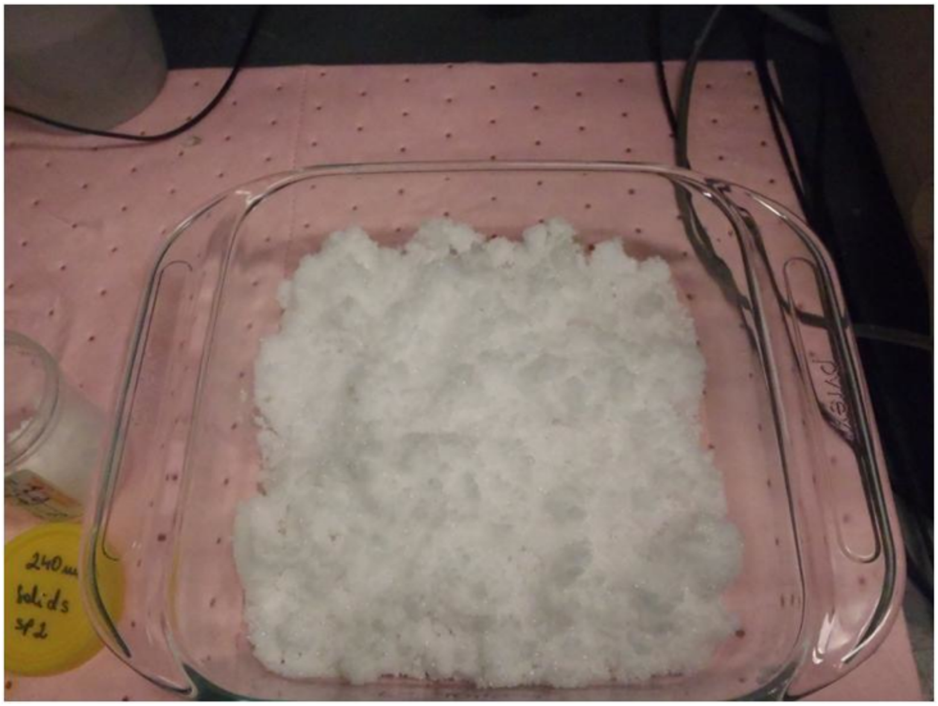
A series of iron reduction tests was performed to determine if reducing the iron would prevent iron co-crystallization during ACH production and so could replace iron solvent extraction. This approach showed some promise as a method of attaining iron specifications in products.

Aluminum Chloride Hexahydrate Crystallization

The crystallization of aluminum chloride hexahydrate (ACH) was tested by sparging hydrogen chloride (HCl) gas into aluminum chloride solution to increase the acid concentration to a level where aluminum chloride solubility is substantially reduced. The test was performed in a glass reaction kettle equipped with a lid and was agitated with an overhead mixer. The solution was heated with a heating mantle and gas flow was control by a flowmeter. Off gas was directed to a scrubber solution containing dilute sodium hydroxide. A photograph of a typical setup is presented in Figure 13-6. After the test was complete, the pulp was filtered and the crystals were washed with fresh concentrated hydrochloric acid. A photograph of washed ACH is shown in Figure 13-7.

Figure 13-6 Photograph of ACH Crystallization Equipment

Figure 13-7 Photograph of Washed ACH Crystals



The primary variable throughout the test series was the feed composition. The initial test, SP1, was performed on direct AL PLS. Tests SP2 to SP13 were performed on PLS samples that were subjected to iron control procedures. The acid leaches for tests SP7 and SP8 had calcium chloride additions to simulate recycle streams (50% and 150% excess Ca, respectively).

The two initial tests were performed in a reactor with a high height to diameter ratio which was selected for increased gas contact time but limited the size of the impellor used. During these tests there were issues keeping the ACH crystals suspended. For the remaining tests, standard glass reactors with less extreme height to diameter ratio were used and allowed the use of a larger impeller which had no trouble suspending the crystals. During the first two tests, gas was sparged via a titanium tube directed under the impellor. In an attempt to reduce bubble size and improve gas efficiency/reduce impurity precipitation, a fritted glass sparger was used in test SP3 but crystallization plugged the fine pores of the frit just over an hour into the test and the switch was made to a straight tube. All remaining tests used a custom plastic sparger with multiple ~1 mm pores.

The aluminum percent crystallization ranged from 86% to 98%. The amount of iron present in the feed to SP1 was 6% relative to the aluminum content, therefore 12% Fe co-precipitation during crystallization resulted in significant iron contamination.

The aluminum percent crystallized vs. HCl gas added was plotted for each of the three gas strengths tested. The results indicate that 100% HCl gas addition results in slightly higher aluminum crystallization rates but no significant difference was observed between 50 and 67% HCl gas composition.

The ACH crystal assays are included as Table 13-4. With the exception of tests SP1 and SP3, all crystal chemical compositions were determined by dissolving a known mass of crystals in a known amount of deionized (DI) water, assaying that liquor with an ICP scan and back-calculating the crystal assay. This method was performed to achieve far lower detection limits than that possible by XRF which was used for analysis of SP1 and SP3 crystals and to improve sample uniformity. The impurity content of the crystals produced in a test was not homogenous, as shown by Figure 13-8, a scanning electron microscope (SEM) photograph of a few ACH crystals where the round white spherical particles (labeled #1) were determined to be NaCl by Energy Dispersive Spectroscopy (EDS) analysis and the longitudinal crystal was indicated to be aluminum chloride (labeled #2) by EDS. Numerous crystals are dissolved during the crystal re-dissolve and produce a homogenous solution which is representative of the average crystal distribution.

The specification for SGA requires Fe_2O_3 level of 0.025%. The results indicate that ACH produced with iron control produced ACH with Fe levels below the specification.

The addition of 50% more calcium during the acid leach increased the ACH calcium content slightly from 0.03% Ca in SP6 to 0.04% Ca in SP7. The 150% excess calcium addition resulted in 0.09% Ca in the ACH, significantly higher than all other tests to date. However, as indicated below, the two-stage calcination process removes both sodium and calcium.

Table 13-4: ACH Crystallization – ACH Crystal Analysis

	Calculated ACH Analysis, %												
Element	SP1*	SP2	SP3*	SP4	SP5	SP6	SP7	SP8	SP9	SP10	SP11	SP12	SP13
Si	0.005	0.001	<0.005	0.001	0.002	0.001	0.002	0.001	0.002	0.002	0.003	0.001	0.001
Al	10.8	11.1	10.64	10.84	11.73	12.67	10.74	11.42	11.06	12.47	13.32	8.95	9.67
Fe	0.08	0.0002	0.08	<0.0001	<0.0001	0.0013	0.0015	0.0015	0.0018	0.0015	0.0019	0.0011	0.0019
Mg	<0.01	0.002	<0.01	0.001	0.002	0.002	0.003	0.002	0.002	0.002	0.003	0.002	0.003
Ca	0.02	0.02	0.04	0.02	0.02	0.03	0.04	0.09	0.03	0.03	0.03	0.02	0.04
Na	0.13	0.63	0.21	0.43	0.58	0.54	0.55	0.41	0.51	0.36	0.46	0.29	0.47
K	0.10	<0.0003	0.17	<0.0005	<0.0005	<0.0005	0.0009	0.0027	0.0010	0.0005	0.0005	<0.0008	0.0055
Ti	<0.01	0.00003	<0.01	<0.00005	0.00001	0.00001	0.00001	0.00001	0.0001	0.0001	0.00002	<0.00001	0.00003
P	<0.004	<0.002	<0.004	<0.002	<0.009	<0.003	<0.002	<0.002	<0.003	<0.002	<0.002	<0.002	<0.003
Mn	<0.01	0.00002	<0.01	0.00003	<0.00002	0.00002	0.00003	0.00003	0.00005	0.00003	0.0001	<0.00002	0.00004
Cr	<0.01	0.0004	<0.01	0.0003	0.0003	0.0002	0.0004	0.0005	0.0004	<0.0003	0.0003	0.0002	0.0002
V	<0.01	<0.0001	<0.01	<0.0001	<0.0001	<0.0010	<0.0003	<0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

*Direct Assay - No ACH Re-Dissolve

The relationships between residual free acid after ACH and ACH purity are illustrated in Figure 13-9. The graph shows that increasingly high residual acid levels mean increasing NaCl precipitation but this is not a concern given the two-stage calcine process.

Figure 13-8 SEM Photograph of SP1 Crystals

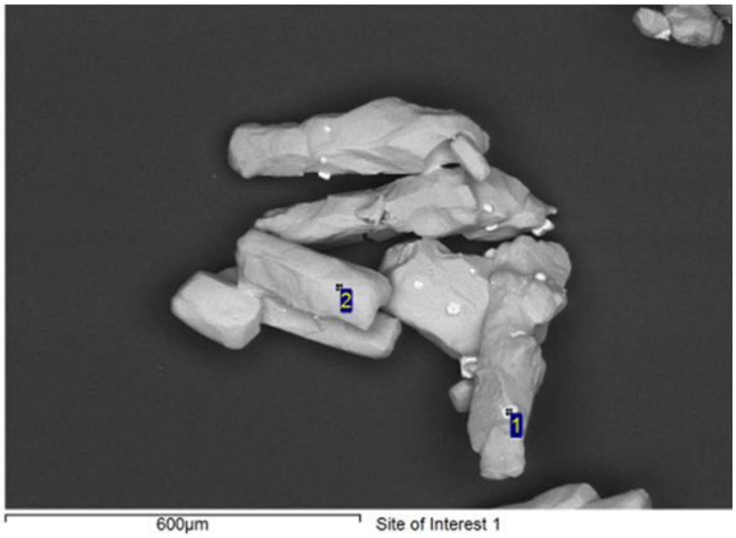
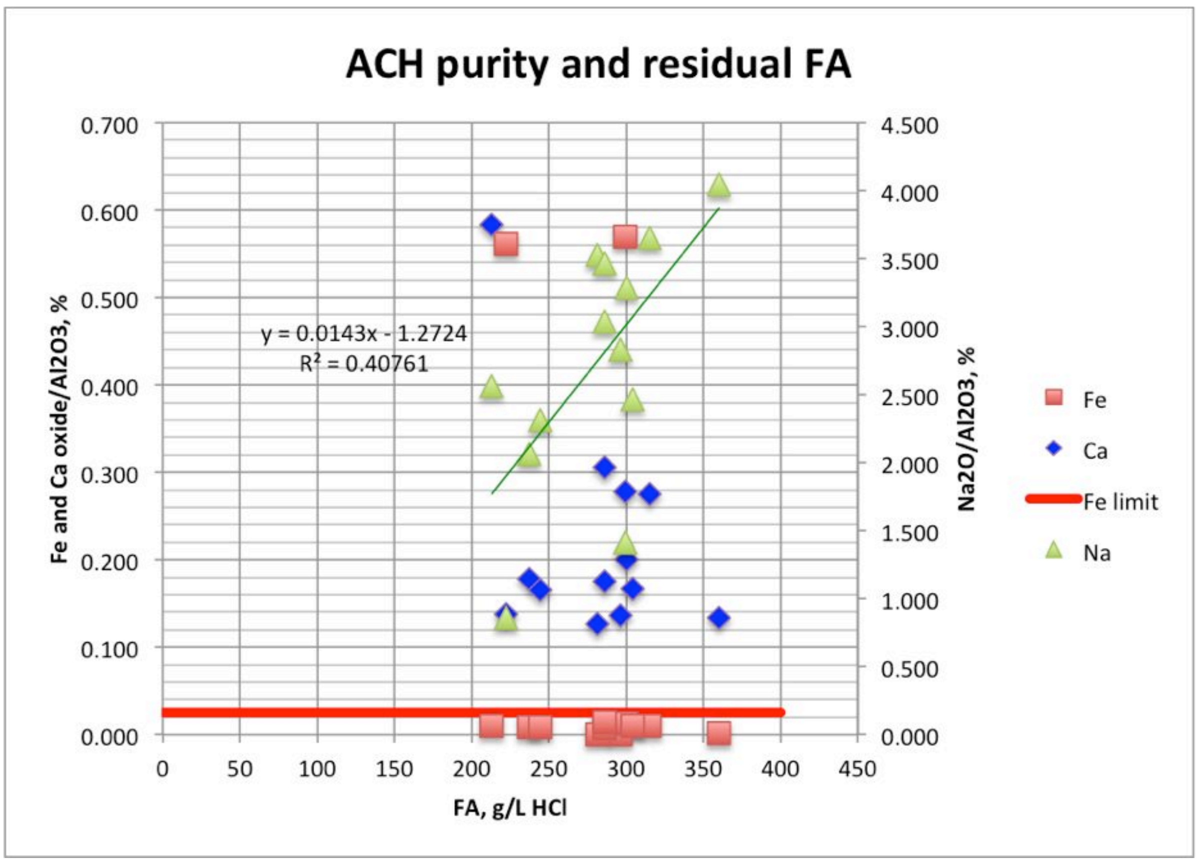


Figure 13-9 Residual Free Acid



Calcination

The ACH crystals require thermal processing or calcination stage(s) to convert the water-soluble aluminum chloride crystals into a solid alumina product. The chlorides in the salt are converted into gaseous products (HCl) and are collected in a water scrubber. Two methods were tested: single stage calcination, where all of the chlorides are converted to oxides at a single high temperature (HT); and the two stage calcination where the aluminum chloride is calcined to an oxide at relatively low temperatures (LT) while sodium and calcium remain in the chloride form which allows them to be separated from the solid alumina phase with an intermediate water wash (WW). The water washed residue is then calcined at high temperature to achieve the desired physical properties. The SGA specifications supplied to SGS by Hudson are presented in Table 13-5.

Table 13-5 SGA Specifications provided by Hudson

	%
SiO_2	0.025
Fe_2O_3	0.025
CaO	0.05
Na_2O	0.55
TiO_2	0.007
P_2O_5	0.003
V_2O_5	0.005
LOI	1.00
Al_2O_3 - alpha	12% Max
BET, m2/g	60-80
-45 µm, %	12% Max

Single Stage Calcination

The initial calcination test was single high temperature test performed in a quartz tube furnace. SP2 ACH crystals were heated to 1000°C for 2 hours and the resulting calcine was water washed for 2 hours at 20% solids and 40°C. The single stage calcination method was not able to selectively separate the sodium from the aluminum; therefore no further testing of that approach was performed.

Two Stage Calcination

The LT calcination tests for the two stage calcinations flowsheet were performed in a quartz tube furnace. The LT calcines were water washed to remove impurities while leaving alumina in the residue. Initial scoping tests (C2, C3, and C5) were performed to determine the optimum temperature that results in the conversion of ACH to alumina. Tests C1.3 and C1.4 were performed on ACH samples that had calcium chloride additions during the acid leach to simulate recycle streams (50 % and 150 % excess Ca, respectively).

The optimum LT calcination temperature was determined based on the high impurity removal and low aluminum level in the WW filtrate. The addition of a calcium excess resulted in a slightly higher calcium grade in the residues.

The water washed residue from the LT calcine was subject to HT calcination in a box furnace. The LT temperature was varied from 800 to 1100°C and the HT time was varied from 2 to 4 hours.

To evaluate the calcined product, assays were performed by SGS while alpha alumina and Brunauer-Emmett-Teller (BET) surface area tests were outsourced to McGill University. To obtain the lower detection limits required of the SGA specification, the whole rock analysis (WRA) by x-ray fluorescence (XRF) used throughout this program had to be supplemented with inductively coupled plasma atomic emission spectroscopy (ICP-OES) analysis of trace elements while maintaining XRF analysis to determine Al_2O_3 and SiO_2 content. Optimum results for all chemical impurity specifications, other than SiO_2 and LOI, and on–specification alpha alumina content of 9.1% and on-specification BET of 75 m^2/g were achieved in test C2.9. The cooled calcine was directly assayed without a drying step to remove any moisture acquired during cooling and 3% moisture was measured in the calcine; theoretically lowering the LOI to less than the spec of 1%. The contamination of silica was an issue throughout the test program and is attributed to the use of glass fiber insulation required to keep the sample within the hot zone of the tube during the LT calcine operation.

Table 13-6 High Temperature Calcine Results

Al2O3	SiO2	Fe2O3	MgO	CaO	Na2O	LOI	Alpha
99.8%	0.07%	0.01%	0.005%	0.05%	0.04%	0.35%	99.8%

K2O	TiO2	P2O5	MnO	Cr2O3	V2O5	Cl, g/t	BET, m2/g
0.002%	0.009%	0.003%	0.0002%	0.001%	0.0002%	31	4.1

k80, µm
5.8

Acid Regeneration

The acid leach residue was combined with a synthetic salt mixture representative of ACH filtrate after evaporation and calcined in a steam atmosphere to re-generate hydrochloric acid. The silica in the leach residue and calcium chloride mixture react with water vapour to produce calcium silicate and hydrochloric acid as per Equation 1.

$$SiO_2 + CaCl_2 + H_2O = CaSiO_3 + 2HCl \quad (1)$$

The tests were performed in a tube furnace with water or steam pumped into one end and off gas collected at the other end and directed to a bubbler filled with water to scrub the off gas. The initial two tests were performed in quartz tubes. Etching of the tube occurred in the first test and fracture of the tube during the second, due to the quartz (SiO_2) reacting with the salt and steam. An alumina tube was purchased and survived the remaining three tests without damage. The calcined sample was water washed to determine the amount of unreacted salt. The initial test work showed chloride conversions as high as 65%. Additional test work will be executed.

14 Mineral Resource Estimate

14.1 Introduction

The White Mountain project is at an advanced stage of exploration. This section describes the initial mineral resource estimate for the area designated as 'Grid 3' using available drilling results and geological interpretation as first reported in Druecker and Simpson (2013). The primary economic item is high calcium plagioclase known as 'anorthosite'.

14.2 Exploratory Data Analysis

The Grid 3 drill hole database consists of 14 BTW core holes totalling 1080.4 m completed in 2012. Core recovery was excellent averaging 98% with a median value of 99.3%.

The database includes interval tables for lithology, mineralogy/veining, geotechnical data and density measurements. Lithologic codes used are listed in Table 14-1.

Table 14-1 Lithologic codes

Code	Description
OB	Overburden
ANO	Anorthosite
AGN	Amphibolite Gneiss
GRGN	Granite Gneiss
GNSS	Gneiss
GDGN	Granodiorite Gneiss
GGN	Granite Gneiss
KD	Kimberlite Dike
DIA	Diabase Dike

Statistics for the individual oxides based on drill core analyses from the Grid 3 area are shown in Table 14-2.

Table 14-2 Sample Statistics

	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	K_2O
n	522	522	522	522	522	522	522
Min	32.30	9.46	0.72	4.16	0.19	0.22	0.06
Max	74.40	32.80	10.90	17.00	18.15	5.15	2.32
1st Quartile	47.90	28.93	0.97	13.95	0.29	2.17	0.16
Median	49.00	30.60	1.06	15.10	0.34	2.37	0.23
3rd Quartile	50.80	31.40	1.21	15.80	0.43	2.61	0.34
Mean	50.04	29.60	1.30	14.57	0.55	2.46	0.32
Variance	15.64	9.49	1.03	3.88	1.16	0.21	0.10
Std Dev	3.95	3.08	1.01	1.97	1.08	0.46	0.31
CV	0.08	0.10	0.78	0.14	1.96	0.19	0.98

Frequency distributions of oxides are negatively skewed with the upper limits of CaO and Al_2O_3 determined by the composition of anorthosite.

14.3 Deposit Modeling

The target area is a very small portion of the anorthosite body and is remote from any wall rock contacts. The estimated resource was confined to an area mapped as >90% anorthosite.

14.4 Compositing

Oxide analyses were composited 5m downhole intervals. Statistics for composites are summarized in the following table.

Table 14-3 Composite statistics

	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	K_2O
n	210	210	210	210	210	210	210
Min	29.08	15.99	0.56	4.29	0.16	0.87	0.07
Max	73.76	32.38	4.45	16.44	4.40	4.19	1.72
Median	49.26	30.23	1.10	14.95	0.36	2.36	0.24
Mean	49.92	29.66	1.24	14.58	0.51	2.45	0.31
Variance	11.74	5.17	0.21	2.48	0.29	0.16	0.06
Std Dev	3.43	2.27	0.46	1.58	0.54	0.40	0.25
CV	0.07	0.08	0.37	0.11	1.04	0.16	0.81

14.5 Density

The mean value of 342 density measurements of anorthosite core samples was 2.75. This value was used to determine resource tonnes.

14.6 Variogram Analysis

Due to the very narrow range of oxide values, semi-variograms were quite noisy and did not display clear structures. Nested spherical models yielded maximum ranges varying from 110 to 200m (Table 14-4). No significant anisotropy was detected.

Table 14-4 Semi variogram model parameters

Oxide	co	c1	a1	c2	a2	c3	a3
Al_2O_3	0.33	0.481	18.8	0.19	180		
CaO	0.425	0.215	15.9	0.112	50.6	0.248	175
MgO	0.3	0.488	17.3	0.213	110		
Na_2O	0.25	0.3	9.8	0.18	54.5	0.27	200
Fe_2O_3	0.24	0.44	11.6	0.21	39.7	0.11	200

14.7 Block Model and Grade Estimation Procedures

A block model was created in Gemcom:Surpac Vision software using a block size of 25x25x10 metres. The parameters of the model are summarized in the following table.

Table 14-5 Block model parameters

	Min	Max	Extent	Size	# blocks
X	446,000	446,800	800	25	32
Y	7,381,700	7,382,500	800	25	32
Z	350	650	300	10	30

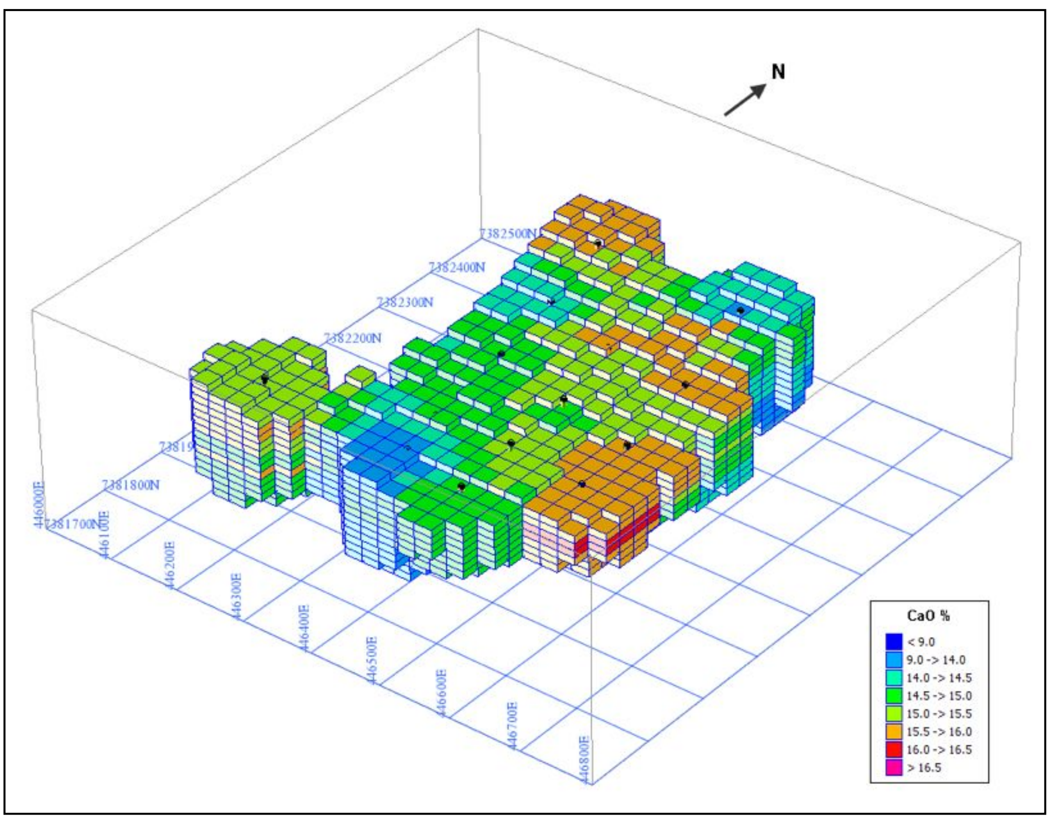
Block grades were estimated using the inverse distance squared method (ID^2) in three passes. The first pass used a maximum anisotropic search of 125 m and was restricted to the area surrounded by drilling on all sides (interpolated blocks). A second and third estimation pass using distances of 50 and 100m was performed peripheral to the drill grid (extrapolated). Details of the block estimation parameters are summarized in **Error! Reference source not found.**

Table 14-6 ID^2 Grade estimation parameters

Pass	Search Distances	Composites Used		Max per Hole	Constraints
		Min	Max		
1	125	4	28	3	within limits of drill grid (interpolated)
2	50	4	28	4	not estimated in pass 1
3	100	4	28	4	not estimated in pass 1 or 2

Block model extent and CaO content is illustrated in Figure 14-1.

Figure 14-1 Block model grade distribution - % CaO



14.8 Mineral Resource Classification

Resource classifications used in this study conform to the following definition from National Instrument 43-101, dated May 10, 2014

Mineral Resource

Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories. An Inferred Mineral Resource has a lower level of confidence than that applied to an Indicated Mineral Resource. An Indicated Mineral Resource has a higher level of confidence than an Inferred Mineral Resource but has a lower level of confidence than a Measured Mineral Resource.

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.

Measured Mineral Resource

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

Indicated Mineral Resource

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.

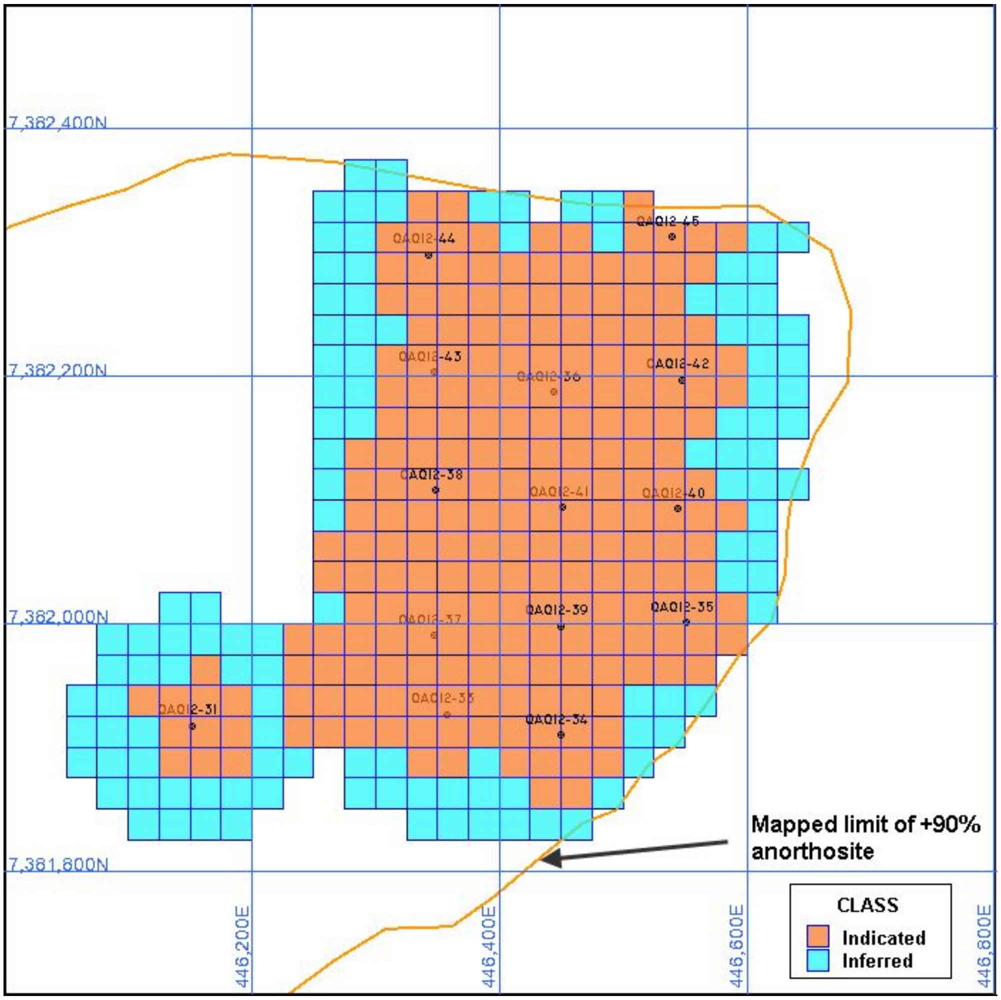
Inferred Mineral Resource

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.

Blocks were classified as 'Indicated' if they were estimated in the first pass (interpolated) or within 50m of a drill hole (extrapolated). All other estimated blocks falling within the area mapped as +90% anorthosite were classified as 'Inferred'. Classification is illustrated in Figure 14-2.

Figure 14-2 Model classification - Plan View



14.9 Model Validation

Model verification was carried out by visual comparison of blocks and sample grades in plan and section views. The estimated block grades showed reasonable correlation with adjacent composite grades.

A comparison of global mean values shows a reasonably close relationship with samples, composites and block model values (Table 14-7).

Table 14-7 Global mean grade comparison

	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	K_2O
Samples	50.04	29.60	1.30	14.57	0.55	2.46	0.32
Composites	49.92	29.66	1.24	14.58	0.51	2.45	0.31
Block Model	50.00	29.60	1.24	14.54	0.51	2.47	0.32

14.10 Reasonable Prospects of Economic Extraction

In assessing reasonable prospects of economic extraction the following costs were assumed for quarrying and pre-processing the material:

Table 14-8 Cost Assumptions

	cost/Tonne
Mining	$10.23
G&A	$2.22
Contingency	$1.24
Total	**$13.69**

The value per tonne of product is estimated at $35.29/tonne.

14.11 Mineral Resource Statement

The following table present the mineral resource estimate for the Grid 3 area restricted to blocks containing less than 2.5% Na_2O.

Table 14-9 Mineral Resource Estimate

Class	Max % Na_2O	Tonnes (000's)	% SiO_2	% Al_2O_3	% Fe_2O_3	% CaO	% MgO	% Na_2O	% K_2O
Indicated	2.50	27,384	49.2	30.0	1.26	14.95	0.55	2.35	0.29
Inferred	2.50	32,724	49.4	30.1	1.22	15.01	0.52	2.34	0.26

Notes:

1. The Qualified Person for the estimate is Mr Ronald G. Simpson, P.Geo. of Geosim
2. Mineral resources have an effective date of January 30, 2013
3. Resources have been classified in accordance with 2014 CIM definitions for Mineral Resources
4. Indicated Mineral Resources are drilled on approximately 100 x 100 metre drill spacing with extrapolation beyond the drill limits limited to 50m
5. Mineral Resources are restricted to blocks containing less than 2.5% Na2O.
6. Mineral Resources are not mineral reserves and do not have demonstrated economic viability.

The sensitivity of the resource to Na2O level is presented in the following tables:

Table 14-10 Model sensitivity to maximum % Na_2O – Indicated Category

Max % Na_2O	Tonnes (000;s)	% SiO_2	% Al_2O_3	% Fe_2O_3	% CaO	% MgO	% Na_2O	% K_2O
2.00	25	40.8	26.5	0.87	13.24	0.26	1.93	0.19
2.20	2,250	47.7	30.2	1.20	15.28	0.49	2.15	0.22
2.25	5,110	48.3	30.3	1.22	15.32	0.49	2.20	0.21
2.30	8,869	48.6	30.3	1.23	15.24	0.49	2.23	0.23
2.35	13,588	48.7	30.2	1.26	15.14	0.55	2.27	0.26
2.40	18,721	48.9	30.1	1.26	15.08	0.54	2.30	0.27
2.45	24,183	49.1	30.0	1.26	15.00	0.55	2.33	0.28
2.50	27,384	49.2	30.0	1.26	14.95	0.55	2.35	0.29
2.55	30,009	49.3	29.9	1.26	14.90	0.54	2.36	0.30
2.60	31,437	49.3	29.9	1.26	14.87	0.53	2.37	0.30
2.65	32,708	49.4	29.9	1.25	14.84	0.53	2.38	0.30

Max % Na_2O	Tonnes (000;s)	% SiO_2	% Al_2O_3	% Fe_2O_3	% CaO	% MgO	% Na_2O	% K_2O
2.70	33,642	49.4	29.9	1.25	14.81	0.53	2.39	0.30
2.75	34,086	49.5	29.9	1.25	14.80	0.53	2.39	0.30
2.80	34,607	49.5	29.8	1.25	14.78	0.53	2.40	0.31
2.85	34,979	49.5	29.8	1.25	14.76	0.53	2.40	0.31
2.90	35,315	49.5	29.8	1.25	14.75	0.53	2.41	0.31
2.95	35,535	49.6	29.8	1.25	14.73	0.53	2.41	0.31
3.00	35,707	49.6	29.8	1.25	14.72	0.53	2.41	0.31

Table 14-11 Model sensitivity to maximum % Na2O – Inferred Category

Max % Na_2O	Tonnes (000;s)	% SiO_2	% Al_2O_3	% Fe_2O_3	% CaO	% MgO	% Na_2O	% K_2O
2.00	155	48.3	26.8	2.35	15.08	1.81	1.98	0.76
2.20	3,703	48.4	30.7	1.14	15.51	0.44	2.13	0.18
2.25	7,811	48.5	30.6	1.16	15.45	0.47	2.19	0.19
2.30	11,890	48.6	30.6	1.16	15.38	0.45	2.22	0.21
2.35	15,224	48.7	30.5	1.19	15.31	0.48	2.25	0.22
2.40	20,961	49.0	30.4	1.20	15.20	0.48	2.28	0.23
2.45	30,510	49.4	30.1	1.21	15.04	0.51	2.33	0.25
2.50	32,724	49.4	30.1	1.22	15.01	0.52	2.34	0.26
2.55	36,693	49.5	30.0	1.24	14.93	0.52	2.36	0.29
2.60	38,205	49.5	30.0	1.24	14.91	0.52	2.37	0.29
2.65	39,047	49.5	29.9	1.25	14.89	0.52	2.37	0.29
2.70	39,683	49.6	29.9	1.25	14.87	0.52	2.38	0.29
2.75	40,010	49.6	29.9	1.25	14.86	0.52	2.38	0.29
2.80	40,614	49.6	29.9	1.25	14.84	0.52	2.39	0.30
2.85	41,157	49.6	29.8	1.25	14.82	0.52	2.39	0.30
2.90	41,501	49.7	29.8	1.25	14.80	0.52	2.40	0.30
2.95	41,725	49.7	29.8	1.25	14.79	0.52	2.40	0.30
3.00	42,034	49.7	29.8	1.25	14.77	0.52	2.40	0.30

14.12 Factors That May Affect the Mineral Resource Estimate

Areas of uncertainty that may materially impact the Mineral Resource Estimate include:

- Commodity price assumptions;
- Assumptions that all required permits will be forthcoming;
- Material recovery assumptions; and
- Mining and process cost assumptions.

There are no other known factors or issues that materially affect the estimate other than normal risks faced by mining projects in Greenland in terms of environmental, permitting, taxation, socio-economic, marketing, and political factors. Hudson is not aware of any known legal or title issues that would materially affect the Mineral Resource estimate.

15 Mineral Reserve Estimate

A mineral reserve has not been estimated for the Project as part of this PEA.

A mineral reserve is the economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a prefeasibility study.

16 Mining Methods

16.1 Introduction

Mining will employ standard open pit methods using a hydraulic excavator loading articulated dump trucks. It is planned to mine 400,000 t of anorthosite per year, with the mine operating for nine months. Anorthosite will be hauled to a mobile crushing plant near the pit exit. After crushing, the material will be hauled 10 km to the port area where it will be stored outside.

The potential for acid generation and for metal leaching from the deposited material has been examined. The conclusion is that the anorthosite has no acid generating potential as there are no contained sulphides.

Mining will be undertaken by Hudson using its own equipment and workforce. Explosives, blasting agents, fuel and other consumables will be sourced from established suppliers.

The open pit was designed by Watts, Griffis and McOuat Ltd. (WGM) under sub-contract to Hains using recommended standards for road widths and minimum mining widths based on efficient operation for the size of mining equipment chosen for the project. The pit for the White Mountain deposit was selected based on Lerchs-Grossman (LG) open pit optimization using Whittle™ software.

Table 16-1 Unconfined compressive test results on selected drill core

	UCS (MPa)	Dry Density (kg/m3)	Mass (g)	Dia. (mm)	Hgt. (mm)	Hgt/Dia	Load (kN)
QAQ 12-41 Sa.1, 27.55 m	**256**	2,755	373.4	41.83	98.63	2.36	351.8
QAQ 12-42 Sa.2, 66 m	**249**	2,761	357.1	41.92	93.70	2.24	343.5
QAQ 12-43 Sa.3, 24.6 m	**121**	2,758	342.5	41.45	92.08	2.22	163.6
QAQ 12-44 Sa.4, 8 m	**138**	2,747	365.4	41.44	98.63	2.38	186.6
QAQ 12-45 Sa.5, 11 m	**128**	2,754	315.3	41.74	83.69	2.00	175.0
QAQ 12-45 Sa.6, 59.6 m	**295**	2,769	317.9	41.69	84.13	2.02	402.9

Source: Test Report from Thurber Engineering dated March 4, 2013

16.2 Pit slopes and geotechnical consideration

The pit is designed essentially entirely within the Indicated Resource so that there is no waste rock in the walls. This enables a conservative slope angle so that slope stability will not be an issue. Consequently, a geotechnical study has not been prepared. Unconfined Compressive Strength (UCS) tests on selected drill core (Table 16-1) indicate the rock is quite competent and that potential zones of weakness are confined to thin (1 cm – 2 cm), widely spaced fracture zones represented by mafic dykes. Such zones are clearly evident in the field and can be readily accommodated by using low slope angles. The selected maximum slope angle is 40°.

16.3 Pit design

16.3.1 Optimization

Whittle software was employed to prepare an optimized pit shell. The optimization inputs are shown in Table 16-2.

Table 16-2 Pit optimization parameters

Inter-ramp slope	40°
Bench height	10 m
Batter angle	70°
Ramp gradient, max.	8%
Ramp width, including ditch and safety allowance	15 m

Note that the above costs and values were prepared at the time of pit optimization. They are not the final amounts used in the Operating Cost and Financial Analysis sections of this study.

The optimized pit shell roughly follows the surface outline of the Indicated Resource and descends to a depth limited by the shallow pit wall slopes. The depth is also close to the limit of Indicated Resources.

16.3.2 Design

A pit design was prepared from the optimized pit shell by smoothing and by adding a haulage ramp. The design bench height is 10 m. The final pit contains 10.5 million tonnes of anorthosite, sufficient for 26.25 years at the anticipated production rate. The pre-mining topography is shown in Figure 16-1 below, along with the final pit outline.

Figure 16-1 Predevelopment topography and final pit outline

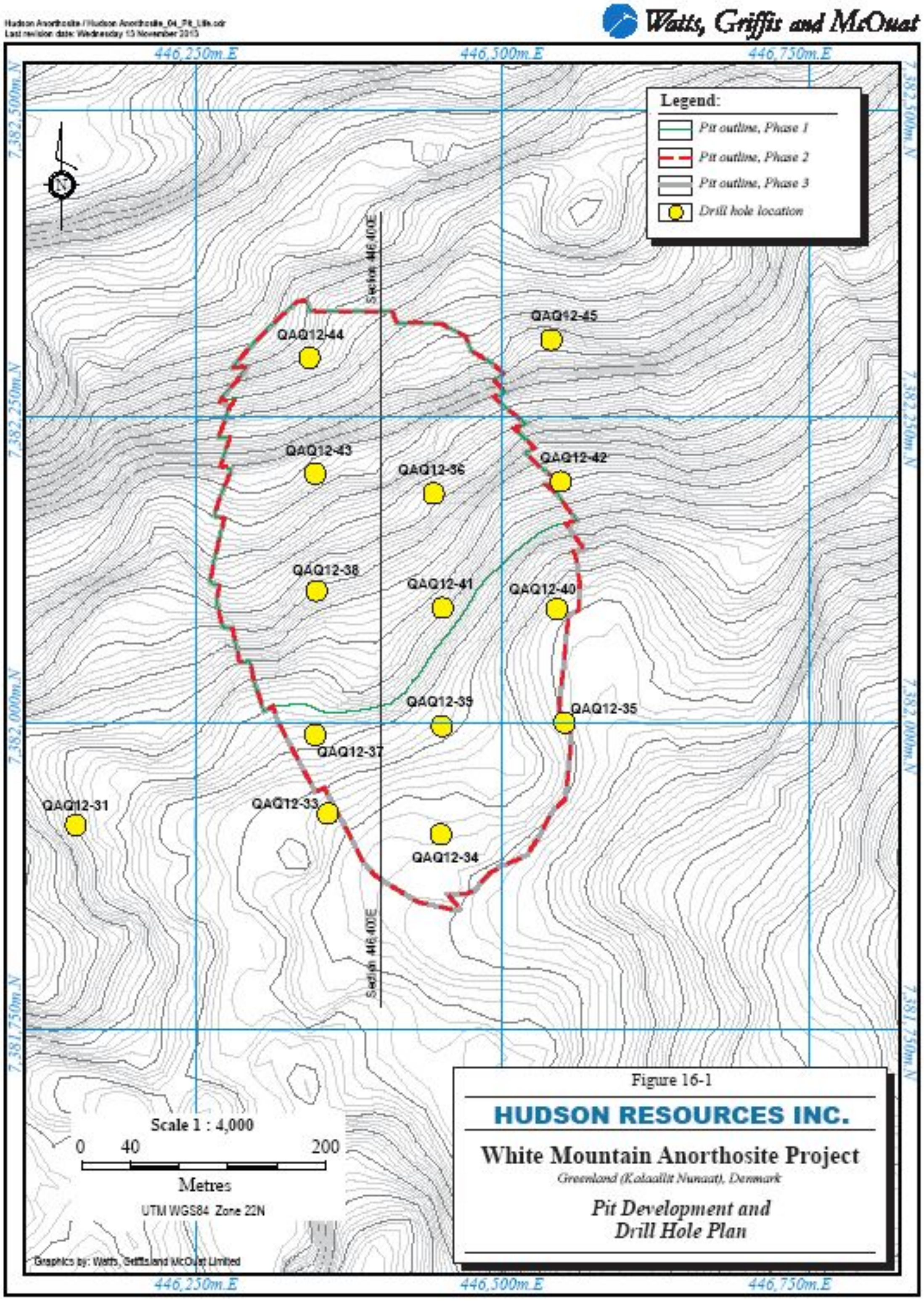
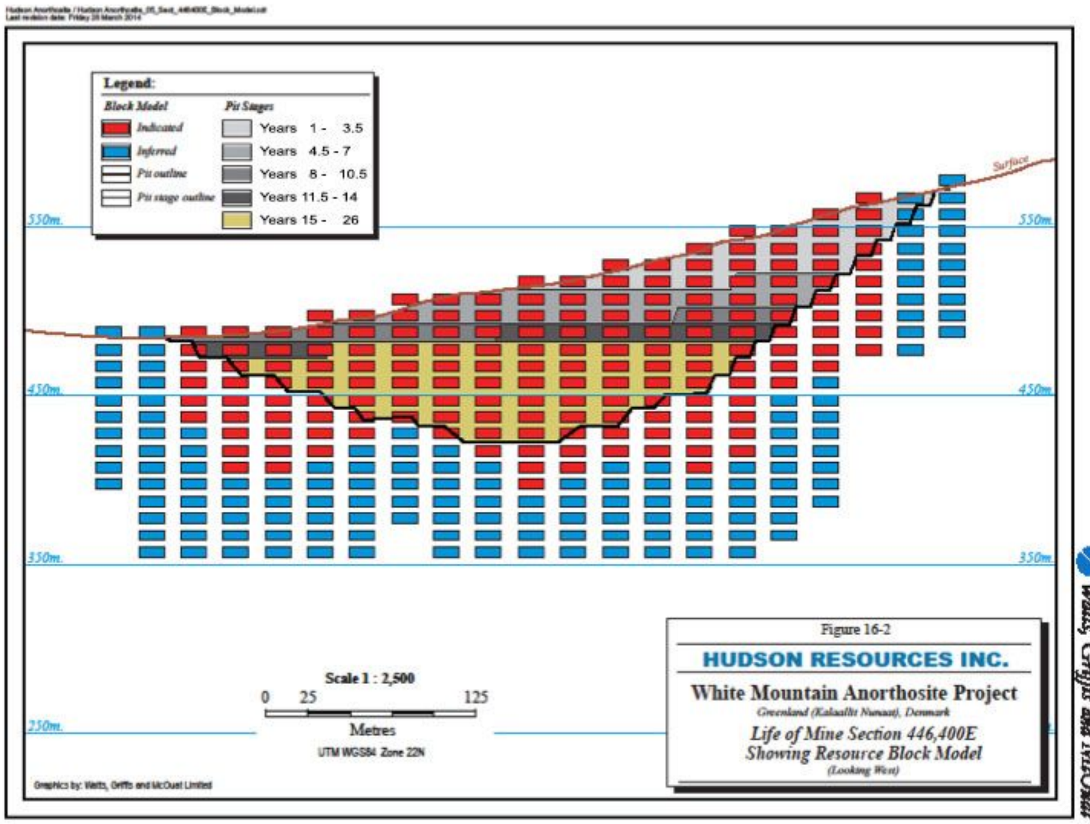


Figure 16-2 shows the final pit outline as well as the advancement of the pit after 3.5 years, 7 years, 10.5 years, and 14 years.

Figure 16-2 Pit development - section view



The pit design incorporates 187,000t of Inferred Resource. For the purpose of this study, the Inferred material is considered to be waste, for a negligible stripping ratio of 0.02:1. (It is noted that Inferred Resources are anticipated to be converted to Indicated Resources after commencement of production.)

There is a thin layer of moss and lichen growing on parts of the anorthosite surface. Hudson plans to hydraulically clean the surface prior to drill and blast operations.

16.4 Dilution and mining losses

The pit has been designed within the anorthosite resource. At the pit wall, any "dilution" material has the same grade as the anorthosite material. Hains estimates that the dilution and mining loss tonnages will be equal and have no effect on grade.

16.5 Dewatering

The pit ramp daylights at the 476 m elevation. All higher benches, from the 480 Bench to the 590 Bench, will be side-hill and drain by gravity. Suitable ditching will be provided to direct surface water away from the crusher area. Dewatering will not be required until Year 12. After that, a small sump will be excavated on each bench from the 475 Bench to the 420 Bench. The sump will be equipped with a portable diesel pump, with the outflow directed away from quarry operations.

16.6 Mine equipment

Drilling will be by a Sandvik DX780 drill. The primary loading tool will be a 3.5 m^3 excavator (CAT 329E). Haulage will be in three 33.5 t articulated dump trucks (Volvo A35) supplemented by an existing Doosan MT31 ADT.

Pit floors and haulage roads will be maintained with an L250G loader and a 4.3 m road grader. The loader will also serve as back-up to the excavator for loading of haulage trucks. Hudson also has available a Komatsu FC240 excavator. This machine will be used as back-up to the CAT329E and to provide secondary breaking of anorthosite, if required. Crushing will be by portable PowerScreen jaw and cone crushing units. Loading of haul trucks from the cone crusher stockpile will be via a Volvo L150G front end loader.

Auxiliary mining equipment includes a water truck, service/mechanics truck, explosives carrier/ANFO mixer truck, mobile crane and pick-up trucks.

The daily anorthosite haulage will be approximately 1,500 t (46 trips). Table 16-3 summarizes the main equipment to be used in the quarry operations.

Table 16-3 Main mining fleet

Description	Quantity
Production Drill, Sandvik DX780	1
Excavator, Caterpillar 329E	1
Haul Truck, Volvo A35	3
Front End Loader, Volvo L250G	1
Front End Loader, Volvo L150G	1
Grader, 4.3m	1
Water Truck	1
Service Truck	1
Fuel Truck	1
Explosives Carrier/Anfo Mixer	1
Mobile crane	1
Light Vehicles	3

The required mine fleet has been determined based on the drill and haul truck productivities detailed in Table 16-4 and 16-5.

Table 16-4 Drill productivity

Rock Density	2.76	t/m^3
Burden	2.6	m
Spacing	2.5	m
Bench Height	10.0	m
Sub-drill	1.25	m
Collar (stemming)	3.0	m

Hole diameter	89	mm
Rock per hole	179.4	t
Drill Penetration rate	0.3	m/min
Drill Time/hole	37.5	min
Set-up Time	5.0	min
Total time/hole	42.5	min
No. Holes/year	2,230	
Redrill holes (10%)	223	
Drill time required/year	1,755	hrs
Effective hr/year	2,700	hrs
Drill Utilization rate	65	%
No. Drills Required	1	unit

It is anticipated drilling will be conducted to blast approximately 32,000 tonnes anorthosite per blast, or approximately 1.5 blasts per month. Drilling time per month is estimated at approximately 195 hours based on the productivity data in Table 16-4. It is anticipated that the drilling and blasting personnel will be cross-trained to operate the ancillary mobile equipment (grader, Komatsu excavator, water truck, etc.) as required when not involved in drill and blast operations.

Hudson purchased a used 28.5 t articulated dump truck (Moxy MT31) for road-building in 2013. This will be kept and the purchase of one of the A35s will be deferred for 10 years. The old truck will be kept on standby, so that the fleet will eventually increase to five trucks with three drivers.

The Moxy MT31 will be used primarily for anorthosite haulage from the pit face to the primary crusher, with the Volvo A35s used for haulage from the secondary crusher to the process plant. Considering the low annual hours, the excavator and L250G loader will be replaced every 15 years and the L150G loader and drill every 10 years. The haul trucks will be replaced half-way through the mine life.

16.7 Crushing equipment

Mine trucks will haul anorthosite from the pit face to a 2-stage mobile crushing plant located near the mine.

The primary crusher will be a track mounted PowerScreen XA400S portable single-toggle jaw crusher with an 1100 mm by 700 mm opening. The closed side setting can be adjusted from 50mm to 125mm. A $10m^3$ hopper will feed a 1,060 mm wide spring-mounted vibrating pan and grizzly feeder. The 1,000mm discharge conveyor will directly feed the secondary crusher feeder. The crusher, feeder, and discharge conveyor will be powered by a 194 kW diesel engine.

The secondary crusher will be a track mounted PowerScreen Maxtrax 1000S portable cone crusher with a closed side setting of 25 mm. The 4.4 m^3 hopper will be equipped with a 1,000 mm wide feed conveyor. An 800 mm wide discharge conveyor will directly feed the surge pile conveyor hopper. The crusher, feed conveyor, and discharge conveyor will be powered by a 242 kW diesel engine. The head pulley of the 800 mm wide surge conveyor will be elevated 6 m, sufficient to permit building a 500 tonne surge pile.

Figures 16-3 and 16-4 illustrate the crushers. The surge pile conveyor will be powered by a generator serving the buildings and fuel depot in the crusher area.

Figure 16-3 Jaw crusher

Figure 16-4 Cone crusher

16.8 Mining and crushing personnel

Given the relatively low mining rate required to meet market demand, and in order to avoid the potential for severe winter weather, the mine will be operated on a nine-month (270 day) basis. During this time period, the mine will operate one 12 hour shift per day, 7 days per week. The mining and crushing crews will work 12 hour shifts, 28 days on, 28 days off. The mine will operate on day shift only, so two crews will be required. The total payroll in the mining and crushing area will be 22, as shown in Table 16-5, although actual requirements are 11 full time person-equivalents/year.

Table 16-5 Mining and crushing personnel

Description	Per Crew	Payroll	FTE
Excavator Operator	1	2	1
Haul Truck Driver	3	6	3
Production Drill Operator	1	2	1
Crusher Operator	1	2	1
Utility Driver	1	2	1
Mine Technician/Surveyor	1	2	1
Maintenance Technicians	3	2	3
Total	**11**	**22**	**11**

The mine will work all holidays that fall within the nine-month production season; an allowance for the resulting overtime pay has been incorporated into the operating cost estimate. Figure 16-5 illustrates the work rotation schedule.

Figure 16-5 Quarry labour schedule

The rotation schedule will require a total of 99 individual round trips from home base to the project site. It is assumed that transport will be primarily by boat from Sisimiut and Maniitsoq with limited air travel dependent on ice cover in Sondre Stromfjord.

17 Recovery Methods

The results of mineral processing and hydrometallurgical testwork detailed in Section 13 of this report have formed the basis for the development of the proposed process flow sheet and operating plan for the project.

17.1 Design basis

The design basis for the White Mountain project is an open pit quarry and loadout facility in Greenland. Crushed material will be shipped in bulk to North America where it will be unloaded, moved to storage and recovered for final grinding to minus 100 to minus 200 mesh product. The grinding product will enter the process facility where it will be treated with hydrochloric acid, followed by HCL sparging and two stages of calcination to produce an alumina particle. Co-products in the production are amorphous silica and calcium silicate.

Finished product will be shipped to customers as needed.

Initial production capacity is based on annual Run-of-Mine (ROM) anorthosite production of 400,000 tonnes. The production profile is scalable with respect to ROM tonnage due to the size of the available resource and the capacity of the primary mining, crushing and haulage equipment.

The design concept for the operation is based on the following:

- Open pit mine, 270day/year operation, 12 hour shifts/day, 7 days/week, 3240 hr/year
- 400,000 tpy nominal ROM production = 120 t/hr nominal production, size for 150 tph
- Portable jaw/cone crusher plant at mine site
- Truck haul of primary crush material to outside storage at port
- Storage/loadout of final product, 9 month shipping season
- Storage capacity for 40,000 tonnes
- Finished product bulk shipped to North America. Storage for 100,000 tonnes feed material required
- Final milling
- Alumina HCL processing plant in North America
- Loadout/transport to customers as required. Finished product storage capacity approximately 4,000 tonnes.

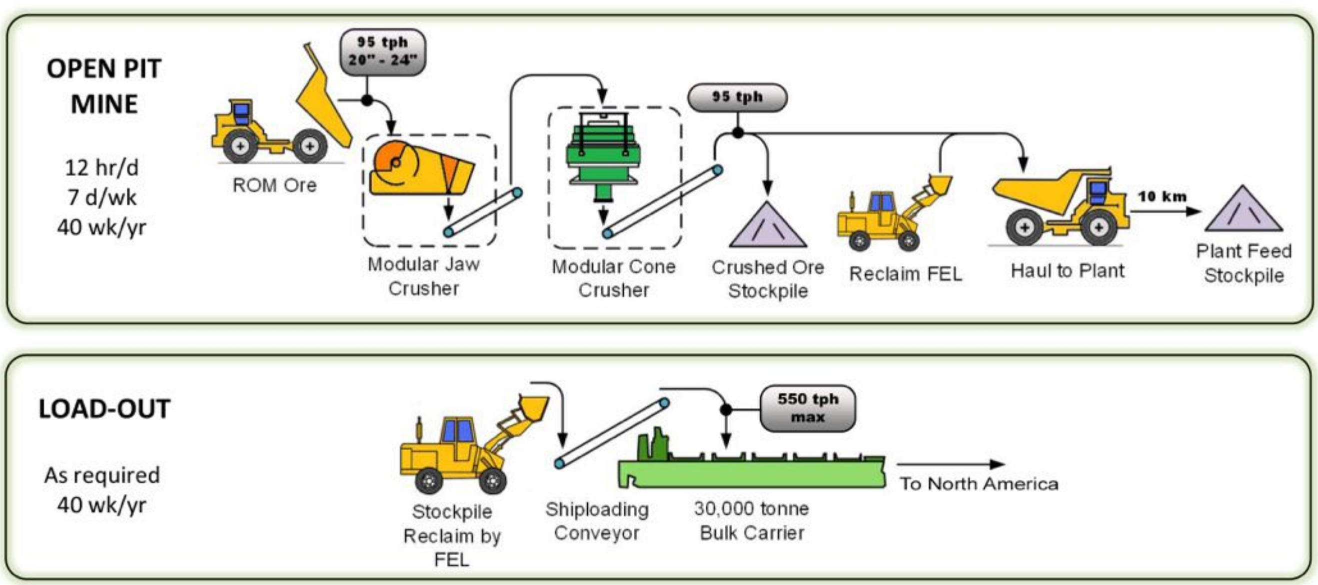
All diesel powered equipment at the site, such as the drill, excavator, haul trucks, jaw and cone crusher will operate with EU stage IIIB or better diesel engines using low sulphur fuel. Power generators will also be equipped with these types of low emission, fuel-efficient diesel engines.

17.2 Quarry Operations

Quarry operations, equipment and labour requirements have been detailed in Section 16 of this report. The quarry plan is based on a nominal production of 400,000 tpy, with a nominal crusher capacity of 150 tph. Quarry operations are based on the following design basis:

- Bench height of 10 m, drill pattern of 2.6 m x 2.4 m, 89 mm dia. blast holes
- Sandvik DX780 drill
- Nominal maximum blast rock size of 950 mm x 650 mm (37.4” x 25.5”)
- Secondary breakage, if required, by existing Komatsu FC240 excavator equipped with jack hammer
- Caterpillar 329E excavator to load anorthosite truck (Moxy MT31 or Volvo A35)
- Volvo L250G front end loader for bench cleanup, etc.
- PowerScreen XA 400S mobile jaw crusher set at 100 mm CSS (closed side setting) for approximate 8:1 crushing reduction ratio feeding
- PowerScreen Maxtrax 1000S mobile cone crusher with 25 mm CSS for approximate 4:1 crushing reduction ratio
- Discharge from cone crusher stockpiled in surge pile
- Recovery from surge pile by VolvoL150G loader to Volvo A35 trucks
- Haulage to port for stockpiling

Figure 17-1 Mining schematic



17.3 Product Loadout and Shipping

Product loadout is based on recovery from stockpile and conveying out to a shiploader system positioned on the dock. Stockpile material will be recovered by front end loader and dumped to the conveyor receiving hopper. Material will be conveyed out to the shiploader for loading into the ship’s hold. All conveyors and the shiploading system will be covered and equipped with appropriate dust collection systems to minimize fugitive dust emissions. The outboard side of the dock will built out approximately 30 m from shore to ensure a low water depth of approximately 12 m. This depth will provide sufficient draft for the largest vessels expected to be used for ocean transport of product. It is anticipated most vessels will be HandySize vessels with a capacity of 25,000 to 35,000 tonnes. Based on the proposed production schedule, shipments of 40,000 to 50,000 tonnes per month during the operating season are anticipated.

17.4 Product Receipt– North America

The process plant in North America will produce the final product. A site has yet to be identified as having the required ship access and available surface area. The proposed location will need to have access to industrial chemicals, such as HCL, and natural gas. Bécancour, Quebec and Houston, Texas are obvious choices to consider. Each has access to the industrial inputs - natural gas, electricity and water - necessary for the efficient and economical production of calcined alumina. As well, each is situated in an industrial location where the co-products of amorphous silica and calcium silicate are likely to be sold in the volumes produced.

17.5 Process Plant – North America

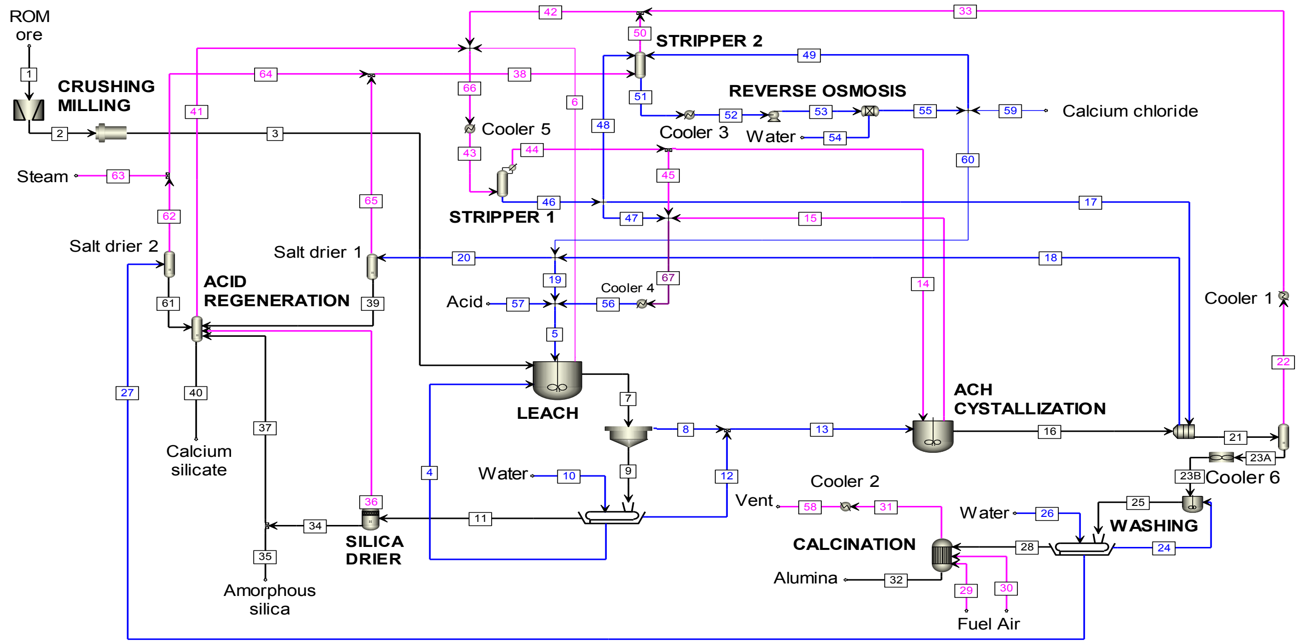
Feed material will be recovered from the stockpile by front end loader and transferred to a hopper feeding a conveyor/bucket elevator system leading to a day bin for the grinding mill. From the day bin, feed will be fed to a ball mill operating in closed circuit with air classifiers and associated bag houses. For 400,000 t/a processing rate, the mill feed rate will be 48 t/h or 1,152 t/d which is a low milling rate by industry norms. The feed will be ground in the mill to a fineness of between 100 mesh and 200 mesh. Oversize material is returned to the mill, with the undersize discharged by rotary valve to a product conveyor and the final product storage silos ahead of the hydrometallurgical plant.

A simplified flowsheet for the hydrometallurgical plant, located in North America, is provided overleaf as Figure 17-2. The main unit operations in the plant are described in subsequent sub-sections

Dissolution

The anorthosite is metered into the first of a series of leach vessels operated at elevated temperatures where it is dissolved in strong HCl solution obtained from recycling and regeneration sections of the plant. Essentially all of the Ca and Al in the anorthosite are dissolved and essentially all of the silica reports as an amorphous product. The slurry exiting the leach train is thickened and filtered. The filter cake, which is amorphous silica (AS), is water washed and dried with part going to market and part going to HCl regeneration. The filtrate, which contains very little excess HCl, is processed for alumina recovery.

Figure 17-2 Simplified flowsheet for hydrometallurgical plant



Note: Black lines contain solids or slurry, blue lines contain liquids, and pink lines contain gas

ACH crystallization

The filtrate is sparged with HCl gas. As the HCl strength increases, aluminium chloride hexahydrate (ACH or $AlCl_3.6H_2O$) crystallizes out along with some of the contained Na and Ca as chlorides. The ACH crystals are removed from the solution which, at that point, is strongly acidic and is returned to the leach circuit. The crystals are washed with strong HCl to remove soluble Ca and Na and sent to calcining.

ACH calcination

The washed ACH crystals are calcined at low temperature to regenerate HCl which is collected and re-used for sparging and leaching. The low temperature calcine is water washed to remove Na and Ca salts, then fired at high temperature in a second calcining operation to give a product of the desired chemical and physical specifications.

Acid regeneration

A means of bleeding calcium from the circuit and extracting the associated chloride is essential. This is done by taking a bleed stream from the ACH filtrate and crystallizing $CaCl_2$, along with minor amounts of NaCl and $AlCl_3$, from it in a crystallizing evaporator. The resulting mixed salt is reacted with a part of the dried amorphous silica produced from the leach residue and heated to high temperature in the presence of steam. The dominant reaction is between steam, $CaCl_2$, and SiO_2 to form $CaSiO_3$ and HCl.

The regenerated HCl is collected for re-use and the calcium silicate marketed.

Product handling

The simplified flowsheet does not show the necessary systems but various surge bins, automatic bagging lines, etc., are included to handle the three products.

Utilities

The proposed operation will consume cooling and make-up water. Additionally, the project will be a significant consumer of natural gas used for drying, calcination operations, crystallization and evaporation.

The main reagent used will be HCl which will be purchased as standard HCl. Consumption of HCl is expected to be 34,000 t/a expressed as 35% HCl. The HCl is essentially used to replace chloride salts remaining in the calcium silicate by-product.

18 Project Infrastructure

18.1 Greenland requirements

The project site can be considered remote and all required infrastructure in Greenland will have to be supplied by Hudson. Major infrastructure requirements in Greenland include the following:

- Roads
- Port facility and dock structures
- Ship loader
- Accommodation complex, including water and sewage system
- Equipment shops and spare parts storage
- Fuel storage facilities
- Diesel power plant
- Explosives storage facilities
- Communications system
- Solid and hazardous waste disposal facilities

The general site layout for the processing plant, camp site and quarry site is illustrated in Figure 18-2, which also shows the proposed road layout between the plant and the quarry.

18.1.1 Roads

The quarry site is located approximately 10 road km from the port site. An access and haul road is required to connect the two locations. The quarry site has a base elevation of approximately 450 m asl. A preliminary road design has been developed based on a maximum 10% grade, with most of the grade well below that level. Road design is based on the cross section detail provided in Figure 18-1.

Figure 18-1 Road Section Design

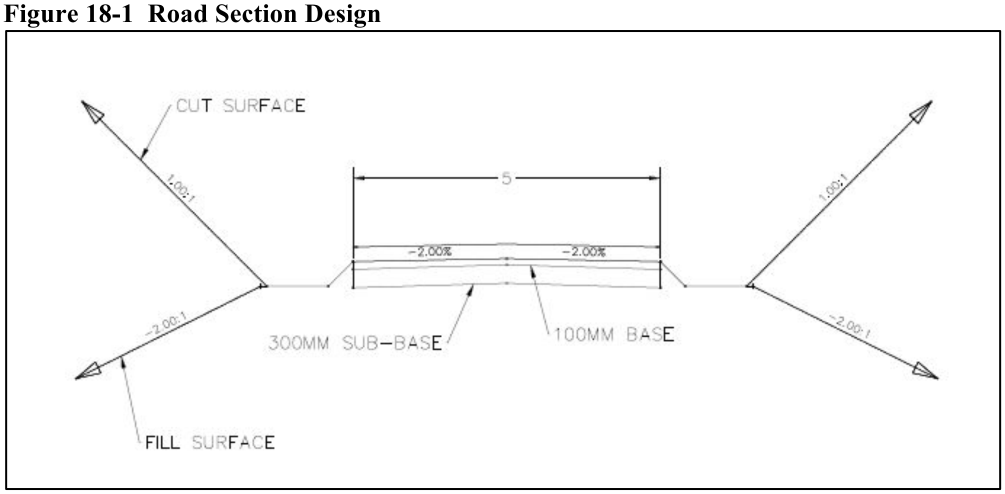
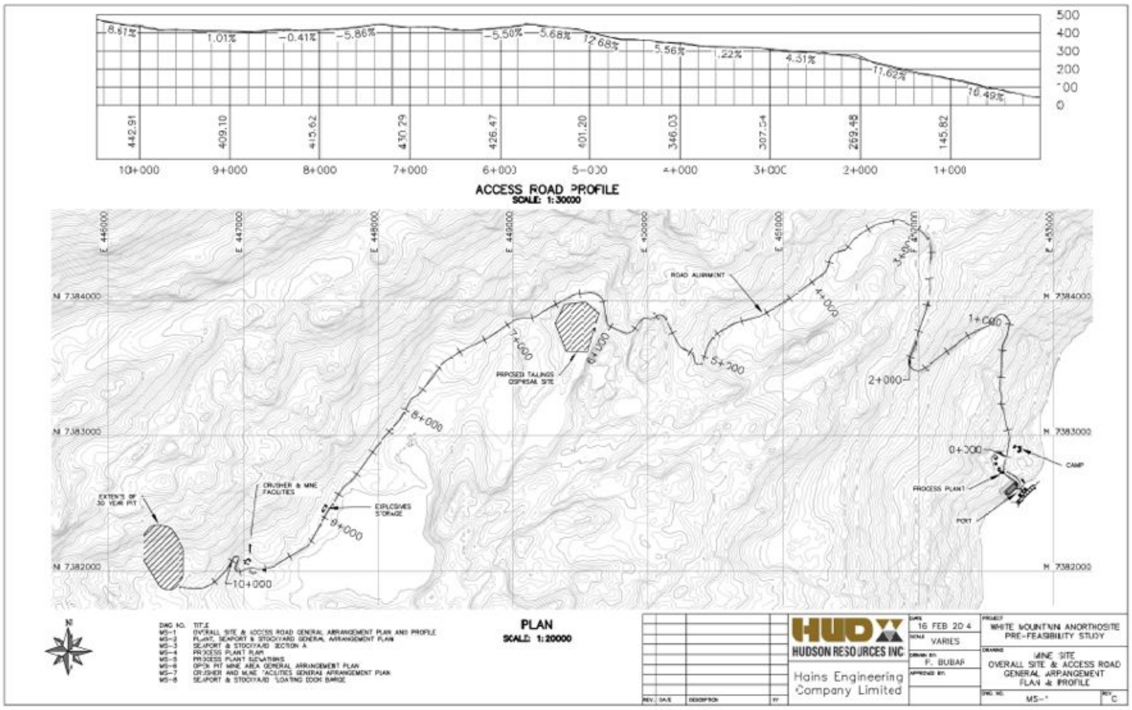


Figure 18-2 Road Layout



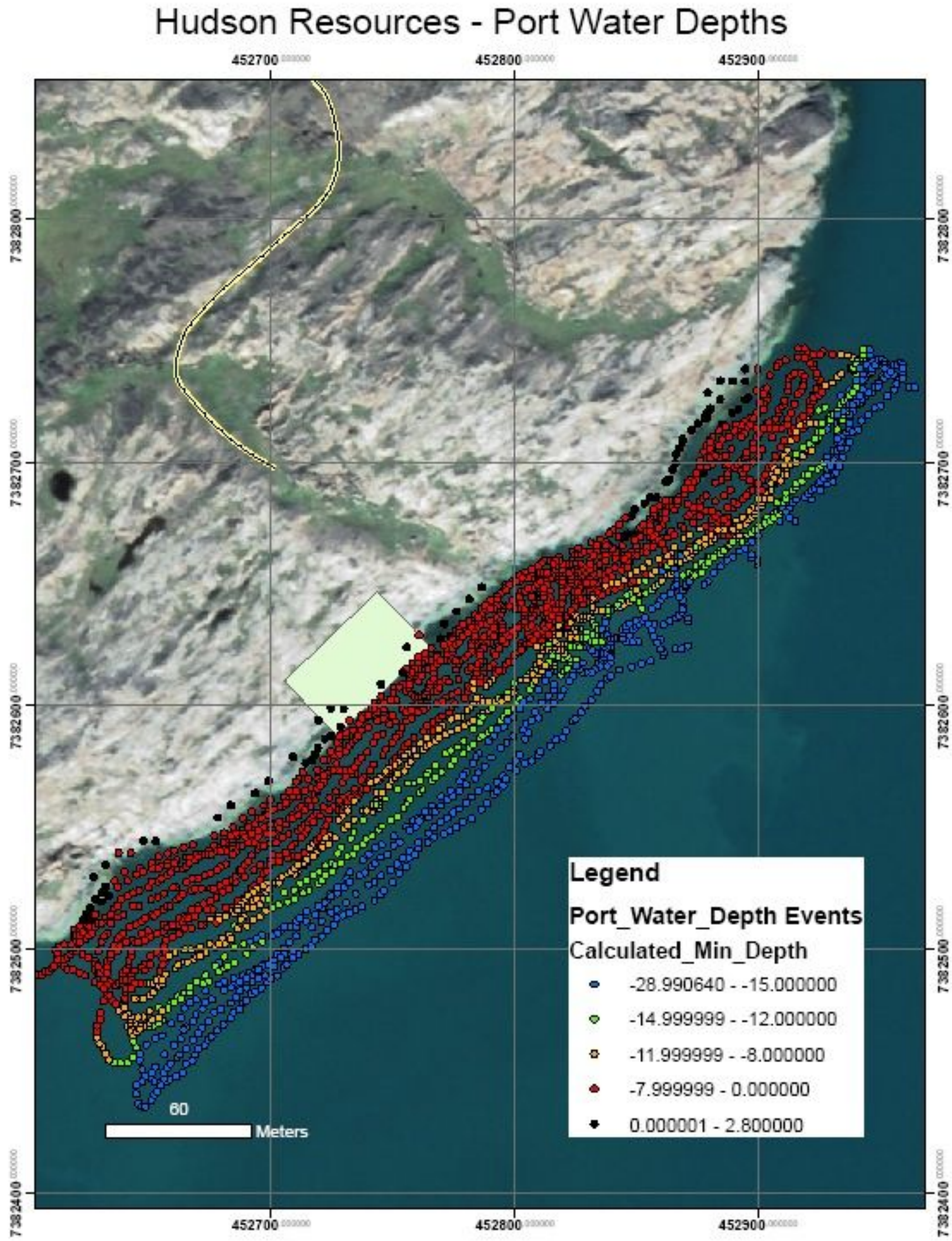
In 2013, Hudson commenced road construction to the site for bulk sampling purposes, and as of the date of this report has constructed approximately 4 km of road. The road layout has been positioned to avoid an environmentally sensitive area containing arctic orchids. Road construction consists of drilling, blasting and crushing the rock to excavate to the required grade level and prepare sub-base and base material, with ditching and berms as required. Work to date has involved blasting and crushing approximately 150,000 tonnes of rock. This portion of the road construction is by far the most challenging and the remaining approximate 6 km of road construction will primarily involve the laying down of crushed rock. The initial part of the road construction has been completed at a cost of $1,00,000, with an estimated $1,000,000 required to complete the road to the quarry site and to blast out the port area, which is planned to be completed in the 2016 season. The road is designed as a single lane structure with a width suitable for the 33.5 tonne ADTs. Suitable by-pass areas will be constructed as appropriate to allow passing of vehicles. Figure 18-3 illustrates the progress of road construction.

Figure 18-3 Road Construction in Progress

18.1.1 Port Facilities

Bathymetry data obtained in October, 2013 indicates a total tidal swing of approximately 2.37 metres between high and low tide, or approximately 1.19 metres between the mean sea level and either high or low water. The bathymetry data also indicate an approximate distance of 35 m from shore to accommodate a draft of 12 m at low tide (Figure 18-4). These data have governed the design of the port facilities.

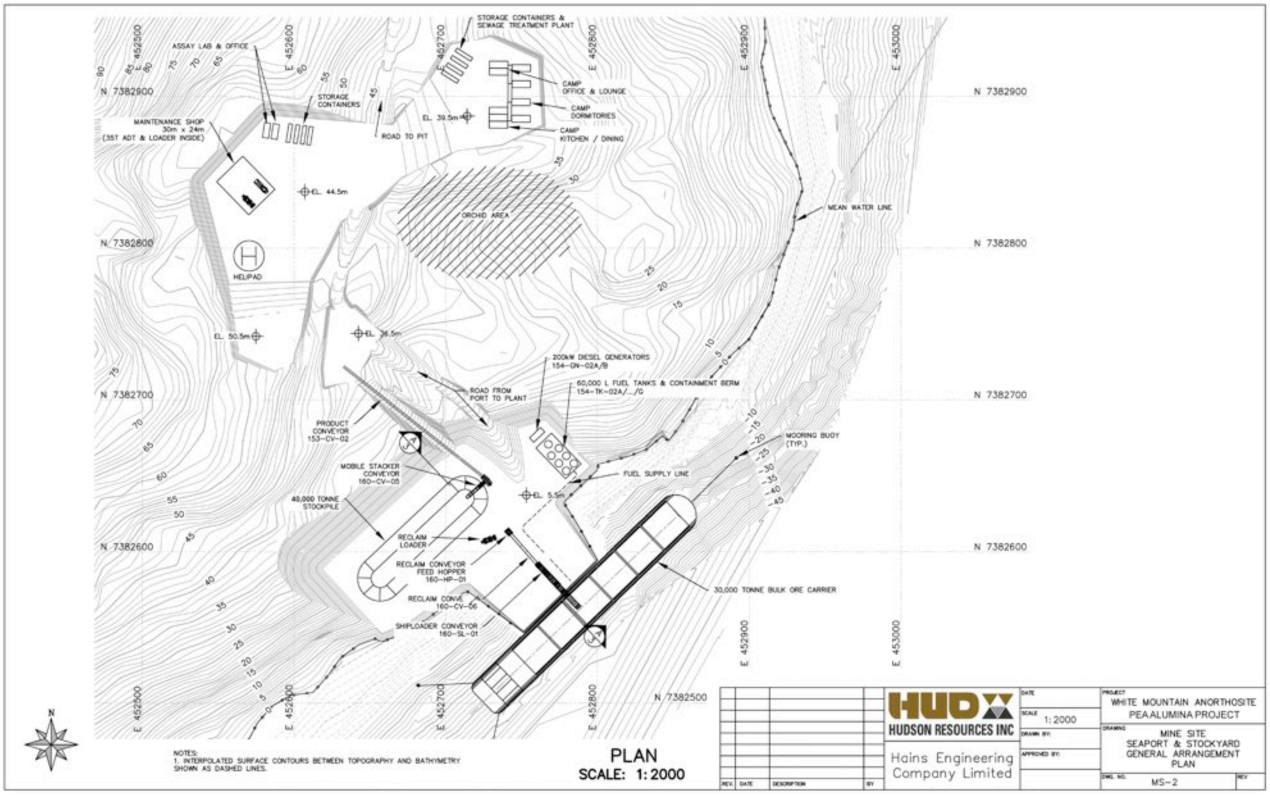
Figure 18-4 Bathymetry Data

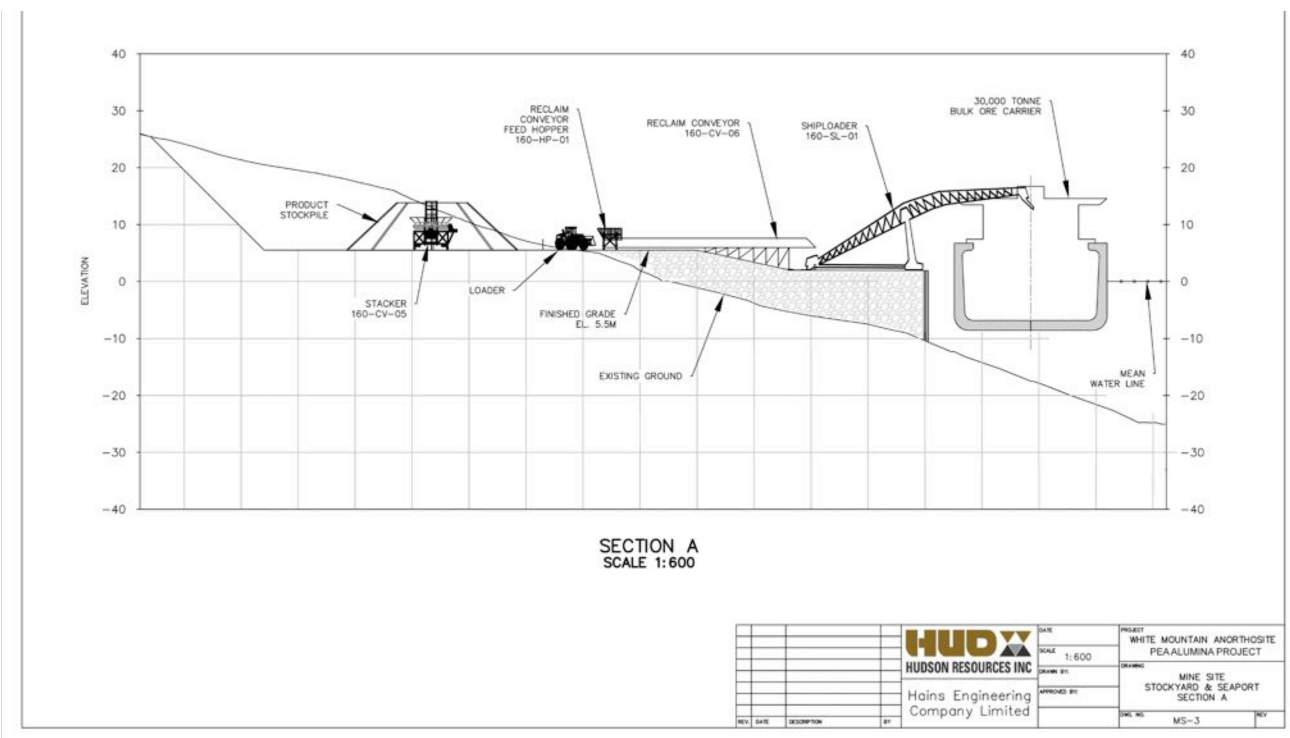


Source: Hudson Resources Inc.

Figure 18-5 illustrates the port design and layout. A structure of steel sheet pile will be constructed to hold blasted rock from the storage area.

Figure 18-5 Port Design and Layout





A provision for fuel lines for direct off-loading of fuel from the coastal tanker is included in the wharf design. Ships will tie up and be moored using three-point bow and stern floating mooring points equipped with quick release connectors. Warping of the ship will be accomplished by adjusting the mooring lines using the ships winches. The port will be fitted with a spill protection boat on davit launch and spill protection kit for use in emergency. It is planned to deploy a spill protection boom around ships when they are berthed. This measure is designed to prevent any escape of fuel or other material to the fjord.

18.1.2 Shiploader

The shiploader will be suitably positioned on the dock structure to provide efficient loading of vessels. The selected type of loader is illustrated in Figure 18-6. This type of loader has been used previously in Greenland at the Sequi olivine mine in southern Greenland. The loader will be equipped with a suitable dust suppression spout and deflection plates to minimize dust and enable even distribution of material in the ship's hold. The shiploader will have its own internal source of power.

Figure 18-6 Shiploader Concept

18.1.3 Ancillary Facilities

Ancillary site requirements include the following:

- Staff accommodation, including toilets and showers
- Kitchen and cafeteria
- Recreation facilities
- Laundry
- Works shops for mobile equipment
- Storage for tools and equipment, kitchen supplies etc.
- Spare parts storage
- Fuel storage

18.1.4 Accommodation Complex

The accommodation complex will be a modular design constructed to industry acceptable standards for long term, permanent accommodation for mine operations personnel. Requirements for these facilities will be met by use of "flat pak" type portable buildings. Such buildings come pre-wired and plumbed for easy erection in the field. The buildings can be placed on simple squared timber supports and anchored to the rock with cables. This type of structure can be joined together to provide buildings of various sizes and uses and is ideally suited to use in a remote environment.

Sufficient units will be installed to provide for accommodation for up to 40 staff at any time based on single occupancy. Kitchen and cafeteria units will be sized to handle up to 25 people at a time. Recreational units will include games room, satellite TV, fitness room, as well as medical, first aid and emergency response facilities.

18.1.5 Sewage Treatment System

The sewage treatment system will be a bio-film reactor system as supplied by Janda Busse of Germany. This system is modular in design and specifically engineered for remote locations. The system is fully compatible with European regulations for waste water treatment and meets European Water-framework Directive known as DIN EN 12566-3 for all reduction standards, N, D, H + P as well as the tests following NSF standard 40 and 245 in the US.

Specifications for the proposed system are:

Capacity:	40 persons
Maximum effluent flow rate:	8,000 litres/day

The sewage treatment system will be installed as a single insulated 40 ft. high-cube container fitted with the following components:

- One (1) 5,000 liter storage tank, with coarse matter separator and aeration units
- Four (4) Aeration tanks each with 3,200 liter volume
- Two (2) MBR tanks each with 3,200 liter volume and membrane modules installed inside
- Piping to connect the tanks inside the container, air compressors, float switches, filtrate collectors, solenoid filtrate outlets, connecting pipes, adjustable time switching unit
- One cleaning box to maintain the membranes

The guaranteed performance specifications for the system are:

Domestic Waste Water Treatment System	Model	40PE
Performance Volume (inhabitants)	[P.E.]	max. 50
Daily quantity of Waste Water	[m³/d]	8
Daily pollution load	[kg BOD_5/d]	
Energy Consumption, 230V altering current (min-max) for technical functions only	[kWh/d]	~ 10-25
COD-Concentration in Outflow	[mg/l]	<75
$cBOD_5$/-Concentration in Outflow	[mg/l]	<5
Suspended Solids	[mg/l]	<2
Fecal Coliform Reduction	[cfu/100ml]	<10
Meets Requirements of Washington (USA) Standard of hygiene (WAC 246), Category 1 – Level A		

Discharge from the system is fully compatible with direct disposal in a receiving water stream or the fjord.

A 4 person Janda Busse treatment system will be installed at the quarry site. This system will have the following performance specifications:

Domestic Waste Water Treatment System	Model	4 PE
Performance Volume (inhabitants)	[P.E.]	4
Daily quantity of Waste Water	[m³/d]	1
Energy Consumption, 110V	[kWh/d]	2-3
Dissolved Oxygen	[mg/l]	>4
NH4	[mg/l]	<1
$cBOD_5$/-Concentration in Outflow	[mg/l]	<2
TSS	[mg/l]	<2
Fecal Coliform Reduction	[cfu/100ml]	<10
Meets Requirements of Washington (USA) Standard of hygiene (WAC 246), Category 1 – Level A		

18.1.6 Potable Water

Water supply will be drawn from a lake near the quarry site and carried by traced, insulated pipeline. The system will be split to provide untreated water for use in showers and toilets and treated water for potable water. Potable water will be passed through a particulate filter and UV sterilization system and then to 3 x 5 m^3 insulated HDPE storage tanks fitted inside a 40' shipping container. Potable water will be withdrawn from the storage tanks using a pressure system for distribution to the accommodation and kitchen facilities. Projected water supply requirements based on a maximum of 36 on-site staff at 220 litres/person/day are 8,000 litres/day. Water consumption is anticipated to be concentrated over short time periods during the day, with peak demand estimated at 2 L/sec. The average daily requirement is estimated at 0.1 L/sec. Potable water requirements for the lunchroom at the quarry site will be supplied using bottled water.

18.1.7 Mine Maintenance Building

The mine maintenance building will be adjacent to the warehouse facility. The building will be a prefabricated metal clad building with two maintenance bays, lubricant storage, machine shop and related offices. The workshop will contain the following:

- Lubricant storage and dispensing rooms
- A machine and welding shop
- An electrical/instrumentation shop
- Mechanical/electrical room
- Equipment washing and sump room
- Tire changing pad and equipment
- Coffee room
- An overhead crane with the capacity to lift heavy truck components

18.1.8 Fuel Storage

Fuel storage at the mine site will be for the equivalent of approximately three months of supply. Fuel will be delivered in bulk by ship and pumped directly into the storage tanks. Tanks will be located in bermed containment areas; secondary containment will protect against leaks and spills. Fuel tanks will be equipped with pumps for transfer of fuel to smaller containers and to fuel mobile equipment.

Fuel supply to the main power units in the port and camp area will be via dedicated line, while supply for mobile equipment will be via metered pumps. Fuel supply for the generator at the quarry site will be via a self-contained tank which will be refilled as required from a mobile service truck.

Fuel is delivered by coastal tanker operating out of Nuuk. Based on the proposed schedule and estimated fuel consumption rates, the tanker will be required to berth four times during the operating season.

18.1.9 Power Generation - Greenland

Power for the work area and accommodation buildings will be provided by diesel generator. Power requirements are estimated to average 300 KVA, which will be provided by two 200 KW units. Surplus heat energy will be recovered from the generators using a recovery system supplying heat to adjacent buildings such as the work shop.

A separate generator (25 KW unit) is planned to meet requirements at the quarry site.

18.2 Waste Disposal

Organic refuse will be incinerated in an approved incinerator or composted, as permitted. Hazardous waste materials such as used oil containers, used oil, used oil and fuel filters, etc. will be collected and removed from site to an approved disposal facility at Kangerlussuaq. If such facilities are not available, hazardous wastes will either be incinerated at high temperature, with the ash material buried in an approved disposal site, or securely stored in containers for shipment to an approved disposal facility in Europe.

Hazardous liquid wastes (used oil, etc.) will be disposed in a suitable approved high temperature incinerator or drummed for shipment to Europe for disposal at an approved facility.

18.3 Communications

Communications (voice and data) from the project area will be via a bi-directional satellite link, with local networks for on-site communications, supplemented by two-way radios and a satellite-based real time location system (RTLS) for vehicles travelling between the mine and the port. A repeater station may also be established to link to the mobile telecom network in Kangerlussuaq.

18.4 Medical Emergency Response

Medical and emergency response facilities will be provided at the accommodation complex where there will be a nurse’s station. A qualified nurse will be available at the mine site to deal with medical emergencies. Qualified personnel trained in first aid and emergency response will also be available. If needed, an air ambulance is available in Kangerlussuaq situated 70 km from the project.

18.5 North American Plant Infrastructure Requirements

North American infrastructure requirements relate to the process plant for production of the final alumina product. Major requirements include:

- Receiving dock facilities to offload shipments from Greenland
- Storage facilities for approximately 100,000 t of anorthosite
- Grinding equipment to reduce anorthosite to between 100 and 200 mesh
- Alumina hydrometallurgical plant established near source of chemicals and natural gas
- Site location close to markets for co-products amorphous silica (AS) and calcium silicate (CS)
- Final product storage and loadout facilities capable of handling SuperSacs, bulk containers and pneumatic trucks

These facilities have been described in greater detail in Section 17 of this report.

The required North American facilities are typical for industrial minerals processing plants and several examples of such facilities are in operation in the Gulf of St. Lawrence (Bécancour, Quebec) and the Gulf of Mexico (Houston, Texas), for example.

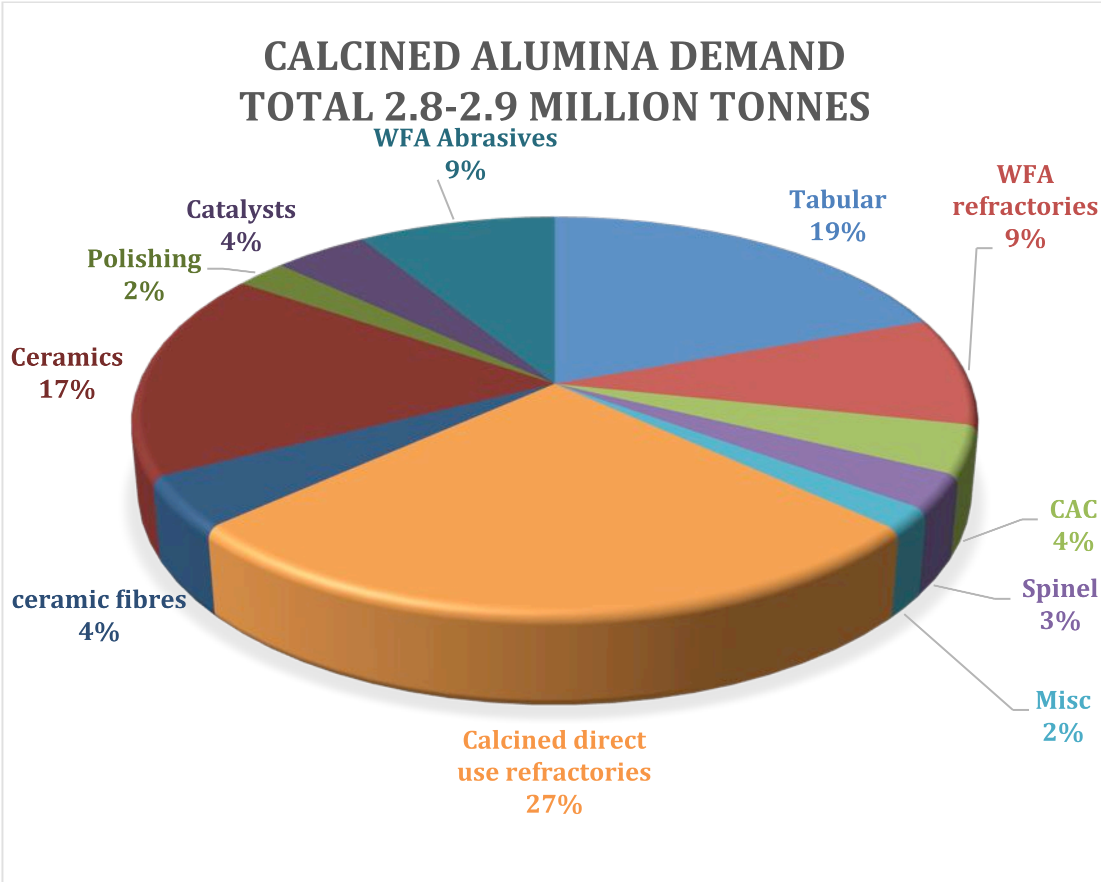
19 Market Studies and Contracts

Hudson commissioned Ted Dickson of TAK Industrial Mineral Consultancy, to prepare a report titled "Nonmetallurgical Alumina Market Study" (the "TAK Report) under the direction of Dr. Michael Druecker. Dr. Druecker has assumed responsibility for the content and conclusions of the TAK Report. The TAK Report notes that specialty alumina prices can vary from $600/t to $3,000/t with most falling in the range $700/t to $1,200/t. In general the finer grain size, lower soda content, and higher degree of calcination/sintering/fusing achieve higher prices. Hudson's inherently low soda content indicates that it could achieve premium prices of $1,000/t to $1,100/t. For the purposes of the Study, Hudson has chosen to use a conservative base price of $850/t for specialty grade alumina to reflect that it would be a new entrant in the market with volumes of just over 100,000 tonnes per year at full production. The TAK Report also comments on potential pricing for the amorphous silica and calcium silicate co-products resulting in a nominal value of $75/t being used for both.

19.1 Executive summary

- Total production of what is termed "Chemical Grade Alumina" by the International Aluminium Institute was 6.159 million tonnes. Of this calcined grades, which is the product to be produced by Hudson Resources amounted to an estimated 2.8-2.9 million tonnes with the balance alumina trihydrate. Product source from Bayer plants is the starting point or feedstock for the production of a wide range of specialty alumina products with significant added value.
- There had been a trend towards specialty alumina producers being independent from Bayer alumina suppliers, purchasing their feedstock from outside sources. However, in a reversal of that trend Almatis acquired the Burnside alumina plant of Ormet to supply a considerable portion of its requirements internally.
- Because IAI tends to report sales rather than production demand matches the estimated supply of 2.8-2.9 million tonnes. There is considerable differentiation of products at this stage with the estimated breakdown shown in Figure 19-1 below.
- Product differentiation is achieved by various means such as further calcining or sintering, fusing, purification to reduce soda or other impurities, grinding and grain sizing, or manufacture into other products such as calcium aluminate cement (CAC), spinel or ceramic fibres.
- The largest use for specialty grades of calcined alumina is in refractories, an estimated 1.9 million tonnes consisting of virtually all of the tabular alumina, about half of the white fused alumina, CAC, spinel, ceramic fibres and direct use of a range of grades of calcined alumina
- Estimated use in the wide range of ceramics manufactured from specialty alumina is 650-750,000 tonnes. This is a relatively fragmented and opaque market with hundreds of products manufactured in such diverse uses as ceramic tiles and tableware, abrasion resistant products, engineered ceramics, electrical ceramics, catalyst carriers, specialty glass and even armour for both personnel and military equipment.

Figure 19-1 Calcine Alumina Demand



- Polishing is a relatively small sector estimated to be 65-70,000 tonnes of calcined alumina. Fused alumina is widely used in the production of abrasive grain with demand estimated to be 250,000 tonnes.
- There are a very wide range of grades of specialty alumina on the market, literally hundreds of stock published grades from existing suppliers. There are variations depending on the soda content, grain size, grain size distribution, crystal size, surface area, density, porosity or lack of it or degree of alpha alumina formation, some in standard products supplied by manufacturers and others customised for individual customer needs.
- On chemistry grades are divided into normal, medium and low soda, Hudson Resources grade at 0.05 soda content falls into the low soda category, a grade that when derived from Bayer alumina plants requires additional processing to remove residual soda due to the use of caustic soda in its production process. Test work to date indicates the product would be competitive at the premium end of the market. Considerable further work will be required to develop a range of products with added value to be marketed
- Producers of specialty aluminas are concentrated in Europe, North America and Japan, although there is a growing number of producers of tabular and calcined aluminas in China and some producers in India.

- Refractory grades of specialty aluminas tend to be used primarily in the more technically advanced steel producing areas of Japan, Europe and North America, although given the very large steel industry in China, volumes there are still large.
- In terms of unit consumption of alumina per tonne of steel in the more advanced technology countries 1.2-1.4 kg of alumina is used per tonne of steel, whereas in China less than 0.5kg per tonne of steel is used. With policies to reduce overall refractories consumption, which favours increased use of alumina, as well as a move to production of cleaner steels, there is considerable potential for large increases in Chinese consumption in refractories over the next 5-10 years.
- There are also regional differences in the case of ceramics markets. Relatively low specification ceramics such as grinding media and tiles are produced cheaply in large quantities in China. High tech ceramics tend to be produced in Japan, Europe and North America based on technology leadership of some of the advanced ceramics producers.
- Rough estimates of the consumption by region would be of the order of 400-500,000 tonnes in Europe, 300-400,000 tonnes in North America, 400-500,000 tonnes in North East Asia (primarily Japan Korea and Taiwan) and as much as 500,000 tonnes in China (although there is considerable uncertainty about Chinese estimates) with the balance throughout the rest of the world.
- Pricing of specialty grades of calcined alumina is very opaque, with no terminal markets and few published prices. There are also a myriad of grades with a very wide range of prices. These are not commodities and while there is price competition the technical service component of sales is at least equally important with price to many consumers some of whom demand customised products.
- The starting price for feedstock grades from Bayer alumina plants is of the order of $370-400 per tonne. Considerable added value is achieved by the specialty alumina producers and grades can vary from $600-3000 per tonne with most falling in the range $700-1200 per tonne. In general the finer grainsize, lower soda content, and higher degree of calcination/sintering/fusing achieves higher prices but there are many factors influencing prices. Hudson Resources inherently low soda content indicates that it could achieve premium prices. While there is a general trend towards the use of low soda grades, the total market is currently only 100-150,000 tonnes, partly due to the extra cost. If Hudson Resources low soda grades could be supplied at prices competitive with a wider range of soda content grades, that market has the potential to be developed further. A range of products with added value would need to be developed but is reasonable to assume average prices that could be achieved of $1000-1100 per tonne.
- Volume demand growth in the longer term is expected to be of the order of 2-3% on a global basis, although there are also predictions quoted by Almatis in a recent paper of 3-4%. It is likely to be lower in Europe and North America at 1-2% per annum (Almatis quotes 2-3%), although there should be some faster growth as economies, especially in Europe recover to more normal industrial levels. In China, growth is expected to be significantly larger, of the order of 10-15% in the next 3 or 4 years as the refractories industry adapts to steel producer requirements that will reduce specific consumption of refractories per tonne of steel. This will require considerably greater use of high performance refractories including alumina based ones. After that growth rates are expected to drift back to slightly above those of steel production at around 4-5% per annum.

However, the situation in China is very uncertain with growth rates for the economy as a whole disappointing and some indications that longer term growth rates will be lower than many observers had predicted. Growth rates for higher value added products are expected to be at a level of 3-5%, although it should be remembered that volumes in some of these sub sectors of the ceramics industry are relatively low.

19.2 Introduction

There are no comprehensive statistics published for the production and consumption of non-metallurgical alumina. The International Aluminium Institute does publish statistics for what they term "Chemical grade alumina" This includes both calcined alumina, which is the focus of this study and alumina trihydrate (ATH), which is recorded as the alumina content of that product. There is no breakdown of the statistics into the individual products and the figures tend to be an underestimation because they only record material reported as being sold for non-metallurgical applications and in some cases smelter (metallurgical) grades may be used.

With the exception of some low volumes of ultra-high purity alumina world production of alumina is derived from the Bayer process, almost all using bauxite (there has been some minor production from nepheline syenite). In the Bayer process, bauxite is digested in caustic soda and aluminium hydroxide, commonly referred to as alumina trihydrate (ATH) is precipitated from the solution. Some of the ATH may be sold for production of aluminium chemicals but the rest is calcined to form aluminium oxide – alumina, a large proportion of which is used in the production of aluminium metal. Because of the use of caustic soda digestion alumina derived from the Bayer process has a degree of soda impurity, which in a number of the applications for calcined alumina is considered undesirable. For many applications a standard soda content of 0.3-0.4% is acceptable, although there are some up to 0.7%. Intermediate soda grades with 0.1-0.3% soda are produced by either modifying the precipitation of ATH or through adjusting the calcination process sometimes with the addition of other elements that result in the sodium content being driven off in the exhaust gases. Low soda aluminas below 0.1% generally require washing of the ATH before calcination and/or additional efforts to remove during the calcination process. The Hudson product is inherently low in soda as the process involves digestion with hydrochloric acid and, with a soda content of about 0.05% indicated from testwork, it would on that specification be competitive on quality in that market. While there is no definitive split between applications, advanced ceramics including electronic applications, wear resistant ceramics and some of the reactive aluminas for refractory applications tend to prefer a low soda alumina, with applications such as electrical porcelain and spark plugs using an intermediate soda grade.

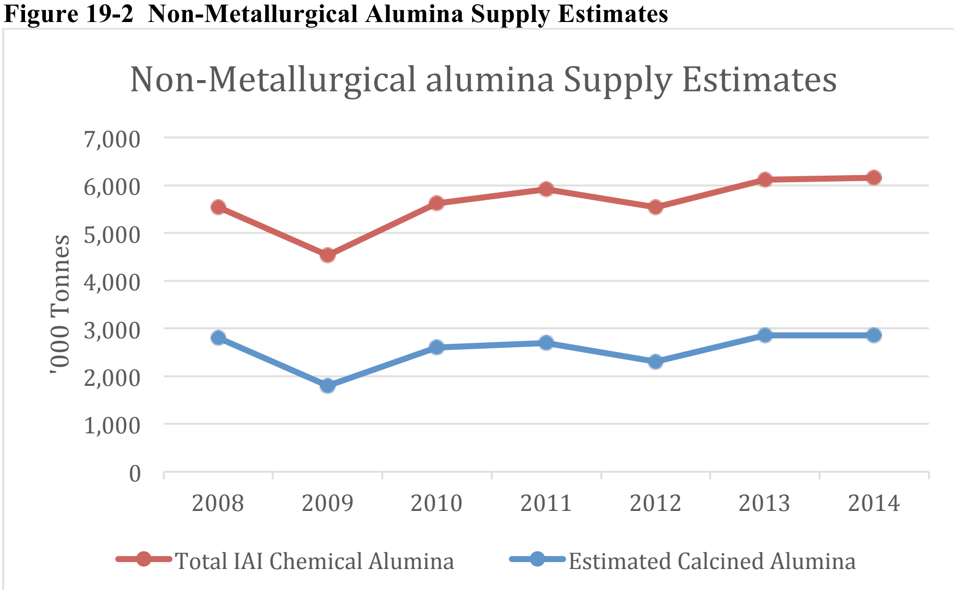
19.3 Supply

Total production of alumina from Bayer plants as reported by the International Aluminium Association (IAI) amounted to 108 million tonnes in 2014. Within that 102 million tonnes was designated as metallurgical grade and 6 million tonnes (6.159 million tonnes to be precise) was designated as "Chemical Grade" 5.68% of the total production in 2014. However, in some years when demand is high or supply tight there may be additional usage of material designated as metallurgical grades in non-metallurgical applications that is difficult to track. The chemical grade material is product recorded as sold for non-metallurgical uses with sales of ATH recorded as the alumina content of the material as opposed to the gross weight, which includes about one third water. While there are no accurate breakdowns of the split between ATH sales and calcined alumina for non-metallurgical applications, it is estimated that current sales by Bayer alumina producers of calcined alumina for non-metallurgical uses amounts to about 2.8-2.9 million tonnes.

Table 19-1 "Chemical Alumina" production as reported by IAI ('000 tonnes)

	Africa & Asia (ex China)	China	North America	South America	West Europe	East & Central Europe	Oceania	Total
2007	827	909	786	198	1,698	608	262	5,288
2008	772	1,003	883	179	1,862	530	312	5,541
2009	940	897	739	114	1,163	369	304	4,526
2010	1,125	884	898	200	1,632	406	477	5,622
2011	1,125	1,012	900	276	1,718	365	522	5,918
2012	1,063	978	867	277	1,680	107	561	5,533
2013	995	1,425	894	456	1,778	52	517	6,117
2014	867	1,468	1,056	489	1,701	49	529	6,159

Figure 19-2 Non-Metallurgical Alumina Supply Estimates



In 2008 markets were booming and it is estimated that as much as 500,000 tonnes of smelter grade alumina was used to supplement the IAI reported sales of chemical grade alumina. Companies supplying feedstock grades specialty alumina business were essentially sold out of product, although there was a degree of stock building because of fears of escalating prices and tight supply. When the recession hit in 2009, sales plummeted in the first half of the year with some recovery in the second half. It is estimated that total sales of calcined alumina fell from about 2.8 million tonnes to 1.8 million tonnes with the proportion of smelter grade material falling to probably less than 200,000 tonnes. In subsequent years the proportion of smelter grade material use is understood to have declined further as there has been little pressure on availability of non-metallurgical commodity grades. There may also have been better reporting of IAI figures more closely reflecting actual sales to the non-metallic sector.

It should be noted that US production rose considerably in 2014, reflecting the restart of production at the Burnside plant now owned by Almatis and dedicated for non-metallurgical use mainly in house. Chinese production has also risen very significantly reflecting the further development of tabular alumina production in the country and a move toward higher alumina refractories as a means to move its unit consumption of total refractories more in line with best practice elsewhere in the world. Other regions of the world have recorded declines or at best stable production.

In general, production of non-metallurgical grades reported is the same as sales as Bayer producers can adjust their production to supply those grades. However, the sales are a relatively small portion of the total sales of alumina from Bayer plants. Historically, when markets are strong for metallurgical alumina and supply tight the large Bayer alumina producers may neglect the smaller volume sales to non-metallurgical applications. In contrast, when demand for metallurgical alumina is low and there is excess supply there tends to be greater emphasis put on diversifying sales to the smaller volume non-metallurgical markets but drop their sales efforts once their metallurgical grade markets recover. This can result in specialty alumina producers struggling to get enough non-metallurgical feedstock grades when markets are strong.

Sales of what can essentially be described as commodity grades of calcined alumina from Bayer plants are generally made on a contract basis. In the past there have been multi-year contracts agreed certainly on volumes and also sometimes on prices linked to escalators. However, after the shock of the deep recession in 2009 there tended to be a reduction in contract lengths due to a level of uncertainty that still exists to a certain extent. There had been a trend towards specialty alumina producers becoming independent from the large Bayer alumina producers, purchasing their feedstock needs as required. However, some are still integrated, Such as Alteo, now independent from Rio-Alcan but with a dedicated Bayer plant, sufficient for all its needs and more recently Almatis has purchased the Burnside Bayer plant of Ormet and will be able to supply a considerable portion of its needs internally.

19.4 Demand

Because sales are recorded by IAI than production, demand (including an estimate of any smelter grades used) is virtually same as supply. As such current demand is estimated to be of the order of 2.8-2.9 million tonnes. This refers to the total consumption of commodity calcined alumina and at this stage considerable product differentiation occurs as value is added through processing. Figure 19-1 above presents and estimated breakdown of the various products derived from the commodity alumina. Consumption in the different products is shown on the basis of the alumina content, which in the case of many is essentially 100% of the product but for calcium aluminate cement (CAC) it is about 70% of the volume and similarly catalysts, spinel and ceramic fibres have varying levels of alumina in the finished products.

Care must be taken to avoid double counting of alumina demand by confusing feedstock grades with specialty finished products -- essentially all of the products presented in the chart are manufactured from commodity feedstock grades of alumina. Some quantities may be used directly in low specification ceramics and even in refractories, but in general, value is added through further calcining, purification or at very least grinding or sizing of the product. The ceramics category refers to a wide variety of ceramic products and glass but catalysts are in essence ceramics as the main product is a ceramic catalyst carrier. Also some of the tabular and even some of the white fused alumina may be used in ceramic products.

19.4.1 Refractories

Tabular alumina is primarily used in refractories and is generally produced by calcining in a shaft kiln at temperatures up to about 1800-1900 ˚C. The feedstock for this is a Bayer alumina material, with a general preference for a hard calcined, low surface area material fired at temperatures of up to 1250˚C. The kiln run product is balls of sintered alumina with high density and very low open porosity. This is then crushed to form refractory aggregates or finely ground for use in refractories or in some cases ceramics. About half of the white fused alumina is used in refractories again as crushed aggregates or finely ground, but the balance is used as one of the primary hard abrasives with a mohs hardness second only to diamond. Sintered and fused spinel and fused mullite is also used in refractories and the higher alumina (70-80% alumina) CAC is almost exclusively used in refractories. Together with specialty calcined aluminas, generally calcined at higher temperatures in carefully controlled conditions, the refractories industry consumes more than 65% of all of the non-metallurgical calcined alumina, of the order of 1.9 million tonnes in total.

19.4.2 Ceramics

The ceramics industry consumption of specialty alumina is much more diverse with a wide range of products manufactured. This can include:

- Grinding media and wear resistant ceramics
- Tableware, specifically the tougher hotel ware variety
- Tiles and Glazes
- Electronic substrates
- Spark plugs
- Electrical Insulators
- Catalytic converters
- Engineered ceramics
- Ceramic rollers for kilns
- Specialty glass
- Armour

Ceramic fibres can also be considered amongst the ceramics but in many cases they are more regarded as refractory insulating materials.

Estimated consumption in ceramic	000 tonnes
Tableware/tiles/glazes	80-100
Grinding Media/Wear Resistant ceramics	100-120
Engineered Ceramics	120-140
Specialty Glass	80-90
Armour	60-70
Electrical Ceramics/spark plugs	60-70
Electronics	40-50
Catalysts	120-140
Total	650-750

Total consumption of alumina in ceramics and glass of all kinds is estimated to be of the order of 650-750,000 tonnes, although it is difficult to obtain reasonably detailed estimates in what is a relatively fragmented and opaque market. This would include about 100-120,000 tonnes in grinding media and wear resistant ceramics, about 80-110 in tableware and tiles and glazes, 80-100,000 tonnes in specialty glasses, up to 120-140,000 tonnes in engineered ceramics, an estimated 120-140,000 tonnes in catalyst carriers, as much as 60-70,000 tonnes in ceramic armour, and 60-70,000 tonnes in spark plugs and electrical insulators, plus an estimated 40-50,000 tonnes in electronic applications. The wide range of estimates testifies to the opaque nature of the markets and difficulties in obtaining more detailed information.

19.4.3 Polishing and Abrasives

Polishing media is a relatively small sub sector of the specialty alumina market. It is essentially fine abrasives used in finishing items such as specialty glass or electronic substrates. Calcined alumina with very tight sizing specifications are used in this sector, which has an estimated total market of about 65-70,000 tonnes.

About half of the white fused alumina produced is widely used in the production of abrasive grain, with total current demand of the order of 250,000 tonnes. While some materials may be ground to fine sizes, there is also a requirement for coarse grained material and as it stands this would not be seen as a potential market for Hudson’s material unless provided as a feedstock for fusing at low cost, or unless there was a fusing plant set up at the company’s own operation, which would require the availability of low cost electrical power.

19.5 Grades used by sector

There are a very wide range of grades of alumina on the market, literally hundreds from the various suppliers. There are variations depending on the soda content, grain size, grain size distribution, crystal size, surface area, density, porosity or lack of it or degree of alpha alumina formation, some in standard products supplied by manufacturers and others customised for individual customer needs. Just as standard grades, Alteo and Almatis, which produce both tabular alumina and calcined aluminas plus white fused alumina in the case of Alteo, list around 50 each, Martinswerk which produces calcined aluminas, list 39 different standard grades, Nabaltec lists 17, and AluChem 24, and even Nalco in India, a relatively small supplier lists 19 different grades of non-metallurgical calcined alumina.

Product differentiation is a significantly important factor in the sector and it should be stressed that this is far from being a commodity market. There is considerable importance put on consistent quality of product, a wide range of products offered and in many cases significant technical backup including being able to offer the services of an in house R&D department to develop the best solution for a customer's individual needs.

In the refractories industry there is a requirement for alumina aggregates in both brick and monolithics. These are generally provided by either tabular alumina or white fused alumina, through crushing of kiln run balls in the case of tabular alumina (commonly 15-25mm size) or ingots of fused alumina. A whole range of finer grades of these materials is produced for both refractory and ceramic applications. The starting point for calcined aluminas is a finer product with unground material at around 150 microns top size and grades going down to sub-micron sizes in some cases. Calcined alumina is generally used as a fill material to ensure good packing in the refractory mix and thus higher density in refractory products. Finely ground material, commonly referred to as reactive alumina, is used in applications where it reacts with other components of the refractory to form a ceramic bond in applications such as low cement castables. The material may be sub-micron or even up to 2-3 microns, often with very narrow size specifications. Total current usage, depending on where the size cut-off is made is estimated to be of the order of 40,000 tonnes, compared with the total refractory market for calcined alumina of around 700,000 tonnes plus tabular alumina amounting to about 550,000 tonnes (although some may be used in ceramics) and white fused alumina of about 250,000 tonnes.

Ceramics tend to use finer products than refractories, certainly with a finer top size, although a range of ground products are generally required to obtain the required densities and some very fine material may be required for certain applications. Relatively low specifications are often required for tableware or tiles and glazes, sometimes even what could be described as commodity grades. However, some of the high tech applications require very tight specifications on size, chemical purity and surface area.

Soda contents are generally around 0.3-0.5 for normal soda products that make up a large portion of the market. Low soda products, a category in which Hudson's product would fit are those below 0.1% soda. Because it requires additional processing to remove the soda from Bayer alumina feedstock this is a more expensive product than standard grades. While many consumers may prefer low soda grades, and there is a general slow trend towards greater use of intermediate or low soda grades, compromises are often made to balance economics with product performance. There are instances, however, where a degree of soda content can be preferred as it can make sintering of the final product easier reducing firing costs, but this may have to be balance against say the refractoriness of the product. It is extremely difficult to identify how much low soda material is marketed, but estimates have been obtained of 100-150,000 tonnes worldwide.

In very general terms, value is added to the products as the soda content declines, the grain size declines, the crystal size increases and the surface area increases

19.6 Major specialty alumina producers

There are a limited number of producers of specialty alumina. All of the very large Bayer alumina producers have divested their specialty alumina divisions, although they still supply feedstock grades of calcined alumina and in some cases some higher value added calcines, very much as a sideline to their primary metallurgical alumina production.

Table 19-2 lists some of the major producers and their estimated production, although companies such as Alteo and Hindalco and MAL do not split out how much they use or sell as calcines and how much is ATH which is not included in this table.

Table 19-2 Major Alumina Producers

	Capacity	Calcined	TA	CAC	WFA
Almatis	650	280	330	40	
Alteo	200	154	36		10
Martinswerk	100	100			
Nabaltec	60	60			
Silkem	36		36		
Aluchem	55	25	30		
Showa Denko	150	140	10		
Hindalco	70	70			
Nalco	25	25			
Imerys	100				100
Rusal	65				65
Washington Mills	25				25
China (ex-Almatis)	350	60	190		100
Kerneos	70			70	
MAL	150	150			
Motim	50				50
ROW	669	376			150
Total	2,825	1,440	775	110	500

Note: 1. The MAL Bayer plant was closed in February 2015. The calcined alumina operations have been purchased by Silkem the associated MAL company that produces tabular alumina in Slovenia, but will now have to source Bayer alumina feedstock from outside sources possibly from Birac in Bosnia.
2. Alumina content of CAC quoted.

Almatis, formerly the chemicals division of Alcoa, is the largest of the specialty alumina producers. It produces a wider range of calcined aluminas, generally towards the higher end of added value and is by far the largest producer of tabular alumina. Total capacity at 9 plants in Europe, North America, Japan and China is estimated to be of the order of 650,000 tonnes, of which about 330,000 tonnes is tabular alumina with most of the rest calcined alumina, although they also produce 50,000 tonnes of calcium aluminate cement as well as some spinel, although the latter is produced on a campaign basis using the same kilns as the tabular alumina. When the company was sold off by Alcoa it had no Bayer alumina production of its own and purchased exclusively from Alcoa at least initially. However, the company bought the Burnside, USA, Bayer alumina plant of Ormet in 2013. It has restarted production at the refurbished plant, which will be able to supply as much as 450,000 tonnes of feedstock as production ramps up, with the balance of its requirements bought on the open market.

Alteo has a nominal capacity of about 650,000 tonnes total alumina, although it is difficult to determine how much is sold as specialty grades of calcined alumina. It supplies feedstock to its own 36,000 tonne capacity tabular alumina plant in Germany as well as a 10,000 tonne capacity white fused alumina plant in France. It is also a large supplier of specialty grades of hydrated alumina and feedstock for production of alumina chemicals. It has a very wide range of specialty aluminas on offer. There was rumour that the company was working at below capacity with only about 400,000 tonnes currently required for its specialty sales and that the company was attempting to sell some metallurgical grade alumina, a market that the Gardanne plant had ceased supplying before it was sold to a private equity organisation by Rio Alcan. Total external sales of specialty calcined aluminas may be of the order of 150,000 tonnes to a variety of industries including refractories, ceramics and polishing.

Martinswerk is now part of the Albemarle Group best known as the world's largest producer of flame retardants and it produces a range of alumina hydrate products for that market. Those products were obviously the target of Albemarle when it purchased the operation and there was speculation at the time as to whether they would retain the calcined side of the business. As it happened they just carried on producing as before. The company has a wide range of calcined products amounting to approximately 100,000 tonnes of capacity sold to refractories, ceramics and polishing markets. It is unusual in that it purchases wet alumina hydrate as its raw material, which it then calcines to its specialty aluminas. It is also an important producer of specialty alumina hydrates for the flame retardant markets and as that uses hydrate as its raw material and means that they only purchase a single grade of raw material. Following a large acquisition of a lithium producer, Albemarle has stated in an investor presentation that it plans to sell of non-core assets including its mineral flame retardants business, which would include Martinswerk.

Nabaltec has about 60,000 tonnes of capacity at its German plant. It claims to be operating at near that capacity. In the refractories side of the business it sells mainly reactive aluminas, a market it indicated was about 40,000 tonnes worldwide, although that very much depended on what was classified as reactive, whether the cut was made at 1 micron, or 2 micron or even in some cases 5 micron. It did admit that Almatis was the leader in the reactive aluminas markets, much larger than their own share of that market. It also sells a considerable amount of its products to the ceramics industry for example, production of friction liners for brakes, machine parts, spark plugs, high-voltage insulators, mill liners, grinding media and other technical and bio-ceramic components as well as polishing grades and prepared ceramic bodies. While it does sell small quantities outside of Europe, the vast majority of its sales base is within Europe.

MAL in Hungary has been a troubled company. A few years ago it had a major breach of a tailings pond for red mud from its Bayer alumina plant and at the time there were fears that it may be closed down permanently. It seemed to have recovered, although it was effectively nationalised during the recovery process, but it looks as if the companies assets are being liquidated and it is uncertain how much of the company's production capacity will remain. The Bayer plant was closed down in February 2015 it had a capacity of about 300,000 tonnes of non-metallurgical grades including ATH at least partly based on local bauxite, although those mines have now been closed. The company had supplied feedstock alumina to its associated company Silkem's 36,000 tonne capacity tabular alumina plant in Slovenia. Silkem has apparently acquired the calcining facilities of MAL, which supply a range of calcined aluminas for various industries, although its strengths tend to be in Southern and Eastern European markets given it history and location. However, it will have to source feedstock Bayer alumina from a third party, possibly Birac of Bosnia. Some feedstock alumina had also been sold to fused alumina producers, probably including Motim in Hungary, that produces a range of fused materials including white fused alumina and fused spinel. It may also have provided some raw material for some of the white fused alumina plants of Imerys in Slovenia, Austria or the Czech Republic, which will have to find new sources of feedstock grades from another Bayer alumina producer.

Motim, also in Hungary is a specialist in fused minerals and has an estimated production capacity of about 50,000 tonnes of white fused alumina

In the alumina market in North America, apart from Almatis, which is the largest producer there is only one direct domestic competitor Aluchem, which in recent years has added a second kiln at its tabular alumina plant to double capacity to 30,000 tonnes. It is not certain if the company has yet managed to reach full production. Aluchem also sells calcined aluminas for refractories, ceramics and polishing compounds. Capacity is not revealed but it is likely to be of the order of 25,000 tonnes, although it is understood that the company also grinds alumina from other sources. It is also known that the Bayer alumina plants on the US Gulf coast produce and sell some higher added value but still relatively unprocessed grades.

In Asia, Showa Denko produces up to 300,000 tonnes of specialty aluminas in Japan, but both ATH and calcined. The calcined capacity is estimated to be less than half of that total, although the company also has a small, 10,000 tonne capacity, tabular alumina plant.

Hindalco, in India is an integrated producer, primarily focussed on metallurgical markets, but has a capacity of about 140,000 tonnes of specialty grades, both ATH and calcined, with calcined grades representing about half of that.

Also in India, Nalco, another integrated supplier, mainly involved with metallurgical grades, produces an estimated 25,000 tonnes of specialty alumina, although it is understood that much of the production is actually feedstock for fused alumina production.

There are a number of white fused alumina suppliers such as Treibacher, part of the Imerys group, Rusal in Russia and Washington Mills in the USA. However, they are consumers of essentially commodity calcines and markets for their products are likely to be very different from those of Hudson’s, mainly as abrasives and refractory aggregates.

Kerneos is the largest producer of CAC, including an estimated 100,000 tonnes of the higher alumina grades, which would require about 70,000 tonnes of alumina as a raw material.

There are a number of Chinese producers of tabular alumina that have emerged in recent years apart from Almatis that has been established in China for a number of years with a 50,000 tonne capacity tabular alumina plant as well as a 50,000 tonne capacity calcining operation. These are listed in the Table 19-3 below, although both capacity and current production may be slightly overstated.

Table 19-3 Chinese Tabular Alumina Producers

Manufacturer	Capacity ('000tpa)	Production ('000tpa)
Almatis (Qingdao)	50	50
Zibo Taibeilier Aluminium & Magnesium	50	50
Jiangsu Jinghui Refractories	50	40
Zhejiang Zili	40 →90	40
Shandong Kunpeng Technology	25 →50	15
Pingxiang Huangguan Chemical Material	15 →30	12
Zhonglu Group Jinlu Refractory Material	15	12
HanZhong Qinyuan New Material	12	10
Zhengzhou Lucheng Sanxing	10	10
Total	**267 → 357**	**239**

Data: Taken from Paper presented by Richard Flook at the 3rd Asian Bauxite & Alumina Conference 2013

There are also a number of relatively small producers of tabular alumina in Japan, Korea, and Russia, as well as a number of specialty calcined alumina producers in Japan, in some cases aimed at particularly high grades for specialist ceramics applications. The Tayan project in Indonesia, a joint venture between Antam Aluminium of Indonesia and Showa Denko of Japan, is designed to produce 300,000 tonnes of chemical grades of alumina, although no breakdown between ATH and calcined grades is available. This is essentially a dedicated non-metallurgical feedstock grade operation, with a considerable portion of production aimed at exports to Japan, but possibly also to China.

19.7 Regional markets

In the case of refractory grades of specialty aluminas, which represent over 65% of all consumption, the main areas of consumption are in Europe, North America and Japan. High alumina refractories tend to be used in the more technically advanced steel producing areas and to date the relative consumption in China and other developing nations has been relatively low. As an example, while alumina consumption has been of the order of 1.2-1.4kg per tonne of steel in Europe, North America and Japan, it has been less than 0.5kg per tonne in China. It is expected that there will be strong growth in this sector in China as there are policies to reduce total refractory consumption in steel from about 23kg per tonne down to 15 kg in the next few years and further improvements in the future. To achieve this higher performance refractories such as alumina based ones will need to be used and while total refractory consumption is expected to fall alumina refractory consumption is expected to rise considerably. Despite the low unit consumption per tonne of steel, the sheer size of the Chinese steel industry means that its total consumption of alumina refractories is still high.

In the case of ceramics, there are some regional differences. Grinding media, primarily alumina grinding balls used in applications such as ball mills for mineral grinding, have tended to be produced at relatively low cost in China. The specifications are not particularly tight and products from China have gained a large market share, due to their low cost.

High tech ceramics based on alumina have tended to be produced in Japan, Europe and North America, based on technology leadership of some of the producers. Electrical ceramics, including spark plugs and high voltage insulators are produced in Europe, North America and the Far East, although there had been a trend to move production to the Far East. Engineered ceramics and ceramic armour have also tended to be in the more advanced economies, again mainly Japan, North America and Europe. In the case of specialty glasses for the rapidly growing smartphone and tablet markets (and some other specialty markets) has largely been developed in the USA and Korea, in which Corning has plants for its Gorilla Glass, and other producers in Japan and Korea. This is a market that did not exist a decade ago. In the case of tiles, glazes and tableware, the specifications for alumina are not particularly high and a considerable amount of the production of these products has shifted to low cost producing countries, led by China and Brazil but with remnant production still important in Italy, Spain, Turkey and to a lesser extent in North America.

It is very difficult to get reasonable estimates of total consumption by region. While a considerable portion of available capacity is in Europe and North America, Japan, India, and a growing amount in China, there is trade between these regions. However, it is impossible to track that trade from published statistics as it is hidden amongst the much larger volumes of metallurgical grades. Even in the case of a category defined as artificial corundum, much of the material recorded is brown fused alumina produced from bauxite and used in refractories and abrasives, with some tabular alumina or specialty calcined alumina included depending on how customs officials log it.

Rough estimates of the consumption by region would be of the order of 400-500,000 tonnes in Europe, 300-400,000 tonnes in North America, 400-500,000 tonnes in North East Asia (primarily Japan Korea and Taiwan) and as much as 500,000 tonnes in China (although there is considerable uncertainty about Chinese estimates) with the balance throughout the rest of the world. These are far from definitive estimates and would need considerable refining in a more in depth study at a feasibility stage of Hudson's project.

19.8 Prices

Pricing of specialty grades of calcined alumina is very opaque. There are no terminal markets and few published prices. There is also the factor that with such a myriad of grades there are no standard prices. These are not commodities, and while there is price competition, technical service is equally if not more important to many customers, some of whom demand customised products.

That being said some general indications of pricing ranges have been obtained.

Industrial Minerals magazine quotes the following prices for some fairly standard grades of alumina, essentially from US producers, which can be taken as rough indicators of list prices for products that may be further processed by specialty alumina suppliers or in some cases consumers through say grinding to custom specifications or used directly in refractory or other applications in which a standard products is acceptable such as increasing alumina content, improving packing in refractories mixes or in relatively low specification ceramic applications. Materials that are fine ground, have tight size distribution, low soda materials and other value adding processes command higher prices.

Table 19-4 Quoted prices - Industrial Minerals

	Low	High
Alumina, calcined, 98.5-99.5% min Al2O3, bulk, FOB refinery, US, $/tonne	680	730
Alumina, calcined, medium-soda Al2O3, bulk FOB refinery $/tonne	810	850
Alumina, calcined, ground 98.5-99.5% Al2O3, bulk FOB US refinery, $/tonne	755	850

However, prices for specialty calcined aluminas can vary from US$ 600-3000 per tonne with the largest volumes falling in the range of US$700-1200 per tonne. The price level depends on a whole range of chemical purity and physical factors including grain size and grain size distribution, porosity, density, surface area, degree of alpha alumina formation and reactivity plus the volumes purchased all of which can influence the negotiated price. In general, higher the alumina content, lower soda content, finer size and tight size distribution products command the higher prices. In some cases products are customised to individual consumers' specifications. One overriding factor is that product quality must be consistent. Variation from batch to batch or delivery to delivery is not tolerated by customers and once a specification has been set it must be met to within agreed limits. These are not commodity products and frequently they are sold with a high degree of technical backup and customer service with producers providing their expertise to the customer and a new entrant to the market has to gain that expertise or ally with an existing player in the market.

The Hudson product would fall within the range of low soda aluminas probably with prices at the high end of ranges, probably in the region of US$1000-1500 for a basic product unground, and higher for more specialised grades. However, the total market for low soda alumina is estimated to only be 100-150,000 tonnes and to achieve sufficient market share to justify a reasonable capacity operation would need penetration of other markets. There is a trend in many cases to a preference for low soda grades but compromises are made because of the additional costs. If the Hudson material was priced at a level that was competitive with higher soda grades it could compete in a broader market base.

At a level of providing a feedstock grade in which it would have a total market to aim for of 2.8-2.9 million tonnes, essentially a commodity grade market. However, the average price that could be expected would be of the order of about US$370-400, perhaps a bit higher because of the low soda content.

To compete in the market for calcined alumina in refractories, a total of about 700,000 tonnes, the average price that would need to be targeted might be in the region of US$600-1000. In addition, targeting the ceramics and specialty glass markets with a total volume of about 650-700,000 tonnes the average price that could be achieved might be somewhat higher at maybe US$800-1200. However, prices can vary from virtually commodity prices of $400-500 per tonne at the most basic level for low specification ceramic grades up to perhaps US$3000 for the highest specification materials.

It should be stressed that unless Hudson was to simply provide a feedstock grade, a whole range of products would need to be developed for the various markets. Some of these would have significant added value. At a later stage of development, further assessment of the range of grades that could be produced including assessment of calcining methods would need to be addressed.

Prices have been subdued recently with some minor declines reported in 2014 in the face of slight overcapacity. The industry as a whole has yet to fully recover from the effects of the world financial problems, and the Eurozone is still seen as weak. Prices are not expected to escalate in 2015, although there is hope that prices will improve as economies recover. Demand is expected to grow strongly in China as its refractories industry upgrades, but domestic production of the grades required is also growing. In dollar terms prices in Europe that are quoted in Euros have been falling in US$ terms because of the weakness of the Euro. Fuel prices and particularly gas, which most of the producers use have been falling and were already at low levels in the USA, which may moderate any future pricing due to reduced costs, although feedstock alumina prices are expected to rise in the next few years assuming there is a continuing economic recovery and alumina supply/demand tightens.

Volume demand growth in the longer term is expected to be of the order of 2-3% on a global basis, although there are also predictions quoted by Almatis in a recent paper of 3-4%. It is likely to be lower in Europe and North America at 1-2% per annum (Almatis quotes 2-3%), although there should be some faster growth as economies, especially in Europe recover to more normal industrial levels. In China, growth is expected to be significantly larger, of the order of 10-15% in the next 3 or 4 years as the refractories industry adapts to steel producer requirements that will reduce specific consumption of refractories per tonne of steel. This will require considerably greater use of high performance refractories including alumina based ones. After that growth rates are expected to drift back to slightly above those of steel production at around 4-5% per annum. However, the situation in China is very uncertain with growth rates for the economy as a whole disappointing and some indications that longer term growth rates will be lower than many observers had predicted. Growth rates for higher value added products are expected to be at a level of 3-5%, although it should be remembered that volumes in some of these sub sectors of the ceramics industry are relatively low.

19.9 Amorphous silica and calcium silicate potential

Hudson may also be able to market amorphous silica and calcium silicate as by-products of the process for producing the alumina. Test have already been carried out to show the pozzolanic effects of the amorphous silica. Because of this there may well be a market in cement for this product. While it has some impurities it is also worth testing this as a material that could be used in the refractories industry where it may be used in conjunction with reactive alumina in low cement castable refractories forming the mineral mullite as part of a ceramic bond. However, this is a fairly high specification product and it is uncertain if the by product would be able to be used in such an application. While some pozzolans can fetch fairly high prices with fumed silica reaching prices of several hundred dollars per tonne, there are other lower cost materials such as fly ash waste from coal fired power stations. Entering the market can be difficult with considerable customer testing needed to assure the product fulfils requirements. It also has to be able to be delivered to the customer easily and to a very consistent specification. As such until considerable further test work can be carried out and interest obtained from potential consumers, it is difficult to assess a reasonable FOB price for the product, but a nominal value of US$75 per tonne seems reasonable pending customer acceptance of its usefulness. If it should become an accepted product there are likely to be large potential markets in North America and Europe that could be targeted.

Calcium silicate is another potential by product. Commercially calcium silicate in the form of wollastonite is mined and sold with a total market volume of around 600,000 tonnes. This is used in various ceramic, filler and metallurgical applications. In filler applications the main criteria is that it has an acicular or needle like shape which gives it reinforcing properties. In ceramics and metallurgy it is the chemistry that is important. Test work needs to be carried out to determine if the material could be used in any of these applications. High aspect ratio grades produced in the USA can fetch US$200-250 per tonne and for very high aspect ratio grades over US$400 per tonne. However, powder grades out of China are more commonly US$75-100 per tonne FOB China. The specifications for use in metallurgical applications such as a flux in compounds for tundish slags in steelmaking are less than for ceramics, where impurities such as iron and colouring oxides are considered unacceptable in significant quantities. Prices for metallurgical grade calcium silicate (as wollastonite) are typically in the $US65 - $US80/tonne range. Other forms of calcium silicate, include manufactured lightweight aerated calcium silicate blocks and shapes used in high temperature insulation.

19.4 CONTRACTS

Hudson is pursuing opportunities for strategic alliances and off-take agreements and has several confidentiality agreements signed with potential end users, but at the time of writing, no contracts are in place for sale of alumina.

20 Environmental Considerations

In 2012 Hudson commenced EIA and SIA activities on the White Mountain Project under the direction of Inuplan A/S environmental consultants of Nuuk, Greenland. These studies were undertaken to support the mining of anorthosite for an industrial mineral application. The consultants have completed two seasons of baseline data collection for fauna, aquatic and water specimens. In 2012 and 2013 Hudson also completed meetings with 22 stakeholder groups in the region. A team of archaeological experts from the Greenland National Museum visited the property in 2013 to assess the project area for cultural significance and reported there were no artifacts impeding the project.

Hudson has now completed the EIA and SIA studies and they have been approved by the Greenland governments as part of the exploitation permitting process. The Company will likely need to resubmit new reports in order to receive approval to mine the anorthosite for alumina production. The following summarizes information relevant for the alumina feedstock production project.

The following generally describes and discusses the environmental aspects of the Greenland operation. The environmental aspects of the hydrometallurgical plant to be located in North America are less well defined since a site for the plant has not yet been selected. Despite this, environmental aspects of the hydrometallurgical plant are addressed in a preliminary way in Section 20.9.

20.1 Environmental Studies - Greenland

Guidelines for preparation of the Environmental Impact Assessment report are to be found on the Government of Greenland's Mineral Licence and Safety Authority (MLSA) website at http://www.govmin.gl/minerals/terms-rules-laws-guidelines. The EIA report must follow the outline summarized below (detailed report guidelines are to be found on the MLSA website)

- An **extended, non-technical summary**
- An **introduction** which describes the mine project, its background and objectives
- A thorough description of the state of the **environment** before mine start
- A description of the **mine project** with all phases from exploration to closure and beyond
- An assessment of **environmental impacts** of the project with an evaluation of alternatives compared to the preferred option
- An **environmental management plan (EMP)** which describes how the identified impacts are dealt with
- An **environmental monitoring plan** with a description of e.g. species, stations and parameters to be monitored
- **Public consultation**
- **Conclusions**
- **References** used in the EIA process and **Glossary** of terms and abbreviations

Water quality is a particular concern of the MLSA with respect to mining projects and all projects must meet the designated water quality standards. As the Hudson project does not use water in the process, water quality is not expected to be an issue. Other aspects of the project are also anticipated to have very low impacts. The quarry site will not be visible from sea level in the fjord and the port facilities and accommodation complex are similar to the Seqi olivine mine in southeastern Greenland.

20.2 tailings management plan - Greenland

No tailings will be produced during preparation of the alumina feedstock.

20.3 Mobilization Test on anorthosite rock

To evaluate the extent to which metals and other elements may be released from any blasted and crushed anorthosite, mobilization tests were conducted at the SRC laboratories in Canada.

A representative 5 kg sample was collected from the bulk sample processing. It is assumed that the anorthosite produced by the bulk sample processing at SRC is representative and four separate analyses were undertaken to demonstrate the uniformity of the material. The average of these samples was used to generate Table 20-1.

The tailings were characterized by solids ICP-OES/MS trace element analysis, modified acid base accounting, and particle size distribution (PSD).

Kinetic testing using a 20 week column leaching test (with duplicate) was performed. In each cycle, solution samples were collected from the primary column and duplicate column. The sampling schedule is at day 1, 3, 6, 10, week 2 through week 20. The samples for analysis are scheduled at day 1, 3, 6, 10, 15, 20, 25, and week 5, 7, 10, 15, and 20. The samples are analyzed for pH, conductivity, and DO. A full suite of dissolved metals (24 elements – Ag, Al, As, B, Ba, Be, Cd, Co, Cr, Cu, Fe, Mn, Mo, Ni, Pb, Sb, Se, Sn, Sr, Ti, Tl, U, V, Zn) and general chemical package (alkalinity, Ca, Mg, Na, K, CO_3, HCO_3, OH, F, Cl, NO_3, NO_2, and SO_4) was performed.

Kinetic Test Procedure for the Evaluation of Heavy Metal Mobilization

The procedures described in this method include:

1) Collection of representative samples,
2) preparation of samples,
3) controlled simulation of field weathering conditions, and
4) leachate collection and analysis

Limitations/Interferences

The purpose of this method – to evaluate the mobilization of heavy metals in the anorthosite sample – is limited primarily by the extent to which the sample and simulated weathering conditions approximate actual site conditions. The degree of representation is dependent on simulated weathering conditions.

The kinetic test procedure is detailed below:

Apparatus and Materials

Columns consist of vertical cylinders that are constructed to contain a sample and to allow for transport and/or holding water (see Figure 20-1).

Column – the column is constructed of a rigid transparent PVC pipe with an inner diameter of 2 inches.

Column seals – columns are sealed at the bottom and include a removable cap.

Column ports – ports are inserted into the top and bottom of the column to allow introduction of water, leachate collection, and gas venting if any.

Reagent Water

Reagent water is prepared by deionization that removes potential interferences, e.g., metals and organics. The pH is matched with the pH recorded from in field water sampling (7.2 was used). Downstream samples measured between 7.2 and 7.87 for samples collected in 2012 and 2013 (collection points 20 and 21).

Sample Collection and Handling

Small samples were collected from each bag of material that was produced during the bulk sample processing. A composite was made by mixing and homogenizing the small samples. Approximately 10 kg sample was prepared.

The composite was analyzed for a full suite of metals by ICP-MS. Modified ABA was performed as well.

Two test columns were each loaded with approximately 2 kg of sample.

Column Preparation

Uniform exposure of the sample to weather conditions is critical to method performance. Using a powder funnel, approximately 2000 g of the sample is added to the column, being careful to ensure uniform distribution with little to no packing. The top of the sample should be at least 4 inches below the top of the column to prevent loss of sample or leachate water during test implementation. Weigh the sample before adding it to the columns.

Column Maintenance

Maintain the column at a temperature at 4±3^{o}C in a refrigerated environment. Check and record column daily to ensure temperature is maintained.

Simulated Weathering Procedure

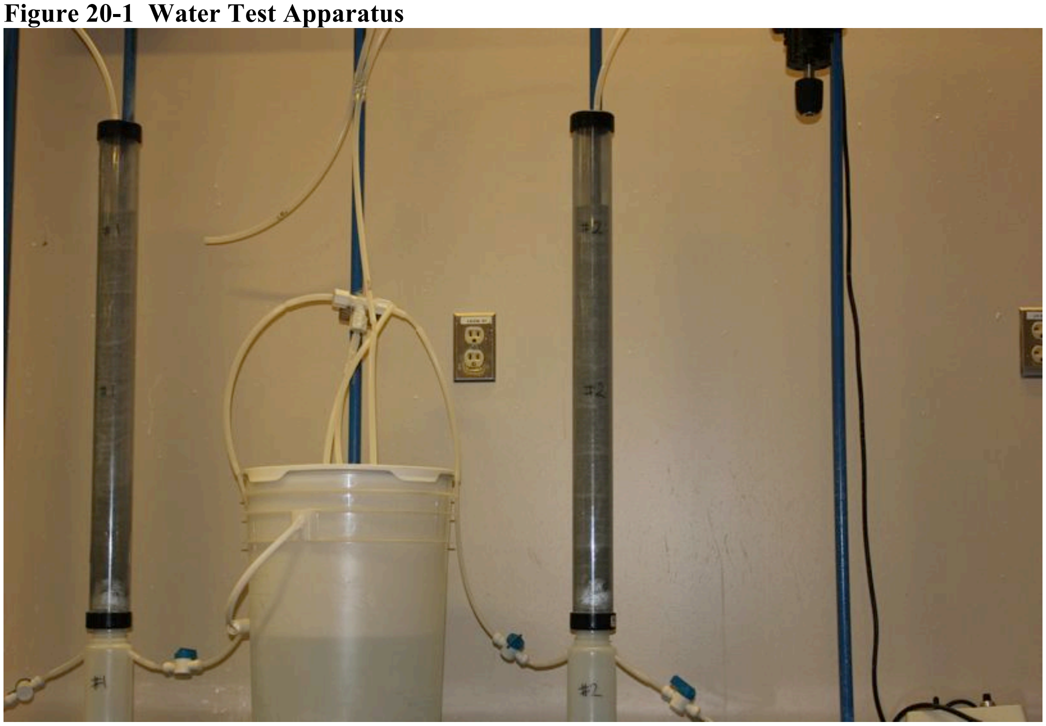
The simulated wreathing procedures described in this section consist of cycles of saturation:

1) Initial Column Flush – Once the column has been filled with sample, deionized water is introduced through the water inlet port at the bottom of the column until the column is full and all visible pore space are saturated. Gently tap the column to fill any visible air pocket with water. Allow the water to sit in the column for approximately 1 hour prior to collecting and analyzing the initial flush water for conductivity. Continue to add, drain, and analyze reagent water in this manner until the

conductivity of the water stabilized. The relative standard deviation between conductivity measurements must be less than 20%.

2) Saturation Cycles – Once the column has been drained of the final initial flush sample, deionized water is introduced to the columns to just above the sample surface. The volume of water added must be recorded.

Figure 20-1 Water Test Apparatus



3) Leaching – allow the column to sit for various periods of time based on the sampling schedule in the saturation condition. The apparatus is stored in a refrigerated environment to simulate the temperature conditions in the field. Following the sampling schedule, drain the column and collect the leachate. Then saturate the column again. The saturation cycle is repeated until method implementation is complete.

4) Leachate Collection and Analysis – Following each saturation cycle, the water/leachate is drained from the column and collected for analysis. The volume of leachate must be recorded. The leachate will be measured for pH, conductivity, and dissolved oxygen immediately. The sample is submitted to SRC environmental analytical laboratory for analysis. The analysis includes a full suite of metals (ICP-MS) and anions (alkalinity, HCO_3, CO_3, NO_3, F, Cl, and SO_4).

Table 20-1 Column Leaching Test Results

#	Day	Temp	pH		Conductivity		Dissolved O2		HCO3		Cl		Sum of ions		Total ankalinity	
		(°C)			(uS/cm)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)	
101	1	21	8.98	8.96	39.1	56.4	8.28	8.63	38	30	1	1	47	46	31	25
102	3	21	9.25	9.19	55.1	43.3	11.62	11.92	34	26	0.4	0.2	48	36	28	21
103*	6	3.5	8.09	8.42	461	420	10.86	10.82	68	66	39	34	296	266	56	54
104	10	3	8.9	8.96	58.8	40.4	11.4	11.34	34	24	3.2	2.5	62	48	28	20
105	15	3	9.15	9.09	49.7	31.9	9.69	9.72	29	32	2.8	2	52	48	24	26
106	20	3.5	9.23	9.3	34.7	27.5	9.89	9.97	32	20	1.6	0.8	49	30	26	16
107	25	3	9.11	9.36	31.3	28.9	10.41	10.52	26	30	0.6	0.7	37	40	21	25
108	28	3	9.21	9.36	28.7	23.5	9.33	9.06	27	30	0.6	0.3	39	38	22	25
109	42	3	8.98	9.1	28.4	23.3	11.45	11.42	29	30	1.0	0.8	41	40	24	25
110	61	3	8.26	8.31	27.8	25.8	11.43	11.08	32	32	0.9	0.4	43	41	26	26
111	96															
112	131															

#	Day	Total Hardness		Nitrate		F		Ca		Mg		K		Na		SO4	
		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)	
101	1	13	17	<0.04	0.04	0.04	0.09	4.8	6.4	0.3	0.2	0.4	0.6	0.9	4.8	0.9	2.6
102	3	21	16	<0.04	<0.04	0.06	0.03	8.1	5.9	0.2	0.3	0.4	0.2	2.7	2.5	2.2	1.2
103*	6	147	130	0.66	1.5	0.14	0.14	54	48	3	2.5	1.7	1.4	30	26	100	87
104	10	25	17	0.04	0.11	0.07	0.04	9.2	6.5	0.5	0.2	0.4	0.3	5.6	5.1	9.5	9.4
105	15	21	16	<0.04	<0.04	0.06	0.04	8.1	5.9	0.2	0.2	0.3	1.1	4.8	3.2	7	4
106	20	18	12	<0.04	<0.04	0.04	0.02	6.7	4.8	0.3	<0.1	0.2	0.2	3.4	2.4	4.8	2
107	25	15	12	<0.04	<0.04	0.03	0.03	5.6	4.5	0.2	0.3	0.2	0.2	2.3	2.2	2.3	1.9
108	28	15	10	<0.04	<0.04	0.04	0.04	5.5	4.2	0.3	<0.1	0.2	0.2	2.8	1.8	2.5	1.3
109	42	16	13	<0.04	<0.04	0.04	0.03	6.0	5.2	0.2	0.1	0.2	0.2	2.4	2.0	1.9	1.6
110	61	15	12	<0.04	<0.04	0.03	0.02	5.9	5.0	<0.1	<0.1	0.2	0.1	2.4	1.7	1.7	1.4
111	96																
112	131																

#	Day	Al		Sb		As		Ba		Be		B		Cd		Cr	
		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)	
101	1	0.62	1.16	0.011	0.011	0.0002	0.0008	0.0032	0.0039	<0.0001	<0.0001	<0.01	0.01	0.00001	<0.00001	<0.0005	0.0066
102	3	0.57	0.42	0.01	0.009	0.0004	0.0004	0.0028	0.0026	<0.0001	<0.0001	<0.01	<0.01	<0.00001	0.00001	0.0013	0.0013
103*	6	0.64	1.29	0.0076	0.005	0.0005	0.0004	0.0061	0.0065	<0.0001	<0.0001	0.03	0.03	0.00001	<0.00001	0.0006	<0.0005
104	10	0.93	0.38	0.0037	0.0024	0.0002	0.0001	0.0036	0.0029	<0.0001	<0.0001	<0.01	<0.01	0.00001	<0.00001	<0.0005	<0.0005
105	15	0.64	0.41	0.0041	0.003	0.0002	0.0002	0.0027	0.0024	<0.0001	<0.0001	<0.01	<0.01	<0.00001	<0.00001	<0.0005	<0.0005
106	20	1.52	0.86	0.0034	0.003	0.0004	0.0003	0.0041	0.0028	<0.0001	<0.0001	0.07	0.04	0.00001	0.00001	0.0007	<0.0005
107	25	0.89	0.51	0.0030	0.0025	0.0002	0.0002	0.0034	0.0026	<0.0001	<0.0001	0.01	0.02	0.00001	<0.00001	<0.0005	<0.0005
108	28	0.81	0.50	0.0024	0.0020	0.0002	0.0002	0.0035	0.0025	<0.0001	<0.0001	<0.01	<0.01	<0.00001	<0.00001	<0.0005	<0.0005
109	42	0.90	0.65	0.0046	0.0038	0.0003	0.0002	0.0039	0.0034	<0.0001	<0.0001	<0.01	<0.01	<0.00001	<0.00001	<0.0005	0.0005
110	61	0.78	0.44	0.0050	0.0043	0.0003	0.0002	0.0039	0.0039	<0.0001	<0.0001	<0.01	<0.01	<0.00001	0.00001	<0.0005	<0.0005
111	96																
112	131																

#	Day	Co		Cu		Fe		Pb		Mn		Mo		Ni		Se	
		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)	
101	1	<0.0001	<0.0001	0.0041	0.0042	0.016	0.039	0.0002	0.0008	0.004	0.007	0.0022	0.0200	0.0012	0.0004	<0.0001	0.0002
102	3	<0.0001	<0.0001	0.0023	0.0016	0.015	0.011	0.0002	0.0002	0.0042	0.0056	0.0040	0.0043	0.0001	0.0001	0.0001	0.0002
103*	6	0.0001	0.0001	0.009	0.0079	0.047	0.086	0.0006	0.0008	0.17	0.04	0.0370	0.0840	0.0017	0.001	0.001	0.001
104	10	<0.0001	<0.0001	0.0026	0.0016	0.049	0.013	0.0004	0.0002	0.017	0.0093	0.0038	0.0054	0.0004	0.0003	0.0001	0.0001
105	15	<0.0001	<0.0001	0.0026	0.0013	0.028	0.012	0.0003	0.0001	0.011	0.0064	0.0027	0.0030	0.0002	0.0002	0.0001	<0.0001
106	20	<0.0001	<0.0001	0.0032	0.0012	0.062	0.024	0.0007	0.0004	0.0088	0.0038	0.0020	0.0018	0.0003	0.0002	<0.0001	<0.0001
107	25	<0.0001	<0.0001	0.0018	0.0012	0.040	0.0093	0.0004	0.0002	0.0063	0.0035	0.0018	0.0018	0.0002	0.0001	<0.0001	<0.0001
108	28	<0.0001	<0.0001	0.0014	0.0014	0.039	0.012	0.0004	0.0002	0.0058	0.0033	0.0014	0.0014	0.0003	<0.0001	<0.0001	<0.0001
109	42	<0.0001	<0.0001	0.0020	0.0016	0.047	0.016	0.0003	0.0002	0.0044	0.0031	0.0025	0.0027	0.0002	0.0002	<0.0001	<0.0001
110	61	<0.0001	<0.0001	0.0015	0.0014	0.020	0.0054	0.0003	0.0001	0.0029	0.0024	0.0024	0.0024	0.0002	0.0001	<0.0001	<0.0001
111	96																
112	131																

#	Day	Ag		Sr		Tl		Sn		U		V		Zn		Hg	
		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)		(mg/L)	
101	1	<0.00005	<0.00005	0.0056	0.0071	<0.0002	<0.0002	0.0005	0.0016	0.0014	0.0049	0.0006	0.0012	0.0026	0.005	0	0
102	3	<0.00005	<0.00005	0.0067	0.0044	<0.0002	<0.0002	0.0003	0.0007	0.0029	0.0049	0.0008	0.0007	0.001	0.0071	0	0
103*	6	<0.00005	<0.00005	0.0390	0.0370	<0.0002	<0.0002	0.0022	0.0034	0.0130	0.0250	0.0002	0.0003	0.0022	0.0026	0	0
104	10	<0.00005	<0.00005	0.0079	0.0049	<0.0002	<0.0002	0.0009	0.0008	0.0084	0.0025	0.0003	0.0002	0.0011	0.0056	0	0
105	15	<0.00005	<0.00005	0.0065	0.0042	<0.0002	<0.0002	0.0006	0.0007	0.0017	0.0025	0.0003	0.0003	0.0009	0.0053	0	0
106	20	<0.00005	<0.00005	0.0140	0.0085	<0.0002	<0.0002	0.0005	0.0005	0.0011	0.0020	0.0006	0.0004	0.001	0.0038	0	0
107	25	<0.00005	<0.00005	0.0054	0.0046	<0.0002	<0.0002	0.0004	0.0005	0.0001	0.0016	0.0004	0.0003	0.0011	0.0026	0	0
108	28	<0.00005	<0.00005	0.0048	0.0033	<0.0002	<0.0002	0.0003	0.0004	0.0008	0.0014	0.0004	0.0003	0.0013	0.0042	0	0
109	42	<0.00005	<0.00005	0.0049	0.0038	<0.0002	<0.0002	0.0004	0.0004	0.0011	0.0020	0.0004	0.0003	0.0012	0.0037	0	0
110	61	<0.00005	<0.00005	0.0044	0.0034	<0.0002	<0.0002	0.0004	0.0004	0.0011	0.0019	0.0004	0.0003	0.0010	0.0066	<0.01	<0.01
111	96																
112	131																

Note: - The table compares the results from Column 1 (white background) with Column 2 (Beige background) .
- After 6 days the columns were moved into the fridge to better represent local conditions in Greenland. This resulted in some agitation of the tailings and, as a result, the assays from this day should be ignored.

Results

The kinetic test results are detailed as Table 20-1. The tests showed that minor metal leaching to the test water will take place, however for most metals the leaching will result in concentrations below the Greenland Water Quality Guideline (GWQG) values.

The Company's EIA concluded that no significant contamination by toxic materials or other pollutants is expected to take place. Dust dispersal will be small and local and will not contain toxic material. No key animals (such as White-tailed eagle and Arctic char) or rare plants are expected to decline or be displaced because of the mine project.

20.4 Dust and emissions

20.4.1 Dust

The most significant issue with respect to the mining process and the material handling of the White Mountain anorthosite will be the production of dust. The White Mountain project will produce dust as part of the normal working conditions of an operating mine and processing plant with a ship loading facility. The key areas where the potential for dust to be created are as follows:

- Drilling and blasting in the pit
- Primary and secondary mobile crushers at the pit
- Loading and hauling anorthosite along the 10 km road to the process plant
- Loading vessels by mobile ship loader

The vast majority of dust from mining activities will consist of coarse particles larger than 10 micrometres (PM10). Total Suspended Particulates (TSP) and Particulate Matter less than 10 micrometres (PM10) particles are expected to occur in minor amounts.

PM10 particles are expected to be generated in the form of dust from activities at the mine including drilling and blasting and loading of haul trucks, and from haul truck traffic along the haul road. At the port site, particulate matter is expected to be generated from dust at the storage stockpile and during ship loading.

Several control measures will be imlemented to help minimize the effects of dust on the surrounding environment. These include the following:

- Speed limits for vehicles
- Watering of road surfaces and possible use of dust control reagents such as calcium chloride (if use approved by the government)
- Enclosed conveyors with dust collectors at transfer points
- Efficient blasting
- Sighting of stockpiles taking into consideration prevailing winds

In conjunction with these measures, dust levels will be monitored and a response plan created that outlines procedures to be followed if dust levels become elevated.

With around 160,000 cubic meters (400,000 tonnes) of material moved annually, the total impact of dust created during the mine operation is considered to be minor. The geographic extent of the potential effects are generally expected to be limited to within a few hundred metres of the project facilities. The dust material does not contain any free silica or metals in any concentration that would pose a health risk. During bulk sample processing of 120 tonnes of anorthosite at the Saskatchewan Research Council in March 2013, SRC tested the filters on dusk masks worn by workers, which showed silica levels were below the detection limit of 0.01 mg/m^3.

20.4.2 Dust Management Plan

Hudson has developed a comprehensive Dust Management Plan (DMP) to address and monitor all dust related issues. The DMP is outlined in detail below.

Project Climate

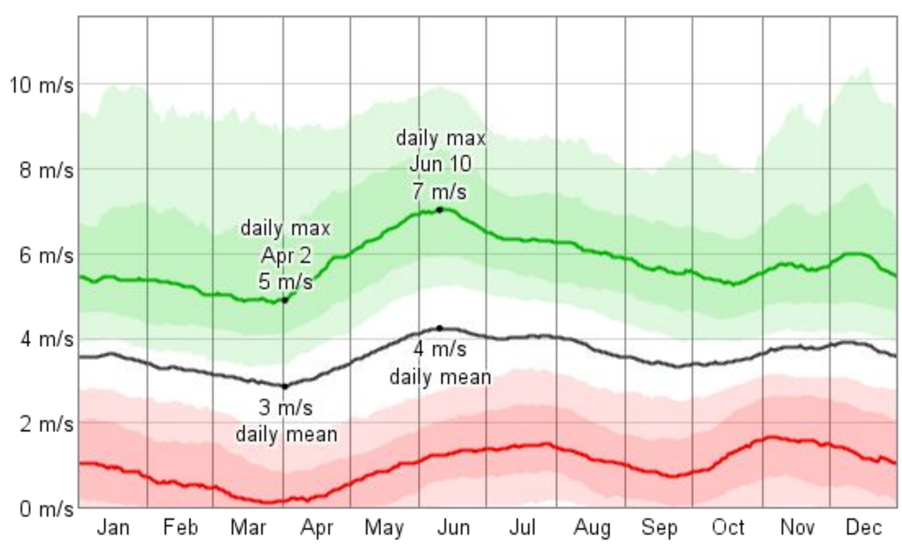
The project has very similar weather to Kangerlussuaq, which is located 80 km to the east along the Sondrestrom Fjord. The wind and precipitation data can be extrapolated from Kangerlussuaq to the project to determine the potential weather impacts on dust generated from project activities.

Wind

Over the course of the year typical wind speeds vary from 0 m/s to 7 m/s (calm to moderate breeze), rarely exceeding 10 m/s (fresh breeze). The *highest* average wind speed of 4 m/s (gentle breeze) occurs around June 10, at which time the average daily maximum wind speed is 7 m/s (moderate breeze). The *lowest* average wind speed of 3 m/s (light breeze) occurs around April 2, at which time the average daily maximum wind speed is 5 m/s (gentle breeze).

Wind Speed

Figure 20-2 Average daily wind speed - Greenland

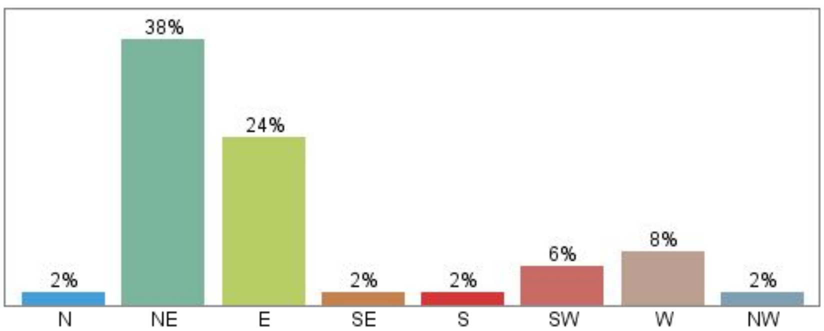


The average daily minimum (red), maximum (green), and average (black) wind speed with percentile bands (inner band from 25th to 75th percentile, outer band from 10th to 90th percentile).

The wind is most often out of the *north east* (38% of the time) and *east* (24% of the time). The wind is least often out of the south (2% of the time), northwest (2% of the time), north (2% of the time), and southeast (2% of the time).

Wind Directions Over the Entire Year

Figure 20-3 Average wind direction - Greenland

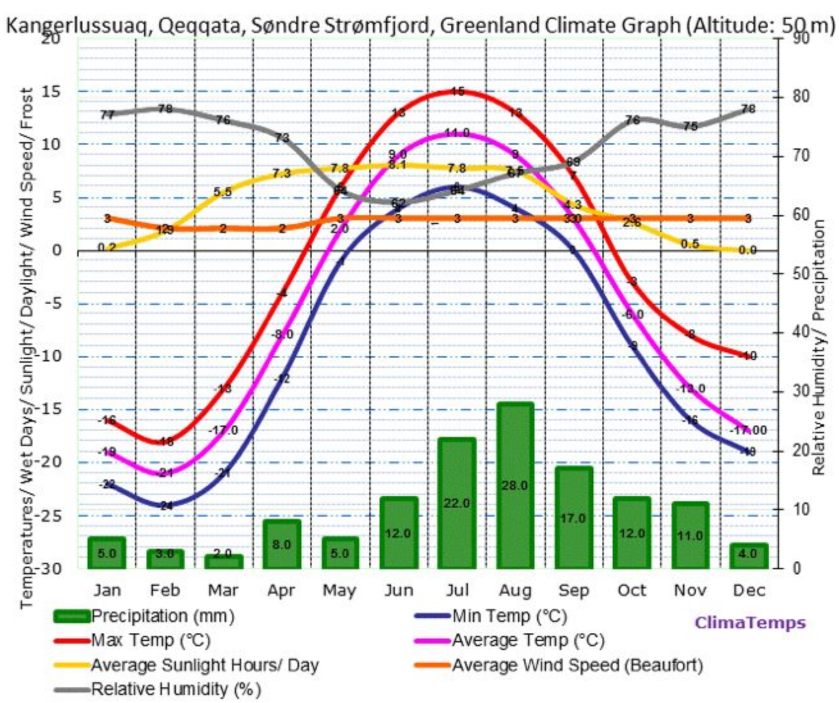


Source: https://weatherspark.com/averages/27554/Kangerlussuaq-S-ndre-Str-mfjord-Kitaa-Greenland

Precipitation

The area receives a modest amount of precipitation in the form of rain and snow.

Figure 20-4 Greenland climate graph



Source: http://www.kangerlussuaq.climatemps.com

From the weather data it can be seen that the project area is relatively dry with moderate winds prevailing mostly from the northeast. This information has been taken into consideration in the design and layout of stockpiles and structures and incorporated in to the Dust Management Plan.

The DMP identifies all potential sources of fugitive dust emissions generated from daily mining operations and details procedures and practices that will be implemented to reduce the release of dust to the atmosphere. The DMP further specifies monitoring, record keeping, and contingency plans in order to maintain a lasting and effective dust mitigation program.

A copy of the DMP will be kept on file at the mine and will be followed at all times by staff during mining operations.

The primary air emission associated with mining operations is particulate matter released in the form of fugitive dust. Sources of dust will include traffic from the 10 km haul road, rock processing and handling, and natural releases occurring from exposed stockpiles and rock faces at the pit.

To limit the transfer of dust in to the surroundings, Hudson will take all reasonable actions to ensure that fugitive dust emissions are minimized using the best management practices associated with the industry. Once implemented, the DMP will serve to minimize all dust emissions from the operation, so that the risk to human health and the environment is minimized.

20.4.3 Dust Control Measures

Figure 20-5 illustrates the potential areas of dust dispersion and the prevailing wind pattern at the quarry site. Dust mitigation measures planned for the quarry and crushing area include the following:

Crushing and Screening

- Where possible, the height of lifts and discharge distances to the top of the stockpile will be kept to a minimum and aligned parallel to the prevailing wind to minimize dust generation
- Installation of dust control systems including hoods and flaps on both of the mobile crushers located at the pit

Haul Roads

- A truck or trailer mounted tank will be located on site at all times and will be equipped with a spray bar to deliver water or another approved dust suppressant (such as calcium chloride in the winter months) evenly over the haul route surface.
- Dust suppressant supply will be available to allow the tanker truck to fill and apply the full payload each hour, if necessary, during dry conditions.
- The actual application rate will vary, depending on surface moisture conditions and traffic conditions, and will be triggered whenever the site manager or scale operator observes trucks producing a trailing cloud of dust greater than 1/3 of a trailer length.
- The haul road will be re-graded approximately monthly during May to October, to ensure that loose fine material on the haul route surface is minimized.
- Trucks and other mobile equipment will reduce speed as necessarily to reduce trailing dust clouds.

The maximum speed will be 50 km/hr.

Calcium Chloride

Upon approval of the Government of Greenland Hudson may use calcium chloride during the colder months on roads for dust suppression when spraying with water could produce dangerous driving conditions due to ice build-up. Calcium Chloride is a material produced from natural brine deposits under the ground. It is processed into a colourless, odourless liquid or into solid form as pure white flakes and pellets. $CaCl_2$ is its chemical symbol.

Calcium chloride is one of only two approved dust suppressants in the NWT, Canada, by the Ministry of Environment and Natural Resources. The NWT has an arctic environment similar to the project area in Greenland.

Figure 20-5 Projected dust dispersion schematic - pit area

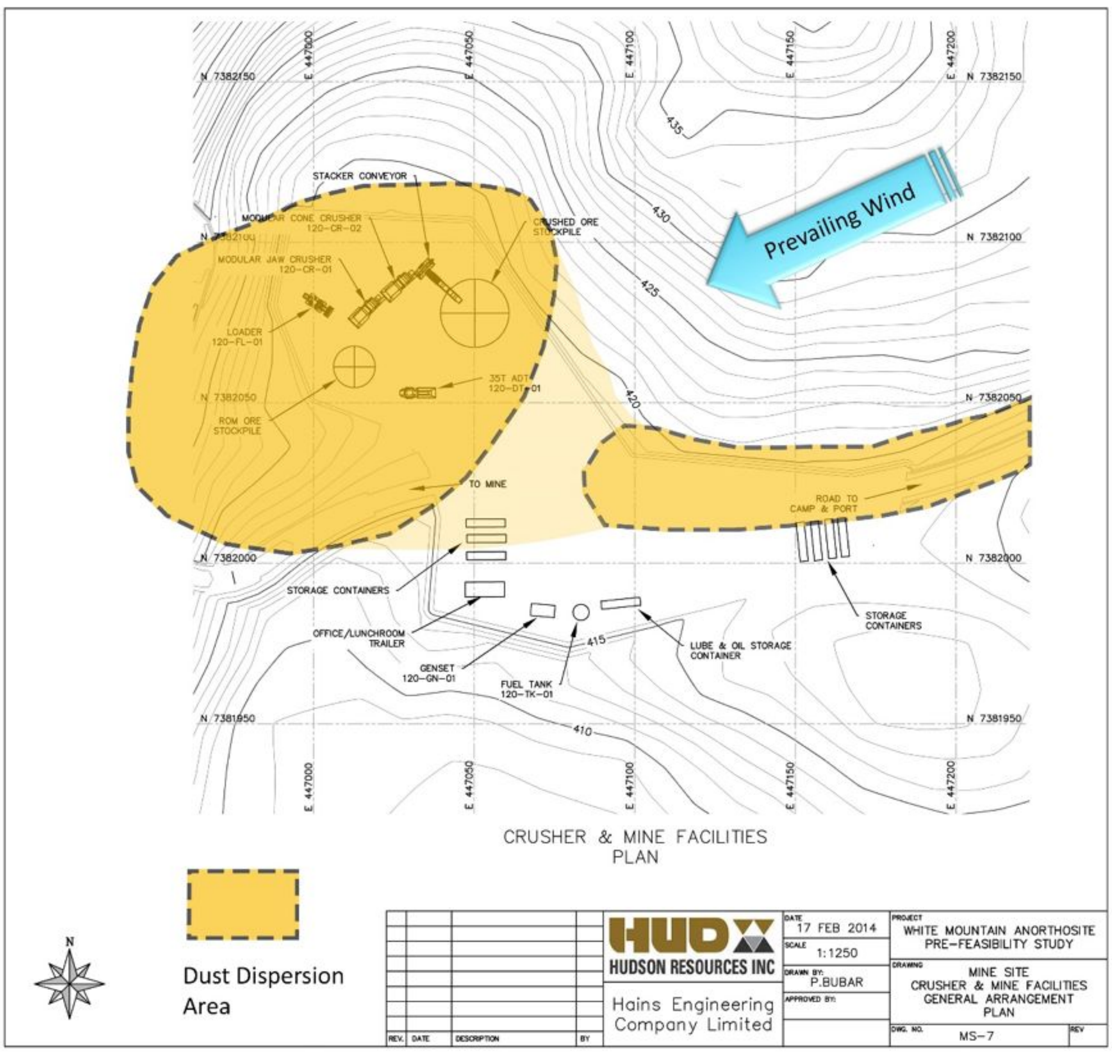
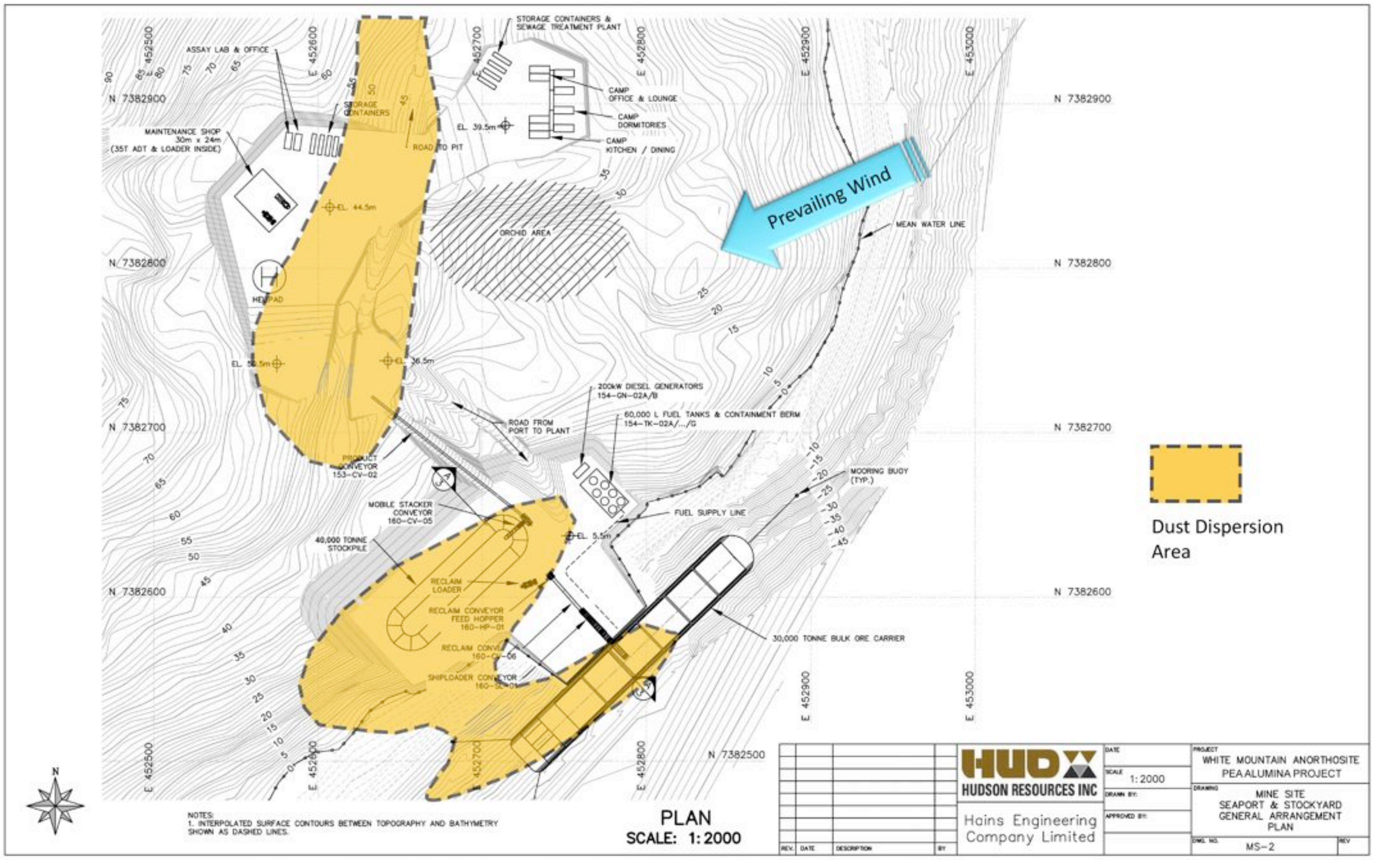


Figure 20-6 Projected dust dispersion schematic – port area



Truck Loading and Transportation

- Truck loading will be suspended if the site manager observes the material to be dry and dusty and the wind is at a speed greater than 50 km/h (14m/s) or otherwise sufficient to cause wide-spread visible emissions.
- The highest point of the material loaded into a truck will not exceed the vehicles tray walls unless it is covered.

Wind Erosion of Exposed Faces

- Rock extraction will be suspended if the condition of the quarry face is dry and dusty and the wind is greater than 50 km/h (14 m/s)or otherwise sufficient to cause wide-spread visible erosion of the open face.
- Rock stockpiles will be located on the pit floor in close proximity to the extraction face or in the stockpile area.
- Wind forecasts will be monitored regularly during this phase of the operation to anticipate the need for these measures and allow for next day planning.

Rock Drilling

- Primary and secondary dust collectors will be employed on the rock drill to minimize the emissions of fine dust particles. The dust collectors will be maintained to the manufacture’s specifications.

Figure 20-6 illustrates the projected dust dispersion area at the storage and loading area. Dust is expected to be generated in the area of the anorthosite stockpile and during ship loading operations. Mitigation measures to be employed will be similar to those at the quarry site. The ship loader will be fitted with a dust suppression spout and dust extraction system to minimize fugitive dust during loading operations.

Implementation Schedule

All control measures are to be in place prior to project start-up. Control measures will remain in place so long as the mining operation remains in operation.

Implementation Plan

The following outlines how the DMP will be implemented, including training of facility personnel:

- The DMP will be kept on file at the mine office;
- Training on new and existing operating procedures will be provided to relevant staff;
- Refresher training will be provided at a minimum of once every 3 years;
- The mine management team will communicate the DMP to responsible supervisors, who will ensure staff are following operating procedures defined in the DMP;
- The Site Manager will be responsible for ensuring the DMP is followed;
- Management will ensure DMP is reviewed annually; and
- The staff will follow the DMP procedures.

Identification of Problems

The Site Operator will be informed of any issues that arise from inspections performed. Operations may be curtailed if dust control equipment is not adequately performing.

Monitoring and Record Keeping

Visual inspection for dusty conditions in areas of emission sources identified in the DMP will occur at a minimum of twice daily during dry weather and once per day otherwise. Records will be made each time the following events occur:

- Dust suppressant is applied to the haul road;
- Water sprays are used on the haul road;
- Heavy dust plumes are observed.

Records will be kept onsite in a logbook and made available to government inspectors at any time.

20.5 Air Emissions

Air emissions from the White Mountain project, aside from dust, will be comprised of emissions from mining operations and anorthosite transport and processing, which will include the following:

- Oxides of nitrogen (NOx) primarily from blasting;
- Carbon monoxide (CO);
- Sulphur dioxide (SO_2) resulting from sulphur in the diesel fuel;
- Carbon dioxide (CO_2), a Greenhouse Gas (GHG)

All the emissions will be released in to the atmosphere but only the CO_2 is expected to be released in measurable quantities. The other compounds are expected to be emitted in much smaller quantities, as by-products of fuel combustion in the mining equipment, vehicles and diesel generators, and as by-products of explosive use in blasting.

Air emissions from mining activities will increase the airborne concentrations of particulate beyond the baseline levels where there is currently no mining activity. With mitigation measures in place, total suspended particulates (TSP) and PM10 criteria are expected to be met at possible receptor locations such as Kangerlussuaq, Maniitsoq and Sisimiut. Total suspended particulate (TSP) are generally considered to be in the particle size range of up to 44 micrometres in aerodynamic diameter.

Project-related greenhouse gas emissions (principally CO_2) will result from fuel combustion in the mining equipment, haul trucks and diesel generators. No other direct sources of GHG emissions are present. The project is estimated to consume approximately 1,740,000 litres of diesel fuel annually.

GHG emissions from combustion will be minimized through efficient combustion practices, including minimizing fuel use, and ensuring all engines are compliant with Stage IIIB (Tier 4) EU legislation and are maintained to ensure optimal performance.

Provided that the project is operated using current best management practices for fugitive dust control and the other design and mitigation measures are implemented to minimize air emissions of the other key pollutants, the project is not expected to exceed air quality criteria during operations.

20.5.1 Emissions by Equipment

The project will produce CO_2 emissions from combustion exhaust from engines on major equipment in the operation. Diesel fuel consumption is shown in Table 20-4.

Table 20-2 Annual fuel consumption for major equipment

Type	Load Factor (%)	Number of Units	Maximum Fuel Consumption (L/hr)	Engine size (Horsepower)	Maximum Annual Fuel Consumption (L/yr)
Drill Rig (Sandvik DX780)	50	1	15	225	24,300
Excavator (CAT 349E)	30	1	20	400	19,440
Front End Loader (Volvo L250G)	30	1	26.5	300	25,758
Front End Loader (Volvo L150G)	70	1	15.1		34,246
Haul Truck (Volvo A35F)	85	3	30.3	440	250,338
400 kW Diesel Generator	80	1	100	Two 200 kW Units	520,992
Mobile Cone Crusher (1000SR)	75	1	40	325	97,200
Mobile Jaw Crusher (XA400S)	60	1	60	260	116,640
Skid Steer Loader	50	1	10		32,400
Ancillary Equipment	50	various	60	various	97,200
TOTAL					**1,218,514**

Based on CO_2 emissions of 2.68 kg/litre for diesel oil, the project will produce a total of 3,265,618 kg, or 3,266 tonnes, of CO_2 annually. This would account for less than 1% (0.45%) of Greenland's CO_2 output based on 2011 data.

Nitrogen from Blasting

The project will introduce nitrogen in to the local environment during blasting from residues of nitrogen-based explosives (ANFO). The average annual amount of ANFO used for blasting is estimated to be 36,364 kg (based on 0.25 kg/m^3 x 145,500 m^3). This is equivalent to 90.9 grams of ANFO per tonne of rock (rock density of 2.75 tonnes/m^3). The basic ANFO mixture (94% ammonium nitrate, 6% fuel oil) contains 33% (by weight) of nitrogen, which equates to a nitrogen content in the ANFO of approximately 30 grams/tonne of blasted rock for the White Mountain project.

Following the detonation of ANFO, 97% of the nitrogen is released to the atmosphere with 3% remaining on the blasted rock. This equates to 0.90 g (30 g x .03) of nitrogen per tonne of blasted rock at White Mountain that will impact the local environment.

Nitrogen is readily soluble if exposed to water, and as such, one of the more significant risks is the introduction of nitrates in to the water system. Nitrates can be introduced in to the water system through wet blast holes and the movement of ground water. Hudson has not encountered water in any of the drill holes at the proposed pit site and the risk of contamination from aquifers is considered very low. The initial mine plan is for benching into the hillside without the need for a pit to be created where there is potential for water collection and discharge.

Given the small amount of ANFO being utilized and the relatively dry environment with no known aquifers, it can be assessed that nitrogen from blasting on the local ecosystem will have a minimal impact with no increases in nitrogen levels in any significant bodies of water in the project area.

20.6 Project Permitting - Greenland

The project permitting process has been previously described in section 4.2.2 of this report.

20.7 Social or Community Requirements - Greenland

It is a requirement of the mine permitting process that a socio-economic assessment report be submitted and social impact benefits agreement signed with the affected local communities. Given the sparse population of Greenland, the geographical coverage of the social impact benefit agreement can be quite widespread. The MLSA has issued guidelines for preparation of Social Impact Assessment reports. These guidelines can be found on the MLSA website at http://www.govmin.gl/minerals/terms-rules-laws-guidelines.

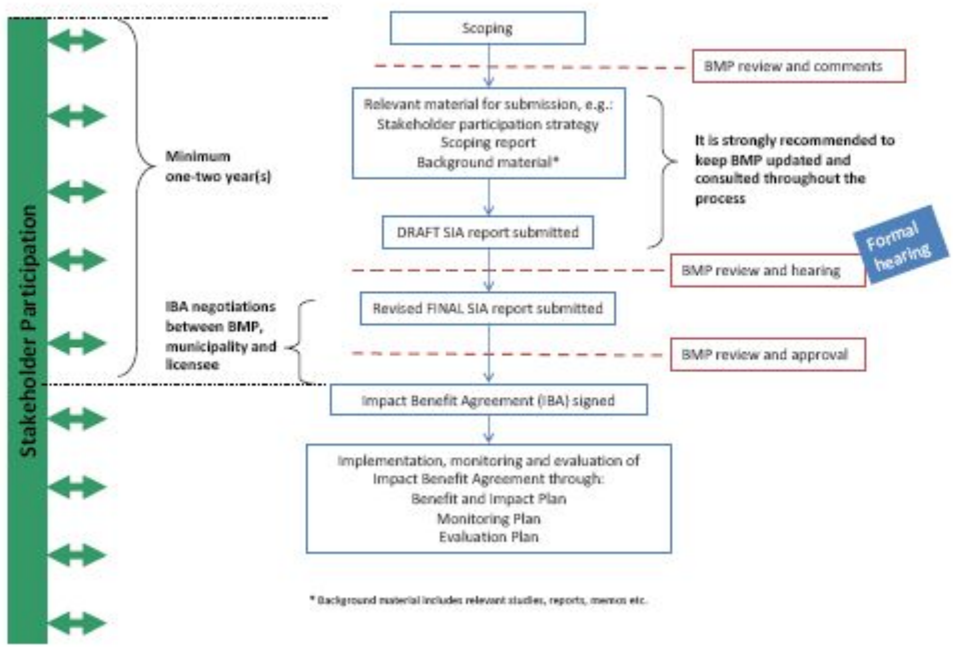
The objectives of the SIA report are to:

- to engage all relevant stakeholders in consultations and public hearings;
- to provide a detailed description and analysis of the social pre-project baseline situation as a basis for development planning, mitigation and future monitoring;
- to provide an assessment based on collected baseline data to identify both positive and negative social impacts at both the local and national level;
- to optimize positive impacts and mitigate negative impacts from the mining activities throughout the project lifetime;
- to develop a Benefit and Impact Plan for implementation of the Impact Benefit Agreement.

Within this context, the SIA needs to be integrated with the EIA and other documents submitted with the application for the Exploitation Licence.

Figure 20-7 illustrates the general framework for preparing an SIA report.

Figure 20-7 SIA report framework

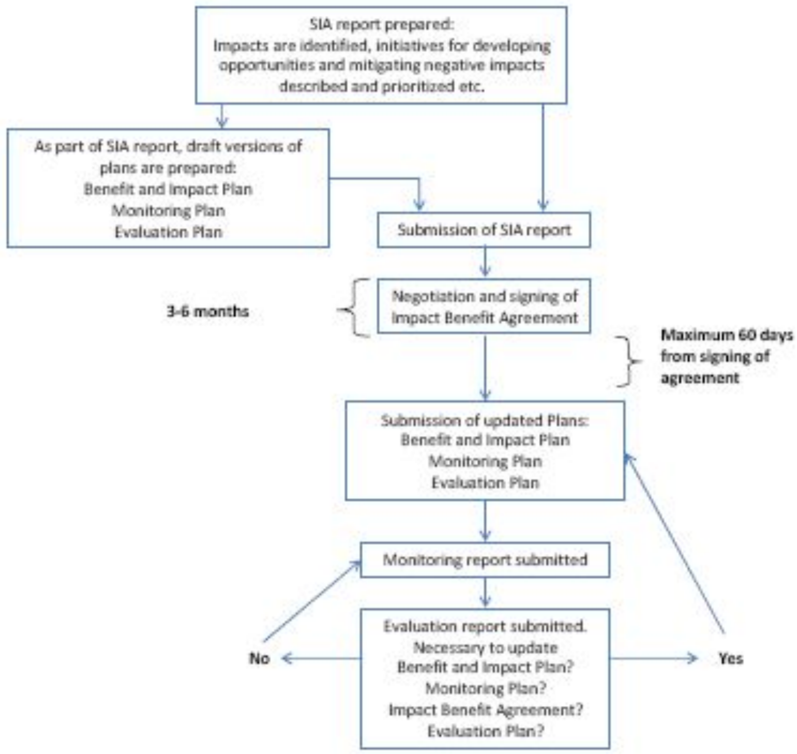


Source: MLSA

A significant part of an SIA report is the Impact Benefit Agreement (IBA). This agreement specifies the commitments of the project proponent to local employment and other benefits, how these are to be achieved, the responsibilities of the project sponsor, the local communities and the government of Greenland.

Upon completion of the required consultations and other work, a comprehensive SIA is submitted which is comprised of an Impact Benefit Agreement, Benefit and Impact Plan, Monitoring Plan and Evaluation Plan. The overall reporting and evaluation process is illustrated in Figure 20-8.

Figure 20-8 Overview of IBA, monitoring plan and evaluation plan process



Source: MLSA

The basic components of an IBA are summarized below. The focus is primarily on the local employment aspects of the project and maximization of overall benefits to the Greenland economy.

1. Definitions
    a. Definitions and abbreviations used in the agreement
2. Purpose of the agreement and guiding principles
3. Principles for planning significant project modifications
4. Employment practices
    a. Quantitative Employment targets for Greenlandic workforce
    b. Hiring commitments from contractors
    c. Employment incentives
    d. Employment requirements
5. Human resource development
    a. Recruitment strategies
    b. Education targets for Greenlandic workforce, apprenticeships, training etc.
    c. Gender awareness
6. Business development
    a. Quantitative targets for involvement of Greenlandic companies/contractors/suppliers
    b. Business opportunity management
    c. Mentorship/joint ventures for local businesses
7. Social well-being
    a. Social wellness initiatives for staff

   b. Integration in local community, including social wellness initiatives.
8. Cultural well-being
   a. Cultural initiatives for staff
   b. Integration in and involvement of local community, including cultural wellness initiatives.
9. Company's socio-economic monitoring agency with the purpose of monitoring, implementing the agreement etc., including a plan for monitoring meetings for the subsequent year between the licensee, MLSA and the relevant municipality.
10. Representation
11. Commencement, suspension and termination of agreement
12. Governing law and dispute resolution
13. Notices
14. General provisions

Appendix 1 Benefit and Impact Plan
Appendix 2 Monitoring Plan
Appendix 3 Evaluation Plan

Hudson has undertaken an extensive program of community consultations related to the SIA, EIA and IBA processes as part the exploitation application.

20.8 Mine Closure Requirements

A conceptual closure plan has been developed to cover all of the project components.

At the conclusion of mining activities it is anticipated the pit will be allowed to fill with water and the infrastructure on site dismantled and removed. The closure is expected to take place over a six-month period and encompass the following:

- Buildings, mobile crushers and processing plant will be salvaged and removed by barge or ship for reuse, recycling or disposal,
- Organic material burned on site,
- Road materials will be ripped and leveled to encourage re-vegetation,
- Road culverts will be removed where appropriate and the natural drainage system restored,
- Floating dock/barge and bollards will be removed from the port facility,
- All mining equipment will be removed and the pit will be allowed to fill with water.

Revenues from sale of surplus equipment will be used to offset some of the mine closure costs.
As vegetation is limited, the plan is not to seed the area but to leave the area to natural plant succession.

The closure plan is designed to restore the mine site to a satisfactory condition and assumes that the future use is wildlife habitat. Disturbed areas will be returned, where possible, to a pre-mining state so that traditional activities can resume. An allowance of 10 years for post closure monitoring has been made for data collections and analysis to demonstrate achievement of the closure criteria and objectives.

Due to the large resource and the very long mine life, mine closure activities are not expected to commence until at least 50 years after project start-up.

20.9 Hydrometallurgical plant – North America

Hudson has not yet selected a location for the necessary hydrometallurgical plant. Key factors in the selection process will include:

- proximity to a port able to receive 400,000 t/a of anorthosite brought in by ocean freighter from Greenland
- proximity to customers ready to accept 209,000 t/a of calcium silicate, 89,000 t/a of amorphous silica, and 110,000 t/a of high-purity alumina
- reasonably priced hydrochloric acid, natural gas, electrical power and water
- a reasonably skilled and priced workforce
- a favourable taxation regime

Possible locations are the shores of the St. Lawrence River (for example, Bécancour, Quebec) and certain areas along the shores of Gulf of Mexico (such as, Houston, Texas).

Regarding the environmental aspects of the hydrometallurgical plant, the following should be noted:

The proposed plant will not generate a solid waste requiring disposal as a "tailings". The overall reaction in the hydrometallurgical plant is as in Equation 2. Equation 2a shows a simplified chemical equation while Equation 2b provides the same in words.

$$CaAl_2Si_3O_{10} \rightarrow Al_2O_3 + 2SiO_2 + CaSiO_3 \quad [2a]$$

$$\text{Anorthosite} \rightarrow \text{alumina + silica + calcium silicate} \quad [2b]$$

The products of the anorthosite decomposition process are marketable products and essentially all components of the anorthosite fed to the plant will leave the plant and be shipped to markets. The anorthosite decomposition reaction is essentially catalyzed by HCl and driven by thermal energy supplied by the combustion of natural gas.

Solid residues

It is not expected that the hydrometallurgical plant will generate any significant amount of solid wastes. Minor industrial or personnel waste (garbage and the like) will be dealt with in an approved manner.

Atmospheric emissions.

Dust arising from ship off-loading and comminution of the anorthosite ahead of leaching will be controlled with suitable approved dust collection systems and all local environmental regulations will be complied with.

The hydrometallurgical plant will include numerous stacks as required to release water vapour and other process gases. These could include HCl but all such exhaust streams will be passed through scrubbers so that HCl is recovered and emissions of HCl will be negligible and well below regulated limits. Quite apart from the desire to comply with regulations, it can be noted that HCl is a costly reagent and its capture and recycle is an important part of the process.

Liquid waste streams

As now designed, the process water operates in what is essentially a closed loop. Cooling water will be required but recirculated through cooling towers. Minor amounts of blowdown will require treatment and discharge.

The hydrometallurgical complex will require potable water and discharge waste water into an existing sewage handling system or after treatment in a treatment plant belong to the hydrometallurgical plant.

21 Capital and Operating Costs

Capital and operating costs have been estimated based on budget quotations received from vendors for major equipment and data from the CostMine© mine and equipment costs data base for smaller items. Aspen Plus, a chemical process simulation software package was used to model the process plant and Aspen Process Economics Analyser (APEA) then used to estimate capital and operating costs.

Costs are reported in the currency quoted in the budget quotations, or in $US. All costs and revenues related to the Greenland operations are expressed in constant, 2015 Canadian dollars. Process plant costs are expressed in $US. Overall project economics have been expressed in $US. Costs have been converted to $US at the following exchange cross rates (Table 21-1):

Table 21-1 Foreign Exchange Rates

	DKK	$ US	$ Cdn	€
DKK	1.0000	5.5000	5.0000	7.5000
$ US	0.1818	1.0000	1.1765	1.3588
$ Cdn	0.2000	0.8500	1.0000	1.5000
€	0.1333	0.7359	0.6700	1.0000

The following are excluded from the capital cost estimate:

- Project financing and interest charges
- Sunk costs

21.1 Basis of Estimates

Capital costs have been estimated based on the following criteria:

Greenland Quarry Operation

- Mobile equipment: vendor quotes
- Minor process equipment (small conveyors, etc): CostMine data base
- Construction Labour: cost estimate for hourly rate provided by Hudson
- Miscellaneous Steel platforms, railings, etc.: 3% of mechanical equipment cost
- Concrete Foundations: 100 m^3/175 m^2 building area
- Concrete: $824.68/$m^3$, placed
- Electrical: 10% of mechanical equipment cost
- Instrumentation: 5% of mechanical equipment cost
- Construction equipment & tools: data base
- Plate work: $3,850/tonne material cost
- Labour hours: data base

North America Process Plant

- Equipment: Aspen Process Economics Analyser
- Piping:20% of equipment
- Civil: 10% of equipment
- Instruments 8% of equipment

- Electrical:15% of equipment
- Installation: 17% of equipment
- Buildings: 20% of equipment
- Tailings and other facilities:$10,000,000 allowance.
-

21.2 Mine capital costs Greenland

Mine capital costs relate predominately to mobile equipment and crusher requirements. Mine capital costs have been developed based on the materials handling and productivity data detailed in Section 16 of this report. Existing equipment on hand (Moxy MT31 truck, ZW220 FEL and Komatsu FC240 excavator) are included in the analysis of overall equipment requirements but not in the capital cost estimate as they are regarded as sunk costs. Similarly, expenditures on road construction and site development as of December 31, 2013 are treated as sunk costs and not incorporated in the capital cost estimates.

21.2.1 Mine Pre-Development Costs

The quarry surface holds small amounts of lichens and grasses and is stained. It is planned to hydraulically wash the surface to remove this material. Sufficient area will be washed to provide for the first two years of production. Costs are incorporated into annual operating costs for mining.

21.2.2 Mine Equipment Capital Costs

Mine equipment requirements and capital costs are detailed in Table 21-2.

Table 21-2 Mine Equipment Capital Costs

			Unit Cost		Extended Cost		Total
Item	**Description**	**Number**	**DKK**	**Euro**	**DKK**	**Euro**	**$Cdn**
Jaw Crusher	PowerScreen XA400S	1	2,500,000		2,500,000		$500,000
Cone Crusher	PowerScreen 1000SR	1	3,500,000		3,500,000		$700,000
Stacking Conveyor with Hopper	To stack cone crusher discharge	1	225,000		225,000		$45,000
Generator/Lights	25 KW	1	250,000		250,000		$50,000
Production Drill	Sandvik DX780	1	3,195,505		3,195,505		$639,101
Ancillary	Office, Storage, Fuel Tank	1	312,810		312,810		62,562
Excavator	CAT329E	1	1,400,000		1,400,000		$280,000
Haul Truck, ADT	Volvo A35	3	2,650,000		7,950,000		$1,590,000
Front end Loader	Volvo L150G	1	1,835,000		1,835,000		$367,000
Front end Loader	Volvo L250G	2	2,086,830		4,173,660		$834,732
Anfo Mixer/Loader		1	300,000		300,000		$60,000
Grader	4.3 m blade, CAT or Volvo	1	1,700,000		1,700,000		$340,000
Water truck	used, 5,000 litre	1		100,000		100,000	$149,254
Service Truck		1		125,000		125,000	$186,567
Fuel Truck	for field fuelling	1		150,000		150,000	$223,881
Mechanic Truck		1		200,000		200,000	$298,507
Pick-up Trucks	Double cab type	3		40,000		120,000	$179,104
Haul Truck, ADT	Moxy MT31HL, existing	1	-		-		$0
Excavator	Komatsu FC240, existing	1	-		-		$0
Front End Loader	Hitachi ZW220, existing	1	-		-		$0
Total		**26**	**19,955,145**	**615,000**	**27,341,975**	**695,000**	**$6,505,708**

A small equipment shop, lunch room and kitchen are planned for the quarry site. The shop is planned as a basic shelter for short term repairs, with the main equipment shop located at the processing plant site. Used shipping containers will be used for tools storage, repair and spare parts storage. Explosive storage will be located at approximately one kilometre from the pit and will consist of approved containers for ANFO and detonators. The explosives storage facility will be fenced and locked for security.

21.2.3 Mine Sustaining Capital Costs

Sustaining capital costs for mine equipment relate to replacement of mobile equipment. Replacement schedules are based on estimated equipment life given the annual usage and operating conditions. The jaw and cone crusher are anticipated to be replaced every 5 years. Replacement schedules for other mobile equipment are based on projected utilization rates and estimated useful lives of between 15,000 and 20,000 operating hours for haul truck and other heavy mobile equipment. Table 21-3 detailed the estimated equipment replacement and costs.

21.2.4 Site capital costs – Greenland

Other capital costs associated with operation in Greenland include stockpiling and product loadout conveyors. Mobile equipment costs include those for a Bobcat skid-steer loader, stacking equipment and shiploader. Infrastructure related costs include site preparation and completion of road construction, accommodation buildings, sewage treatment system, equipment maintenance shops, fuel storage, power generation, and the dock structure.

Major infrastructure cost items include:

- Road completion and site preparation: $ 825,000
- Accommodation complex: $ 570,000
- Sewage treatment system: $ 85,000
- Explosive stores: $ 44,776
- Shiploader (including stacker and wheel loader): $ 2,794,372
- Wharf infrastructure: $ 2,000,000
- Port site (civil, mechanical, electrical): $ 1,341,211

Total costs $ 7,660,359

Table 21-3 Mine Equipment Replacement Schedule

Item	Year 5		Year 7		Year 10		Year 15		Year 20	
	No.	Cost	No.	Cost	No.	Cost	No.	Cost	No.	Cost
Jaw Crusher	1	2,500			1	2,500	1	2,500	1	2,500
Cone Crusher	1	3,500			1	3,500	1	3,500	1	3,500
Excavator, Cat 329E							1	1,400		
Production Drill, DX780					1	3,196			1	3,196
Haul Truck, Volvo A35	1	2,650			1	2,650	1	2,650	1	2,650
Front End Loader, Volvo L250G					1	2,200			1	2,200
Front End Loader, Volvo L150G					1	1,835			1	1,835
Anfo Loader/Mixer			1	300			1	300		
Grader					1	1,700			1	1,700
Service Truck					1	933			1	933
Mechanics Truck					1	1,492			1	1,492
Pumping Installation					1	149				
Light Plant	2	200			2	200	2	200	2	200
Pickup Trucks			3	895			3	895		
Total Cost DKK'000		8,850		1,195		20,355		11,445		20,206
Total Cost ($Cdn 000)		$1,770		$239		$4,071		$2,289		$4,041

21.2.5 Indirect and contingency costs - Greenland

Indirect costs include detailed engineering and EPCM costs, freight, and owners costs. EPCM costs are estimated at 5.4% of direct costs. The low EPCM estimate reflects the relative simplicity of the overall project and the use of pre-engineered buildings.

Construction camp and other temporary services are estimated at $60/day/person and 1,500 man-hours for construction in Greenland.

Freight costs are estimated at 3.5% of equipment costs for material delivered to Greenland.

Owners costs are estimated as follows:

- Project management: 0.5% of direct costs
- First fills, capital and commissioning spares: 0.8% of mechanical equipment
- Recruitment and training: 0.25% of mechanical equipment costs
- Pre-commissioning & vendor reps: 0.25% of mechanical equipment costs
- Commissioning & start-up: 0.25% of mechanical equipment costs

Contingency was set at 20% of capital costs and 20% of indirect costs.

Estimated indirect costs are detailed in Table 21-4.

Table 21-4 Indirect and contingency costs - Greenland

Item	Estimated Cost
EPCM	$764,968
Temporary Services	$90,000
Freight	$466,510
Owners Costs	$261,845
Contingency	$3,149,878
Total	**$4,733,201**

21.2.6 Total Greenland Capital Costs

The total estimated capital budget in Greenland is C$18,899,268.

21.3 Process Plant costs – North America

Capital costs for the process plant in North America relate to requirements for anorthosite grinding, the hydrometallurgical process plant and load out of the finished product.

Material from Greenland will be unloaded using a contracted stevedoring service. The plant will be located as conveniently as possible to deep water shipping, access to industrial chemicals and sufficient storage space. Material will be recovered from the storage area using a front end loader to a feed hopper/bucket elevator system to the day bin supplying the grinding mill. The ball mill will operate in closed circuit with air classifiers to produce a -100 +200 mesh product as leach feed. Following leaching and other unit operations, the three products (alumina, AS, and CS) will be stored in a series of product bins capable of loading supersacs, pneumatic silo trucks, and containers.

Capital costs are based on the Aspen estimating system which has been adjusted upwards where necessary. Table 21-5 details the estimated capital costs for the process plant in North America.

Table 21-5 Process Plant Capital Costs

Aspen ICARUS - ADJUSTED UPWARDS			
Project Cost Summary			
Project Title:	PROJECT:		
Project Name:	Hudson Anorthosite Circuit 2(Scenario 3 Air cooling		
Proj. Location:	North America		***Prep. By:***
Estimate Date:	12FEB15 10:15:50		***Currency:***
Account	%	MH	Total Cost
Equipment			38,000,000
Piping	20%		7,600,000
Civil	10%		3,800,000
Instruments	8%		3,040,000
Electrical	15%		5,700,000
Installation	17%		6,460,000
Buildings	20%		7,600,000
Tailings Facilities	Allowance		10,000,000
Total Direct Field Costs		**0**	**82,200,000**
		(TDMH)	(TDC)
Indirect Field Costs		**16,575**	**5,109,800**
		(IFMH)	(IFC)
Total Field Costs		**16,575**	**87,309,800**
		(TFMH)	(TFC)
Freight	4%		3,288,000
Taxes and Permits	5%		4,110,000
EPCM	15%		12,330,000
Construction indirects	10%		8,220,000
Other Project Costs	5%		4,110,000
Spares and first fill	2%		1,644,000
Contingency	25%		30,252,950
Total Non-Field Costs		**0**	**63,954,950**
		(HOMH)	
Project Total Costs			**151,264,750**
			(TIC)

21.4 Total capital costs

The total estimated capital budget is US$16,064,377 (C$18,899,268) in Greenland and US$151,264,750 for the process plant in North America for a total estimated capital cost of US$167,329,128. Included in this total are contingency costs of $32,930,346 equivalent to a 24.5% addition to direct and indirect costs.

On top of these costs, the analysis includes working capital requirements of $17,141,948. Sustaining costs average $3.5 million per year, or $70 million over the 20 year plan period.

21.5 Operating costs

Operating costs primarily relate to labour and energy in both Greenland and North America. Costs have been estimated based on typical local labour costs in each jurisdiction. Energy cost is the main reason that the processing plant needs to be located in North America. Greenland's only source of power at the project site is diesel generated electricity. As a result, electricity in Greenland costs approximately $0.30/kWh versus $0.06/kWh in North America. More importantly, the natural gas required to calcine the alumina and provide heat to other operations is not available in Greenland but plentiful and cheap in North America.

Fuel consumption rates and maintenance requirements for major mine equipment are based on information from equipment suppliers. Explosive costs are based on supplier quotes. Drill supplies costs are based on estimated wear rates and quotes for supplies. Camp supplies costs are based on an allowance of $Cdn 60/person/day for catering and cleaning assuming contract operations. Local transport costs for personnel in Greenland are estimated based on Hudson's experience and assume staff pick-up and return from Sisimiut and Maniitsoq using a ferry service.

Shipping and handling costs for moving material from Greenland to North America have been estimated based on quotations from suppliers.

21.6 Operating costs - Greenland

Mine operating costs are based on annual production of 400,000 tonnes of anorthosite mined and shipped to North America. Table 21.6 details the operating costs in Greenland. All casts are denominated in Canadian dollars. For the study, they are converted into US currency at $US0.85 = $C1.00.

Mine labour costs assume a 4 week on-4 week off schedule with two crews working a 12 hour day shift. It is assumed most of the operators are local Greenlandic personnel and would require only local transport to nearby communities.

Mine consumables costs includes costs for drilling and blasting, crushing and truck haul to the process plant. Consumption rates and costs for consumables have been based on suppliers' recommendations for fuel, tires and wear parts. Utilization rates are based on productivity analysis. Tire costs assume abrasive conditions and replacement of tires each year for haul trucks and approximately every 18 months for front end loaders. Explosives consumption rates are based on experience with similar rock types, while costs are based on supplier quotes.

General and administrative costs include those associated with camp catering and cleaning, operations management and administration, communications, occupational health and safety, and power supply for non-process loads.

Camp operations for catering and cleaning are assumed to be contracted out at cost of $Cdn 60/person/day.

Staff transport costs are based on the assumption that most staff will be local residents and transport by coastal ferry will be possible during much of the operating season. Provision has been made for limited local air transport to Sisimiut, Maniitsoq, and Nuuk and for international travel to Denmark for more senior staff. Staff transport costs assume a four week on/four week off schedule in Greenland and nine months of operation.

An allowance of $C400/person/annum has been made for personal protective equipment.

Other administrative costs include senior management, a nurse and associated occupational health and safety costs, local office and staff costs and communications costs. Senior administrative staff include an Operations Manager responsible for overall direction and management of the Greenland operations.. The Operations Manager will be employed on a 12 month contract basis The Greenland office will be staffed by an administrative assistant on a 12 month basis.

Total mining, processing and administrative costs for operations in Greenland have been estimated at $C13.69/tonne of mined and shipped material. This amount includes. $C10.22/tonne in mining costs, $C2.22/tonne in G&A and other site costs, and a contingency of $C1.24/tonne (representing 10% of operating costs).

Table 21-6 Total Operating Costs - Greenland

OPERATING COST DETAILS ($CAD)

HUDSON RESOURCES INC

Client: Hudson Resources Inc.
Project: White Mountain Project Pre-Feasibility Study

Prepared by:
Date:

Item	Description						Labour	Material	Power	Fuel	Sub-Contract	Total	$/tonne mined
100 Mine Site													400,000
110 Operations													
111 Mining & Crushing													
Cone Crusher	Consumables, Tires, Parts, Maintenan	1 ea @	.13 $/t;	400,000 t/y			$ -	$ 52,000	$ -	$ -	$ -	$ 52,000	$ 0.13
Excavator, Cat 349E	Consumables, Tires, Parts, Maintenan	1 ea @	.29 $/t;	400,000 t/y			$ -	$ 116,000	$ -	$ -	$ -	$ 116,000	$ 0.29
Drill, Sandvik DX780	Consumables, Tires, Parts, Maintenan	1 ea @	.05 $/t;	400,000 t/y			$ -	$ 20,000	$ -	$ -	$ -	$ 20,000	$ 0.05
Jaw Crusher	Consumables, Tires, Parts, Maintenan	1 ea @	.11 $/t;	400,000 t/y			$ -	$ 44,000	$ -	$ -	$ -	$ 44,000	$ 0.11
Heavy Equipment Operator	Labour, incl. OT & all burdens	1 ea @	9 m/a;	12,569 $/m			$ 113,121	$ -	$ -	$ -	$ -	$ 113,121	$ 0.28
Haul Truck Driver	Labour, incl. OT & all burdens	4 ea @	9 m/a;	11,907 $/m			$ 428,652	$ -	$ -	$ -	$ -	$ 428,652	$ 1.07
Production Drill Operator	Labour, incl. OT & all burdens	1 ea @	9 m/a;	12,569 $/m			$ 113,121	$ -	$ -	$ -	$ -	$ 113,121	$ 0.28
Crusher Operator	Labour, incl. OT & all burdens	1 ea @	9 m/a;	12,569 $/m			$ 113,121	$ -	$ -	$ -	$ -	$ 113,121	$ 0.28
Utility Driver	Labour, incl. OT & all burdens	1 ea @	9 m/a;	11,907 $/m			$ 107,163	$ -	$ -	$ -	$ -	$ 107,163	$ 0.27
Mine Technician/Surveyor	Labour, incl. OT & all burdens	1 ea @	9 m/a;	11,246 $/m			$ 101,214	$ -	$ -	$ -	$ -	$ 101,214	$ 0.25
Maintenance Technician	Labour, incl. OT & all burdens	3 ea @	9 m/a;	11,907 $/m			$ 321,489	$ -	$ -	$ -	$ -	$ 321,489	$ 0.80
Blasting		1 ea @	.33 $/t;	400,000 t/y			$ -	$ 132,800	$ -	$ -	$ -	$ 132,800	$ 0.33
Excavator, Cat 349E	Fuel	1 ea @	1.2 $/L;	3,240 h/a;	20. L/h;	40% UT	$ -	$ -	$ -	$ 31,104	$ -	$ 31,104	$ 0.08
Loader, Volvo L250G	Fuel	1 ea @	1.2 $/L;	3,240 h/a;	26.5 L/h;	70% UT	$ -	$ -	$ -	$ 72,122	$ -	$ 72,122	$ 0.18
Loader, Volvo L150G	Fuel	1 ea @	1.2 $/L;	3,240 h/a;	15.1 L/h;	70% UT	$ -	$ -	$ -	$ 41,096	$ -	$ 41,096	$ 0.10
Haul Truck,Volvo A35F	Fuel	4 ea @	1.2 $/L;	3,240 h/a;	30.3 L/h;	85% UT	$ -	$ -	$ -	$ 400,542	$ -	$ 400,542	$ 1.00
Drill, Sandvik DX780	Fuel	1 ea @	1.2 $/L;	3,240 h/a;	15. L/h;	50% UT	$ -	$ -	$ -	$ 29,160	$ -	$ 29,160	$ 0.07
Ancillary Equipment, lot	Fuel	1 ea @	1.2 $/L;	3,240 h/a;	60. L/h;	50% UT	$ -	$ -	$ -	$ 116,640	$ -	$ 116,640	$ 0.29
Jaw Crusher	Fuel	1 ea @	1.2 $/L;	3,240 h/a;	60. L/h;	60% UT	$ -	$ -	$ -	$ 139,968	$ -	$ 139,968	$ 0.35
Cone Crusher	Fuel	1 ea @	1.2 $/L;	3,240 h/a;	40. L/h;	75% UT	$ -	$ -	$ -	$ 116,640	$ -	$ 116,640	$ 0.29
Drill Steel & Bits		1 ea @	.17 $/t;	400,000 t/y			$ -	$ 67,400	$ -	$ -	$ -	$ 67,400	$ 0.17
Loader, Volvo L250G	Consumables, Tires, Parts, Maintenan	1 ea @	.13 $/t;	400,000 t/y			$ -	$ 52,000	$ -	$ -	$ -	$ 52,000	$ 0.13
Haul Truck,Volvo A35F	Consumables, Tires, Parts, Maintenan	4 ea @	.57 $/t;	400,000 t/y			$ -	$ 912,000	$ -	$ -	$ -	$ 912,000	$ 2.28
Ancillary Equipment, lot	Consumables, Tires, Parts, Maintenan	1 ea @	.61 $/t;	400,000 t/y			$ -	$ 244,000	$ -	$ -	$ -	$ 244,000	$ 0.61
Loader, Volvo L150G	Consumables, Tires, Parts, Maintenan	1 ea @	.11 $/t;	400,000 t/y			$ -	$ 44,000	$ -	$ -	$ -	$ 44,000	$ 0.11
111 Mining & Crushing Total							**$ 1,297,881**	**$ 1,684,200**	**$ -**	**$ 947,272**	**$ -**	**$ 3,929,353**	**$ 9.82**
113 Stockyard & Ship Loading													
Equipment Maintenance	Stormajor Stacker			25,000 $/a			$ -	$ 25,000	$ -	$ -	$ -	$ 25,000	$ 0.06
Equipment Maintenance	Shiploader			75,000 $/a			$ -	$ 75,000	$ -	$ -	$ -	$ 75,000	$ 0.19
Reclaim Loader	Fuel	1 ea @	1.2 $/L;	1,000 h/a;	15.1 L/h;	100% UT	$ -	$ -	$ -	$ 18,120	$ -	$ 18,120	$ 0.05
Stormajor Stacker	Fuel	1 ea @	1.2 $/L;	1,000 h/a;	15.1 L/h;	100% UT	$ -	$ -	$ -	$ 18,120	$ -	$ 18,120	$ 0.05
Reclaim Loader	Consumables, Tires, Parts, Maintenar	1 ea @	19.06 $/t;	1,000 t/y			$ -	$ 19,060	$ -	$ -	$ -	$ 19,060	$ 0.05
Equipment Maintenance	Reclaim Conveyor			80,000 $/a		5% UT	$ -	$ 4,000	$ -	$ -	$ -	$ 4,000	$ 0.01
113 Stockyard & Ship Loading Total							**$ -**	**$ 123,060**	**$ -**	**$ 36,240**	**$ -**	**$ 159,300**	**$ 0.40**
110 Operations Total							**$ 1,297,881**	**$ 1,807,260**	**$ -**	**$ 983,512**	**$ -**	**$ 4,088,653**	**$ 10.22**
120 Site General													
121 G&A													
Health & Safety	PPE	20	Staff	400 $/a			$ -	$ -	$ -	$ -	$ 8,000	$ 8,000	$ 0.02
Nurse	Labour, incl. OT & all burdens	1 ea @	9 m/a;	12,569 $/m			$ 113,121	$ -	$ -	$ -	$ -	$ 113,121	$ 0.28
Communications & Local Office				20,000 $/a			$ -	$ -	$ -	$ -	$ 20,000	$ 20,000	$ 0.05
Operations Manager	Labour, incl. OT & all burdens	1 ea @	12 m/a;	10,417 $/m			$ 125,004	$ -	$ -	$ -	$ -	$ 125,004	$ 0.31
Personnel Transport	to/from Greenland site	20 ea @	300 $/trip;	240 Trips			$ 72,000	$ -	$ -	$ -	$ -	$ 72,000	$ 0.18
121 G&A Total							**$ 310,125**	**$ -**	**$ -**	**$ -**	**$ 28,000**	**$ 338,125**	**$ 0.85**
122 Permanent Camp													
Camp Catering & Cleaning		20 ea @	270 days/a;	60 $/man/day;			$ -	$ -	$ -	$ -	$ 324,000	$ 324,000	$ 0.81
122 Permanent Camp Total							**$ -**	**$ -**	**$ -**	**$ -**	**$ 324,000**	**$ 324,000**	**$ 0.81**
124 Power Plant													
Equipment Maintenance	Power Plant	9 m/a;	10.00 $/h;				$ -	$ 64,800	$ -	$ -	$ -	$ 74,968	$ 0.19
Fuel	Non-Process Loads	9 m/a;	75 kW/h;	.268 L/kWh	1.2 $/L;		$ -	$ -	$ -	$ 156,298	$ -	$ 152,032	$ 0.38
124 Power Plant Total							**$ -**	**$ 64,800**	**$ -**	**$ 156,298**	**$ -**	**$ 227,000**	**$ 0.57**
120 Site General Total							**$ 310,125**	**$ 64,800**	**$ -**	**$ 156,298**	**$ 352,000**	**$ 889,125**	**$ 2.22**
100 Mine Site Total							**$ 1,608,006**	**$ 1,872,060**	**$ -**	**$ 1,139,810**	**$ 352,000**	**$ 4,977,778**	**$ 12.44**
400 Provisions													
410 Contingency													
410 Contingency													
Contingency	10% of Operating Costs						$ 160,801	$ 187,206	$ -	$ 113,981	$ 35,200	$ 497,778	$ 1.24
410 Contingency Total							**$ 160,800.60**	**$ 187,206.00**	**$ -**	**$ 113,980.99**	**$ 35,200.00**	**$ 497,777.83**	**$ 1.24**
400 Provisions Total							**$ 160,801**	**$ 187,206**	**$ -**	**$ 113,981**	**$ 35,200**	**$ 497,778**	**$ 1.24**
Grand Total							**$ 1,768,807**	**$ 2,059,266**	**$ -**	**$ 1,253,791**	**$ 387,200**	**$ 5,475,556**	**$ 13.69**

21.7 Shipping costs

Shipping costs are based on use of HandySize and/or Panamax vessels with a typical load of 30,000 – 50,000 tonnes of material, delivered to North America. Based on annual receipts of 400,000 tonnes of material from Greenland, 8 to 12 vessel trips will be required. It is anticipated the first shipment each season will be made at the end of March or early April, with the last shipment being made at the end of November.

Quotations received from ship brokers indicate rates of $US25/tonne are reasonable for shipments of this type of material.

21.8 Process operating costs – North America

The process plant in North America is designed to receive the material from Greenland and finish grind the material to -100 +200 mesh particle size prior to entering the leach circuit. The process plant will operate 24 x 7 on a four shift basis with a steady flow of material.

Table 21-7 Operating costs - North America – Costs in US$

Consumption & Production (8400 h/a)		
Dry anorthosite rock (2% moisture)		400 kt/a
Hydrochloric acid (35% HCl)		34 kt/a
Calcium chloride (54% $CaCl_2$)		0 kt/a
Fresh water		104 kt/a
Natural gas (52 MJ/kg)		60 kt/a
Electricity (3495 kW)		42 TJ/a
Alumina product (100% Al_2O_3)		110 kt/a
Amorphous silica (86% SiO_2)		89 kt/a
Calcium silicate (52% $CaSiO_3$)		209 kt/a
Overall Al2O3 recovery to alumina		91.6%
Al2O3 in the dry anorthosite rock		30.0%

Variable costs, $ million/a		
Mining and freight ($55/t)		22.0
Comminution ($2/t)		0.8
35% Hydrochloric acid ($150/t)		5.1
Natural gas (4$/GJ)		12.5
Water ($1.00/t)		0.1
Electricity ($0.06/kWh)		1.8
Total variable cost		42.3

Fixed costs, $ million/a			
Item	Number	Unit cost/a	
8 operators x 4 shifts=	32	$ 75,000	2.4
2.5 operators x 4 shifts=	10	$ 125,000	1.3
Misc. supplies as % variable	2%	$ 42.3	0.8
Maintenance as % equip	4%	$ 82,200,000	3.3
Total fixed cost			7.8

Table 21.7 details the annual costs to process 400,000 tonnes of calcium feldspar to produce 110,000 tonnes of alumina, 89,000 tonnes of amorphous silica and 209,000 tonnes of calcium silicate. Mining and anorthosite freight assumes a transfer price of $US30/tonne for the material plus $US25/ tonne for shipping.

Consumables costs include natural gas, hydrochloric acid, water, and electricity costs, repair and maintenance parts costs and operating costs for moving material. The major cost is natural gas, representing over half of the variable cost.

Repair and maintenance consumable costs are budgeted at 4% of initial direct capital costs. Another 2% of annual operating costs have been added for other supplies.

Based on producing at the outline capacity of 400,000 tonnes per annum, operating costs are equal to $US 133/tonne of anorthosite processed equivalent to $US483/tonne of alumina product. These costs include an annual fixed corporate overhead of $US1.5 million per year and a 10% contingency on operating costs.

22 Economic Analysis

An after-tax cash flow projection has been generated for the initial 20 years of mine operation based on the mine and process plant production plan and capital and operating detailed in this report. The cash flow projection is summarized in Table 22-1. Due to different tax jurisdictions and the impact of royalties in Greenland the cash flow summary was broken into two. The transfer price of $30/tonne was used since it resulted in an after tax internal rate of return in Greenland of 26% and a slightly lower IRR of 23% in North America.

The PEA is preliminary in nature and there is no certainty that the preliminary assessment and economics will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

Table 22-1 Capital and operating costs

REVENUE	**US$/t Mined Anorthosite**
Alumina	$233.69
Amorphous Silica	$15.89
Calcium Silicate	$37.26
	$286.84
OPERATING COSTS	
Mining	$9.86
Processing[1.]	$62.50
Shipping	$25.00
G&A	$4.62
Contingency	$13.20
Sustaining Capital	$9.53
TOTAL OPERATING COSTS	**$124.71**
CAPITAL COSTS	**US$ MILLIONS**
DIRECT	
Mining	$12.0
Processing	$87.3
	$99.3
INDIRECT	
Mining	$1.3
Processing	$33.7
	$35.0
Working Capital	$17.1
Contingency	$32.9
	$50.0
TOTAL CAPITAL COST	**$184.3**

Other notable inputs include:	
Specialty Grade Alumina	$850/t
Amorphous Silica	$75/t
Calcium Silicate	$75/t
Hydrochloric acid (35% HCl)	$150/t
Natural gas	$4.0/GJ
Water	$1.0/t
Electricity	$0.06/kWh
Greenland Royalty	2.5%
Greenland Corp Tax Rate	31.8%
Nominal North America Tax Rate	20.0%

Note 1. The Net Processing Cost is $62.50/tonne. From a North American perspective, the processing cost will be $30/ tonne higher to account for the transfer price.

The financial model is based on a two year construction period followed by shipments of 200,000 tonnes in year three, 300,000 tonnes in year four and 400,00 tonnes of anorthosite each year thereafter. The revenue generated from the alumina, amorphous silica and calcium silicate is based on sales at $US850/tonne, $US75/tonne and $US75/tonne, respectively.

Table 22-2 Summary of cash flows for Greenland and North American operations

Hudson Resources White Mountain Project -- Cost Summary & Cash Flows

Project Economics - GREENLAND		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Total
Mine Production																							
Ore Tonnage	t (Metric)	-		200,000	300,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	7,300,000
Product Tonnage				200,000	300,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	7,300,000
Product Price																							
-1/4 inch material	US/t	-		30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
Cash Flow																							
Revenues																							
Net Revenue Product Sales	USm	-		6,000,000	9,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	219,000,000
Operating Expenses																							
Operating Costs - Greenland	USm			1,971,853	2,957,779	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	3,943,705	71,972,622
G&A - Corporate Overhead	USm			143,703	215,555	287,406	287,406	287,406	287,406	287,406	287,406	287,406	287,406	287,406	287,406	287,406	287,406	287,406	287,406	287,406	287,406	287,406	5,245,164
Contingency @ 10%	USm			211,556	317,333	423,111	423,111	423,111	423,111	423,111	423,111	423,111	423,111	423,111	423,111	423,111	423,111	423,111	423,111	423,111	423,111	423,111	7,721,779
Depreciation	USm	-		5,421,712	5,421,712	5,421,712	1,844,160	4,198,260	2,428,260	2,746,130	1,940,730	1,923,030	7,260,980	2,855,090	2,855,090	1,552,370	1,511,660	4,556,030	2,267,030	2,267,030	1,534,550	1,511,660	59,517,197
Total Out Flows - Operating	USm	-		7,748,824	8,912,379	10,075,935	6,498,383	8,852,483	7,082,483	7,400,353	6,594,953	6,577,253	11,915,203	7,509,313	7,509,313	6,206,593	6,165,883	9,210,253	6,921,253	6,921,253	6,188,773	6,165,883	144,456,762
Operating Cash Flows																							
Operating Profit Before Tax	USm	-		-1,748,824	87,621	1,924,065	5,501,617	3,147,517	4,917,517	4,599,647	5,405,047	5,422,747	84,797	4,490,687	4,490,687	5,793,407	5,834,117	2,789,747	5,078,747	5,078,747	5,811,227	5,834,117	74,543,238
Taxes	USm	-		150,000	225,000	300,000	1,749,514	1,563,770	1,563,770	1,538,690	1,718,805	1,724,434	1,321,544	1,428,039	1,428,039	1,842,303	1,855,249	1,615,042	1,615,042	1,615,042	1,847,970	1,855,249	26,957,501
Add Back Depreciation	USm	-		5,421,712	5,421,712	5,421,712	1,844,160	4,198,260	2,428,260	2,746,130	1,940,730	1,923,030	7,260,980	2,855,090	2,855,090	1,552,370	1,511,660	4,556,030	2,267,030	2,267,030	1,534,550	1,511,660	59,517,197
Cash Flow After Tax	USm	-		3,522,889	5,284,333	7,045,777	5,596,263	5,782,007	5,782,007	5,807,087	5,626,972	5,621,344	6,024,234	5,917,739	5,917,739	5,503,474	5,490,528	5,730,736	5,730,736	5,730,736	5,497,807	5,490,528	107,102,934
Investing Expenses																							
Capital Costs - Initial	USm	8,032,189	8,032,189	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16,064,378
Capital Costs - Increase in Capacity	USm			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sustaining Capital Costs	USm	-		-	-	-	-	1,504,500	-	203,150	-	-	3,460,350	-	-	-	-	1,945,650	-	-	-	-	7,113,650
Working Capital	USm			1,112,148	556,074																		
Total Investing Expenses	USm	8,032,189	8,032,189	1,112,148	556,074	-	-	1,504,500	-	203,150	-	-	3,460,350	-	-	-	-	1,945,650	-	-	-	-	23,178,028
Net Cash Flow after tax	**USm**	**-8,032,189**	**-8,032,189**	**2,410,741**	**4,728,259**	**7,045,777**	**5,596,263**	**4,277,507**	**5,782,007**	**5,603,937**	**5,626,972**	**5,621,344**	**2,563,884**	**5,917,739**	**5,917,739**	**5,503,474**	**5,490,528**	**3,785,086**	**5,730,736**	**5,730,736**	**5,497,807**	**5,490,528**	**82,256,684**
Cumulative Cash Flow after tax	**USm**	**-8,032,189**	**-16,064,378**	**-13,653,637**	**-8,925,378**	**-1,879,601**	**3,716,662**	**7,994,169**	**13,776,176**	**19,380,113**	**25,007,085**	**30,628,429**	**33,192,313**	**39,110,051**	**45,027,790**	**50,531,264**	**56,021,792**	**59,806,878**	**65,537,613**	**71,268,349**	**76,766,156**	**82,256,684**	
Net Cash Flow pre-tax	USm	-8,032,189	-8,032,189	2,560,741	4,953,259	7,345,777	7,345,777	5,841,277	7,345,777	7,142,627	7,345,777	7,345,777	3,885,427	7,345,777	7,345,777	7,345,777	7,345,777	5,400,127	7,345,777	7,345,777	7,345,777	7,345,777	109,214,185
Cumulative Cash Flow pre-tax	USm	-8,032,189	-16,064,378	-13,503,637	-8,550,378	-1,204,601	6,141,176	11,982,454	19,328,231	26,470,858	33,816,635	41,162,413	45,047,840	52,393,617	59,739,394	67,085,172	74,430,949	79,831,076	87,176,854	94,522,631	101,868,408	109,214,185	
Discounted Cash Flows																							
Afer Tax																							
Net Cash Flow @ 7.50%	USm	-8,032,189	-7,471,804	2,086,092	3,806,062	5,275,882	3,898,125	2,771,660	3,485,133	3,142,140	2,934,936	2,727,442	1,157,191	2,484,587	2,311,244	1,999,486	1,855,612	1,189,982	1,675,971	1,559,043	1,391,325	1,292,542	31,540,463
Net Cash Flow @ 10.00%	USm	-8,032,189	-7,301,990	1,992,348	3,552,411	4,812,361	3,474,839	2,414,541	2,967,084	2,614,278	2,386,386	2,167,271	898,626	1,885,574	1,714,158	1,449,237	1,314,389	823,745	1,133,795	1,030,723	898,935	816,132	23,012,653
Net Cash Flow @ 12.50%	USm	-8,032,189	-7,139,723	1,904,783	3,320,807	4,398,644	3,105,528	2,109,967	2,535,192	2,184,103	1,949,405	1,731,071	701,812	1,439,877	1,279,891	1,058,039	938,267	574,957	773,780	687,804	586,532	520,671	16,629,218
Cumulative Cash Flow @ 7.50%	USm	-8,032,189	-15,503,992	-13,417,900	-9,611,838	-4,335,956	-437,831	2,333,829	5,818,962	8,961,102	11,896,038	14,623,480	15,780,671	18,265,258	20,576,502	22,575,988	24,431,600	25,621,582	27,297,552	28,856,595	30,247,920	31,540,463	
Cumulative Cash Flow @ 10.00%	USm	-8,032,189	-15,334,179	-13,341,831	-9,789,420	-4,977,060	-1,502,221	912,321	3,879,404	6,493,682	8,880,068	11,047,339	11,945,965	13,831,539	15,545,697	16,994,934	18,309,322	19,133,067	20,266,863	21,297,586	22,196,521	23,012,653	
Cumulative Cash Flow @ 12.50%	USm	-8,032,189	-15,171,912	-13,267,130	-9,946,322	-5,547,678	-2,442,150	-332,183	2,203,009	4,387,112	6,336,517	8,067,588	8,769,400	10,209,277	11,489,168	12,547,207	13,485,474	14,060,431	14,834,211	15,522,015	16,108,547	16,629,218	
Pre-Tax																							
Net Cash Flow @ 7.50%	USm	-8,032,189	-7,471,804	2,215,892	3,987,178	5,500,522	5,116,765	3,784,923	4,427,703	4,004,887	3,831,436	3,564,127	1,753,661	3,084,155	2,868,981	2,668,820	2,482,623	1,697,730	2,148,295	1,998,414	1,858,989	1,729,293	43,220,401
Net Cash Flow @ 10.00%	USm	-8,032,189	-7,301,990	2,116,314	3,721,457	5,017,265	4,561,150	3,297,249	3,769,545	3,332,088	3,115,327	2,832,115	1,361,819	2,340,591	2,127,810	1,934,373	1,758,521	1,175,225	1,453,323	1,321,203	1,201,093	1,091,903	32,194,191
Net Cash Flow @ 12.50%	USm	-8,032,189	-7,139,723	2,023,301	3,478,832	4,585,933	4,076,385	2,881,328	3,220,847	2,783,799	2,544,867	2,262,104	1,063,558	1,787,341	1,588,748	1,412,220	1,255,307	820,283	991,847	881,642	783,682	696,606	23,966,717
Cumulative Cash Flow @ 7.50%	USm	-8,032,189	-15,503,992	-13,288,100	-9,300,922	-3,800,400	1,316,364	5,101,287	9,528,991	13,533,878	17,365,314	20,929,440	22,683,101	25,767,256	28,636,238	31,305,057	33,787,681	35,485,410	37,633,705	39,632,119	41,491,108	43,220,401	
Cumulative Cash Flow @ 10.00%	USm	-8,032,189	-15,334,179	-13,217,864	-9,496,407	-4,479,143	82,007	3,379,256	7,148,801	10,480,889	13,596,216	16,428,331	17,790,150	20,130,741	22,258,551	24,192,923	25,951,444	27,126,669	28,579,992	29,901,195	31,102,288	32,194,191	
Cumulative Cash Flow @ 12.50%	USm	-8,032,189	-15,171,912	-13,148,611	-9,669,779	-5,083,846	-1,007,462	1,873,866	5,094,713	7,878,512	10,423,378	12,685,482	13,749,040	15,536,381	17,125,129	18,537,349	19,792,656	20,612,939	21,604,786	22,486,429	23,270,110	23,966,717	

Project Economics - NORTH AMERICA			Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Total
Cash Flow					50%	75%	100%																	
Revenues																								
Net Revenue Product Sales	USm		-	-	57,367,738	86,051,606	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	114,735,475	2,093,922,420
Operating Expenses																								
Operating Costs - Variable	USm				21,159,125	31,738,687	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	42,318,250	772,308,059
Operating Costs - Fixed	USm				4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	4,496,365	85,430,935
G&A - Corporate Overhead	USm	1.5			1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	28,500,000
Contingency	USm	10%			2,715,549	3,773,505	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	4,831,461	88,623,899
Depreciation	USm		-		50,421,583	51,517,583	52,613,583	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	207,160,750
Total Out Flows - Operating	USm		-		80,292,622	93,026,141	105,759,660	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	56,434,076	1,182,023,643
Operating Cash Flows																								
Operating Profit Before Tax	USm		-		-22,924,885	-6,974,535	8,975,815	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	911,898,776
Taxes	USm	20%	-		-	-	1,795,163	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	11,660,280	188,359,639
Add Back Depreciation	USm		-		50,421,583	51,517,583	52,613,583	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	207,160,750
Cash Flow After Tax	USm		-		27,496,699	44,543,049	59,794,236	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	49,929,119	930,699,887
Investing Expenses																								
Capital Costs - Initial	USm		75,632,375	75,632,375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	151,264,750
Sustaining Capital Costs	USm		-		3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	62,472,000
Working Capital	USm				10,066,019	5,407,707																		
Total Investing Expenses	USm		75,632,375	75,632,375	13,354,019	8,695,707	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	3,288,000	213,736,750
Net Cash Flow after tax	**USm**		**-75,632,375**	**-75,632,375**	**14,142,679**	**35,847,342**	**56,506,236**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**46,641,119**	**701,489,411**
Cumulative Cash Flow after tax	**USm**		**-75,632,375**	**-151,264,750**	**-137,122,071**	**-101,274,729**	**-44,768,493**	**1,872,626**	**48,513,745**	**95,154,864**	**141,795,983**	**188,437,102**	**235,078,221**	**281,719,340**	**328,360,459**	**375,001,578**	**421,642,697**	**468,283,816**	**514,924,935**	**561,566,054**	**608,207,173**	**654,848,292**	**701,489,411**	
Net Cash Flow pre-tax	USm		-75,632,375	-75,632,375	14,142,679	35,847,342	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	58,301,399	889,849,050
Cumulative Cash Flow pre-tax	USm		-75,632,375	-151,264,750	-137,122,071	-101,274,729	-42,973,330	15,328,069	73,629,467	131,930,866	190,232,265	248,533,664	306,835,063	365,136,461	423,437,860	481,739,259	540,040,658	598,342,056	656,643,455	714,944,854	773,246,253	831,547,651	889,849,050	
Discounted Cash Flows																								
Afer Tax																								
Net Cash Flow @ 7.50%	USm		-75,632,375	-70,355,698	12,238,122	28,855,697	42,311,899	32,488,274	30,221,650	28,113,163	26,151,780	24,327,237	22,629,988	21,051,151	19,582,466	18,216,248	16,945,347	15,763,113	14,663,361	13,640,336	12,688,685	11,803,428	10,979,933	256,683,804
Net Cash Flow @ 10.00%	USm		-75,632,375	-68,756,705	11,688,165	26,932,639	38,594,519	28,960,465	26,327,696	23,934,269	21,758,426	19,780,387	17,982,170	16,347,428	14,861,298	13,510,271	12,282,064	11,165,513	10,150,466	9,227,697	8,388,815	7,626,196	6,932,905	182,062,310
Net Cash Flow @ 12.50%	USm		-75,632,375	-67,228,778	11,174,463	25,176,734	35,276,565	25,882,508	23,006,673	20,450,376	18,178,112	16,158,322	14,362,953	12,767,069	11,348,506	10,087,561	8,966,721	7,970,418	7,084,816	6,297,615	5,597,880	4,975,893	4,423,016	126,325,048
Cumulative Cash Flow @ 7.50%	USm		-75,632,375	-70,355,698	12,238,122	28,855,697	42,311,899	32,488,274	30,221,650	28,113,163	26,151,780	24,327,237	22,629,988	21,051,151	19,582,466	18,216,248	16,945,347	15,763,113	14,663,361	13,640,336	12,688,685	11,803,428	10,979,933	
Cumulative Cash Flow @ 10.00%	USm		-75,632,375	-68,756,705	11,688,165	26,932,639	38,594,519	28,960,465	26,327,696	23,934,269	21,758,426	19,780,387	17,982,170	16,347,428	14,861,298	13,510,271	12,282,064	11,165,513	10,150,466	9,227,697	8,388,815	7,626,196	6,932,905	
Cumulative Cash Flow @ 12.50%	USm		-75,632,375	-67,228,778	11,174,463	25,176,734	35,276,565	25,882,508	23,006,673	20,450,376	18,178,112	16,158,322	14,362,953	12,767,069	11,348,506	10,087,561	8,966,721	7,970,418	7,084,816	6,297,615	5,597,880	4,975,893	4,423,016	
Pre-Tax																								
Net Cash Flow @ 7.50%	USm		-8,032,189	-8,032,189	2,560,741	4,953,259	7,345,777	7,345,777	5,841,277	7,345,777	7,142,627	7,345,777	7,345,777	3,885,427	7,345,777	7,345,777	7,345,777	7,345,777	5,400,127	7,345,777	7,345,777	7,345,777	7,345,777	109,214,185
Net Cash Flow @ 10.00%	USm		-8,032,189	-8,032,189	2,560,741	4,953,259	7,345,777	7,345,777	5,841,277	7,345,777	7,142,627	7,345,777	7,345,777	3,885,427	7,345,777	7,345,777	7,345,777	7,345,777	5,400,127	7,345,777	7,345,777	7,345,777	7,345,777	109,214,185
Net Cash Flow @ 12.50%	USm		-8,032,189	-8,032,189	2,560,741	4,953,259	7,345,777	7,345,777	5,841,277	7,345,777	7,142,627	7,345,777	7,345,777	3,885,427	7,345,777	7,345,777	7,345,777	7,345,777	5,400,127	7,345,777	7,345,777	7,345,777	7,345,777	109,214,185
Cumulative Cash Flow @ 7.50%	USm		-8,032,189	-16,064,378	-13,503,637	-8,550,378	-1,204,601	6,141,176	11,982,454	19,328,231	26,470,858	33,816,635	41,162,413	45,047,840	52,393,617	59,739,394	67,085,172	74,430,949	79,831,076	87,176,854	94,522,631	101,868,408	109,214,185	
Cumulative Cash Flow @ 10.00%	USm		-8,032,189	-16,064,378	-13,503,637	-8,550,378	-1,204,601	6,141,176	11,982,454	19,328,231	26,470,858	33,816,635	41,162,413	45,047,840	52,393,617	59,739,394	67,085,172	74,430,949	79,831,076	87,176,854	94,522,631	101,868,408	109,214,185	
Cumulative Cash Flow @ 12.50%	USm		-8,032,189	-16,064,378	-13,503,637	-8,550,378	-1,204,601	6,141,176	11,982,454	19,328,231	26,470,858	33,816,635	41,162,413	45,047,840	52,393,617	59,739,394	67,085,172	74,430,949	79,831,076	87,176,854	94,522,631	101,868,408	109,214,185	

CASH FLOW ANALYSIS

The project has an after-tax undiscounted net cash flow of $ 783.7 million. Simple payback occurs in 3.9 years. The combined operation IRR is 23.5% and the net present value at a 10% discount rate is $ 205 million. Table 22.3 below presents the results of the cash flow analysis.

The cash flow was analysed for the Greenland operation and the North American operation independently. The optimized scenario was to transfer the anorthosite from Greenland at a sale price of $US30/tonne. The North American plant purchased the feedstock for $US30, plus the $US25 in shipping costs.

Table 22-3 Cash flow results

Project Economics - GREENLAND			
Valuation Date (end of period)			
			Post-tax
Cash Flow		$US	$82,256,684
NPV @ 7.5%		$US	$31,540,463
NPV @ 10%		$US	$23,012,653
NPV @ 12.5%		$US	$16,629,218
IRR	%		26.1%
Terminal Value		10%	Post-tax
NPV @ 7.5%		$US	$12,153,970
NPV @ 10%		$US	$7,674,211
NPV @ 12.5%		$US	$4,895,950
Total NPV (Including Terminal Value)			Post-tax
NPV @ 7.5%		$US	$43,694,433
NPV @ 10%		$US	$30,686,864
NPV @ 12.5%		$US	$21,525,169

Project Economics - ALUMINA			
Valuation Date (end of period)			
			Post-tax
Cash Flow		$US	$701,489,411
NPV @ 7.5%		$US	$256,683,804
NPV @ 10%		$US	$182,062,310
NPV @ 12.5%		$US	$126,325,048
IRR	%		23.2%
Terminal Value		10%	Post-tax
NPV @ 7.5%		$US	$109,799,327
NPV @ 10%		$US	$69,329,051
NPV @ 12.5%		$US	$44,230,160
Total NPV (Including Terminal Value)			Post-tax
NPV @ 7.5%		$US	$366,483,131
NPV @ 10%		$US	$251,391,362
NPV @ 12.5%		$US	$170,555,208

Project Economics - COMBINED TOTAL AFTER TAX			
Valuation Date (end of period)			
			Post-tax
Cash Flow		$US	$783,746,095
NPV @ 7.5%		$US	$288,224,267
NPV @ 10%		$US	$205,074,963
NPV @ 12.5%		$US	$142,954,267
IRR	%		23.5%
Terminal Value		10%	Post-tax
NPV @ 7.5%		$US	$121,953,297
NPV @ 10%		$US	$77,003,263
NPV @ 12.5%		$US	$49,126,110
Total NPV (Including Terminal Value)			Post-tax
NPV @ 7.5%		$US	$410,177,564
NPV @ 10%		$US	$282,078,226
NPV @ 12.5%		$US	$192,080,377

SENSITIVITY ANALYSIS

For the purposes of the Study, the authors have chosen to use a base price of $850/t for specialty grade alumina. With time, a range of higher added value products could be developed in order to achieve an average price of $1,000/t to $1,100/t.

Table 22-4 Sensitivity in Net Present Value due to Changing Alumina Prices

Specialty Alumina Price	Change in Alumina Price	Mining Operation Greenland	Process Plant N.A.	Total Operation Net Present Value	Change in Net Present Value	
$700	-18%	$23M	$88M	$111M	-46%	
$850	**0%**	**$23M**	**$182M**	**$205M**	**0%**	**BASE CASE**
$1,000	18%	$23M	$274M	$297M	45%	

Other than the sales price of the alumina, the model is most sensitive to the price of natural gas. Natural gas is needed to calcine the aluminum chloride hexahydrate (ACH) to the alpha phase and in the HCl acid recovery step. Hudson believes that low natural gas prices in North America are a significant reason why the anorthosite project can be competitive with the Bayer process to produce alumina.

Table 22-5 Sensitivity in Net Present Value due to Changing Natural Gas Prices

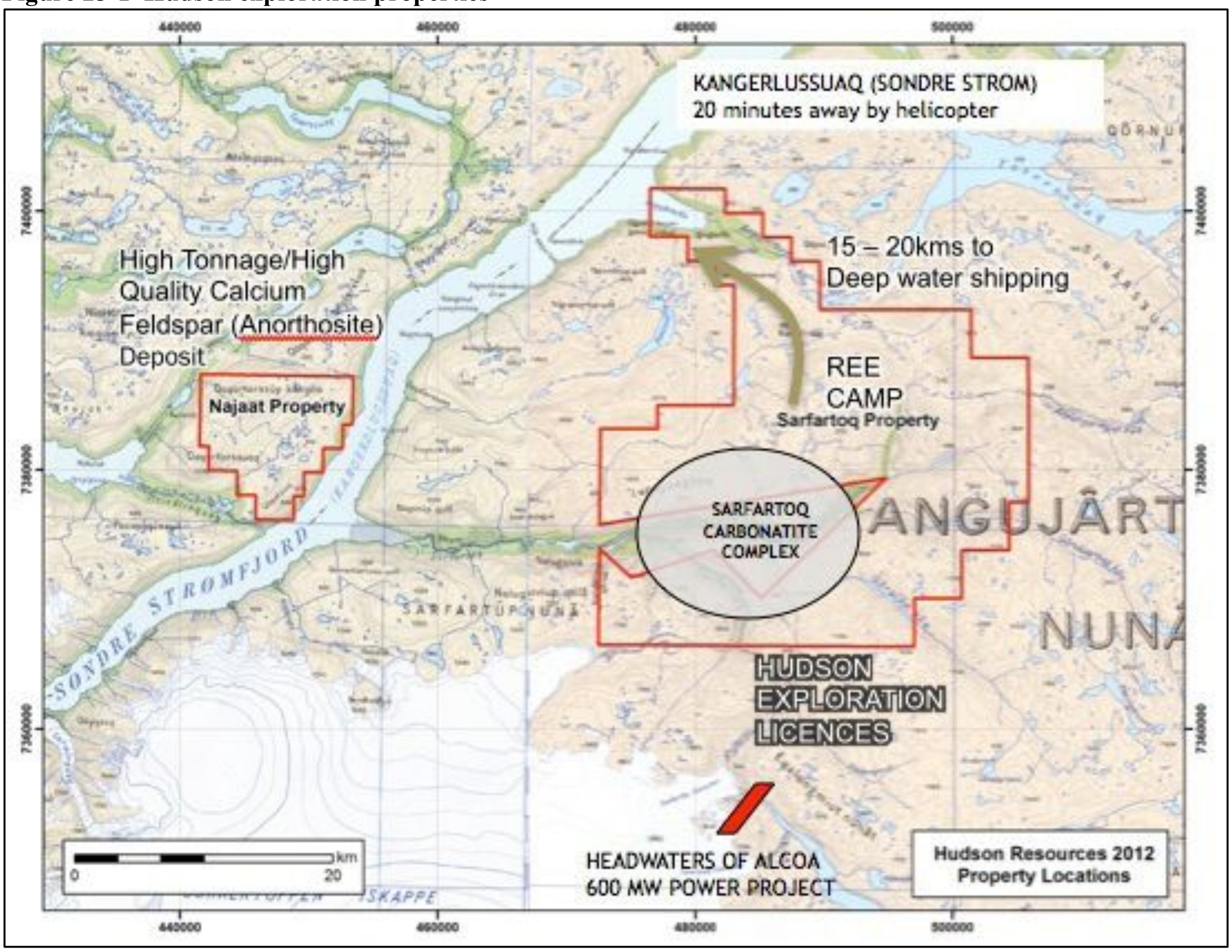
Natural Gas Price	Change in Natural Gas Price	Change in Net Present Value	Mining Operation Greenland	Process Plant N.A.	Total Operation Net Present Value	
$3.00	-25%	10%	$23M	$202M	$225M	
$4.00	**0%**	**0%**	**$23M**	**$182M**	**$205M**	**BASE CASE**
$5.00	25%	-10%	$23M	$162M	$185M	

Natural Gas Price	Indicative World Natural Gas Price Indices	Mining Operation Greenland	Process Plant N.A.	Total Operation Net Present Value
$2.68	Henry Hub (NA) - Feb 27/15	$23M	$209M	$232M
$8.27	EU NG Import Price - Feb 28/15	$23M	$96M	$119M
$13.37	Japan LNG - Feb 28/15	$23M	($9M)	$14M

23 Adjacent Properties

There is an adjacent exploration property of approximately 35 km^2 on the extreme southwest side of Hudson's Naajat property. This property is being explored for gold and base metals. Hudson's Sarfartoq rare earth exploration property is located southeast of the Naajat licence across the Sondre Stromfjord (Figure 23-1).

Figure 23-1 Hudson exploration properties



24 Other Relevant Data and Information

No additional information or explanation is necessary to make this Technical Report understandable and not misleading.

25 Interpretation and Conclusions

Hudson's White Mountain anorthosite project is located in western Greenland with ready access to sea transport. The project proximity to the international airport at Kangerlussuaq and to nearby settlements such as Sisimiut is highly favourable in terms of providing good communications and access to local labour.

The anorthosite deposit is of very high quality. Indicated Resources are estimated at 27.4 million tonnes grading 30.0% Al_2O_3, 49.2% SiO_2, 14.95% CaO, 2.35% Na_2O, 1.26% Fe_2O_3 and 0.29% K_2O. A cut-off value of 2.50% Na_2O has been used to define resources. Based on this, and assuming annual Run-of-Mine anorthosite production of 400,000 tonnes, currently estimated resources are sufficient for 68 years of mine life. The pit was based on a more modest size of 10.5 million tonnes, equivalent to a 26 year mine life.

It is noted that exploration has been limited and that the deposit extends a considerable distance from the currently explored area. The exploration potential for the project is excellent.

The anorthosite is amenable to a simple, low cost dry process in preparation for shipping. Hydrometallurgical processing tests performed to date show that marketable products can be produced. Additional testing, including pilot plant operations, are required.

A project design concept based on mining, crushing in Greenland, with final product processing in North America has been developed. The Greenland operation would operate for approximately 9 months per year, with the processing plant operating 12 months per year.

The PEA is preliminary in nature and there is no certainty that the preliminary assessment and economics will be realized. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

26 Recommendations

The White Mountain project has attractive economic attributes and it is recommended that the project proceed to the prefeasibility study stage.

It is recommended that the Company:

1. Complete all required environmental and social impact/benefit studies in order to update the existing exploitation licence to include an alumina operation.

5. Evaluate North American port and process plant operations. Determine final site selection and establish all required permit approval requirements.

6. Undertake a semi-continuous to continuous pilot trial in order to better evaluate operating parameters and costs.

Budget

The budget to undertake the pilot plant is in the order of $3M to $5M.

27 References

Druecker, M and Simpson, R. (2013): Technical Report on the White Mountain Project, west Greenland; prepared for Hudson Resources Inc. effective date January 20, 2013: March, 2013

Le Clouter, P.C. (2012): Petrographic Report on an Anorthosite, western Greenland; report prepared for Hudson Resources Inc., March, 2012

Dolan, M.L., Hains, D.H. and Ash, D.R. (1991); High Alumina Rocks in Ontario: Resources and Process Technology, Ontario Ministry of Northern Development and Mines, Industrial Minerals Background Paper No. 10, 130 p.

Hains, D.H. (1995): Purechem Limited Pre-Feasibility Study, Warren Township Anorthosite Project; report prepared for Purechem Limited; Hains Technology Associates, Toronto

Hains, D.H., London, I., and Merivale, C. (2010): Batch Solutions to Reduce Energy Demand and Carbon Footprint in Glassmaking; paper presented at 1st International Conference on Lithium Minerals and Markets, Santiago, Chile, January, 2010; Industrial Minerals, London, U.K.

Knudsen, C., Wanvik J. & Svahnberg H. (2012) Anorthosites in Greenland: a possible raw material for aluminium? GEUS, Geological Survey of Denmark and Greenland Bulletin 26, p. 53-56.

Mott, L. (2006): Kaolins for glass fib re applications; paper presented at 18th Industrial Minerals International Congress, San Francisco, March, 2006

Shepperdsen, P and Leese, S. (2012) Anorthosite, An Alternative to Kaolin for E-Glass Production; paper presented at Alternative Raw Materials and Advanced Batch Pretreatment for Glass Melting, Eindhoven, Netherlands, October, 2012

Veldhuyzen, H. (1994): Purechem Limited Warren Township Project, Anorthosite Mapping and sampling, Claims P1197441 and P1197442; prepared for Purechem Limited; HV Geological Services, Toronto, 58 p plus appendices

Wanvik, J.E. (2000): Norwegian anorthosites and their industrial uses, with emphasis on the massifs of the Inner Sogn-Voss area in western Norway. Norges geologiske undersokelse Bulletin 436, p. 103-112.

Wingert, J. (1999):Advantex, An Environmentally Friendly Glass; paper presented at 11th Annual Canadian Conference for Industrial Minerals, Montreal, October, 1999; Blendon Information Services, Victoria, B.C.