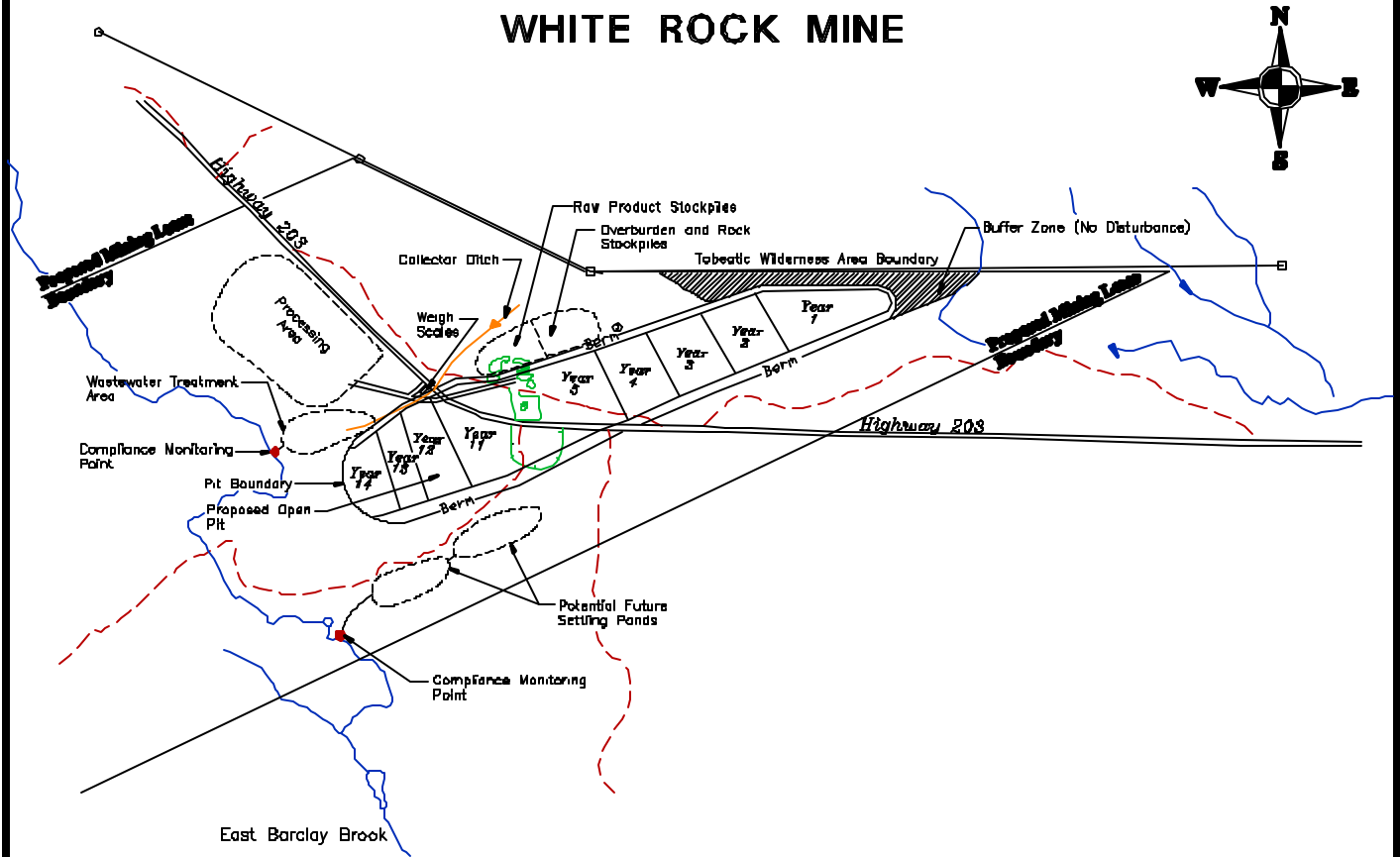
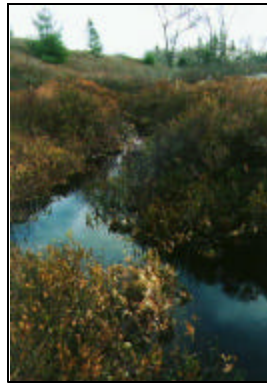


ENVIRONMENTAL REGISTRATION DOCUMENT

WHITE ROCK MINE



Black Bull Resources Inc.



OCTOBER 2001



CONSULTANTS IN ENVIRONMENTAL & EARTH SCIENCES

**ENVIRONMENTAL REGISTRATION
DOCUMENT
FOR THE PROPOSED
WHITE ROCK QUARTZ/KAOLIN
AND MICA MINE**

Prepared for:

**The Nova Scotia Department
of the Environment**

By:

**MGI Limited on behalf
of Black Bull Resources Inc.**

October 2001

BLACK BULL RESOURCES INC.

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October 26, 2001

Nova Scotia Department of the Environment
P.O. Box 2107
Halifax, Nova Scotia
B3J 3B7

Attention: Mr. Chris Daly
Environmental Assessment Coordinator

**Re: Environmental Registration Document, White Rock Quartz/Kaolin and Mica Mine,
Black Bull Resources Inc.**

Dear Mr. Daly:

In accordance with Part IV of the Environment Act, Black Bull Resources Inc. (Black Bull) is registering the White Rock Quartz/Kaolin and Mica Mine to be considered for Environmental Assessment Approval on October 26, 2001. Through the course of the project history from the first One Window Committee meeting in 2000 to present, Black Bull and its consultants have maintained an open and fully consultative approach with regulatory bodies, local residents and communities including First Nations Peoples. We believe that the project as described is technically sound and incorporates principles of community involvement, progressive reclamation and environmental protection that are favorable for an Environmental Assessment Approval to be granted subject to certain conditions.

Sincerely,
Black Bull Resources Inc.



John Keating,
President

PREFACE

This registration document is submitted by Black Bull Resources Inc. (Black Bull), a publicly traded Canadian company in support of a provincial environmental assessment registration for a proposed surface quartz, kaolin and mica mine and associated processing facilities. The document has been prepared utilizing the advice and expertise of a number of different agencies and persons including:

Technical Consultants

MGI Limited (MGI) - Management of Permitting Process, Hydrogeology, Environmental Monitoring
William, Alexander and Associates Limited (WAA) - Public and First Nations Consultation Confederacy
of Mainland Miꞌkmaq (CMM) – First Nations Knowledge Study
DalTech Minerals Engineering Centre (Daltech) – Mineral Evaluation and Processing Lab Services
Dillon Consulting Ltd. (Dillon) - Terrestrial and Aquatic Habitat Evaluations
ATCON Group (Atcon)- Mine Layout and Reclamation Planning, Geotechnical Engineering,
W.G. Shaw and Associates (W.G. Shaw) - Initial Surface Water Monitoring and Digital Mapping
Ruth Newell - Terrestrial Habitat Survey - Plant Communities
Heather Stewart – Terrestrial Habitat Survey – Plant Communities
Fulton Lavender- Avian Communities
Cultural Resource Management Group (CRM) - Archaeological and Heritage Resource Surveys
Dr. Haydn Murray - Kaolin Specialist Consultant
Dr. Ian Wilson - Kaolin Specialist Consultant
George C. Hawley – Mica Specialist Consultant

Technical and Stakeholder Organizations

Clyde River Protection Association (CRPA)
Southwest Nova Biosphere Association
Tobeatic Wilderness Committee (TWC)
Tusket River Environmental Protection Agency (TREPA)
Mr. Chris Miller – Terrestrial Ecology Specialist
Ms. Leah Hagreen - Terrestrial Ecology Specialist

First Nations

Confederacy of Mainland Miꞌkmaq (CMM) – Don Julian
Bear River Band Council - Chief Muise
Acadia Band Council - Chief Robinson
First Nations Forestry Association in Nova Scotia

Government Departments and Community Agencies

Federal Level

Department of Fisheries and Oceans (DFO)

Canadian Environmental Assessment Agency (CEAA)
Environment Canada (EC)
Natural Resources Canada (NRCan)

Provincial Level

Nova Scotia Department of Natural Resources (NSDNR)
Nova Scotia Department of Environment and Labour (NSDEL)
Nova Scotia Department of Transportation and Public Works (NSDTPW)

Municipal Level

Municipality of the County of Shelburne
Municipality of the County of Yarmouth
Town of Shelburne
Town of Yarmouth
Municipality of the District of Argyle

Local Communities

Valuable input was also received from the local communities via the following means:

Initial Community Meeting - August 2000 in Middle Ohio
Community Newsletters – Jul, 2000; December 2000; May 2001
Project Overview Presentations to Shelburne and Argyle Municipal Councils – February 2001
Public Information Sessions - May 2001 - Yarmouth, Shelburne, Middle Ohio, Argyle, Barrington

Contact with persons from the following Nova Scotia communities has been recorded via the informal and formal public consultation undertaken by Black Bull and its consultants:

| | | |
|---------------------------------|-----------------|--------------------|
| Shelburne | Halifax | Tusket |
| Woods Harbour | Sandy Cove | Deerfield |
| Port La Tour | Roseway | Argyle |
| Liverpool | Digby Neck | Carleton |
| Yarmouth | Bear River | Barrington |
| Port Clyde | Welshtown | Northeast Point |
| Upper, Middle and Lower Ohio | Pubnico | East Baccaro |
| Lockeport | Reynardtown | Clarks Harbour |
| Grand Etang | East Kemptville | Barrington Passage |
| Dartmouth | Surettes Island | Acadia |
| | Truro | |

Black Bull and their consultants wish to acknowledge the contribution and input of all of the above and extend thanks.

STATEMENT OF PRINCIPLE

Black Bull looks forward to working in a co-operative way with all members of the local community and in developing a continuously improving spirit of cooperation with the peoples of Southwest Nova Scotia. Black Bull will implement a “local hire-local purchase” policy with respect to services, labour and supplies.

**VOLUME I
TABLE OF CONTENTS**

Page No.

| | |
|--|------|
| PREFACE | |
| STATEMENT OF PRINCIPLE | |
| TABLE OF CONTENTS | |
| EXECUTIVE SUMMARY | i |
| | |
| 1.0 INTRODUCTION AND REGISTRATION | 1-1 |
| 1.1 Introduction | 1-1 |
| 1.2 Registration..... | 1-3 |
| | |
| 2.0 PROJECT AND SITE HISTORY | 2-1 |
| 2.1 Site Use History..... | 2-1 |
| 2.2 Site Ownership | 2-1 |
| 2.3 Mineral Exploration Program History and Environmental Baseline Information Collection | 2-1 |
| | |
| 3.0 PROJECT DESCRIPTION..... | 3-1 |
| 3.1 Corporate Policies | 3-1 |
| 3.2 Site Location and Local Geography..... | 3-1 |
| 3.3 Mining, Processing and Product Movement Overview..... | 3-1 |
| 3.4 Waste Management | 3-8 |
| 3.5 Site Reclamation and Future Land Use | 3-9 |
| 3.6 Employment and Socio-economic Benefits..... | 3-9 |
| 3.7 Project Schedule | 3-10 |
| | |
| 4.0 PROJECT ENVIRONMENTAL SETTING | 4-1 |
| 4.1 Introduction | 4-1 |
| 4.2 Regional and Local Physiography | 4-1 |
| 4.3 Geology..... | 4-1 |
| 4.3.1 Regional Geology..... | 4-1 |
| 4.3.2 Local Geology | 4-2 |
| 4.3.3 Environmental Geology..... | 4-4 |
| 4.4 Atmospheric Conditions | 4-6 |
| 4.5 Watercourses and Surface Water Quality | 4-9 |
| 4.6 Regional and Local Hydrogeology | 4-11 |
| 4.7 Aquatic Habitats | 4-11 |
| 4.7.1 Fisheries Habitat Study..... | 4-11 |
| 4.7.2 Wetland Habitats | 4-12 |
| 4.8 Terrestrial Habitats..... | 4-12 |
| 4.8.1 Introduction | 4-12 |
| 4.8.2 Plant Survey..... | 4-12 |
| 4.8.3 Regional and Local Habitats | 4-13 |
| 4.8.4 Sensitive Habitats and Species..... | 4-14 |

| | | |
|--------|--|------|
| 4.9 | First Nations Mi'kmaq Knowledge..... | 4-14 |
| 4.9.1 | Introduction | 4-14 |
| 4.9.2 | Historical Review | 4-15 |
| 4.9.3 | Mi'kmaq Use Study..... | 4-15 |
| 4.9.4 | Mi'kmaq Significant Species Survey..... | 4-15 |
| 4.9.5 | Conclusions | 4-16 |
| 4.9.6 | Recommendations | 4-16 |
| 4.10 | Archaeological and Cultural Resources | 4-16 |
| 4.11 | Transportation and Infrastructure Shipping Options | 4-17 |
| 4.11.1 | Transportation Infrastructure..... | 4-17 |
| 4.11.2 | Shipping Options..... | 4-19 |
| 4.12 | Socio-Economic Environment..... | 4-19 |
| 4.13 | Regulatory Environment..... | 4-20 |
| 4.13.1 | Overview | 4-20 |
| 4.13.2 | Federal..... | 4-20 |
| 4.13.3 | Provincial..... | 4-21 |
| 4.13.4 | Municipal/County..... | 4-21 |
| 5.0 | PUBLIC CONSULTATION | 5-1 |
| 5.1 | Communications With Residents Of The Project Area..... | 5-1 |
| 5.1.1 | Background | 5-1 |
| 5.1.2 | Program of Contact..... | 5-1 |
| 5.1.3 | Issues and Needs..... | 5-1 |
| 5.1.4 | Responses | 5-2 |
| 5.1.5 | Conclusion..... | 5-2 |
| 5.2 | Communications with General Public | 5-2 |
| 5.2.1 | Background | 5-2 |
| 5.2.2 | Program of Contact..... | 5-2 |
| 5.2.3 | Issues and Needs..... | 5-3 |
| 5.2.4 | Responses | 5-3 |
| 5.2.5 | Conclusion..... | 5-4 |
| 5.3 | Communications with Environmental Groups..... | 5-4 |
| 5.3.1 | Background | 5-4 |
| 5.3.2 | Program of Contact..... | 5-4 |
| 5.3.3 | Issues and Needs..... | 5-4 |
| 5.3.4 | Responses | 5-5 |
| 5.3.5 | Conclusion..... | 5-5 |
| 5.4 | Communications with Native Communities..... | 5-5 |
| 5.4.1 | Background | 5-5 |
| 5.4.2 | Program of Contact..... | 5-5 |
| 5.4.3 | Issues and Needs..... | 5-6 |
| 5.4.4 | Responses | 5-6 |
| 5.4.5 | Conclusion..... | 5-6 |
| 5.5 | Communications with Elected Persons | 5-6 |
| 5.5.1 | Background | 5-6 |
| 5.5.2 | Program of Contact..... | 5-7 |

| | | |
|---------|--|------|
| 5.5.3 | Issues and Needs..... | 5-7 |
| 5.5.4 | Responses | 5-7 |
| 5.5.5 | Conclusion..... | 5-7 |
| 6.0 | IMPACTS AND MITIGATION PLANS | 6-1 |
| 6.1 | Physical Environment - Air Quality and Noise, Surface Water, Groundwater, Liquid Effluents, Habitats (Terrestrial and Aquatic)..... | 6-1 |
| 6.1.1 | Air Quality and Noise..... | 6-1 |
| 6.1.2 | Surface Water..... | 6-2 |
| 6.1.3 | Groundwater..... | 6-3 |
| 6.1.4 | Liquid Effluents | 6-4 |
| 6.1.5 | Habitats | 6-5 |
| 6.1.5.1 | Wetlands | 6-5 |
| 6.1.5.2 | Fish and Fish Habitat..... | 6-7 |
| 6.1.6 | Archaeological, Cultural and Palaeontological Resources..... | 6-10 |
| 6.1.7 | Recreation Land Use..... | 6-10 |
| 6.1.8 | At Risk Animal Species..... | 6-11 |
| 6.1.9 | At Risk Plant Species..... | 6-21 |
| 6.2 | Contingency and Emergency..... | 6-25 |
| 6.3 | Transportation and Shipping..... | 6-26 |
| 7.0 | PROPOSED MONITORING..... | 7-1 |
| 7.1 | Groundwater Monitoring Plan..... | 7-1 |
| 7.2 | Liquid Effluent Monitoring Plan..... | 7-1 |
| 7.3 | Blast Monitoring..... | 7-1 |
| 7.4 | Particulate Emissions | 7-2 |
| 7.5 | Habitat Monitoring..... | 7-2 |
| 7.6 | Surface Water Monitoring Plan..... | 7-2 |
| 8.0 | RECLAMATION & LAND MANAGEMENT PLANS | 8-1 |
| | Reclamation Plan..... | 8-1 |
| | Land Management Plan..... | 8-1 |
| 9.0 | SUMMARY OF IMPACTS AND BENEFITS | 9-1 |
| 10.0 | REFERENCES USED | 10-1 |

LIST OF FIGURES

| | | |
|------------|--|-----|
| Figure 1-1 | Site Location..... | 1-2 |
| Figure 2-1 | Mineable Reserves..... | 2-3 |
| Figure 3-1 | Conceptual Mine Plan and Site Layout | 3-3 |
| Figure 3-2 | Proposed Product Transport Routes..... | 3-4 |
| Figure 3-3 | Conceptual Mine Cross Section | 3-5 |

| | | |
|------------|--|-----|
| Figure 3-4 | Simplified Flow Diagram of Kaolin Processing | 3-6 |
| Figure 4-1 | Bedrock Geology..... | 4-3 |
| Figure 4-2 | Surficial Geology..... | 4-5 |

LIST OF TABLES

| | | |
|-----------|---|------|
| Table 2-1 | Site Data Collection Summary – White Rock Mine | 2-2 |
| Table 4-1 | Acid – Base Accounting Testing..... | 4-6 |
| Table 4-2 | Climate Data (40 Year Normals) – Yarmouth and Kemptville | 4-8 |
| Table 4-3 | Surface Water Monitoring Stations Physical Descriptions | 4-10 |
| Table 4-4 | Census Data – Yarmouth and Shelburne County..... | 4-19 |
| Table 6-1 | Wetland Locations in Relation to Active Areas..... | 6-5 |
| Table 6-2 | Summary of at Risk Animal Species for Project Areas | 6-11 |
| Table 6-3 | Summary of Potential at Risk Plant Species for Mining Lease Area..... | 6-20 |
| Table 6-4 | Habitat in Proposed Extraction/Processing Area | 6-23 |

LIST OF APPENDICES

All Appendices are found in Volume II.

EXECUTIVE SUMMARY

This Environmental Registration Document has been prepared by MGI Limited on behalf of Black Bull Resources Inc. to provide details on a proposed surface quartz, kaolin and mica mine known as the White Rock Mine. The proposed undertaking is located near Flintstone Rock in Yarmouth County. Information contained within this document has been gathered from extensive environmental baseline assessments, formal and informal public consultation, public domain documents, past and present consultants reports, and liaison with regulatory agencies.

Black Bull is a mineral resource development company with sound technical and financial resources to complete this undertaking as described. The company has and will continue to maintain an open and fully consultative approach since purchasing the option on the property in late 1997. Black Bull is committed to principles of progressive reclamation and has incorporated these principles in the mine planning and design for the White Rock Mine. These mine plans outline a surface mine development which involves recovery of approximately 16 million tonnes of quartz, 5 million tonnes of kaolinite and recovery from kaolin processing of approximately 0.25 million tonnes of mica over an extraction period of 15 to 30 years with on-site processing of kaolin and mica. Exploration indicates that the overall deposit could contain over 100 million tonnes of quartz and 20-30 million tonnes of kaolinite.

Black Bull will transport via truck and trailer the finished products to port facilities at Weymouth, Yarmouth and Shelburne. The finished products will then be trans-shipped via ship or barge to customer destinations in Atlantic Canada, central Canada and along the eastern sea-board of the United States. Future shipping could expand to Europe and southeastern USA with favourable marketing and production levels.

Background studies to assess terrestrial and aquatic habitats, rare plant and animal species surveys, First Nations site evaluations, archaeological and heritage resource studies and geotechnical assessments of the site and surrounding area have been completed and heavily used in the design of this current project.

Public consultation has been a key component of the Black Bull approach to the project with informal meetings, public information sessions and community newsletters forming part of the overall public consultation program. Black Bull intends to continue this approach to public consultation through a Community Liaison Committee which will be formed prior to initiating the surface mine development.

The project will have known impacts on the local environment, residents and economy which have been considered in the project design. Early inclusion of environmental criteria in the planning process has facilitated the avoidance and/or mitigation of potential negative effects resulting from aspects of the mine development and operations. Monitoring plans for groundwater, liquid effluent, blasting, particulate emission, terrestrial and aquatic habitat health, surface water and domestic wells have been developed for the project duration.

The project will employ approximately 200 persons from the local area at full production with an estimated payroll of 8.5 million dollars per year. Estimated annual expenditures to Nova Scotia suppliers for items such as fuel, power, equipment and services is in the 11 million dollar range. The project plan includes

reclamation of areas not reclaimed by extraction of materials during previous near site activities (road construction), creation of additional areas of fish habitat in flooded former extraction areas and potential increased recreational opportunities with the reclamation plan.

1.0 INTRODUCTION AND REGISTRATION

1.1 Introduction

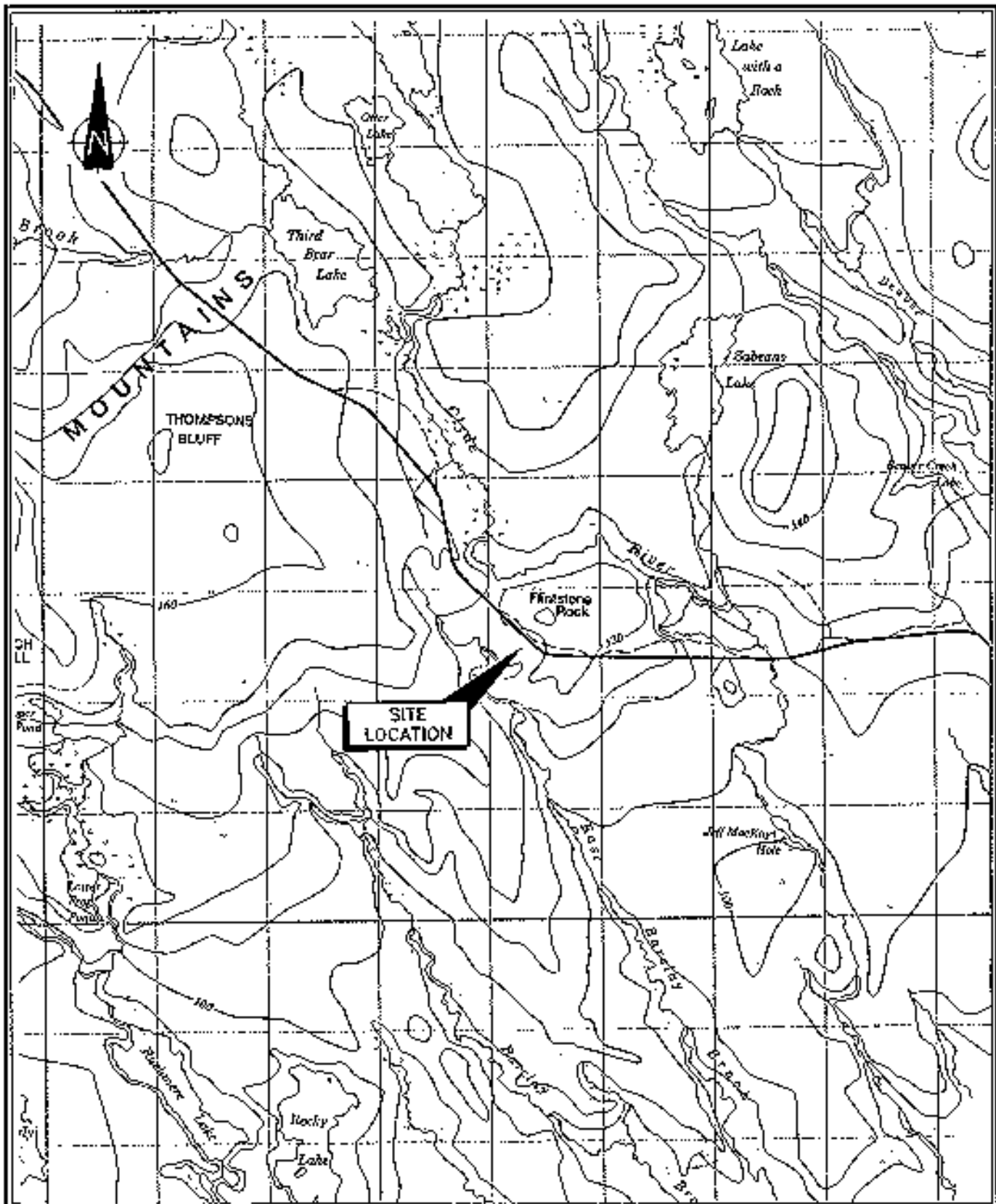
The purpose of this document is to register a proposed quartz/kaolin/mica mineral development project known as the White Rock Mine located at Flintstone Rock, Yarmouth County (Figure 1-1). Black Bull Resources Inc. (Black Bull) is the project proponent having optioned the property from CAG Enterprises Limited (CAG) in 1997. Exploration, advanced exploration and bulk sample programs have been underway at the site since 1995 in compliance with applicable legislation for exploration activities. The exploration claims (#03039, 03039A, 02428, 02429, 02431 and 03486) are held by Black Bull, having been transferred (Transfer #4866) in September of 2001 from Nova Industrial Minerals. The proposed project would involve the extraction of quartz, kaolin and mica from a surface mining operation with on-site processing of raw materials over a twenty five year span including approximately two years of kaolin processing plant development during which time quartz production would be occurring. Finished materials would be transported via truck to Shelburne storage/shipping facilities or Weymouth and Yarmouth shipping facilities for transport to end users in Atlantic Canada, central Canada and the United States. Markets for quartz and kaolin are well established with quartz products expected to be shipped mainly to central Canada and the eastern US markets. Kaolin products are expected to be used primarily within Atlantic Canada for existing paper manufacturing facilities.


The proposed mine operation would be a drill/blast/haul type operation where materials would be extracted from a series of pits along the trend of the deposit and taken to processing facilities on-site using off-road haul trucks or conveyor systems. Test mining completed during the fall of 2000 under a bulk sample (letters of authority) approval indicated that some of the materials require blasting and others will not. Control of surface water within and exterior to the extraction areas will be achieved through the use of ditching and settling ponds located at key areas of the site. To the greatest possible extent, disturbed areas will be minimized and surface water controlled within the extraction areas using sumps pumps and recycling.

Baseline information has been collected from the site since April of 2000 for components of the local environment such as surface water, terrestrial and aquatic habitats, rare and endangered plants and animals and archaeological and cultural resources. An environmental screening was completed by the Nova Scotia Museum for the project area to assist with identifying issues requiring evaluation during the environmental baseline studies (Appendix A). First Nation's involvement in the project has been extensive including the completion of a Mi'kmaq Knowledge Study to supplement data collected by other consultants to the project team. All of the collected data was used in the development of monitoring, mitigation and avoidance plans for the special features identified which may require protection based on legislation or input from stakeholder groups.

Black Bull seeks to have the project reviewed in accordance with the Nova Scotia Environment Act and associated Environmental Assessment legislation administered by the Nova Scotia Department of Environment and Labour (NSDEL). Project components have been examined by a number of consultants to the proponent and via numerous One Window Committee meetings held with all indications that the project can be screened out of the Canadian Environmental Assessment Act review requirements. Identified components of the project that will involve federal regulators after the provincial environmental assessment stage consist of on-going fisheries habitat and migratory bird issues. Black Bull believes that the project as

described in this document has sufficient detail
Figure 1-1 Site Location



| | | | |
|---|--|---------------------------------|---------------------------------|
|  <p>MGI CONSULTANTS IN ENVIRONMENTAL & EARTH SCIENCES</p> | TITLE | DATE | PROJECT NO. |
| | PROJECT | SCALE | FIGURE NO. |
| | DRAWN | SAG | |
| | <p>Site Location</p> <p>Environmental Registration Document White Rock Mine Firststone Rock, Nova Scotia</p> | <p>Oct. 2001</p> <p>1:50000</p> | <p>20232A</p> <p>1-1</p> |

to allow an Environmental Assessment approval to be granted with conditions appropriate for surface mining of industrial minerals in Nova Scotia.

At full production, the project will employ approximately 200 skilled persons from the local area with an estimated payroll of 8.5 million dollars per year. Estimated annual expenditures to Nova Scotia suppliers for items such as fuel, power, equipment and services is in the 11 million dollar range. The project plan includes reclamation of areas disturbed by extraction of materials during previous years site activities, creation of significant areas of fish habitat in flooded former extraction areas and potential increased recreational opportunities with the reclamation and on site land management plans.

During construction peak periods and additional 200 construction workers will be employed on site for 12-18 months. Black Bull local hire policy will be a condition of tenders and contracts.

1.2 Registration

Name of Undertaking: White Rock Quartz/Kaolin and Mica Mine
 Location of Undertaking: Flintstone Rock, Yarmouth County
 Proponent: Black Bull Resources Inc. (BBS:CDNX)
 Project Manager: Mr. John Keating, P.Geo, President
 Head Office: #303 Sun Tower
 100 West Pender Street
 Vancouver, B.C
 V6B 1R8

Contact methods: Telephone: 604-688-9500
 Fax: 604-688-9550
 E-mail – blackbullresources@telus.net

Contact persons for the purposes of Environmental Registration:

Proponent – Mr. John Keating – see above for contact methods

Environmental Consultant – Mr. Peter Oram, P.Geo.,
 MGI Limited
 31 Gloster Court
 Dartmouth, N.S.
 B3B 1X9
 Telephone – 902-468-1248
 Fax – 902-468-2207
 E-mail – peter.oram@mgi-limited.com

The completion of environmental baseline data collection, public consultation and preparation of this document have all been completed to comply with legislation associated with the Environment Act. The proponent requests that the Minister of Environment review the project, determine it favourable for approval

and subject Black Bull to any and all reasonable terms and conditions within the legislation framework of the Province of Nova Scotia.

Black Bull Resources Inc. has not received public funding to go into production at the White Rock Property. Black Bull is working with the Industrial Research Assistance Programme on a kaolin research project in the United Kingdom. The U.K. laboratories were chosen for the research due to a lack of kaolin research capacity in Canada.

Black Bull understands the need and will seek to secure the following prior to development of the White Rock Mine:

Industrial Approval – NSDEL
Mining Permit – NSDNR
Mining Lease – NSDNR
Milling Permit - NSDNR
Crown Land Lease – NSDNR
On-site Sewage Disposal System Approval – NSDEL
Signage and Road Access Authorization- Nova Scotia Department of Transportation and Public Works (NSDTPW)

Black Bull currently holds the following approvals/permits:

Letter of Authority to Bulk Sample Silica and Kaolin, Yarmouth County - NSDNR
Excavation Permits Nos. E-146 and E-152 – Flintstone Rock - NSDNR
Permit for Mineral Exploration on Crown Land - NSDNR
Industrial Approval For CAG Enterprises Ltd. to conduct a Bulk Sample - NSDEL
Excavation Permit No. E-146 - NSDNR
Excavation Permit No. E-143 - NSDNR

Copies of each of the above noted approvals are located in Appendix B for review/reference.

2.0 PROJECT AND SITE HISTORY

2.1 Site Use History

Historical use of the land was investigated by Cultural Resource Management Group (CRM) and by the Confederacy of Mainland Mi'kmaq (CMM). Both consultants noted that First Nations land use was recognized as a given based on proximity of First Nation communities within 50 kilometres of the site (Bear River and Acadia) however no physical evidence of occupation of the land has been determined to date. Documentation (written and anecdotal) and physical evidence of recent land use (last 100 years) for blueberry harvesting, hunting, recreational use and shelter (Aggies Rock) was found.

2.2 Site Ownership

The exploration claim block and the proposed mining lease area for the project are owned by the Province of Nova Scotia and administered by the Nova Scotia Department of Natural Resources. The claim block contains 105 claims for a total of 1650 hectares or 4191 acres and the proposed mining lease contains approximately 510 hectares or 1265 acres within which mining activities would occur on approximately 40 hectares or 100 acres over the 25 year mine plan outlined in this registration. Detailed surveying of mining lease boundaries will be conducted prior to granting of the leases in accordance with applicable legislation for leasing of provincial crown land.

2.3 Mineral Exploration Program History and Environmental Baseline Information Collection

During the late 1970s and early 1980s, the area was included in regional base metals exploration surveys conducted by a number of companies, which include Shell Canada Ltd.'s Minerals Division (Shell), Billiton Canada Ltd. (Billiton) and Esso Minerals Ltd. The regional surveys included geological mapping, regional till geochemistry, air-borne geophysical surveys and were followed up by limited auger and diamond drilling. Within the present Black Bull claim block area, Shell drilled seven (7) diamond drill holes to depths of from 20 to 90 metres. Several of the holes are reported to have intersected large intervals of quartz-kaolinite breccia. To the northeast of the claim block, Billiton reported the presence of a number of auriferous and polymetallic bearing float boulders but failed to locate their source.

Note: kaolinite is the term most often used for raw kaolin where the term kaolin refers to the finished product.

The claim block was included in a 1:50,000 scale regional mapping project conducted by the NSDNR (South Mountain Batholith Project, Wentworth Lake map sheet, NS DNR, Map 94-03). Immediately northwest of the claim block, NSDNR drilled a single stratigraphic drill-hole in 1993.

CAG Enterprises Ltd. conducted geological mapping and a shallow (<15m) core drilling program in 1996. The drilling program was designed to collect samples from the Flintstone Rock and Barclay Brook deposits as reported by Shell in 1982. The program consisted of nine (9), vertical HQ diamond drill holes that were drilled to total depths of from 12 to 15 metres. Kaolinite-bearing altered granite was cored in DDH FR-

97-01 and 02 (Flintstone Rock occurrence) and DDH FR-97-06, 07, 08 and 09 (Barclay Brook occurrence). Although core recovery was poor (30%) the recovered core samples revealed the presence of light grey to white kaolinite in concentrations of from 5 to 50%. Some preliminary testing for brightness and clay type was conducted on the collected samples.

Black Bull carried out a test pit program and trenching surveys over areas of quartz-kaolinite alteration in 1998. The work confirmed the presence of a large hydrothermal alteration system that contains high purity quartz and filler grade kaolinite. Further work was recommended. Black Bull then completed 30 diamond drill holes on the property in 1999, outlining quartz and kaolinite mineralization over a strike length of 1200 metres and having a vertical depth in excess of 150 metres.

Black Bull continued evaluation of the quartz kaolinite alteration zone in 2000. Work included drilling 9 triple tube HQ drill-holes, 25 kms of Induced Potential/Resistivity surveys, trenching, and extracting a 7034 tonne bulk sample of quartz breccia, which included a 300 tonne sample of kaolin. Additional analytical testing confirms the presence of high purity quartz and filler grade kaolinite on the property which is amenable to processing into finished products used in Atlantic Canada.

The quartz kaolinite breccia was extracted using drill, blast and haul methods. Extraction areas were secured and slopes minimized after the extraction program completed and site access restricted using gates and fences for the winter of 2000/2001. Based on all completed exploration work on the proposed mining zone, mineable reserves have been outlined, Figure 2-1.

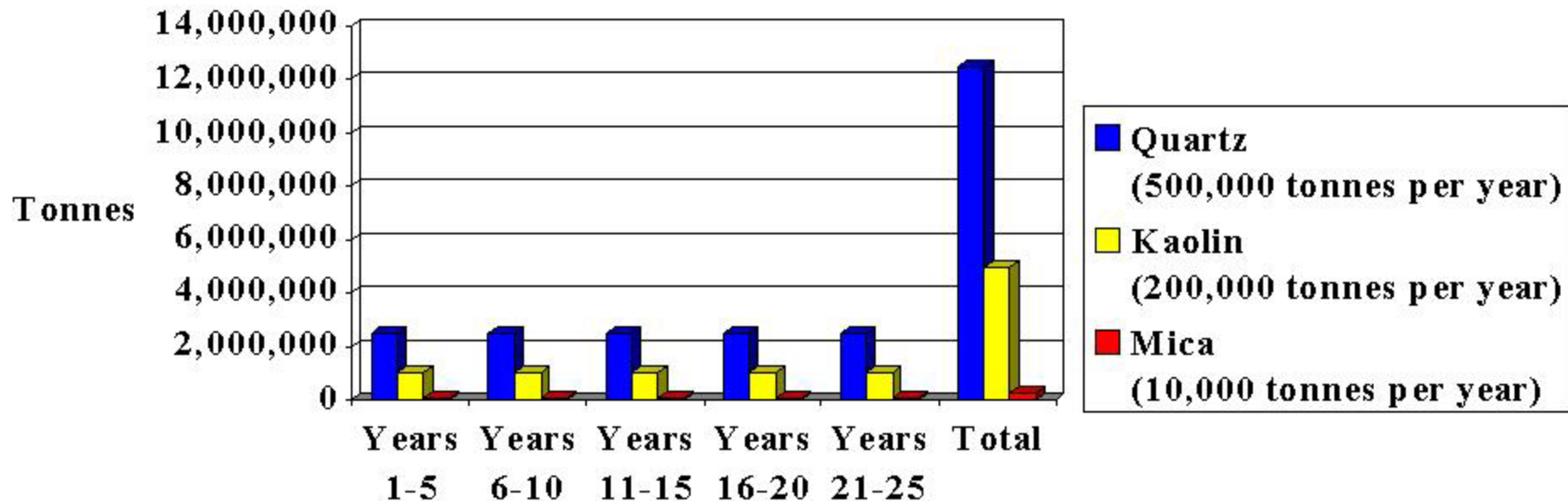
Beginning in April 2001 the site has been the subject of environmental baseline studies and First Nations Knowledge studies as well as additional topographic surveys and data collection associated with preliminary mine design. Please refer to Table 2-1 for an overview of completed studies.

TABLE 2-1: SITE DATA COLLECTION SUMMARY – WHITE ROCK MINE

| ACTIVITY | CONSULTANT | PROJECT TIME FRAME(S) |
|--|---|---|
| Surface Water Monitoring | W.G. Shaw and Associates Ltd. | April 2000 – December 2000 |
| | MGI Limited | April 2001 - Present |
| Fisheries Habitat Evaluation | Dillon Consulting Ltd. | October – November 2000 May – August 2001 |
| Plant and Animal Presence & Habitat Evaluations | Dillon Consulting Ltd. with sub-consultants: 1. Ruth Newell – Plants/Animals 2. Fulton Lavender – Birds/Animals 3. Heather Stewart - Plants | September – October 2000 May – August 2001 |
| Archaeological and Cultural Resource Survey | Cultural Resource Management Group Ltd. | October – November 2000 |
| First Nations Knowledge Study | Confederacy of Mainland Mi'kmaq | June – August 2001 |
| Mineral Processing Evaluations | Daltech – Minerals Engineering Centre | 1997 - Present |
| Kaolin Evaluations | Dr. Ian Wilson Dr. Haydn Murray | 2000 – Present |
| Preliminary Mine Design | Atcon Group | April 2001 – Present |

Figure 2-1: Black Bull Resources Inc. White Rock Mine Quartz/Kaolin/Mica Reserves

Mineable Reserves



Mineable Reserves of Quartz - 16,000,000 tonnes or approximately 500,000 tonnes per year at full production)

Mineable Reserves of Kaolin - 5,000,000 tonnes or approximately 200,000 tonnes per year at full production)

Mineable Reserves of Mica - 250,000 tonnes or approximately 10,000 tonnes per year at full production)

3.0 PROJECT DESCRIPTION

3.1 Corporate Policies

Black Bull Resources Inc. has a corporate policy to provide a safe environment in which to live and work. Black Bull employs and will strengthen technical and business management team who have a vested interest in the success of the company and who have a proven record of developing new prospects while meeting or exceeding environmental regulations and ideals. Black Bull will create a work environment that strives for excellence of the highest standards of personal and professional integrity, achievement and success.

3.2 Site Location and Local Geography

The White Rock Mine property is located approximately 50 km northeast of the Town of Shelburne, in Yarmouth County, Nova Scotia. The property has been tested by Black Bull for its potential for a mineral occurrence of Quartz, Kaolinite ("Kaolin") and Mica to be economically mined. The claim block property consists of 106 contiguous claims of approximately 1650 hectares (4,191 acres).

Geologically the property is host to a primary Kaolinite and Quartz deposit very similar to the Cornwall Kaolin deposits in England. The Cornwall deposits are formed in altered granites along structural zones. Kaolin at the White Rock Mine is also formed in altered granite along a regional structural zone, specifically the Tobeatic Shear. The White Rock Mine area is known to have at least three occurrences of kaolinite along the Tobeatic Shear, two of which appear to be contiguous. Size potential is in the order of tens of millions of tons of kaolinite and 100 million tonnes of high purity quartz.

3.3 Mining, Processing and Product Movement Overview

Quartz Mining and Processing

Initial work would consist of stripping of 2-4 metres of overburden to expose the underlying bedrock, this work would begin in the first quarter of 2002. A portion of the stripped overburden would be used to build a quartz bulk sample storage pad and the remainder used for reclamation. Exposed bedrock is then drilled, blasted and extracted in lifts of approximately 10 metres to a total depth of up to 50 metres depending on quality, and the quartz breccia is mucked up on the storage pad. The material is then crushed to minus 8 inches, and screened into two products, one a 6 to 8 inch product and one a minus 6 inch mesh product. The quartz breccia is then stock-piled into separate piles, depending on size and quality of the material.

The mining of quartz and kaolin will be a drill-blast operation where air track mobile drills will create holes for the explosives (stored off-site). Blasts will create 30-35,000 tonne zones of raw product that will be transported to the processing area. It is anticipated that approximately 3 blasts will occur in the first year of production (100,000 tonnes) and that full production (500,000 tonnes) will require approximately 12 –15 blasts per year. The timing of the blasts will be set through consultation by Black Bull with the Citizens Liaison Committee, local regulatory authorities and stakeholder groups so as to consider factors such as traffic patterns and moose calving. It is expected that the quartz and kaolin mining operation would be a year round 24 hour a day, 7 day a week operation after 1-2 years of development/initial production "ramp up" time. Mica would be recovered from the processing of kaolinite and would therefore not occur until

2003 or 2004. The conceptual mine plan is presented in Figure 3-1.

Processing of quartz and kaolin would occur on the western portion of the site adjacent to Route #203. Raw product, extracted initially from the east side of Route #203, would be transported to the processing area in off-road vehicles via a level crossing with appropriate signage and warning lights. Black Bull will continue to liaise with the NSDTPW on issues relative to transportation. Black Bull has previously had contact with NSDTPW relative to allowable loads and vehicle types. Information to date includes the knowledge that highway trucks with widespread axles have allowable loads of 26,000 kg with each additional axle adding 500 kg in allowable weight. Therefore trucks with loads of 27,500 kg are anticipated for movement of product to the port facilities (Figure 3-2).

The following is a general list of equipment that would initially be used on the White Rock Mine project:

| <u>Equipment Type</u> | <u>Amount</u> |
|-----------------------|---------------|
| Wheel Loaders | 2-3 |
| Track-Type Excavator | 1 |
| Track-Type Bulldozer | 1 |
| Hydraulic Drill | 1 |
| Jaw Crusher | 1 |
| Screening Plant | 1 |
| Weigh Scales | 1 |
| Diesel Generator | 1 |
| Fuel Storage Tanks | 1-2 |
| Site Office | 1 |
| Storage Trailers | 1-2 |

Dry Kaolin Mining

Dry mining will be used for the White Rock deposit. With dry mining stockpiling would be required before moving kaolin to the processing area. A conceptual cross section of the extraction area is presented as Figure 3-3. The stockpile kaolin matrix would be taken to a trommel where the matrix would be blunged (physically agitated via mixing) and then the sand separated from the kaolin and mica. With dry mining it is possible to be more selective in avoiding areas where quality variations occur. With permission from regulatory agencies Black Bull may try “wet” mining trials in select areas of the extraction area to test technical and economic aspects of this mining technique. In “wet mining” the clay is washed from the pit face using high-pressure hoses called monitors. These monitors operate at pressures up to about 250 p.s.i. and preferentially remove the soft kaolin from the matrix leaving behind the hard unkaolinized rock, known as stent. The stent is removed using a front-end loader and dumpers to the processing plant.

Kaolin Refining

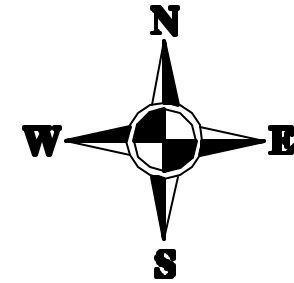
A kaolinised granite would have kaolinite, mica and quartz components. A particle size cut at 20 microns should remove the quartz and a further cut at 10 microns should remove the majority of the mica. The mica would be stockpiled for additional processing.

Figure 3-4 provides an example of a generalized flowsheet of the process route.

White Rock Mine

Conceptual Mine Plan and Site Layout

Yarmouth County, Nova Scotia



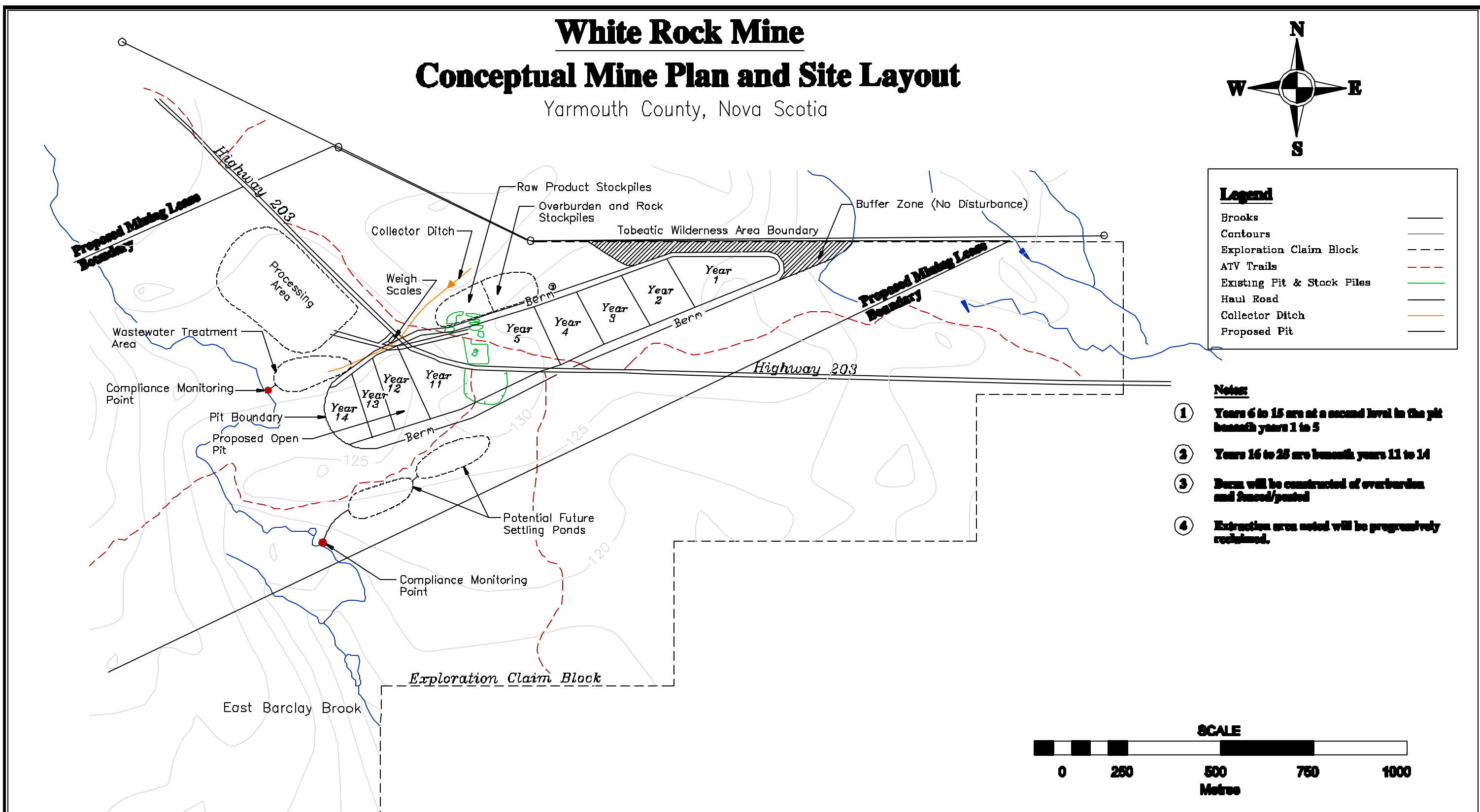
Legend

| | |
|----------------------------|-----------|
| Brooks | — |
| Contours | — |
| Exploration Claim Block | - - - - |
| ATV Trails | - · - · - |
| Existing Pit & Stock Piles | — |
| Haul Road | — |
| Collector Ditch | — |
| Proposed Pit | — |

Notes:

- ① Years 6 to 15 are at a second level in the pit beneath years 1 to 5
- ② Years 16 to 25 are beneath years 11 to 14
- ③ Berm will be constructed of overburden and fenced/posted
- ④ Extraction area noted will be progressively reclaimed.

SCALE



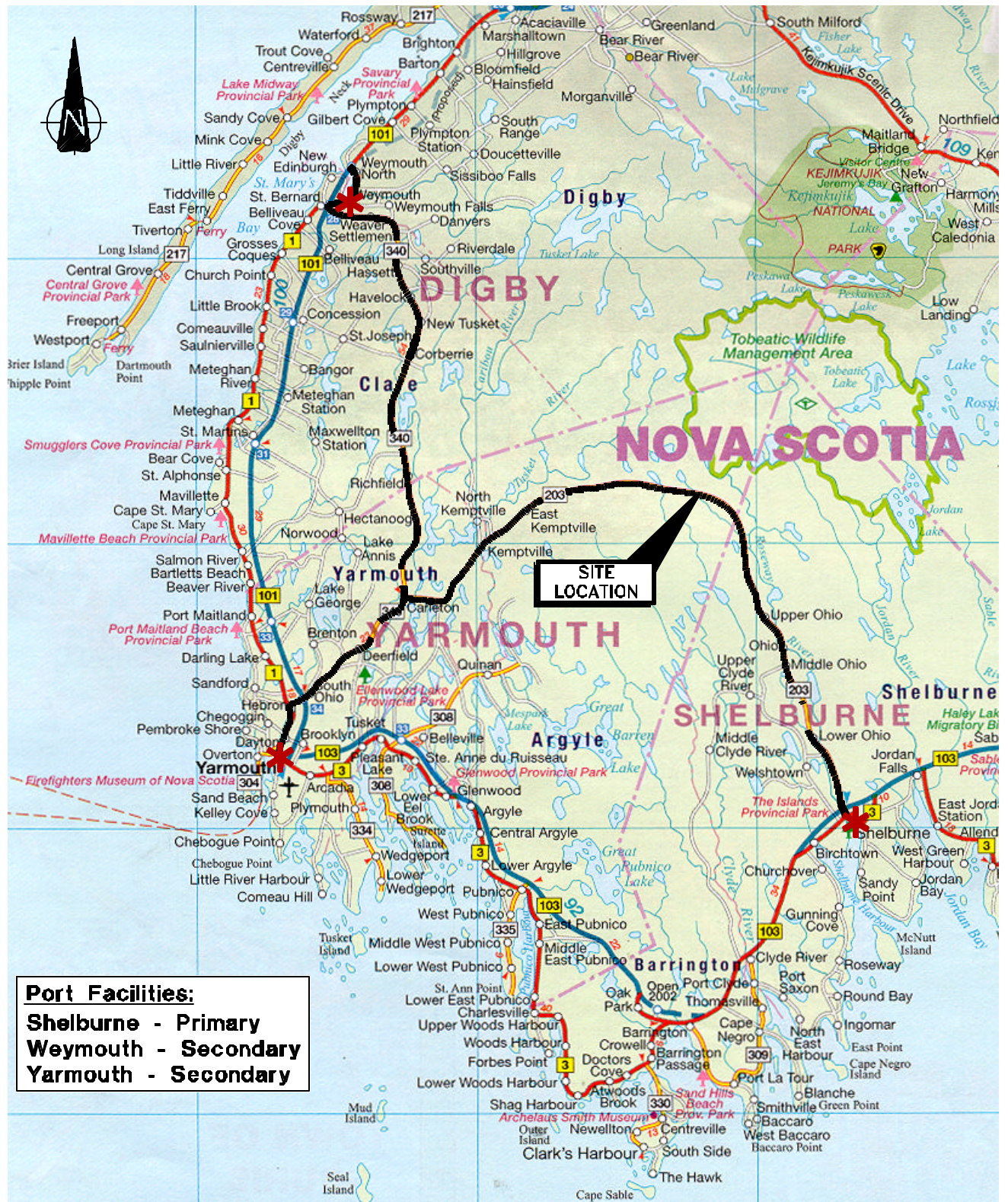
Mine Plan
Prepared By
ATCON
CONSTRUCTION INC.

MGI
CONSULTANTS IN ENVIRONMENTAL
& EARTH SCIENCES


| | | |
|---------|--|--|
| TITLE | Conceptual Mine Plan and Site Layout | |
| PROJECT | Environmental Registration Document White Rock Mine Flintstone Rock, Nova Scotia | |

| | | | |
|-------|-----------|-------------|--------|
| DATE | Oct. 2001 | PROJECT NO. | 20232A |
| SCALE | 1:10000 | FIGURE NO. | 3-1 |
| DRAWN | SAG | | |

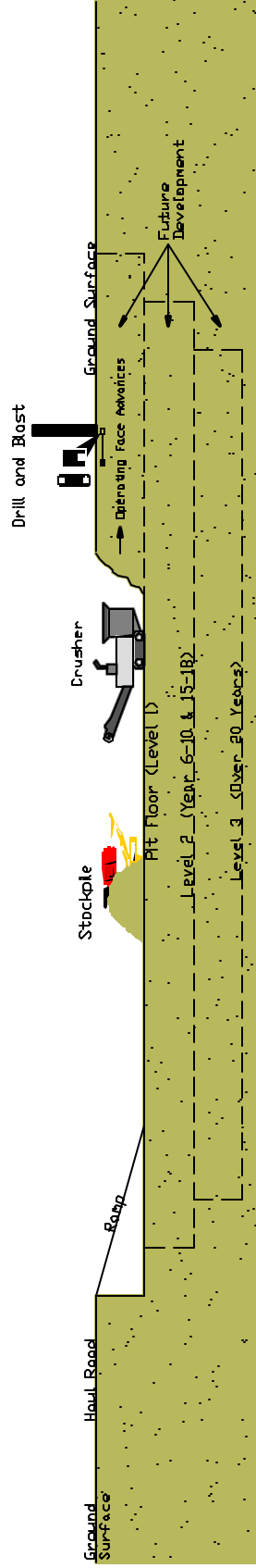
DRAFT No. 20232A-1



Port Facilities:
Shelburne - Primary
Yarmouth - Secondary

| | | | |
|--|--|-------------------------------------|-------------------|
|  CONSULTANTS IN ENVIRONMENTAL & EARTH SCIENCES | TITLE | DATE | PROJECT NO. |
| | PROJECT | SCALE | FIGURE NO. |
| | DRAWN | | |
| | Proposed Product Transport Routes Environmental Registration Document White Rock Mine Flinstone Rock, Nova Scotia | Oct. 2001 Unknown SAG | 20232A 3-2 |

CONCEPTUAL CROSS SECTION



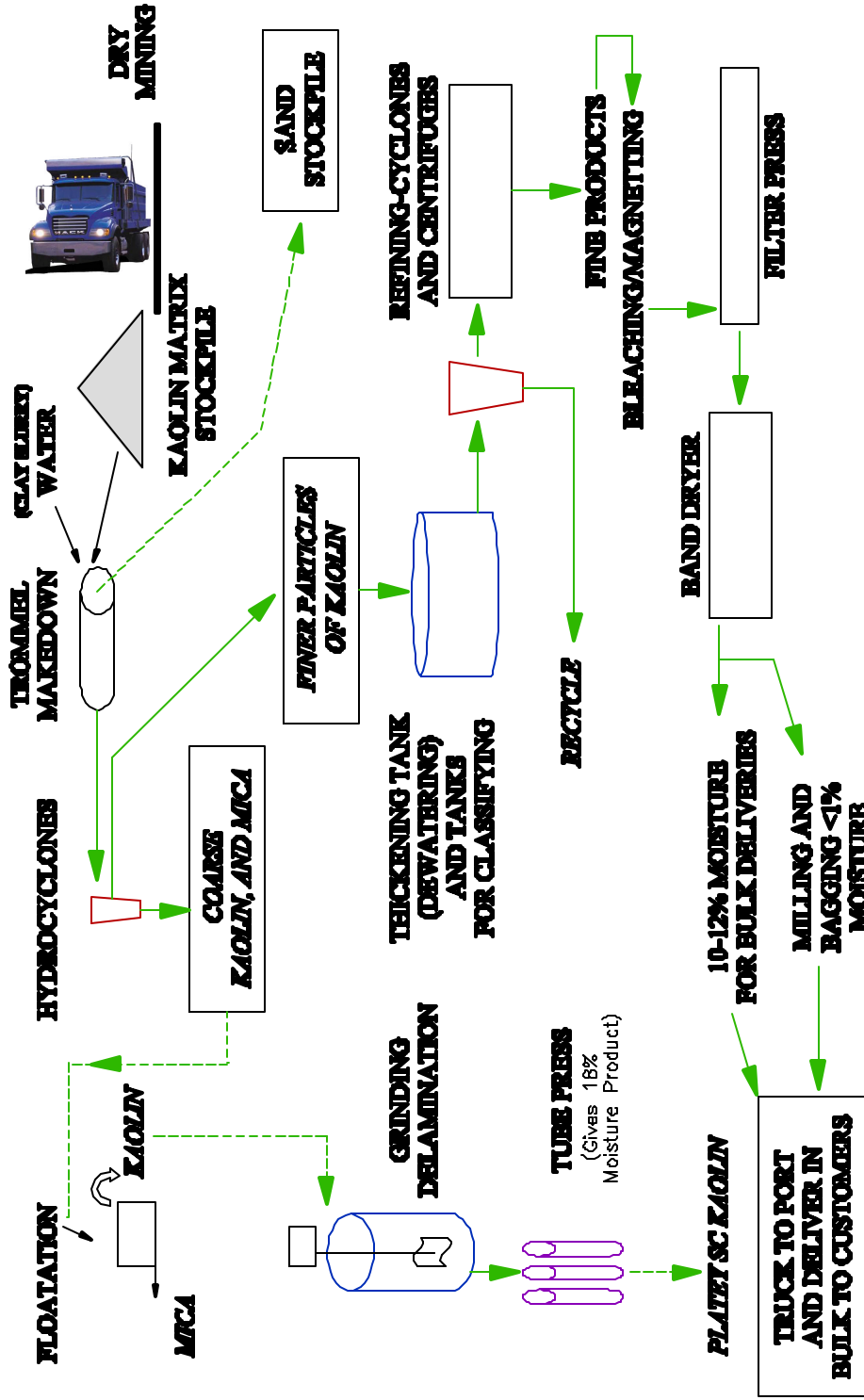
White Rock Mine

Yarmouth County, Nova Scotia



| | | |
|--|--------------------------|------------------------------|
| TITLE Conceptual Mine Cross Section | DATE Oct. 2001 | PROJECT NO. 202324 |
| | SCALE NTS | FIGURE NO. 3-3 |
| PROJECT Environmental Registration Document White Rock Mine Flintstone Rock, Nova Scotia | DRAWN SAG | |
| | | |

FIGURE 3-4: SIMPLIFIED FLOW DIAGRAM OF KAOLIN PROCESSING



A TYPICAL KAOLIN FLOWSHEET FOR FINE AND COARSE KAOLIN, PAPER AND CERAMICS

- **Thickening.** The overflow from the hydrocyclones may require thickening to increase the density to about 1:150. Conventional raked thickeners might be used. If a clear supernatant water can be obtained without chemical treatment then other flocculants may not need to be added. The supernatant water can be returned to the pit for washing and the thickener underflow is fed to the next refining stage. The under flow from the cyclones may still contain some stacks of kaolinite that would require a different processing route.
- **Hydroseparator.** The next stage in the refining process is most often a hydroseparator to further separate coarse and fine kaolin. The hydroseparator is used because it can be more efficient though it is more expensive than using a hydrocyclone system.
- **Centrifugal Separation.** For the production of finer grades of clay, which are used in paper coating, it may be necessary to use centrifugal separation. A typical product from the centrifuge might have 75% -2 microns sized particles.
- **Processing of Underflow from Centrifuges.** Coarse kaolin in the underflow was traditionally a waste material. However, the introduction of fine particle flotation has made it possible to treat these coarse residues and extract quantities of kaolinite from them.
- **Flotation.** The flotation systems use a bank of sub-aeration cells. The slurry, together with the collector and frother, would be fed to the first cell in the bank, the kaolinite is floated off and collected as a product, the tailing pass through an up-and-over weir system to the second cell, and the process is repeated along the bank of cells.
- **Sand Grinding.** The flotation product, which would be very fine by mineral processing standards, is coarse compared with most filler clays and so further treatment may be required to increase the usefulness of the product. Here a process called sand grinding could be used not only to make the product finer but also to delaminate the stacks of kaolinite. Effectively, a “blocky” kaolinite with a low aspect ratio could be transformed into platy kaolinite with a high aspect ratio (high shape factor). The degree of communication is controlled by the throughput, and it may be possible to operate the sand grinder in a closed circuit with a hydrocyclone and obtain a very well controlled product.
- **Magnetic Separation.** In the production of clays for the ceramics industry magnetic separation may be needed as a method of removing iron-containing minerals, which would result in a speckled appearance in the finished ceramic ware. Black Bull is examining the possibility that this product can be created using the White Rock Mine materials. Mica and tourmaline have magnetic susceptibilities which are 20-30 times greater than that of kaolinite: hence the possibility of magnetic separation. High Intensity Magnetic separators have traditionally been used. Ongoing research by Black Bull will determine the need for a superconducting magnet.
- **Bleaching.** The simplified flow sheet omits the bleaching process and it is not anticipated. If required, iron staining which is not susceptible to magnetic separation can be removed

by a reductive bleaching process using sodium hydrosulphite in acid conditions, similar to the system used by the paper maker to bleach wood pulp. Organic staining from humic acids may need to be removed using an oxidative bleach with chlorine or ozone.

- **The Clay Slurry** as it leaves the refining plant would need to be either slurried or dried before sale. Black Bull anticipates “dry” sales but this is dependent on purchasers of the product and their specifications.
- **Drying.** This may first require the clay to be thickened to about 20% solids, then filter pressed to about 70% solids. Coating clay may need to be fed to a pug mill where the action of the mill enhances the rheological properties of the clay. Dry clay could be back-mixed with the press cake to form a dryer feed of about 25% moisture. Special products might be obtained by the use of extruders or pelletizers.
- **Tube Press.** This type of press will likely be required to reduce the moisture content in the clay to about 18% moisture for some products. The clay in this form is hard and handleable and acceptable as a dust-free product. This product has the advantage of being chemical free which is an advantage for the paper maker. This product form is currently delivered to the Port Hawkesbury *Enso Stora Paper Plant* from the UK.
- **Sedimentary American Clays** are frequently stained with iron/titanium compounds and froth flotation is used as a method of enhancing the brightness of these clays. Process water would be required in the order of 100-150 Igpm which would be sourced from groundwater and surface water sources. The raw water would require treatment and then be used in processing with the water being recycled. See Section 4.6 for additional information.

Mica Mining and Processing

Preliminary reports from George C. Hawley & Associates of Cadyville, New York indicate that mica, which is extracted from the kaolin during processing, can be easily separated and upgraded to a commercial quality product. Mica is a “platy” mineral which is separated by centrifuge during kaolin production. Mica is approximately 2% by volume of the kaolinite raw product extracted from the mine. Separation is achieved by using standard equipment and could bring added value to production profits. Tests are on going to establish potential markets and economic viability. If tests indicate that it is not economic to upgrade the mica to a commercial product it will enter the effluent stream and go to the settling ponds or be placed dry into the overburden stockpiles to be used in reclamation.

3.4 Waste Management

Three aspects of waste management at the site have been identified those being domestic waste, industrial waste and tailings. Domestic waste and industrial waste (not able to be put into the tailings management area) will be hauled off-site in accordance with applicable local, provincial and federal regulations. Tailings

(materials created from the processing of ore) will be sent to a tailings management area. The tailings would consist mainly of sand, silt and clay sized natural materials that would be used in reclamation.

3.5 Site Reclamation and Future Land Use

Site Reclamation - to date

Site evaluation activities will be an integral part of the Black Bull approach to the White Rock Mine development. Reclamation activities were completed as part of the bulk sample work in 2000 and will be part of activities for the life of the development. The Province of Nova Scotia currently holds Black Bull's \$20,000.00 cash bond to be used for future reclamation programs. This bond will be greatly increased at the time of application for a mining lease and approval based on a determination by NSDNR. A detailed reclamation plan will be submitted for approval as part of the mining lease where a determination will be made by DNR as to the amount of the bond and conditions of the approval.

Preliminary work on the bulk sample consisted of expanding a previously excavated trench, located approximately 40 metres north of Highway #203. The work was completed using 2 large excavators, 2 - 15 tonne dump trucks, and a D-9 bulldozer. Initially an area of overburden, 50 metres X 50 metres was stripped to expose the siliceous bedrock. The banks surrounding the pit area were sloped back to a 2:1 strip ratio, and the entire area was fenced. The overburden was used to build a bulk sample storage pad immediately north of the pit area. Siltation fences were erected in depressions that drain the area. A lime lined filtration trench was also established to the east of the pit area and was to be used to filter surface/discharge water from the pit area. Water levels in the pit area during sampling were very low and very little water was pumped. Sampling completed at the time and post – bulk sample indicated increased pH only in nearby sampling locations which is a favourable effect in this area of depressed pH in surface waters.

Reclamation of a trench in a gravel pit south of Highway #203 was also completed at this time. The entire area was levelled off and the banks of the trench area were tapered to 3:1 strip ratio. The trenched area was then fenced and a 4-foot berm was erected across the entrance of the former gravel pit to prevent vehicles from entering the area.

Future Land Use - Reclamation

The conceptual reclamation plan is outlined in Section 8.

Future land use will be determined utilizing information and data collected by Black Bull, the CCM and MGI. These plans will form the Land Management Plan which will accompany the Surface Lease Application.

3.6 Employment and Socio-economic Benefits

Local communities will benefit from increased employment opportunities and a more diversified economic base that new industrial sectors bring to a region. It is estimated that 20-30 jobs will be created when quartz production begins in 2002. In addition direct employment at the White Rock operation will increase from

15 to over 125 when the kaolin plant is operational, with over 200 employees when full-production is attained. Total long term employment for quartz, kaolin and mica is as follows:

| <u>Year</u> | <u>Person Years</u> | <u>Notes</u> |
|-------------|---------------------|---|
| 2002 | 20-25 | - primarily due to quartz production and initial mine site development |
| 2003 | 100-125 | - increase due to kaolin plant construction |
| 2004 | 125-200 | - increase due to kaolin plant construction and initial processing |
| 2005 | 200-225 | - based on kaolin processing and full production being achieved for quartz, kaolin and mica |

Indirect employment can be expected to increase as down-stream manufacturing industries are attracted to the region because of benefits such as the availability of raw materials, educated labour force, proximity to Canadian and US markets, and favourable currency exchange rates.

3.7 Project Schedule

The project schedule for activities as part of the permitting and development/operation phases are outlined below.

The following is an outline of the anticipated project schedule prior to development activities:

- October 2001, submit the Environment Assessment Report to the Nova Scotia Department of Environment and Labour for registration.
- November 2001, receive Environment Assessment Approval from the Nova Scotia Department of Environment and Labour.
- November 2001, submit application for Surface Lease to Nova Scotia Department of Natural Resources.
- November 2001, submit application for Mineral Lease to Nova Scotia Department of Natural Resources.
- November 2001, submit applications for Industrial Approvals from Nova Scotia Department of Environment and Labour.
- November 2001, submit application for Mining Approval to Nova Scotia Department of Natural Resources.
- January 2002, receive all necessary Permits and proceed with mining of Quartz.

The following is an outline of the planned development/operations schedule:

- January – March 2002, begin infrastructure work on wastewater treatment facilities, surface water control features, extraction area berms, silt fencing, roads and stockpile areas.
- March 2002 – begin construction on kaolin and quartz processing facilities – kaolin plant construction will be 12 – 18 months and quartz processing equipment set up 1 – 3 months.
- April 2002 – begin quartz mining after overburden removal and begin shipments, 2002 production to be approximately 100,000 tonnes increasing incrementally to 500,000 tonnes by 2005.
- March – August 2003 – begin kaolin processing with 6 – 9 month start up/testing period with production rate of 100,000 – 200,000 tonnes for 2003 and 250,000 tonnes for each year thereafter. Begin recovery of mica from kaolin processing with estimated annual production of 10,000 tonnes.
- March 2004 – begin progressive reclamation of 2002 mining areas to project completion.
- 2004 and beyond - mining in areas outlined in Conceptual Mine Plan with continued production of quartz/kaolin and mica at previously mentioned rates and continue extraction and reclamation activities.

4.0 PROJECT ENVIRONMENTAL SETTING

4.1 Introduction

This section outlines the natural setting and project features of the site and general area including the transportation routes and proposed port facilities. Environmental baseline information collected from published sources and studies completed at and near the mine site is presented. Several of the environmental baseline studies continue to generate information relative to the site through follow-up work to assist in the development of the Reclamation Plan and Land Management Plan (Section 8.0). Additionally, surface water monitoring at the site has been extended past the environmental baseline study timeframe (April 2000 to present) to continue to collect data to be used in mine design and fisheries habitat evaluations. Where a report or data was generated by MGI or sub-consultants during the environmental baseline study, we have summarized this information within the body of this document and provided the original report as a stand alone document as an appendix in Volume II.

4.2 Regional and Local Physiography

The White Rock Mine is located within the Southern Upland physiographic region as defined by Roland, 1982. This region comprises the southwestern half of the peninsula portion of the province and ranges in elevation from sea level to near 300 metres with the interior portions being typically the greatest in elevation. The region is dominated by granitic material in the form of an old erosion plain where the surface appears close up to be abundant rounded hills and ridges but has an almost level surface on a macro-scale. Glaciation has shaped much of the surface with post-glacial action assisting in the development of abundant surface water features such as boulder strewn streams and rivers connected to shallow lakes with boulder rich edges.

The relief in the claim block area is slight with topography ranging from 100 to 140 metres above sea level (masl). The site topography ranges from highs in the north (near Upper Frog Pond and the Aggies Rock area) to lows in the south-southwest (in the Lower Frog Pond area and along the southern edge of the claim block boundary). Slopes are typically low with occasional hummocky areas being formed from localized mounds of glacial material creating localized increased slopes. Erosion potential is low due to the coarse grained nature of the materials, typically low slopes and almost complete coverage by scrub vegetation.

4.3 Geology

4.3.1 Regional Geology

The White Rock Mine is located within the Meguma Tectonostratigraphic Terrane of the Canadian portion of the Appalachian Mountain Range. The Meguma Terrane is the farthest outboard terrane in the northern portion of the Appalachians and is characterized regionally in southwest Nova Scotia by deformed Cambro-Ordovician aged turbidites (Meguma Group strata). Many of the Meguma Group units have been

intruded in southwest Nova Scotia by late Devonian to early Carboniferous plutons (typically granitic material). The Meguma Group is comprised of the Goldenville Formation (meta-greywacke and quartzites) and Halifax Formation (slate).

Southern Nova Scotia was subjected to three distinct periods of glacial action with the oldest to youngest ice directions being 1) to the southeast, 2) to the south-southeast and 3) to the north. The resultant glacial and post-glacial action at the site area has created a blanket of surficial deposits that consist of 3 to 15 metres of glacial till and post-glacial materials. The description of local geology below is based on published information and the results of the exploration and advanced exploration programs completed at the property over the past few years.

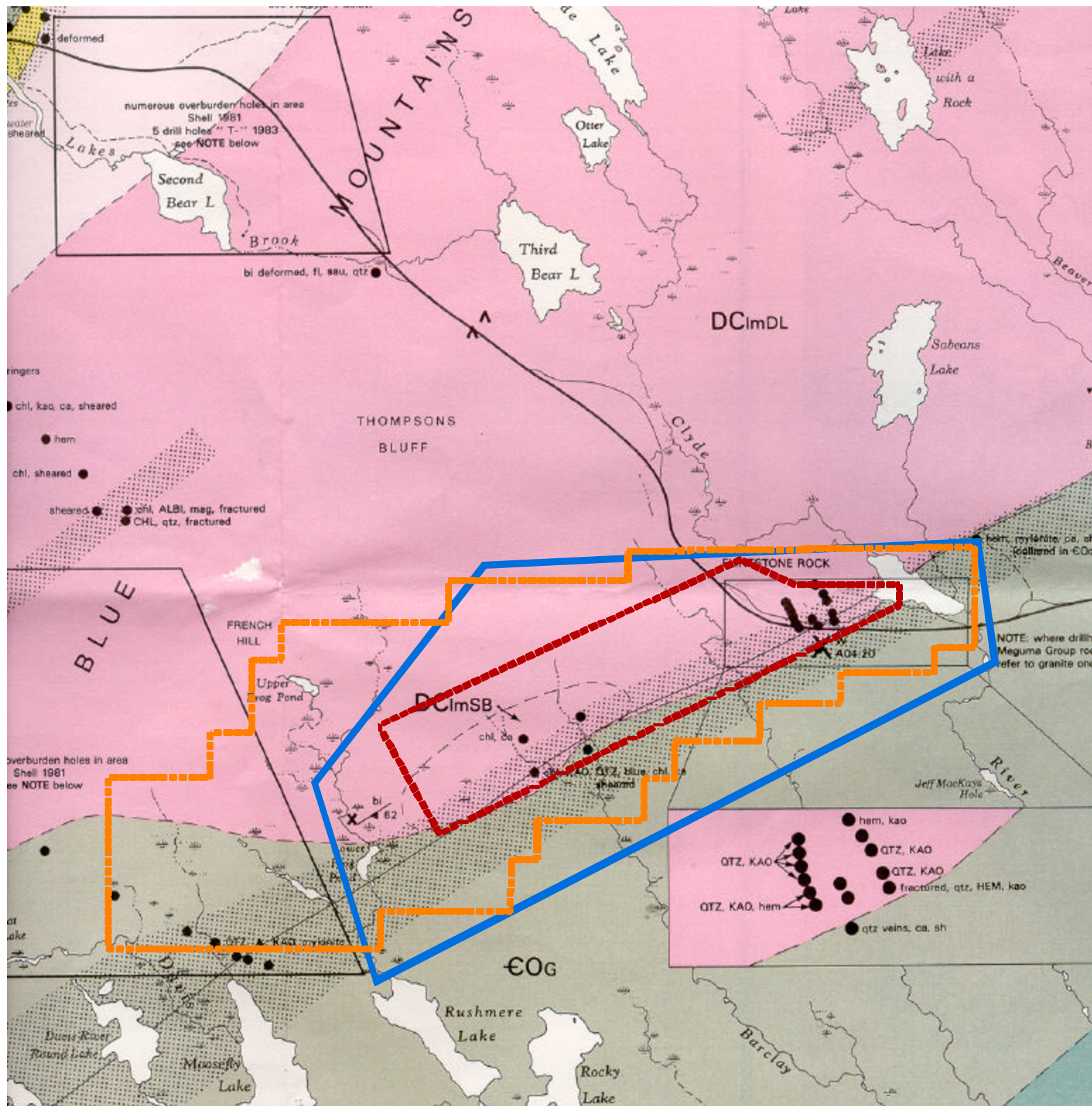
4.3.2 Local Geology

The southern two thirds of the claim block is underlain by rocks of the Cambro-Ordovician Goldenville Formation which consists of greenish-grey coloured greywackes which form the south dipping limb of a regional syncline. These greywackes have been intruded by the Devono-Carboniferous Sabeans Lake pluton, part of the South Mountain Batholith. The pluton consists of grey, medium to coarse grained, porphyritic leucomonzogranite. The contact zone between the greywackes and the pluton are faulted by a regional shear zone called the Tobeatic Shear. This shear has been the focus of intense hydrothermal alteration which has completely altered the hosting plutonic and sedimentary rocks into a zone of complete silica replacement generally flanked by very strong kaolinite and quartz development. This alteration has been traced through drilling and geophysics for about 6,400 meters along strike over widths of 150 to 400 meters. Bedrock geology is presented in Figure 4-1.

The Goldenville Formation is intruded by granitoid rocks of the Devono-Carboniferous Sabeans Lake pluton, which is part of the South Mountain Batholith. Granitic units vary from leucocratic to a light grey colour, medium to coarse grain, equigranular to porphyritic textures. Muscovite is common and composes 1-6% of the unit. Biotite may also be present but is generally less than one percent. Intrusive units are fresh and massive in appearance outside areas of pronounced shearing. Proximal major shear zones, granitic units become highly fractured and contain moderate to strong iron, hematite and chlorite staining along most fractures.

The central portion of the property is underlain by a 100 to 200 metres wide, northeast-trending, quartz-kaolinite breccia zone, which dips at approximately 50 to 70 degrees to the southeast. The zone is emplaced along a major shear (Tobeatic Shear Zone) and has been traced north to the Clyde River and south to Frog Pond, a distance in excess of 7 kilometres. The core of the zone is occupied by 25 to 75 metres wide zone of high purity brecciated quartz. The quartz zone maintains a width of 40 to 75 metres, however, to the north it becomes more braided in appearance with zones narrowing to 20 to 30 metre width. In general, the quartz breccia is massive, white in appearance, but locally may be highly fractured and/or friable. Diamond drilling in the zone is extremely slow and bit wear is excessive. Quartz breccia zones are enveloped by quartz-kaolinite +/- metasediment breccia zones varying in width from 10 to 60 metres.

The northwesterly most quartz-kaolinite zone forms the footwall to the quartz breccia, dipping moderately to the southeast and varying in width from 15 to 30 metres. It has a highly fractured, shear, broken appearance and is white to creamy white in colour. The zone is composed of 20 to Figure 4-1 Bedrock Geology



SYMBOLS

(not all symbols occur on map)

- Rock outcrop, probable outcrop, float X A ⊗
- Geological boundary — gradational
| < 100 m; > 100 m |
- Anticline (defined, approximate, overturned)
- Syncline (defined, approximate, overturned)
- Preferred orientation of feldspar megacrysts (horizontal, inclined, vertical, dip unknown)
- Breccia
- Shear zone, with central mylonite zone
- Dyke or vein: ALBI-albitite; APPG-aplite with minor pegmatite; DIAB-diabase; ELVA-elvan; LUGR-leucogranite; LUMZ-leucomonzogranite; LUPO-leucoporphyr; MIAP-mica aplite; MONZ-monzogranite; PEGM-pegmatite; PEGMZ-zoned pegmatite; PGAP-pegmatite with minor aplite; PORP-porphyr; QTZ-quartz (indicated if mineralized); all unlabelled dykes are apites; < 1 m-thin lines > 1 m-heavy lines (inclined, vertical, dip unknown) ...
- Diamond-drill hole (DDH; reference number from N.S.D.N.R. drill hole database and assessment reports) ● 82158

COMMON MINERAL ABBREVIATIONS

ad-andalusite; am-amethyst; ap-apatite; as-arsenopyrite; at-autunite; bi-biotite; bo-bornite; ca-calcite; cc-chalcocite; ks-cassiterite; cp-chalcopyrite; ch-chlorite; cd-cordierite; cy-chrysocolla; fl-fluorite; gn-galena; gr-garnet; he-hematite; il-ilmenite; ka-kaolinite; ma-malachite; man-manganese mineral; mo-molybdenite; mu-muscovite; po-pyrrhotite; py-pyrite; qtz-quartz; sh-scheelite; sl-sillimanite; sp-sphalerite; se-sericite; to-torbernite; tr-tourmaline; wo-wolframite.

COMMON ALTERATION ABBREVIATIONS

ALB-albitization; CHL-chloritization; DES-desilicification; HAA-high alumina; HEM-hematization; KAO-kaolinitization; LIM-limonitization; POT-potassic (which includes biotitization and K-feldspathization); SAU-saussurization; SIL-silicification; *intense and pervasive in capitals; slight to moderate in lower case.*

- Approximate Study Area
- - - - - Mining Lease Boundary
- - - - - Claim Block Area (Approximate Boundary)

BEDROCK UNITS

- GOg** Goldenville Formation
- DCImDL** Davis Lake
- GOH** Halifax Formation

Reference: Nova Scotia Department of Natural Resources, 1994
Wentworth Lake, N.T.S. Sheet 21A/04 and part of 20P/13



| | | | | | |
|---------|---|-------|-----------|-------------|------------|
| TITLE | Bedrock Geology | DATE | Oct. 2001 | PROJECT NO. | 20232A |
| PROJECT | Environmental Registration Document White Rock Mine Flintstone Rock, Nova Scotia | SCALE | 1:50000 | FIGURE NO. | 4-1 |
| | | DRAWN | SAG | | |

50% coarse white kaolinite cementing light grey, angular quartz clasts that range in size from 0.5 to 5.0 cms. Erratic massive white silicified bands, up to 2 metres in width, occur locally within the clay zone. Accessory flaky muscovite (mica) is common and forms 1 to 5% of the unit. Within sections proximal to the leucogranite, (lower contact), iron and hematite staining is very pronounced and the unit becomes much more sheared to mylonitic in appearance.

Kaolinite bearing zones overlay the quartz breccia, forming a hanging wall along the southeasterly portion of the zone. The hanging wall breccia zones vary considerably in both width and composition. Laterally they pinch and swell along strike and vary in width from 5 to 60 metres. Typical kaolinite may be found as narrow layers and fracture fillings cementing angular quartz clasts and as remnant primary clay produced from the intense kaolinization of leucogranite. Kaolinite has a soft white to white grey colour and range in percent by volume from 10 to 50% and average 25%. In areas proximal to the upper breccia-leucogranite contact, shearing is moderate to strong and portions of the leucogranite are highly kaolinized. Iron and hematite staining may be present. Zones have a friable sheared appearance, and may contain massive white quartz bands up to 1.5 metres in width.

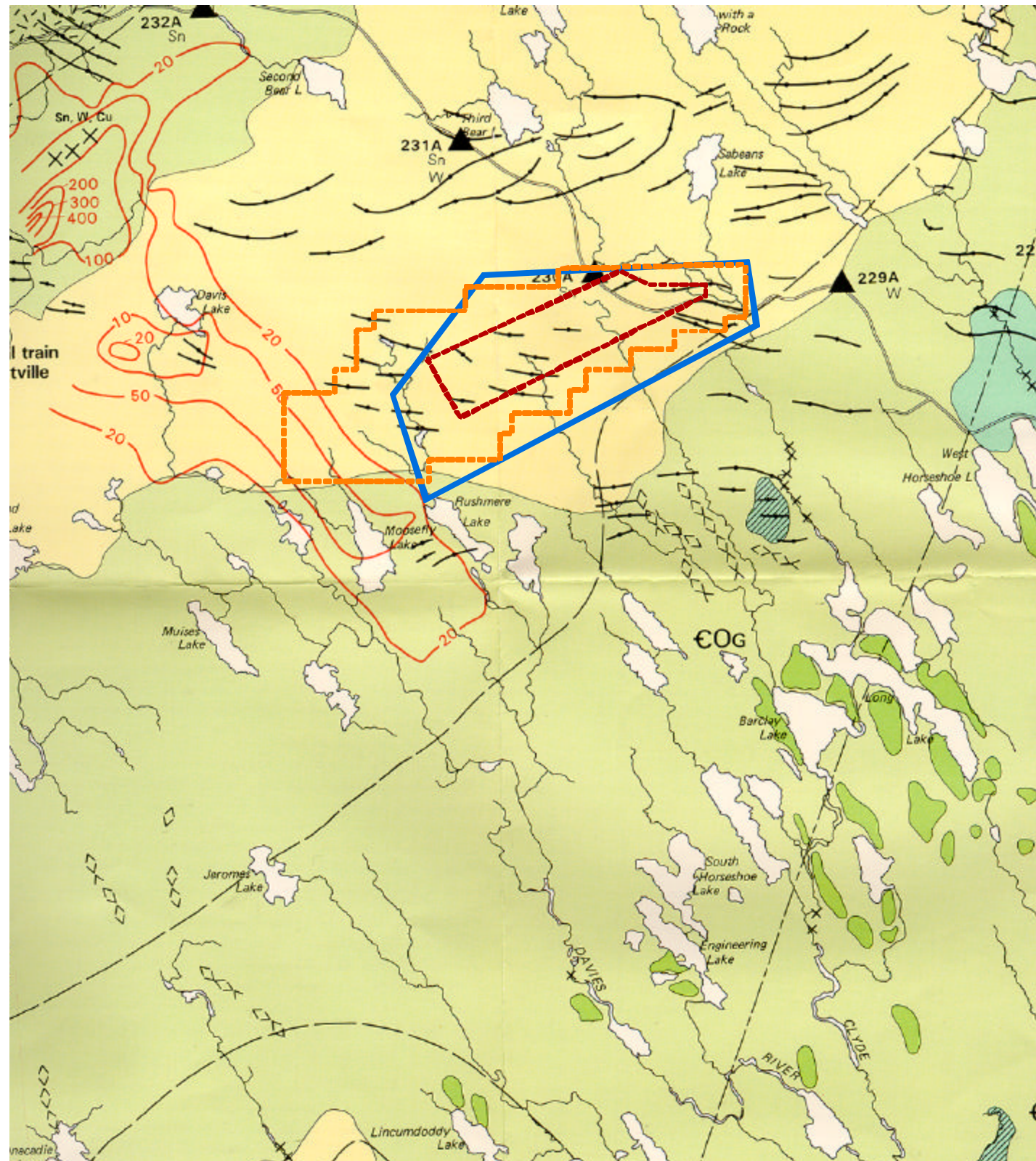
Quartz-metasediment breccia interlayers with quartz-kaolinite breccia in the hanging wall. The metasediment breccia is tan to pale green colour, and composed of highly silicified angular quartzite fragments healed and cross cut by white aphanitic quartz. Fragments are 1 to 4 centimetres in size, angular shaped, and comprise 20 to 60% of the breccia. Minor coarse white kaolinite is noted in the unit. It composes from trace to 4% of the unit and is found filling small vugs and coating fractures in sheared areas. Mild to moderate iron and hematite staining is noted locally. Typically the breccia occurs as irregular discontinuous layers varying in width from 10 to 30 metres.

Surficial deposits of granite till and drumlin facies overlie the majority of the claim block. The till facies consist of greyish orange to yellowish brown loose sandy, angular cobble-sized clasts. The drumlin facies are similar in color to the till facies, however, in some places they are compacted with a finer matrix. Quartzite till and drumlin facies overlie the southern tip of the claim block. The till facies consist of bluish grey, loose, sandy, angular cobble-sized clasts with siltier matrix in metamorphosed terrane. The drumlin facies can be relatively compact. This blanket of surficial material results in no exposed bedrock and numerous scattered boulders of varying sizes throughout the claim block. Surficial geology is presented in Figure 4-2.

4.3.3 Environmental Geology

The environmental geology of the site and adjacent areas was examined using existing data from published sources. Two items of note were examined in detail, those being possible uranium presence associated with the granitic material and acid producing materials associated with the Meguma Group strata.

A spectrometer survey (to detect radiation) was carried out at the White Rock Mine by NSDNR staff on September 21, 2000. No anomalous radiation was detected. An excerpt from the letter report provided by NSDNR is as follows with the full letter contained in Appendix C.



SYMBOLS

- Bedrock geological boundary.....
- Surficial geological boundary.....
- Glacial striae (sense of ice movements known, unknown.....
Note: numbers indicate relative age, 1 being older)
- Tin dispersal train contour.....
(Analysis of entire -10 + 100 mesh fraction of till, value in ppm)
- Drumlin.....
- Moraine (ribbed).....
- Esker (direction of flow unknown).....
- Bedrock outcrop.....

- Approximate Study Area
- - - - - Mining Lease Boundary
- - - - - Claim Block Area (Approximate Boundary)

SURFICIAL MATERIALS UNITS

- Outwash
- Ice Contact Stratified Drift
- Ablation Till
- Granite Till facies including Drumlin facies
- Granzite Till facies including Drumlin facies

BEDROCK UNITS

- EO₁** Goldenville Formation, Grey Wacke, Slate
- EO₂** Goldenville Formation, Metamorphosed Equivalent
- DC₁** Granitied

Reference: Province of Nova Scotia Department of Mines and Energy, 1982.
Pleistocene Geology, Sheet B



| | | | | | |
|---------|---|-------|-----------|-------------|------------|
| TITLE | Surficial Geology | DATE | Oct. 2001 | PROJECT NO. | 20232A |
| PROJECT | Environmental Registration Document White Rock Mine Flintstone Rock, Nova Scotia | SCALE | 1:100000 | FIGURE NO. | 4-2 |
| | | DRAWN | SAG | | |

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“A Urtec Differential Gamma Ray Spectrometer, Model UG135, was used to examine representative drill core samples, exposed bedrock in the area of the excavation work, and float in the general vicinity of the property for potential uranium mineralization. The unit was set to read total count (full spectrum radiation above 80 keV). No anomalous readings were encountered in either the drill core or any of the bedrock or float material examined on the property. The silica and kaolinite/quartz breccias had very low background values and the results for the locally derived granitic float examined on the property carried typical background values for intrusive rocks in the area.”

Based on this information uranium issues are not identified for the site area.

Acid rock drainage is a naturally occurring process that occurs when sulfide minerals are exposed to atmospheric oxygen and water to produce a diluted form of sulfuric acid. Acid rock drainage can be neutralized by the presence of carbonate minerals in bedrock. Acidification occurs when the acid producing potential of the exposed sulfide minerals is greater than the acid consuming ability of the carbonates in the exposed bedrock. Samples of quartz and kaolinite from the White Rock Mine identified the acid producing potential and acid consuming ability as 0.12 and 2.21 for silica and <0.03 and 2.21 for clay respectively. These values identify that the acid consuming ability of the silica and clay from the area are in the magnitude of 1800 % and 7300 %, respectively, greater than the acid producing potential. The pH values for the silica and clay were reported as 6.2 and 5.95 respectively. According to these results there should be no concern of acid rock drainage caused by mining activities at the site, however, monitoring of waste water runoff, local streams and groundwater will be completed throughout the life of the mine which includes monitoring for pH.

TABLE 4-1: ACID-BASE ACCOUNTING TESTING

| Sample | pH | S (Total) % | Acid Producing Potential (kg/t) | Acid Consuming Ability (kg/t) |
|----------|------|----------------|---------------------------------------|-------------------------------------|
| Silica I | 6.20 | 0.004 | 0.12 | 2.21 |
| Clay I | 5.95 | <0.001 | <0.03 | 2.21 |

Notes: I Bulk quartz from the 2000 sample program – east of Route #203.
I Kaolinite

4.4 Atmospheric Conditions

Climate

The climate of the southwest Nova Scotia region is typified by moderate to heavy rainfall amounts and moderate temperatures due to the effects of marine bodies in comparison to other Atlantic Canada regions.

Site climate varies slightly from coastal areas in southwest Nova Scotia in that it has slightly less rainfall and a greater temperature range due to higher highs in the summer and lower lows in the winter.

Table 4-2 presents 30-year climate normals data from the Kemptville meteorologic station located approximately 20 kilometres west of the site. Other local stations at Shelburne and Yarmouth exist however discussions with Environment Canada representatives noted that the Kemptville station would be most representative of the interior southwest Nova Scotia regions. Highlights of the data in Table 4-2 include:

- annual rainfall is 1242.6 mm which is 85.2% of total precipitation (1458.6mm).
- all months of the year have recordable rainfall.
- precipitation is relatively uniform in distribution between all months in the 100 mm/month range.
- snowfall is typically recorded for October through May and totals 216.2 mm for the 30 year normal.
- the daily maximum rainfall event was approximately 120mm recorded in September 1980.
- temperature data indicates that average daily maximums range from +0.4 to 20.7°C.
- the extreme minimum temperature on record is -21.1°C and the extreme maximum on record is 30.0°C.
- the mine site area typically has only three months (December, January and February) where the daily mean temperature is below 0°C.

Air Quality

Regional air quality can be affected by natural conditions, local point sources, distant point sources and mobile sources. Air quality in southwest Nova Scotia is affected most by influences from the northeastern United States as regional sources near the White Rock Mine do not exist. Wind direction (from the west) is both effective in carrying airborne contaminants from the US but also in dispersing effects.

The White Rock Mine site is located in an area that has no heavy industry and very limited light industry. Forestry operations, limited aggregate pits and transportation of goods along existing roads have been identified as existing sources, which could effect air quality. All of these sources are dispersed effectively and are not felt to be problematic for the White Rock Mine development. Roadways adjacent to the mine site are paved and are not known to impact local air quality. Air quality legislation is well established and understood by Black Bull Resources.

Sound/Noise

Sound and noise are considered contaminants as they can cause an effect in a plant/animal species. Point sources of noise (unwanted sound) need to be identified and managed effectively to reduce or eliminate impacts. The site area is one that has low levels of ambient noise with logging operations, recreational activities (ATV's) and vehicle traffic being identified as sources.

Surface mining activities involve the use of equipment that will generate sound/noise. Black Bull understand the legislation and seeks to comply with all requirements through the use of well maintained equipment.

Monitoring of air and sound/noise will be part of the environmental monitoring plan at the White Rock Mine. Some information is contained in Section 6 and additional information will be submitted when the application for the Industrial Approval occurs.

TABLE 4-2: CLIMATE DATA (40 YEAR NORMALS)- YARMOUTH AND KEMPTVILLE **

| Yarmouth Data | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sept. | Oct. | Nov. | Dec. | Year |
|----------------------------------|---------|---------|---------|---------|----------|---------|----------|----------|---------|---------|---------|---------|--------|
| Temperature | | | | | | | | | | | | | |
| Daily Maximum (°C) | 0.7 | 0.4 | 3.8 | 8.4 | 13.5 | 17.6 | 20.4 | 20.7 | 17.8 | 13.2 | 8.4 | 3.3 | 10.7 |
| Daily Minimum (°C) | -6.8 | -7.1 | -3.4 | 0.8 | 5.1 | 9.2 | 12.1 | 12.4 | 9.4 | 5.3 | 1.3 | -4.3 | 2.8 |
| Daily Mean (°C) | -3 | -3.3 | 0.2 | 4.7 | 9.3 | 13.4 | 16.3 | 16.5 | 13.6 | 9.3 | 4.8 | -0.4 | 6.8 |
| Extreme Maximum (°C) | 13.3 | 12.8 | 16.2 | 22.4 | 24.9 | 28.3 | 30 | 29.4 | 29.4 | 25 | 18.8 | 16.1 | |
| Date | 1986/27 | 1976/02 | 1984/16 | 1990/28 | 1989/18 | 1957/17 | 1977/20+ | 1975/11+ | 1969/02 | 1970/09 | 1977/04 | 1950/11 | |
| Extreme Minimum (°C) | -21.1 | -21.1 | -17.6 | -9.4 | -2.2 | 1.7 | 5.8 | 2 | -2.3 | -3.9 | -9 | -20 | |
| Date | 1951/31 | 1943/16 | 1989/07 | 1946/01 | 1972/11+ | 1945/03 | 1977/08 | 1990/11 | 1980/29 | 1974/22 | 1986/20 | 1942/20 | |
| Degree-Days | | | | | | | | | | | | | |
| Above 18° C | 0 | 0 | 0 | 0 | 0.5 | 0.7 | 5.4 | 8.4 | 1.9 | 0.1 | 0 | 0 | 17 |
| Below 18° C | 653.4 | 603.7 | 552.5 | 400.5 | 269.7 | 139.4 | 59.6 | 53.7 | 134.3 | 270.8 | 395.1 | 573.4 | 4106 |
| Above 5° C | 1.3 | 0.9 | 5.5 | 29.2 | 135.4 | 251. | 348.9 | 357.7 | 257.6 | 137.8 | 44.9 | 9 | 1579 |
| Below 0° C | 117.5 | 111.8 | 45.7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 4.7 | 6.1 | 350 |
| Days With | | | | | | | | | | | | | |
| Maximum Temperature >0° C | 18 | 15 | 25 | 30 | 31 | 30 | 31 | 31 | 30 | 31 | 29 | 23 | 324 |
| Freezing Precipitation | 2 | 2 | 2 | * | 0 | 0 | 0 | 0 | * | 0 | * | 2 | 8 |
| Fog | 4 | 5 | 6 | 8 | 12 | 15 | 20 | 19 | 12 | 8 | 6 | 4 | 120 |
| Thunderstorms | * | * | * | * | 1 | 2 | 2 | 2 | 1 | * | * | * | 12 |
| Sunshine (Hrs) | 71.5 | 97.3 | 139.1 | 176 | 212.5 | 231.3 | 209.7 | 211.7 | 180.7 | 151.6 | 94 | 64.5 | 1821.8 |
| Station Pressure (kPa) | 100.78 | 100.84 | 100.81 | 100.80 | 101.00 | 100.93 | 100.99 | 101.08 | 101.24 | 101.21 | 101.00 | 100.90 | 100.96 |
| Moisture | | | | | | | | | | | | | |
| Vapour Pressure (kPa) | 0.43 | 0.41 | 0.51 | 0.68 | 0.95 | 1.29 | 1.58 | 1.61 | 1.33 | 1 | 0.74 | 0.52 | 0.92 |
| Rel. Humidity- 0600L (%) | 82 | 80 | 81 | 86 | 89 | 91 | 93 | 93 | 91 | 87 | 83 | 82 | |
| Wind | | | | | | | | | | | | | |
| Speed (km/h) | 21 | 21 | 21 | 19 | 17 | 16 | 14 | 14 | 15 | 17 | 20 | 21 | 18 |
| Most Frequent Direction | NW | NW | NW | NW | W | S | S | W | W | NW | NW | NW | NW |
| Extreme Hourly Speed (km/h) | 89 | 108 | 77 | 85 | 80 | 58 | 56 | 64 | 97 | 97 | 81 | 76 | |
| Direction | S | S | NE | E | E | N | SE | SE | SE | SE | NW | W | |
| Extreme Gust Speed (km/h) | 134 | 163 | 137 | 121 | 113 | 93 | 85 | 80 | 132 | 137 | 130 | 122 | |
| Direction | S | SW | W | E | E | N | E | S | S | SE | NW | N | |
| KEMPTVILLE DATA | | | | | | | | | | | | | |
| | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sept. | Oct. | Nov. | Dec. | Year |
| Precipitation | | | | | | | | | | | | | |
| Rainfall (mm) | 81 | 65.6 | 80 | 110.1 | 110.7 | 104 | 106.8 | 98.4 | 106.9 | 114.7 | 145.7 | 118.8 | 1242.6 |
| Snowfall (mm) | 60.8 | 52.4 | 32.9 | 9.6 | 1.5 | 0 | 0 | 0 | 0 | 1.8 | 7.9 | 49.2 | 216.2 |
| Precipitation (mm) | 141.7 | 118.1 | 112.9 | 119.5 | 112.2 | 104 | 106.8 | 98.4 | 106.9 | 116.5 | 153.7 | 168 | 1458.6 |
| Daily Extreme Rainfall (mm) | 90.4 | 64.5 | 66.6 | 68 | 68.6 | 66 | 93.5 | 110.7 | 119.6 | 85.1 | 107.2 | 90.9 | |
| Date | 1978/14 | 1955/07 | 1985/12 | 1984/16 | 1972/16 | 1982/29 | 1964/05 | 1952/18 | 1980/14 | 1959/01 | 1975/13 | 1967/04 | |
| Extreme Daily Snowfall (mm) | 35.6 | 40.6 | 30.5 | 15.2 | 12.7 | 0 | 0 | 0 | 0 | 17.8 | 30.5 | 25 | |
| Extreme Daily Precipitation (mm) | 90.4 | 64.5 | 66.6 | 68 | 68.6 | 66 | 93.5 | 110.7 | 119.6 | 85.1 | 107.2 | 90.9 | |
| Date | 1978/14 | 1955/07 | 1985/12 | 1984/16 | 1972/16 | 1982/29 | 1964/05 | 1952/18 | 1980/14 | 1959/01 | 1975/13 | 1967/04 | |
| Month-end Snow Cover (cm) | N | N | N | N | 0 | 0 | 0 | 0 | 0 | 0 | N | N | |
| Days With | | | | | | | | | | | | | |
| Measurable Rainfall | 6 | 4 | 6 | 8 | 10 | 10 | 9 | 8 | 8 | 9 | 11 | 8 | 98 |
| Measurable Snowfall | 10 | 9 | 6 | 2 | * | 0 | 0 | 0 | 0 | * | 2 | 9 | 38 |
| Measurable Precipitation | 15 | 12 | 11 | 10 | 10 | 10 | 9 | 8 | 8 | 9 | 12 | 15 | 130 |

** Data from Kemptville and Yarmouth (temperature only) meteorological stations located 20 kilometres west and 40 kilometres southeast of the site respectively.

4.5 Watercourses and Surface Water Quality

The regional watercourses are numerous with the Roseway, Clyde and Tuskent Rivers being the dominant features. A large number of small lakes and ponds also litter the landscape. Just east of the site the Clyde River drains north to south and the East Barclay and Barclay Brooks exist on the site draining north to south as well. Baseline data collection at the White Rock Mine site has included surface water evaluations (location, character and quality). A compilation of all collected surface water data is presented in Appendix D.

Surface water samples were first collected at four locations (SW-1 through SW-4) within the Clyde River and East Barclay Brook during the spring and summer 2000 by W.G. Shaw and Associates. Two more locations (SW-4 and SW-6) were added within the Clyde River, East Barclay Brook and Barclay Brook watersheds in fall 2000. These samples were collected on April 3, May 28 and August 28, 2000 by W.G. Shaw & Associates.

Surface water samples were collected by MGI Limited (MGI) at seven (7) monitoring stations within the Clyde River, East Barclay and Barclay Brook watersheds beginning in April 2001 and continue on a monthly basis. Samples were collected according to CCME protocols for surface water and shipped in coolers to lab facilities in accordance with Canadian Association of Environmental Labs (CAEL) protocols. These stations consists of SW-1 through SW-6 and Lower Frog Pond. In addition, ponded water from the bulk sample extraction area to the east of Route 203 was also sampled. The samples were collected on April 25, June 1, June 28 and July 26, 2001 at the locations shown on Figure 4-1. Additional data for two other sampling locations (SW-8 and SW-9) has been provided by Dillon Consulting Ltd. These samples were collected on June 6, 2001. All surface water locations are noted on Figure 2 of Dillon's Biological Data report in Appendix E.

The samples were collected in proper containers and preservatives added if required. The samples were shipped in temperature controlled containers to Philip Analytical Services in Halifax, Nova Scotia for chemical analyses for general chemistry (RCap), metals, and total suspended solids (TSS). This lab is a CAEL certified facility.

All brooks draining the areas were sampled and monitored during the duration of the bulk sample program. Results show no variation in any of the parameters measured. The pH level of water in the silica pit on the north side of Highway #203 averaged 6.0 and the kaolin pit south of Highway #203 averaged 7.4. Both of these values are well above background levels as measured in all the brooks that drain the area. This pH fraction by the exposed kaolin/quartz creates opportunities for fisheries habitat enhancement through pH increases.

The results of the chemical analyses of the samples illustrate considerable continuity of hydrochemical signatures within the three watersheds and considerable continuity from season to season. The surface hydrochemical signatures indicates the waters are very fresh (TDS = 12 mg/L to 64 mg/L), very soft (hardness = 1.3 mg/L to 7.4 mg/L and acidic (pH = 4.1 to 6.3).

The baseline program from April 2000 to present indicates that most chemical parameters conform to the

Canadian Council of the Ministers of the Environment (CCME) Guidelines for Freshwater Aquatic Life with the exception of a few select metals. The laboratory reported aluminum and lead levels to be consistently in exceedence of the CCME guideline at each monitoring station sampled throughout the monitoring program, with the exception of lead being below guideline at SW-5 for the June 1, 2001 and at SW-9 on the June 6, 2001 sampling event. The laboratory also reported instances of copper, iron levels being above guideline for select sampling events. Zinc levels were reported above guidelines at SW-2 throughout the sampling program. The collected background data notes that certain parameters are above applicable guidelines and therefore need to be monitored on a long term basis. Please refer to Section 6 for additional information on the importance Black Bull has placed on monitoring.

The higher than average pH value of 6.3 for the sampling location SW-1 on April 3, 2000 may be due to the presence of some limestone material that is reported to have been deposited approximately 10 years ago as part of a river liming experiment. The exceedences of pH, aluminum and iron are characteristic of surface waters in the area due to acidic precipitation, low buffering capacity of the surficial materials and bedrock and to the high availability of aluminosilicates within the surficial materials and bedrock.

To Black Bull's knowledge there are no current or proposed industrial water users within the Clyde River watershed system downgradient of the site. As part of Black Bull's submission for an Industrial Approval additional information on present and possible surface water supply scenarios will be put forward. Further, a proposed Environmental Monitoring Program will be put forward which will involve surface water program details including monitoring station locations, parameters to monitor, frequency of monitoring and reporting formats for review by NSDEL.

TABLE 4-3: SURFACE WATER MONITORING STATIONS PHYSICAL DESCRIPTIONS

| SITE NO. | DESCRIPTION |
|-----------------|--|
| SW-1 | On Clyde River upstream of claim block. |
| SW-2 | On Clyde River downstream of claim block. |
| SW-3 | On East Barclay Brook west and upstream of proposed extraction areas. |
| SW-4 | On East Barclay Brook west and downstream of proposed extraction areas. |
| SW-5 | On the Barclay Brook west of proposed extraction areas. |
| SW-6 | On the Barclay Brook west of proposed extraction areas. |
| SW-7 | Not used due to dry conditions. |
| SW-8 | At outflow from Upper Frog Pond. |
| SW-9 | At inflow to Lower Frog Pond. |
| PIT POND | Settling pond near the bulk sample extraction area, east side of Highway #203. |

4.6 Regional and Local Hydrogeology

The site lies within a region of abundant surface water and limited groundwater resources due to thin surficial materials and bedrock units which are typically low yielding and commonly have exceedences of drinking water guidelines for several parameters. Regional movement of groundwater is controlled by topography with localized groundwater flow patterns affected by water shed and local topographic variations. The granitic material in the site area is documented (NSDOE) to have water which is elevated in hardness, iron, and total dissolved solids when compared to Meguma Terrane materials (greywacke, slate).

Within the site area there are no known water supplies. The closest documented water well is located approximately 11.7 kilometres south of the White Rock Mine site in Upper Ohio. To Black Bull's knowledge there are no present or planned third party groundwater users in the vicinity of the White Rock Mine. No water supplies have been developed at the site as part of the exploration or advanced exploration phases of the project. Black Bull anticipates developing an on-site groundwater source for domestic use at the processing facilities. The site is underlain by two units, the surficial materials (sand) and bedrock (granite and greywacke) which could yield water. Yields up to 50 Igpm could be expected from screened wells where the deposit thickness and groundwater level are sufficient while bedrock wells in the granites and nearby quartzites can be in the 5-20 Igpm range. Cummulative yields from the mining lease area could be in the order of 100-150 Igpm with a properly developed series of wells with adequate spacing. Black Bull will conduct additional work to outline local capabilities for groundwater development.

4.7 Aquatic Habitats

4.7.1 Fisheries Habitat Study

Dillon Consulting Limited (Dillon) was sub-contracted to MGI to complete fisheries habitat assessment work. The work was completed in two time periods in order to gather spring and fall run salmonid data.

The fall 2000 and spring/early summer 2001 fisheries habitat work involved:

- an initial assessment of fish habitat and fish species in East Barclay Brook, Barclay Brook and tributaries identified at 1:10000 scale within the study area;
- an investigation of fish habitat and fisheries at Lower and Upper Frog Pond;
- an assessment of habitat at the Clyde River, at stations upstream and generally downstream of the study area, and a determination of fisheries habitat from existing information; and
- an initial evaluation of potential for species at risk for the study area based on existing information and targeted field surveys in the Barclay Brook, East Barclay Brook and Lower Frog Pond areas.

Fish habitat examined in the fall of 2000 and spring/early summer of 2001 included portions of East Barclay Brook, Barclay Brook, Upper Frog Pond and Lower Frog Pond as well as the Clyde River. Habitat assessments were conducted using standard Department of Fisheries and Oceans (DFO) parameters. Electrofishing was conducted in East Barclay and Barclay Brooks. Water levels were too high in the Clyde River and Frog Ponds to electrofish. Existing information was used along with habitat surveys to evaluate the Clyde River. Angling surveys and minnow traps were used in the Frog Ponds. Electrofishing sites, habitat features, watershed boundaries and surface water sampling sites are identified. Personnel from DFO

were present for portions of the surveys, including Peter Winchester (DFO Southern Nova Scotia Area Habitat Coordinator), Reg Sweeney (DFO Habitat Management Branch) and Richard Dollimont (DFO Fisheries Officer).

Results of the fish habitat surveys indicate that the Clyde River has habitat suitable for adult and juvenile salmonid rearing as well as other fish use. East Barclay Brook has low flow within the claim block area but does support limited brook trout habitat within a southern portion of the claim block. Barclay Brook has limited fish habitat due to low flow, particularly in the northern portion of the claim block. Upper and Lower Frog Ponds and associated stillwaters support brook trout as well as other fish species. Appendix E presents the full fisheries habitat survey information within the Biological Data Collection Reports.

4.7.2 Wetland Habitats

Wetland habitat evaluations were completed by Dillon through review of existing NSDNR Wetlands Habitat mapping and field surveys through 2000 and 2001. This information is best reviewed in the Dillon report, Appendix E. Dillon mapping outlines one wetland (Wetland #11) where the extraction area will affect approximately 0.4 ha of this 0.87 ha wetland. Black Bull is aware of legislation relative to wetland disturbance. It is anticipated that applications will be made to NSDEL relative to the Wetlands Directive as part of the mine development at the Industrial Approval stage for Wetland #11.

4.8 Terrestrial Habitats

4.8.1 Introduction

Several ecologically significant features and species at risk are known to occur south of the study area and in the general south-central Nova Scotia area as reported in the *Re-evaluation of the Shelburne Barrens as a Site of Ecological Significance* (MacKinnon 1997). Potential for species at risk for the study area was evaluated based on known distributions and habitats of at risk species and a comparison with habitat potential in the study area. In addition, directed field surveys were conducted to further assess rare plants, herptiles and birds.

4.8.2 Plant Survey

The botany field survey report (November 2000) presented in Appendix E details plants found in each of the generalized habitats identified.

A botany survey was undertaken in the fall of 2000 to provide a preliminary assessment of potential for rare plants and to focus further field investigations. An initial assessment of habitat types was determined based on air photographs. The field survey targeted the typical habitats present as well as habitats with potential for at risk plant species. Although rare plants were not identified during the initial survey follow-up assessment was recommended for July and late August/September of 2001.

The July 2001 botany survey identified two plant species listed within the provincial rare plant atlas (Pronych and Wilson 1993). *Bartonia* (*Bartonia virginica*) occurs along the ATV trail primarily east of Barclay Brook. This plant is listed as Canadian Priority 4 and by NSDNR as having Yellow status

(sensitive, but not at risk of immediate extinction), but is fairly common in southwestern Nova Scotia. Southern twayblade (*Listera australis*) was identified in red maple/sphagnum/cinnamon fern swales east of Barclay Brook. This plant is listed as nationally imperiled (Canadian Priority 2, Global G4) and has few records in Nova Scotia. An additional assessment identified two main swales as having this plant species, uncorrected locations of main locations from Garmin GPS were:

1/ N 44° 03.182

W 065° 35.829 @ 13:02:36

2/ N 44°03.011

W 065° 36.240 @ 14:49:31

3/ N 44° 03.027

W 065°36.236 @15:03:09

4.8.3 Regional and Local Habitats

The study area is predominantly in the Flintstone Barrens ecoregion area. A small portion of the eastern study area is within the Dog Lake Semi-Barrens. The Tobeatic Wilderness Area is located in the eastern corner of the study area. Indian Fields Provincial Park Reserve is also located in the vicinity of the site, over 2 km south of the study area.

The Flintstone Barrens is an area of hummocky undulating terrain with low granitic bedrock controlled hills and ridges. Intervening low areas have bogs, swales, fens, streams and imperfectly drained flats. Erratic boulders are abundant and soils dominated by sand with gravel/cobble/boulder (MacKinnon 1998). The barrens are characterized by vegetation suited to the thin granitic soil, areas of exposed granite bedrock, forest fires, leaching, low fertility and establishment of heath vegetation (Davis and Browne 1997. *The Natural History of Nova Scotia*). Heath vegetation such as huckleberries and lambkill dominate the upland barrens having a patchy distribution. Along the hummock tops, open areas of exposed bedrock barrens are dominated by lichen-bearberry-broom crowberry associations. As fires tend to be controlled, some of the barrens areas are slowly developing forest cover resulting in semi-barrens habitat. Semi-barrens habitats tend to be a mix of huckleberry-lambkill and white pine-black spruce-intolerant hardwoods. Forest vegetation, dominated by red maple, occurs in drainage swales (stream valley corridors and red maple or alder cinnamon fern-sphagnum swamps). Wet areas have black spruce and tamarack in addition to red maple. Small ericaceous shrub bogs are prevalent throughout the area. One small fen was observed along a Barclay Brook tributary.

The Dog Lake Semi-barrens, located along the southern portion of East Barclay Brook and the Clyde River, is an undulating plain with shallow iron pan and imperfectly drained soil (MacKinnon 1997). Vegetation is typically a mix of black spruce and ericaceous shrub semi-barren.

Barrens and semi-barrens are typically unproductive for wildlife habitat, with the exception of some mammals and moose. Semi-aquatic wildlife are expected to include beaver, otter, muskrat and waterfowl (Davis and Browne 1997). Migratory birds identified were typical of the habitats present. Waterfowl production is generally low due to low fertility of wetlands and watercourses. Wildlife observations during field surveys, including a breeding bird survey, are presented in Appendix E.

4.8.4 Sensitive Habitats and Species

Ecologically significant features and species at risk are known to occur south of the White Rock Mine and the general area of south-central Nova Scotia. Evaluations of published information and field surveys were completed to outline potential habitats and interactions with the mine development. Species at risk were identified and avoidance/mitigation plans developed using Dillon and contact with regulatory agencies. Please refer to Section 6 for information on the habitats and species identified as well as the proposed approach to limiting or eliminating impact through monitoring, mitigation and avoidance.

Additional details of the at risk species surveys are provided in the Dillon report, Appendix E.

4.9 First Nations Mi'kmaq Knowledge

4.9.1 Introduction

The Confederacy of Mainland Mi'kmaq (CMM) was retained by Black Bull Resources Inc. to conduct a Mi'kmaq Knowledge Study (the study) for the proposed Quartz, Kaolin and Mica Project located along Route #203 at Flintstone Rock. The study area consisted of the exploration claim block area but also was expanded, as needed, to the surrounding area outside of the claim block.

The purpose of the study was to identify Mi'kmaq use and concerns with respect to the project. To accomplish this, the study consisted of three main components:

- 1. Historical Review;**
- 2. Mi'kmaq Use Study; and**
- 3. Mi'kmaq Significant Species Survey.**

The rationale for completing this work was three fold. Firstly a review of historical information within the Mi'kmaq Community would provide valuable information as a check on the level of archaeological assessment being done thus increasing the integrity of the work completed.

Secondly, conducting a Mi'kmaq Use Study would establish Mi'kmaq Use of the area within living memory. This information would provide the proponent with known Mi'kmaq Use and possible concerns with the proposed undertaking and assist the proponent with design of possible mitigation plans for site areas.

Thirdly, conducting a Species Survey would provide the proponent with information on species of significance (plants and animals) to Mi'kmaq which would not normally be considered as important within current environmental legislation.

Although all of the components of the Study were completed separately, it was important to ensure that every member of the study team were made aware of any information generated so that the Study would be as comprehensive as possible. The conclusions and recommendations of the information generated

during the study are believed to be a representative sample of Mi'kmaq interests. A copy of the full report generated by CMM is attached as Appendix F.

4.9.2 Historical Review

A historical review was completed by the CMM research department in an attempt to identify information regarding Mi'kmaq use for the project site as well as surrounding communities. For this, both internal and external sources were consulted.

For the most part, there was little information found that relates directly to Black Bull's claim block. There was, however, information generated for the surrounding area. The most significant information generated was for the Rocky Lake area located between 2 and 3 kilometers south of the proposed extraction areas. According to the archives, a Jacques-Pierre Peminuit Paul known to Mi'kmaq as Saq Pie'l Sakmaw was born at Rocky Lake on January 5, 1800 and died on January 10, 1895 in Shubenacadie. This information indicates that there was Mi'kmaq habitation and use within the general area. Additional documentation is included in Appendix F.

4.9.3 Mi'kmaq Use Study

The Mi'kmaq Use Study was completed by gathering input from several Mi'kmaq Communities regarding past use of the study area. To help achieve this, the Treaty and Aboriginal Rights Research Center (TARR) was consulted for any existing information which could have been gathered for the area and contacts for Elders and hunter/ gatherers which could possibly provide information.

All communities identified for involvement have been visited and several interviews were conducted. There was not any specific information gathered from living memory on Mi'kmaq Use within the claim block but there has been some general information on the use of the Tusket, Clyde and Roseway River systems as travel ways for Mi'kmaq People. Again, this information indicates that there was Mi'kmaq use within the general area.

4.9.4 Mi'kmaq Significant Species Survey

A survey of plant species which are known to be significant to Mi'kmaq was conducted in the study area. Emphases was given to concentrating on drainage areas but all habitat types were thoroughly visited to determine what plant species were present. A number of plants were identified which are considered to be of significance to Mi'kmaq. For reporting purposes, 6 separate categories of plants and their uses have been made. They are:

- | | |
|-----------------------------|-------------------------------|
| 1. Medicinal Use- | 42 plants were identified; |
| 2. Food- | 23 plants were identified; |
| 3. Beverage- | 8 plants were identified; |
| 4. Tool or Implement- | 12 plants were identified; |
| 5. Craft, art or finishing- | 5 plants were identified; and |
| 6. Social or Ceremonial- | 8 plants were identified. |

To determine “significance,” or a negative impact on Mi’kmaq learning and culture, the results were tested against four criteria (distribution, frequency, importance, and reconciliation and cross-check). See Appendix F for a complete listing of these identified species.

4.9.5 Conclusions

The following conclusions are based on interpretation of the data collected during the Mi’kmaq Knowledge Study:

1. Historical Review - No Mi’kmaq use was identified within the Black Bull claim block but Mi’kmaq habitation and use was identified within the surrounding area (specifically Rocky Lake);

2. Mi’kmaq Use Study - No specific Mi’kmaq use was identified within the Black Bull claim block area but Mi’kmaq Use within the surrounding area include the use of the Tusket, Clyde and Roseway River systems as travel routes;

3. Mi’kmaq Significant Species Survey - Plants identified within the study area do not demonstrate a negative impact on Mi’kmaq learning or culture as tested against the four significance criteria utilized.

4.9.6 Recommendations

The following recommendations were put forward by CMM to Black Bull Resources. These recommendations have been either acted on (see Section 6.0 for mitigation plans for encountering First Nations artifacts) or consultative processes established for ongoing relations to find satisfactory solutions (see Section 8.0 for information on Land Management Plan).

1. Due to the fact that Mi’kmaq use and occupation has been established outside the Black Bull claim block but within the study area, any clearing or grubbing as a result of mine operations should be aware of possible Mi’kmaq artifacts which could be encountered. It is felt that mine operations be made aware of this potential and precautions taken to protect artifact resources, if encountered;
2. Mi’kmaq feel that the taking of any resources (i.e. plants) which are significant to Mi’kmaq should be compensated by the protection of habitats within the surrounding area. Moreover, the discovery of Rocky Lake having a potential settlement in the area should be considered in any protection/land use plan for the surrounding area. This will be addressed in the Land Management Plan which will be submitted with the Surface Lease Application.

4.10 Archaeological and Cultural Resources

Archaeological Survey

In October 2000, Cultural Resource Management (CRM) Group was retained by MGI to undertake the archaeological component of the Fall 2000 environmental baseline study work for the White Rock Mine area at Flintstone Rock in northeastern Yarmouth County.

The goal of the archaeological screening was to assess archaeological potential within the limits of the claim block. To achieve this goal CRM Group President and Senior Consultant, W. Bruce Stewart, directed a program of background research, consultation and on-site visual inspection to search for indications of archaeological resources and modern disturbances. The field work component, implemented with the aid of Staff Archaeologist Mike Sanders and assistant Sam Gallagher, was undertaken on October 26 and 27, 2000 according to the terms of Heritage Research Permit A2000NS44 (Category "C") issued by the Nova Scotia Museum.

The background research component of the project was designed to reveal the land use history of the study area, providing an historical framework that would assist in the evaluation of archaeological potential. This study involved the resources of several record centres, including the Nova Scotia Museum, the Provincial Archives of Nova Scotia, the Department of Natural Resources Library and the Halifax Land Information Centre. Materials examined included the Maritime Archaeological Resource Inventory, early maps, aerial photographs and historic documents. CRM Group site visitation and consultation with local hunters and foresters added first-hand knowledge of the study area's recent past and current condition.

Sub-surface testing was conducted only in areas seen to have significant archaeological potential. In total, five test pits were manually excavated by trowel to subsoil, a depth averaging 30 centimetres below surface. No artifacts were encountered. Each of the test pits was carefully backfilled and tamped to restore the ground surface to its original appearance.

As a result of background research, consultation and visual inspection it has been determined that the Black Bull claim block in Flintstone Rock, Yarmouth County contains two areas of heritage significance - Aggies Rock and Porcupine Rock. The remainder of the claim block is considered to have low archaeological potential. A copy of the survey report is presented as Appendix G.

4.11 Transportation and Infrastructure Shipping Options

4.11.1 Transportation Infrastructure

Regional transportation infrastructure is limited to paved and unpaved roads which have been in southwest Nova Scotia for some time. Roadways link most locations of industrial activity to marine shipping via port facilities at Shelburne, Yarmouth and Weymouth. Since the closure of the East Kemptville Tin operation the roadways in the mine site area have been utilized under capacity for commercial and passenger use.

The White Rock Mine proposes to use the existing roadways (Route 203) to Shelburne, and Route 340 to Yarmouth and Weymouth. Route 203 is an all season paved 200 series highway which has spring weight restrictions. Route 340 is a paved all season highway which has spring weight restrictions. There are three proposed port locations available for seaward shipment of product produced at the White Rock Mine

location. These include the ports in the towns of Shelburne, Yarmouth and Weymouth. The proposed transportation routes to these locations are as follows:

Shelburne – Primary Port - Transport of product to the Town of Shelburne would leave the mine site on unpaved mine site roads to Route 203. Trucks would travel south on Route 203 to Route 3 where they would turn east and continue into the Town of Shelburne to arrive at the dock facility.

Yarmouth – Secondary Port - Transport of product to the Town of Yarmouth would leave the mine site on unpaved mine site roads to Route 203. Trucks would travel north on Route 203 to Carleton where they would travel southwest on Route 340 to Hebron. At Hebron trucks would travel south on Route 1 into the Town of Yarmouth where they would meet Route 3. On Route 3 the trucks would travel west and continue into the port of Yarmouth to arrive at the dock facility.

Weymouth – Secondary Port - Transport of product to the Town of Weymouth would leave the mine site on unpaved mine site roads to Route 203. Trucks would travel north on Route 203 to Carleton where they would travel north on Route 340 to St. Bernard. At St. Bernard trucks would travel east on Route 1 to the Town of Weymouth and into the dock facility at Weymouth Harbour.

The product would be shipped from the port facilities using a variety of ocean going barges and transport vessels. The proposed transportation routes are outlined on Figure 3-2. Black Bull is currently evaluating several options for use or ownership/use of waterfront industrial properties in the proposed port locations. All properties being examined offer deep water access and have space sufficient to have a storage facility for products and access to loading facilities. Black Bull has had several meetings with key municipal and local development agencies to assist in the identification of suitable properties. As the port area of Shelburne has existing infrastructure and is active, the proposed Black Bull use of waterfront space and the facilities is in line with the existing use and future development. Additional information will be submitted on port infrastructure (loading/storage facilities) for the Industrial Approval.

Information from Mr. Don Evans with NSDTPW Vehicle Compliance Division indicated that Highway 203 from Shelburne to the former tin mine is a Schedule C highway, the maximum allowable for hauling in Nova Scotia without a special permit. It allows trucks with 18,000 kg on the drives and a triple axle trailer with wide spread axles (greater than 10 feet) to carry 26,000 kg. Each axle is allowed a tolerance of an additional 500 kg. Therefore the total permissible allowance for the trailer would be 27,500 kg.

There are no Spring weight restrictions on Schedule C Highways. However, the Project team was informed by Mr. Gerard Chisholm with NSDTPW in Shelburne that spring restrictions were placed on Highway 203 a few years ago because of the poor conditions during break-up. Mr. Chisholm also indicated that a vehicle survey conducted on Hwy. 203 approximately 3 km north of Hwy. 103 (approximately 35 km south of the site) in August 2000 counted 830 vehicles per day. A survey at the same location in 1994 counted 990 vehicles per day. Another survey conducted 2 km east of Carleton (approximately 15 km west of the site) on Hwy. 203 during August 2000 counted 650 vehicles per day.

Based on this information the Black Bull related traffic would be approximately 10-30% for workers, and 10-20% for transport trucks (based on approximately 80 round trips per day to the port facilities) for Route #203 to the south and north of the White Rock Mine, based on 250 workers at full production all with their

own vehicle.

4.11.2 Shipping Options

Port facilities exist at several nearby communities to the White Rock Mine. The following have been evaluated for suitability.

Shelburne, Nova Scotia

The Port of Shelburne comprises of two docks, with two Industrial Business Parks which contain the necessary ship yard and shipping loading infrastructure that is associated with active multi-use ports. The “F” shaped dock is capable of handling ships up to 30,000 tonnes and has depth at the dockside of 9.2 metres. The dock is approximately 117 m long on the end of the “F” and 140m in length along the side of the “F.” The second dock is known as the Town Dock, which can handle ships up to 25,000 tonnes and has a depth at dockside of 6.8m. This dock is approximately 150m long. The Canadian Navy expanded the port in the early 1940s for use as a back up port.

Yarmouth, Nova Scotia

The Port of Yarmouth has numerous docks, wharf’s and support buildings. There is not a specific Industrial Park; rather the port infrastructure has developed along the waterfront for hundreds of metres. The port has a reported depth of 6.1m at dock side, which may limit the loaded tonnage to approximately 20,000 tonnes. There are numerous passenger and large vehicle ferries that depart from the port on regularly scheduled basis.

Weymouth, Nova Scotia

The port facilities at Weymouth are limited to shallow draft ships or vessels. The dock is approximately 30m long with an estimated 4.0m depth of water at dockside. This dock is privately owned and is primarily used to stockpile and load wood chips onto barges for shipping to Saint John, New Brunswick. There is limited infrastructure at Weymouth. This port could be utilized for shipping quartz products via barge(s).

4.12 Socio-Economic Environment

The White Rock Mine project is located in a sparsely populated area of southwestern Nova Scotia in the northeastern corner of Yarmouth County. Yarmouth County operates at a municipal government level in a series of Districts of which the site area is in the Argyle District. Local employment is primarily forest industry with Shelburne and Yarmouth being the regions major centers and the site being located approximately equidistant between the two along existing roads. Census and employment/education information was obtained for both Shelburne and Yarmouth Counties due to the site location. This information was compiled and is presented in Table 4-4.

TABLE 4-4: CENSUS DATA – YARMOUTH AND SHELBURNE COUNTY

| | YARMOUTH COUNTY | SHELBURNE COUNTY | NOVA SCOTIA |
|---|-----------------|------------------|-------------|
| DEMOGRAPHICS | | | |
| Population | 27,310 | 17,002 | 909,282 |
| Population Growth (1991-1996) | -2.1% | -2.0% | 1.0% |
| Population Density (per Km ²) | 13.1 | 7.2 | 16.7 |
| % attained high school (over 25 yrs of age) | 53.5% | 44.3% | 62.9% |
| EMPLOYMENT | | | |
| Unemployment Rate | 13% | 19% | 13.3% |
| Youth Unemployment Rate | 23.8% | 24.7% | 23.3% |
| EMPLOYMENT INDUSTRY | | | |
| Manufacturing | 14.8% | 23.4% | |
| Retail Trade | 13.9% | 10% | |
| Fishing/Trapping | 11.9% | 20.7% | |
| Health & Social Services | 11.5% | 7.0% | |
| Wholesale Trade | Less than 2% | 5.8% | |
| Avocation/Food | 6.9% | Less than 2% | |
| Construction | 6.0% | Less than 2% | |
| Education Service | Less than 2% | 5.3% | |

4.13 Regulatory Environment

4.13.1 Overview

The permitting setting for mine development in Nova Scotia is governed by two lead provincial agencies, namely the departments of Natural Resources and Environment and Labour. Federal involvement is related primarily to the Canadian Environmental Assessment Act. Municipal legislation also applies to certain aspects of mine development. Legal counsel and environmental consultants have provided Black Bull advice on applicable legislation for this project. Black Bull has used the document "A User's Guide to the "One Window" Process for Mine Development Approvals" published by DNR as a guide for the activities at the White Rock Mine site. A copy of this document is provided as Appendix H.

4.13.2 Federal

In general, federal policy relating to the development of natural resources lies mainly in promotion and support for research rather than specific guidelines on resource extraction procedures. Aspects of mine development such as protection of surface water and groundwater quality relate directly to existing fresh and surface water quality guidelines administered by the Canadian Council of the Ministers of Environment (CCME). Federal legislation and supporting regulations exist to govern alterations and/or damage to fish habitat, surface water quality and archaeological resources.

Black Bull is aware of all applicable federal legislation pertaining to this development and is confident that they will meet or exceed requirements and have developed site specific monitoring and mitigation plans in response to regulatory interests.

4.13.3 Provincial

Black Bull and their consultants are aware of applicable provincial legislation relative to the permitting and operation of the White Rock Mine as proposed. Black Bull has and will continue to work closely with regulators to ensure compliance with applicable permit/approval requirements. Black Bull is aware that the Environmental Assessment Approval would come with conditions relative to operations and monitoring.

4.13.4 Municipal/County

The Municipal/County level regulatory requirements relating to this undertaking are limited. We understand that municipal level requirements relate to building codes/design, signage and road construction. Black Bull intends to meet all requirements at the municipal level.

5.0 PUBLIC CONSULTATION

Black Bull has undertaken a public consultation program which commenced in June of 2000. During the ensuing 17 months, the principals of the company and their consultants have met with numerous stakeholder groups. This includes residents along the RR1 Shelburne and RR1 Kemptville roads and members of the general public in Southwest Nova area of the province. Of additional importance, Black Bull initiated and has maintained contact with the local environmental groups such as, but not limited to, the Tuskent River Environmental Protection Association, the Tobeatic Wilderness Committee, and Clyde River Association.

The company has also discussed the project with environmental groups that represent broader environmental interests in the province, such as the Ecology Action Center. Further, Black Bull has briefed elected and regulatory persons associated with the government of the province. The following sections provide greater detail on these programs of contact.

5.1 Communications With Residents Of The Project Area

5.1.1 Background

The area surrounding the project site is sparsely populated. The site is located in the center of the southwestern part of the province and is in an area that is, topographically speaking, not well suited for residential population. The #203 Highway links the project site with the Town of Shelburne which is a possible shipping terminal for mined materials. Along this highway, starting approximately twelve (12) kms east of the project site, there are a number of dwellings. The number of dwellings increases as one approaches the Town of Shelburne. There are a number of fishing/game camps owned by private individuals in the project area. These camps are on Crown land and are under special lease arrangement with the Province.

5.1.2 Program of Contact

Over the past fourteen months, a pro-active program of contact has been conducted with residents. This includes a public open house held in Middle Ohio, Nova Scotia in August of 2000. From this open house, a mailing/contact list was developed for the purposes of providing follow-up responses to questions raised at this session and for forwarding of future mail-outs. In May of 2001, a series of open houses were held to provide information about progress on environmental and development matters for the project. These latter sessions were held in Shelburne, Middle Ohio, Tuskent, Barrington and Yarmouth. In the time between the public open houses, the project principals have met with many residents of the area.

5.1.3 Issues and Needs

The purpose of engaging residents in discussion is to better learn of the questions and concerns they may have of the project. Additionally, it was the intent of the project proponents to provide technical answers to questions and, where reasonably possible, provide mitigations and/or changes to project plans. A number of such questions arose in the consultations with residents of the project area. These include truck traffic along Highway #203, employment and mine start up timing and local benefits, size of mine site, water course management, kaolin run-off, dust control, kaolin production and the environmental review process

for the project. From the earliest public open house session, it was clear that residents of the area wished to be kept informed of progress with the environmental and development aspects of the project. Black Bull Resources has actively followed through on this stated need.

5.1.4 Responses

Following the initial consultation session in August of the 2000, Black Bull Resources engaged a team of environmental consultants. The purpose of this engagement was to start the necessary environmental fieldwork to meet regulatory requirements, as well, to provide a means to meet the on-going information needs of residents and other stakeholders. In December 2000, Black Bull Resources was therefore able to provide written mail-out responses to those questions first raised at the August open house. Some of the questions raised at the first session have prompted the following activities:

- review of kaolin containment systems,
- review of dust control systems,
- development of hire/contract locally policy,
- development focus towards value added processing facilities at/near to the site, and
- review of transportation options.

At the recent open houses the company has been able to present more detailed development and environmental mitigation plans.

5.1.5 Conclusion

Residents of the project area and those along the Highway #203 have been formally contacted as early as August of 2000. During the past fourteen months, the company has maintained communications with these individuals either by pre-arranged formal contact (either in small groups or individually) or by ad hoc contact. A more formal round of public information sessions has been held in May 2001. In the intervening period, and for the foreseeable future the company has and will be able to respond to questions by providing technical responses from its environmental team and/or development/engineering personnel.

5.2 Communications with General Public

5.2.1 Background

For the purposes of this section, the term 'general public' refers to persons who are outside of the immediate project area and are not necessarily a member(s) of a special stakeholder group as it relates to this project. These persons are central to the broader socio-political-government context for the project and thus should be informed about project developments and their opinions accounted for. Thus the company initiated a proactive program of contact with this important stakeholder group.

5.2.2 Program of Contact

The company has conducted two rounds of public information sessions, these occurring in the late summer of 2000 and in spring of 2001. These attracted individuals from the immediate region of the project, special interest groups, and some individuals wishing to do business with the company. In some cases, these public information sessions took place as far away as 75 kilometers from the project site area (for example; The

Town of Yarmouth). Advertisements were placed in newspapers such as the Yarmouth Vanguard, with a paid circulation of 7,350 people. This served to enhance the possibility of attracting individuals to the open houses. It also served to build general awareness of the project regardless of whether individuals came to the information session. As a result of this advanced notification, some members of the general public participated in the information sessions. For follow-up, a mailing list was created of participants at the open houses and correspondence has been periodically sent. Principals of the company responded to and initiated a number of media interviews, these first occurring in the fall of 2000. During this period the company has distributed a number of news releases referring to developments with the project. These were distributed to national, regional and local publications. This media coverage has served to broaden the exposure beyond the immediate region of the project. The company developed a website at www.blackbullresources.com. This site is regularly updated and contains general information about the company, its finances, its projects, and update news releases.

5.2.3 Issues and Needs

By way of media articles and general feedback at public information sessions, questions and comments of the project include the value of the project as a potential employer in the Yarmouth area, the potential number of employees/contracts and tax contribution and other economic contributions to the community. With respect to environmental matters there have been a number of questions relating to the following:

- the offset of the economic contribution versus a perceived environmental risk of the project,
- the possible effect of the project on the near-by Tobeatic Wilderness Area,
- watercourses in the general surrounding area,
- explanation of kaolin containment systems,
- tailings management systems, dusting and noise matters,
- production processes given extraction of certain types of minerals and at various productions levels, and
- truck traffic.

5.2.4 Responses

The company believes that questions related to its proposed mine operations were satisfactorily handled. These questions were mostly straightforward information inquiries. However it was clear that during this questioning, a primary focus was on ensuring that watercourses remained unaffected by operations and the discharge and separation systems were of high operational order. The company took this under advisement and has indicated that it and its technical/environmental consultants will work with provincial government regulators to ensure that containment systems meet high standards and, as a result, much-valued watercourses around the site are fully protected. Beyond watercourses, the company was questioned on matters related to flora and fauna. Details of the native and non-native flora and fauna/environmental assessments appeared to satisfy these questions. The possible impact of the mine on the Tobeatic Wilderness Area was raised a number of times. Related to this was discussion of sustainable and non-sustainable development and mining projects. The company has indicated that it will work with independent technical and environmental consultants as well as government regulators to ensure that its operations do not affect the TWA. Questions related to buffers in or outside are viewed as part of government policy to which government can best respond. With regard to trucking along the Highway #203, the company has

responded by indicating that the highway was purpose-built for trucks and for much higher volume levels than anticipated (at least for the near future) by the company. The company has indicated that it will work with its transportation contractor to maximize public traffic safety and minimize any public inconvenience. Regarding on-going community input into the project, the company will establish a Community Liaison Committee consisting of a variety of local and regional stakeholder groups.

5.2.5 Conclusion

Black Bull Resources believes that it has created a sufficient level of public and media awareness of the project. Further, it believes that it has engaged members of the public in a dialogue on matters of interest to them. On technical and environmental issues related to mine operation, responses have been provided. In the case of containment systems and protection of waterways, the company has acknowledged concerns and has paid particular attention in the design of its operations at site. On questions related to border buffers between wilderness areas and the mine site, the company has attempted to satisfy any concerns by way of plans to minimize impacts, and to keep an ongoing “open door” working relationship with all concerned stakeholders.

5.3 Communications with Environmental Groups

5.3.1 Background

There are number of environmental organizations that exist near to the project area. As well there are a number of province-wide environmental organizations that could have interests in the project. The project exists near to a designated wilderness area (The Tobeatic Wilderness Area) and a previous mine operation, several kilometers from the Black Bull site, which has had environmental issues related to watercourses.

Thus the project proponents were encouraged by local officials to make contact with these various organizations. Representing local environmental interests were such organizations as; Tusket River Environmental Protection Association (TREPA), the Clyde River Protection Association (CRPA) and The Tobeatic Wilderness Committee (TWC). Representing the broader provincial/regional interests are the Ecology Action Center (EAC), the World Wildlife Fund (WWF) and the Sierra Club of Canada (SCC).

5.3.2 Program of Contact

Frequent contact has occurred with the key local environmental groups such as TREPA, CRPA, and the TWC. This contact occurred in August of 2000 at the first open house in Middle Ohio. Thereafter, regular contact was made in the form of individual telephone contact and group meetings. With respect to the provincial/regional organizations a briefing meeting was held July 2001 with the EAC. Over the past several months, ongoing contact has been made with the Sierra Club as well as a request for a briefing meeting. The WWF was advised of the project in the fall of 2000 with several individual contacts.

5.3.3 Issues and Needs

Environmental organizations near to the project site area posed questions related to kaolin containment systems, watercourse management, mine water in-fill, habitat protection and reclamation, and material

processing systems. Specifically related to the Tobeatic were questions on; possible mine cross border effects into the wilderness area such as blasting, fauna migration patterns, dusting, and noise matters. The environmental organizations that have a more provincial/regional focus posed questions similar to the above with greater focus on the Tobeatic.

5.3.4 Responses

Responses have been developed by the environmental and/or development team of Black Bull and these have been discussed with the various local environmental organizations. At this stage of the project, the responses have been adequately received. These organizations have indicated a desire to be permitted to observe practices at the site as development and operations are undertaken. As well there is a desire to examine stipulations to environmental permits and responses in preparation of operating permits. In terms of the mine and the near-by Tobeatic Wilderness Area, the company has committed not to seek any approvals to mine or explore in the Tobeatic and to allow for a 50 meter buffer area. The companies are cognizant of the issue of potential mine effects such as dusting and blasting and has undertaken to observe operational practices that reduce or eliminate such occurrences.

5.3.5 Conclusion

For the past year Black Bull Resources has been in contact with environmental organizations that have an interest in the project. Some of these organizations have local environmental interests and others have interests which are provincial and regional in nature. The environmental and technical consultants associated with this project have attempted to answer all questions that have been posed by these organizations. Particularly with respect to local organizations, the contact has been regular. In the cases of provincial/regional organizations, the contact has been by way of briefing meetings and telephone contact. This contact has allowed for the proponent to better understand sensitivities associated with the development and operations of the project as well as provide for mitigations were reasonably possible.

5.4 Communications with Native Communities

5.4.1 Background

There are a number of native communities in the Southwest part of Nova Scotia. Some of these are located in the general area of the proposed mine site area. Black Bull Resources felt it appropriate to initiate a proactive program of communications with representatives of these native communities. This program of contact commenced in the fall of 2000. At that time, verbal and written contact was made with the Union of Nova Scotia Indians and the Confederacy of Mainland Mi'kmaq. These two organizations have representation from all 13 Mi'kmaq Communities in the Province of Nova Scotia.

5.4.2 Program of Contact

A number of meetings were held with executive and technical persons associated with the Confederacy. These meetings were held in late 2000 and throughout the winter, spring, and summer 2001. At the same time, informal updates were provided to the Union. In April 2001, a meeting was held in Bear River, Nova Scotia for the purposes of a project briefing for the Chiefs of the Confederacy. As well, an onsite tour of the mine was held for various Chiefs and their guests. In June 2001, a project-briefing meeting was held

with the Chief Deborah Robinson, Chief, Acadia First Nation and her advisors. Regular contact continues with native environmental and executive persons.

5.4.3 Issues and Needs

Early in the program of communications, native representatives raised a number of issues. These included the need to examine the proposed mine site area for native archeological, valued and medicinal plants, historical harvesting and gathering activities, and environmental interests. Whilst non-native environmental studies were being conducted at the site, it was also considered important to include a native perspective in some of these studies. Of particular interest to native communities was the planning for future and on-going site reclamation, and on-going resource and environmental management within the proposed mine lease area.

5.4.4 Responses

In view of the above issues, Black Bull Resources felt it appropriate to commission a Mi'kmaq Knowledge Study undertaken by a team of native persons. This study consisted of three parts; Historical Review, Mi'kmaq Use Study, and Mi'kmaq Species of Significance Study. Key parts of these studies have been previously detailed (Section 4.9) in this report. Additionally, Black Bull Resources felt it appropriate to have additional native inclusion in the project beyond the initial research component. This inclusion now extends to land use and environmental planning for the proposed mine lease area as well as roles for First Nations in on-going environmental monitoring.

5.4.5 Conclusion

Black Bull Resources has undertaken a program of communications with native communities in the Southwest part of the Province. This communications has expanded into mutually beneficial native studies as well as plans for land use and environmental planning followed by on-going environmental monitoring at the site.

5.5 Communications with Elected Persons

5.5.1 Background

The Black Bull Project is located in the Southwest Nova area of Nova Scotia. Whilst the mine site is located in Yarmouth County, this project has number of other factors that could relate to other political jurisdictions of the area. These factors include the location of the proposed shipping terminals, the number and home locations of workers who will work at the mine site, the broad geographical area of the valued ecological systems that would be associated with the mine site, the location of the mine site visa-vis the Tobetic Wilderness Area, the potential of economic impact to the general southwest area of the province, the previous existence of Rio Algom tin mine in the same area as the mine site and, associated with this, the occurrence of a number of environmental incidents. Black Bull Resources felt it appropriate to contact elected persons to advise them of the project and to seek their input on the best manner of public consultation for the area. Additionally, the company wanted to ensure that elected persons were continuously briefed such that they could respond to the on-going inquiries of their constituents.

5.5.2 Program of Contact

Contact with elected persons began in the late summer of 2000. The contact included Mayors and Councilors of the Town of Shelburne, Wardens and various Councilors of the Counties in Southwest Nova, Members of the Legislatures (MLAs) including Ministers of the Provincial Cabinet who are part of the area (or have portfolio responsibilities for the area) and the two Federal members of Parliament (MPs). As part of the program of contact with elected persons, the Leader of the (Provincial) Liberal Party and the New Democratic Party's critic for environment and natural resources have been periodically updated. This contact has included formal and informal briefings, written and verbal updates, as well as forwarding of news releases issued by the company.

5.5.3 Issues and Needs

Elected persons of the area expressed a number of concerns and needs regarding the project. These are as follows; the need for the project proponents and consultants to contact local environmental groups including the Tuskent River Environment Protection Association (TREPA), CRPA, and TWC. Additionally, they expressed the need for contact with residents of the area, a program to maximize the possible hiring of local persons and contractors in view of the closure of the near-by tin mine. With respect to local environmental groups and residents, there was a need expressed by elected persons to ensure that Black Bull commissioned the proper environmental studies and undertake mitigations and communicate these to interested parties. Additionally, it was requested that the project proponents undertake a series of open houses and public information sessions in the general area as project details developed.

5.5.4 Responses

In view of these stated concerns and needs, Black Bull hosted an open house in Lower Ohio, Shelburne County. This occurred in the late summer of 2000. This provided an opportunity for the project proponents and the environmental consultants to learn of the specific issues of interests to residents and environmental groups of the area. These issues were logged and then provided to the environmental consultants in order that specific studies or inquiries could be made to satisfy questions. These responses were then put in writing and mailed out (following the open house) to the participating individuals. Further, this initial input served to expand and/or modify some of the studies being undertaken at the site. Consistent with the request of elected persons, extensive contact was made with TREPA, CRPA and the TWC, these being identified as the principle environmental groups of the area.

In term of a local benefits policy and the desire for local hiring and contracting in the area, the company has initiated some actions. These include the development of a local hiring employee roster and similar with respect to contractors. The company has also committed to local officials to ensure that hiring and contracting will be done with local content as a top priority. The company has explored with the Province of Nova Scotia the arrangement of local community college training for potential employees. As well the company is in contact with the local Regional Development Authority to explore contracting opportunities out of the southwest area of the Province.

5.5.5 Conclusion

Black Bull Resources has conducted an extensive program of contact with elected persons of the area. The purpose of this contact has been to ensure that the project is developed in a manner consistent with the will of the people of the area as expressed by themselves and through their elected representatives. The company has benefited by this contact in that direction has been given on key issues and needs associated with the development of a project of this type.

Documentation from the May 2001 public information sessions is included as Appendix I.

6.0 IMPACTS AND MITIGATION PLANS

The proponent understands the location of the development is within an area of the province with significant and unique natural features. Black Bull has undertaken to seek input and information from all existing sources in order to design a mining operation which is compatible with the short and long term objectives of habitat creation, minimization of disturbance and to be a player in a program of preserving natural areas for the benefit of all. Black Bull has several initiatives that display this commitment including a linkage with the Nova Scotia Nature Trust for purchasing assistance in natural areas, with CRPA for fish habitat creation, with CMM for land management and creation of interpretative trails with traditional healing plants.

The White Rock Mine will create impacts, both beneficial and harmful, to the local communities and environment. Harmful impacts will require mitigation plans and monitoring. Mitigation plans are designed to eliminate or reduce the impacts to acceptable levels. Monitoring plans are designed to determine if the levels of impact are within acceptable ranges and adjustment to the design of mitigation plans will be made where the level of impact is not acceptable. The determination of whether an impact is acceptable or not is most often determined by existing guidelines. In some cases, mitigation plans can result in overall enhancement of local environments. The role of monitoring and the specific monitoring plans which Black Bull intends to complete as part of this undertaking are more fully explained in Section 7. The remainder of this section outlines the approach which will be taken by Black Bull in minimizing known and potential effects through the use of environmental protection plans, monitoring data and mitigation plans.

6.1 Physical Environment - Air Quality and Noise, Surface Water, Groundwater, Liquid Effluents, Habitats (Terrestrial and Aquatic)

6.1.1 Air Quality and Noise

Known and Potential Effects

Known localised effects on air quality will occur due to activities at the project site which will create gases and particulate from equipment, disturbed areas presently vegetated and processing of raw materials. Gas emissions can result from vehicle exhaust, blasting, processing of raw materials and in some cases from off-gassing of natural materials. Vehicle exhaust from mine equipment such as haul trucks, excavators and bulldozers will occur in the pit area and stockpiling operations. Blasting creates some gases as well as particulate through blasting action. The natural materials which will be disturbed as part of the development of the White Rock Mine (quartz, sand and clay) are not known sources for off-gassing. Gas emissions from the processing areas may occur due to exhaust from heat sources. Known particulate sources at the proposed undertaking would include localized sites within the extraction areas, stockpiles and processing plant material (raw materials, overburden, barren rock) transfer points, areas not yet revegetated, haul roads and blasting points.

Similar concerns are noted for the storage and shipping facilities proposed for the Shelburne Industrial Business Park with Black Bull aware of these concerns and designing for minimizing or eliminating concerns through on-site practices.

Mitigation Plan

NSDEL has developed the Nova Scotia Air Quality Standards which use components of the Environment Canada's National Atmospheric Protection Service (NAPS) guidelines. Black Bull intends to meet all applicable legislation through a mitigation plan which identifies sources, develops mitigation methods and monitors performance, and provides for changes to procedures as required.

Gas Emissions - Identified known and potential sources for gas emissions will be mitigated through the use of approved equipment which is able to meet or exceed all applicable legislation. Monitoring of the effectiveness of the emissions systems will be part of the overall equipment maintenance program on a frequency prescribed by the manufacturers of the equipment and legislation.

Particulates - Identified known and potential sources for particulates will be mitigated through the use of the following measures at the mine site:

- revegetation of disturbed areas when reclamation plan objectives for backfilling of areas are reached
- limits on vehicle speeds on haul roads
- dust control measures on haul roads
- use of limited numbers of large capacity extraction and hauling equipment
- use of existing vegetation for windblocks and dust capture
- Awet@system for waste materials from processing

Blasting - Several components of the proposed surface mine development will reduce the effect of blasting on the local area. These include the overburden (sand and clay), conducive to dampening blasting effects, fully vegetated areas, no residential areas within 10 kilometres. The legislation related to blasting has been reviewed and is well understood by Black Bull. Monitoring data will be used to determine the degree of mitigation in consideration of ground shock and decibel levels recorded at various distances from blasting activities.

A camp is located approximately 500 metres south of the proposed extraction area adjacent to East Barclay Brook. The property is on land leased from the Province and the owner has been consulted and is aware that blast notification procedures will be worked out with the camp owner.

6.1.2 Surface Water

Known and Potential Effects

Potential effects to surface water conditions resulting from the proposed mine operation and associated activities include:

- \$ erosion and sedimentation as a result of the construction of the surface infrastructure, mine development and stockpiles

\$ improved water quality for fish species due to pH increases

Near stream construction will be minimized at the White Rock Mine and Black Bull is aware of legislation and principles of good construction that will minimize effects of construction. Black Bull and consultants have copies of the NSDEL Sediment and Erosion Control Handbook and have and will continue to use the document as a guide for sediment and erosion control plans for all construction activities. Water courses have been identified through the environmental baseline work completed by Dillon. Buffer zones in accordance with DFO suggest 25 metres with additional zones where wetlands are adjacent to the water courses. Black Bull intends to meet or exceed these and will use the expertise of DFO and fisheries habitat consultants in finalization of buffer zones. The buffer zones will be well marked in the field and modified at the time that mine development activities approach them if conditions have changed from baseline.

Mitigation Plan

Black Bull has paid particular attention to the potential environmental effects associated with both construction and operation of the proposed mine and processing facilities. Care has been taken at all stages of the mine design process to identify all possible erosion and sedimentation issues. Planning and design principles have been adopted to aid in the prevention of siltation events, and to ensure that protective measures are in place during construction activities. These include:

- \$ the area of disturbed lands (including the stockpiles) will be kept to a minimum, using principles of progressive development and reclamation
- \$ buffer zones have been established between existing watercourses and proposed works
- \$ diversion ditches will collect drainage from the toe of the slopes of each of the proposed benches of the stockpiles, to prevent hillside erosion and to provide time for sedimentation to take place
- \$ stockpiles will be progressively revegetated to promote soil stability

Note: the site conditions (low slopes, coarse surficial materials) are such that erosion potential is limited.

In the mining and processing of kaolin the objective is to extract raw materials and process the material to create a finished product. All efforts are therefore made to maximize the amount of kaolin extracted and process which assists in meeting environmental objectives by minimizing the amount of kaolin and fine particles that go to waste and are lost as finished product. Reprocessing of fine materials in settling ponds and waste treatment areas will be evaluated as well to further capture all kaolin.

6.1.3 Groundwater

Known and Potential Impacts

Localized effects to the groundwater system in the surficial materials and bedrock will occur in close proximity to the extraction areas. Black Bull proposes to install a series of groundwater monitoring wells and implement a program to track potential changes in the localized water levels and water chemistry during the course of the mining operations, and the closure phase of the mine. Locations for monitor wells will include the area between the extraction area on the TWA, extraction area and East Barclay Brook, north

of the extraction area, south of the extraction area and between East Barclay and Barclay Brook. Water levels and water quality will be monitored in these wells prior to and during the mine operations. This information will be used as the baseline for comparison of future groundwater conditions. Black Bull and its hydrogeological consultant (MGI) believe that the groundwater conditions will be different than at present, however, any potential effects will be localized and not adversely impact local habitats. There are no known domestic wells within 10 kilometres of the site.

Mitigation Plan

Data gathered through the groundwater monitoring program would be used to design any necessary mitigation plans. Should any negative impacts be identified modifications to pit dewatering procedures and surface water control plans can easily be implemented.

6.1.4 Liquid Effluents

Known and Potential Impacts

Liquid effluent will be generated in the processing plant and directed to a series of settling ponds (Wastewater Treatment Area) for treatment prior to eventual discharge to the environment. Effluent will consist mainly of fine sand, silt and mica. Process chemicals (for blending and pH control) are typically removed through the filtering process. Monitoring will occur at the discharge point to the Treatment Area in order to characterize effluent and make certain that aspects of mine operation such as recovery rates for kaolin and generation of fines from processing are addressed. Compliance monitoring at the discharge point to the environment will be a requirement and Black Bull is aware of current legislation on wastewater quality.

Mitigation Plan

A comprehensive monitoring program will be in place for liquid effluent at the White Rock Mine. Should this program identify any issue of non-compliance, a mitigation plan will be developed using all previously collected data to correct the non-compliance issues. Typically kaolin mines require flocculation to reduce solids in liquid effluent to levels below discharge limits. Flocculation is a natural process which can be assisted by using “flocculants” when required. Based on testing completed by Black Bull the kaolin at the White Rock Mine is amenable to flocculation. The mine design and local soils and topography for the White Rock Mine are such that a series of settling ponds can be developed where the residence time can be long for liquid effluent. The use of “flocculants” will be avoided where possible in favour of methods to reduce sediment load and increase residence time. Note as well that settling pond construction can be completed with ease at the site due to variable bedrock topography and well known location constraints from the environmental baseline work. Where settling ponds are created the reclamation approach would be to leave that area as an aquatic environment by reducing side slopes and encouraging aquatic plant growth. Black Bull will make available environmental monitoring data to the Community Liaison Committee for review. Black Bull will propose a comprehensive surface water and liquid effluent monitoring plan for review by NSDEL as part of the application for an Industrial Approval.

6.1.5 Habitats

6.1.5.1 Wetlands

Known Wetlands

Wetlands within the proposed mining lease area are described in Dillon's Biological Data Collection Report and located in Dillon Figure 4, Volume II, Appendix E. Several wetlands occur in the general area of active extraction/processing areas as listed in Table 6-1.

TABLE 6-1: WETLAND LOCATIONS IN RELATION TO ACTIVE AREAS

| Wetland No. | Distance and Direction from Extraction Area | Distance and Direction from Other Active Area |
|-------------|---|---|
| 11 | Bordering extraction/berm area | over 300m from processing area |
| 8 | 30 m from western end | over 200 m east to processing area |
| 4 | over 50 m to the east of the eastern end | over 1 km |
| 14 | over 100 m south of central area | immediately south of potential future settling ponds |
| 16 | over 200 m south of central area | over 100 m south of potential future settling ponds |
| 6 | over 300 m north west | over 250 m west of the processing area and west of the sedimentation pond |
| 3 | over 600 m north west | over 350 m north west of the processing area and sedimentation pond |
| 1 | over 600 m north | over 250 m north of the processing area |
| 2 | over 350 m north east of the eastern end | over 1 km |
| 18 | over 500 m south of eastern end | over 600m south of potential future sedimentation ponds |
| 15 | over 500 m south of central area | over 500 m south of potential future sedimentation ponds |
| 20 | over 750 m south of eastern end | over 600m south of potential future sedimentation ponds |

Potential Impacts

Potential impacts to wetlands include direct loss of a portion of Wetland No. 11 (0.87 ha) and potential indirect impacts to other wetlands in the general area. Potential indirect impacts could include:

- \$ noise disturbance to resident or migratory species,
- \$ changes to the groundwater and surface water regime, and
- \$ related habitat changes and degradation of habitat through inputs of sediment or other contaminants (such as accidental hydrocarbon spills) carried in surface water.

Mitigation

Loss of a Portion of Wetland No. 11 – It is expected that there is direct loss of 0.4 ha of Wetland 11.

Further study required to determine existing function and to develop appropriate compensation in consultation with NSDNR using principles outlined in the Nova Scotia Wetlands Directive.

Noise Disturbance

Sensitive species were not identified during 2000 and 2001 biological data collection. However, if species are identified mitigation would be incorporated into mine operations as discussed in the at risk species section. Typical measures may include scheduling to avoid sensitive periods, establishment of appropriate separation distances from activities such as blasting or modifications to activities (such as reduction in charges or changing the timing of charges).

Changes to Groundwater Regime

For wetlands within 250 m of the extraction area, groundwater monitoring will be undertaken to determine if effects are occurring. The collected monitoring data will be used to evaluate potential for groundwater effects and additional studies will be undertaken to determine appropriate mitigation or develop compensation. The relatively thin and permeable surficial materials at the site make groundwater effects due to extraction areas and pit dewatering likely but with localized effects.

Changes to the Surface Water Regime

Wetland Nos. 1, 3, 6 and 2 are generally upgradient of the site and are not expected to be affected by surface water changes. Wetland Nos. 18 and 20 are downstream of the sedimentation pond discharge and will be regulated as noted for fish habitat and most likely will be compliance monitoring points as well in the Industrial Approval, when granted. Wetland No. 15 is over 500 m from the site and receives the majority of its surface water locally. Wetlands Nos. 14 and 16 also have no obvious surface water inputs which are expected to be local. Wetland No. 4 is along the Clyde River and the surface water regime will reflect Clyde River flows. These are not expected to be effected as noted under fish habitat, Section 6.1.5.2. Wetland No. 8 is along East Barclay Brook and may be affected by water withdrawals if they are required. Mitigation for fish habitat such as no low flow withdrawal should also mitigate for changes to surface water at this wetland.

Habitat Degradation

The potential for accidental discharge of contaminants to wetland areas will be minimized through development of Environmental Protection Plans, Monitoring and Contingency Plans as part of the Industrial Approval application. Typical wetland protection measures may include;

- \$ maintenance of 30 m undisturbed buffer zone around wetlands.
- \$ direction of water from active areas to sedimentation ponds as outlined for protection of fish habitat and water quality.
- \$ restricting use of pesticides and fertilizers as outlined for protection of fish habitat and water quality.

- \$ erosion and sediment control measures as outlined for fish habitat and water quality protection.
- \$ requirements for fuel and lubricant handling and equipment maintenance procedures such as designation of appropriate refueling and petroleum, oil and lubricants storage areas over 30 m from wetlands, inclusion of drip pans and containment.
- \$ restricting ATV access to wetlands.

Residual Impacts

- \$ Significant residual impacts are not expected given the species and habitat type present and incorporation of mitigation as noted.

6.1.5.2 Fish and Fish Habitat

Known Fish and Fish Habitat

Fish and fish habitat are protected under the *Fisheries Act*. The proposed extraction and processing areas will not occur within 30 m of a watercourse. The nearest watercourse within the site watershed is the East Barclay Brook to the southwest of the proposed extraction area. Fish habitat in East Barclay Brook adjacent to the site is poor and generally provides non-salmonid habitat as outlined in the Dillon Data Collection Report attached. No fish were captured during surveys until over 500 m downgradient of the proposed active area, where brook trout were captured. A potential brook trout spawning and rearing area occurs over 600 m downgradient of the proposed extraction area. The proposed extraction area also extends into the Clyde River watershed in the eastern portion of the site, east of Highway 203. The Clyde River is considered brook trout habitat in the upstream reaches adjacent to the study area and salmon habitat in downstream reaches.

No federally listed COSEWIC at risk aquatic species were noted for the study area. There is some potential for provincially listed at risk aquatic invertebrates to occur in East Barclay Brook or the Clyde River. At risk species are discussed further in a Section 6.1.8.

Potential Impacts

Potentially significant impacts to fish could include indirect mortality, indirect destruction/disruption of fish habitat (including water quality and fish foods) and disruption of seasonal migrations/fish passage.

Mitigation

Indirect mortality of fish could result from introduction of deleterious substances to the watercourses (e.g. accidental hydrocarbon spill), from insufficient low flow provision, sudden and significant changes to pH, excessive sediment deposition on redds or blasting concussion impacts.

Fish Mortality

Mitigation measures proposed to prevent fish mortality include:

- \$ Directing all active area surface water drainage away from the main Clyde River watershed towards the lower quality habitat in East Barclay Brook through diversion berms and ditching and settling ponds.
- \$ The set-back from the Clyde River and berm heights will be sufficient to prevent flood conditions in the Clyde River (1 in 100 year flood) from entering the pit.
- \$ The extraction and disturbed areas account for approximately 14 ha of the Clyde River watershed. This is a very small proportion of the Clyde River watershed at this point (which is over 1200 ha) and is not anticipated to affect flows in the Clyde River.
- \$ If water withdrawal from the Clyde River is required for kaolinite processing Black Bull will apply for NSDOE approval during which a water balance study would most likely need to be completed. If there is potential for reduced flows in the Clyde River during low flow conditions, water will only be withdrawn during high flow periods and will be stored on-site.
- \$ The addition of 14 ha surface area to the East Barclay Brook is not expected to negatively affect the low flow condition.
- \$ Design and construction of settling ponds to meet NSDOE discharge guidelines of average Total Suspended Sediment levels less than 25 mg/L.
- \$ Discharge from site to meet CCME FWAL guidelines or background water quality if natural conditions exceed guidelines.
- \$ pH of site discharge and downstream waters to be monitored daily. Site discharge to be controlled to limit any sudden changes in pH (to be determined on consultation with DFO, such as over 0.5 units within 200 m downstream of discharge within a week). In conjunction with DFO effects on fish habitat of any pH change will be monitored over the short and long term.
- \$ Restriction of use of pesticides and fertilizers on-site.
- \$ Development of an Erosion and Sediment Control Plan as part of site operations including measures such as:
 - maintaining a 30 m undisturbed buffer adjacent to watercourses, including no stockpiling or waste rock storage within this area.
 - maintaining existing vegetation unless actively mining and minimizing exposed areas.
 - direction of surface water from all active areas to sedimentation pond designed for 1 in 25 year rainfall events.
 - management of drainage from stockpiles and waste rock as active areas.

- use of temporary sediment control measures such as silt fence and check dams as appropriate.
- \$ Blasting in the immediate vicinity of watercourses will follow DFO's *1998 Guidelines for Use of Explosives In or Near Canadian Fisheries Waters* requiring written commitment to follow the *Blasting Fact Sheet - Fish and Fish Habitat Protection*.
- \$ Contingencies as part of EPP to prevent and minimize impact of accidental events such as hydrocarbon spills and for storm water control and wet weather shutdowns.
- \$ Conduct monitoring of fish habitat and fish population monitoring on a schedule determined through consultation with DFO. Conduct routine water quality monitoring as outlined in monitoring section.

Indirect Destruction/Disruption of Habitat

Indirect destruction/disruption of fish habitat could result from sediment deposition (derived from processing or from erosion) or other deleterious substance, or changes to flow regimes. Mitigation to minimize habitat destruction/disruption includes the measures noted above for protection of fish as well as:

- \$ No mining or other active area within 30 m of a watercourse.
- \$ The addition of 14 ha surface area to the East Barclay Brook represents approximately 10 % of the existing watershed area at this point. This minor net increase in available drainage will be controlled (volume and timing of discharge) by the sedimentation pond(s).
- \$ The operation of sediment ponds and re-circulation of process water will minimize changes to peak flows which may result from clearing of the active area (approximately 3-4 ha opened each year).
- \$ Any water withdrawn for processing from East Barclay Brook will be returned to the Brook through a settling pond. The location of potential withdrawal and the subsequent water return will occur upstream of any significant fish habitat. If withdrawal occurs it will meet NSDOE water approval requirements and will not occur during low flow periods.
- \$ If water withdrawal occurs from the Clyde River, discharge to the East Barclay System will be controlled through the sedimentation pond(s) and released in a manner to minimize downstream erosion.
- \$ Surface water flow monitoring will be undertaken to allow for appropriate control of water discharged to East Barclay Brook from the sedimentation pond(s).
- \$ The outlet to the sedimentation pond will be properly stabilized to reduce downstream erosion.
- \$ No fording of watercourses policy.

- \$ Provision of a structure to cross East Barclay Brook to be located approximately 200 m south of the existing ATV trail. The structure will be constructed during the low flow construction window and following NSDOE specifications.

Disruption of Seasonal Migration/Passage

Disruption of seasonal migration or passage could result from chemical barriers such as suspended sediment or other deleterious substance, physical barriers or through changes to flow regimes (such as insufficient low flow provision). Mitigation to minimize disruption of passage include the measures noted above for protection of fish and habitat as well as:

- \$ Any East Barclay Brook or Barclay crossing structure design will provide for fish passage following DFO guidance.

Residual Impacts

- \$ Significant residual impacts are not expected given incorporation of mitigation as noted.

6.1.6 Archaeological, Cultural and Palaeontological Resources

Potential Impacts and Mitigation Plan

Two special cultural features have been identified to date at the White Rock Mine site which have been given a priority for protection by Black Bull. These features are in the form of “monument” rocks (Aggies Rock and Porcupine Rock) which rise above the local topography by several metres. Based on a recommendation from the archaeological consultant a proposed buffer zone (30 metres) for disturbance from the features has been in place for the exploration phase and will be in place for the mine development phase of the project. As part of the training program for the heavy equipment operators there will be training in the identification and recognition of artifacts. Should artifacts be suspected, operations will cease in that area of the development until proper evaluation of the features are completed by qualified consultants to Black Bull. Black Bull will use the qualified consultants to assist in determining notification requirements depending on the significance of found items/features.

6.1.7 Recreation Land Use

Known and Potential Effects

Recreational land use was well documented through contact with persons at public consultation sessions, site visits and physical evidence to include fishing, hunting, recreational vehicle (ATV’s) trail use and roadside (Route 203) and near roadside berry harvesting.

Trails used by ATV’s and foot traffic were pre-existing to the reactivation of exploration activity in 1995. Recreation use of the mining lease area and areas in the crown land lease where valued habitats, rare plants and other special features (Aggies Rock, Porcupine Rock, Northern Ribbon Snake habitat) will be affected.

Mitigation Plan

Restrictions to lands for these reasons and safety due to blasting activities will occur. These restrictions will be determined by Black Bull, it's consultants and CMM and discussed with the Citizens Liaison Committee prior to implementation. The goals of the restrictions will be to protect features of value and to integrate safety into this aspect of the project for all site visitors. As the land will be leased from the Province, DNR will have a role in determining access restrictions.

6.1.8 At Risk Animal Species

Known At Risk Animal Species

Table 6-2 summarizes at risk animal species expected at the site based on 2000 and 2001 data collection and an outline to the approach to minimizing impacts to these species or their populations. Please refer to the full text in the Dillon report, Appendix E.

TABLE 6-2. SUMMARY OF AT RISK ANIMAL SPECIES FOR PROJECT AREAS

| Species | Name | Known in Mining Lease Area | Potential in Mining Lease Area | Potential in Extraction/ Processing Area I | Mitigation Required |
|--|-----------------------------|----------------------------|--------------------------------|--|------------------------------------|
| <i>Asio otus</i> | Long-eared Owl | No | Yes | Negligible | See mitigation description below |
| <i>Alces alces</i> | Moose - mainland population | Yes | Yes | Yes | See mitigation description below |
| <i>Coregonus huntsmani</i> | Atlantic whitefish | No | No | No | None |
| <i>Emydoidea blandingi</i> | Blandings turtle | No | No | No | None |
| <i>Gavia immer</i> | Common Loon | No | No | No | None |
| <i>Lasionycteris noctivagans</i> | Silver-haired bat | No | No | No | None |
| <i>Lasiurus borealis borealis</i> | Red bat | No | No | No | None |
| <i>Lasiurus cinereus</i> | Hoary bat | No | No | No | None |
| <i>Martes americana</i> | American Marten | No | Negligible | Negligible | See mitigation description below |
| <i>Martes pennanti</i> | Fisher | No | Negligible | Negligible | See mitigation description below |
| <i>Myotis lucifugus</i> | Little brown bat | No | Negligible | Negligible | See mitigation description below |
| <i>Myotis keeni</i> | Northern long-eared bat | No | Negligible | Negligible | See mitigation description below |
| <i>Pipistrellus subflavus subflavus</i> | Eastern pipistrelle | No | Negligible | Negligible | See mitigation description below |
| <i>Salmo salar</i> | Atlantic salmon | No | Negligible | Negligible | Avoidance of Clyde River Watershed |
| <i>Thamnophis sauritus septentrionalis</i> | Northern ribbon snake | No | No | No | Avoidance of Frog Pond System |
| <i>Margaritifera margaritifera</i> | Eastern river pearl mussel | No | Negligible | Negligible | See mitigation description below |
| <i>Incisalia</i> | Bog Elfin | No | Negligible | Negligible | See mitigation description below |

| Species | Name | Known in Mining Lease Area | Potential in Mining Lease Area | Potential in Extraction/Processing Area I | Mitigation Required |
|---------------------------|---|----------------------------|--------------------------------|---|----------------------------------|
| <i>lanoraineensis</i> | | | | | |
| <i>Danaus plexippus</i> | Monarch | No | Yes | No | None |
| <i>Polygonia gracilis</i> | Hoary Comma | No | Yes | No | None |
| Invertebrates | there are thirteen species of dragonflies and damselflies listed by NSDNR as Red or Yellow status. These species inhabit aquatic and surrounding environments. There is limited potential habitat within the extraction/processing area for any of these species. However, although they are generally not known for the study area little data is available on their distribution. | | | | See mitigation description below |

Notes: I Within Mining Lease Area

Potential Impacts

Potential impacts include direct mortality or disruptions with potential to affect individuals or populations through alteration or loss of critical habitat (project footprint), disturbance of reproductive or feeding activities (generally due to noise or site activity), increased predation (natural predators, vehicle collision or hunting/trapping) due to improved access and traffic or disruption of migration patterns and habitat fragmentation. Accidental events could result in similar impacts.

Mitigation

Long Eared Owl and other Raptors Disturbance

Although Long Eared Owl nests are not anticipated within the lease area, if any raptor nests are encountered, NSDNR guidelines (Bald Eagle, Osprey, Colonial Birds, such as herons and cormorants and Woodland Hawk) will be followed to limit disturbance during sensitive nesting periods.

Moose

Removal/Alteration of Habitat

As noted in Dillon Appendix E, moose are known to occur in the general area of the proposed mining lease area and within the active extraction/processing area. It is noted that preferred habitat areas are located to the west of the mining lease area and in the eastern corner of the proposed active area and that the density of moose is generally low. Critical habitat for moose tends to be wintering and calving areas.

Preferred wintering habitat typically consists of mature conifer or mixed conifer stands where snow tends to be less deep and browse is available reducing winter energy demands. Wintering areas may be less well defined in area in Nova Scotia where snow depths are often not excessive, however suitable wintering areas contribute to moose survival. The mining lease area does generally not provide the mature conifer/mixed conifer habitat associated with wintering.

Calving areas are often associated with aquatic/wetland areas. Preferred calving areas are expected to be associated with the Frog Ponds area and within the Clyde River valley (Brannen, 2001, Appendix E). The Frog Pond system is outside of the proposed mine lease area. A portion of the preferred habitat outlined by Brannen intersects with the proposed extraction area between Highway 203 and the Clyde River.

Use of habitat within the mine lease area is expected to be primarily during the spring to fall period. The barrens area may be used after snow melt in the spring and the more lush vegetation within the East and Main Barclay Brook's treed stream corridors are expected to be used in the late spring and summer when moose feed heavily on herbaceous vegetation.

Loss of portions of this habitat will be mitigated by:

- Limiting the area removed at any given time (estimated at 4-5 ha annually with progressive reclamation).
- On going monitoring of moose use of the area through collaboration with NSDNR and university research currently underway. Monitoring may include establishment of new pellet count transects and use of Black Bull site staff for field surveys.
- Surveys of moose habitat may be combined with scheduled aerial monitoring surveys of the lease area by NSDNR to provide up-to-date information of changes in habitat and population.
- Discussion with NSDNR and researchers on appropriate habitat restoration. Such restoration may include:
 - Restoration/planting of trees to provide shelter from humans/predator and shade from the heat of summer when moose tend to suffer heat stress.
 - Trees planted should include balsam fir, poplar, birch, willow and striped maple which provide forage during the winter months when food sources are limited.
 - Provision of open water in the form of ponds or still waters with associated wetland habitat. This will provide a source of aquatic forage as well as a means of relief from insects and escape for calves from predators such as black bears and coyotes.
 - Habitat restoration will include natural regeneration and avoid fertilizer use and, where appropriate, enhanced regeneration focusing on existing native species and habitat types to avoid the introduction of invasive or exotic species.

Some temporary disruption of seasonal movements and foraging habitats may occur, however, the area to be affected is a relatively small proportion of the larger similar habitat available in the immediate area and it is expected that foraging areas of the moose are somewhat flexible.

Disturbance

The site activities such as use of heavy equipment, blasting or general human activities may potentially disturb moose in the vicinity. Temporary disturbance from feeding areas is less of a concern than disturbance of critical habitat such as wintering or calving areas. Moose are generally tolerant of disturbance and will avoid roads and active areas.

Potential calving areas are located at Frog Ponds, which are over 3.5 km west of the active area.

Disturbance will be mitigated by:

- No wildlife harassment policy and restricting ATV use on-site.

- Avoidance of active wintering/calving areas, i.e. disturbance will not occur in these identified areas during active wintering and or calving periods.
- Use of blast noise reduction methods (smaller multiple charges), and matting if sensitive habitat identified within 2 km. Given that blasting is expected to occur approximately 6m below grade and that berms and other physical boundaries will be in place, noise from blasting should be significantly reduced.
- Field surveys prior to blasting during calving season from May to June if sensitive habitat identified within 1 km and changes to blasting schedule if moose presence is noted. Please note as well blasting, at full production, is expected to occur 1-2 times per month.

Increased Access by General Public/Predators

Predators and hunters will take advantage of trails and corridors to gain access to moose habitats. These features also provide an increased line of sight and bisect habitats and migration routes. Public access will be restricted in the active mine/processing area. Should access roads and corridors be constructed outside the active area the routes will consider moose habitat and document occurrences.

Habitat Fragmentation

The area of the proposed extraction and processing area is currently intersected by an existing highway and by ATV trails and is not currently contiguous but consists of patchy shrub and exposed areas with limited forested areas. The project is not expected to add significantly to habitat fragmentation in the local area. Habitat will undergo a process of progressive reclamation and restoration as noted above with aquatic and terrestrial corridors as part of reclamation.

Disruption of Movement

The location of the pits and waste rock piles may restrict movement in the extraction area. The primary travel corridors are expected to occur along the river valleys which will not be disturbed. Temporary disruption of some movement may occur in active areas. As noted above, progressive reclamation will reduce the extent of these areas.

Accidental Events

Mortality of wildlife may occur through accidents associated with blasting or vehicle traffic. As part of the Environmental Protection Plan procedures will be developed to reduce potential for accidental death of wildlife. Typical measures may include:

- Fencing of pit areas with potential hazards such as cliffs or ponds
- Pre-blast surveys to determine if moose are present in the area

- Maintenance of wildlife sighting records
- On going communication with NSDNR to develop wildlife management strategies

Bats

Disturbance

Although bat hibernating areas are not known for the mining lease area, if encountered protection measures will include:

- Consultation with NSDNR/NSM to determine need for additional surveys

American Marten

Removal/ Alteration of Habitat

American Marten are not confirmed to occur within the study area, however it is reported that significant numbers of marten occur to the west of the site (pers. Comm. A. Duke, NSDNR Manager Wildlife Resources). No marten habitat exists in the mining lease area, however important marten habitat is generally mature coniferous and mixed wood forest. Small stands of white pine over 80 years old are located to the south of the mining lease area, the closest being 300 metres south of the active extraction area. As noted, these stands could provide important denning habitat if marten are present and the lease area including the active area could provide part of a foraging range. Loss of the active area is not expected to significantly affect martens as similar habitat is available throughout the area.

In order to confirm habitat effects, the following is proposed:

- Collaboration with NSDNR and Kejimikujik researchers to determine if marten are present in areas adjacent to mining lease, as noted on Figure 3, Dillon report, Appendix E, and in development and incorporation of wildlife management measures and monitoring in Environmental Protection Planning

Disturbance

The site activities such as use of heavy equipment, blasting or general human activities may potentially disturb marten if they occur in the vicinity. Temporary disturbance from peripheral areas of home ranges is less of a concern than disturbance of core habitat and denning areas.

Marten surveys will be completed in Winter 2001 in areas of habitat potential south of the mining lease area as noted above. If marten are determined to be present, collaborative efforts with NSDNR/NSM for relocation to other suitable habitats will be undertaken.

If marten are determined to be present in the area, disturbance will be mitigated by:

- No wildlife harassment policy, limit ATVs
- Avoidance of sensitive denning areas
- Use of blast noise reduction methods (smaller multiple charges) if marten presence is confirmed in mining lease area
- Determination of potential for winter activity to disrupt winter hunting activities when marten may already be stressed.

Increased Access by General Public/Predators

Human access to the site could result in increased losses of individuals due to increased trapping. Public access will be restricted to the active mine/processing area. Additional access roads/corridors will not be created.

Accidental Events

Mortality of wildlife may occur through accidents associated with blasting, bycatch in snares or traps or vehicle traffic. As part of the Environmental Protection Plan procedures will be developed to reduce potential for accidental death of wildlife. Typical measures may include:

- Initial surveys to determine presence or absence of martin within the study area (transects through potential habitats to locate dens, scat, tracks)
- Limiting trapping within the lease area if marten determined to be present
- On going communication with NSDNR to develop wildlife management strategies

Fisher

Mitigation measures undertaken to protect marten should also protect Fisher.

Butterflies

Although at risk butterflies are not known for the lease area, additional work will be undertaken as part of Environmental Protection Planning and wetlands evaluations to further assess potential. If identified appropriate authorities will be contacted and protection planning undertaken.

Potential At Risk Aquatic Animals

Although at risk mussels, dragonflies (larval stage) and damselflies (larval stage) were not observed during field surveys in the area, additional work will be undertaken as part of Environmental Protection Planning and wetlands evaluations to further assess potential. If identified appropriate authorities will be contacted and protection planning undertaken.

Generalized measures to reduce disturbance

- \$ Limiting clearing/disturbed area at any given time
- \$ Conduct initial clearing in winter to limit impacts to migratory bird nests
- \$ Avoid mechanical clearing and establish exclusion zones around bird ground nests during the breeding season
- \$ Salvage of merchantable timber
- \$ Clear flagging of areas to be cleared in advance
- \$ Maintenance of buffer zones from watercourses (permanent or intermittent) until within 1 week of clearing and grubbing.
- \$ On-site chipping of shrubs/slash
- \$ Topsoil stockpiling and reuse in reclamation (stabilized)
- \$ Sediment and erosion control plan including stabilization of open areas and appropriate drainage control
- \$ Dust control measures to reduce adverse impacts on plant and animal health
- \$ Waste management - removal of human waste, proper storage and removal of domestic garbage.
- \$ Blasting to meet DFO guidelines near water
- \$ Petroleum, Oil and Lubricant (POL) handling procedures
- \$ Contingency planning

Residual Impacts

- Residual impacts will be avoided through careful mitigation and on going consultation with NSDNR Wildlife Division and with the Nova Scotia Museum to refine appropriate protection strategies.

Migratory Birds

Known Migratory Birds

Bird species present, relative abundance and distribution within the overall study area are listed in the Dillon report, Appendix E. Migratory birds in the proposed project area reflect the habitats present. The majority of the proposed extraction/processing area and the proposed settling pond area is predominantly barrens area. A small shrub wetland borders the southwestern corner and predominantly forested areas occupy the northeastern and southeastern corners of the extraction area. Existing roads/trails and pits cross the central portion of the extraction area. Species expected to nest the shrub wetland include Swamp Sparrow, Common Yellowthroat, Palm Warbler and thrushes. Diversity and abundance in the barrens area was generally low. The barrens area does provide feeding habitat for raptors, however, this area is a small proportion of similar habitat available in the locally and regionally. Species present are generally common throughout the regional area. No federally listed COSEWIC at risk bird species were noted for the study area. The only provincially listed at risk birds expected in the study area (Common Loon and Long-eared Owl) are not likely in the extraction/processing area and are discussed further under at risk species. A Whip-poor-will, an uncommon bird in Nova Scotia, may occur in the East Barclay Brook area (west of the extraction area), however this could not be confirmed.

No designated protected areas for migratory birds occur within the study area. No areas of high concentrations of migratory birds were observed such as breeding areas colonies, spring/fall staging area or wintering areas. Areas of higher diversity of migratory birds were identified outside of the proposed extraction area at the western end of the proposed mine lease. Mature forest stands were identified to the south of the proposed mine lease area, but not within. There is potential for habitat important to individual birds, such as nesting areas, snags, cavity trees the Wetland No. 11 and riparian area and edge feeding areas, however these habitat types are well represented outside of the proposed area of disturbance.

Potential Impacts

Potentially significant impacts to migratory birds could include direct mortality or disruptions with potential to affect populations such as loss of critical habitat, habitat fragmentation or significant disruption of migration or reproduction.

Mitigation

Direct Mortality

Migratory birds are protected under the *Migratory Birds Convention Act* (MCBA) which prohibits deposition of harmful substance such as oil to migratory birds or areas frequented by migratory birds and prohibits disturbance/destruction of nests, eggs and nesting areas of migratory birds. Nests may be affected when trees are removed or clearing occurs. Accidental events may result in harmful substances entering the birds habitat. Mitigation measures proposed to prevent mortality of migratory birds include:

- \$ scheduling clearing activities to occur outside the nesting period

- \$ contingencies as part of EPP; if ground nests encountered mechanical clearing and establish exclusion zone around nest during the breeding season; if cavity nests encountered cutting delayed until after nesting season, consultation with NSDNR or Canadian Wildlife Service (CWS)

Critical Habitat Loss

Areas of critical habitat (breeding colonies, staging areas, areas of wintering concentrations) or other important habitat (supporting high abundance, high diversity, priority or at risk species) are not expected to occur within the proposed extraction/processing area. Mitigation/contingency for encountering nests is discussed above. Habitat present will be removed over the extended time frame of the project and progressively reclaimed. Habitat restoration will include natural regeneration and where appropriate enhanced regeneration focusing on existing native species and habitat types.

Habitat Fragmentation

The area of the proposed extraction and processing area is currently intersected by an existing Highway and by ATV trails. The habitat is currently not a uniform contiguous block, but patchy areas alternating between shrub and more exposed rock. Similar habitat is extensive surrounding the site. Large blocks of forest are not bisected. The project is not expected to add significantly to habitat fragmentation in the local area.

Disruption of Migration

Disruption of migratory patterns is not expected due to the low profile structures, limited lighting and localized activity at the site.

Disruption of Reproduction

Noise associated with site activities may disrupt individual birds nesting within several hundred metres of the active area, however similar habitat is available throughout the adjacent area and impacts at the population level or to at risk species are not expected.

Residual Impacts

- \$ Significant residual impacts are not expected given the species and habitat type present and incorporation of mitigation as noted.

6.1.9 At Risk Plant Species

Known At Risk Plant Species

Risk species were determined to either be present within the proposed lease area and vicinity or have potential habitat within this area (detailed in Dillon Data Collection Report, Appendix E), The following

provides a listing of potential plants and those known within the mining lease area including the proposed extraction/processing area and an outline to the approach to minimizing impacts to these species or their populations.

TABLE 6-3: SUMMARY OF POTENTIAL AT RISK PLANT SPECIES FOR MINING LEASE AREA

| Species | Common Name | Known in Mining Lease Area | Potential in Mining Lease Area | Potential in Extraction Area | Mitigation Required |
|--|-------------------------------|----------------------------|--------------------------------|------------------------------|--|
| <i>Alnus serrulata</i> | Alders sp. | No | Negligible | Negligible | Not anticipated |
| <i>Aster undulates</i> | Aster sp. | No | Low | Low | Not anticipated |
| <i>Bartonia virginica</i> | Bartonia | Yes | Yes | Yes | Avoided Refer to mitigation description below |
| <i>Carex atlantica ssp. capillacea</i> | Sedge sp. | No | Low | Low | Not anticipated |
| <i>Cephalanthus occidentalis</i> | Buttonbush | No | Negligible | Negligible | Not anticipated |
| <i>Clethra alnifolia</i> | Sweet pepperbush | No | Negligible | Negligible | Not anticipated |
| <i>Coreopsis rosea</i> | Pink coreopsis | No | No | No | None |
| <i>Decodon verticillatus</i> | Water-willow | No | No | No | None |
| <i>Desmodium canadense</i> | Canada tick-trefoil | No | Low | No | None |
| <i>Eleocharis flavescens</i> | Capitate spikerush | No | Low | Low | Not anticipated |
| <i>Eupatorium dubium</i> | Eupatorium sp. | No | Negligible | Negligible | Not anticipated |
| <i>Euthamia galetorum</i> | Goldenrod sp. | No | No | No | None |
| <i>Euthamia tenuifolia</i> | Goldenrod sp. | No | No | No | None |
| <i>Galium obtusum</i> | Bedstraw sp. | No | Low | Negligible | Not anticipated |
| <i>Goodyera repens</i> | Creeping rattlesnake plantain | No | Low | Negligible | Not anticipated |
| <i>Listera australis</i> | Southern twayblade | Yes | Yes | Negligible | Avoided Refer to mitigation description below |
| <i>Myriophyllum farwellii</i> | Water-milfoil sp. | No | No | No | None |
| <i>Panicum rigidulum (longifolium)</i> | Grass sp. | No | No | No | None |
| <i>Platanthera flava flava</i> | Tuberclad orchid | No | Negligible | Negligible | Not anticipated |
| <i>Rhexia virginica</i> | Meadow-beauty | No | No | No | None |
| <i>Sabatia kennedyana</i> | Plymouth gentian | No | No | No | None |
| <i>Spiranthes casei</i> | Case's ladies-tresses | Yes | Yes | Yes | Refer to description below for mitigation measures |
| <i>Spiranthes ochroleuca</i> | Yellow ladies-tresses | Yes | Yes | Yes | Refer to description below for mitigation measures |

| Species | Common Name | Known in Mining Lease Area | Potential in Mining Lease Area | Potential in Extraction Area | Mitigation Required |
|------------------------------|------------------|----------------------------|--------------------------------|------------------------------|---|
| <i>Symplocarpus foetidus</i> | Skunk cabbage | No | Low | Low | Not anticipated |
| <i>Utricularia gibba</i> | Bladderwort sp. | No | No | No | None |
| <i>Utricularia subulata</i> | Bladderwort sp. | Possible | Moderate | Negligible | Avoided Mitigate if confirmed at Lower Frog Pond |
| <i>Woodwardia areolata</i> | Dwarf chain fern | No | Low | Negligible | Not anticipated |

Potential Impacts

Potential impacts to at risk plant species include removal of plants or alteration of their habitat as discussed below.

Mitigation

Removal/Alteration of Habitat

Bartonia virginica - The mine plan will avoid disturbance of the area where this plant was observed. *Bartonia* habitat at the site, appears to be associated with a very localized surface depression that retain some moisture and has a thin layer of peat. Mine infrastructure within 30 m of this area is not expected to change habitat conditions due mainly to microhabitat that this species requires, i.e. very localized surface depressions. However, this plant also seems to depend on colonization of suitable disturbed areas (at the edge of a secondary, occasionally used, ATV trail) where competition from shrubs is reduced. This habitat is expected to naturally change as shrubs invade, reducing suitability for the *Bartonia* while other site areas will create suitable habitat as part of the mine development.

Mitigation measures to be undertaken to minimize impact include:

- \$ A buffer zone of 30 m will be extended around the site where the plants were identified. Project related disturbance of habitat within this buffer zone will not be permitted.
- \$ As part of Environmental Protection Planning, Contingency Planning and Monitoring, the proponent will work with regulatory agencies such as NSDNR, Wildlife Division and with the Nova Scotia Museum to develop appropriate protection strategies, such measures may include monitoring to assist in determining groundwater contribution to habitat and monitor changes through peizometers installed upgradient and downgradient of the plant locations.

Listera australis - The mine plan will avoid disturbance of the area where this plant was observed. The plant appears to primarily inhabit lowlying areas in headwaters of a couple of small tributaries. These swampy areas flood in the spring but are dry in the summer and fall. If additional populations are encountered the measures noted below will be employed.

Mitigation measure to be undertaken to minimize impact include:

- \$ A buffer zone of 30 m will be extended around the site where the plants were identified. No disturbance of habitat within this buffer zone will be permitted.
- \$ The tree cover within this habitat area will not be removed during this mining activity.
- \$ As part of Environmental Protection Planning, Contingency Planning and Monitoring, the proponent will work with regulatory agencies such as NSDNR, Wildlife Division and with the Nova Scotia Museum to develop appropriate protection strategies.

Spiranthes species - The at risk *Spiranthes* species encountered, particularly the Case's Ladies-tresses, are early successional species which depend to some extent on disturbance to reduce competition for habitat. The plants found at the site were located within a road ditch area subject to occasional disturbance and on the adjacent recently disturbed backslope. These colonies are generally transitional in nature, typically invading as large colonies in suitable disturbed habitats and eventually declining as shrubs reinvade (often in less than 5 years). Current mine plans include removal of the road area currently utilized by these plants. However, without continual occasional disturbance it is expected that this habitat would naturally become unsuitable for *Spiranthes*.

Mitigation measure to be undertaken to minimize impact include:

- \$ The proponent will work with regulatory agencies such as NSDNR, Wildlife Division and with the Nova Scotia Museum (NSM) and local experts to develop a strategy to minimize impact on the local *Spiranthes* population. This may include stockpiling and re-establishing the topsoil and associated seed bank in an appropriate habitat, whole transplantation of plugs of plants and/or collection of seeds as well as a contribution to the understanding of populations in the area.
- \$ A considerable amount of disturbed habitat will initially occur which may be utilized to promote and research recolonization of these plants.

Coastal Plains Species - The *Thelypteris simulata* ferns encountered were generally associated with the *Listera* maple swale habitat and will be protected through protection of the *Listera*. The *Hudsonia* found at the site occupies similar habitat to the *Bartonia* and also appears to require somewhat open/disturbed habitat. This plant of sand barrens is likely an invader from the sand barrens to the south. *Hudsonia* found during surveys were generally outside the proposed extraction area and not within preferred habitat which is available outside the study area. The *Panicum* grass species found in Wetland No.11 will be evaluated further during wetland evaluations. This grass of peaty swales and lake edges, has a scattered distribution from Halifax to Yarmouth and Annapolis counties and is most common in the southwest (Zinck 1998). As

with other plants, the NSM and NSDNR will be consulted on appropriate protection strategies. The mining lease area is unlikely to provide unique or critical habitat for any of these coastal plains species.

Removal/Alteration of Potential Habitat

As this project is expected to extend in the order of 25 years, on-going monitoring at the mine site, will include botany work. It is anticipated that additional surveys will be conducted coincident with 5 year mining plans.

If at risk plants are found, protection measures for rare plants will be include:

- \$ flagging the general area to prevent accidental impact.
- \$ discussion with NSDNR, the NSM and appropriate experts to determine protection planning.

Residual Impacts

- \$ Significant residual impacts are not predicted based on the species and their locations identified and on monitoring and protection measures developed in consultation with NSM, NSDNR and other recognized experts.

TABLE 6-4: HABITAT IN PROPOSED EXTRACTION/PROCESSING AREAS

| Habitat Type | Area Ha | % of Total Area |
|-----------------------|----------------|------------------------|
| Barrens | 25 | 72.7 |
| Forested | 7 | 20.3 |
| Wetland | 0.4 | 1.2 |
| Disturbed (presently) | 2.0 | 5.8 |
| Total - estimated | 34.4 | 100 |

6.2 Contingency and Emergency

Contingency and emergency plans are prepared for activities where there is the potential for environmental emergencies such as releases of substances to the environment and for emergency situations involving mine workers and nearby residences and communities. The White Rock Mine operation as planned and presented in this document has few components which present potential for emergency situations. Settling pond overflows and releases of petroleum hydrocarbons from mobile equipment including haul trucks taking finished product to Shelburne have been identified as activities requiring contingency and emergency plans. Facilities such as the maintenance shop building will be designed using best practice for minimization of effect and will have associated contingency and emergency plans developed. These plans will be developed

using information from NSDEL guidance documents and submitted for review and approval during the Industrial Approval stage of the mine permitting.

6.3 Transportation and Shipping

Transportation and shipping components of the proposed White Rock Mine development have components that require planning for minimizing impacts. These include the design and construction of access roads to get onto the transportation routes and design and operation of facilities at the ports. The use of specialist consultants for both of these issues will be undertaken with the final design being such that all applicable legislation will be known and complied with. Black Bull recognizes that additional information will be required for the Industrial Approval application and will complete studies necessary to supply the required information. Proposed plans for emergency situations related to transportation and shipping will be prepared using the collected information and submitted for review.

7.0 PROPOSED MONITORING

Black Bull has completed and intends to continue comprehensive monitoring programs for the project. As previously discussed in other sections there has been a significant amount of environmental monitoring completed at the White Rock Mine and surrounding area to date by Black Bull and a significant body of baseline information available. Certain components of the proposed monitoring plan have been outlined in this section to assist in gaining an appreciation for the role of monitoring in the overall project. Black Bull views monitoring as a first line of defence in problem solving with respect to environmental issues as hard data is available as a basis for decision making. Black Bull is aware that there will be regulatory requirements for monitoring provided as conditions of the Environmental Assessment Approval and other regulatory approvals which will need to be secured prior to mine development activities. In pre-planning for the mine development stage of the project, Black Bull has continued some aspects of the baseline monitoring and continues to use the data generated for mine and mine infrastructure planning. Proposed monitoring plans are presented further in this section for review. Modifications to these plans will be completed based on conditions to approvals granted, site conditions and review of data generated from the site and surrounding areas.

7.1 Groundwater Monitoring Plan

Black Bull intends to install a series of groundwater monitoring wells strategically placed in and around the mine site to be included in the groundwater monitoring system. Specific monitoring requirements, during full scale operation, will involve as a minimum, the collection of static water levels on a weekly basis, the collection of samples for general chemical analysis on a quarterly basis and the collection of samples for a metal scan on an annual basis. Future groundwater monitoring will follow approval stipulations and may be augmented, in terms of monitoring locations and parameters, in consultation with the appropriate regulatory authorities.

7.2 Liquid Effluent Monitoring Plan

Accumulated water from the proposed open pit development and associated works will be directed to settling pond system yet to be designed. Some site data (watershed size, topography surveys, vegetation cover types) has been collected at the pre-design stage of the wastewater treatment system development, which will be supplemented (geotechnical data and settling time studies) prior to submission of the Industrial Approval application. NSDEL has well defined discharge limits for liquid effluent that Black Bull is aware of and understand will be outlined in an approval prior to construction and operation of the system.

7.3 Blast Monitoring

The monitoring of blasting is also covered under existing legislation and includes stipulations of 0.5 inches/second for peak particle velocity measured below grade or less than one metre above grade in any part of a building not located on the property where blasting occurs. A stipulation is also provided for air blast which states that this component shall not exceed 128 dBA measured within 7 metres of a building not located on the property where blasting occurs. The frequency of blast monitoring will be determined

through consultation with the appropriate regulatory authorities with a monitoring plan being submitted prior to mine development.

7.4 Particulate Emissions

Current legislation also includes limits for particulate emissions at adjacent property boundaries. These include an annual geometric mean of 70 ug/m^3 and a 24 hour average of 120 ug/m^3 . Monitoring will be carried out using high volume samplers, at the proponent's expense on an as required basis as directed by the NSDEL.

7.5 Habitat Monitoring

Data collection of information on habitats within and adjacent to the White Rock Mine proposed mining lease will augment the existing information base. The complete database will be used to develop the long-term habitat monitoring plan, which will involve input from appropriate regulatory agencies and stake holders. As previously mentioned Black Bull intends to retain the services of CMM to assist in ongoing habitat monitoring as well as other specialist consultants.

7.6 Surface Water Monitoring Plan

Environmental assessment and Industrial Approvals typically include a provision for surface water monitoring to determine the effectiveness of surface water/sediment control on a site. This program will be developed in association with the NSDEL but will generally consist of a number of stations (using the existing stations to the greatest extent possible in order to continue long term data collection from key areas of the site) where flow and water quality data will be collected from.

8.0 RECLAMATION & LAND MANAGEMENT PLANS

Black Bull has provided information in previous sections on the general approach to reclamation and overall land management of the mining lease area. Specifically Black Bull has developed a conceptual reclamation plan (for the extraction and other disturbed areas) for the site based on existing information. A detailed reclamation plan will be presented in the Mining Lease and Permit application and be based on all previously collected data and information Black Bull will collect in the interim. A Land Management Plan outlining the overall approach and details of ways in which the land under lease (outside the extraction areas) will be used will be developed with the assistance of CMM and DNR as part of the Mining Lease application. Principles of both plans are presented here for review along with some specifics that are known and able to be presented as commitments.

Reclamation Plan

The local physiography and mineral deposit type at the White Rock Mine are favourable for a “progressive reclamation” approach which “fills the hole in as you go” to the greatest extent possible and limits unvegetated and disturbed areas. This approach is favourable from environmental and economic aspects as material movement is reduced (economic), disturbed areas are reclaimed soon after extraction (environmental), reclamation bonds can be returned to a proponent sooner (economic) and sediment and erosion control is better managed where disturbed areas are minimized and revegetated (economic and environmental).

The final plan will involve the following activities in its development :

- a review of existing features
- discussions with various stakeholder groups
- characterization of on-site materials and capabilities for various reclamation activities
- a review of legislation dealing with reclamation in Nova Scotia and Canada

Within the extraction areas approximately 60% of the total volume of materials is raw product (quartz, kaolinite and mica) with the remainder being mainly quartz sand. This creates a situation where materials for backfilling of all of the former extraction areas will not occur. The reclamation plan therefore takes this into account and the fact that there is expressed desire for creation of aquatic habitats where there is opportunity for pH adjustment above the background 3.5 to 4.2 units. There is also an expressed desire for the landscape to remain connected through the use of aquatic and terrestrial corridors, both of which are easily achieved at the White Rock Mine aspect of reclamation. The reclamation plan will therefore create a landscape similar to the present one with ponds/lakes, some with outflows and inflows (aquatic corridors) with islands or rocks in some cases and some areas filled in at or near original grade to provide terrestrial corridors.

Land Management Plan

The various ways in which the mining lease area will be used (mining, recreation, wildlife) will be outlined in the Land Management Plan. Principles of this plan that will be used in its development include a desire expressed by several groups to be involved in fisheries habitat evaluation and possible enhancement. The focus of this document will be on lands outside the extraction area. Aspects of the overall project that are

known presently to be included in the Land Management Plan include interpretive trail development opportunities with CMM.

9.0 SUMMARY OF IMPACTS AND BENEFITS

This Environmental Registration Document for the White Rock Mine project has outlined the project details and described the ways in which the work to date and work to follow at the site incorporates responsible environmental management and public involvement. This approach will continue to be employed during the course of the project because the project proponent believes that the White Rock Mine project brings significant benefit to the local area with the successful permitting and operation of the mine, processing equipment and facilities. This section identifies positive and negative impacts of the project and outlines the main benefits which will result from the operation and reclamation of the mining area described and processing facilities.

The identified positive impacts from the White Rock Mine operation are:

1. Creation of mine positions (up to 200 at full production) for the local communities with an estimated payroll in the \$8.5 million dollar/year range for an estimated 25 year mine span.
2. Payments to Nova Scotia suppliers (fuel, power, equipment, services) in the range of \$11 Million dollars/year.
3. Payments to Nova Scotia Government for royalties from mineral production and land lease.
4. Spin-off effects to local communities in the range of \$25 Million per year using economic multipliers (2.5 – 4 times payroll) typical for the mining industry.
5. Improved local and regional infrastructure as a result of shipping components of project.
6. Creation of fish habitat and potential recreational opportunities with the proposed reclamation plan.
7. Long term opportunities for research on surface water, vegetation and fisheries habitat improvement as part of mine operation environmental monitoring.

Negative impacts of the proposed project will be incurred however, as previously described, Black Bull intends to continue to use monitoring and mitigative measures to reduce or eliminate impacts. Input from regulators and consultants regarding the proposed undertaking has noted that negative impacts associated with the project can be managed by proper environmental monitoring plans and mitigative measures. Public input solicited by Black Bull has indicated that the public has specific concern relative to the possible negative impacts of the mine project as follows:

1. Negative impacts to surface water chemistry and/or fish habitat as a result of mining operations.
2. Effects to wildlife in the local area.
3. Increases in the volume of trucks using local highways, specifically Highway #203

Each of these concerns has been acknowledged and incorporated into the design of the White Rock Mine project as described in this document. Specific information relative to each of these concerns is presented below.

1. Surface Water/Fish Habitat

Black Bull and its consultants have worked closely with the Federal Department of Fisheries and Oceans and local groups (TREPA and Clyde River Association) to outline the present fish habitat at and near the site. Opportunities exist for enhancement of habitat as part of the mine operations which will continue to be explored with all noted parties. Fish habitat opportunities exist in reclaimed areas with the creation of several deep pools where water temperature will be lower and create places for fish to seek relief from high water temperatures during the summer.

2. Wildlife

Extensive habitat evaluations have occurred at the mine site and the Black Bull approach to mine development will have an ongoing habitat and species survey components during operation. Mitigation plans for breeding birds, plant species and other species have been outlined to some extent in this document. Wildlife values will be mapped and used in detailed mine planning and mine operation.

3. Existing Traffic

The volume of trucks using local roads on the transport route will be accommodated by existing infrastructure. The various products from the White Rock Mine will be shipped using B-train style trucks which will have loads in the 25 to 30 tonne range. Black Bull will engage in discussions with residents and local officials when shipment levels are determined and the resultant truck volumes calculated. Black Bull is aware that spring weight restrictions occur for the local roads and may result in changes to the shipment schedule for certain times of the year.

10.0 REFERENCES USED

Beak International Incorporated, 1997, Aquatic Environmental Study, Existing Conditions Report – East Kemptville Tin Mine

Canadian Wildlife Service, 1986. Wetlands Atlas of Nova Scotia.

Davis, Derek, Sue Brown, 1997. The Natural History of Nova Scotia, Nova Scotia Museum.

Dillon Consulting Limited, 2000. Year 2000 Biological Data Collection Report.

Dillon Consulting Limited, 2001. Final Report – Black Bull Project Biological Data Collection.

Erskine, A.J. 1992. Atlas of Breeding Bird of the Maritime Provinces. Nova Scotia Museum.

Gilhen, John, 2001. Personal Communication.

Loucks, O.L. nd. A Forest Classification for the Maritime Provinces.

MacKinnon, D., Nova Scotia Department of Environment Re-evaluation of the Shelburne Barrens as a Site of Ecological Significance, 1997.

National Air Pollution Surveillance, 1992 Air Quality Monitoring.

Nova Scotia Department of the Environment and Labour, 1995. Environment Act, S.N.S. 1994-95.

Nova Scotia Department of the Environment, Report 70-3. Hydrogeology of the Musquodoboit River Valley, Nova Scotia.

NSDEL, Sediment and Erosion Control Handbook

Pronych and Wilson, 1991. Atlas of Rare Vascular Plants in Nova Scotia.

Pronych, G. and A.Wilson. 1993. Atlas of Rare Vascular Plants of Nova Scotia. Nova Scotia Museum.

Roland, Albert E., 1982. Geological Background and Physiography of Nova Scotia, Nova Scotia Institute of Science, Halifax, N.S.

Rowe, J.S. nd. Forest Regions of Canada.

W.G. Shaw and Associates Ltd., 2000. Report on the Bulk Sampling Program, Yarmouth Quartz-Kaolinite Project, Yarmouth County, Nova Scotia.