ENVIRONMENTAL PROTECTION PLAN, ATLANTIC MINERALS LIMITED, LOWER COVE QUARRY

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Abbreviations

AML	Atlantic Minerals Limited
CWS	Canadian Wildlife Service
DFO	Department of Fisheries and Oceans
EPP	Environmental Protection Plan
SDS	Safety Data Sheet
NLDFLR	Newfoundland and Labrador Department of Fisheries and Land Resources
NLDMAE	Newfoundland and Labrador Department of Municipal Affairs and Environment
NLDNR	Newfoundland and Labrador Department of Natural Resources
OSEM	On-site Environmental Monitor
PAO	Provincial Archeological Office
SAAM	Sales and Administration Manager
SDS	Safety Data Sheet
WHMIS	Workplace Hazardous Materials Information System

1.0 INTRODUCTION

Atlantic Minerals Limited (AML) owns and operates quarry and plant facilities on the Port au Port Peninsula in Lower Cove, NL. Operations include the mining, processing and exporting of chemical grade high-calcium limestone and chemical grade dolomite to consumers in North and South America, Europe and Africa. To continue providing high calcium limestone and dolomite, AML plans to extend its current operations to include the While Hills lease area, adjacent to its existing mining leases.

To address potential environmental concerns associated with routine daily activities on-site and potential environmental emergencies, an Environmental Protection Plan (EPP) was developed. The EPP also outlines the procedures to be implemented during quarry extension and future operations. The activities outlined reflect AML's intent to reduce and mitigate environmental concerns through the application of those operational best practices.

1.1 Purpose of Environmental Protection Plan

The EPP is the primary mechanism for site-specific implementation of environmental mitigation and monitoring measures for quarry extension and operation activities. The EPP was designed to be proactive and used for effective and efficient implementation of procedures required for all personnel (AML staff and Contractors) to reduce or eliminate potential adverse environmental effects. For this EPP, potential environmental effects include those associated with routine daily activities on-site during construction and operation as well as anticipated accidental events.

The EPP was developed in compliance with industry standards, best practices and regulatory requirements, and considers the issues unique to the current and future operations. The purposes of this EPP are to:

- Meet commitments to reduce or eliminate adverse environmental effects
- Document environmental concerns and provide clear and concise instructions for project personnel regarding appropriate environmental protection measures
- Provide direction for the management of accidental events (contingency plans)
- Act as a reference document when planning and / or conducting specific activities or for recommending improvements
- Provide a mechanism for communication of changes to the EPP through a defined revision process
- Provide direction at the corporate level for ensuring commitments and regulatory requirements are implemented and monitored

1.2 Environmental Policy

AML is committed to the protection of the environment and providing employment to residents of local communities. AML is also committed to working with our neighbours in a respectful environment in order to address as many concerns as possible.

1.3 Environmental Protection Plan Organization

This EPP focuses on routine activities as well as accidental events related to quarry extension and operations, and provides instructions to address potential adverse environmental effects. The EPP is organized according to the following sections:

Section 1.0 **Introduction** – introduces the EPP and AML's environmental policy, and outlines the purpose and organization of the EPP, roles and responsibilities, and orientation and training requirements.

Section 2.0 **Existing Operations and Extension Overview** – provides an overview of existing operations and quarry extension.

Section 3.0 **Regulatory Requirements and Commitments** – lists the approvals, authorizations and permits that may be required, provides an overview of environmental compliance monitoring, rehabilitation of work sites, and reporting and communication procedures.

Section 4.0 **General Environmental Protection Procedures** – describes environmental concerns and general environmental protection procedures associated with quarry extension and operations.

Section 5.0 **Protocols for Surface Water Control, Dust Control and Rare Plants** – describes site-specific environmental concerns and environmental protection procedures for surface water control, dust control, and rare plants.

Section 6.0 **Contingency Plans** – outlines contingency plans for fuel and hazardous material spills, settling pond overflow, wildlife encounters, forest fires, extreme weather, and discovery of historic resources.

Section 7.0 **Environmental Project Plan Control Revisions** – outlines the process for revising the EPP.

Section 8.0 **Contact List** – contains a list of key contacts relevant to the EPP.

Section 9.0 **Reference Material** – contains a list of references cited in the EPP, and other relevant sources of additional information.

Section 10.0 **Signature Page** – for employee and contractor sign-off.

Appendix A Environmental Emergency Contingency Plan

Appendix B Controlled Copy Distribution List

Appendix C Revision Request Form

Appendix D Revision History Log

1.4 Roles and Responsibilities

AML will:

- Provide final approval of the EPP and subsequent revisions
- Monitor and inspect work activities on site
- Liaise with relevant government agencies, community groups and / or aboriginal groups as required

The Sales and Administration Manager (SAAM) will:

- Oversee the implementation of the EPP and confirm that AML staff and sub-contractors implement the EPP correctly
- Maintain document control of the EPP
- Be responsible for staff adhering to applicable approvals, authorizations and permits;
- Distribute the EPP and revisions to controlled EPP holders
- Work with controlled EPP holders to help them become familiar with the EPP and its procedures and their responsibilities under the EPP
- Conduct a review of the EPP on an as-needed basis, and review revision requests
- Upon revision of the EPP, confirm and maintain records documenting AML on-site staff and sub-contractors review the EPP and acknowledge revisions
- Report Incidents of environmental non-compliance to AML President, AML Safety and Security Manager, AML Operations Manager, AML Plant Engineer
- In the event of an emergency, immediately contact the appropriate reporting agency as indicated in the EPP, as well as AML President, AML Safety and Security Manager, AML Operations Manager, AML Plant Engineer

The assigned On-site Environmental Monitor (OSEM) will:

- Act as AML's on-site representative, responsible for environmental protection, and report to the SAAM
- Monitor site preparation and other field activities for compliance with the EPP and regulatory requirements and commitments
- Report issues or developments related to the environment or the EPP, including incidents of non-compliance, to the SAAM
- Work with controlled EPP holders to help them become familiar with the EPP and its procedures and their responsibilities under the EPP
- Confirm revisions to the EPP are communicated to on-site staff

- Communicate with the SAAM about proposed work activities so that applicable approvals, authorizations and permits can be obtained
- Complete an environmental orientation session for new employees, sub-contractors, and other personnel to be involved in site preparation activities
- Maintain documentation of environmental orientation sessions and other environmental training, including names and dates
- Monitor or designate a representative to monitor quarry extension and operations activities for compliance with the EPP and regulatory requirements / commitments
- In the event of an emergency, contact the appropriate agency as indicated in the EPP immediately, as well as the SAAM

AML staff, contractors, subcontractors, and other site personnel will:

- Review and familiarize themselves with the EPP and approved revisions
- Prior to commencing work, sign-off that they have read, understood, and accept the conditions in the EPP (refer to Section 10.0 – Signature Page)
- Implement commitments made in the EPP and confirm that personnel and subcontractors comply with the EPP, contract requirements, and applicable laws and regulations
- Maintain a record of training, including names and dates
- Report concerns related to the EPP immediately to the SAAM and / or OSEM
- Report incidents (e.g., spills or other events) that may have an adverse effect on the environment immediately to the OSEM
- In coordination with the SAAM, obtain necessary approvals, authorizations and permits for the work being carried out, and implement the conditions outlined in the documents
- Complete site clean-up or reclamation / restorative measures as required by government agencies and / or by AML

Controlled EPP Holders will:

- Maintain current copies of the EPP and document revisions
- Familiarize themselves and their staff with the EPP and approved revisions
- Provide feedback regarding concerns related to the EPP and changes to improve the quality of the EPP

1.5 Environmental Orientation and Training

AML staff, as well as new individuals arriving on-site, receive proper environmental orientation and ongoing awareness training. Individuals on-site, including staff and contractors, will:

- Receive appropriate orientation at the start of a new activity,or at their initial introduction to the site
- Be competent to do their jobs properly and safely
- Understand their roles and responsibilities

- Understand potential environmental effects of the operations and extension as a whole and specific to their work activities
- Understand the environmental protection procedures to be applied during their work
- Have access to the necessary resources to implement prescribed environmental protection procedures

2.0 EXISTING OPERATIONS AND EXTENSION OVERVIEW

AML operates the Lower Cove Quarry consisting of limestone and dolomite quarries as well as integrated processing and shipping facilities on the south coast of the Port au Port Peninsula located in western NL. Currently, AML operates three active quarries on site: Limestone Quarry #1, Dolomite Quarry #1 and Dolomite Quarry #2 (Figure 2-1). Although not completely exhausted of it's resource, reclamation activities have been initiated in the south pit of Dolomite Quarry #1. Pigeon Head, a former quarry, serves as a processing facility with a primary crusher and screening plant as well as a site for temporary storage.

AML produces two general products at the Lower Cove Quarry, which includes high-calcium limestone and chemical grade dolomite. To continue providing these products to markets in North and South America, Europe, and Africa, AML plans to extend its operations (Figure 2-1) to encompass an area approximately 140 ha in size, adjacent to the existing mining leases.

Figure 2-1 Project Location, Existing Site Plan and Proposed Project Extension

3.0 REGULATORY REQUIREMENTS AND COMMITMENTS

3.1 Approvals, Authorizations, and Permits

The major permits and authorizations currently in place for the Project are listed in Table 3.1. Additional permits that may be required for the quarry extension and operation are provided in Table 3.2. Conditions or expiry dates attached to these permits are considered as elements of this EPP and AML President, SAAM, AML Safety and Security Manager, AML Operations Manager, and AML Plant Engineer should be familiar and adhere to relevant permits, authorizations, and approvals.

Table 3.1 Permits and Authorizations Currently in Place

Government Agency	Applicable Legislation	Permit, Authorization or Approval	Relevant Activity
Provincial Authorizations			
Department of Environment and Climate Change (NLDECC)*	*Environmental Protection Act*, SNL 2002 c E-14.2, Section 83	Certificate of Approval # AA14—35590, March 31, 2014 – March 31, 2019.	AML Lower Cove Operation
NLDECC	*Water Resources Act*	Permanent Water Use Licence #97-12-4802	Water withdrawl from Goose Pond and Duck Pond
Department of Environment and Labour*	*Environment Act*, SN 1995 c E-13.1, Section 11	Certificate of Approval – December 16 1997	Diversion of Duck Pond, Lower Cove
Department of Natural Resources (NLDNR)	*Mining Act*	Mining Lease	Active quarrying
NLDNR	*Mineral Act*	Mineral Licence	Exploration
NLDNR	*Quarry Minerals Act*	2017 Operation Permit	Quarry operations
NLDNR	*Forestry Act*	2017 Cutting Permit	Clearing

* The name of the department responsible for environment has changed several times during the life of the Quarry. The names included above reflect the department name at the time of issueing the permit / approval. As of March 2017 it is the Department of Municipal Affairs and Environment.

Table 3.2 Additional Permits and Authorizations that May Be Required for the Quarry Extension

Government Agency	Applicable Legislation	Permit, Authorization or Approval	Relevant Activity
Provincial Authorizations			
NLDNR	*Mining Act*	Exploration Approval and Notice of Planned Mineral Exploration Work (also initiates Water Use Licence Application).	Exploration work
Department of Municipal Affairs and Environment (NLDMAE)	*Water Resources Act*	Certificate of environmental approval to alter a body of water – e.g., fording, bridges, culverts, site drainage.	Activities within 15 m of a body of water; run-off from site being discharged into receiving waters.
NLDMAE	*Water Resources Act*	Water use licence.	Water use on site.
NLDMAE	*Environmental Protection Act (Gasoline and Associated Products Regulations)*	Certificate of approval for storage and handling of gasoline and associated products.	Storage, handling and transportation of fuels and chemicals.
NLDMAE	*Environment Act*, SN 1995 c E-13.1, Section 11	Certificate of Approval	CofA Admendment or new CofA required for quarry extension
NLDMAE and Service NL	*Environmental Protection Act*	Waste Disposal Permit	Hazardous waste disposal.
Department of Fisheries and Land Resources (NLDFLR)	*Wildlife Act* and Regulations	Authorization to control nuisance animals.	Site construction and operations.
NLDFLR	*Lands Act*	Permit to occupy Crown Lands	Land disturbance on Crown Lands.
Federal Authorizations			
Department of Fisheries and Oceans (DFO)	*Fisheries Act*	*Fisheries Act* S35 (2) Authorization for works in fish bearing waters.	Work that could impact fish habitat; Installation of culverts and / or bridges, if required.
Transport Canada	*Transportation of Dangerous Goods Act*, 1992	Permit to store, handle and transport dangerous goods.	Storage, handing and transportation of fuel and chemicals.
Transport Canada	*Navigable Waters Protection Act*	Authorization of works in navigable waters.	Activity (works, obstructions, depositing / throwing and dewatering activities) in navigable waters.

3.2 Environmental Compliance Monitoring

Site inspections and compliance monitoring will occur during the implementation of the environmental protection procedures specified in this EPP and requirements specified in the applicable contracts and other relevant permits, authorizations and approvals.

3.2.1 Site Inspections

Site inspections are conducted by trained personnel (e.g., OSEM or designate) and are completed before, during, and after site disturbances related to Project construction and operations activities. Regular site inspections aid in the implementation of prescribed environmental protection measures. Details of site inspections are documented and issues or concerns communicated to the SAAM and the OSEM.

For site inspections conducted prior to quarry extension or operations activity, details including vegetation, general terrain / topography, drainage patterns, and other details are recorded. Photographs are taken during each site inspection. The required frequency of site inspections performed during quarry extension and operations activities are determined by the OSEM (or designate) and depend on the duration and type of activity being performed.

3.2.2 Compliance Monitoring

AML employees and contractors must comply with relevant approvals, authorizations, permits and legislation. Monitoring confirms that quarry extension and operations activities comply with applicable regulatory requirements and that the environmental protection procedures are being implemented effectively.

The OSEM will:

- Be responsible for environmental compliance monitoring on-site
- Instruct the contractor on the environment-related general, special, and technical clauses to be implemented as part of the contract(s)

Compliance monitoring may be required for various activities during Project construction and operations. Federal and provincial government compliance standards that may apply to AML's construction and operations activities include those listed in Table 3.3.

Table 3.3 Environmental Compliance Standards

Government Agency	Legislation / Guidelines	Activity Requiring Compliance	Comment
Federal Regulations			
Environment and Climate Change Canada (ECCC)	*Fisheries Act,* S36(3), Deleterious Substances	Run-off from the work site to receiving waters	Deposited substance or discharge must not be deleterious (i.e., must be acutely non-lethal). Liquid effluents that enter freshwater or marine waters must comply with the Act.
Canadian Wildlife Service (CWS), ECCC	*Migratory Birds Convention Act* and Regulations	Disturbance of nests and / or mortality of migratory birds under federal authority.	CWS will be notified by AML about the mortality of migratory birds in the project area, including passerine (songbirds), seabird and waterfowl species. Harmful substances (e.g., oil, wastes, etc.) that are harmful to migratory birds must not be deposited into waters that are frequented by them. To address 'incidental take', nests, eggs, nest shelters of migratory birds must not be disturbed or destroyed. Such locations should be identified and avoided temporally and spatially by recommended parameters. Notice should also be given about the mortality of endangered species (under federal regulation).
ECCC	*Canadian Environmental Protection Act* (CEPA)	Activities that have the potential to interact with the environment and human health.	CEPA provides a framework for setting environmental quality objectives, guidelines and codes of practice, pollution prevention plans, regulation of toxic substances, controlling pollution of other wastes and environmental emergency plans.
ECCC	*Species at Risk Act*	Mortality of endangered species or other species under federal authority.	Measures must be taken to avoid or lessen adverse effects on species at risk and that effects are monitored. Mitigation measures must be consistent with recovery strategies and management plans for species.
Transport Canada	*Transportation of Dangerous Goods Act* and Regulations	Handling and transporting of dangerous goods.	If the materials are transported and handled fully in compliance with the regulations, a permit is not required. A Permit of Equivalent Level of Safety is required if a variance from the regulations is necessary.

Government Agency	Legislation / Guidelines	Activity Requiring Compliance	Comment
Provincial Regulations			
Pollution Prevention Division (PPD)-NLDMAE and Service NL	*Environmental Protection Act* and Regulations	Site Preparation	Activities associated with site preparation are subject to the *Air Pollution Control Regulations*. Materials as stipulated in the Regulations cannot be burned in the open. Waste material will be considered, prior to disposal, for reuse, resale or recycling. Waste materials, associated with site preparation activities are disposed at an approved waste disposal site.
		Storage, handling and disposal of gasoline and other fuels	Petroleum storage and handling is subject to the *Storage and Handling of Gasoline and Associated Products Regulations*.
		Disposal of used oil	The storage and disposal of used oil is subject to the *Used Oil Control Regulations*.
		Handling and storage of hazardous materials	Activities involving the use of designated hazardous materials are subject to Workplace Hazardous Materials Information System (WHMIS), which outlines procedures for handling hazardous materials and provides details on various hazardous materials.
PPD-NLDMAE and Service NL	*Water Resources Act* and Regulations	Site drainage during site preparation activities	Waters discharged from work sites must comply with the *Environmental Control Water and Sewage Regulations*.
NLDFLR and Department of Justice and Public Safety	*Wildlife Act*	Various	Requirements for measures to reduce disturbance or mortality to wildlife.
NLDFLR	*Endangered Species Act*	Various	Requirements to address disturbance of individuals and avifauna nests (incidental take) through temporal and spatial avoidance.
NLDFLR	Provincial Policy on Species at Risk	Various	Requirements to address disturbance of individuals and avifauna nests (incidental take) through temporal and spatial avoidance.
Service NL	*Dangerous Goods Transportation Act* and Regulations	Storage, handling and transportation of fuel	Transportation of goods considered dangerous to public safety must comply with regulations.

Government Agency	Legislation / Guidelines	Activity Requiring Compliance	Comment
Department of Tourism, Culture, Industry and Innovation	*Historic Resources Act*	General site preparation / field activities	Archaeology sites and artifacts are considered the property of the Crown and must not be disturbed. Archaeology materials encountered must be reported to the Provincial Archaeology Office (PAO).
Mines and Energy Branch, NLDNR	*Mining Act*	Project planning and development	A Development Plan and a Rehabilitation and Closure Plan must be submitted to the NLDNR. Financial assurance must also be submitted. The Rehabilitation and Closure Plan must outline reasonable steps to progressively rehabilitate the site, whether or not closure has commenced.

3.3 Rehabilitation of Work Sites

AML is committed to the rehabilitation and closure of areas included in the quarry extension. A detailed Development Plan and Rehabilitation and Closure Plan is being prepared for the quarry extension. The Development and Rehabilitation and Closure Plan provides detailed information regarding progressive rehabilitation that will take place over the life of the quarry, with accompanying financial assurance required for submission to the Newfoundland and Labrador Department of Natural Resources (NLDNR), in accordance with the requirements of the *Mining Act* (1999).

Where applicable, the general rehabilitation process includes the following:

- Slopes are stabilized on an ongoing basis, if applicable, to limit erosion and promote natural re-vegetation
- Natural re-vegetation of surface disturbances is encouraged and active re-vegetation is pursued where this is deemed critical and where terrain and soil conditions permit
- Dismantling and removal of surface infrastructure associate with site preparation activities
- Handling of hydrocarbon and / or hazardous materials according to provincial and / or federal handling requirements
- Contouring of terrain to establish permanent drainage patterns, reduce erosion, and aid in safety of the public

The success of erosion control and site rehabilitation measures is inspected periodically by the OSEM or their designate subsequent to completion of site preparation activities.

3.4 Reporting and Communication

3.4.1 Internal Communications

Environmental performance concerns and issues that arise during quarry related construction and operation activities are communicated internally as required. The SAAM is responsible for communicating AML policies, procedures, and legal and other requirements to staff and contractors. Each individual is responsible for the timely communication of environmental incidents to the SAAM / OSEM. EPP orientation and sign-off for new staff / contractors on-site is also conducted by the SAAM, or designate, prior to start of work.

3.4.2 External Communications

When required, environmental issues related to Project construction and operations activities are reported by the SAAM to the NLDMAE, NLDFLR (Wildlife Division), and PAO. Issues which may be communicated include:

- Dust
- Erosion
- Historic resources
- Wildlife encounters of note
- Permits and authorizations

As per the *Certificate of Approval* issued by NLDMAE (dated March 31, 2014), monthly reports containing the environmental compliance monitoring and sampling information required in the Approval (i.e., Water Quality Monitoring Program) are provided within 30 days of the reporting month. Furthermore, incidents of the following are reported immediately to NLDMAE Pollution Prevention (Stephenville) **tel. (709) 643-6114, fax. (709) 643-8654**:

- Environmental Contingency Plan implementation
- Non-conformance of conditions within the Approval
- Spillage or leakage of a regulated substance
- Verbal / written complaints of an environmental nature from the public received by AML related to the Lower Cove Quarry

Spills of petroleum products or other hazardous materials are reported immediately to the **Environmental Emergencies 24 Hour Report Line (Coast Guard Traffic Centre, St. John's):**

- St. John's: 709-772-2083
- **Other Areas: 1-800-563-9089**

The *Fisheries Act* requires spills to be reported, regardless of size. Spills in ditches or on roadways or in other places that may enter waterways frequented by fish must also be reported. Refer to

Section 4.17 (Storage, Handling and Transfer of Petroleum Products and Other Hazardous Material) for the definition of reportable spills on-land versus aquatic environments.

Additionally, prior to activities requiring removal of merchantable timber, AML will contact the provincial Forestry and Agrifoods Agency.

Other compliance reporting required by permits or through compliance requirements not listed above are submitted to NLDMAE.

4.0 GENERAL ENVIRONMENTAL PROTECTION PROCEDURES

Environmental protection procedures implemented during quarry extension and operations are described for the following anticipated activities:

- 4.1 – Surveying
- 4.2 – Vegetation Clearing and Buffer Zones
- 4.3 – Grubbing, Stripping, Grading and Excavation
- 4.4 – Drilling
- 4.5 – Blasting
- 4.6 – Equipment Installation, Use and Maintenance
- 4.7 – Use of Pumps and Generators
- 4.8 – Staging and Storage Areas
- 4.9 – Quarry Waste Rock and Overburden Storage
- 4.10 – Erosion and Sediment Control
- 4.11 – Site Drainage
- 4.12 – Dewatering Pits and Work Areas
- 4.12 – Trenching
- 4.14 – Water Supply
- 4.15 – Watercourse Crossings and General Work Around Water
- 4.16 – Work In and Around the Marine Environment
- 4.17 – Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials
- 4.18 – Hazardous Waste Disposal
- 4.19 – Non-Hazardous Waste Management and Recycling
- 4.20 – Sewage Disposal
- 4.21 – Road Construction and Maintenance
- 4.22 – Vehicle Traffic and Remote Access
- 4.23 – Dust Control
- 4.24 – Noise Control
- 4.25 – Protection of Heritage Resources

This EPP will be revised as necessary to include new or amended activities and environmental protection procedures.

4.1 Surveying

Environmental Concerns

Potential environmental concerns associated with surveying include disturbance to wildlife. In addition, clearing could potentially disturb sensitive vegetation and historic resources.

Environmental Protection Procedures

a) No attempt will be made to harass or disturb wildlife.

b) Vehicles yield the right-of-way to wildlife.

c) Vehicles are restricted to designated roads and trails.

d) Vehicle access to sensitive areas such as wetlands occurs only with prior approval and as per protocols outlined in Section 4.15 (Wetlands, Watercourse Crossings and General Work Around Water).

e) Clearing of vegetation, if required, follows protocols outlined in Section 4.2 (Vegetation Clearing and Buffer Zones) and Section 4.25 (Protection of Heritage Resources).

4.2 Vegetation Clearing and Buffer Zones

Environmental Concerns

Vegetation clearing is required as part of site preparation activities (e.g., road construction, overburden removal). Potential environmental concerns are associated primarily with stockpiling cleared vegetation in or near watercourses.

Buffer zones are boundaries of undisturbed vegetation maintained along water bodies, or other sensitive habitats (e.g., nests, rare plants). Buffer zones along the edge of waterbodies provides habitat (shade) for fish. Buffer zones around active bird nests helps reduce the risk of direct mortality or incidental take (i.e., the inadvertent harming, killing, disturbance or destruction of migratory birds, nests and / or eggs). Without adequate buffer zones, vegetation, streams, ponds and lakes are also potentially affected by silt from run-off.

Environmental Protection Procedures

a) Environmentally sensitive sites, features and areas are identified and communicated with Operational Supervisors, which when practical may include flagging prior to clearing.

b) A mitigation strategy approved by NLDFR for rare or regionally uncommon plant species will be followed for activities that may cause disturbance in areas where they are suspected to occur. Refer also to Section 5.3 (Rare Plants).

c) Clearing activities comply with the requirements of applicable permits.

d) Clearing or removal of trees is limited to the extent possible.

e) Clearing consists of cutting to within **15 cm** of the ground, for merchantable timber and disposing of standing trees, as well as removing shrubs, debris and other vegetation. Mulching, if approved by NLDFLR, is also an accepted practice. These materials are stacked clear of ongoing AML activities for future rehabilitation. The Environmental Protection Guidelines for Ecologically Based Forest Resource Management (NLDFRA 1998) is observed.

f) Slash and other material or debris related to exploration activities is not permitted to enter watercourses, and are piled above spring flood levels.

g) Chain saws or other hand-held equipment are used in clearing vegetation, if required, except where alternative methods or equipment is approved by AML. The use of mechanical clearing methods, such as bulldozers, is permitted only in areas where there is no merchantable timber, and where the resulting terrain disturbance and erosion will not result in the loss of topsoil or the sedimentation of nearby water bodies.

h) A minimum buffer zone of **30 m** of undisturbed natural vegetation will be maintained between site preparation areas and water bodies, to the extent feasible. Where possible, additional buffer widths will be maintained according to the guidelines in Table 4.1.

Table 4.1 Recommended Minimum Buffer Zone Requirements for Activities near Watercourses

Activity	Recommended Buffer Width
Development around watercourses in urban or other developed area	30 m depending upon site specific considerations
Resource roads or highways running adjacent to water bodies	20 m + 1.5 X slope (%)
Piling of wood and slash Grubbing	30 m
Placement of site trailers Fuel storage	100 m
Source: Gosse et al. 1998	

i) AML understands the ecological importance that wetlands possess and attempts to avoid disturbances to wetlands where feasible. Activities that may influence or alter wetlands are carried out in accordance with the Policy for Development in Wetlands (NLDEC 2001). If wetlands cannot be avoided, mitigation measures will be developed through consultation with NLDFLR. Refer also to Section 4.15 (Wetlands, Watercourse Crossings and General Work Around Water).

j) Where development does occur in the vicinity of wetlands, a vegetation buffer zone of 30 m will be maintained around existing wetland areas where feasible.

k) If required, timber is felled inward toward the work area to avoid damaging adjacent standing trees.

l) Workers will not destroy or disturb features indicative of a cultural or archaeological site. Such features are avoided until a report has been made to the PAO and clearance to proceed has been received (see Section 4.25 – Protection of Heritage Resources, and Section 6.6 – Discovery of Historic Resources).

m) Tree clearing activities will be executed in a manner that complies with the *Migratory Birds Convention Act* (MBCA) and the *Species At Risk Act* (SARA), specifically to avoid incidental harm to birds:

- Primary mitigation during the bird breeding season is achieved through Project planning and scheduling of clearing activities, on a best-efforts basis, to avoid the breeding season of **April 15 to August 15.** AML will take due diligence related to nest searches and established buffers during breeding season
- In the event that clearing and or grubbing needs to occur during the bird breeding season, an ornithologist or qualified biologist will survey the potential habitat in advance of clearing activities to identify active avifauna nests (secondary mitigation).

- Nests found are protected with a buffer zone determined by a setback distance appropriate to the species. The buffer will remain in place until the young have permanently left the nest. Recommended buffers are provided in Table 4.2
- In addition, AML site staff will receive information that outlnes basic nesting behaviours to identify potential avifauna nests and procedures to follow if encountered.

Table 4.2 Recommended Minimum Buffer Widths around Avifauna Nests During Nesting Period

Species Group	Minimum Buffer Width
Raptors	No clearing of vegetation with **800 m** and no activity within **200 m** of an active raptor nest
Songbirds and other small birds	**30 m**
Waterfowl, Shorebirds and other Waterbirds	**100 m**
Swallow colonies	Up to **50 m** or more
Species At Risk (SAR)	**300 m**
Each nesting species responds differently to various activities. No permits will be given that will result in the intentional destruction of an active nest, however, for those activities where habitats are not being removed, but rather temporarily disturbed, AML will work with necessary authorities to determine appropriate timely solutions.	
Notes: 1. Based on Environment Canada's Avoidance Guidelines and previously used / accepted buffer widths. Appropriate setback distance may vary according to the species and circumstances. Final approvals from appropriate federal and provincial authorities are required prior to clearing activities during the April 15 – August 15 breeding season. Individual species may have specific setback requirements. Prior to ground disturbances, AML will review the ACCDC database for occurrences of new species (e.g., Rusty Blackbird, which has a different buffer). http://accdc.com/ 2. Refer to Avoidance Guidelines and Technical Information regarding incidental take of migratory birds, nests and eggs (http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=C51C415F-1).	

- Where vegetation clearing is not avoidable and a nest is found:
  - The nest and neighbouring vegetation will be left undisturbed until nesting is completed
  - Construction activities will be reduced in the immediate area until nesting is complete
- Where such measures cannot be undertaken, AML will seek approval from the appropriate federal and provincial authorities.

n) Sites where surface disturbances are planned or may occur are inspected and monitored prior to, during, and after the work.

4.3 Grubbing, Stripping, Grading and Excavation

Environmental Concerns

Grubbing, stripping, grading, excavation and other similar land-disturbance activities are required for site preparation. Generally, soils are thin in the area and will be conserved and reused on-site where feasible. Potential environmental concerns include soil erosion, transfer of sediment-laden runoff to surrounding water bodies and disruption of breeding activities of ground-nesting birds.

Environmental Protection Procedures

a) Grubbing limits are clearly identified in the field using survey stakes and or flagging tape.

b) Grading for gravel pads for site preparation areas and access roads are limited to areas where it is needed for the safe and efficient operation of vehicles, machinery and site preparation equipment.

c) Grading for site rehabilitation and restoration is in accordance with regulatory requirements.

d) Grading is not permitted within established buffer zones and setback distances from water bodies.

e) Grading is only permitted within pre-determined right-of-ways and site preparation areas.

f) Gravel pads are graded so that surface runoff is directed away from water bodies, riparian areas and wetlands.

g) Required erosion protection and sediment control measures are put in place prior to grading in accordance with the erosion and sediment control measures (Section 4.10).

h) Areas containing soil with high silt content, artesian springs or areas of previous erosion receives special erosion protection and sediment control techniques.

i) Areas requiring extensive grubbing are stabilized as soon as possible to reduce erosion.

j) Grubbing in areas of finely textured soils is halted during heavy precipitation events.

k) Grubbing is not permitted within established buffer zones and setback distances from water bodies.

l) Stockpiled materials from grubbing must not block natural drainage patterns.

m) Unless required for the work, the extent of grubbing is reduced as much as possible.

n) A minimum of 30 m is maintained between grubbed areas and watercourses. Where practicable, grubbing limits adjacent to watercourses are flagged in the field using flagging tape.

o) During grubbing, when feasible, material will not be pushed into areas which are to be left undisturbed.

p) Mineral topsoil and surficial organic materials are stripped separately from subsoil, segregated, and stockpiled for later use in backfilling, contouring and rehabilitation. Soils are placed in the reverse order to which they were removed.

Protocols described in Section 4.2 (Vegetation Clearing and Buffer Zones) are followed for grubbing activities that occur during bird nesting season (approximately April 22 – August 12).

4.4 Drilling

Environmental Concerns

The environmental concerns with drilling (e.g., exploration, water well drilling) and pump tests are primarily related to the potential surface disturbances from the disposal of drilling fluids and cuttings, potential siltation,and the generation of dust, noise, and other potential impacts on terrestrial habitats, air quality, aquatic ecosystems and historic resources.

Environmental Protection Procedures

Potential drilling sites in sensitive areas are inspected prior to drill site preparation by the OSEM, whenever possible.

a) Vegetation is cleared following the procedures detailed in Section 4.2 (Vegetation Clearing and Buffer Zones.

b) Waste oil is removed from the drill site and properly disposed of.

c) Water applications are used to control dust where necessary. The use of water for dust control or lubrication during drilling is undertaken in such a manner that runoff will not enter watercourses.

d) Water used throughout the drilling process remains on the drill site. Every effort is made to prevent turbid water from entering watercourses.

e) Cuttings from drill activities are not removed from the site; they will remain in the immediate location of drilling activities, while taking buffer zones into consideration.

f) When practical, drilling equipment will have muffled exhaust to reduce generated noise.

g) Fuel is stored, handled and transported according to Section 4.17 (Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials).

h) Garbage and solid waste is removed from the drill site and deposited in an approved waste disposal area.

i) If oil drops or leaks occur, every attempt possible will be made to clean up the area immediately. Equipment and worksites will have access to oil absorbent material in case of a leak or spill (e.g., portable spill kits).

j) Drilling of water wells, if required, must be conducted in compliance with the *Water Resources Act* and *Well Drilling Regulations, 2003.*

k) newly drilled exploration holes will be capped with material that will not contaminate the source product (i.e., not clay based products) when test work on the hole has been completed.

4.5 Blasting

Environmental Concerns

Potential environmental concerns associated with blasting activities include disturbance to vegetation, wildlife, fish, and residents and other persons in the vicinity of operations. There is also potential for changes to water quality of surrounding surface and ground water from run-off and residue from blasting operations.

Environmental Protection Procedures

a) A communication protocol is followed, to notify affected parties of blasting operations.

b) Blasting is conducted and monitored in accordance with Fisheries and Oceans Canada (DFO) Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters (Wright and Hopky 1998).

c) Quarry blasting operations are scheduled to reduce disturbance to wildlife and area residents, and for the safety of workers.

d) The immediate area of the site is surveyed within three hours prior to a blast and operations are curtailed if sensitive species are observed. Wildlife sightings should be reported immediately to the OSEM.

e) Blasting is reduced, to the extent possible, during timing windows established for sensitive bird breeding, nesting and brood rearing months.

f) Explosives are stored, transported and handled in accordance with federal requirements through the *Explosives Act* and *Transportation of Dangerous Goods Act* and provincial regulations.

g) Blasting will not occur near fuel storage facilities.

h) Use of explosives is restricted to authorized personnel who have been trained in their use.

i) The blasting contractor must be in possession of valid licenses, permits and certificates required for blasting in Newfoundland and Labrador.

j) Changes in water quality from drainage from exposed areas, will be captured in established monthly surface water monitoring procedures.

4.6 Equipment Installation, Use and Maintenance

Environmental Concerns

A variety of vehicles and heavy equipment (e.g., excavators, pumps, generators) are used during quarry extension and operations. Potential environmental concerns include air emissions, accidental spills, leaks, and rutting.

Environmental Protection Procedures

a) To reduce fire hazards, fuel will not be stored immediately adjacent to generators, and the fuel storage area must be well ventilated. Fuel will not be stored within 100 m of water bodies (Gosse et al. 1998).

b) Portable fuel storage containers have spill trays beneath with a potential capacity of 110% of volume. They should also be in a covered and secured area.

c) Leaks are reported immediately to the OSEM or designate and then to the SAAM.

d) Spill kits are located at fuel storage locations. Additional spill kits and other clean-up equipment are located at designated central storage location(s). Personnel who deal with fueling, fuel transfer and pumps and generators must be trained in the use of the kits.

e) When feasible, drip pans will be placed underneath pumps, fuel storage, and portable generators.

f) Hoses and connections on equipment are inspected routinely for leaks and drips.

g) When practical and possible, only minor repairs and maintenance (e.g., lubrication) of 'non-mobile' equipment such as the cranes and flatbeds will be performed on-site. Where possible, major repairs are performed at a locations outside of the quarry area. If waste is stored on-site, it must include secondary containment. Waste oil is recycled.

h) Fuel and other hazardous materials are handled according to the procedures in Section 4.17 (Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials).

i) Emergency Response / Contingency Plans and spill control and clean-up equipment are provided at designated vehicle, equipment, and machinery maintenance areas.

j) Unnecessary idling of vehicles, equipment and machinery is avoided to the extent practicable.

k) Vehicle, equipment and machinery operators perform daily inspections for fuel, oil and fluid leaks and immediately shutdown and repair leaks. Machinery working near watercourses is kept clean and free of leaks and confirmed through daily inspections.

l) Vehicles transporting dangerous goods or hazardous products must display required placards and labelling in accordance with provincial legislation.

m) Vehicles, equipment and machinery must arrive on-site in clean condition free of fluid leaks.

n) Equipment operators must have required training and/or experience and licenses to work.

o) Use of vehicles in wetlands is avoided, to the extent feasible. Where equipment entry into wetlands is unavoidable, the area disturbed as well as the number of repeated passes over the same trail / access road are reduced where feasible.

p) Construction and use of gravel access roads is limited during spring thaw and other wet periods where practicable.

q) Heavy equipment will be operated in a manner to maximize fuel efficiency, thereby reducing greenhouse gas emissions that could contribute to climate change issues.

4.7 Use of Pumps and Generators

Environmental Concerns

Water pumps and generators are used to support mine extension activities and supply the work site. Environmental concerns are associated with accidental spills or leaks that could contaminate soil and / or waterbodies.

Environmental Protection Procedure

a) Fuel is stored, handled and transported according to Section 4.17 (Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials).

b) Petroleum storage tanks will be registered with Service NL and leaks/spills will be reported to NLDMAE.

c) An environmental emergency contingency plan has been developed which includes information regarding the location of spill response equipment and a trained contractor, in the event of a spill.

d) Minimal volumes of fuel is available for operation of generators but not located within 100 m of a waterbody. Refueling and maintenance activities (including storage of oils, greases, diesel, gasoline, hydraulic and transmission fluids) will also occur at least 100 m from a body of water (including shoreline and wetlands), and on level terrain.

e) Waste oils and used lubricating oil will be retained in a tank or closed container, and disposed of by a company licensed for handling and disposing of used oil products.

f) Fuel storage containers are equipped with a spill tray with a capacity to contain 110% of the storage container volume.

g) When feasible, drip pans are placed underneath pumps and generators to contain leaks that may occur.

h) Hoses and connections on pumps and generators are routinely inspected for leaks, drips or other potential hazards.

i) Leaks are immediately reported to the OSEM.

j) Spill kits are located at designated locations. Personnel who deal with fuel, pumps, and generators are trained in the use of the kits.

k) Biodegradable fluids will be considered for use in place of petroleum products whenever possible.

4.8 Staging and Storage Areas

Environmental Concerns

Areas will be required for storing and maintaining equipment and supplies during activities associated with quarry extension and operations. Potential environmental concerns include erosion and run-off of sediment into nearby water bodies.

Environmental Protection Procedures

a) Where feasible existing laydown and storage areas are used.

b) Establishing new laydown or storage areas will follow the procedures for Vegetation Clearing and Buffer Zones (Section 4.2) and Erosion and Sediment Control (Section 4.10).

c) External storage areas are placed on level terrain and kept free of ponding or run-off.

d) Drainage from areas of exposed soil is controlled by grade or ditching and directing run-off away from water bodies.

e) Laydown and storage areas no longer required will be rehabilitated, when practical.

f) Fuel is stored, handled and transported according to Section 4.17 (Storage, Handling and Transfer of Petroleum Products and Other Hazardous Materials).

g) Waste oils and used lubricating oil will be retained in a tank or closed container, and disposed of by a company licensed for handling and disposing of used oil products.

h) Petroleum storage tanks will be registered with Service NL and leaks/spills will be reported to NLDMAE.

i) Drums of petroleum products or chemicals should be tightly sealed against corrosion and rust and surrounded by an impermeable barrier in a dry, water-tight building or shed with an impermeable floor.

4.9 Quarry Waste Rock and Overburden Storage

Environmental Concerns

The principal concern associated with the storage of waste rock and overburden is potential siltation and run-off into terrestrial and aquatic environments, with potential effects on habitat and the potential loss or displacement of fish and wildlife in the area.

Environmental Protection Procedures

a) Overburden and waste rock storage areas are located at least 50 m from waterbodies, on well-drained soil (Gosse et al. 1998).

b) If required, collection ditches and settling ponds are used to manage surface runoff from stockpiles.

c) Waste rock and overburden storage areas are stored in stable piles and sloped to avoid the pooling of surface water.

4.10 Erosion and Sediment Control

Environmental Concerns

Eroded material could potentially cause siltation in water bodies and, subsequently, potentially decrease suitable habitat for aquatic and terrestrial animals.

Environmental Protection Procedures

a) Site preparation activities must be conducted according to the conditions set out in the permits and / or approvals and authorizations from the NLDMAE.

b) Primary means for controlling erosion is avoiding activity that contributes to erosion. The disturbance of new areas will be reduced where possible.

c) Drainage ditches are stabilized if required (e.g., lined with vegetation or rock, terracing, interceptor swales, installation of rock check dams) to reduce soil erosion. Such measures are properly maintained following installation.

d) Areas of exposed erodible soil, including soil stockpiles, are stabilized by back-blading, grading and / or compacting to meet engineered slope requirements.

e) If it is observered that that silt is entering a waterbody, further mitigation measures will be implemented, such as temporary drainage ditches, siltation control (settling) ponds, ditch blocks / check dams, berming or sediment dam traps, to intercept and/or divert run-off. The necessary or appropriate measures will be determined in the field.

f) Work, laydown and storage areas are monitored for erosion and appropriate repair action taken as necessary.

g) Existing or new siltation control structures used in this work are monitored for excessive accumulation of sediment. Accumulated sediment from control structures is removed to gain full effectiveness of the systems. Effluent from control structures is released to flow overland for appropriate filtration prior to entering a waterbody.

h) Excess water is removed from siltation control systems prior to excavation of sediment.

i) Site preparation activities are suspended during extreme wet weather events where erosion protection and sediment control measures are compromised.

j) Exposed soil areas will be reduced by limiting the area exposed at any one time, and by limiting the amount of time that an area is exposed.

k) Disturbed areas that are susceptible to erosion, can be revegetated, naturally or intentionally or coveredwith a thin layer of brush or slash, to reduce potential erosion. In more susceptible

areas, particularly those that may affect waterbodies, anti-erosion techniques, such as rip rap, filter fabrics, gravel or wood chip mulches, may be applied where practical.

l) Erosion prevention and drainage control measures should be installed or implemented prior to land disturbance. Control devices such as filter fabrics, berms, sediment traps and/or settling ponds should be in place to receive drainage from areas disturbed by site preparation and site clearing, grubbing, scarification and general construction activities.

m) Erosion protection and sediment control measures remain intact during quarry extension and operations, as required, and are only removed after disturbed areas are protected and sediments are disposed.

n) Orientation provided by AML for field crews working on site preparation activities will include erosion protection and sediment control measures.

o) Erosion control measures are inspected regularly by AML representatives, once per week, and after a significant storm.

p) Erosion control measures are maintained in good working order. If a repair is necessary, it is initiated within 24 hours.

q) AML understands the ecological importance that wetlands possess and attempts to avoid disturbances to wetlands where feasible. Activities that may influence or alter wetlands are carried out in accordance with the Policy for Development in Wetlands (NLDEC 2001). Refer also to Section 4.5 (Wetlands, Watercourse Crossings and General Work Around Water).

4.11 Site Drainage

Environmental Concerns

Potential environmental concerns associated with dewatering work areas and site drainage are the potential for siltation and direct fish mortality and / or habitat destruction in adjacent water bodies.

Environmental Protection Procedures

The following Environmental Protection Procedures outline general measures related to site drainage. More detailed measures for surface water control are provided in Section 5.1.

a) Construction activities will be coordinated with seasonal constraints (e.g., time clearing, grubbing and excavation activities) to avoid periods of heavy precipitation.

b) Site water is discharged to vegetated work areas to reduce potential effects on watercourses.

c) Discharged water is encouraged to follow natural surface drainage patterns.

d) Effluent or runoff leaving the site will be required to conform to the requirements of the *Environmental Control Water and Sewage Regulations*, 2003.

e) Adherence to groundwater monitoring plan as approved by NLDMAE, 2018.

f) Monitoring of site run-off is conducted as per provincial requirements following effluent quality standards.

g) If periodic monitoring indicates regulated water quality standards are exceeded, AML will develop additional protocols in consultation with the appropriate regulatory authorities (NLDMAE and / or DFO).

h) Blockage of natural drainage patterns by construction activities is avoided.

i) Culverts are installed and maintained in accordance with provincial Environmental Guidelines for Culverts (NLDEL 1992), Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador (Gosse et al. 1998), and Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2013). Refer to Section 4.15 (Wetlands, Watercourse Crossings and General Work Around Water) for detailed protocols.

j) Erosion protection and sediment control are provided in accordance with Erosion and Sediment Control measures (Section 4.10).

k) Erosion prevention and drainage control measures will be installed / implemented prior to land disturbance. Control devices such as filter fabrics, ditching, sediment traps and/or settling

ponds will be in place to receive drainage from areas disturbed by site preparation and site clearing, grubbing, scarification and general construction activities.

l) Existing, natural drainage patterns and flows are maintained to the extent possible.

m) No debris or slash is allowed to be placed in drainage channel / ditches.

n) AML understands the ecological importance that wetlands possess and attempts to avoid disturbances to wetlands where feasible. Activities that may influence or alter wetlands are carried out in accordance with the Policy for Development in Wetlands (NLDEC 2001). Refer also to Section 4.15 (Wetlands, Watercourse Crossings and General Work Around Water).

4.12 Dewatering Pits and Work Areas

Environmental Concerns

The main concern associated with dewatering of pits and work areas is the potential for siltation and surface water discharge into freshwater environments, posing a threat for fish mortality and alteration / destruction of fish habitat.

Environmental Protection Procedures

The following Environmental Protection Procedures outline general measures related to dewatering of pits and work areas. More detailed measures for Surface Water Control focused on potential release into the marine environment are provided in Section 5.1.

a) If silt is entering a waterbody, filtration or other suitable devices (e.g., settling ponds, silt fences, dykes) are provided to remove silt from water pumped from work areas, prior to discharging.

b) Effluent discharged is monitored as per provincial requirements for water quality standards.

c) Staff and contractors will undertake measures that may reduce or eliminate discharge of oily waste into the marine environment. Runoff from development will be directed away from wetlands.

d) If periodic monitoring indicates regulated water quality standards are exceeded, AML will develop additional protocols in consultation with the appropriate regulatory authorities (NLDMAE and / or DFO).

e) Erosion protection and sediment control are provided in accordance with Erosion and Sediment Control measures (Section 4.10).

f) AML understands the ecological importance that wetlands possess and attempts to avoid disturbances to wetlands where feasible. Activities that may influence or alter wetlands are carried out in accordance with the Policy for Development in Wetlands (NLDEC 2001). Refer also to Section 4.15 (Wetlands, Watercourse Crossings and General Work Around Water).

4.13 Trenching

Environmental Concern

The construction of water lines, sewage lines, or other infrastructure has the potential for sediment laden runoff to enter into the adjacent environment, with potential effects on fish, fish habitat, and water quality.

Environmental Protection Procedure

a) Topsoil and overburden, while expected to be minimal on-site, that has been excavated during the trenching process is stored in a separate stockpile, when practical, to be used during rehabilitation.

b) Trenches are filled as soon as possible, and the retained topsoil used to assist in re-vegetation of the disturbed area.

c) Material that is deemed unsuitable to be used in the rehabilitation process is disposed of in a separate area approved by the OSEM and / or SAAM.

d) Dewatering of trenches incorporates measures to control the release of sediment laden water through the use of settling ponds, silt nets, or other devices, as required.

4.14 Water Supply

Environmental Concerns

Potential environmental concerns related to water supply, including potable water supply, include effects to habitat and fish populations in and around the potentially affected water bodies.

Environmental Protection Procedures

a) Drilling of water wells, if required, will follow protocols outlined in Section 4.4 (Drilling).

b) Monitoring wells will be installed as identified in the approved ground water monitoring plan (Stantec, 2018).

c) Specific protocols in Section 4.15 (Wetlands, Watercourse Crossings and General Work Around Water) have been implemented for work in proximity to water.

d) The water intake has appropriate screen to prevent damage to fish. Guidelines for the screening of water intake are provided by DFO (1995).

e) Volume of water withdrawal from approved sources is limited to reduce adverse impacts on fish or fish habitat.

f) AML routinely tests potable water for compliance with the Guidelines for Canadian Drinking Water. If compliance is not met, alternative drinking water is provided.

4.15 Wetlands, Watercourse Crossings and General Work around Water

Environmental Concerns

The potential environmental concerns associated with wetlands, watercourse crossings, and general work around water include direct disturbances on vegetation, mortality of fish and other wildlife, and loss of habitat resulting from sedimentation and / or removal of habitat and stream bank vegetation.

Environmental Protection Procedures

a) An evaluation of soil erosion potential is conducted at stream crossings. This assessment of potential erosion risk assists in the development of specific erosion stabilization methods and effective sedimentation control practices on a site-specific basis.

b) No work below the high water mark of surface water features is conducted without the prior notification and assessment by the OSEM or his / her designate. Stream crossings, if required, are constructed in compliance with the required permit for culvert installation (Section 48 of the *Water Resources Act*; NLDEC undated) and other approvals required from NLDMAE and DFO.

c) Avoid the entry of deleterious substances including, but not limited to, materials such as sediment and fuel to watercourses and water bodies during watercourse crossing work or work around water.

d) A minimum buffer of undisturbed natural vegetation must be left between an access road and the bank of a watercourse that it parallels. The buffer width is determined through the formula: buffer width (m) = 20 m + 1.5 x slope (%), (Gosse et al. 1998).

e) In locations within defined fish habitat where culverts are required, application is made to NLDMAE and DFO, if additional approvals, other than approvals received from NLDMAE for works within defined buffers for water bodies, are required. Culverts are sized to handle the 1-in-25 year return period flood and are constructed in accordance with the Newfoundland and Labrador Environmental Guidelines for Culverts (NLDEL 1992a) and Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2013). The following measures are also implemented:

- install culvert(s) in accordance with good engineering and environmental practices. When feasible, bottomless culverts may be considered
- unless otherwise indicated, in-stream work will take place in dry conditions, either by the use of cofferdams or by diverting the stream
- culverts should be marked to indicate their position under the snow
- installation of cylindrical culverts are counter-sunk only where necessary to protect fish habitat such that the culvert bottom is 1/3 the diameter below the streambed in the case

of culverts less than 750 mm outside the diameter; for culverts greater than 750 mm outside diameter, the culvert bottom is installed a minimum of 300 mm below the streambed
- in multiple (gang) culvert installations, install one culvert at an elevation lower than the others
- the natural low flow regime of the watercourse will not be altered
- a culvert will not be installed before site specific information such as localized stream gradient, fish habitat type and species present have been evaluated. Culverts are to be installed using the guidelines provided in Gosse et al. (1998)
- riprap outlets and inlets to prevent erosion of fill slopes
- use culverts of sufficient length to extend a short distance beyond the toe of the fill material
- use backfilling material that is of a texture that will support the culvert and limit seepage and subsequent washing out
- align culverts such that the original direction of stream flow will not be significantly altered
- remove fill and exploration related debris from the culvert area to a location above the peak flow level to prevent its entry into the stream
- fill material will not be removed from streambeds or banks, except when installing a culvert when removal of material is necessary for a flat foundation
- reduce and restrict the use of heavy equipment in and near watercourses; where possible, an excavator is used from shore rather than a bulldozer in the watercourse. Where it is absolutely necessary to do so, in-stream work is performed by rubber tired vehicles (Gosse et al. 1998) only and will only be done with prior notification of the OSEM, in compliance with NLDMAE, and with approvals from DFO
- as required, cofferdams of non-erodible material are used to separate work areas from the watercourse when excavating for culverts and footings
- cofferdams are removed upon completion of exploration and the streambed returned as closely as possible to its original condition

f) Fording of watercourses is compliant with the Environmental Guidelines for Fording (NLDEC 1992b) and Measures to Avoid Causing Harm to Fish and Fish Habitat (DFO 2013), in conjunction with the following:

- fording activities comply with requirements, conditions, permits and / or approvals under NLDMAE and DFO
- areas of spawning habitat are avoided
- crossings are restricted to a single location and are made at right angles to the watercourse
- fording of a watercourse occurs as infrequently as possible. Temporary crossing structures are constructed when repeated crossings are necessary
- fording areas are stabilized using vegetation mats, corduroy roads or coarse material where they are not in an area of natural bedrock or where the substrate is easily disturbed by fording
- fording in areas where substrate is not easily disturbed by fording, or where coarse material is not readily available for stabilization, occurs only under the direction of the OSEM or qualified person

- equipment crossing a watercourse does so at slow speeds and in low gear
- equipment crossing a watercourse is free of leaks (e.g., oil, gasoline, hydraulic fluid) and is not washed or serviced (fueled or otherwise), within 30 m of the watercourse
- fording does not occur under high flow conditions
- fording activities do not decrease the depth of the watercourse to less than 20 cm (activities maintain depths when existing depth is less than 20 cm)
- bank sections with loose or erodible materials are stabilized. No materials are deposited in a watercourse or below the high water mark, if sloping is used for stabilization

g) AML understands the ecological importance that wetlands possess and attempts to avoid disturbances to wetlands where feasible. Activities that may alter or disturb wetlands are carried out in accordance with the Policy for Development in Wetlands (NLDEC 2011).

- a permit will be obtained under Section 48 of the *Water Resources Act* (2002) prior to wetland development
- where feasible, access to work sites deviates around a wetland. If deviation is not feasible, temporary mitigation measures such as swamp or brush mats or other appropriate mitigation measures are used to cross the wetland
- wetland crossings are reduced during times of increased or prolonged precipitation, where feasible
- wetland crossings that have been established are reassessed when conditions change (e.g., change in season, increased rainfall)
- natural vegetated buffers are maintained if vegetation clearing activities are required within 30 m of a wetland (refer to Section 4.2 – Vegetation Clearing and Buffer Zones)
- run-off from vegetation clearing activities is directed away from wetlands
- no debris is left in wetlands, watercourses or their buffers, or in coastal areas
- if wetlands are unavoidable, AML will discuss mitigation, and possible compensation requirements, with NLDFLR in advance of acitivites

4.16 Work In or Around the Marine Environment

Environmental Concern

The main concern arising from works conducting around the marine environment include noise and the potential disturbance to fish and fish habitat. Activities can also result in the avoidance of the area by seabirds, waterfowl, and marine mammals, as well as near shore terrestrial species. Marine work also has the potential for chronic or acute contamination to the surrounding environment (aquatic and terrestrial).

Environmental Protection Procedure

a) Equipment has muffled exhausts to reduce noise.

b) Vessels will use the main navigation channels to get to and from the site.

c) Staff and contractors will undertake measures that may reduce or eliminate discharge of oily waste into the marine environment.

d) Food scraps and other garbage left on beaches and other coastal habitats can artificially enhance the populations of avian and mammalian predators of eggs and chicks. Litter (including food waste) will not be left in coastal areas by staff and/or contractors.

e) Land-based equipment is serviced and fueled on land at least 100 m from the marine environment, when practical, or in designated areas.

f) Mechanical inspections are conducted routinely on equipment to search for leaks. Leaks are repaired immediately.

g) An Environmental Emergency Contingency Plan is in place (Appendix A) and appropriate spill equipment is available on-site.

h) Disturbed areas along the shoreline are stabilized in a timely manner, to prevent erosion.

4.17 Storage, Handling and Transfer of Petroleum Products and Other Hazardous Material

Typical hazardous substances that may be used on-site include, but are not necessarily limited to:

- Petroleum (including vehicle fuel), oil and lubricants
- chlorinated and non-chlorinated solvents (e.g., cleaner-degreasers)
- flammable gases (e.g., acetylene)
- waste petroleum products (e.g., used engine oil)
- corrosives (e.g., battery acid)
- glycol (e.g., antifreeze)
- propane

Environmental Concerns

The main potential environmental concern with use of hazardous substances is a potential uncontrolled release to the environment through spillage, and subsequent adverse effects on terrestrial and aquatic habitat and species, soil, groundwater quality, and human health and safety.

Propane is flammable and poses a potential threat as an asphyxiate to humans and animals. In liquid form, propane could potentially cause frostbite on skin contact. Propane containers could potentially explode if exposed to heat or fire.

Environmental Protection Procedures

a) The WHMIS Regulations under the *Occupational Health and Safety Act* applies to handling and storage of hazardous materials. Relevant current Safety Data Sheets (SDS) are readily available for the site.

b) Precautions are taken to prevent and reduce the spillage, misplacement, or loss of fuels and other hazardous materials.

c) Biodegradable fluids will be considered for use in place of petroleum products whenever possible, as a standard for best practices.

d) Spills, regardless of size, are reported to the SAAM.

e) In the event of a reportable spill on-land or a spill, regardless of size, in the freshwater environment, the **Environmental Emergencies 24-Hour Report Line** is contacted by the SAAM: **St. John's: 709-772-2083 or Other Areas: 1-800-563-9089.** In addition, the SAAM reports the spill incident to **DFO at 709-772-4423.**

A spill is defined as reportable to the Environmental Emergencies 24-hour Report Line, depending on the class and quantity of dangerous goods involved, which varies between applicable Regulations:

- Reportable spill quantities for hazardous materials are listed in the Transportation of *Dangerous Goods Act*: *Clear Language Regulations – Part 8*
- A reportable hydrocarbon spill is defined as loss of gasoline or associated products in excess of 70 L in *the Storage and Handling of Gasoline and Associated Products Regulations, 2003*
- A spill, regardless of size, that may enter the freshwater environment, must be reported according to the *Fisheries Act*

f) An environmental emergency contingency plan has been developed which includes information regarding the location of spill response equipment and a trained contractor, in the event of a spill.

g) A copy of emergency response / contingency plans for fuel and hazardous material spills is readily available on-site (refer to Section 6.1 – Contingency Plans for Fuels and Hazardous Materials Spills, and Appendix A – Environmental Emergency Contingency Plan).

h) Personnel working on-site will be knowledgeable about response procedures.

i) Fuel storage systems are registered and comply with the *Storage and Handling of Gasoline and Associated Products Regulations*. Verification of storage tank approvals are retained by AML.

j) Only workers who are qualified and trained in handling these materials as stated in the manufacturer's instructions and government laws and regulations may handle fuel and other hazardous materials.

k) Fuel truck operators must attend the entire refueling operations.

l) Refueling and maintenance activities will be undertaken on level terrain, at least **100 m**, when practical, from environmentally sensitive areas, including shorelines and wetlands, on a prepared impermeable surface with a collection system to prevent oil, gasoline and hydraulic fluids from entering surface waters.

m) Long term storage of drums of petroleum products or chemicals will be tightly sealed against corrosion and rust and surrounded by an impermeable barrier in a dry, water-tight building or shed with an impermeable floor. Drums stored outside will be within bermed containment areas, and for shorter time periods.

n) Fuel and other hazardous materials must be stored at least 100 m from surface water (Gosse et al. 1998).

o) Handling and fueling procedures must comply with the *Storage and Handling of Gasoline and Associated Products Regulations* and additional requirements put forth by the NLDMAE in order to limit potential contamination of soil or water.

p) Fuel storage areas and non-portable transfer lines are clearly marked or barricaded so that they are not damaged by moving vehicles. The markers are visible under weather conditions. Barriers are constructed in compliance with the *Storage and Handling of Gasoline and Associated Product Regulations*.

q) Waste oils, lubricants, and other used oil are retained in a tank or closed container, and disposed of in accordance with the *Used Oil Control Regulations*. Waste oil generated and temporarily stored on-site must have secondary containment. Waste oil is recycled.

r) Fire and spill response materials must be kept nearby.

s) Soil contaminated by leaks of oil or grease from equipment is treated, or disposed of, according to the *Environmental Protection Act*.

t) Contracted fuel suppliers will, before transporting or positioning fuel or oil, have on file at AML a copy of their fuel and hazardous material spills contingency plan, which is required under *Storage and Handling of Gasoline and Associated Products Regulations* and which is acceptable to AML.

u) Transportation of hazardous and dangerous materials is conducted in accordance with provincial, territorial and federal transportation regulations. Transportation documents are retained in a retrievable filing system and stored for the duration of the undertaking.

v) Smoking is prohibited within 10 m of a fuel storage area.

w) Fueling or servicing of mobile equipment does not occur within 100 m of a body of water (Gosse et al. 1998).

x) Small quantities of hazardous material (cans and other containers under 20 L volume) are stored in a secure location protected from weather and freezing, as well as vehicle traffic.

y) Where hazardous materials are stored outdoors, a designated area is established, graded and fitted with an impermeable membrane covered with local soil and surrounded by an earth berm.

z) Decommissioning of a temporary storage tank system is conducted according to the *Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products* (Canadian Council of Ministers of the Environment 1994).

aa) Hazardous waste is moved to an appropriate hazardous waste storage area for disposal (Section 4.18 – Hazardous Waste Disposal). These areas are constructed in compliance with applicable federal and provincial legislation.

bb) Propane storage tanks are installed as per manufacturer's specifications, and maintenance schedules are set and followed.

cc) Propane tanks are painted and free of corrosion and damages.

dd) Areas surrounding propane storage tanks are well ventilated and free of possible ignition sources, and combustible materials.

ee) Tanks are grounded to avoid static accumulation.

4.18 Hazardous Waste Disposal

Environmental Concerns

The main potential environmental concern with disposing of hazardous substances is an uncontrolled release through leakage or accidental spill, and subsequent effects on terrestrial and aquatic habitat and species, soil, groundwater quality, and human health and safety.

Environmental Protection Procedures

a) Hazardous wastes are handled according to the provincial *Environmental Protection Act*. Waste classified as "hazardous" or "special" that cannot be disposed of in regular landfill sites are sent for disposal at a licensed hazardous waste management company.

b) Precautions are taken to prevent and reduce the spillage, misplacement, or loss of fuels and other hazardous materials. In the event of a spill on land or in the freshwater environment, refer to the Fuel and Hazardous Material Spills Contingency Plan (Section 6.1) and AML's Environmental Emergency Contingency Plan (Appendix A).

c) A copy of the Fuels and Hazardous Materials Spills Contingency Plan (Section 6.1) and the Environmental Emergency Contingency Plan (Appendix A) is available at hazardous material storage sites and fuel transfer locations.

d) Hazardous waste materials are only handled by workers who are qualified and trained in handling these materials as stipulated in government laws and regulations.

e) Waste accumulated on site prior to disposal is confined, so that it does not pose an environmental or health hazard.

f) Waste material is not disposed of on-site or in a body of water.

g) Burning of hazardous waste is not permitted.

h) Where hazardous waste materials will be stored outdoors, a designated area is established, graded and fitted with an impermeable membrane covered with local soil and surrounded by an earth berm.

i) Waste oils, lubricants and other used oil are retained in a tank or closed container, and disposed of in accordance with the *Used Oil Control Regulations*.

j) Soil contaminated by leaks of oil or grease from equipment is disposed of, or treated, according to the *Environmental Protection Act*.

k) Hazardous wastes generated by alternative treatments are handled according to the procedures for handling fuel and hazardous materials (Section 4.17 – Storage, Handling and Transfer of Petroleum Products and Other Hazardous Material).

4.19 Non-Hazardous Waste Management and Recycling

Environmental Concerns

Waste (e.g., domestic and industrial wastes, grey water, paper, cardboard and wood), if not properly controlled and disposed of, can be unsightly and could potentially cause human safety and health concerns. It also has the potential to attract wildlife to storage sites.

Environmental Protection Procedures

a) Solid waste is handled according to the provincial *Environmental Protection Act*.

b) Waste receptacles will be installed at active areas for use by workers.

c) Upon completion of operations, the site will be left clean and clear of litter and debris.

d) Solid waste materials are considered, prior to disposal, for reuse, resale, or recycling.

e) Solid waste produced by site personnel and operations is collected and disposed of at an approved facility, with permission obtained from that facility.

f) Waste accumulated on site prior to disposal is confined, so that it does not pose an environmental or health hazard.

g) Work areas are kept clear of waste and litter to reduce the potential for human-wildlife interactions.

h) Waste that may attract animals (i.e., food) is stored in covered, wildlife-proof containers.

i) Burning of waste is not allowed without appropriate permits.

j) Hazardous wastes generated are handled according to the procedures for handling fuel and hazardous materials (Section 4.17 – Storage, Handling and Transfer of Petroleum Products and Other Hazardous Material).

4.20 Sewage Disposal

Environmental Concerns

Potential environmental concerns related to the release of untreated sewage include effects on human health, drinking water quality, and aquatic ecosystems.

Environmental Protection Procedures

a) The sewage disposal system complies with the Newfoundland and Labrador Department of Health guidelines, the *Lands Act*, *Waste Management Regulations, 2003*, and the *Environmental Control Water and Sewage Regulations, 2003* under the *Environmental Protection Act*.

b) Septic tanks are regularly pumped by an external company.

c) Location of on-site facilities is clearly marked and vehicle traffic is not permitted to operate within this defined boundary.

d) Development or alteration of sewage facilities must proceed in consultation with the appropriate regulatory authority. Required permits and approvals are obtained prior to these activities.

4.21 Road Construction and Maintenance

Environmental Concerns

Erosion of road beds and siltation of watercourses may result from improperly constructed or upgraded roads. Road maintenance activities may result in discharges to waterbodies.

Environmental Protection Procedures

a) Where possible, existing access are used.

b) Necessary approvals from appropriate regulatory agencies are obtained prior to construction of the new haul road.

c) Clearing of vegetation for road construction will adhere to protocols described in Section 4.2 (Vegetation Clearing and Buffer Zones). Overburden removed is stored according to methods described in Section 4.9 – Quarry Waste Rock and Overburden Storage.

d) Access roads and trails are constructed to a width to accommodate the safe movement of Project equipment while limiting the footprint to the extent feasible.

e) Access roads and trails are located, constructed and operated and decommissioned in accordance with contract specifications.

f) Access roads and trails are provided with erosion protection and sediment control measures in accordance with the Erosion and Sediment Control procedures (Section 4.10).

g) Approach grades to water bodies are reduced to limit disturbance to riparian areas.

h) Environmentally sensitive sites and buffer areas are clearly marked prior to construction of new roads.

i) Field crew is restricted to established roads and trails, and cleared site preparation areas.

j) Equipment, machinery and vehicles may only travel on cleared access roads and trails, and will cross waterways at established temporary and permanent crossings.

k) Only water and approved dust suppression products are used to control dust on roads where required.

l) Roadbeds are inspected on an annual basis for slumping and potholes.

m) The use of straight salt on roads is limited for ice removal.

4.22 Vehicle Traffic and Remote Access

Environmental Concerns

Potential environmental concerns related to vehicle traffic include dust, emissions, and noise. Concerns associated with access to remote areas (i.e., quarry extension area) include potential disturbance to terrestrial wildlife and habitat, and to fish and fish habitat from the use of off-road vehicles.

Environmental Protection Procedures

a) Vehicle and equipment use is restricted to designated routes within and between work, laydown, maintenance, and storage areas.

b) Where possible, existing trails or routes are used to gain access to remote areas, to avoid disturbance of wildlife. Vehicles only cross waterways at an established temporary or permanent crossing site.

c) Equipment, machinery, and ATVs only travel on cleared existing roads and trails.

d) Vehicles and equipment are properly maintained to meet emission standards.

e) Travel in areas outside designated work areas is not permitted.

f) Vehicles and equipment yield to wildlife.

g) Vehicles and equipment yield to people and reduced speeds are maintained on roadways.

h) Chasing and / or harassing wildlife with vehicles and equipment is not tolerated.

i) Maintaining and refueling vehicles primarily occurs in designated areas, away from waterbodies, and with proper mitigation measures put in place. Mobile equipment is refueled as required, in areas away from water bodies and that are generally level.

j) Vehicles and equipment are fueled prior to entering remote areas.

k) Access roads are monitored for signs of erosion and appropriate action is taken to repair roads, when necessary.

l) As required, dust suppression measures such as watering roads are implemented (refer to Sections 4.23 and 5.2 related to Dust Control).

4.23 Dust Control

Environmental Concerns

Potential environmental concerns associated with dust include effects to human health and on aquatic ecosystems and vegetation.

Environmental Protection Procedures

The following Environmental Protection Procedures outline general measures related to dust control. More detailed measures for dust control at AML's Lower Cove operation are provided in Section 5.2.

a) Dust from operating activities are primarily controlled using water and other mitigations and operational practices such as low stacker heights above stockpiles. In the event of excessive dust, water is applied to travel and work surfaces.

b) Waste oil will not be used for dust control.

c) When using calcium chloride or magnesium chloride, it be used in accordance with the *Best Practices for the use and Storage of Chloride-Based Dust Suppressants*, prepared by ECCC.

4.24 Noise Control

Environmental Concerns

Potential environmental concerns associated with noise include effects on wildlife resources including distribution and abundance, and effects on nearby residents or people in the area.

Environmental Protection Procedures

Measures are implemented whenever possible to reduce potential impacts arising from a variety of noise sources.

a) Adherence to permits and approvals.

b) Vehicles and generators have exhaust systems muffled and are regularly inspected.

c) Noise from blasting is mitigated and monitored as described in Section 4.5 (Blasting).

4.25 Lighting

Environmental Concerns

Quarry construction and operations activities may require lighting that could have adverse effects on animal species, particularly migratory birds.

Environmental Protection Procedures

To reduce risk of incidental take of migratory birds related to human-induced light, AML will implement the following beneficial management practices where it does not compromise the safety of workers:

a) The minimum amount of pilot warning and obstruction avoidance lighting will be used on tall structures. Warning lights will flash, and should completely turn off between flashes.

b) The fewest number of site-illuminating lights possible will be used in the quarry extension area. Only strobe lights should be used at night, at the lowest intensity and smallest number of flashes per minute allowable by Transport Canada.

c) Lighting for the safety of the employees should be shielded to shine down and only to where it is needed.

d) LED lights will be considered for replacement where possible used to replace failing lights where possible. LED light fixtures are less prone to light trespass (i.e. are better at directing light where it needs to be, and do not bleed light into the surrounding area), and this property reduces the incidence of migratory bird attraction.

4.26 Protection of Heritage Resources

Environmental Concerns

Quarry extension and operations activities resulting in ground disturbance have the potential to disturb or destroy heritage resource sites and artifacts.

Environmental Protection Procedures

AML personnel are advised on the provisions of the *Historic Resources Act* protecting heritage resources and procedures to be followed if heritage resources are encountered in the field (refer to Section 6.6 – Discovery of Historic Resources). Measures are implemented wherever possible to reduce potential impacts on heritage resources arising from quarry extension and operations activities.

a) Project activities are not carried out within established buffer zones for heritage resources except as approved by authorized personnel from AML, in consultation with the Provincial Archaeology Office (PAO).

b) Environmental protection measures for heritage resources are reviewed with field crew prior to commencement of on-site activities. Orientation of AML staff working in construction areas include heritage awareness and training including the nature of heritage resources and the management of resources encountered.

c) The OSEM or his / her designate will inspect borrow pits and other excavations regularly for the presence of heritage resource materials.

d) Activities will cease in the immediate vicinity of heritage resources encountered until authorized personnel from AML, having consulted with the PAO, permit the work to resume.

e) Archaeological finds discovered during site preparation will be left in their original position until authorized personnel from AML and subsequently the PAO are contacted for guidance.

f) Flagging tape will be used to mark sites where heritage resources are encountered. Personnel will not move or remove artifacts or associated material unless approved by authorized personnel from AML, having consulted with the PAO.

5.0 PROTOCOLS FOR SURFACE WATER CONTROL, DUST CONTROL, AND RARE PLANTS

5.1 Surface Water Control

The erosion of natural buffer zone in a few locations, combined with limited site drainage infrastructure, has resulted in the occasional formation of plumes in the ocean adjacent to AMLs Lower Cove Quarry (Stantec 2015a). These plumes are often associated with short and intense rain events, during which fine material is easily and rapidly carried away. As a result of an increase in the frequency of occurrence of plumes since 2013, surface water control measures (Stantec 2015a) have been developed to mitigate the formation and potential effects of these plumes. Potential mitigation measures include the following:

- Side slopes of exposed areas, including material stockpiles, are flattened
- Surfaces are graded to provide positive surface and subsurface drainage
- Existing vegetation is protected and new vegetation is promoted, whenever possible
- Settling basins on the south side of RR #3 Highway are used to remove particulate matter from surface water, prior to its discharge
- Settling basins are designed to maximize removal of particulates, based on the size of particulate matter to be removed and other factors as described in Stantec (2015a)
- Overflow spillways for sediment basins are provided at inlet and outlet berms and Rip Rap used down gradient to prevent erosion
- Granular berms are used to allow seepage flow to exit sediment basins
- Rock flow check dams are constructed down-gradient of outlets to reduce velocity and promote further deposition of sediment, prior to ocean discharge
- Rock flow check dams are constructed at inlets, to reduce velocity prior to entering settling basins
- Settling basins are monitored and maintained regularly

Refer to Stantec (2015a) for additional details related to surface water control measures.

5.2 Dust Control

Operations that have the potential to result in large quantities of fugitive dust emissions includes drilling and blasting, crushing, screening, conveying (and conveyor transfer points), stockpiling, ship loading, haul truck loading and unloading, as well as travel on unpaved roads. Additional activities associated with quarry extension may further increase the potential quantity of fugitive dust emissions. Several factors may affect the release of fugitive dust emissions including the type, size, volume and moisture content of the material being processed, the type of equipment being used, the moisture and silt content of the roads, as well as weather conditions such as wind speed and direction, humidity and precipitation (Stantec 2015b).

Mitigation measures [Best Management Practices (BMPs)] are put in place to reduce the potential impact of fugitive dust emissions and an adaptive management approach taken whereby on-site conditions and mitigation effectiveness are continually monitored and modified, as required, in a timely manner to achieve control efficiencies. Measures implemented are listed below and described in detail in Stantec (2015b).

Drilling

- Drilling equipment is equipped with a cyclone / dust collecting system where possible.

Crushing

- The drop height from the exit of a crusher to the receiving conveyor belt is reduced to limit dust emissions.
- Material being dumped into the primary crusher bin is moistened, as required.
- Built up dust on and around the crusher is removed whenever possible.
- Activities are adjusted when winds are sufficient enough to cause wide spread visible dust emissions.
- A Dust Boss, or similar piece of equipment, is used to emit a dust trapping mist in the vicinity of crushing activities.

Screening

- Dust controlling hoods are used, as required, on screens that are not enclosed within a building, where feasible and practical.
- Drop heights from screens to conveyors are reduced.
- Water Sprays are used at screen entry points where necessary, practical and feasible

Conveying and Conveyor Transfer Points

- Drop heights at conveyor transfer points are limited.
- Water suppression is used at conveyor transfer points, where feasible.

Stockpiles

- When possible, drop heights from the stockpile stackers to the top of stockpiles are reduced.
- Where possible, dust curtains are used, around the edge of stockpile stackers.
- Disturbance of stockpiles is limited during conditions of high wind speeds and when winds are directed towards the nearest communities, when practical.
- Wet suppression is applied to temporary and long term storage piles as required during windy and dry periods.
- A Dust Boss, or similar piece of equipment, is used as required, to emit a dust trapping mist.

Truck Loading and Unloading

- Drop heights are limited during loading and unloading.
- A Dust Boss, or similar piece of equipment, is used as required, upwind of a material handling activity.

Ship Loading

- Drop height between the ship loader and the ship's receiving bin is limited, when feasible
- Dust suppression is applied to the ship loading road as required.

Travel on Unpaved Roads

- Speed limits of 50 km / hr are enforced.
- Water is applied to road surfaces as required.
- Chlorides (e.g., calcium chloride or magnesium chloride) or other commercial binding substances are applied to quarry roads, as required.
- Roads are graded and maintained for safety and reducing equipment issues. Class A materials are used for surface topping.

Additional mitigation measures, if required based on an evaluation of effectiveness, are outlined in Stantec (2015b).

5.3 Rare Plants

One plant Species at Risk (SAR) [Lindley's aster (*Symphyotrichum ciliolatum*)] and Species of Conservation Concern (SOCC) occur within the quarry extension area (Stantec 2015c). The location, population size, habitat, and status of these species are detailed in Stantec (2015c).

Mitigation measures will be put in place in consultation with and approval from NLDFLR, to reduce potential Project-related effects on SAR and SOCC. The measures to address potential effects on Lindley's aster will be documented in a Species at Risk Impact Mitigation and Monitoring Plan (SARIMMP). Measures to address *Cystopteris laurentiana* (SRank S2, 1 identified record) and *Platanthera hookeri* (SRank S2, 17 individuals recorded), identified for conservation by Wildlife Division will be documented in a Environmental Protection and Effects Monitoring Plan for Rare Plants and Habitat. These plans will include:

- Avoidance of direct and indirect disturbance to known populations of SAR / SOCC by altering extension activities.
- Consideration of alternative mitigation options (e.g., transplantation of SAR).
- Monitoring of known SAR / SOCC within or adjacent to extension area.
- Maintaining wild populations of SAR / SOCC through the establishment of new colonies in appropriate natural habitats (e.g., transplantion of local plants within the lease boundary, possibly plants cultivated through seed collection, germination and propagation).

6.0 CONTINGENCY PLANS

Contingency plans to address accidents and unplanned situations are described in this Section, for the following:

- 6.1 – Fuel and Hazardous Material Spills
- 6.2 – Settling Pond Overflow
- 6.3 – Wildlife Encounters
- 6.4 – Forest Fires
- 6.5 – Extreme Weather
- 6.6 – Discovery of Historic Resources

Contingency plans are modified, as required, throughout quarry extension and operations. Notwithstanding the existence of these plans, policies are adopted to implement preventative measures as the first line of defense against potential accidents.

6.1 Fuel and Hazardous Material Spills

6.1.1 Environmental Concerns

Fuel and hazardous materials can potentially be damaging to vegetation, soil, surface water, ground water, wildlife, aquatic organisms, historic resources and human health and safety.

6.1.2 Environmental Protection Procedures

In case of a fuel or hazardous material spill, the following procedures will apply. **Please note that a detailed Environmental Emergency Contingency Plan (EECP-01) is available to address hydrocarbon and hazardous materials spills on water, land and ice – the information presented here is a quick reference guide only. Please refer to the site Environmental Emergency Contingency Plan as early as practical after a spill has been identified. Information regarding the location of spill response equipment and contractor contacts is included in the EECP.**

a) The individual who discovers the leak or spill must make a reasonable attempt to immediately stop the leakage and contain the flow. Spill kits are located at fuel storage tanks and at designated central storage location(s).

b) Spill location, type of fuel or hazardous material, volume and terrain condition at the spill site are determined and reported immediately to the SAAM, who will report it immediately to Environment and Climate Change Canada. In the event of a reportable spill on-land, or spill regardless of size that may enter a waterbody frequented by fish, must be reported immediately to the

Environmental Emergencies 24 Hour Report Line

709-772-2083 or **800-563-9089**

[Refer to Section 4.17 (Storage, Handling and Transfer of Petroleum Products and Other Hazardous Material) for the definition of reportable spills on-land versus aquatic environments].

Required pertinent information includes:

- name of reporter and phone number
- time of spill or leak
- time of detection of spill or leak
- type of product spilled or leaked
- amount of product spilled or leaked
- location of spill or leak
- source of spill or leak
- type of accident - collision, rupture, overflow, other
- owner of product and phone number

- if the spill or leak is still occurring
- if the spill or leaked product is contained, and if not, where it is flowing
- wind velocity and direction
- temperature
- proximity to water bodies, water intakes, and facilities
- snow cover and depth, terrain, and soil conditions

c) The SAAM acts as the "On-Scene-Commander" for the purposes of cleaning up a fuel or hazardous materials spill. The HSE Manager is familiar with spill clean-up procedures and mobilization procedures of the clean-up equipment. The HSE Manager has full authority to take necessary and appropriate action without unnecessary delay.

The overall responsibility of coordinating a clean-up and maintaining this contingency plan current and up-to-date is the SAAM.

Staff are trained on the procedures to follow in case of hydrocarbon spills as well as information related to general communication line. AML provides personnel a responsibilities list before the start of exploration activities.

A complete list of spill response equipment is generated and distributed on-site before the start of exploration activities.

d) In reaching decisions on containment and clean-up procedures, the following criteria is applied:

- reduce danger to workers and public
- protect water supplies
- reduce pollution of watercourses
- reduce area affected by spill
- reduce the degree of disturbance to the area and watercourses during clean-up

e) The SAAM acts in consultation with the regulating authorities to:

- assess site conditions and environmental impacts of various cleanup procedures
- assess potential for fuel recovery versus burning
- deploy on-site staff to mobilize pumps and empty 215-L drums or other appropriate storage containers to the spill site
- deploy on-site staff to build containment dykes and commence pumping contaminant into drums
- apply absorbent as necessary
- dispose of contaminated debris, cleaning materials and absorbent by approved methods only
- take necessary precautions to avoid the incident in the future

f) The SAAM is responsible for the preparation of a written report which is sent (as soon as possible and no later than five (5) days after the spill) to the OSEM; and from there to:

Director, Pollution Prevention Division
Department of Environment and Municipal Affairs
PO Box 8700
St. John's, NL A1B 4J6
Tel. (709) 729-2556, Fax. (709) 729-6969

and

Environmental Emergencies - Atlantic Region
Environment and Climate Change Canada
45 Alderney Drive, 15th floor, Queen Square
Dartmouth, Nova Scotia, B2Y 2N6
Tel. (800) 668-6767, Fax. (902) 426-9709

6.2 Settling Pond Overflow

6.2.1 Environmental Concerns

The likelihood of an overflow is low, as settling basins are designed to contain run-off associated with extreme precipitation events (1:10 year storm event). In the unlikely event of an overflow, water containing unsettled particulate matter would be released into the ocean. The released water could have elevated levels of Total Suspended Solids (TSS).

6.2.2 Environmental Protection Procedures

a) Reduce water levels in settling ponds, if required, to accommodate expected precipitation.

b) Site personnel will take immediate action to prevent, stop, or reduce the release (e.g., divert or contain the released water), as appropriate.

c) Incidents are immediately reported to the OSEM and / or Genera Manager of Operations.

d) In the event that released water becomes contaminated with fuel or other hazardous material, the procedures outlined in Section 6.1 will apply.

6.3 Wildlife Encounters

6.3.1 Environmental Concerns

Wildlife encounters pose a potential risk for stress or injury to both the wildlife and site personnel. Control measures and environmental protection procedures have been put in place to reduce this potential risk to wildlife and humans. Hunting, trapping or fishing by AML and contractor personnel is not permitted on the site, this will also include visitors.

6.3.2 Environmental Protection Procedures

The following measures are implemented to prevent and / or reduce wildlife encounters and potential risks to wildlife and humans:

a) Site and working areas are kept clean of food scraps and garbage.

b) Waste is collected for disposal in appropriate containers and routinely transferred to the local landfill.

c) No attempt is made by workers at the AML site to chase, catch, divert, follow or otherwise harass wildlife by vehicle or on foot.

d) Equipment and vehicles yield the right-of-way to wildlife.

e) No personal pets, domestic or wild, are allowed on the site.

f) Personnel should be aware of the potential for encounters with wildlife and they are instructed to immediately report significant sightings (e.g., black bear) to the SAAM Operations. The SAAM Operations will notify the OSEM to report wildlife sightings and to assess actions for follow-up.

g) The SAAM is responsible for actions in response to nuisance animals (e.g., bears) in the project area and will advise the OSEM for further action.

h) Under provincial wildlife regulations, the displacement and release of animals is the sole jurisdiction of the NLDFLR Wildlife Division and is to be undertaken only under appropriate supervision.

i) If the nest of a raptor or other bird is encountered during vegetation clearing or other project-related activities during construction or operations, work in the vicinity of the nest is to be curtailed until the OSEM has had the opportunity to contact the Wildlife Division and appropriate mitigation is applied. This may include suspending activities until the breeding season has passed (i.e. after August 15) or monitoring the response of the individual to acitivites to assess disturbance or level of habituation to the site and associated activities.

j) Staff, contractors and visitors will not approach concentrations of seabirds, sea ducks or shorebirds.

6.4 Forest Fires

6.4.1 Environmental Concerns

Activities during quarry extension and / or operations could potentially result in a fire, which could spread to the surrounding area. Such events could potentially be damaging to vegetation and wildlife, air and water quality, human health and safety, and AML assets.

6.4.2 Environmental Protection Procedures

AML, or the contractor, takes necessary precautions to prevent fire hazards when working at the site. These include but are not limited to:

a) Flammable materials are stored and handled properly.

b) Disposal of flammable waste on a regular basis.

c) In the event of a forest fire, AML or the contractor will take immediate steps to contain or extinguish the fire.

d) Fires should be reported immediately to the SAAM or OSEM who in turn will report to Forest Regional Services Office in Corner Brook 709-637-2409. The following information will be provided:

   - name of the reporter and phone number
   - time of detection of the fire
   - size of the fire
   - location of the fire

   The police will also be notified immediately by the SAAM (or designate).

e) AML's SAAM appoints a supervisory staff member as "On-Scene-Commander" for fighting forest fires.

6.5 Extreme Weather

6.5.1 Environmental Concerns

Extreme weather events involving snow, ice, wind and freezing rain, can disrupt site materials (e.g., stockpiles) and infrastructure, with potential negative impacts on environmental protection measures such as settling ponds (e.g., overflows).

6.5.2 Environmental Protection Procedures

AML or the contractor takes precautions necessary during extreme weather events. These include but are not limited to:

a) Reducing water levels in settling ponds, if required, to accommodate expected precipitation.

b) Coverings, containers and other loose materials are properly secured.

c) AML confirms that boats and other marine equipment are secured.

d) Debris is removed from ditched, culverts, or other drainage channels as necessary.

e) Free product in drip pans / pads or elsewhere is collected and properly disposed.

6.6 Discovery of Historic Resources

6.6.1 Environmental Concerns

Historic resource material that is disturbed, destroyed or improperly removed from a site represents a potential cultural loss of information and history that could otherwise be handled and interpreted in an efficient and appropriate manner.

6.6.2 Environmental Protection Procedures

a) If suspected archaeological material is encountered, stop work in the immediate area of the discovery until authorized personnel from AML, having consulted with the Provincial Archaeology Office (PAO), permit resumption of the work.

b) Report the find immediately to the SAAM.

c) Mark the site's visible boundaries. Personnel will not move or remove artifacts or associated material unless the integrity of the material is threatened.

d) The SAAM will report the find with the following information to the PAO (709-729-2462), and comply with the instruction provided. The SAAM will identify or provide the following, as required:

- nature of the find
- precise descriptive and map location and the time of the find
- nature of the activity resulting in the find
- identity of the worker(s) making the find
- present location of the material, if moved, and protective measures initiated for the material and the site
- extenuating circumstances

7.0 ENVIRONMENTAL PROTECTION PLAN CONTROL REVISIONS

AML is committed to continual improvement in its work activities to reduce risks to the environment and improve operational effectiveness. The strategy adopted by AML is regular monitoring supported by operational change and adoption of other mitigating measures as warranted. The EPP will be revised as necessary to reflect site-specific environmental protection requirements, and allow updates as work progresses.

Holders of controlled copies (i.e., those version which contain the up-to-date procedures) of the EPP are listed in Appendix B. EPP holders may initiate revisions by forwarding proposed revisions to the OSEM. The following information will be provided on the Revision Request Form (see Appendix C) for revision requests:

- section to be revised
- nature of the revision
- rationale for the revision (i.e., environment / worker safety)
- who submitted the revision request

Approval for revisions will be the responsibility of the SAAM. When approval is received for the revision request, details of the revision will be distributed to identified Controlled EPP Holders and will be documented in the Revision History Log (Appendix D). Each revision will be accompanied by:

- revision instructions
- list of sections being superseded
- an updated Table of Contents indicating the status of each section in the EPP

When EPP Holders receive a revision, they will, within two working days:

- read the text of the revision
- check the control sheet to confirm that the listed pages have been received
- remove and destroy the superseded pages from their copy of the EPP
- insert the revised pages in the proper place in their copy of the EPP
- page check the EPP, using the updated table of contents to confirm the EPP is complete and current
- enter the revision number and date entered on the Revision History Log
- incorporate the revision into the area of responsibility, as appropriate
- confirm that their personnel are familiar with the revisions

8.0 CONTACT LIST

Table 8.1 Contact List

Entity	Contacts
Atlantic Minerals Limited	**President** William D. Fitzpatrick Tel. (709) 637-2810 Fax. (709)639-0300 **Sales and Administration Manager (SAAM)** Vaughn Granter Tel. (709) 637-2824 Fax (709) 634-3839
NL Environmental Emergencies 24-Hour Report Line	St. John's, NL Tel. (709) 772-2083 Other Areas 1-800-563-9089
Environment and Climate Change Canada – Environmental Protection	**Environmental Emergencies – Atlantic Region** Environment and Climate Change Canada Tel. (800) 563-9089
Environment and Climate Change Canada – Canadian Wildlife Service	**Atlantic Region** ec.enviroinfo.ec@canada.ca Nat'l : 1800-668-6767
Department of Fisheries and Oceans (DFO)	**Area Office – Corner Brook, NL** Tel. (709) 637-4308 Fax. (709) 637-4476
Newfoundland and Labrador Department of Government Services (Service NL)	**Assistant Deputy Minister** **Serious Workplace Accident Reports** Tel. (709) 729-4444 (24-hour accident reporting line)
NLDFLR - Forestry Regional Services	**Western Regional Office** Tel. (709) 637-2410 Fax. (709) 637-2403 **Wildfire** (709) 637-2408
NLDNR – Mines and Energy Branch	**Provincial Office** St. John's, NL ADM Mines Tel. (709)-729-2768
NLDFLR – Wildlife Division	**Senior Wildlife Biologist** Corner Brook, NL Tel. (709) 637-2014 Fax. (709) 637-2004

CONTACT LIST
March 28, 2019

Entity	Contacts
NLDMAE – Pollution Prevention Division	**Western Regional Office** Stephenville Tel. (709) 637-2528 **Director** Tel (709) 729-2556 Fax (709) 729-6969
NLDMAE – Water Resources Management Division	**Director** Tel: (709) 729-2563 Fax: (709) 729-0320
Newfoundland and Labrador Department of Tourism, Culture, Industry and Innovation	**Provincial Archaeologist** St. John's, NL Tel. (709) 729-2462 Fax. (709) 729- 0870
Royal Newfoundland Constabulary	Corner Brook, NL Tel. (709) 637-4100
RCMP	Corner Brook, NL Tel. (709)-637-4433 Fax. (709)-637-4432 Bay St. George District – Stephenville, NL Tel. (709)-643-2118 Fax. (709)-643-9393

9.0 REFERENCE MATERIAL

Canadian Council of Ministers of the Environment. 1993. Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products.

DFO (Department of Fisheries and Oceans). 1995. Freshwater Intake End-of-Pipe Fish Screen Guidelines, March 1995.

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Gosse, M.M., A.S. Power, D.E. Hyslop, and S.L. Pierce. 1998. Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador. Fisheries and Oceans, St. John's, NL. X + 105 pp., 2 appendices.

NLDEC (Newfoundland and Labrador Department of Environment and Conservation). undated. Application for Permits and Licences. Pamphlet produced by the Newfoundland and Labrador Department of Environment and Conservation, Water Resources Division. Available online: http://www.env.gov.nl.ca/env/waterres/regulations/appforms/permit_brochure_oct_12.pdf (Accessed on November 18, 2015).

NLDEL (Newfoundland and Labrador Department of Environment and Lands). 1992a. Chapter 5: Environmental Guidelines for Culverts. Report produced by the Department of Environment and Conservation, Water Resources Management Division, Water Investigations Section. Available online: http://www.env.gov.nl.ca/env/waterres/regulations/appforms/chapter5.pdf (Accessed on November 13, 2015).

NLDEL (Newfoundland and Labrador Department of Environment and Lands). 1992b. Chapter 6: Environmental Guidelines for Fording. Report produced by the Department of Environment and Conservation, Water Resources Management Division, Water Investigations Section. Available online: http://www.env.gov.nl.ca/env/waterres/regulations/appforms/chapter6.pdf (Accessed on November 13, 2015).

NLDFRA (Newfoundland and Labrador Department of Forest Resources and Agrifoods). 1998. Environmental Protection Guidelines for Ecologically Based Forest Resource Management (Stand Level Operations).

Stantec (Stantec Limited Partnership). 2015a. Atlantic Minerals Limited Quarry Expansion – Site Surface Water Control, Design Brief. Report prepared for Atlantic Minerals Limited, July 2015. 6 pp. + Appendices.

Stantec (Stantec Limited Partnership). 2015b. Dust Control Plan. Report prepared for Atlantic Minerals Limited, June 2015. 16 pp. + Appendices.

Stantec (Stantec Limited Partnership). 2015c. 2015 Rare Plant Survey Report – Atlantic Minerals Limited Lower Cove Quarry Extension. Draft report prepared for Atlantic Minerals Limited, November 2015. 60 pp. + Appendices.

Stantec (Stantec Limited Partnership). 2018. Environmental Protection Plan, Atlantic Minerals Limited, Lower Cove Quarry. October 2018. 11pp. _ Appendix.

Wright, D.G. and G.E. Hopky. 1998. Guidelines for the use of explosives in or near Canadian fisheries waters. Canadian Technical Report of Fisheries and Aquatic Sciences, 2107: iv + 34 pp.

https://www.nr.gov.nl.ca/nr/department/environment.pdf

http://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=C51C415F-1

10.0 SIGNATURE PAGE

Atlantic Minerals Limited

The undersigned certify that they have reviewed, and understand their role and responsibility regarding:

LOWER COVE QUARRY

EXTENSION AND OPERATIONS ACTIVITIES

ENVIRONMENTAL PROTECTION PLAN

As part of their Site Orientation

_____ representing _____
Name (Printed) Company

_____ _____
Signature of above Date

_____
Name of Manager or Supervisor

_____ _____
Manager or Supervisor's Signature Date

APPENDIX A

Environmental Emergency Contingency Plan (EECP-01)

QUALITY ASSURANCE

Atlantic Minerals Limited

Environmental Emergency Contingency Plan

EECP-01

Presented in ISO 9002 Format

Revision Number	Date	Description of Change	Section Number	Page Number	Approved By
1	09-17-01	General revision	All		R.E.
2	06-05-02	Added information on ANFO truck Quarry, Removed water pumping station near goose pond, water pumping station at the floor of the dolomite and limestone quarries. Added 2000 litre above ground furnace oil jeep tank bulk A.N. storage silo, explosives transfer truck. Added Atlantic Explosives to contractor list. Added Bulk A.N. sheet 5, disposal information on A.N. section (6) sheet 6	1.0 3.0 9.0 10.0		R.E.
3	12-05-02	Revised spill discovery chart. Safety coordinator was team coordinator, shift supervisors and leadhands was alternate team captains and alternates.	7.0		R.E.
		Added items 13, 14 & 15 Shift Supervisors and Leadhands was Team captains and Alternates	8.0 9.0		R.E.
		Complete revision. Added duties of Observer, Supervisor, Plant Manager and Safety Coordinator	11.0		R.E.
4	06-28-05	Revised: Containment: (A), (B), (C) added (D) Revised: Bulk A.N., (6)	10.0	1 of 6 5 of 6	R.E.
5	07-14-05	Revised Containment (c), Bulk A.N., (6)	10.0	1- 6	R.E.
6	01-16-06	Added Supplier	15.0		R.E.
7	03-26-07	Added company signature	2.0		R.E.

This manual has been issued to:

Safety Coordinator

Manual Number: EECPM-01
Manual Location: Safety Coordinator Office

This manual may not be reproduced without consent from the Safety Coordinator. Controlled copies of this manual are distributed as follows:

Manual Number	Location
EECPM-01	Safety Coordinator Main Office (AML)
EECPM-02	Site Office (AML)
EECPM-03	Maintenance Garage (AML)
EECPM-04	Quarry Lunchroom (AML)
EECPM-05	Control Room (AML)

The contents of this manual have been authorized and approved by the undersigned and all revisions to it will be approved on the amendment page in the beginning of this manual.

Authorized: _____ V.P. Operations

Approved: _____ Safety Coordinator

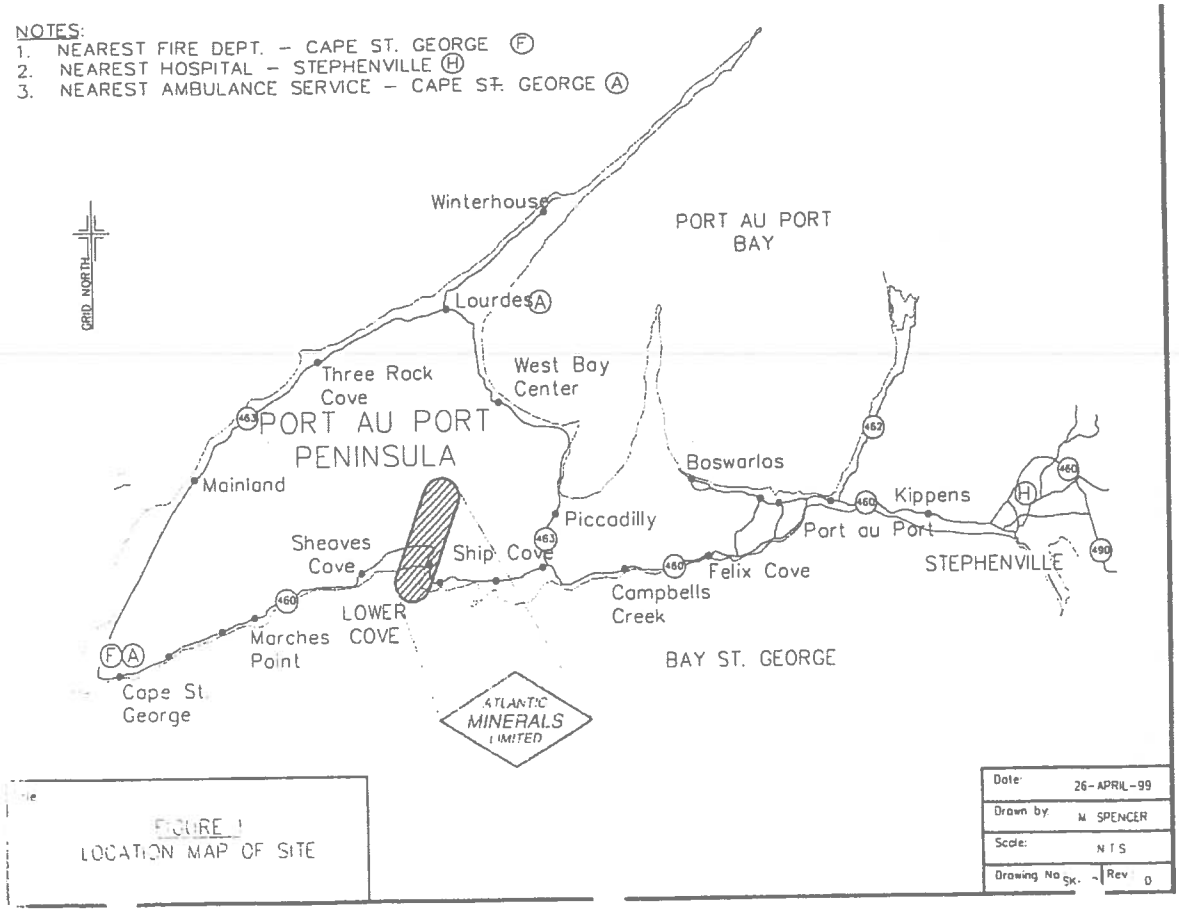


FIGURE 1
LOCATION MAP OF SITE

GENERAL INFORMATION

Atlantic Minerals Limited (AML) owns and operates quarry and plant facilities on the Port au Port peninsula in Lower Cove, Newfoundland. At this site, AML quarries, processes, and exports chemical grade limestone & dolomite and construction aggregates. Facilities at this site include the main office, laboratory, process buildings, quarry operations, tailings lagoon, ship loading conveyor & tunnel system, and maintenance garage. Refer to the Figure 1 for a general location plan of the site and Figure 2 for a layout of the plant facilities. Due to the type of operation, the potential for an environmental emergency would be minimal. If an emergency did occur it could be from waste oils, motor oils, fuel tanks, tailings lagoon (muddy water), bulk A.N. storage silo, and explosives delivery vehicle. This plan will identify the location of products that could be a source for an environmental emergency. In the event of an oil spill it would be mainly land based, this plan will however cover the procedure for a water-based spill. The word emergency in this plan refers to "Environmental Emergency only".

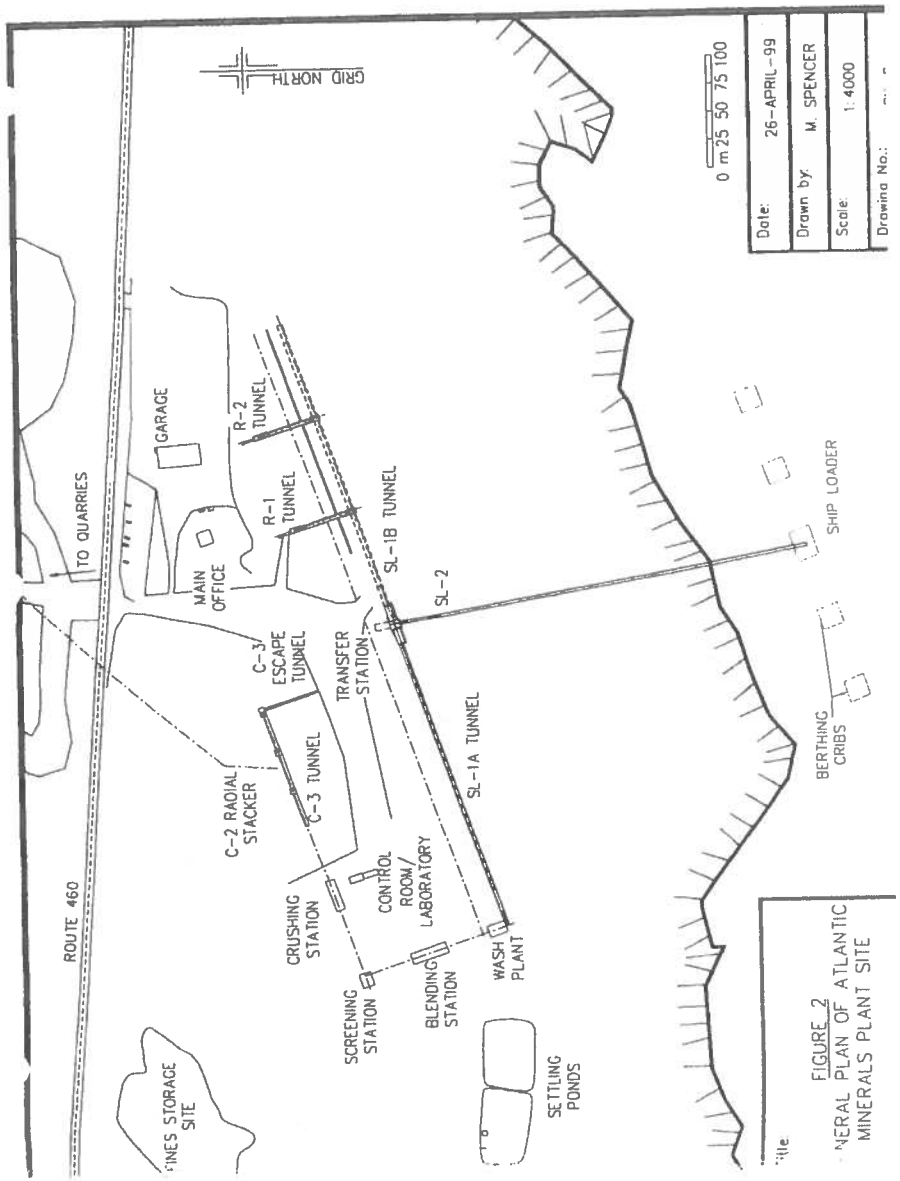


FIGURE 2
NERAL PLAN OF ATLANTIC MINERALS PLANT SITE

STATEMENT OF PURPOSE

To provide the Company with a contingency plan which will give guidance in our reactions to an emergency. The company realise the necessity of being prepared to protect the environment against damage as a result of its activities.

It is the intention of Atlantic Minerals Limited, through the development of its contingency plan, to establish a plan of action, which will be capable of dealing with incidents resulting in contamination of the environment, with the following terms of reference:

1. To have trained manpower, equipment and information On a co-operative basis with other members of the Canadian Petroleum Products Institute to provide Adequate and efficient means of dealing with any Particular incident.

2. To enable action which will minimise the overall effect on the environment.

3. To establish appropriate lines of communication and liaison with public authorities.

Immediate action is essential in limiting the pollution resulting from an emergency. This Contingency Plan outlines the responses, which must be taken for any size of emergency.

Company Signature:

Vice-President of Operations: _____

Date: _____

GARAGE:

45 gal. drums of hydraulic and motor oils
1135 litre underground waste oil tank complete with oily water separator
4550 litre above ground, waste oil jeep tank
4550 litre above ground, gasoline jeep tank
10,000 litre above ground, diesel jeep tank
45 gal drums of oil on storage pad at rear of maintenance garage
Underground furnace oil tank

QUARRY:

10,000 litre above ground, diesel jeep tank
2,000 litre above ground, furnace oil jeep tank
Tailings lagoon (on quarry road)
Bulk A.N. Storage silo
Explosives transfer truck

The four basic principles of preventing an emergency are:

1. You must have adequate facilities.
2. The facilities must be properly maintained.
3. You must have good operating procedures.
4. The procedures must be followed and given close operator attention.

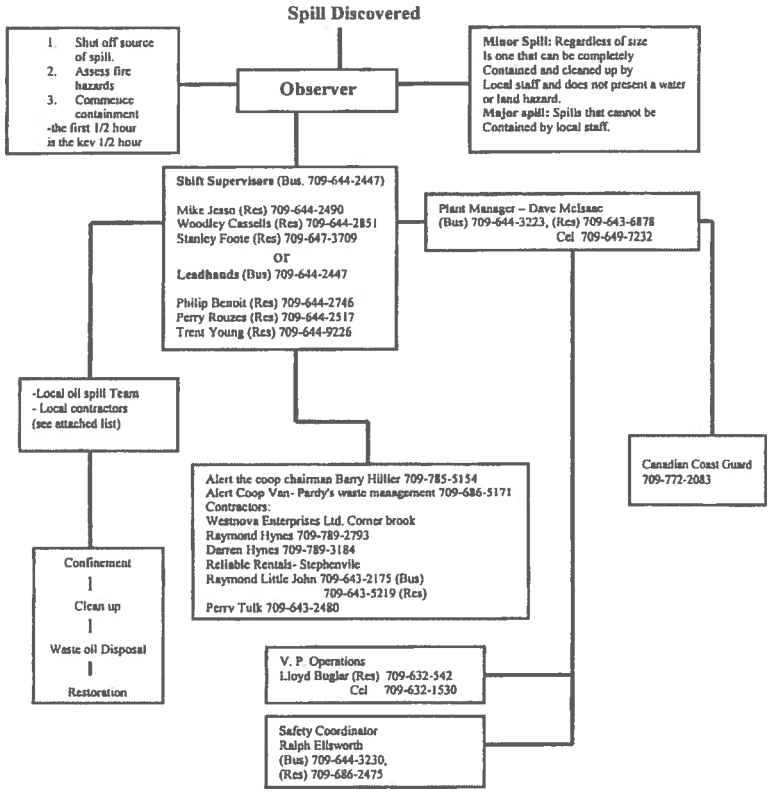
The seven basic steps of our response sequence are:

1. Assess fire, environmental and safety hazards.
2. Stop the flow.
3. Containment.
4. Call your Supervisor - assess the emergency using emergency classification Form A-1 section 8.0.
5. Collection.
6. Disposal and restoration.
7. Reporting.

The response sequence chars promote smooth communications. If the sequence shown on the major-minor spill discovered chart section 7.0 is followed, we can effectively reduce the damage to the environment.

A Contingency Plan tells us:

1. What steps to take.
2. Who is assigned to each step.
3. Essential telephone numbers.
4. Where the necessary equipment is located.



FORM A-1

1. Time and date emergency occurred or was first noticed: _____
2. Location: _____
3. Type of emergency: _____
4. Relevant conditions (wind, fog, tide, etc.): _____
5. Area likely to be affected: _____
6. Origin of emergency: _____
7. Action already taken: _____
8. Persons notified: _____
9. Emergency classification (major or minor): _____
10. Person reporting emergency: _____
11. Time emergency reported: _____
12. Time emergency reported to Government: _____
13. Product or material spilled: _____
14. Quantity of product or material spilled: _____
15. Status of containment: _____

		Office	Home
Safety Coordinator -	Ralph Ellsworth	637-2848 644-3230	686-2475
Vice-President - Operations	Lloyd Buglar	637-2811	632-5421
Plant Manager -	Dave Mcisaac	644-3223	643-6878
Shift Supervisors	Mike Jesso	644-3221	644-2490
	Woodley Cassells	644-3221	644-2851
	Stanley Foote	644-3221	647-3709
Leadhands:	Philip Benoit	644-3221	644-2746
	Perry Rouzes	644-3221	644-2517
	Trent Young	644-3221	644-9226
Co-op Chairman	Barry Hillier Imperial Oil	785-5154	
Location of nearest Co-op van	North Harbour Road, Pasadena, NF		

CONTRACTORS	EQUIPMENT/SERVICES SUPPLIED	TELEPHONE
Pardy's Waste Management & Industrial Services Contact: Derek Pardy	Vacuum Truck Used oil collection Oil spill cleanup	686-2012
Crosbie Industrial Services limited Contact: Sean Burton Atlantic Explosives	Vacuum Truck Used oil collection. Oil spill cleanup Explosives Emergency	686-5665 902-568-2527

Co-op Members	Telephone
Imperial Oil	785-5154
Ultramar	785-5135
Environment Canada (Coast Guard)	772-2083

Other Contacts	Telephone
R.C.M.P.	643-2118
Fire Department	644-2222
Government Services Centre	637-2449
Sir Thomas Roddick Hospital	**643-5111(Ext. 247)**

Once a spill has occurred and been detected, the seven steps of our Response Sequence (Section 5.0) must be carried out. How these are applied depends on the conditions under which we are working, on land or water, day or night, winter or summer, fog or sunshine, etc. No two spills can ever be expected to have the same set of "combat conditions".

ASSESS THE FIRE AND SAFETY HAZARDS

If you know your product, you will be aware of the particular hazards it involves. Our first concern is the safety of the people threatened by a spill.

STOP THE FLOW

The source of the leak must be sought and the flow arrested. This can be done by closing a valve, blocking a culvert, damming a ditch, etc. The idea is to halt the advance of the spill.

CONTAINMENT

(A) Water-based oil spills can be confined by using booms. Booms can be the floating type manufactured from synthetic fabrics or they may be made on-site from logs, felled trees, and bales of straw or wire fencing materials. The confinement efficiency, of most booms, can be enhanced by using a sorbent material, such as, foamed polyethylene, straw, etc.

(B) Land-based oil spills can be impounded by digging a dyke. Sheets of polyethylene or vinylite plastic can be used to make the ground impervious to oil and prevent seepage into the ground water system.

(C) Bulk A.N. spills can be controlled by collecting it in a pile, using a non sparking shovel and rake. The collected product can be placed in a container or tote bag, depending on the quantity. The container or tote bag will be properly identified as AN prill. The collected AN prill will be disposed of in a borehole. Contaminated area will be washed down to dissolve any remaining product.

(D) ANFO product spills could and would normally occur at the borehole site. If this were to occur the ANFO truck auger system would be shut down. The spilled ANFO product would be collected using a non sparking shovel and placed in a borehole. The person collecting and disposing of the spilled ANFO product would normally be the ANFO truck operator/blaster.

CALL YOUR SUPERVISOR - ASSESS THE SPILL

Your immediate supervisor must be notified immediately in order to determine what resources will be necessary to clean up the spill. Form A-1 (Oil Spill Classification Chart section 8.0) has been designed to serve two purposes: First, it contains important information concerning the nature of the spill; Secondly, it is used to help determine whether the spill is minor or major and therefore which line of communication should be followed. By using this Classification Chart, you will be able to quickly determine how much equipment will be necessary and the amount of outside help you will need. Once the employee has notified his supervisor, he should return to the spill site to keep watch over its progress and resume containment

procedures. The supervisor, by referring to his Response Sequence Chart (Section 5.0) will notify the appropriate people of the spill

SPILL CONTAINMENT ON WATER

Containment: Oil spilled on water will rapidly spread out to form a thin film over a wide area, thus making clean-up more difficult to complete. To prevent this, a boom can be effectively used, with its limitations.

Often a sorbent material will have to be used to soak up the oil before collection. This is usually necessary for thin slicks and for very heavy oils that become difficult to pump on cold water. Some sorbents are pump able, but you might have to resort to manual pick-up of oil-soaked sorbents with pails, pitchforks etc. Sorbent pads are applied to land or water spills and can be wrung out and re-used. They repel water, therefore yielding an almost pure product upon recovery.

Sorbents and booms are also used to protect hard-to-clean places from becoming contaminated by an approaching oil slick. By lining the shore of a beach, the boats in a marina or any other area likely to be affected by a spill, the oil can be kept away from these sensitive areas and be collected at the same time.

AML do not have booms on site. If booms were required, they would have to be supplied by an outside agency. Sections 7.0 and 9.0 list the appropriate contacts.

OIL SLICK MOVEMENT

The presence of wind is assumed to generate an instantaneous surface current with a magnitude of 3.5% of the wind speed. This current is assumed to directly transport the slick 10 degrees to the right of the wind.

Waves, produced by the wind, limit the effectiveness of the booms. Multiple booms may have to be used to reduce the loss of product due to wave action.

SPILL CONTAINMENT ON LAND

Spills on land present two major hazards:

(a) Pollution **of Open Natural Watercourses (small streams, lakes):**

ATLANTIC MINERALS LIMITED
Environmental Emergency Contingency Plan
10.0 TECHNIQUE FOR HANDLING A SPILL

The simplest method of containing an oil spill on flowing streams is to use a rigid boom, if it can be sealed into the banks (packed with straw, etc.) to stop leaks around it. Installing a culvert and using earth to partially dam the flow is also an effective method of collecting the oil together.
A dam made from bales of straw on slow moving water can be effective in separating the oil and collecting it together. This should be followed by a second (straw bale or other) boom, a technique which may be necessary as a guard against slicks which get past the rigid types mentioned above.

Damage to Private Property:

Oil spills can occur on private property, and the smallest spills can create difficult legal battles. For this reason, **all spills**, regardless of size, must be reported to your supervisor and to the Team Captain. Immediate cleanup of spills on asphalt, grass, gardens, basements, etc., will reduce the total damage. During cleanup, be careful not to track oil around on boots, remove too much soil, or drive vehicles over the property.

OIL SPILLED ON ICE

Oil spilled onto or under ice is especially difficult to clean up. Since evaporation under these conditions is reduced, the main method of cleanup has to be mechanical. Burning is extremely difficult and the action of wind and waves, useful in non-ice conditions, has no effect. Recent experience has proven one technique (similar to trenching) to be quite effective. When oil has been spilled onto or under the ice, pits can be dug in the ice (but not all the way through) by cutting out blocks with a chain saw or ice saw. Once a trough of about 3 feet by 10 feet has been dug, the surface oil can be directed onto it and pumped off. Oil that has soaked into the ice will flow into the pits. Finally, oil that is under the ice will tend to soak through, by capillary action, and collect in the trough.
Oil spilled on ice-covered, fast flowing water will be even more difficult to contain. Booms should be installed downstream of the spill in areas that are ice-free; or the ice may have to be removed and booms installed.

COLLECTION

Oil Recovery: After an oil spill has been contained, and if possible, corralled into a small area, the next step is removal from the surface. An oil skimmer can be employed to skim oil from the surface of the water for pickup by a diaphragm pump or vacuum truck and appropriate hose arrangement. The skimmer is normally positioned on the upstream side at the shore end of each boom. The discharge from the pump can be directed into a tank, truck, lined earthen pit, etc.

Absorbents such as sorbent pads, Speedi-dri, peat moss, straw, etc, expanded foams, etc., can be used to soak up oil. There is no simple method of pick-up of most sorbents from the water surface. Pitchforks or basket screens can be used for peat moss and straw, when these materials have been

used. Some synthetic sorbents are pump able, and sorbent pads can be collected manually, wrung out, and used again. In general, peat moss and straw are used on land and synthetic sorbents on water. Speedi-dri is most effective on concrete. Oil should be pumped without the use of sorbents if at all possible. Peat moss and straw might have to be used on water for heavier oils (bunker or crude).

In some cases, oil can be removed from absorbents by squeezing or water leaching onto an impervious sheet or collecting system. This oil can be sent back through a refinery system or sent to a disposal site.

Other Methods

Conditions will often prevent the collection of spilled oil. Although we must make every effort to collect as much product as possible, spills on the water, especially in large bodies of water, have seldom occurred under ideal conditions, and containment is difficult.

Dispersants:

Natural wave action and microbial degradation of the oil will, over time, break up the slick. IF APPROVAL IN WRITING HAS BEEN OBTAINED FROM GOVERNMENT AUTHORITIES, DISPERSANTS MAY BE APPLIED TO AN OIL SLICK TO SPEED UP THIS PROCESS. This is sometimes done to protect wildlife feeding or breeding areas further downstream.

The Ministry of Transport and some oil companies have various dispersants in stock throughout the Region.

Burning:

Burning of product on land and water must never be done without clearance from Government authorities and with due regard to human and animal safety. Precautions must be taken to prevent the possibility of the fire spreading. Burning of gasoline and other light products is never recommended because of the explosion hazards that exist.

Sinking: SHOULD NEVER BE DONE

Sinking as a way of "clean-up" should **never** be considered. We cannot hide the spill "under the carpet"; it usually does not stay at the bottom anyway. Sunken oil usually resurfaces after a short period, even when chemical or mechanical sinking agents have been used.

Herding:

Herding agents can be used in some circumstances, after approval from the Government; and should be used only by experienced personnel who are familiar with the techniques.

Bulk A.N.

Material can be collected into piles, then placed in a container or tote bag for reuse or disposal. Material from explosives truck can be collected by means of using a shovel. It is then put directly into a borehole or placed in a container for disposal into a borehole.

(6) DISPOSAL AND RESTORATION

Collected oil can often be run through the refinery processes provided that there is essentially no solids content. Oily water may possibly be disposed of through an API or similar separator and treating system. Oil soaked straw, peat, sand, soil, etc., is most easily disposed of by burial, or open microbial action. Government approved sites in Stephenville and Corner Brook may be used for the disposal of approved contaminated material.

Collected bulk A.N. can be disposed of on farmers fields or in boreholes. The collected bulk A.N. is normally placed in a borehole.
Collected material from the explosives truck can be disposed of by placing in blasting boreholes.

DISPOSAL SHOULD NEVER BE THROUGH DRAINAGE OR SEWER SYSTEMS.

Oil saturated beaches should be cleaned in the following order of preference:

1. Absorption of the oil by materials, such as peat moss, straw, sorbent pads, etc.;
2. Physical removal of contaminated sand, gravel or stones by hand or by machinery;
3. High pressure water washing of freshly deposited oil may help reduce accumulations; and
4. Chemical cleaning -- BUT WITH GOVERNMENT APPROVAL.

Collected oil-soaked sand and soil may be washed in a suitable location to reduce the oil content. The oil and water from this location should be collected and sent to a recovery system or disposal area. Small quantities of earth or sand can be restored to a reusable condition by burning off the oil or by ploughing the small quantity into the soil and fertilizing the area. Adequate precautions should be used in burning operations. Government approval is required for burning oil waste.

(7) **REPORTING**

Final reports of oil spill incidents are an important part of our prevention program. The causes of the spill, as well as the experience of various actions taken, help us to improve our techniques and perhaps reduce the incidence of oil spills.

Spill Reports should contain all the information relevant to the spill, including the events leading up to the spill, the response sequence followed (and its success or failure), action taken to contain and clean up the spill (including any outside contractor or co-operative help used), and all the data relevant to the incident (such as amount and type of product spilled, estimated or actual cost of clean-up, etc.). The report should include recommendations as to how that type of spill could be prevented in future.
The report should be accompanied by, a copy of Form A-1 (filled out at the time of the spill) as well as an Accident Investigation Report.
Summary: See section 5.0 for the seven basic steps of our response sequence.

OBSERVER:
Assess the hazard to one's own health and safety and to others in the vicinity. If danger is eminent, then leave the area and warn others to leave also. Notify your supervisor immediately.

SUPERVISOR:
The Supervisor assumes control of all Company activities associated with an environmental emergency within his designated area. He is also responsible for contacting the Plant Manager with the following information.

- Name of person discovering the spill
- Time of the incident
- Location of the incident
- Type of emergency
- Cause of the incident (if known)
- Current Weather conditions
- Any potential for hazard or injury to people, wildlife, or the marine environment
- Whether a fire or explosion hazard exist
- Action already taken

- He will co-ordinate the assistance rendered by industry co-operatives.
- Develop and maintain a communication network with industry in his area.
- Assume responsibility for directing initial Company action on a spill in accordance with the Environmental Emergency Contingency Plan.
- Determine potential facts about a particular spill, namely location, type, quantity, property damage, ecological damage and clean-up effort required.
- Prepare the final report in consultation with the Plant Manager.

- The Supervisor has the authority to summon Company personnel, industry co-ops, and contractors.

PLANT MANAGER:
In the event of an emergency, the Plant Manager or his designate will immediately inform the following.

- Vice – President of Operations
- Safety Coordinator
- Canadian Coast guard at 709-772-2083

The Plant Manager will arrange for the disposal of any recovered spill material and, upon completion of the cleanup and restoration, prepare, in consultation with the supervisor, a spill report.

SAFETY COORDINATOR:
The Safety Coordinator will maintain contact with, advise and coordinate work crews undertaking the actual cleanup of the emergency. After successful cleanup is complete the Safety coordinator will.

- Ensure the Environmental Emergency Contingency Plan is up-to-date with all potentially hazardous materials listed and all names of personnel and phone numbers are accurate
- Be responsible to assessing new emergency hazards has they develop and take preventative actions, whether covered in this plan or not.
- Check and maintain the operating status of required response equipment which may be required for an emergency.

FUNCTION:

In the event of an oil spill, the unit, within its capability, will confine, clean up, restore and dispose of the spilled oil.

WORK FORCE:

Hourly and salaried staff and contract forces assigned to the team by the Supervisor.

RELATIONSHIP:

Normal line responsibility for the operation concerned. In case of major spills beyond the capability of the operating unit, local co-operatives, industry and Government are to be summoned.

RESPONSIBILITIES:

1. To operate in accordance with Company procedures and in a manner to **prevent** oil spills.

2. In the event of a spill, immediately commence confinement and clean-up operations and report the spill as provided for in the Response Operations (Section 5.0).

3. When it is determined that a spill is beyond the capability and/or capacity of the unit, the local co-operative must be mobilized. Contact must be made with Pardy's Waste Management & Industrial Services And A users agreement must be signed before unit can be moved to site.

4. Maintain inventory of materials and equipment in good condition for oil spill emergencies.

COOPERATIVES

An oil spill co-operative is a volunteer association of company representatives from the petroleum and related industries. Representatives from each member company meet to pool information and resources important to the prevention of, preparation for, and combat of oil spills. Atlantic Minerals Limited is a member of the local co-operative in this area.

PURPOSE OF COOPERATIVES

A co-operative's primary purpose if to serve as a medium through which companies can:
(a) discuss and agree on methods of preventing oil spills, and
(b) pool equipment and human resources in order to make organized assistance quickly available in the event of a product spillage.

AML is a member of the following co-op

CPPI: Co-op Network - operates in the Atlantic Provinces, and includes:

1. Halifax, N.S.
2. Point Edward - Sydney, N.S.
3. Charlottetown, P.E.I.
4. Newcastle - Chatham, N.B.
5. Saint John, N.B.
6. Lewisporte, NF
7. St. John's, NF
8. Corner Brook, NF
9. St. Anthony, NF
10. Labrador City,NF

ECRC: East cost response centre for Atlantic Canada and Quebec. Located in Dartmouth Nova Scotia.

CO-OPERATIVE VANS

Many co-operatives have equipped themselves with Pollution Control Vans, which are owned jointly by all the members. The Vans have many uses:

1. For Practice Drills: Vans may be obtained by the co-op members for training purposes. They are responsible for returning the Van in operating condition with a full inventory of equipment. Nfld. locations are Pasadena, Lewisporte and St. John's.

2. For Precautionary Purposes: The Vans are available on call to stand by on the docks when loading and unloading ships. The cost of this precaution is well worth the time saved should the Van be required if a spill occurs. This would also provide an opportunity to become familiar with the equipment and its use.

3. For Spills: The Co-op Vans have booms, sorbents, lights, shovels, pumps, etc. all useful for rapid response to spill clean-up requirements. They must often be supplemented with heavier or more sophisticated equipment, which is available from outside contractors, in order to complete the job. The Van's greatest value lies in instant availability to reduce the total damage caused by a spill. "The first 1/2 hour is the key 1/2 hour".

CARE OF THE VANS

Many thousands of dollars have been invested in the Pollution Control Vans and it is each member's responsibility to make sure that any equipment used is returned in working condition, and that materials are returned or replaced immediately.

If the Pollution Control Van is kept in top shape, our oil spill response capabilities are greatly enhanced, and the large investment is made worthwhile.

The van for the Corner Brook Co-operative is operated and maintained by Pardy's Waste Management & Industrial Services.

Product, which has been spilled in the winter, presents a very specific problem. On one hand, the frozen ground helps reduce the penetration of the oil. On the other hand, the snow hides the spill and hampers clean-up procedures. And of course, winter spills are characterized by another factor, the cold. Spills, on ice-covered water present further complications. Clean-up procedures on ice are covered in Section 3.

PREVENTION

Many of the spills experienced in winter could have been prevented. They fall into two basic categories, human error and faulty equipment and often a combination of the two.

It is important that lines and pumps be kept free of snow and ice. In this way, minor leaks can be detected before they develop into major catastrophes. Every plant should make an extra effort to prepare for winter, before the snow comes, so that the equipment is in a condition to withstand the abuses our climate will present.

Human error accounts for more than 50% of all spills. Winter conditions can invite "short-cuts" or risk-taking at the expense of safe operating procedures. We know how cold it is watching a tank being filled at 2:00 a.m. in -20 deg. weather but we also know that is dangerous not to walk the line and check the tank.

CLEAN-UP

The procedure for cleanup in winter is the same as for any other time of the year. See sections 4 thru 11

The same conditions that make cleanup in winter difficult also increase the chances that spills will occur. The prevention of oil spills once again becomes our best contingency plan.

MATERIAL: (Located in stores)

ITEM:	DESCRIPTION:	QTY:	SUPPLIER:
1	Sorbent products- socks, oils only, hydrocarbons WS040 3" x 4"	4 boxes of 40	Hi-point Industries Battle Field Equipment Ltd.. United Rentals Ltd.
2	Hi-Point Industries, petroleum sorbent, HI-R-P200 3/16" x 17" x 19" pads	2 bags of 200	Same
3	Oil dry No. 15005, all purpose absorbent	10 bags (15 kg)	Same

APPENDIX B

Controlled Copy Distribution List

Table B1 Controlled Copy Distribution List

Department or Organization	Individual or Location
AML President	William Fitzpatrick, Corner Brook
AML Safety and Security Manager	Ken Marche, Corner Brook
AML Sales and Administration Manager	Vaughn Granter, Corner Brook
AML Plant Engineer	Raymond Fitzpatrick, Lower Cove
AML G.I.T.	Arthur Fitzpatrick, Lower Cove
AML Operations Manager	Shawn Rose, Lower Cove
On-site Environmental Monitor	To Be Assigned, Lower Cove

APPENDIX C

Revision Request Form

Table C1 Revision Request Form

Revision Request Form - Atlantic Minerals Limited Environmental Protection Plan
SECTION TO BE REVISED:
NATURE OF REVISION:
RATIONALE FOR REVISION: (i.e., environment / worker safety)
SUBMITTED BY:
Please submit request to the Sales and Administration Manager

APPENDIX D

Revision History Log

Table D1 Revision History Log

Version	Date Issued	Name of Last Issuer	Revision Notes
0.0			Draft
1.0			Draft Rev 1