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*Whites Point Quarry and Marine Terminal Project  
Joint Review Panel*

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July 28, 2006

Mr. Paul Buxton  
Bilcon of Nova Scotia, Corporation  
P.O. Box 2113  
Digby, NS B0V 1A0

Dear Mr. Buxton:

The Whites Point Quarry and Marine Terminal Project Joint Review Panel submits the attached document to you as our second request for additional information pursuant to Part II, Section 7 of the Terms of Reference appended to the Joint Panel Agreement. The Panel may submit further information requests within 15 days of the close of the comment period on the EIS or within 15 days of receiving additional information from you.

The attached document details a series of issues from the EIS that the Panel has identified as requiring further information or clarification to allow us to proceed with developing a schedule for public hearings. You will notice that the Panel has abandoned the format of our June 28, 2006, information request in which requests were assigned a sequential code of IR-1 through IR-10. This is to allow you to provide information in the comprehensive, integrated approach reflected in the EIS Guidelines. The Panel asks, however, that your responses are referenced to the appropriate sections of the EIS.

You are responsible for providing the Panel with a response to the comments that you have received within 15 days of the close of the comment period on the EIS. Since it is likely that you will require additional time to satisfy this requirement, the Panel expects that you will provide a schedule which estimates the time needed to satisfy our information requests as well as the time you require to respond to any outstanding information requests from the public and interested parties. This schedule is essential to allow the Joint Review Panel process to continue in an effective and efficient manner. As always, your responses will be posted to the public registry for the Project.

Yours sincerely,

Robert Fournier, Chair

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## **PREAMBLE**

The Whites Point Quarry and Marine Terminal Joint Review Panel is committed to key principles, as articulated in the EIS Guidelines (March 2005). The Panel expects the Proponent, Bilcon of Nova Scotia, to apply these principles throughout the EIS. Furthermore, the Panel expects the Proponent to use the highest scientific standards in providing evidence, wherever appropriate.

### **Traditional and Community Environmental Knowledge**

The Panel encourages the Proponent to employ traditional knowledge more fully to resolve some of the data gaps as identified through the information requests. For example:

9.1.7.1.5 Ocean Tides and Currents – This is an instance where the evidence could have been informed by local knowledge.

9.3.6.1 Aesthetics Research – Information on tourism and the recreational use of the waters in the Project area could have been supported with local knowledge.

### **Public Involvement**

Public involvement needs to go beyond disseminating information and surveying respondents. The Panel expects the Proponent to identify meaningful opportunities for the public to participate in the assessment process (e.g. in the identification of VECs) and in plans for the Project mitigation and monitoring.

The Community Liaison Committee, established previously under provincial regulations, struggled to operate effectively. The Proponent identifies a significant role for a renewed CLC in monitoring of the Project. Explain the steps the Proponent will take to enhance the effectiveness of the CLC as an independent advisory committee and to improve the climate for public involvement in Project assessment.

Appropriate measures for conflict resolution should be included and defined in all the plans for mitigation and follow-up.

### **The Ecosystem Approach**

The Panel believes that an ecosystem approach requires the Proponent to identify the links and relationships between ecosystem components rather than treat them simply as individual components. The EIS should provide such an

analysis and it should consider how the Project would potentially affect ecosystems and individual species.

The Panel recognizes that the boundaries of ecosystems may seem somewhat "arbitrary" but expects the Proponent to identify and describe suitable boundaries for its analyses in the EIS.

### **The Precautionary Principle**

The Panel called for the application of the precautionary principle.

The examples provided by the Proponent in sections 8.5.1 to 8.5.4, as applications of the precautionary principle, demonstrate a misinterpretation of the accepted definition as provided in the Guidelines. For instance, creating sediment retention ponds does not, in itself, demonstrate the application of the principle although designing the ponds to appropriate structure and capacity for 100-year storm events would indicate precaution. The monitoring program should reflect the precautionary principle through early and regular monitoring along with appropriate responses to mitigate any adverse effects. Provide the Panel with a detailed summary of the application of the precautionary principle to all components of the proposed Project.

### **Proper Scientific Standards**

The Panel requires sound data for assessing effects. In some cases, the data provided fails to meet appropriate scientific standards leading to conclusions that cannot be substantiated by evidence. In responding to information requests, the Proponent should endeavour to:

- standardize measurement units (in metric);
- use appropriate scientific methods and describe them fully;
- demonstrate that environmental baseline data was obtained using high standards in sampling, laboratory, and statistical practices; and,
- provide quantitative data or estimates to replace vague qualifiers (e.g., "some", "extensive").

### **Valued Ecosystem Components (VECs)**

The Proponent's analysis of VECs mixes ecosystem components and Project effects. It omits some species identified by government authorities as potentially of concern. It omits ecosystems like the coastal bog which it has identified as

playing an important role in managing effluent from the site. It omits consideration of human environment components. Clarify the VECs.

### **EIS Format**

It is unfortunate that the Proponent did not follow the structure of the EIS Guidelines as issued by the Panel in March 2005. The proposed format was to begin by describing the Project and proceed to describing the existing environment. Where there was potential for interaction between an environmental component and a Project component, the potential effects were to be assessed. Mitigation, monitoring and management were then to be presented collectively to limit repetition and recognize the interrelated nature of both the environmental components and the Project components.

This suggested format would have allowed the Panel to verify the information gaps more efficiently in its review of the EIS and to better understand the Proponent's opinions concerning the potential of the Project to cause environmental effects.

To assist the Panel in this regard, at this stage of the process, the Proponent is instructed to provide an environmental component (VEC)/Project component matrix that will clearly demonstrate where components of the Project may interact with the environment to cause effects. Ensure that all phases of the proposed Project are included.

For examples from other assessments, see the web site of the Canadian Environmental Assessment Agency. Two instructive examples have been reproduced in this document as Appendix 1 and Appendix 2 for illustration only.

### **7.0 PROJECT DESCRIPTION**

The Province currently owns Whites Cove Road. If the Proponent does not acquire ownership of that road, the entire operational scheme of the Project, the mining plan, hydrology and site drainage will be affected. The Proponent is instructed to resolve the road ownership issue or propose plans, Project components, mitigation and effect assessments for both options.

The level of detail for most Project components described in the EIS is not adequate for the Panel to properly understand the Project and assess its potential effects or to judge the effectiveness of the proposed mitigation measures. Discrepancies in the various documents and maps make it difficult for the Panel to confirm where activities will occur.

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The Panel requires a level of detail at this stage of Project planning that could be described as pre-engineering (as opposed to the conceptual information presented in the current EIS documents). More precise quantitative, pre-engineering design details that include schematics and/or diagrams, where appropriate, are required for the following Project components, at a minimum. (Some specific requirements related to the Project description are reinforced or expanded on later in this information request.)

- Mining plan
- Water budget
- Constructed wetland (including general planting plans)
- Decommissioning plan
- Transportation during construction (both land and sea, including facilities for equipment unloading during construction)
- Sediment ponds
- Sediment and organic disposal areas
- Site lighting
- Reclamation plan (providing sufficient detail to determine, for example, the capacity of vegetation to absorb greenhouse gasses)

#### **Specific Comments**

Describe the zone of influence of the marine area expected to be affected by the manoeuvring requirements of the ship during varying sea and wind conditions.

Identify factors that may alter the rate of removal of aggregate materials from the site. For instance, the EIS suggests that bulk carriers may range up to 70,000 tons capacity. Could this reduce the number of ship trips required per year? Could enhanced demand by Clayton increase the rate of aggregate extraction?

In some parts of the EIS, the Proponent indicates that it expects it will have a dedicated ship while in other parts it says it will not. Clarify.

Clarify the communication plan that will be used to apprise fishers, whale watchers or others of Project activities such as blasting or ship loading.

Provide a detailed decommissioning plan. The lease the Proponent has on the property extends for 90 years, while the Project plan calls for 50 years. Clarify the intended use of the property for the years remaining on the lease.

#### **Water Budget**

Provide complete quantitative schematic water budgets for each phase of the construction and operation of the project. This analysis should include all water usages such as:

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- aggregate washing;
- dust suppression on roads, operating faces, conveyors, crushers, sediment disposal areas etc.

All water disposals such as:

- residuals from aggregate washing operations; and
- precipitation runoff from working areas, sediment and organics disposal areas, compound area, processing plant area.

Storage capacities and channel capacities should be provided for areas such as:

- sediment ponds;
- connecting channels to the bermed areas;
- constructed wetlands; and
- managed coastal wetland (bog).

Quantitatively evaluate the capability of the system to operate under average climatic conditions, as well as extremes such as exceptionally arid summers or an extreme storm event.

Provide mitigative and contingency plans in the case of failure of any of the control structures proposed for surface or process waters.

### **Debris Cycle**

Section 9.1.7.1.4 should form part of the Project description.

In view of the planned component relocations of the quarry operation, how can subsequent five-year plans be similar? Provide the five-year plans for subsequent periods.

Plans OP-1 to OP- 4 show the organic and sediment disposal areas for the first 20 years located on slopes that range possibly up to 25%. (Sediment retention structures are usually sited on level ground or in depressions.) Provide details on the berms, along with measures proposed to prevent down-slope movement of the sediments and berms by creep or flow. What mitigative and contingency plans are proposed in the case of berm failure during extreme precipitation events?

The Proponent proposes de-watering methods to stabilize the sediment load on the sloping surface. It also proposes spraying water to suppress dust. Provide information how these apparently contradictory approaches would be compatible.

### **Facility and Component Locations**

The quarry infrastructure plans (Figure 1) for the EIS and the Fish Habitat Compensation Plan of September 2005 (Appendix 17) differ in how they illustrate critical components. Examples include the footprint of the physical plant, orientation of the loading tunnel, the direction of flow in drainage channels, and the use of the "Phase 1 Reclamation area".

Resolve discrepancies in the drawings to indicate which of these infrastructure plans represents the final proposed design of the Project.

### **Access Road**

If the current access road remains public property, the Proponent proposes to fence it off, enclosing it within a 30m environmental preservation zone. After ten years of quarrying activities, the road will exist on an isolated ridge that traverses the site, almost 90m above the quarry floor on either side.

Provide contingency plans of the effects of such a ridge on facility locations, quarry operations, surface drainage, and site reclamation. Consider the stability of this ridge and safety issues arising for the workforce and the public.

### **7.1 Alternatives to the Project**

The Panel requires further information considering alternative quarry sites in Atlantic Canada and the United States: these are alternatives to the Project.

Identify individual sites or areas considered and provide the rationale for removing each site/area from further consideration.

The Panel will determine if further information is required to support the assessment of alternative means of undertaking the Project after the Proponent provides detailed Project description information.

### **8.0 IMPACT ASSESSMENT METHODOLOGY**

The Panel will determine the likelihood of the Project causing significant adverse environmental effects. The Panel will use the systematic framework from the Canadian Environmental Assessment Agency Reference Guide: Determining Whether a Project is Likely to Cause Significant Adverse Environmental Effects (November 1994).

The Panel will assess predicted residual effects (the effects that remain after mitigation) through the application of a combination of criteria that are

appropriate to each potential effect. The criteria will normally include the magnitude, geographical extent and duration of the effect and may also include the frequency, reversibility and ecological context. Each effect will therefore be described in terms of a combination of factors.

The Panel will determine what would constitute a significant effect on an environmental component using these same parameters. This judgement will draw from environmental standards, guidelines and objectives, advice from experts, risk assessments, results of past environmental assessments, and other relevant sources. The Panel will then be able to compare the predicted effects to effects that, should they occur, would be considered as "significant".

If the Panel determines that a component of the Project could cause a significant adverse environmental effect on an environmental component, it will then decide whether this effect is likely by determining the probability of the occurrence and the scientific certainty associated with the prediction.

The approach that the Proponent has used in the EIS to form the Impact Statements is not entirely compatible with the methods above (which were recommended in the EIS Guidelines). The Panel expects the Proponent to provide data and information in a form that is compatible with and uses the methodological terminology described in the Guidelines and summarized above.

## **8.2 Public Consultation**

8.2.2 Provide the updated communications plan referred to in the last paragraph of pg.10 and show how the public consultation initiatives have influenced the plan.

8.2.3 The stakeholders' consultation list is presented in Appendix 6 (not Appendix 34 as reported).

8.2.4 Describe the Attitude Survey information in a table that identifies and differentiates responses by geographical location (so that the Panel can identify local responses from the larger survey area, for example).

8.2.6 Provide full details (past and future plans) of the issues management system, community forums, and the stewardship process for community grants.

***NOTE – At this stage of the environmental assessment, the Panel's questions on the Environment and Impact Analysis chapters of the EIS are focused to obtain the existing environment information needed to assess the potential effects of the Project.***



## **9.1 PHYSICAL ENVIRONMENT AND IMPACT ANALYSIS**

### **9.1.1 Climate**

The Panel requires more complete and locally relevant climate data and related information to assess the potential effects of the project. The data needs to come from weather stations close to the Project site, and to reflect an appropriate time frame for identifying weather averages and extremes. Traditional knowledge may provide useful information in this case.

#### **9.1.1.1 Precipitation and Temperature**

- Appendix 14 (Table Pg1) – Provide a title for the table which includes location and years. Provide the most current information on extreme events recorded in this region. (This information is important for the consideration of precipitation in the design of the sediment ponds and constructed wetlands, and the evaluation of the capacity of the coastal bog to deal with suspended and dissolved contaminants.)
- Appendix 14 (Tables Pg2-Pg3) – The table values do not make sense (especially in relation to the text in 9.1.1.1.1). For instance, the table reports that the greatest rainfall for 1966-1985 is only 6.4mm; lowest temperature cited is minus 14°; greatest snowfall is 5.8cm. The Panel does not believe that the data adequately represent averages and extremes for the Whites Point area.

#### **9.1.1.1.2 Visibility/Fog**

Given the potential effect of fog on many of the Project's operations and impacts, the Panel requires good data on the likelihood of fog during the year.

- Yarmouth station information is presented. Given the particular conditions of the Bay of Fundy area, how applicable is this data to predicting days of fog at the Project site? If information is available for closer locations, like Meteghan or Grand Manan, that should be provided.
- Provide a more appropriate data set. If available, seek traditional knowledge or the records of the whale-watching organizations to provide additional information.

#### **9.1.1.1.3 Greenhouse Gas**

Provide a GHG compensation plan which negates the emissions from the Project during the construction and operational phases (including the effects of land clearing).

### **9.1.2 Geology**

The Panel requires better scientific data on site geology and hydrogeology to assess the possible effects of quarrying on the environment.

The Proponent states that quarry operations will not intersect or breach the middle basalt flow unit (identified as an aquifer). Keeping in mind that the tops of basalt flows can show a significant amount of local topography (i.e., the intersection of flows cannot be delineated by planar interpolation / extrapolation from a few boreholes), the Panel requires additional detail in the mining plan (not just conceptual diagrams) as to how the Proponent will avoid intersecting the middle flow unit.

What thickness of basalts in the upper flow will remain as a cap on the middle flow unit? What mitigation strategies will the Proponent employ if the middle flow unit is inadvertently breached? (The precautionary approach suggests planning for such worst-case scenarios.)

Explain the contradiction between the claim that quarrying will not intersect the middle unit or the water table (Figure 6A) even though the final site drawing (Figure 7 in map volume) shows that such an intersection could have occurred.

The chemistry of the basalts is currently characterized by only three analyses from different levels of a single borehole. Copper values, which are of special concern to the assessment, range from 27 to 170 ppm from those three samples. (Considerably higher values have been determined by others in tests of the North Mountain Basalts.) Provide statistically meaningful averages, especially for copper, from the basalts that are to be quarried, along with the range of values encountered. Document the sampling protocol used for the analysis. (For this purpose, "statistically meaningful" may be defined as +/- 10% at 95% confidence level of the measured statistic.)

### **9.1.3 Hydrogeology**

#### **Watershed Delineation**

All plans and maps show both the surface water divide and groundwater divide coinciding with the maximum topographic elevations. However, data provided indicate that the middle flow is a confined aquifer that recharges in the valley to the east of the property (designated as the Little River surface watershed).

Based on sound scientific analysis, provide concrete evidence either that the two divides coincide or properly delineate the groundwater divide. If the two do not coincide, re-evaluate the effect on the mining plan and the wells on adjacent properties.

### **Hydrogeology of Upper Flow Unit**

The EIS concludes that the upper flow unit is "dry" (i.e., above the water table). An alternative perspective would suggest that this unit is fracture-dominated and that water storage and transport in it occurs along both horizontal and vertical fractures as well as isolated vertical shear zones. Such flow would be more rapid and localized than due to the pore spaces in the middle flow unit. The Preliminary Hydrogeological Assessment by Jacques Whitford (Reference Documents V.5 Tab 28) states that "This observation suggests the presence of possible perched water table conditions associated with shallow bedrock fractures, and a downward vertical hydraulic gradient."

Provide a hydrogeological analysis that fully evaluates the role of fracturing on the hydrogeological properties of the upper flow unit.

### **Groundwater Usage**

The EIS states that groundwater will not be used at any point for the quarry operations. Provide quantitative information in the water budget to verify this statement. Include conditions for exceptionally arid summers derived from the climate data.

The Hydrologic Budget Analysis by CRA (Reference Documents V.5 Tab 30) appears to be based solely on average historic climate records. The Panel requires an analysis that also considers extremes.

### **Water Table Data**

In section 9.1.3.2, water table data was obtained from "existing bore holes, the six monitoring wells and neighbouring wells" in the fall of 2005. Provide the data obtained during this survey.

The chemistry of a single groundwater sample from the property is inadequate to establish a baseline. Provide chemical analyses for a representative set of groundwater samples.

### **Impact of Blasting on Groundwater**

Pg28, Bullet 3 asserts that blasting will not affect groundwater quality and quantity. Provide specific information on the studies that have been used to evaluate the effects of blasting on groundwater supplies and wells. Describe

their relevance and applicability to this site. Identify the "comparable mines" at which no change in groundwater quality or quantity was observed as a result of blasting.

### **Saltwater Intrusion**

The EIS concludes (Pg28, Bullet 6) that "Construction of aggregate mines have been used in coastal areas to prevent saltwater intrusion". Provide evidence that this concept applies to the Project.

### **Groundwater Mitigation**

The Proponent says that it will use four existing bore holes along the access road (three of which have been vandalized and are not usable) for monitoring.

What is the Proponent's plan for replacing the vandalized bore holes to obtain the information?

What criteria will the Proponent apply in adjudicating claims that quarrying operations have affected water supply or quality? Will the claimants be expected to litigate? Describe the process for resolving conflicts.

### **Groundwater Monitoring**

The EIS states that on-site and adjacent property groundwater data is essential for establishing reliable, pre-Project baseline conditions. The Guidelines (9.1.3.2) provided to the Proponent requested this information. Include this information in the EIS.

## **9.1.4 Surficial Geology and Soils**

### **Soil Analyses**

Only two soil samples were analyzed for inorganic parameters on the property. Soils are thin and developed on top of Beaver River Till. No information on total soil depth at the sampling sites or sampling depth is provided. Beaver River Basalt Till (Table SG-1) shows considerable variability, with copper values ranging from 80 – 218 ppm.

In view of the ISQG guidelines for copper in marine (18.7ppm) and freshwater sediments (35.7 ppm), provide statistically meaningful averages for concentration levels of inorganic parameters, particularly for copper, from the soils on the

property. Describe the range of values encountered. Document the sampling protocol and spatial distribution used for the analysis. (For this purpose, "statistically meaningful" may be defined as +/- 10% at 95% probability of the measured statistic.)

On Pg36, the Proponent should note that the sample taken from the existing sediment pond is not typical of material that is expected to be in the sediment ponds during operation of the Project. (It is the product of surface runoff from grubbing the site, not the result of a basalt-crushing process.)

#### **9.1.6 Surface Water**

Describe the flocculent that will be used in the water recycling process. How much of this material will be released into the sediment retention ponds in average and extreme conditions?

Section 9.1.4.2 discusses a "high rate thickener". Is this the same compound as the flocculent? Provide information on the toxicity and environmental behaviour of these compounds.

#### **9.1.7 Physical Oceanography**

##### **Marine Sediments**

9.1.7.1.2 (Pg52, paragraphs 2 & 4) – The Proponent says that data indicates "little current movement close to the bottom" and "sediments are sparse and do not appear to be in transport". These two statements appear to be in contradiction. Resolve the inconsistency.

##### **Ocean Tides and Currents**

9.1.7.1.9 Provide specific information on ocean tides and currents for the coastal zone adjacent to the proposed marine terminal. Consider normal as well as extreme meteorological conditions and use traditional knowledge to supplement existing data.

##### **Sea Level Change**

9.1.7.1.9 Clarify the apparent inconsistency in statements concerning rising sea levels (generally) and falling sea level (locally) on Pg58.

9.1.7.2 Provide evidence that all other possible locations for a marine terminal in the Bay of Fundy been investigated to support the conclusion that "Digby Neck is the most optimum location", as stated on Pg61.

### **9.1.8 Air Quality**

The EIS proposes the use of air quality criteria for particulate matter that are found in the 1999 provincial Pit and Quarry Guidelines. While accepting the relevance of these criteria to the project, the Panel wishes to know if Bilcon has considered the use of parameters more directly related to particulate matter and human health, e.g. PM10 and/or PM2.5. If other criteria were considered and rejected, the Panel would like to receive the rationale behind the decision.

Bulk carriers are identified in the EIS as a source of air pollutants yet no mitigation is identified. The EIS does indicate emissions from the carriers will be "brief". Provide a more detailed analysis of effects on air emissions from this source and identify mitigation measures if appropriate.

#### **Mitigation**

9.1.8.3 In the Air Quality Study (Reference Documents V.5 Tab 31) the consultant, Jacques Whitford, reports that the Proponent has made commitments that the Panel does not see carried through to the EIS.

These include:

- the Proponent will take measures to minimize visible plumes;
- crushing will be conducted in an enclosed space which is ventilated through filters to the outdoors (by contrast, elsewhere the EIS limits the scope to "whenever practical"); and
- a complaint resolution program will be put into place.

Confirm whether these commitments apply to the EIS or otherwise resolve the discrepancies in the documents. Describe any measures to be taken on these items.

Jacques Whitford Air Quality Study (sections 3.6 and 3.8) recommends steps that can be taken to reduce or eliminate particulate emissions.

Provide information on which of these measures will be adopted and provide reasons for rejecting or omitting the others.

Provide a clear indication as to the components of the Project that will be covered to control dust so that the residual effects can be evaluated.

### **9.1.9 Noise and Vibration – Blasting**

The text on Pg67 and Pg68 cites an example of blasting effects under specific parameters using a considerable amount of jargon. Clarify the meaning of this paragraph and explain the relevance of this example to the blasting proposed for the operation.

The EIS states that no blasting will be permitted if there is a thermal atmospheric inversion or low cloud cover or fog conditions. These criteria are highly subjective. Provide numerical criteria and describe the manner in which they will be implemented.

### **9.1.10 Noise and Vibration – Plant**

9.1.10.5– Assess the effects of noise and vibration for the construction and decommissioning phases of the Project.

## **9.2 BIOLOGICAL ENVIRONMENT AND IMPACT ANALYSIS**

9.2.0.1 Species at Risk – The Panel requested that species identified as at risk on the COSEWIC and SARA lists be treated as VECs. However, the Panel did not intend to suggest that only species on those lists could be treated individually as VECs.

The Panel considers it more appropriate to treat species at risk individually as VECs.

Appendix 39 identifies a range of species at risk that are “possible” or “likely” to be present at or near the site. Explain why these species are not described more fully in the EIS.

### **9.2.1 Terrestrial Ecology**

9.2.1.1.3 Flora and Fauna – The Panel believes that a species previously listed as extirpated in Nova Scotia but subsequently discovered to be on the site could merit inclusion as a VEC. The Proponent should review and consider other floral species at risk from Nova Scotia lists, or explain why they have been excluded from the VEC list.

9.2.1.2 Analysis – The Panel requires a more detailed reclamation and monitoring plan as part of the Project description to assess the effects of the quarry on the biological diversity of the site.

9.2.1.3 Migratory Land Birds Species at Risk – The Panel requires sufficient and appropriate quantitative information to judge the potential for adverse environmental effects of Project-related lighting on migrating birds. Similarly, a detailed description is required of potential mitigative measures, coupled with a means for assessing their effectiveness.

9.2.1.4 Monitoring – The Proponent states that early detection of invasive species is important, yet monitoring is proposed to occur every five years. Resolve this discrepancy within the context of the precautionary principle.

## **9.2.2 Aquatic Ecology – On-site Freshwater**

9.2.2.1– The Proponent proposes to use the bog/marsh to polish effluent from the settling ponds. At the same time, it will designate the bog as an environmental protection area. Effluent from the quarry site will pass through this wetland to be cleansed of harmful elements on its way to the ocean. The Panel requires additional information for its assessment including:

- the dimensions of the coastal bog/marsh, and documentation (including maps at sufficient resolution) of where and how it currently drains;
- an indication of the soil depth, type, and water storage capacity (based on a series of cores/samples collected on transects both parallel and perpendicular to the coast);
- an indication of the salinity of the water in different areas of the bog/marsh;
- estimates of the current and projected water flow through the bog/marsh (in average and extreme weather conditions, and during periods when water is being stored for operational purposes);
- estimates of potential sediment and solute loads into the bog/marsh as a result of the Project; and
- an assessment of the effects of the Project on the bog/marsh and its capacity to continue to function as projected.

9.2.3.2 Bioaccumulation in Locally Harvested Species – Clarify who will conduct the monitoring of VECs throughout the course of the Project to ensure that the effects of Project-derived metals are not significant. Ensure that monitoring intervals reflect a precautionary approach.

9.2.4.1.11 Waterbird Species at Risk – What evidence was used to determine that the Common Loons sighted do not belong to the Nova Scotia breeding population? On what basis has the Proponent concluded that only a small number of Common Loons are expected to be exposed to Project activities (despite evidence that considerable numbers were observed congregating at the site)?



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9.2.4.3 Waterbird and Mammal Mitigation – If a Project employee observes marine mammals or water birds within predetermined distances from the quarry site, and if that information is transmitted to the captain of the ship, what mitigation measures will the Proponent expect the ship to take in order to limit effects? Will those conditions be stipulated in the contract with the shipper? How accurate are those observations expected to be at the proposed distances under variable weather conditions?

9.2.6.2 Fish, Threatened and Special Concern, Analysis – What are the possible effects of a major breach of the sediment ponds or the berms enclosing the sediment disposal areas on species in the Bay of Fundy ecosystems, especially those that may be endangered?

### **9.2.9 Blasting**

The Panel requires better information on the potential effects of blasting on marine species at this site.

9.2.11.2 Harbour Porpoise (and Seals) – Harbour porpoises, commonly sighted off Whites Point, are a species of concern. Provide evidence to substantiate the claim that a distance of 170 m from a blast is acceptable for these animals without lasting physiological or behavioural effects.

DFO has suggested monitoring seal colonies near the site before, during and after blasts occur to gauge effects on behaviour. Describe how that suggestion has been incorporated into the monitoring plan.

How does the Proponent intend to verify the results of the blasting model in the absence of a test blast?

### **9.2.13 North Atlantic Right Whale – Ship Interactions**

Based on existing records of vessel-whale interactions in the Bay of Fundy, provide a quantitative risk analysis of such a collision by a ship serving the Project over its anticipated 50-year lifespan. Since the EIS states that both 44 and 50 vessel-visits are expected annually, identify the correct number. Identify the planned mitigation measures that will be employed to avoid a whale collision and indicate if those measures will be written into the contract with the shipper.

**Reference Documents V.2 Tab 12** – The consultant recommends that better baseline data be provided on Total Suspended Solids (TSS). Provide that information.

**Reference Documents V.2 Tab 13** – The consultant recommends several commitments that might be added to the contract with the shipper to limit the risk of invasive species. Is the Proponent adopting these commitments?

**Appendix 29** – A letter from the Nova Scotia Museum alerted the Proponent to possible rare or important species on the basalt cliff (including, for instance, a “rare bristletail insect” and an unusual terrestrial mollusc). Explain why these species were not considered in the EIS.

### **Contaminants**

Provide information on the potential effects of copper on marine life. What are the normal range of levels and acceptable levels for marine sediments and waters? What organisms could take up or accumulate copper and what organisms are particularly susceptible to the presence or effects of copper? What strategies may be applied to mitigate (a) the potential release of copper in the marine environment or (b) the effects of its release?

## **9.3 HUMAN ENVIRONMENT AND IMPACT ANALYSIS**

The Panel expected that in assessing the effects on the human environment the Proponent would take full advantage of traditional knowledge and of public involvement as a strategy.

The Panel needs to understand how the community functions to assess fully the effects of the Project.

### **9.3.1 Heritage Resources**

The site has 1.9 miles of coastline not 9 miles; distances should be reported in kilometres. (see Pg10, Paragraph 1)

Provide a current resume for the Archaeologist, Charles R. Watrall, Ph.D.

9.3.1.2 Analysis (Pg13, Paragraph 1) – Provide the personal communication between the Proponent and Robbie Bennett of Canadian Seabed Research Ltd.

9.3.1.3 Mitigation – The consultant, Gordon Fader (Reference Documents V.3 Tab 14, Pg11), states that, “To prevent potential future damage or disturbance to the seabed of the large ridge trending east west adjacent to Sandy Cove north of the proposed marine terminal construction site, shipping routes will be positioned to avoid passage over the area. This will reduce unnecessary disturbance of the

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area and reduce the possibility of contact with the seabed from anchoring". Clarify whether the Proponent commits to this mitigation measure.

### **9.3.3 Aboriginal Land and Resource Use**

The study provided by the Confederacy of Mainland Mi'kmaq indicates that "the historic Indian Hill Camp" was located at the northeast section of the site. The location of Indian Hill Camp is not identified on Map 27. Describe how the Proponent investigated this

On Pg21, last paragraph, the Proponent says that "the only effect on the fishery will be to the lobster fishers in close proximity to the marine terminal". Clarify the evidence the Proponent has used to rule out effects of the Project on other fisheries (such as herring, sea cucumber).

9.3.4.4 An appropriate archaeological recovery monitoring and recovery program should be identified as part of the environmental management plan.

### **9.3.6 Aesthetics**

The Panel requires additional information drawn from traditional knowledge or documented evidence regarding the type, frequency, duration and geographic location of various uses of the waters offshore of Whites Point, especially for recreation and adventure tours.

Little information and no quantitative evidence are provided concerning the effect of the Project on aesthetics (views) from the Bay of Fundy. Identify the areas from which the marine terminal will be visible along the coast and into the Bay. Provide an analysis, propose mitigation and make supportable conclusions on the potential effects of the Project (specifically from the quarry and from the marine terminal) on aesthetics from the Bay.

Pg104 concludes with the comment that "views of the quarry and marine terminal from tour boats will not be common". From its own offshore inspection of the proposed quarry site, however, the Panel noted that Whites Point is visible from the exit of Petit Passage where tour boats leave the harbour. Resolve this discrepancy. Provide a view-shed analysis of the quarry and marine terminal site from the water during clear conditions.

Consider alternate mining plans or mitigation strategies to reduce the visual effect of the quarry from the water.

### **9.3.7 Community Profile**

9.3.7.1 Demographic Profile – Include the community of Brier Island in the analysis of population, economy, tourism, etc. Discuss how changes of the population in the Digby Neck and Islands region compare with other rural coastal areas of Nova Scotia over the same period.

9.3.7.1.1 Describe the population and distribution of seasonal residents.

The Proponent has committed to focusing its hiring efforts on women in the local area yet it provides no evidence or argument in 9.3 that would lead to this strategy. Provide evidence or otherwise explain the Proponent's proposed hiring strategy to target women.

9.3.7.1.7 The EIS states that "The area appears to be a community in decline." Describe the evidence, apart from population loss, used to draw this conclusion. Consider evidence from traditional community knowledge or public consultation in drawing conclusions about community character, function and viability.

Correct the references to the table numbers on Pg60.

Describe social networks and institutions, community values and concerns, and the cultural characteristics of the area.

### **9.3.8 Transportation – Land and Marine**

Quantify the expected increases in truck traffic along Highway 217 during construction and decommissioning of the project. Explain how it is possible for the Project to "effectively eliminate heavy truck traffic from the quarry" given the need to bring in some materials and remove wastes by road.

How does the Proponent propose to mitigate or compensate the inconvenience its activities will cause lobster and other fishers during the ship berthing and loading periods?

What mechanisms will be used to alert fishers to activities on the site and offshore?

9.3.8.3 Mitigation– Provide details regarding the "lobster trap fund" that the Proponent commits to financing, including details of the consultation process that was followed to develop a plan for the fund, and the conflict dispute mechanism to be employed. Clarify what losses it will cover.

**9.3.9 Economy – WPQ and Marine Terminal**

9.3.9.1– Provide details on the EcoTec Economic Impact Model and a summary of its inputs, outputs and assumptions.

The Panel is surprised that the number of individuals employed in “mining, quarrying and oil well” is so low that it rounds down to zero for all census years shown in Table E-1 (Pg70). Since there are at least two other quarries in the area, verify these figures. Explain why tourism and ecotourism are not included as industries, either separately or together in Table E-1, Pg70.

9.3.9.1.2 Identify the “local planning strategy” referred to at the bottom of Pg80.

9.3.9.1.2 Provide evidence to substantiate the statement that “similar operations in Nova Scotia have not affected the tourism industry in those areas” (Pg80).

9.3.9.2 Analysis, Construction -- Provide a breakdown of capital expenditure from the Project that the Proponent commits to spend in Canada, in Nova Scotia and in Digby County, compared to that committed elsewhere. Provide the same breakdown for construction employment estimates.

9.3.9.2 Analysis, Operation – Provide a breakdown of the calculations concerning employee salary and requirements to allow the Panel to verify and understand the situation. Include, for example, a listing of the jobs and their respective salaries, the requirements of different jobs, the hours of work and any benefits included in the salary and those that are in addition to the salary. Clarify whether the “annual salary” is based on actual earnings over 44 weeks (as projected for the operating season). How many workers will be laid off during the non-operating season and how many assigned to other tasks?

9.3.9.2 Clarify the basis upon which the estimates of taxation revenues to federal and provincial governments are derived.

9.3.9.3 Given the level of concern raised in the community over the Project’s potential effects on the economy of fishing and tourism, what possible community mitigation measures has the Proponent considered?

9.3.10 Harvesting of sea cucumbers and dulse occurs in the area. Are these fisheries and harvesting activities included in proposed compensation plans?

9.3.14 During the scoping sessions, members of the public suggested that the effects on tourism could extend beyond the immediate Project area, and might affect a large region of Southwest Nova Scotia. Justify the boundaries chosen.

9.3.14.2 Describe what is known about the gender and household characteristics of employees in the tourism sector in the region. (For instance, how many households have more than one member employed in the tourism sector?) What proportion of tourism businesses are family-run and owned?

9.3.14.3 Mitigation – The paragraph does not describe mitigation measures. (Public consultations revealed several issues of concern to the community --for example, a heritage centre and recreational facilities-- that might suggest possible mitigation measures.)

### **9.3.15 Economy – Land Use and Value**

9.3.15.3 Clarify the process by which residents may redress concerns about their wells being affected by the Project. Consider a “no fault” mitigation process.

In some situations, septic systems could be affected by blasting activities. Provide evidence to substantiate the comment that “These systems will not be affected by the project.” (pg 108)

9.3.15.6 Property Values – Provide proper data on the property values or properties that may be affected by the Project to determine baseline conditions and to verify the accuracy of the predicted effects, should the Project proceed. Include comparative data from other coastal areas and from the province as a whole. Include a historic component on assessment records to capture relative values prior to the announcement of the Project.

9.3.15.9 The consultant's report recommended forming a property value monitoring committee. Will the CLC be involved in this monitoring? Describe the role of affected property owners in the monitoring program. How will property evaluators determine whether losses in value are attributed to the project?

### **9.3.16 Recreation**

Since the mid-twentieth century, community residents used the Whites Cove site as a recreation area, despite its status as private property. The Proponent identifies the nearest publicly owned recreational area as 10 km away. The survey of residents identifies a desire for recreational facilities.

9.3.16.3 Does the Proponent plan to mitigate or compensate for the loss of community recreational use of the site?

If the Proponent acquires the right to Whites Point Road, then how will harvesters gain access to the shore? Will the Proponent limit access to the beach to quarry operating hours?

Has the Proponent considered making the buffer properties it has acquired available for community recreation or other use?

### **9.3.17 Human Health and Community Wellness**

The EIS does not adequately address the possible respiratory effects from dust generated from all aspects of the Project. It gives insufficient attention to the stress that may be caused by the Project to local residents. Describe the baseline conditions for respiratory illness in the area. Consider the possible effects of the Project on mental health and well-being both among those in favour of and opposed to the Project.

### **9.3.19 Human Health –Marine Contaminants**

9.3.19.2 The on-site sampling is not adequate to generate scientifically defensible information concerning copper concentrations. The Proponent argues that “implications to human health are uncertain”. The Panel expects the Proponent to present current scientific information on the implications of copper on human health.

Given that periwinkles harvested for human consumption in the near shore environment on the site may be exposed to high concentrations of copper draining from the sediment ponds, this matter requires clarification.

9.3.19.2 Analysis – Provide the “Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health”, cited as Reference 41 (but not there).

### **9.3.20 Human Health – Land Contaminants**

9.3.20.3 Mitigation – Identify all “chemical agents” that may be used at the Project site and their amounts/concentrations, properties, usage, storage and other relevant information. Include fertilizers, herbicides, pesticides and other agents.

Although the Proponent commits to minimizing dust escaping from the site, dust is a by-product of blasting, crushing and loading. Consider the implications of dust on the health and well-being of neighbouring populations. Describe the areas likely to be affected and proposed methods of monitoring human health as well as air quality parameters—TSP, PM<sub>10</sub>, or PM<sub>2.5</sub>..

Pg145 – Explain the meaning of the statement “the project activities ... are not expected to have an adverse effect on social cohesion...as it relates to social capital”. What evidence supports this conclusion?

Pg147 – A statement suggests that “new people employed at the quarry” may become active in volunteerism. Elsewhere the EIS suggests that employees will be hired locally. Resolve this discrepancy.

Pg148 – Explain how the benefits available to employees are interpreted to provide positive effects at a “community scale”.

During the community consultations and scoping sessions, some community members indicated a concern that the quarry Project would draw away skilled employees (like heavy equipment mechanics) from other local businesses. Address this concern.

Of those with highly specialized skills required by the Project who have submitted applications to the Proponent, what proportion is already employed locally?

On Pg155, the Proponent refers to a possible “influx” of students due to quarry employment. (Are any effects expected on staffing in the schools?) On Pg156, the EIS concludes there will be “no significant influx of workers”. Resolve this discrepancy on whether any “influx” is anticipated.

On Pg158 the Proponent says, “No similar undertakings are known to be planned in the near future.” During the scoping sessions, community residents identified a concern that the nature of the local geology and geography could facilitate further developments of basalt quarries along North Mountain. To address that issue, describe the anticipated demand and supply for aggregates along the Eastern Seaboard over the next 25 years.

## **10.0 CUMULATIVE EFFECTS ASSESSMENT**

The cumulative effects analysis does not follow the methodology recommended in the Guidelines and the Panel does not accept the Proponent's justification for the approach that was taken in the EIS.

The Proponent is directed to submit a revised cumulative effects assessment that employs the accepted methodology outlined by the Panel and detailed in Addressing Cumulative Environmental Effects under the Canadian Environmental Assessment Act (March 1999).

For further clarity, where a measurable effect on a VEC is predicted, the proponent is to define the spatial and temporal boundary of that VEC and predict the effects that would result from the proposed Project in combination with other past, present and reasonably foreseeable projects of all kinds. The revised assessment should include an inventory of these other projects. Consider using maps or diagrams to illustrate how the ‘zones of influence’ of other projects overlap with the boundaries of an affected VEC.



Of particular interest to the Panel are the predicted cumulative effects on marine mammals, aesthetics and tourism. Ensure that the cumulative effects on these and other relevant VECs are appropriately assessed. As directed in the Guidelines, emphasize sensitive VECs or VECs that may be at significant risk.

Follow the directions below in the revised assessment to allow the Panel to understand the Proponent's opinion on the significance of the potential cumulative effects:

- assess effects over the lifecycle of the Project;
- provide quantitative, verifiable and referenced information and data – avoid vague qualifiers such as some, higher and recently;
- use the significance parameters of magnitude, duration, geographical extent, frequency, reversibility and ecological context, as appropriate, in the prediction of effects

In addition, ensure that a revised table of cumulative effects is submitted. Consider using a table that summarizes the predicted effects, the source of effects, mitigation/compensation, monitoring, follow up and significance determinations.

## **11.0 ENVIRONMENTAL MANAGEMENT**

Clearly detail the potential situations (e.g., the possible presence of human remains, a pre-historic artefact, birds or mammals) that will result in a "stop work" order for different Project activities (e.g., blasting, quarrying, shipping) and discuss the procedures that will be followed in these situations

### **11.2 Accidents and Malfunctions**

The Panel requires information that is much more detailed and further analysis concerning:

- potential accidents and malfunctions that may occur in connection with all phases of the Project;
- the environmental effects of the potential accidents and malfunctions;
- measures proposed to mitigate effects; and
- the likelihood that the accidents and malfunctions will result in significant adverse environmental effects.

The material provided in the EIS does not meet the requirements of the EIS Guidelines. The Guidelines, the mandate of the Panel and the *Canadian Environmental Assessment Act* require that the Panel consider the environmental effects of malfunctions and accidents that may occur in connection with the

Project in the assessment. Throughout the EIS Guidelines, the Panel has emphasized the importance of predicting the environmental effects of accidents and malfunctions and of considering worst-case scenarios.

The Panel requires the Proponent to integrate the assessment of potential effects of accidents and malfunctions into the environmental effect analysis. (For example, the Panel expects the Proponent to present a comprehensive assessment, proposed mitigation and residual effects analysis from accidents and malfunctions that may occur in connection with the Project components related to sediment production, storage, transfer and disposal.)

The Panel expects the Proponent to use the results of the effects analysis from accidents and malfunctions to inform the development of management plans.

### **Specific Comments**

Whale Watching Operations, Pg23 – Detail the mechanisms by which communications will occur between the different Project sectors (quarrying, shipping, etc.) and the tourism operators. Explain how the management plan will function to minimize disruption to tourism excursions that are sometimes arranged well in advance yet may be affected by Project activities because of weather delays that alter shipping schedules.

Addendum 4, Emergency Plan, Pg36 – Explain the relevance of the partial emergency plan from Great Lakes Dredge and Dock Co. to the Environmental Management of this project.

### **11.6 Follow-up Program**

The information provided in the EIS does not fulfil the requirements of the Guidelines nor does it address the objectives of the Guidelines. Develop a follow-up program as instructed in the Guidelines.

### **Table ECM – 1**

The Environment Component Mitigation Summary Table does not follow the requirements of the Guidelines. Restructure the table and insert the required information to present the proposed mitigation aligned with a potential effect for each component of the Project over the lifespan of the Project. Wherever possible, each proposed mitigation should be tied to a regulatory instrument or other process to ensure implementation.

Specific errors noted in the existing table include:

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*Whites Point Quarry and Marine Terminal Project*  
*Joint Review Panel*  
EIS Information Request - July 28, 2006

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- Pg2, last Proposed Mitigation – Should 'salt water intrusion" read 'salt water invasion"?
- Pg3, last Proposed Mitigation – What environmental effect of the Project is this proposed to mitigate? Provide evidence that this mitigation would be effective or remove it from the table.
- Pg17, Heritage Resources, Land Archaeology – A commitment to stop work should be made if archaeological resource presence is suspected.

Commitments are made in the EIS that are not necessarily mitigation measures. See 10.0.4 Development by the Proponent or Others that May Appear Feasible Because of the Proximity of the Project's Infrastructure, for example, where the Proponent states that it does not intend to make the shiploader available to others.

The Panel requires this and all other commitments on behalf of the Proponent that do not appear in the Mitigation Summary Table to be complied in a separate table.

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*Whites Point Quarry and Marine Terminal Project  
Joint Review Panel*

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## **Appendix 1**

**EXAMPLE 1 – Project Component/Environmental Component Matrix**

**001353**



Comprehensive Study Report  
Proposed 345 kV International Power Line:  
From Point Lepreau to the New Brunswick/Maine Border

Submitted to:

**New Brunswick Power Corporation**  
Fredericton, New Brunswick

Submitted by:

AMEC Earth & Environmental Limited  
Fredericton, New Brunswick

July 10, 2002

AMEC Project: TE21002.1

**001354**

**TABLE E-1**  
**Issues Scoping/Pathway Analysis Summary Matrix - Valued Environmental Components of Concern (VECs):**  
**345 kV IPL, From Point Lepreau to the NB/Maine Border**

Environment/ Resources	Environmental Components of Concern (Biophysical and Socio-Economic) (ECCs)	ECC Avoided During Corridor Selection		Pathway of Concern		Possible Pathways	VEC		Rationale for Inclusion/Exclusion as Valued Environmental Component (VECs)	
		Yes	No	Yes	No		Yes	No		
<b>Biophysical/Ecosystem Setting:</b>										
Atmospheric Environment	Air Quality		X	X		• Air emissions (e.g., dust, exhaust fumes, leaks)	X		Included as a VEC - Protected by statute/regulation.	
	Ozone Depleting Substance		X		X	• Air emissions		X	Excluded as a VEC - Pathway not a concern. Minor (if any) quantities of ozone depleting substances generated during Project activities.	
Terrestrial Environment	Groundwater Quality and Quantity		X	X		1, 4, 8	X		Included as a VEC - Protected by statute/regulation.	
	• Wildlife (mammals, reptiles and amphibians, herpetiles, birds, and invertebrates)		X	X		1-8		X	Excluded as a VEC - Populations of these species are protected/included with other VECs (wetland habitat, designated areas and other critical habitat features, species at risk). The rationale for this is to protect habitat characteristics that occur along the 1 km wide Preferred Corridor deemed limiting to each population.	
	• Plants		X	X				X		
	Species at Risk (flora & fauna)		X	X				X	Included as a VEC - Protected by statute/regulation. If a species is endangered, effects on individuals may be considered significant.	
	Migratory Birds		X	X				X	Included as a VEC - Protected by statute/regulation.	
	Designated Areas and Other Critical Habitat Features (ESAs, DWAs, MCFH, PSPs, and Protected Areas)		X	X				X	Included as a VEC - Represents potentially limiting habitat to populations of wildlife.	
	Soil Quality		X	X		1, 4, 8		X	Excluded as a VEC - Soil quality is protected/included with other VECs (groundwater, fish habitat).	
Aquatic Environment	Fish Species		X	X		3, 4, 8		X	Excluded as a VEC - Protected/included with other VECs (fisheries, species at risk, and fish habitat).	
	Species at Risk		X	X		1-4, 8		X	Included as a VEC - Protected by statute/regulation. If a species is endangered, effects on individuals may be considered significant.	
	Fisheries Resources (commercial, recreational)		X	X		1-4, 8		X	Included as a VEC - Protected by statute/regulation.	
	Fish Habitat		X	X		1-4, 8		X	Included as a VEC - Protected by statute/regulation.	
	Surface Water Quality and Quantity (protection areas)		X	X		1-4, 8		X	Excluded as a VEC - Protected/included with other VECs (fisheries, species at risk, fish habitat, and groundwater resources).	
	Hydrology		X	X		1, 3		X	Excluded as a VEC - Protected/included with other VECs (fisheries, species at risk, fish habitat, and groundwater resources).	
	Hydrogeology		X	X		1, 3		X	Excluded as a VEC - Protected/included with other VECs (fisheries, species at risk, fish habitat, and groundwater resources).	
Wetland Environment	• Wildlife (mammals, herpetiles, birds, and invertebrates)		X	X		1-8		X	Excluded as a VEC - Populations of these species are protected/included with other VECs (wetland habitat, species at risk, designated areas and other critical habitat features). The rationale for this is to protect habitat characteristics that occur along the 1 km wide Preferred Corridor.	
	• Plants		X	X				X		
	Species at Risk		X	X				X	Included as a VEC - Protected by statute/regulation. If a species is endangered, effects on individuals may be considered significant.	

- Key:
- |                                   |                  |
|-----------------------------------|------------------|
| 1. Clearing and Grubbing          | 5. Light         |
| 2. Excavation                     | 6. Noise         |
| 3. Blasting                       | 7. Air Emissions |
| 4. Release of Hazardous Materials | 8. Site Runoff   |

001355

**TABLE 5-1**  
**Issues Scoping/Pathway Analysis Summary Matrix - Valued Environmental Components of Concern (VECs):**  
**345 kV IPL, From Point Lepreau to the NB/Maine Border**

Environment/ Resources	Environmental (Biophysical and Socio-Economic) Components of Concern (ECC)	ECC Avoided During Corridor Selection		Pathway of Concern		Possible Pathways	VEC		Rationale for Inclusion/Exclusion as Valued Environmental Component (VEC)
		Yes	No	Yes	No		Yes	No	
Wetland Environment (Cont'd)	Wetland Habitat Function		X	X		1-8	X		Included as a VEC - Protected by regulatory authorities (Federal no net loss in wetland function policy; NBDNRE; NBDELQ); represents potentially limiting habitat to populations of wildlife.
	Ongoing Management Initiatives, including DU and EHJV Project Sites		X	X		1-8		X	Excluded as a VEC - Avoided during Corridor selection process and protected with other VECs (wetlands).
	Water Quality		X	X		1-4, 8		X	Excluded as a VEC - Protected /included with other VECs (wetland habitat, fish habitat, and groundwater resources).
	Hydrologic Regime		X	X		1-3		X	Excluded as a VEC - Protected /included with other VECs (wetland habitat, fish habitat, and groundwater resources).
<b>Socio-Economic Setting:</b>									
Economic	Local Economy (expenditures and employment)		X	X		* Construction/ Operations & Maintenance	X		Included as a VEC - Potential to increase beneficial effects of local construction, operational expenditures and employment.
Land Use	Industry/Commercial		X		X	* Construction/ Operations & Maintenance		X	Excluded as a VEC - No pathway of concern identified.
	Local Business								
	Housing		X		X			X	Excluded as a VEC - No pathway of concern identified.
	Cultural/Institutional		X		X			X	Excluded as a VEC - No pathway of concern identified.
	Recreational		X	X				X	Included as a VEC - Pathway of concern identified.
	Agricultural		X	X				X	Included as a VEC - Pathway of concern identified.
	Forestry		X	X				X	Included as a VEC - Pathway of concern identified.
	Transportation Infrastructure		X	X				X	Included as a VEC - Pathway of concern identified.
Other Infrastructure		X	X				X	Included as a VEC - Pathway of concern identified.	
Community & Emergency Services	Emergency Services		X	X		* Construction/ Operations & Maintenance	X		Included as a VEC - Pathway of concern identified.
Mineral Aggregate Resources/Minng Areas	Mineral Claims/Aggregate Resources		X	X		* Presence of RoM, Blasting	X		Included as a VEC - Potential interaction with the Project identified.
Archaeological and Heritage Resources	Archaeological/Heritage Resources		X	X		1-3	X		Included as a VEC - Pathway of concern identified. Required by Regulatory Agency under provincial legislation.
Current Use of Lands and Resources for Traditional Purposes by Aboriginal Persons	Resources traditionally used by Aboriginal Peoples		X	X		1-4, 8	X		Included as a VEC - Pathway of concern identified. Required by Statute/Regulation.
Paleontological Resources	In-ground fossil resources				X	2, 3		X	Excluded as a VEC - No pathway of concern identified.

- Key:
- |                                   |                  |
|-----------------------------------|------------------|
| 1. Clearing and Grubbing          | 5. Light         |
| 2. Excavation                     | 6. Noise         |
| 3. Blasting                       | 7. Air Emissions |
| 4. Release of Hazardous Materials | 8. Site Runoff   |

001356

## **Appendix 2**

### **EXAMPLE 2 – Project Component/Environmental Component Matrix**

**001357**



# **Comprehensive Study Report**

**PAMOUR PIT EXPANSION**

**FEBRUARY 2005**

**001358**

**FIGURE 6-1  
IDENTIFICATION OF POTENTIAL PROJECT-ENVIRONMENT INTERACTIONS**

KEY PROJECT ACTIVITIES/ PROCESSES	ENVIRONMENTAL COMPONENTS																												
	CONSTRUCTION	Clearing (Noise, Dust, Loss of Habitat)	Grubbing, Excavations and Earth Moving	Vehicle Activity	Placement of Fill / Construction Materials	Fuel and other Hazardous Materials (Storage and Handling)	Overburden Stripping and Tailings Removal	Water Diversion	OPERATION / MAINTENANCE	Vehicle Activity	Blasting	Ore and Waste Rock Mining	Waste Rock Management and Disposal	Replacement Fish Habitat	DECOMMISSIONING / ABANDONMENT	Vehicle Activity	Boat Activity	ACCIDENTS, MALFUNCTIONS AND UNPLANNED EVENTS	Fuel and Hazardous Materials Spills	Dam, Seepage Barrier, Channel, Berm Failure	Flooding of Work Areas	Erosion and Sedimentation Control Failure	OTHER PROJECTS AND ACTIVITIES	Forestry and Agriculture	Mining Related Operations	PJV Haul Road	Hwy. 101 Relocation		
<b>ATMOSPHERIC ENVIRONMENT:</b>																													
Air quality (emissions, noise)		o	o	o	o					o	o	o	o															o	o
<b>GROUNDWATER ENVIRONMENT:</b>																													
Shallow groundwater levels			•		o	o	o	•						o															
<b>AQUATIC ENVIRONMENT:</b>																													
Water quality		o	o		•	o	o	o				o	•						o	•	o	o					o	o	o
Surface flow patterns		o	o		o		o	•				o	•						o	•	o	o					o	o	o
Fish and fish habitat			•		•	•	•	•					•						o	•	o	o						o	o
Aquatic furbearers		o			o	o	o	o																					o
<b>TERRESTRIAL ENVIRONMENT:</b>																													
Vegetation		•										•	•														X	o	o
Wildlife (mammals)		o	o	o	o				o			•	•	o	o											X	o	o	o
Wildlife (birds)		o			o							o	o	o												X	o	o	o
<b>SOCIO-ECONOMIC ENVIRONMENT:</b>																													
Trapping		•	o	o	o			•	o			o	•			o			o						X		o	o	o
Angling					o	o		•	o			•		o		o	o		o	•	o	o							
Country Foods (Fish)													o																
Health and safety - worker									o	o				o						o	o								
Health and safety - residents				o					o	o	o				o				o										

Legend: o - Interactor  
 • - Key Interaction for planned activities (potential for VEC effect assessment consideration)  
 X - Interaction of the Project in consideration of other projects and activities (Not considered for VEC review due to no planned activity within study boundary at this location)  
 C - Interaction of the Project in consideration of other projects and activities (Considered for VEC review due to planned activity within study boundary)

001359