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**WATTERS
ENVIRONMENTAL
GROUP INC.**

CONFIDENTIAL

**INDEPENDENT CONSULTANT
REVIEW OF THE INTEGRATION REPORT**

**CITY OF PORT COLBORNE
COMMUNITY BASED RISK ASSESSMENT**

Prepared for:

**PUBLIC LIAISON COMMITTEE &
CITY OF PORT COLBORNE**

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EXECUTIVE SUMMARY

An Integration Report was prepared by Vale Inco Limited (Inco) (dated June 1, 2008) to provide guidance on how the findings of a Community Based Risk Assessment (CBRA) would be applied to individual properties located within the City of Port Colborne, Ontario.

Inco is the proponent in a CBRA intended to assess the impacts to the Port Colborne environment from Inco's emissions. A Public Liaison Committee (PLC) was established to facilitate public involvement, and a Technical Sub-Committee (TSC) [of the PLC] was formed to address the technical components of the CBRA. Watters Environmental Group Inc. (Watters Environmental) is the "Independent Consultant" to the City of Port Colborne and PLC.

Three major studies were undertaken as part of the CBRA; namely, Ecological Risk Assessments for Crops and the Natural Environment, and a Human Health Risk Assessment. Individual study reports were prepared by Inco's consultants, Jacques Whitford Limited (JW) (now Stantec Limited). These reports, and review comments by Watters Environmental, are provided under separate cover. However, the findings of each of those studies are presented and used by Inco in its Integration Report.

Prior to issuance of Inco's Integration Report, technical sessions and open houses were held with members of the community to solicit their opinions on the format and content of an Integration document for the CBRA. The findings of these sessions (held April 6, 2004, April 22, 2004, June 17, 2004 and September 8, 2004) were summarized in a memorandum to the PLC from the TSC dated December 15, 2004. This information was provided to Inco in advance of its report preparation.

In the opinion of Watters Environmental, the general approach used by Inco to integrate the three CBRA studies is sound, and generally involves considering the most sensitive receptor for a property and then remediating to the level deemed to be safe by the CBRA studies.

Despite this overall view, Watters Environmental has identified several specific issues of concern, as follows:

- The current structure of the Integration Report assumes that the findings of each of the three study reports are correct. In our opinion, this is not a reasonable assumption. Under separate cover, Watters Environmental has identified significant issues with the data analysis and interpretation of results. As such, in our opinion, credence cannot be given to the conclusions in the reports, and the structure of this

Integration Report may likely be much different if the results of the three studies are confirmed to be incorrect.

- The currently proposed integration by Inco does not allow for unrestricted land use for properties within the City of Port Colborne. As Inco notes in its Report, “... *in order to protect vegetables being grown, specific conditions will be instituted for risk management ...*” (Page 16). Backyard vegetable gardens need to be sampled and tested by Inco before use, and it appears that the homeowner is responsible for contacting Inco when this testing is required. Under Ontario Regulation 153/04, all Ontario residents (including those residing in Port Colborne) have unrestricted use of their land (i.e., they don’t need to contact anyone to have soils tested before use, and there are no special conditions applied to their land).
- The discussion of options for remediation is insufficient, providing scant information on approaches that might be effective and no information on their likely effectiveness, time to complete, adverse side-effects and the sustainability of the proposed interventions over time. It was our understanding that this document would have all the details for remedial options and specific logistics on how these activities would be carried out.
- Lead has not been included for discussion in this Report, despite the fact that the community has raised lead as a significant concern and, in the opinion of Watters Environmental, lead meets the condition for inclusion as a Chemical of Concern (CoC).
- There is a scarcity of information on the specific logistics for sampling, testing, remediation and reporting that would affect the homeowner. Of particular importance to a homeowner is what documentation is provided at the end of the process, and this remains unclear. It is also unclear what happens if a homeowner isn’t supportive of Inco’s proposed actions, and what opportunities there are for mediation. Although there is some discussion about possible need for a Record of Site Condition (RSC), it should be made clear that Inco will only be providing information on the CoCs for the CBRA (i.e., nickel, copper, cobalt and arsenic). The homeowner will be responsible for any additional testing. As such, if any lending institution or mortgage company requires an RSC because of possible concerns about financing property in Port Colborne, the homeowner will have to incur costs for the additional effort to satisfy the requirements for preparation of this RSC.

- There are inferences made to the likely risks for pets and domestic animals, but no supporting information provided. The concern for pets has been raised repeatedly by residents, with no serious review or assessment made by Inco/JW.
- There is little information on how Inco will ensure that all future homeowners are made aware of the CBRA and Inco's responsibilities and commitments. This is particularly relevant for future owners that may want to change or add new backyard vegetable gardens.
- Inco has proposed an advisory role for the Ontario Ministry of the Environment (MOE), and a diminished opportunity for community input and oversight for the second phase of the CBRA. The MOE must advise on whether its role of regulator of the CBRA process can include being an advisor to the proponent. The history of the CBRA process to date underlines the importance of community oversight of the process. The PLC, in some form or other, must continue to ensure that the needs of the community are understood and acted upon.
- Inco has presented no proven approaches to remediating highly contaminated agricultural land and it is extremely uncertain whether it will ever be able to return cropland to conditions that would meet the objective of establishing, "*concentrations that would present no risk to any agricultural crops being grown or reasonably expected to be grown within the Study Area.*" Consequently the company is encouraged to consider the application of biodiversity offsets in the Port Colborne area in order to establish a net biodiversity gain for the area rather than more narrowly focusing on remediation. Instead of investing in uncertain remediation, Inco could consider purchasing highly contaminated land, at fair market value, and reverting this to Carolinian woodland, ponds and other wetland habitat. This would provide fair compensation to affected landowners while boosting biodiversity in the Port Colborne area. The approach would have additional social benefits by providing educational and research opportunities, employment opportunity and attractions for visitors to the area.

Overall, it is the opinion of Watters Environmental that the Integration Plan proposed by Inco fails to address the concerns identified by community members, and provides insufficient detail on how the findings of the CBRA will actually be implemented on an individual property basis. There is a scarcity of information concerning remediation and the logistics associated with that activity, and gaps concerning the nature and type of documentation that will be provided to the homeowner at the end of the process.

In conclusion, although there are some generally positive aspects to the document, in our opinion, the lack of detail and logistical information currently presented will not allow for the effective implementation of CBRA findings to an individual property in Port Colborne.

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1.0 INTRODUCTION

An Integration Report was prepared by Vale Inco Limited (Inco) (dated June 1, 2008) to provide guidance on how the findings of a Community Based Risk Assessment (CBRA) would be applied to individual properties located within the City of Port Colborne, Ontario.

Inco is the proponent in a CBRA intended to assess the impacts to the Port Colborne environment from Inco's emissions. A Public Liaison Committee (PLC) was established to facilitate public involvement, and a Technical Sub-Committee (TSC) [of the PLC] was formed to address the technical components of the CBRA. Watters Environmental Group Inc. (Watters Environmental) is the "Independent Consultant" to the City of Port Colborne and PLC.

Three major studies were undertaken as part of the CBRA; namely, Ecological Risk Assessments for Crops and the Natural Environment, and a Human Health Risk Assessment. Individual study reports were prepared by Inco's consultants, Jacques Whitford Limited (JW) (now Stantec Limited). These reports, and review comments by Watters Environmental, are provided under separate cover. However, the findings of each of those studies are presented and used by Inco in its Integration Report.

Inco notes that, "*This Integration Report concludes the CBRA (Phase 1) and provides guidance on how the findings of the CBRA (including possible remediation [Phase 2]) will be applied on a site by site basis*" (Page 4). It is in this context that the review by Watters Environmental was undertaken.

2.0 BACKGROUND

Inco's position on the CBRA is that, *"It was intended that the CBRA would conduct its scientific work in precisely the same way such work is conducted within the SSRA [Site Specific Risk Assessment] framework. The CBRA differs from an SSRA only in its scope"* (Page 18).

The Ontario Ministry of the Environment (MOE) Guidance on the conduct of SSRAs requires that if site-specific numeric values above the appropriate generic values are to be proposed for remediation of contaminated sites, then the uncertainty in each element of the Risk Assessment must be properly assessed, and the overall uncertainty analysis must be sufficient for the valued ecosystem components. Also, it is required that the conclusions be fully justified in relation to risk characterization and the degree of uncertainty.

In our opinion, a significant issue with the Integration Report is that it relies on studies of environmental and human health risk that we do not believe meet the MOE's requirements for an SSRA (i.e., the conclusions are, in our opinion, not justifiable within the context of the level of uncertainty in the studies). Also, the Integration Report does not address contamination by lead, which, in our opinion, meets the criteria for inclusion as a Chemical of Concern (CoC) for the CBRA. Given this information, the structure of this Integration Report may be much different if the results of the three studies are confirmed to be incorrect, and/or if lead is added as a CoC for the CBRA.

3.0 SPECIFIC COMMENTS ON THE INTEGRATION REPORT

The following sections of this document provide comment on the individual sections of the Inco Integration Report, in the same order as presented by Inco.

3.1 CONTEXT OF THE CBRA (SECTION 3.0 OF THE INTEGRATION REPORT)

- Inco reports that, “*risk management strategies that come out of the CBRA will be applied mainly for protecting current land uses and their receptors*” (Section 3.3.1). It does not appear that this strategy allows for unrestricted land use (currently in-place with current regulation).
- Section 3.3.1 should be more clear to homeowners that Inco will not provide all information required for a Record of Site Condition (RSC) (if required), or a “sign-off” for all contaminants that may be present on a property. Inco will only provide information on the CoCs for the CBRA.
- Inco states that, “... *in order to protect vegetables being grown, specific conditions will be instituted for risk management for such cases*” (Section 3.3.2). It does not appear that this strategy allows for unrestricted land use (currently in-place with current regulation).
- Inco’s position with regards to backyard gardens is that, “*It is therefore incumbent on the property owner to install a vegetable garden in a desired location, and to notify Vale Inco of such placement, prior to Vale Inco assuming responsibility for sampling the soil of the garden and remediating, if necessary*” (Section 3.3.2). Although we understand Inco’s position, there is no information in the Report on how current and/or future homeowners will be made aware of this requirement. As noted, it also restricts activities on a property, which appears counter to the unrestricted land use offered by current regulation.

3.2 THE CBRA (SECTION 4.0 OF THE INTEGRATION REPORT)

- There is a statement that, “*Decisions about the technical work were made by consensus of the TSC*” (Page 21). Although this was the intent of all parties, this was not always the case, and thus this statement is misleading.

- Inco correctly states that each of their technical reports for the CBRA underwent external peer review (Page 22). It is a reasonable assumption by a reader of this document that the comments of the external peer reviewers were integrated/incorporated into the final reports. It is worthy of note that Inco's external reviewer for the Crops Report (Dr. McBride) had very significant issues with the Inco/JW report, and did not concur with the findings presented.
- Although the Executive Summary notes that, "*The CBRA is, therefore, applicable to all sites within Port Colborne ...*" (Page 4), Inco later states that, "*The CBRA did not include the Vale Inco property ...*" or "*aquatic receptors within the near shore freshwater environment of Lake Erie to the immediate south of Vale Inco's plant property ...*" (Page 23).

3.3 RESULTS OF THE RISK ASSESSMENTS (SECTION 5.0 OF THE INTEGRATION REPORT)

- The reader of this document is referred to the Review Reports prepared by Watters Environmental for each of the technical documents prepared by JW/Inco to support the CBRA. As noted in each of those reviews, Watters Environmental has significant concerns regarding the data analyses and interpretation provided by JW/Inco, and thus does not support the conclusions made by those authors.
- Inco state that "*... although household pets were not specifically assessed, risks to pets from CoC exposures were included by assessing the risks to wild small mammals. Since household pets would be expected to have lower exposures than small wild animals, pets are protected because small mammals had negligible risk*" (Page 29). There is no information provided to support this position.

3.4 SITE-BY-SITE REMEDIATION DECISION-MAKING (SECTION 6.0 OF THE INTEGRATION REPORT)

- No decision flowchart is provided for Human Health, as Inco contend that no health risk exists at nickel concentrations found in Port Colborne soils. This may change, depending on the MOE's review of the Inco/JW Human Health Risk Assessment report.
- Inco notes that, "*Since negligible risks exist for large wild animals such as deer, it is concluded that negligible risks exist for horses, cattle, hogs, etc.*" (Page 35). Again, there is no information provided to support this position.

- The issue of vegetable gardens has been highlighted previously in this document, which also relate to this section of the Integration Report.
- Inco generally describes the process for the sampling of vegetable gardens, and mentions that a “letter” will be supplied by the company doing the sampling (and possibly the remediation) (Page 45). No logistical details are provided. For example, it is unclear whether the homeowner will have reliance on the letter, and what assurances they have that the work was done properly, etc. It also remains unclear whether the MOE will endorse this “letter”.
- Maps H (Page 41) and J2 (Page 45) will likely need to be modified if the PNEC (oats) changes through the MOE’s review and approval of the Inco/JW Crops Report.

3.5 SITE-SPECIFIC SOIL SAMPLING PROCEDURES (SECTION 7.0 OF THE INTEGRATION REPORT)

- As noted, the soil sampling strategies may need to be altered if the value for the PNEC (oats) is changed through the MOE’s review and approval.

3.6 OPTIONS FOR REMEDIAL ACTIONS (SECTION 8.0 OF THE INTEGRATION REPORT)

- Risk reduction strategies are discussed only in the most general way. A limited number of options are presented and some of these are dismissed out of hand as being impracticable. Of the remaining options (possibly soil replacement in residential plots and bioremediation and soil amendment for agricultural land), there is no substantive discussion of the expected effectiveness of the remediation option or potential unwanted side-effects. The time needed to complete remediation is not considered, nor is there a discussion of the sustainability of remediation options.
- Significantly more information is required on the logistics for each remedial option, and how each option will be selected for use.
- Inco concludes, “*Because of the likely difficulties in effective remediation of woodlots that are found to be above the earthworm PNEC, discussions between the site owner, the MOE and Vale Inco will take place. These discussions will review the results and examine the possible effectiveness of remedial options. Action on a site’s woodlot will be taken from the consensus reached among the concerned parties as listed above*”. As Inco correctly points out, woodlots are becoming an increasingly rare

feature in southern Ontario. Inco have presented no strategy for dealing with these valuable ecological components.

- Inco presents four approaches for soil remediation of agricultural land; excavation and removal, soil leaching, phyto-extraction, soil capping, and application of amendments. Of these, excavation and capping are not regarded as feasible because of the volumes involved and leaching is not known to be effective for metal contamination. Phyto-remediation is a relatively new and untried technology. Inco has, reportedly, been experimenting with the use of *Alyssum sp.* for use in Port Colborne, but has not yet shared any results with the community. Application of amendments is also not without concern. Amendment by limestone in the JW/Inco Crops Study showed some promise as a mitigative measure against toxicity in Till Clay, but did not have an obvious effect in other soil types. In fact, for Welland Clay, the amended soil EC₂₅ was lower than that for unamended soil (amended EC₂₅ = 1,300 mg/kg, unamended = 1,880 mg/kg), possibly as a consequence of manganese deficiency in plants grown in amended soil. Manganese deficiency is known to occur in soils with a high concentration of free carbonate which makes the use of limestone amendment for Port Colborne contaminated soils problematic. The other concern with amendment as a mitigative intervention is that it is not clear whether it provides a permanent solution or whether it just provides temporary reduction in CoC bioavailability and would need to be repeated periodically as the lime is leached from the soil or otherwise neutralized.

3.7 PATH FORWARD (SECTION 9.0 OF THE INTEGRATION REPORT)

- Only the most general information is presented on the process for implementation of the site sampling and remediation activities, and the information that is provided raises some important concerns regarding involvement of the MOE, the contractors for remediation, and the community.
- Inco state that, *“An Advisory Committee, if necessary, will be formed by Vale Inco. Consideration will be given to having a member of the public serve on this Committee, which would have the task of reviewing priorities for the site-specific work needed”*. Watters Environmental regards an Advisory Committee, with full participation of representatives of the Community, as being essential to the next Phase of the CBRA. The Terms of Reference for the Group should be determined through consultation with and the agreement of the Community and the MOE, not defined by Inco alone. The Terms of Reference should include review of the

- qualifications and proposals of the companies asked to bid on carrying out the site sampling and remediation work.
- Inco propose that the MOE should serve in an “advisory capacity” in determining remediation options for contaminated sites. However, the MOE must advise on whether its role of regulator of the CBRA process can include being an advisor to the proponent.
 - Inco proposes that the “reputable” company hired to do the remediation work should also be responsible for verifying the remediation and for certifying it. This appears to be a conflict of interest. Inco implies that the MOE will conduct “audits” of the remediation, although it is not clear what form these would take or whether the MOE regard this role as being within their mandate.