PORT COLBORNE COMMUNITY BASED RISK ASSESSMENT

ECOLOGICAL RISK ASSESSMENT – NATURAL ENVIRONMENT

ADDENDUM REPORT
MARCH 2005

1.0 INTRODUCTION

As part of a Community Based Risk Assessment (CBRA) initiated by Inco Limited to address potential impacts resulting from historical emissions from a former nickel refinery in Port Colborne, Jacques Whitford Limited (Jacques Whitford) completed an Ecological Risk Assessment (ERA) for the natural environment of Port Colborne. Following completion of two years of fieldwork and analysis of data, Jacques Whitford prepared a draft ERA-Natural Environment Report in July 2003. Following the CBRA process, copies of the report were presented to the City of Port Colborne Public Liaison Committee (PLC) and the public for review and comment. These comments were reviewed by Jacques Whitford and, where revisions were required, these were incorporated into the Final Report.

In September 2004, Jacques Whitford tabled a final ERA-Natural Environment Report for the CBRA. Following the CBRA process, a public review and comment period for the final report was identified, ending December 16, 2004. During this review period, Jacques Whitford received written comment from the PLC's Consultant and two written comment submissions from the public. Jacques Whitford prepared a response to these comments, and a Technical Sub-Committee (TSC) meeting was held on January 20, 2005 to review the comments and Jacques Whitford's response. Following the TSC meeting, the TSC Chair prepared a TSC Recommendations Report that was presented to the PLC at a public meeting held on February 17, 2005.

This addendum report has been prepared to document the CBRA public review process following the tabling of the Final September 2004 ERA-Natural Environment Report and to address residual issues that were raised during the final review period. This addendum to the Final Report will be presented to the PLC and will be part of the formal submission of the ERA-Natural Environment Report to the Ministry of the Environment (MOE).

This addendum report is presented as follows:

Tab 1: Jacques Whitford Response to the Regional Niagara Public Health Department comments on *"Jacques Whitford Draft ERA-Natural Environment Report dated July 2003"*.

Tab 2: Jacques Whitford Response Letter to the PLC Chair on *"Recent Sediment Sampling in the Wignell Drain by Niagara Environmental Dynamics Ltd, and Relevance of these findings to the ERA Report, November 25, 2004"*.

Tab 3: Jacques Whitford Review and Response to PLC's Consultant Comments on Jacques Whitford Final Report dated September 2004.

Tab 4: Jacques Whitford Review and Response to Public Comments of Jacques Whitford Final Report dated September 2004.

Tab 5: Summary of Jacques Whitford Responses to Specific Comments raised by the PLC's Consultant and Community Members.

Tab 6: TSC Chair's Notes on the January 20, 2005 TSC Meeting regarding the Jacques Whitford Final Report dated September 2004.

Tab 7: TSC Chair's Recommendation that the PLC receive the Jacques Whitford Final Report dated September 2004 and associated documents.

Tab 8: PLC Minutes of PLC Meeting of Thursday February 17, 2005.

Tab 9: Compilation of Public Notices, TCS and PLC meetings for documenting the public process for the CBRA.

TAB 1

Jacques Whitford Response to
the Regional Niagara Public Health Department comments on
"Jacques Whitford Draft ERA-Natural Environment Report dated July 2003".

Jacques Whitford tabled a draft ERA-Natural Environment Report with the Public Liaison Committee (PLC) in July 2003. Following the Community Based Risk Assessment (CBRA) process, members of the Technical Sub-Committee (TSC) were provided copies of the report for review and comment. As member of the TSC, the Regional Niagara Public Health Department (RNPHD) provided three critical comments on the draft report in a letter dated October 2, 2003 (letter attached). All of these were addressed in the Final ERA Report (September 2004). Hence this section of the Addendum Report outlines Jacques Whitford's specific responses to the RNPHD comments as provided below.

COMMENT #1

In the final ERA Report (September 2004), in Section 1.3.1 – CBRA Participants, on page 1-5, the RNPHD has been identified as follows:

"***The Regional Niagara Public Health Department*** is the government agency ensuring that human health issues are suitably addressed by the CBRA."

COMMENT #2

The ecological risk assessment examined three lines of evidence to examine the potential risk to biological receptors in the Port Colborne environment:

1) Detailed field observations (qualitative) and data collection (quantitative) of the Study Area's flora, fauna and environmental media;

2) Controlled laboratory experiments on specific VECs using soils collected from the Study Area; and,

3) Quantitative risk characterization using the Quotient Method with dose exposures based on specific data collected for the Study Area.

Chapter 9 of the September 2004 ERA report is entitled Integration. In this Chapter, the potential risks to individual VECs was examined on the basis of a weight of evidence approach with regard to each of the three lines of evidence collected. Jacques Whitford believes that this is an appropriate method by which to evaluate the potential risk to each of the VECs based on what all three lines of evidence indicate.

This approach allows the reader to clearly follow, for each VEC, how potential risk to individual VECs was drawn by Jacques Whitford. We do not feel that deriving a scaling factor or matrix approach of low, medium or high would strengthen conclusions drawn in the report. Professional interpretation on how each of the three lines of evidence impact risk characterization would be weakened by such an approach. It is not sufficient to say each line of evidence should be provided an importance in ranking. It is through the interpretation of the individual lines of evidence that conclusions on risk can be drawn for individual VECs.

COMMENT #3

Section 9.9 – Site Remediation Requirements in the July 2003 draft report has been removed from the Final ERA Report (September 2004). As indicated by the RNPHD in their comment, discussions regarding recommendations for remedial action will be detailed in a separate Integration Report, which is to be prepared for the CBRA. The Integration Report will integrate the findings of the three main reports prepared for the CBRA, ERA-Natural Environment, ERA-Crops Studies and Human Heath Risk Assessment (HHRA), and identify remediation requirements, methods and process.

Comments on Behalf of the Regional Niagara Public Health Department on JWEL Project No Ont33828: Port Colborne CBRA-Ecological Risk Assessment: Natural Environment (July 2003)

October 2, 2003

Prepared by
Evert Nieboer, Ph.D.
(with assistance from
Ruwan Jayasinghe, M.Sc.)
McMaster University
Department of Biochemistry
Email: nieboere@mcmaster.ca

Background and Overview

The Port Colborne Community Based Risk Assessment (CBRA) has the following components:

(i) confirmation that all chemicals of concern (CoCs) have been considered;

(ii) a quantitative ecological risk assessment (ERA) of the natural environment;

(iii) a quantitative ERA of crops;

(iv) a quantitative human health risk assessment (HHRA);

(v) integration of the ERAs and HHRA and an evaluation of all applicable remediation options.

The Natural Environment Risk Assessment comes in five volumes, which contain the following information:

Vol I: details of the findings and results and represents the primary documentation;

Vol II: protocols for data collection and analyses;

Vol III: documentation in support of the data sets, calculations and input used in the exposure assessment and risk characterization;

Vol IV: copies of reports of supporting studies conducted by other consultants;

Vol V: quality assurance and quality control documentation.

Volume I is organized into nine sections: introduction; problem formulation; site characterization; receptor characterization; data collection methods; exposure assessment; hazard assessment; risk characterization; and study integration.

The following are the study conclusions.

Based on both qualitative and quantitative assessment, the evaluation of potential risk to the Study Area's animals, plants and natural processes found no unacceptable risk. As a result, all existing soil concentrations for the four CoCs can be considered to be safe for the natural environment. The description of risk to the natural environment is based on analysis of an extensive data set that is specific to the soils of the Port Colborne area. In addition, for the collection of data, the study's sampling design ensured that data for soils with the highest concentration for the four CoCs represented a significant portion of the data set. In this respect, the conclusions for the description of potential risk is appropriate for all areas located in the Study Area.

An assessment of risk to birds and mammals has identified that exposure to CoCs in the environment is significantly reduced by the soil-plant barrier that prevents the movement of metals up the food chain. This identified that the American Woodcock is a sensitive receptor for the assessment of potential risk to soil CoCs due to its feeding habit (probing soil) and major prey item (earthworms with a high soil content). However, even for this sensitive receptor, the population of American Woodcock in the Study Area was not found to be at risk. For plants, a number of lines of evidence found that existing soil concentrations have not resulted in a decrease in species diversity or productivity of woodlots. This was true even for woodlots located adjacent to the Refinery. The study did identify that very high concentrations of CoCs in woodlots on organic soils located near the Refinery are having a localised effect on earthworm numbers, and potentially other soil decomposers. However, these potential localized effects do not pose a risk to the earthworm community or the productivity of woodlots in the Study Area. Finally, based on exposure to CoCs in surface water, the study determined that local frog and toad populations are not at risk.

As no risk to the natural environment in the Study Area was identified, no immediate need to mitigate an unacceptable risk to the natural environment has been identified. However, consideration for long-term remediation efforts for the high soil CoC concentrations in organic woodlots located near the Refinery may be considered as the CBRA process moves forward.

Critical Comments

1. In Section 1.3.1 (CBRA Participants), the role of the Regional Niagara Public Health Department is incorrectly stated. We suggest the wording, "The Regional Niagara Public Health Department is the government agency ensuring that the human health issues are suitably addressed".

2. A major weakness in the document is that the communication of risk is poorly handled. In nearly all instances some level of risk is identified only to be dismissed using the phrasing "the evaluation found no unacceptable risk" or "no risk was identified" in the conclusion or summary statements. No systematic weight-of-evidence approach appears to have been employed. It is recommended that a risk decision tree be followed using all three lines of evidence examined for the selected valued ecological components (VECs), namely, (i) detailed field observations (qualitative) and data collection (quantitative); (ii) controlled laboratory experiments on specific VECs; and (iii) quantitative risk characterization using the quotient method. Strength-of-the-evidence arguments (i.e., the sample size for the data used such as tissue CoCs concentrations) must be factored in any assignment of risk or its absence. The level of concern remaining after this "weight-of-evidence" analysis might then be designated as low, mild, moderate or high. A point scale could be adopted to overcome the inherent "softness" of such risk terminology.

3. Recommendations or comments concerning remedial actions seem premature and should be left for the CBRA integrated risk assessment document which is to consider all risks (to crops, the natural environment, and humans) and their management.

TAB 2

Jacques Whitford Response Letter to the PLC Chair on "Recent Sediment Sampling in the Wignell Drain by Niagara Environmental Dynamics Ltd, and Relevance of these findings to the ERA Report, November 25, 2004".

Jacques Whitford

Engineering, Scientific, Planning and Management Consultants

7271 Warden Avenue
Markham ON
Canada L3R 5X5

Bus 905 474 7700
Fax 905 479 9326

www.jacqueswhitford.com

VIA: email

November 25, 2004

Mr. Harry Wells
Chair
Public Liaison Committee
Community Based Risk Assessment
City of Port Colborne

Dear Mr. Wells:

Re: Recent Sediment Sampling in the Wignell Drain by Niagara Environmental Dynamics Ltd and Relevance of these Findings to the ERA Report

The Public Liaison Committee (PLC) made a request that Jacques Whitford Limited (JW) provide comment on the recent discussion at the November 18th 2004 PLC meeting regarding the summer 2004 sediment sampling by Niagara Environmental Dynamics Ltd in the Wignell Drain and the potential relevance of these results to the CBRA's Ecological Risk Assessment (ERA) Report completed by JW.

For the CBRA's ERA study, sediment samples from ponds, ditches and municipals drains were collected by JW throughout the study area. This resulted in the collection of 10 sediment samples for the ERA. Of these samples, one sample, SF-H-4, was collected from the Wignell Drain, at a location west of the Snider Road allowance and just south of an old concrete weir structure. This sampling site was selected by JW as it represented a location directly adjacent and down stream of the Inco Refinery. The sediment sample was collected at a depth of 0-5cm and sent for analysis for 19 chemicals. In addition, to sediment samples, four water samples were collected from the Wignell Drain at various locations.

JW's review of Niagara Environmental Dynamics Ltd report prepared by Wiebe Engineering Group (August 9, 2004), identified that the sampling method was similar to that used by JW, and that of the five samples collected in the Wignell Drain by Wiebe, sample sites W1-3, W1-4 and W1-5 are representative of sample site SF-H-4 collected by JW. Table 1 below presents the results of the analysis of the Wiebe and JW sediment samples for the Chemicals of Concern (CoCs) identified for the CBRA.

A review of Table 1 identifies two important points. First, the results of samples sites W1-2, W1-3, W1-4 and W1-5 collected by Wiebe in 2004 are very similar to the results of the sediment collected by JW in the same general location of the Wignell Drain. This independent third party QA/QC for the sampling and analysis of the sediment represents good confirmation of the repeatability of the sampling and analysis methods conducted by JW for the ERA. The second important point is that for the 10 sediment samples collected by JW throughout the study area for the ERA, the sample collected from the Wignell Drain represents the maximum values for sediment for the ERA. In addition these maximum values are very similar to the values reported for the five sample sites where Wiebe collected sediment from the Wignell Drain.

Table 1 CoC Concentrations in Sediment Collected From the Wignell Drain by Wiebe (#W) and JW (SF)

Sediment Sample Site	Concentrations of Chemical of Concern (mg/kg)			
	Nickel	Copper	Cobalt	Arsenic
#W2-1	76	34	21	6
#W1-2	497	83	19	6
#W1-3	484	100	18	6
#W1-4	504	119	21	6
#W1-5	460	93	27	9
SF-H-4	429	85	16	4.7
Maximum Reported for JW 10 Samples	429	85	16	4.7

Therefore based on this review, it can be confidently stated that the recent sampling results of the Wignell Drain sediments do not require a re-assessment of the potential risk due to exposure to CoCs in the study areas sediments. For example the highest value for nickel in sediment of the Wignell Drain collected by Wiebe was 504 mg/kg for site #W1-4. This value is not significantly higher than the maximum value of 429 mg/kg used in the ERA for the sample taken by JW from the Wignell. The same is true for the other CoCs. In addition, the Wiebe Wignell Drain sediment sampling results also confirm that for the sampling of environmental media (soil, sediment, water, biological tissue) for the ERA, that JW's sampling program for the CoC's was a comprehensive one.

I trust the above meets your present needs, should you require further clarification, please do not hesitate to call the undersigned

Yours truly,

JACQUES WHITFORD

Ron Huizer
Senior Biologist

cc. Chuck Miller, City of Port Colborne

TAB 3

Jacques Whitford Review and Response to PLC's Consultant Comments on Jacques Whitford Final Report dated September 2004.

JACQUES WHITFORD REVIEW AND RESPONSE TO PLC's CONSULTANT COMMENTS ON JACQUES WHITFORD FINAL REPORT DATED SEPTEMBER 2004

As part of a Community Based Risk Assessment (CBRA) initiated by Inco Limited to address potential impacts resulting from historical emissions from a former nickel refinery in Port Colborne, Jacques Whitford Limited (Jacques Whitford) completed an Ecological Risk Assessment (ERA) for the natural environment of Port Colborne. Following completion of two years of fieldwork and analysis of data, Jacques Whitford prepared a draft ERA report in July 2003. Following the CBRA process, copies of the report were presented to the City of Port Colborne Public Liaison Committee (PLC) and the public for review and comment. These comments were reviewed by Jacques Whitford and, where revisions were required, these were incorporated into the Final Report completed in September 2004.

Following the tabling of the Final Report with the PLC, the PLC's Consultant undertook a review and provided comments in a letter dated December 20, 2004 (Appendix A). This section of the Addendum Report addresses those comments from the PLC's Consultant. Jacques Whitford's responses to the comments follow those section headings as presented in the PLC's Consultant December 20th, 2004 letter.

1.0 INTRODUCTION

Page 1, first paragraph. The PLC's Consultant is referred to the report under review in which the author is clearly indicated as Jacques Whitford Limited (Jacques Whitford). We request that the PLC's consultant correct this reference throughout their comments.

Page 1, paragraph 5 and bullets. The referenced page and section do not contain the information indicated. The bulleted activities are not complete and do not come directly from the report under review. Key activities included in the study have been omitted from the list presented. The ERA process is outlined in bullet form on page 1-9 of the final report and the specific objectives are outlined on page 1-15, Section 1.4.6. Please refer to these sections for an outline of the actual process.

2.0 UNRESOLVED ISSUES

Page 2, bullets. The 7th and 10th bullets are unsubstantiated in the comments received and are thus inappropriate to make and should be removed.

2.1 Definition of the Study Area

Defining the Study Area by the 200 µg/g Isopleth

At the initiation of the ERA-Natural Environment (ERA-NE), the identification of a general study area was based on the 200 mg/kg soil isopleth, as mapped, based on soil data collected by the Ministry of the Environment (MOE). This general study area was identified based on the MOE generic guideline for soil nickel, 200 mg/kg. The study area was identified for the purpose of conducting site characterization that was undertaken in the year 2000. The findings of the site characterization were presented in a report completed by Jacques Whitford in March 2001. This report identified the key natural features, flora and fauna on which the ERA would focus, as well as providing the background for the development of a field data collection program. This was the primary purpose for the identification of a general study area for the ERA.

It was recognized that as more soil data were collected during the CBRA that a fine tuning of the 200 mg/kg isopleth for soil nickel would be undertaken. This fine-tuned 200 mg/kg isopleth for soil nickel is presented in Figure 2-2, page 2-6, of the final report. A comparison of the location of the 200 mg/kg isopleth based on the original MOE soil data set as identified on Map 1 in the final report is very similar to that found in Figure 2-2 of the report (see Figure 1 attached for a comparison). As stated above, the primary purpose for the identification of a study area for conducting the ERA was so that ecological site characterization, VEC selection and a data collection program could be determined to supplement the MOE soil sampling data where appropriate to assess the potential risk to the natural environment as a result of elevated levels of CoCs in the soils of the local Port Colborne area. The minor differences in the location of the 200 mg/kg isopleth, or 500 mg/kg isopleth, for soil nickel based on the full soil data set does not, and would not, alter the findings of the ERA's site characterization for the local environment, the selection of VECs for the purpose of risk assessment or the locations for collection of field data. The 200 mg/kg isopleth for soil nickel identified in Figure 2-2 does not include or exclude natural features or flora and fauna that are found to occur in the study area on which the ERA was conducted. Therefore, minor changes to the location of the boundary of the 200 mg/kg isopleth does not have an effect on the interpretations or findings of the ERA-NE. To have an effect on the study's findings, the location of the 200 mg/kg isopleth based on the full soil data set would have had to result in a significant change in the site characterization of the local areas natural environment. This is not the case.

Excluding Residential Areas

As stated in Jacques Whitford's first report presented to the PLC in March 2002, based on CCME 1997 guidelines, "For the purposes of an ecological risk assessment for the natural environment, social features in the environment or humans are not considered to be ecological receptors in the assessment of adverse effects" (Jacques Whitford 2001, section 3.1, page 28). Following these accepted government guidelines, urban/residential areas of Port Colborne were not considered to be part of the study area as defined for the ERA-NE.

Nevertheless, the issue regarding the assessment of risk to pets has been raised by the public. When assessing pets (as opposed to naturally occurring wildlife), risks are typically evaluated with consideration for pets as individuals because of the importance that people place on their individual pets. In the ERA-NE report, we evaluated the endpoint of an effect level at or near the No Observable Adverse Effect Level (NOAEL). In an assessment of pets, the NOAEL would be considered appropriate so there is only a small deviation from this.

Reviewing the specific Toxicity Reference Values (TRVs) selected for mammals in the ERA-NE, Lowest Observed Adverse Effects Levels (LOAELs) were selected for nickel, cobalt and arsenic. A NOAEL was selected for copper. For copper, there would be no difference in TRVs if pets were evaluated and thus the consideration of wildlife as surrogates for pets exposed to the same environmental concentrations is conservative.

For nickel, cobalt and arsenic, somewhat more conservative values may have been selected, and these are estimated as follows:

- Nickel – TRV a factor of 3 lower
- Cobalt – TRV a factor of 2.6 lower
- Arsenic – TRV a factor of 2.5 lower

The implication of this is that it is reasonable to assume that wildlife are reasonable surrogates for pets exposed to similar concentrations if pets are not likely to receive more than 1/3 of the exposure of wildlife (e.g., receive 1/3 or less of their diet from hunting and/or foraging). This would seem to be a reasonable assumption for pets. Given that the potential risk to mammals in the natural environment is very low, the overall conclusion would be that the potential risk to domestic mammalian pets (dogs/cats/rabbits/guinea pigs/hamsters/ferrets/chinchillas/mice/rats/ hedgehogs/pony/horses/goats, etc) is also very low.

Irregular Distribution of Sampling Stations

As stated by Jacques Whitford in response to the same comment raised by the PLC's Consultant following their review of the draft report, Jacques Whitford does not share the opinion that there is an irregularity in the sampling locations. For the study, sampling sites were identified based on a set of predetermined criteria (located in the secondary and primary study area based on soil Ni concentrations, organic and clay soils, and woodlots and fields). As the study area is heterogeneous with respect to these criteria, the resulting sampling pattern appears to be "irregular" when mapped; nevertheless the data collected are scientifically representative of environmental media and potential receptors in the study area.

Regarding the question as to whether the sampling program as undertaken may compromise the study, it should be pointed out that over 700 samples of environmental media and biota was collected. As stated in the cover letter of the independent third party reviewer, CH2M Hill, October 2, 2003, "It is apparent that great effort was spent to thoroughly assess risk to the natural environment. Few ERAs have the benefit of having such an extensive site specific data to

support the analysis". As a final point, a critical review of the location of sample sites as presented on Map 1 shows that a significant portion of the sample stations are located in the area where soil CoCs are know to be at their highest concentrations. In this respect the "irregularity" or "patchiness" of the sampling can be considered to have generated a data set that is conservative for the assessment of potential risk.

With respect to incomplete mapping of inland water bodies and its importance to the assessment of risk to amphibians, Jacques Whitford does not understand the relevance of this question. To assess the potential risk to frog and toad populations in the study area, sampling of frogs, tadpoles, surface water and sediment in water bodies (i.e., ponds, drains, ditches) was undertaken at locations throughout the study area. Sample sites were identified so that collectively the samples were representative of amphibian exposures to the CoCs in the study area. A detailed map showing the location of all ponds is not required to assess potential risk to frogs and toads as only a sub-set of these ponds would be/have been sampled.

2.2 The Objective of the ERA NE

Identification of Potentially Missing Species

The PLC's Consultant is of the opinion that identifying missing species that should be present in the local natural environment is an important part of this ecological risk assessment. Jacques Whitford agrees that if one is conducting a ***qualitative risk assessment***, the examination of species diversity or assessment of the presence/absence of species can be used as an initial rough cut assessment to identify potential high risks of receptors to CoCs. However, this qualitative assessment method generally requires that a species inventory identifies a significant number of species, or suite of species, are absence in order to identify a potential high risk. This level of species absent was not identified for the ERA. For this ERA, the inventory of local bird, mammal, tree, and shrub species indicated that few species were found to be absent when habitat requirements and general local/regional rarity of a species was taken into account. Therefore, based on a qualitative assessment for the ERA, it was reasonable to conclude that there is no significantly high risk to species populations in the study area.

The PLC's Consultant Report provides part of the response provided by Jacques Whitford to this question. The full response is as follows:

"the question of determining species absence or low numbers in any local landscape is very difficult given the level of investigation that would be required (time period of study; assessment of natural population dynamics including emigration and migration; requirements for detailed comparative assessment of a number of local areas in a region; and so on). Given all the potential confounding factors, and time constraints for completing this study, detailed analysis of this type was not considered appropriate for the CBRA ERA."

For clarification, to have 99% confidence that all bird species that breed in a local area are identified would take at least three years of extensive field inventory for four seasons. This is because in a fractured landscape such as is found in the Port Colborne area, the number of bird species that breed in or inhabit the woodlots and fields can be expected to change yearly by as much as 25% ***due solely to natural emigration and migration in the local area***. That is why detailed analysis of this type was not considered appropriate for the CBRA. Instead, an extensive data set of environmental media (i.e., soil, sediment, water, biological tissue) was collected so that a quantitative assessment of potential risk to a broad range of potential bird and mammal species, which potentially inhabit the study area, could be undertaken.

2.3 Weighting of Various Studies in Determining Overall Findings

Leaf Litter Study

The leaf litter study was suggested by the Ministry of the Environment as a line of evidence to assess the potential effect of the CoCs on litter decomposition by soil invertebrates. Jacques Whitford followed the MOE's suggestion and engaged a qualified subconsultant, Kilty Springs Environmental, to undertake the field program. Jacques Whitford undertook separate statistical analysis of the data collected by Kilty Springs Environmental, including a generalized linear model of the mass of dry leaf litter against such factors as total tree basal area, soil type and soil nickel concentrations (p. 8-46). After controlling for the influence of total tree basal area (since bigger trees and/or more trees are likely to produce more leaves), the statistical analysis showed a significant contribution of soil nickel concentration to the prediction of leaf litter mass at a site. This was found to be a positive relationship, with greater leaf litter mass tending to be found at sites with higher soil nickel concentrations. We acknowledge that there is much variability in the raw data, but the statistical analysis undertaken for this study takes into consideration this variability. We also acknowledge that the slope of the plot in Figure 8-23 is shallow, indicating that, although an effect is present, it is not a large effect.

Frogs and Toads

As a first point, Jacques Whitford highlighted in the report that "specific nickel concentrations at roughly 80% (19/24) of the ponds and ditches within the Primary and Secondary Study Areas would put tadpoles at **potential** risk according to this **conservative** TRV". The important points in this statement, which we have highlighted here, is that the quotient method is a **conservative** method that identifies **potential risk**. For the study, the frog calling survey clearly identified that no significant reduction in population numbers was found to occur. These field data did not support the assessment of potential risk as determined by the quotient method. The use of actual field data for verifying an initial result of potential risk using the quotient method is common practice in conducting ecological risk assessments. Generally, in practice, the scientific method places more value on real observations compared to mathematical calculations that employ very conservative assumptions.

With respect to the occurrence of the Northern Leopard Frog in the study area, the following statement is made in Section 3.8.4 of the report:

"The roadside survey appeared to underestimate the distribution and abundance of the commonly recognized *Rana* species, Bullfrog, Northern Leopard Frog and Green Frog. The roadside survey found the Bullfrog to be uncommon in the Study Area, being recorded in low numbers at only two stations with large, well established dugout ponds. The Green Frog was recorded at three stations and the Northern Leopard Frog was found to be sporadically distributed, recorded at ten stations. However, surveys of ditches and ponds (old and new farm ponds dug into the clay soil) in the summer of 2001 found that all ponds and deep water ditches held large numbers of both adult and tadpole Green Frogs and Northern Leopard Frogs, and both species were common and well distributed throughout the Study Area."

Jacques Whitford believes that these lines of direct evidence to scientific field observations support the conclusion that the "CoCs in surface water of the study area does not represent an unacceptable risk to the frog and toad populations."

Maple Sap, Wood Cores

The maple sap was collected for the Human Health Risk Assessment, and we did not believe that the statistical analysis of this maple sap collection would provide a worthwhile contribution to the ERA. However, the maple sap data were useful to demonstrate the soil-plant barrier to the movement of CoCs into the environment (see Section 6.4.1 and Figure 6-8, page 6-14).

For the woodlot health study, wood cores were collected and analyzed for the four CoCs. The cores were subdivided by 20 year increments before they were analyzed. The wood core analysis was conducted so as to provide ***potential additional data*** should the woodlot health study find that woodlot productivity was reduced significantly in areas with elevated soil levels of CoCs. As the woodlot heath study did not find a significant reduction in woodlot productivity, even for woodlots where the highest levels of soil CoCs occurred, further discussion on the core analysis is not provided. However, the data of the wood core laboratory analysis is provided in the ERA Report in full, see Volume V, Tab 43.

2.4 The Lack of Arsenic Data

The four extraction techniques included in Table 2-8 and 2-9 cannot be used to effectively quantify arsenic extraction from soil. DTPA, oxalate and strontium nitrate extractions function by extracting cations of metals from soil (i.e., nickel, copper and cobalt). Since arsenic is a metalloid and not a metal, it does not form cations under aqueous conditions and thus can not be quantified using these extraction techniques.

The aqueous extraction, on the other hand, can be used to extract arsenic from soil, which can then be quantified by hydride generation atomic absorption analysis. However, in the case of Port Colborne soils, aqueous extractions of the nickel, copper and cobalt only extracted a small proportion of CoCs from the soil. Given that arsenic soil concentrations in Port Colborne are generally low (i.e., arsenic: nickel ratio approximately equal to 1:35) in comparison to the other CoCs, analysis of arsenic from aqueous extractions would likely have been below the analytical detection limit.

In addition, with very few exceptions, concentrations of arsenic observed in analyzed plant tissues were below analytical detection limit (i.e., 0.2 mg As/kg). As such, testing for arsenic as a phytotoxic element was not necessary in examination of Port Colborne soils.

With respect to the comment on protocols in Volume II, there is no Section D, therefore Jacques Whitford can not provide a response.

Although arsenic extraction tests of the aforementioned nature were not carried out on Port Colborne soils, there was a significant collection of total arsenic concentrations in environmental media (i.e., water, sediment, soils and biological tissue). The oral bioaccessibility of arsenic for mammals and avian species was determined through "in vitro" testing and used in the ERA-NE. In all other cases, the total concentration of arsenic in environmental media was used to conduct the risk assessment. Given that there was no increased potential risk to VECs through the use of the total concentration of arsenic, there would be no further requirement to better understand the environmental availability of arsenic, as was conducted for the other CoCs. Therefore, Jacques Whitford believes that the data collected and presented for arsenic in the Port Colborne environment is sufficient to support the findings of the ERA-NE.

2.5 Changing the Risk Quotients

The comments substantially overstate the significance of the quotient method. The reviewer is referred to the 13 pages of text in Chapter 10 discussing the uncertainties, much of which involves uncertainties in data and assumptions that are implicit in the application of the quotient method in this assessment. Refinement and improvement of the assumptions, data and calculations led to changes in calculated hazard quotients between the final draft report and the final report. The values in the draft report can be discarded and the final report is considered to replace this. However the following is provided.

Changes to the risk quotients from the first draft report to the final report were explained in the appendices of the final report, specifically Jacques Whitford's response to questions posed by draft report reviews from CH2M HILL and Stantec. Revisions were made that reflected changes to the values input into the risk quotient, including the following:

- Toxicity Reference Values were re-examined and modified to more accurately present toxic values to receptor species;
- Diets of some receptors were re-examined and modified to reflect more accurately actual diets in the Port Colborne area;
- Potential exposure of CoCs due to inhalation of air was omitted as part of the exposure calculation; and,
- Ingestion rates modified based on a re-examination of normalizing the ingestion rates in relation to body mass and moisture content of diet items.

2.5.1 Additive or Synergistic Interactions

Additive and synergistic effects have been specifically considered and quantitatively evaluated in this assessment. The reviewer is referred to a discussion of the topic in Sections 7.1.2, 7.1.3, 7.1.4, 7.3.1 and 8.4. The quantitative evaluation is presented in the last two rows of each of Tables 8-21 through 8-28. Additionally, additive and synergistic effects are evaluated in all field observations and laboratory toxicity tests. The reason for this comment being made at all is unclear. With respect to lead, since this is not a CoC in this study, no comment can be made.

The risk assessment of contaminants is complicated by the reality that most toxicological studies are conducted on single chemicals, but exposures are rarely limited to single chemicals. Exposures generally involve more than one contaminant. Although chemicals in the environment are most often present in some sort of mixture, guidelines for protection of ecological health are almost exclusively based on exposure to single chemicals.

Chemicals in a mixture may interact in four general ways to elicit a response:

- Non-interacting – chemicals have no effect in combination with each other; the toxicity of the mixture is the same as the toxicity of the most toxic component of the mixture;
- Additive – chemicals have similar targets and modes of action but do not interact, the hazard for exposure to the mixture is simply the sum of hazards for the individual chemicals;
- Synergistic – there is a positive interaction among the chemicals such that the response is greater than would be expected if the chemicals acted independently; and
- Antagonistic – there is a negative interaction among the chemicals such that the response is less than would be expected if the chemicals acted independently.

To derive a best estimate of risk associated with exposure to a number of chemicals at one time, the US EPA suggests using information on the toxicology of the specific mixture (US EPA 1986). The type of interaction (see bullets above) between metals in mixtures is dependent on the biological response measured, because mixtures can have additive effects on one biological endpoint, while having antagonistic or synergistic effects on other endpoints (ATSDR 2002). In addition, environmental factors may also influence the toxicity of metal mixtures, not just the toxicity of the individual metals (Franklin *et al.* 2002).

For environmental exposures, and particularly for wildlife, information on interactions among metals in mixtures is rarely available. In the absence of information on the toxicity of a mixture, risk could be assessed based on the addition of the risks of the individual mixture components, assuming information indicated the effects are likely additive. This is considered possible if the individual components are structurally similar and have similar toxicity characteristics. However, there is considerable uncertainty associated with the arbitrary application of an additive approach in that risk may be greatly overestimated or underestimated. Given this uncertainty, this ERA focused on the individual and independent risks of CoCs to wildlife for which relevant data are available.

With respect to the results of the quotient method in the assessment of risk to amphibia, we concur that the preference in the scientific method for reliance on field observation is strongly supported as the best evidence available.

2.6 A Weak Uncertainty Analysis

The uncertainty analysis follows the accepted format for a qualitative evaluation of uncertainty. Since the comment is not specific, no further response can be given.

2.7 Averaging Away the Risks

The ERA looked at the potential risk of the CoCs on *populations* of receptors, with a population spatially defined as those animals within the Study Area (both the Primary and Secondary Study Areas used for data collection purposes). This was discussed with members of the Technical Sub-Committee and Public Liaison Committee throughout the process, and was an approach selected due to the large spatial scope of the ERA, rather than the usual smaller scope of a Site Specific Risk Assessment (SSRA). The use of UCLMs for assessing risk at the population evel is accepted practice. The values used to estimate exposure of receptors to CoCs were high, largely based on UCLMs or maximums within data sets collected on the Site. For example, the soil nickel concentrations inputted into exposure calculations were as follows (from Tables 6-17 and 6-18):

- Overall – 2650 mg-Ni/kg
- Woodlots on clay soils – 1630 mg-Ni/kg
- Fields on clay soils – 1090 mg-Ni/kg
- Woodlots on organic soils – 15,200 mg-Ni/kg
- Fields on organic soils – 2020 mg-Ni/kg

The areas within the study area where the above soil nickel values are found to occur are presented in Figure 1 (attached). A review of Figure 1 graphically demonstrates that for the assessment of potential risk to a population in the study area, the assessment area is in fact based only on a small area of the total study area. As can be seen by the above numbers, the soil nickel concentrations used to estimate soil exposure to receptors are far higher than the 200 mg Ni/kg used to define the outer boundary of the Study Area, and far higher than even the outer boundary of the Primary Study Area, which is 500 mg Ni/kg (see Figure 1). If one wishes to assess the risk of receptors in the area with the highest soil nickel concentrations (i.e., the Reuter Road Woodlot), the scenario of "woodlots on organic soils" actually represents these values, with a high soil nickel concentration of 15,200 mg Ni/kg.

Trends in data were assessed in statistical analyses reported in Chapter 6, and effects potentially caused by CoC concentrations were statistically analysed and reported in Chapter 8. Variability of such data as earthworm CoC concentrations is controlled for by modeling it against the variable soil nickel concentrations (i.e., quantitative data) rather than Primary and Secondary Study Area (i.e., categorical data). The "averaging" of data was used for calculating exposures for derivation of a risk quotient; this was largely done for multiple scenarios, representing a variety of conditions. Additionally, the summary values inputted into exposure calculations represent areas with the highest soil nickel concentrations, as can be seen in Figure 1.

Finally, with respect to the concern that a specific assessment for the potential risk to an ***individual*** of a population that inhabits a ***specific individual area*** with the ***highest levels*** of soil CoCs, the PLC's Consultant is directed to Sections 11.2 and 11.3 and 11.4 of the Final ERA-NE Report (September 2004).

It is Jacques Whitford's opinion that the data analysis and statistical methods applied to the data provide realistic estimates of VEC exposures to CoCs and of the potential risk to population sustainability in the Port Colborne community.

3.0 QUALITY ASSURANCE/QUALITY CONTROL

Protocols and Field Data Collection

At no time were samples collected in the field without prior review of draft protocols by the PLC's Consultant. This enabled field biologists from Jacques Whitford and the PLC's consultant to collect samples in the field while weather and time permitted with a Standard Operating Procedure (SOP). Any deviations from the draft protocol were noted at the time of sampling by both consultants in their respective field notes and were later incorporated into the respective protocols. All protocols were finalized for report production. Finalized protocols presented in Volume II accurately reflect the methodology undertaken by Jacques Whitford and the PLC's consultant to collect samples under actual prevailing field conditions for this ERA.

As the PLC's consultant is well aware, the scientific collection of biological specimens inherently presents challenges that may occur in conducting a field program but cannot always be foreseen. Thus, scientific protocols are commonly required to adapt to site specific conditions and challenges once sample collection commences. Required changes to protocols (e.g., due to unforeseen conditions/circumstances in the field) were agreed upon by both consultants in the field at the time of sample collection and were later incorporated into the finalized protocols. Thus, Jacques Whitford's approach to sample collection was not only scientifically correct but it was supported by the PLC's Consultant during sample collection. In summary, Jacques Whitford is confident that the collection of field data for the ERA represents a level of completeness and quality that supports the validity of the conclusions presented in the ERA report.

Number of Parameters for Analysis

With respect to the protocol, Volume 2, Tab 1, it is agreed that Table 3 is somewhat confusing as it is attempting to summarize parameter EQLs for five different matrices (i.e., soil, vegetation, groundwater, surface water and air) chemically analysed for the CBRA. The parameters PSC reports in the "Report of Analysis" are dependent on the matrix tested, as described below.

The analysis of soils at PSC uses a method called ICP (17) and does not include the hydrides arsenic, antimony and selenium in the scan. Parameters reported for soils included 17 metals

with the addition of 2 metalloids, arsenic and selenium, for a total of 19 parameters being reported in the "Report of Analysis".

For vegetation samples, the "Report of Analysis" reported 27 parameters including the CoCs. EQLs for CoCs are listed in Table 1. Reporting for groundwater included 30 parameters. EQLs for CoC are listed in Table 1. For surface water, PSC reported 32 parameters including the CoCs. EQLs for these CoCs are reported in Table 1. Air samples were tested for 21 parameters. EQLs for air samples tested are reported in Table 1. EQLs for the four CoCs are summarized below in Table 1 for five different matrixes tests in the CBRA. EQLs for all other parameters can be found on the Certificates of Analysis of the respective component studies of the CBRA.

Table 1 Estimated Quantitation Limits (EQLs) for CoCs in five different matrixes

Parameter	Soil (mg/kg)	Vegetation (mg/kg)	Groundwater (µg/L)	Surface Water (µg/L)	Air (µg/filter)
Nickel	2.0	0.1	1.0	1.0	0.5
Copper	1.0	0.05	0.5	0.1	0.5
Cobalt	2.0	0.01	0.1	0.1	0.05
Arsenic	0.2	0.2	2.0	2.0	1.0

Definitions in Protocols

1. Referring to Method Detection Limits (MDLs) in this protocol is incorrect. The protocol should have referred to Estimated Quantitation Limits (EQLs).

2. The word variability should not have been used in this context. The word accuracy should have been written in its place.

3. PSC conducts 'replicate' analysis on one sample in the lab, meaning two aliquots are obtained from the same sample. Therefore, 'replicate' results appear on the certificate of analysis for one sample. To avoid confusion in reporting, Jacques Whitford and Stantec labeled two physically different samples collected in virtually the same location in the field as 'duplicate' samples. This labeling system was agreed to by Stantec staff for the purposes of being able to easily distinguish sample labeling on the Certificate of Analysis. The use of replicate and duplicate sampling/labeling is clearly outlined in the Quality Assurance and Quality Control Protocol for Data of the Ecological Risk Assessment. A response explaining this was also provided to Stantec in a Jacques Whitford response to comments in January 2003, and is as follows:

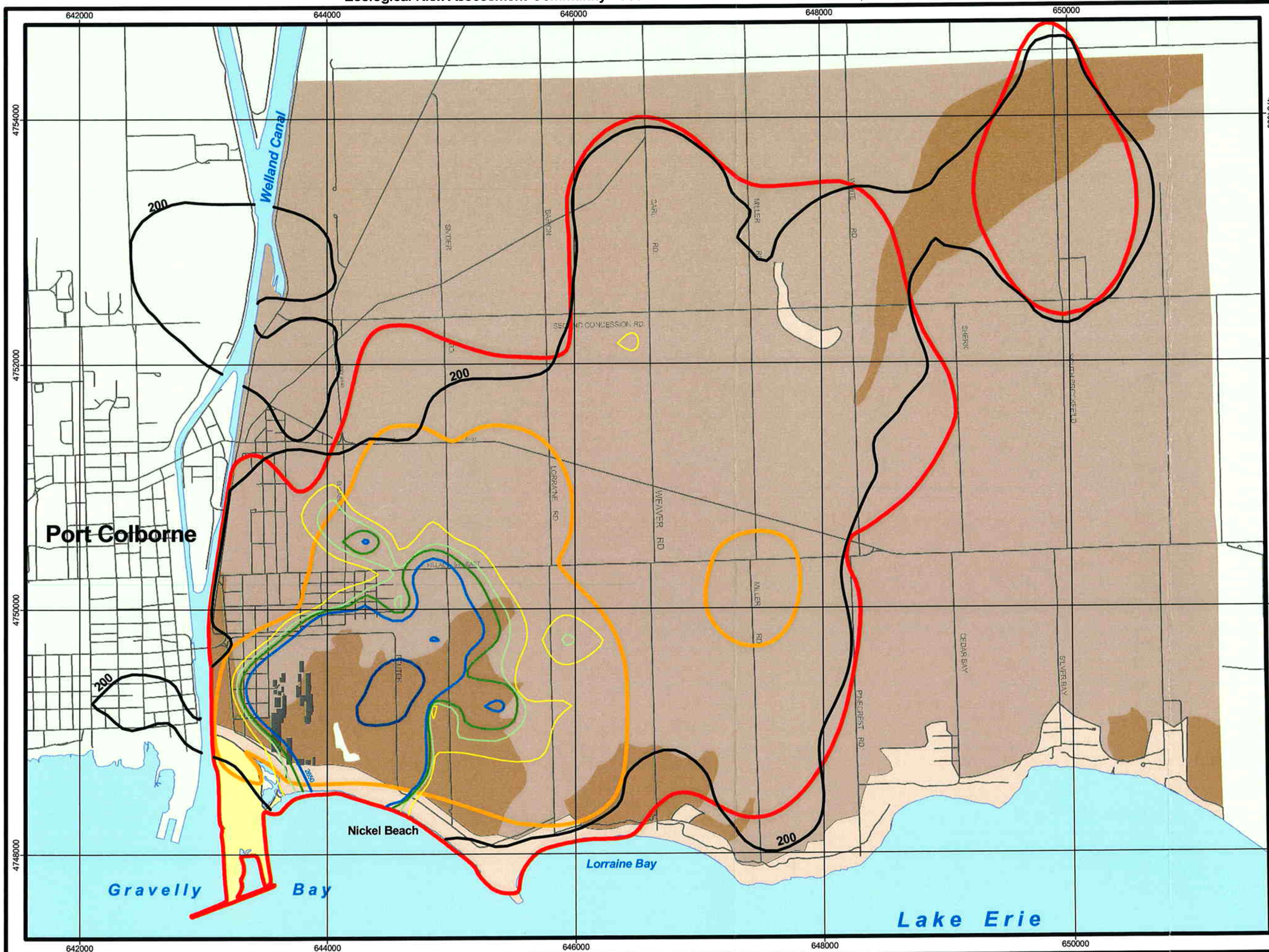
"the definitions of replicate and duplicate are understood. However, in the context of this ERA, these terms are merely two codes that refer to two different procedures, regardless of how they are defined elsewhere. The term "replicate" has been assigned by PSC when two or more portions of the same sample are taken, prepared, and analyzed by PSC. The term "duplicate" was assigned by Jacques Whitford and Stantec to designate the second of two physically different samples collected in virtually the same location in the field".

Summary

Jacques Whitford agrees with the PLC's Consultant that comments presented in Section 3.0 Quality Assurance/Quality Control, do not unduly criticize the ERA report nor question the validity of the conclusions presented in the ERA report.

Ecological Risk Assessment-Community Based Risk Assessment-Port Colborne, Ontatio

Figure 1
Nickel Isopleth Values for Risk Assessment Scenarios



0 500 1000 1500

Metres

N

Legend

- Primary Study Area
- Secondary Study Area

Nickel Contours

- 1090mg Ni/kg Fields on Clay Soils
- 1630mg Ni/kg Woodlots on Clay Soils
- 2020mg Ni/kg Fields on Organic Soils
- 2650mg Ni/kg Overall Scenario
- 15200mg Ni/kg Woodlts on Organic Soils
- 200mg Ni/kg

Soil Groupings

- Clay
- Organic
- Sand
- Built Land

Topographic Features

- Inco Refinery
- Roads

The approximation is based on:
- 0-5cm surface soil data from MOE 1999, MOE 2000 (Rodney Street Community)
- AMEC 2001 (Seaway Properties)
- JWEL 2001 Programs

Job Number: ONT34644
Date: January 2005
Dwn by: C. Amirault
Approved by: Oliver Curran

Map Parameters
Projection: UTM
Datum: NAD 83
Scale 1 : 30,000

Regional NIAGARA

Jacques Whitford

Consulting Engineers
Environmental Scientists
Risk Consultants

APPENDIX A

WATTERS ENVIRONMENTAL GROUP INC.

MEMORANDUM

WATTERS ENVIRONMENTAL GROUP INC.

MEMORANDUM

To:	Chuck Miller	From:	Robert Watters, Peter Nicoll
Date:	December 20, 2004	Ref. #:	04-0007
Re:	**Outstanding Comments of the PLC Consultants on JWEL's ERA - Natural Environmental Report, dated September 2004**		

Please find attached a document that highlights outstanding, residual comments by the PLC Consultants on JWEL's ERA – NE report dated September 2004.

We have attempted to highlight only those comments that we believe to be significant, and which may potentially alter the interpretation and findings of the data.

We note that all of these comments have been previously raised with JWEL by the PLC Consultants, either in response to a previous report, or during meetings.

Please contact us if there are any concerns or questions concerning this material.

1.0 INTRODUCTION

Inco Limited's consultant for the Port Colborne Community Based Risk Assessment (CBRA), Jacques Whitford Environment Limited (JWEL), completed an ecological risk asessment (ERA) for the natural environment of Port Colborne, to address potential impacts resulting from historical emissions from a former nickel refining operation in Port Colborne, Ontario,.

Their report (referred to as the "ERA NE Report") was initially issued in November 2002 was modified in July 2003 and culminated in a "final" report dated September 2004.

A Public Liaison Committee (PLC) was established to oversee the CBRA process and to help facilitate community consultation. Beak International Incorporated (acquired by Stantec Consulting), and now Watters Environmental Group Inc., are the technical consultants to the PLC (collectively the "PLC Consultants").

This document was prepared by the PLC Consultants to outline current residual comments and technical concerns on JWEL's September 2004 ERA NE Report.

The objective of the ERA NE was to evaluate the potential risk of elevated levels of various metals in Port Colborne soils to plants, insects, amphibians, birds, mammals and other organisms. In order to accomplish this, the following activities had to be completed (from September 2004 ERA, p. 1-10, Sn. 1.4.2):

- gather samples and have the samples analyzed for a number of chemicals;
- identify chemicals of concern (CoCs); based on the results of the sampling,
- determine the receptors for the CoCs;
- determine the exposure to the receptors for each CoC;
- compare the exposure to published toxicological information so as to assess the degree of hazard for each receptor for each CoC; and
- characterize the risk of resulting from exposure to the CoCs to the receptors.

Such an approach builds on each preceding step, so that the entire process depends on the first step. If the first step is scientifically and procedurally sound, the remaining steps can proceed and will depend on the second step, and so on, to the last step. The last step is directed toward answering the question:

"Are there species or components of the natural environment at risk in the Port Colborne area because of current concentrations of CoCs?"

2.0 UNRESOLVED ISSUES

Throughout the ERA NE study process, the PLC Consultants have identified a number of concerns with the ERA. Many of these concerns continue to be outstanding in JWEL's 2004 ERA NE Report, and are related to:

- the definition of the study area;
- the objectives of the ERA NE;
- the weighting of various studies in determining overall findings;
- the lack of arsenic data;
- the (arbitrary) changing of risk quotients;
- the weakness of the uncertainty analysis;
- the rejection of analytical data;
- the manner in which tissue and soil concentrations are averaged out over large areas of land;
- the QA/QC measures undertaken throughout the ERA NE; and
- the conclusions reached as a result of the various ERA studies.

These remaining concerns leave a feeling of uncertainty over the validity of the conclusions that are reached, particularly since these issues were raised with JWEL well in advance of the final September 2004 ERA NE report. Details on these issues are outlined below.

2.1 Definition of the Study Area

Defining the Study Area by the 200 ug/g Isopleth

An important remaining concern with the ERA is that the definition of the study area is based on a 200 ug/g nickel isopleth that was developed using the initial MOE soil quality data, despite the fact that there is now a significant volume of additional data that could have been used to better define this isopleth. The PLC Consultants have previously shown to JWEL that the pattern of nickel distribution using the more recent data does not correlate with the distribution using only the original MOE data. The differences in the patterns of distribution need to be reconciled and explained, because this new data may change the boundaries of the study area and possibly affect the conclusions and interpretations of the ERA NE findings.

Excluding Residential Areas

Animals within the urban areas of Port Colborne, such as squirrels and domestic animals, have also not been included in the risk assessment. The concern that impact of CoCs on these animals has not been addressed under the CBRA has been a long-standing and consistently expressed concern of the community. In our opinion, this is a significant gap in the NE ERA and one that must be properly addressed.

Irregular Distribution of Sampling Stations

Related to the concern over the definition of the study is a concern regarding the irregularity or "patchiness" of the distribution of the sampling stations. It is understood that some amount of unevenness is inevitable to properly address sites of special interest, such as woodlots. Although we recognize that an irregular distribution doesn't necessarily imply that inferior data will be produced, it is no guarantee that it won't. If the irregularity does produce anomalous data that require follow-up, or it produces meaningful trends, either will be lost when all of the individual station data is averaged, as is commented upon in Section 2.8 of this review.

If JWEL believe that the distribution of sampling stations does not compromise their study, then an explanation should be provided to allay the concern that readers of the ERA Report are likely to have when they examine Map 1 "Sample Site Locations". The PLC Consultants have identified this issue several times to JWEL in the past.

There is also a concern that mapping of inland water bodies, referred to in the report as "cow ponds"), is not complete, despite their obvious importance for amphibia VECs, or for proper understanding of the sample results for tadpoles and adult amphibia.

2.2 The Objectives of the ERA NE

Identification of Potentially Missing Species

As the PLC Consultants have noted previously, part of a review of the natural environment would logically include identifying missing species that should be present based on habitat and ecological factors; this has not been pursued in the ERA study. Similarly, little effort was made to identify species that are present, but at very low in numbers in the Port Colborne area.

These concerns were raised by the PLC Consultants in a review of the previous version of the ERA (April 7, 2003), but JWEL's response was:

> *"Given all the potential confounding factors, and time constraints for completing this study, detailed analysis of this type was not considered appropriate for the CBRA ERA."*

2.3 Weighting of Various Studies in Determining Overall Findings

The PLC Consultants have requested previously that JWEL provide a better description of the process for determining the relevance of each of the studies, limitations on them, the weight that each should be accorded, and the process that was followed for selecting studies and developing conclusions from them would be valuable. Some of the issues of the PLC Consultants are as follows:

Leaf Litter Study

The protocol for the Leaf Litter Study states (page 1) "*In cases where the decomposition process is decreased, the amount of materials being formed and returned to the system (i.e., leaf litter fall) is greater than the amount being broken down or decomposing. Under conditions of decreased decomposition the amount of litter on the ground may start to accumulate and nutrients would not be available to the vegetation (i.e., trees) in that area. If the disruption continued over a long period of time, the tree's growth might decrease accordingly*".

The results presented by JWEL in Figure 8-23, Volume 1 show the mass of dry leaf litter plotted against the soil Ni concentrations. The range of values was high for woodlots in high Ni areas and in low Ni areas. The range of litter weights given by JWEL is from 63.2 to 536.9 g/m^2, i.e., an order of magnitude difference. Several types of forest were sampled (FOD 2, FOD 7, SWD 6 and MAS 3) as indicated by examining the location of Leaf Litter Sampling Locations in Maps 1, 2 and the ELC forest classifications on Map 3.

JWEL plots the data and suggests, "*As soil nickel concentrations increase, dry weight of leaf litter increases (Figure 8-23), presumably indicating that decomposition is slower*". For this data, with such wide ranges in the amounts of litter collected per site and such a low slope, such conclusions are at the most tenuous. While we do not question the final conclusions that the woodlots appear to be healthy, we do question the logic path by which these conclusions are reached.

While the Leaf Litter Study appears to be been carried out diligently by the sub-contractor, the relevance and usefulness of its findings are questionable, as "*time constraints imposed by the current situation would not allow for a detailed investigation using the normal procedures. Instead a proxy method of assessing the rate of decomposition was used*".

Frogs and Toads

Two lines of evidence are pursued by JWEL: the quotient method for calculating risk and a survey of frog calling.

JWEL highlight in their report that the quotient method determined that 80% of ponds and ditches put tadpoles at risk as a consequence of nickel exposure. However, the report relies on the spring calling survey to provide evidence that no unacceptable risk exists. The scientific rationale for giving more weight to the frog calling compared with the quotient method is not clearly presented. The situation is confused even more by the selective weighting given to information provided by the calling survey.. For example, the Northern Leopard frog, generally common throughout Southern Ontario, was absent in many calling sites and the density of calling adult frogs was reported to be lower than would be expected compared to other areas of S. Ontario.

Despite two lines of evidence leading to a concern that frog and toad populations are at risk, the report concludes: "*CoCs in surface water of the study area does not represent an unacceptable risk to the frog and toad populations*". The quotient method is dismissed as being "*too conservative*" and the suggestion in the conclusion that the study area "*supports high species diversity and typical abundance of adult frogs for the species present*" begs the question of what is happening with the species absent (e.g., Leopard Frog) in many sites, and does not appear to be consistent with other observations made in the report.

Maple Sap, Wood Cores

In assessing woodlot health, JWEL considers the results of studies of woodlot health, leaf litter decomposition and maple leaf health, while not including all the woodlot studies of maple sap and wood increment cores. The reason for the partial selection of studies is not clear, but it seems that considerable sampling, analytical and assessment time and effort resulted in no visible input to the ERA.

2.4 The Lack of Arsenic Data

While the CoCs are generally dealt with in terms of their distribution in soil and in tissues, potentially useful information on arsenic has been omitted. Tables 2-8 and 2-9 describe the various means by which CoCs can be extracted from clay and organic soils for nickel, copper and cobalt, but provide no data for arsenic. Although JWEL comment on this matter, the fact remains that the data are missing. JWEL's comment is "*Data for arsenic were not obtained due to the limitations of these extraction methods with arsenic*" (p. 2-15). This means that the four different soil extraction techniques were either not capable of extracting arsenic, and/or the studies failed to examine arsenic. In either case, the report lacks potentially useful information regarding the amount of arsenic that could be available in Port Colborne soils to either have beneficial or harmful effect on organisms. At the very least, Tables 2-8 and 2-9 should be renamed "Percentage of *some* CoCs …".

A conclusion follows Table 2-9: "*less than 1% of soil CoCs are removed, indicating that soils in the Study Area have a low leaching capacity under neutral water*

conditions". This generalized conclusion, and others following it, cannot be made in the absence of data for one of the CoCs.

Similarly, in the September 2004 ERA, Vol. 2, Section D, Tables 2 and 4, no arsenic data is provided despite the table titles, which include "arsenic" along with nickel, copper and cobalt. It is understood that parts of the ERA were carried out before arsenic was established as a CoC, and possibly this accounts for some of the information gaps regarding arsenic. It is suggested that a thorough review by the authors would have determined any other gaps of this nature. Arsenic may be a more recently added CoC, but it is nonetheless a CoC and should be assessed as thoroughly as the other CoCs.

2.5 Changing the Risk Quotients

The quotient method is a cornerstone line of evidence for many of the studies that comprise the ERA NE. It is claimed to be a standardized method, although considerable changes in risk quotients are presented from the draft report to the final report. For example, the American Woodcock has a risk quotient (RQ) of 0.87 for nickel in woodlots in the July 2003 ERA NE report, but a RQ of 0.24 in the September 2004 report. These changes are nowhere satisfactorily justified within the report and this is an important omission.

The method is claimed to be conservative, yet there are important aspects that demonstrate a lack of conservatism. For example, the method does not consider additive or synergistic interactions. This is an important weakness when considering metal toxicity, especially when the study area is impacted by additional heavy metals, such as lead. The inclusion of factors for bioavailability into the calculation of absorbed dose is also non-conservative.

Ironically, the suggested conservatism of the method causes its rejection as the major line of evidence in favour of observational studies in the case of amphibia.

2.6 A Weak Uncertainty Analysis

An "uncertainty analysis" is now provided in the report to provide a response to many concerns raised by reviewers and the public regarding approaches in the ERA and assumptions in the previous report. This section is less of an analysis of uncertainty and more an expression of unsubstantiated opinion as to whether genuine concerns with the ERA and identified shortcomings in the study approach are likely to underestimate or overstate the assessed risk.

2.7 Averaging Away the Risks

The study area for the ERA NE consists of two general areas for the purpose of data collection: a Primary Study Area (105 hectares) and a Secondary Study Area (462 ha).

A Reference Area, consisting of woodlands, wetlands and conservation areas, was also sampled for data collection.

Within the Secondary and Primary Study Areas, the various sampling sites were sampled for various biota. The analytical results show significant differences from one sampling location to another for various CoCs and biota/tissue types, with samples from the Primary Study Area showing generally higher levels of CoCs than those from the Secondary Study Area. Study Area CoC levels were usually, but not always, higher than those from the Control Area. In other words, the CoC levels in some individual sites in the Primary and Secondary Study Areas were not significantly different from the Reference Area.

An earlier draft of the ERA Report (January 2003) combined these individual data points into two data points for each biota/tissue type and CoC within the Primary and Secondary Areas, which was then considered in the assessment of risk to the VECs. As will be seen, the PLC Consultants cautioned JWEL that this approach, over such a large geographic area, would "average out" meaningful data showing high and low values within the Primary and Secondary Study Areas.

However, much of the data for various Port Colborne VECs provided in Section 6 of the September 2004 report has now been collapsed into *one* data set for the entire "Study Area". This one combined data set is referred to as "Primary and Secondary Areas" (i.e., combined into one) in Tables 6.3 and 6.13, and as the "Study Area" (i.e., one combined study area comprising the previous Primary Study Area and the Secondary Area) in Tables 6.4, 6.5, 6.6, 6.7, 6.9, 6.10 and 6.12. In other words, *all* of the study area data has now been treated as one data point. The mean values, sometimes consisting of 50 or so samples, are used to typify an area of 567 hectares.

If one was describing a water body, and had 50 data points for a given CoC, it might possibly be acceptable to discuss "mean" values, because water solutions generally mix well enough to cause relatively lower variability than is the case for metals in soil. However, in the case of the ERA samples, where much of the risk assessment data is from amphibians, worms, insects and other biota living on, in, and around the soil, the variability is enormous. Within the "Study Area", the difference between the maximum CoC value and the minimum CoC value is often as much as 100-fold (and higher), for various amphibian and other tissue results. The use of "mean" values minimizes the significance of the individual site data sets and thereby marginalizes much of the large ERA field data.

The Problems with "Averaging"

The standard deviation for the combined nickel and other CoC results is frequently greater than the mean value. Some of these variations are due to sampling and analytical variability, but most of it is due to the practice of averaging the results over such a broad area.

Such large standard deviations indicate that the data are extremely variable, and is indicative of data sets that should not be simply "averaged", but which should be further evaluated to determine whether data trends emerge within the data set(s).

In fact, preliminary review of some of the *individual sample sites* within the Primary and Secondary (and Reference) Areas indicates that there are major differences in CoC levels in various tissues, and that data patterns can be observed. Some sites in the Primary Area have CoC levels that are similar to those in the Reference Area; others have CoC levels that are significantly elevated. These patterns are obviously lost once the data are averaged.

This problem of averaging out the potential high risk values for localized areas with the Primary Study Area was expressed to JWEL as a result of the PLC Consultant's review of earlier draft ERA reports. The earlier ERA reports (up until July 2003) dealt with both the Primary and Secondary Areas as separate components in comparison to the Reference Area. The response in the current ERA seems to have been a step backwards, as the earlier version's tables showing CoC concentrations in various tissues were in three groupings (Primary Area, Secondary Area, and Reference Area). Even at this degree of averaging, concern had been expressed to JWEL that the average values had far too much variability; the final report now has even more.

It is understood that such a large data base needs to be broken down, and averaging within carefully established geographic limits is certainly a way to provide a sense of the degree to which a soil or an organism living in a given soil may be contaminated. However, the use of a mean value spread out over such a large study area becomes a way of obscuring or obliterating any local variations, whether high or low. In this case, it is a mechanism virtually guaranteed to obfuscate potentially meaningful data trends within the study areas.

Meaningful trends can be seen in the data for various types of tissue from Control, Secondary and Primary Study Areas, and some of these are shown below. However, JWEL's final September 2004 ERA does not show such trends, because of the blending of Primary and Secondary Study Area data.

In addition, it is suggested that within the Primary Area, at least, there are localized areas that will have lower or higher CoC levels, and that closer examination of the latter would help accomplish one of the goals of the ERA – to evaluate the potential risk of CoCs to the natural environment, on a more local level than for the entire study

area of 572 hectares. Averaging the data negates the appearance of potential risk by blending high field values with low ones.

In fact the following section shows that it is possible to use the tabled data from a previous JWEL draft (January, 2003) of the ERA NE report to demonstrate that relationships exist for numerous organism tissues. These relationships demonstrate that higher soil levels of CoCs are consistent with higher tissue levels of the same CoCs for various organisms.

Examples of potential CoC relationships can be seen with the frog Gastrointestinal (GI) tract data. Just using frog GI tract data reported by JWEL, the following tables indicate the concentrations for nickel, copper, cobalt, arsenic and lead.

Table 1: Frog GI Tract Data – Individual Sites

PRIMARY SITES					
Sample	**Pb**	**Ni**	**Cu**	**Co**	**As**
H-1-E	0.95	101	30.9	8.19	2.4
H-1-A		76.9	106	2.77	3
H-1-B	3.53	27.2	26.5	1.15	1
H-1-C	1.29	1.04	10.4	0.26	4.1
H-1-D	0.62	6.77	43.3	0.803	0.7
H-1 Average	1.5975	42.582			
H-1 Std. Dev.	1.317052	44.25842			
H-2-A	1.65	5.28	12.6	0.446	0.6
H-2-B	0.47	4.17	15.8	0.379	0.3
H-2-C	0.43	2.24	11.3	0.478	0.25
H-2-D	0.93	2.13	9.87	0.346	0.6
H-2-I	0.7	7.24	26.2	0.788	0.7
H-2 Average	0.836	4.212	15.154	0.4874	0.49
H-2 Std. Dev.	0.497172	2.152596	6.552258	0.176002	0.201246
H-3-A	0.6	7.66	8.47	0.439	0.3
H-3-B	1.71	51.1	17.1	1.29	0.3
H-3-C	0.45	4.62	9.75	0.258	0.25
H-3-D	1.07	31.8	**236**	1.24	0.3
H-3-E	1.12	23.2	20.6	0.788	0.3
H-3 Average	0.99	23.676	58.384	0.803	0.29
H-3 Average (outlier removed)			14.0		
H-3 Std. Dev.	0.496337	18.96012	99.41845	0.46311	0.022361
H-3 Std. Dev. (outlier removed)			5.8		
H-4-A	0.19	2.45	12.7	0.212	0.3
H-4-B	0.91	17.7	47.9	0.688	0.35
H-4-C	0.63	9.83	10.7	0.567	0.25

PRIMARY SITES					
Sample	**Pb**	**Ni**	**Cu**	**Co**	**As**
H-4-D	0.31	1.98	9.12	0.217	0.25
H-4-E	2.02	40	21.5	1.16	0.4
H-4 Average	0.812	14.392	20.384	0.5688	0.31
H-4 Std. Dev.	0.731587	15.68593	16.1096	0.392046	0.065192
H-5-A	3.65	36.3	73.2	1.9	0.7
H-5-B	4.23	35.3	81.9	2.52	1
H-5-C	10.2	108	47.2	5.29	2.4
H-5-D	5.1	40.5	37.8	2.79	1.5
H-5-E	12	26.8	43.7	2.14	1.1
H-5 Average	7.036	49.38	56.76	2.928	1.34
H-5 Std. Dev.	3.799307	33.14494	19.5175	1.364027	0.658027

Bold represents Outlier. Note: There may be other outliers in this data set.

The data indicates:

- Site H-5 has the highest average nickel values, followed by Site H-1, followed by H-3.
- The lead data follows the same pattern.
- The copper and cobalt data follows almost the same pattern (except for Cu and Co, Sites H-1 and H-3 appear to be statistically similar).

Such an apparent relationship might be statistically meaningless, or it might indicate a real relationship between COCs and these locations relative to that of the Inco refinery. Averaging obliterates such relationships and contributes to an untested assumption that there are no impacts.

CoC Relationships for Selected Biota – Primary, Secondary and Reference Areas

The January 2003 ERA report is the last ERA report that provided separate CoC values for tissues from the Primary, Secondary and Reference Areas. The following data tables were prepared from the data in Table 6-3 of the January 2003 draft ERA report. They indicate an obvious relationship between tissue levels and the proximity of the organisms to the refinery, based on the average CoC results for Primary, Secondary, and Reference Areas.

Table 2: Concentration Levels of Tissues from Primary, Secondary, and Reference Areas of NE ERA

		Nickel			Copper		
		Reference	Secondary	Primary	Reference	Secondary	Primary
Tadpoles (Table 6-3)							
GI Tracts	Mean	48.1	166	219	62.1	86.2	83
	SD	44.4	106	104	56.4	49	21.3
	N	3	3	3	2	3	3
Remaining Carcass	Mean	3.49	18.9	40.4	9.63	15.8	29.2
	SD	1.29	15.8	55.3	2.5	12.5	20.6
	N	2	3	3	2	3	3
Frogs (Table 6-4)							
GI Tracts	Mean	5.61	14.8	26.9	30.2	45.4	38.8
	SD	9.44	21.5	30.2	24.6	36.6	48.2
	N	25	24	25	25	24	25
Livers	Mean	0.28	0.49	0.5	120	118	266
	SD	0.29	0.43	0.37	71.2	124	141
	N	25	24	25	25	24	25
Remaining Carcass	Mean	0.21	0.48	1.08	10.2	6.89	27.7
	SD	0.14	0.53	1.3	6.91	4.1	44
	N	25	24	25	25	24	25
Total Body	Mean	0.77		3.69	16.2		35.5
	SD	0.95		3.94	6.53		41.4
	N	25		25	25		25
Worms (Table 6-8)							
Whole Earthworm	Mean	22.5	132	380	19	37.4	83.6
	SD	18.2	89.1	141	5.81	11.4	24.7
	N	5	4	4	5	4	4
Vole (Table 6-13, July 2003)							
Livers	Mean	0.17	0.25	0.44	62.1	86.2	83
	SD	0.14		0.28	56.4	49	21.3
	N	12	1	10	2	3	3
Remaining Carcass	Mean	1.46	3.31	16	9.63	15.8	29.2
	SD	0.59		7.12	2.5	12.5	20.6
	N	12	1	10	2	3	3

As noted above, these data are taken from Table 6.3 of the January 2003 ERA report. They indicate a relationship between tissue metal levels and the proximity of the tissue samples (organisms) to the refinery.

Table 6-2 in the July 2003 ERA report provides a summary of the relationships between soil/sediment/water CoC concentrations (based on information provided in ERA, Appendix C). However, the approach in Table 6-2 doesn't demonstrate the

degree to which many of the tissue CoC levels are affected by the level of the CoCs in the soil or sediment or water.

CoC Relationships – Individual Sample Site Locations

The results for each individual sample site are found in Volume V, "Laboratory and Analytical Data and Quality Assurance/Quality Control", ERA-NE, November 2002. A quick review was made based on the results for one tissue type (Gastrointestinal Tract) for one animal (Frog) to demonstrate the large variation between the various sampling stations comprising the overall study area and to determine whether linkages could be found for tissue levels and distances from the refinery amongst the individual sampling stations. This was done to indicate the usefulness of the individual sampling station data in ascertaining relationships that wouldn't be detected if the individual station results for a given sample type were averaged.

The raw results for nickel concentration in frog GI tract values in the Control and Primary Study Areas are as follows:

Control Area:	Mean levels range from about 2 to 15 ppm Ni over five control sites. Overall range is 0.3 to 48 ppm.
Primary Study Area:	Mean levels range from 4.2 to 49.4 ppm Ni over five sites just east and north of the Inco refinery. Overall range is 1 to 108 ppm Ni.
Trends:	Most data sets means range from 1 to 24 ppm in the Primary Study Area, except for H-1 and H-5 which have mean Ni levels of 42.6 and 49.4 ppm, respectively. Thus, the nickel levels in tissue from most Primary Study sites are somewhat similar to the Ni level in the Control sites. Sites H-1 and H-5 are north and northeast of the Inco refinery.

It is noteworthy that the level of other COCs (and non-CoCs, including lead) follows a pattern similar to that for nickel.

Nickel and other metals showed similar variability among stations within relatively small geographic areas – relative to the large Study Area. These data indicate that it may well be the case that localized data patterns/trends occur in the other local sample areas. Such trends or patterns are completely lost when all of the data over the larger area is averaged. The PLC Consultants remain convinced that the large database collected for the ERA is not being used to its optimum purposes .

Specific Problems with Averaging ERA Data

The data collection methods are described in Section 5 (of the JWEL report) and the field sampling structure for earthworms is indicated in Table 5-1 (of the JWEL report). This indicates that there are five stations to be sampled in each of the Primary, Secondary and Reference Areas for earthworms (total of fifteen) with three replicates at each station. The PLC Consultants did not observe soil sampling in 2001 and it is not clear whether 38 soil samples were collected in 2002 as stated in Table 5-3. In Table 5-6, it is indicated that 13 samples of earthworms were analyzed in 2001 (not 15) and tissue from 35 samples in 2002, not 38. Yet in Table 6-9 (of the JWEL report), JWEL provide data from 30 sites in 2002. These discrepancies are confusing. One would expect that the next section would provide a summary of the data collected (i.e., what are the levels of CoCs found in the data at these different collection sites). However, JWEL proceeds with an Exposure Assessment in which the CoC data for earthworms from Primary and Secondary Study Areas are combined in Tables 6-7, 6-8, 6-9 and 6-10.

The text on page 6-22 concludes "*the data in Table 6-7 indicate that earthworm CoC concentrations are highest in the Study Area*". There is no comment on the fact that: (i) the range for nickel is 39.8 to 1,250 ppm with a standard deviation of 263 ppm, which is a relative standard deviation (RSD) of 86%, and (ii) much of the variation could be explained by the combining of data from the Primary and Secondary Study Areas. Similar ranges are evident for copper, cobalt and arsenic.

However, if one examines the same data in the January 2003 ERA, where some data are provided in separate categories of Primary, Secondary, and Reference Areas, the standard deviations (SD) are much lower. For example, the RSD for nickel in earthworms in the Primary Study Area is only 37% (less than half the deviation as in the combined data).

This combining of data across the entire Study Area results in a loss of information. One can see from the very high ranges of values (e.g., Ni in Table 6-10 (RSD = 125%)) that, within the Study Area, there is a great range of values. When one examines the actual data in relation to their geographic position, it is clear that there is a marked gradient, with high values obtained near the Inco site and lower values further away. Thus, while there is a high variability within the 18.6 km^2 of the Study Area, this is explicable by the high concentrations near the smelter and the lower concentrations further away.

This is particularly relevant since JWEL is tasked with providing suggestions for remediation if and where warranted. The areas where recommendations for remediation might be required are lost in the general summary tables, due to the averaging across the area.

3.0 QUALITY ASSURANCE / QUALITY CONTROL

The use of standard operating procedures (SOPs) for environmental sampling and analysis is a well accepted practice, and is an essential element of an acceptable quality assurance program.

One further issue in JWEL's approach to the ERA NE is the fact that, for many of the ERA's individual studies and study components, fully reviewed and agreed-upon sampling protocols were not completed until well after the samples were collected. Not having an agreed-upon SOP means that different individuals might undertake different sample-taking actions. Sample homogenization, splitting of bulk samples, and selection of optimum sample locations are only a few of the activities that could vary according to individual preferences in the absence of an SOP. Each variation will add imprecision and even inaccuracy to the data needed for environmental decision-making.

JWEL were made aware of the concerns that much of their fieldwork was done without finalized agreed-upon protocols at least twice before the release of their final ERA NE report. In the September 2004 ERA NE report (Tab C "Response to Stantec Comments"), they acknowledge that field work was undertaken with only a first draft protocol.

A review of the September 2004 field and analytical protocols in the Field Sampling and Laboratory Procedure document (JWEL, Vol. II, September 2004 ERA NE report) provides a good example of how JWEL has, in many cases, ignored the comments of the PLC Consultants to improve the quality of the reporting.. JWEL's final report continues to have some factual and technical errors, and confusing statements. Some examples:

- JWEL's document refers to "all seventeen (17) ICP metal parameters as well as for arsenic, selenium and antimony" (p. 8).

  However, Table 3 in the same document provides criteria for 19 parameters. This immediately follows the above discussion of "all seventeen (17) ICP metal parameters". This alone would lead a reader to conclude that the authors are confused on whether there were 17 or 19 or 20 metals or other parameters measured. In fact, there are at least 24 (and up to 30) ICP metal parameters in the data sets reported by the external lab.

  The report equates "Method Detection Limit" with "EQL" or estimated detection limit; these are two very different concepts.

- Variability (p. 9, Sn. 7), which is a measure of precision, is mistakenly confused with accuracy.

- "Duplicate samples", which means two samples of the same thing, is defined as "*any number of additional samples*" (p. 4). This is a definition of replicate samples. This mistake is found throughout the Protocols, and it shows confusion on the part of the report authors.

- Grammatical and spelling errors are numerous.

The above items are not presented to unduly criticize the ERA report, but to provide examples of technical errors that were repeatedly pointed out by reviewers and which were ignored.

JWEL was first made aware of these above matters at a meeting in their offices on January 16, 2003. After the errors were discussed, a copy of a corrected version was left with JWEL. As seen in the September 2004 final ERA NE report, these and many other errors were left unattended. However, JWEL clearly felt that something had to be done, as they acknowledged in their July 2003 ERA draft (Tab A):

> "*It is noted here, that for the CBRA process initial drafts of protocols were provided to the PLC consultants for review and comment as the technical advisor to the PLC. While JW takes responsibility to typos and grammatical errors, it is not clear to JW as to why Stantec would only wait until now to identify technical errors. The identification of technical errors in protocols developed by JW for the CBRA was the purpose of the PLC review process. In this respect, it appears that Stantec has not full filled (sic) its role and responsibilities to the PLC.*"

More than a year later, the 2004 September ERA report carries exactly the same comment. It's clear that just as the necessary changes weren't made earlier in 2003, they were also not attended to in 2004.

TAB 4

Jacques Whitford Review and Response to
Public Comments of Jacques Whitford Final Report dated September 2004

JACQUES WHITFORD REVIEW AND RESPONSE TO PUBLIC COMMENTS OF JACQUES WHITFORD FINAL REPORT DATED SEPTEMBER 2004

As part of a Community Based Risk Assessment (CBRA) initiated by Inco Limited to address potential impacts resulting from historical emissions from a former nickel refinery in Port Colborne, Jacques Whitford Limited (Jacques Whitford) completed an Ecological Risk Assessment (ERA) for the natural environment of Port Colborne. Following completion of two years of fieldwork and analysis of data, Jacques Whitford prepared a draft ERA report in July 2003. Following the CBRA process, copies of the report were presented to the City of Port Colborne (PLC) and the public for review and comment. These comments were reviewed by Jacques Whitford and where the response required revisions, these were incorporated into the Final Report completed in September 2004.

Following the tabling of the Final Report with the PLC, a public review and comment period extended to December 17 2004, the PLC received two formal written responses from the public. This section of the Addendum Report combines the comments of the public individual's review with Jacques Whitford's response following those comments.

The format of this section is to present the individual questions and comments in their entirety, with Jacques Whitford's response following each question, statement or comment.

1.0 Public Comment - Diana Wiggins, resident of Port Colborne.

1.1 CH2M Hill

1. **Rank A #3** – "The manner in which exposure of the VEC's is evaluated should reflect how these receptors experience their environment. Plants and invertebrates are immobile (or functionally so). They do not experience average CoC concentrations; rather they experience concentrations at each individual point. As a consequence, exposure for plants and invertebrates should be evaluated on a point-by-point basis."

Jacques Whitford's response: "This was the study design and approach agreed to by all stakeholders for the CBRA."

TSC meeting October 24, 2002 a PLC\TSC member "questioned what soil concentration will be used for animals that have small range distances."

Simply by saying the Protocol was approved by all stakeholders is not an appropriate response as this approach was in question. Please respond.

Jacques Whitford Response #1

Jacques Whitford states in the ERA report, that the study objective for the ecological risk assessment for the natural environment was to assess the potential risk of soil CoCs to a species population that occurred within the study area. In this way, the concept of a site-specific risk assessment is expanded so that the study area represents the site. That is why it is a Community Based Risk Assessment. This study design was selected because the CoCs are distributed over a large area, originating principally from a common source, and impact all land uses.

Similarly, the potential risk to an individual of a species population was not considered a reasonable end point, as potential risk to one individual of a population, would not, nor could not, put a species population in the study area at risk. Therefore, for the ERA a sustainable population of a species within the study area was the risk assessment endpoint (see Section 1.4.8 General Study Design and Approach).

For the CBRA, the study area is defined as the lands where soil concentrations of nickel exceeded the MOE generic guideline of 200 mg/kg. To assess risk at a population level, data were collected throughout the study area to determine the exposure of a ***receptor's population*** to environmental media (i.e., soil, water, diet). Exposure values were determined by calculating the upper confidence limit of the mean (UCLM) where the number of samples collected were greater than 10 ($N \geq 10$) or the maximum value found where the number of samples collected was less than 10. This approach resulted in the use of CoC concentrations in exposure media that were significantly higher than the 200 mg/kg MOE generic guideline. A more detailed discussion on this approach is provided in Jacques Whitford's response to Stantec's comments under the cover of this addendum.

For the specific point raised by CH2M HILL that invertebrates and plants are not as mobile as birds and mammals and should be assessed on a point by point basis, Jacques Whitford provides the following. First, risk to plants as a result of elevated levels of soil CoCs was calculated in the ERA-Crops Study. In the crops risk assessment, point by point risk assessment was undertaken by exposing plants, in this case oats, to a range of soil CoC concentrations to determine at what level an effect could be determined. For soil invertebrates, in the final ERA - NE report, Jacques Whitford provided an analysis of earthworms for woodlots with the highest soil CoC concentrations. This analysis was specifically undertaken to address the CH2M HILL comment noted above. The analysis, as detailed in Section 11.3 of the report, identified "safe" soil CoC values for soil invertebrates.

2. **Rank C #27:** Jacques Whitford response is not clear. *Did the Beak and Klohn-Crippen 1997 study evaluate the effects of storm water and sediment discharges?*

Jacques Whitford Response # 2

The Lake Erie nearshore aquatic environment was not within the scope of the ERA-NE. This statement was presented in the first ERA report prepared by Jacques Whitford and presented to the TSC and PLC in March 2001. It was also stated that the Lake Erie near shore was not within the scope of the ERA in a Data Interpretation Protocol prepared by Jacques Whitford and presented to the TLC and PLC in April 2002. The Beak and Klohn-Crippen report noted above addresses the potential impacts of chemicals, including the CoCs, on benthic organisms that live in the lake sediment as well as on fish. The report found no significant effect on the local benthos community or fish. In the report, the chemicals found in the sediment and water were found to not solely originate from atmospheric deposition. As a result, for the CBRA assessing risk in Lake Erie as a direct result of atmospheric deposition of the CoCs is not possible.

3. **Rank B #60:** *Jacques Whitford response is misleading as the MOE does not have guidelines for nickel in water. Please indicate this.*

Jacques Whitford Response # 3

For the HHRA,analysis of water samples collected at the tap of drilled wells found that mean concentrations of arsenic and copper were below the applicable MOE Ontario Drinking Water Standard (ODWS). The reviewer is correct in that there are no MOE or Environment Canada criteria for cobalt and nickel in drinking water. However, the mean cobalt and nickel concentrations did not show exceedances with respect to US EPA Region III.2002. Region III RBC Table (United States Environmental Protection Agency Region II, October 9, 2002.)

4. **Rank B #83:** As per the reviewers comments "additional attention to these areas to determine whether they have been affected would seem to be warranted."

The area in question doesn't seem to have been studied in detail as per the suggestion of the reviewer. Please explain.

Jacques Whitford Response # 4

The Nickel Beach Woodlot and Wetland were studied in detail. These areas were included in the woodlot health study and leaf litter study. A number of soil and water samples were also collected from these areas (see Map 1 in ERA-NE). In addition, a bird survey was conducted for these areas (see Map 1 in ERA-NE).

5. **Rank A #96:** "The overall ecosystems in the Study Area are not **significantly** impaired and that adverse effects of CoCs in the soil on specific species populations in the Study Area are **probably** at a low level."

Please elaborate on Jacques Whitford meaning of "significantly" and "probably" as used in this response.

Jacques Whitford Response # 5

In the context of the paragraph provided by Jacques Whitford, "significantly impaired" would represent an existing condition where obvious gaps in species occurrence is found. That is, an area is found to support very low numbers of species of birds or mammals when compared to what could normally be expected to occur for that local area. For this ERA, significantly impaired as stated is based on an assessment of qualitative data such as number of species present, not a quantitative risk assessment.

In the context of the paragraph provided by Jacques Whitford, "probably" means that based on the assessment of qualitative data for a number of bird or mammal species, the potential for adverse effects of soil CoCs is not considered to be at a level that would result in observable effects on species populations.

6. Rank B #98: *It appears that the reviewer's comments should be addressed in the uncertainty section.*

Jacques Whitford Response # 6

The potential risk to a small carnivorous mammal, the common shrew, was calculated by Jacques Whitford. The common shrew was found not to be at risk. See calculations at the end of Tab A of the Final Report, September 2004.

7. Rank B #121: *Please clarify the reviewer's method of calculation with the reviewer and then indicate what the response was.*

Jacques Whitford Response # 7

Information presented in Figure 6-7 (former Figure 6-6), summarizes mean BAFs for three ponds in the secondary study area. Nickel BAFs for the individual ponds are 0.5, 0.3 and 1.4 (based on one composite sediment sample and tadpole sample for each pond) that when averaged provides a mean of 0.7, as presented in Figure 6-7. The intention of Figure 6-7 is to provide the reader with a representation of BAFs for the CoCs in the secondary study area pertaining to sediment, surface water and tadpoles samples. Jacques Whitford is of the opinion that presenting a mean BAF for the three ponds is appropriate.

8. Rank A #140: *The data referred to here for the ambient air for the HHRA has never been approved by the PLC or the members of the public. Therefore the statement "the values are very low and below current MOE guidelines" can not be verified. Please explain.*

Jacques Whitford Response # 8

Results of the ambient air values for the CoCs were collected for the HHRA following protocols that were reviewed by the PLC's consultant, Stantec. In addition, duplicate data were collected for independent testing by the PLC's consultant, Stantec. As a result, the data can be verified.

9. Rank A #147: *Why were adult frogs and plants excluded and who made this decision?*

Jacques Whitford Response # 9

Frogs and maple trees (plants) were not excluded from the risk assessment. Table 6-15 that is referenced in comment #147 presents those VECs for which risk assessment was undertaken based on different exposure scenarios, soil type (clay-organic) and habitat type (woodlot-field). The assessment of potential risk for adult frogs was undertaken based on the assessment of qualitative data collected during the frog calling surveys. Risk based on the quotient method could not be undertaken for adult frogs due to the lack of TRV values in the literature. For plants, risk was assessed for maples trees by undertaking greenhouse germination and growth studies, leaf health assessment of trees and generally by the woodlot heath study.

10. Rank B #154: *There is no response to the suggestion of including the conditions on the sample collection date (August 1, 2001).*

Jacques Whitford Response # 10

There is no need to present the conditions of the breeding pond at the time of sampling, as the assessment of risk to the toad tadpoles in the pond is based on the concentrations of the CoCs in the pond water. Pond water was collected and analysed for the four CoCs. The results of this analysis were used for the calculation of risk.

11. Page B-35 2.1.7 Lake Erie Near shore

With the proximity of contaminated soils and the Lake Erie shoreline as well as other water sources, the potential risk of CoC's in local soils could affect the quality of surface water, groundwater and sediment through storm water run off. This has been brought up many times through out this process and has yet to be resolved. What is Jacques Whitford going to do to resolve this?

Jacques Whitford response # 11

Jacques Whitford agrees that CoCs could enter the aquatic ecosystem of Lake Erie from a number of sources including surface water and groundwater from historic operations at the refinery site proper. That is why the Lake Erie nearshore lies outside the scope of the ERA, as the assessment of risk was to address the effect of CoCs in soils as a result of historic air deposition. Sediment in Lake Erie has a number of other potential sources for CoCs that are not related to atmospheric deposition; see Jacques Whitford response to comments on the Beak and Klohn-Crippen Report above.

12. Page B-36 Earthworm toxicity tests and field sampling protocol

See comments referring to Eisenia Andrei and using it in the green house study. In this respect as per the minutes of the meeting October 21, 2004 "Ron Huizer said there are limitations to lab testing." This needs to be added to the uncertainties section of the final report.

Jacques Whitford Response # 12

The comment made by Ron Huizer regarding "limitation to lab testing" was to point out that lab testing with the above noted worm species in pots with soils collected from the study area does not fully represent natural conditions found in the local environments (fields and woodlots) where soil levels of CoCs are elevated. That is why for the ERA considerable effort was undertaken to sample local soils to assess existing worm populations. These field data could then be used to assess whether the results of the lab testing were either over-or under-estimating the adverse effects on worms.

1.2 Other comments

13. *It is mentioned many times that risk is not evaluated* separately *for Primary and Secondary Areas for the Natural Environment. How then would it be possible to come up with an accurate clean up number\s for various levels of contamination as the numbers can be significantly different from the Primary to the Secondary Areas? Please explain.*

Jacques Whitford Response #13

As was noted above, data were collected from the entire study area so that the potential exposure of a receptor's population in the study area to CoCs could be assessed. As stated in the report in Section 8.2.4, should a potential risk to a receptor's population be identified following the assessment method, then through a back calculation by setting the risk quotient to 1, one could determine what a safe soil value for a CoC would be.

14. *Jacques Whitford mentions many times that the study approach and design has been agreed to by all stakeholders. As I have been questioning the exclusion of the groundwater studies since it was first discussed please identify whether members of the Public are considered to be Stakeholders. If members of the Public are considered to be stakeholders then your statements of agreements are incorrect. If they are not you need to make the reader aware of your interpretation of the Public and their comments.*

Jacques Whitford Response # 14

First, in the CBRA process the public is a stakeholder, and are represented by the Public Liaison Committee (PLC) and the Technical Sub-Committee (TSC). As well throughout the process, a public open house format was conducted at key milestones, including the study approach, VEC selection, and data analysis methods so that the public in the Port Colborne community could provide input and comment. Second, for the ERA, groundwater has not been excluded from the study. Section 2.1.5 provides a review of existing groundwater conditions and the occurrence of CoCs in groundwater. Based on this assessment, it is concluded that groundwater does not represent a pathway for potential exposure to CoCs for the receptors in the defined study area since impacted groundwater in the study area is principally restricted to the refinery property, and the migration controlled by wells which recover impacted groundwater for treatment. CoC impacted groundwater does not contribute to base flows to municipal drains or local springs. As a result, potential groundwater exposure to receptors in the study area is not possible.

15. *As this report relies a great deal on the Crop Study report and its outcome, I would like to reserve the right to be able to submit more comments as warranted.*

Jacques Whitford Response # 15

As was the case with the ERA-Natural Environment Report, the public will have the opportunity to review and comment on the ERA-Crop Studies Report.

Diana Wiggins
diana.wiggins@sympatico.ca

2.0 Public Comment - by Ms Ellen Smith, Resident of Port Colborne.

In addition to my previous comments in regards to the CBRA – ERA Natural Environment Report (July 2003) that were subsequently submitted to Jacques Whitford, the Ontario Ministry of Environment, the Public Liaison Committee and the City of Port Colborne, and upon reviewing the responses from Jacques Whitford that are included in the latest version of the ERA – Natural Environment Report dated September 2004, I submit the following additional comments for inclusion by means of an addendum to Jacques Whitford, the Ontario Ministry of Environment, the Public Liaison Committee, and the City of Port Colborne.

GENERAL COMMENTS:

1. *If this "final draft" version of the ERA Natural Environment report is referenced or referred to in other instances, are both reports (July 2003 & Sept. 2004) going to be made available to the interested party? Reason being, the current report (Sept. 2004) directs the reader to different "volumes" and "tabs" (of the previous draft version) in order to locate information within the current report. Unless those previous volumes are available to the reader, they would be misinformed and confused as to the whereabouts of that information. In addition, the comments/recommendations by CH2M HILL and members of the public are not properly addressed in the current report (Sept 2004) if comments/recommendations refer to other volumes of the previous draft (July 2003) report.*

Jacques Whitford Response #16

Copies of the draft July 2003 report will be made available to the Ontario Ministry of Environment (MOE) reviewers should the MOE make this request. The PLC and TLC already have copies of the draft July 2003 report. With respect to Jacques Whitford's response to comments on the July 2003 draft report, where changes have been made in the final report (September 2004) as a result of the reviewers comments on the draft July 2003 report, the location of these changes in the final September 2004 report have been referenced by volume, tab, section, page and paragraph so that review process is recorded.

2. *It is stated that the peer reviewers (CH2M HILL) provided two sets of comments in regards to the ERA report. It would be helpful had the reviewer's comments and Jacques Whitford's responses been separated instead of combined together. Were additional comments from members of the public, Stantec's, etc., available to CH2M HILL for reference to the report?*

Jacques Whitford Response # 17

CH2M HILL reviewers were provided the same July 2003 draft ERA-Natural Environment Report as was submitted to the PLC. That report contained Beak/Stantec comments following their review of the first draft report. The process following the tabling of the draft July 2003 report was to receive comments from both the public and CH2M HILL.

3. *Appendix "A" CH2M HILL comments - includes 4 pages at the end of the section that are presumably charts. What are these charts in reference to? There doesn't seem to be any indication in CH2M HILL's comments that these charts would refer to. Would Jacques Whitford explain what the 4 pages refer to?*

Jacques Whitford Response # 18

The four pages provide the data and calculations that were used to assess the potential risk to the Common Shrew. It is in reference to Jacques Whitford's response to comments made by CHM2Hill that risk should be assessed for the Common Shrew as it represents, in CHM2Hill's opinion, the most sensitive mammal identified to occur in the study area. Risk was assessed for the shrew following the Quotient Method and it was found not to be potentially at risk.

4. *Recently it was brought to the attention of Jacques Whitford personal that additional sampling was initiated by a resident's group and also by consultants for the City of Port Colborne for the Wignell and Michener Drains that transect the Natural Environment study area. Jacques Whitford feels that this additional information regarding groundwater and sediment testing is not needed for inclusion in the present Natural Environment report citing they have enough information with the limited testing they have done in that regard. Members of the public have asked repeatedly since the inception of the CBRA process for certain emphasis to be placed in key areas of the natural environment to capture ALL necessary media that may be impacted as a result of CoC exposure. These requests have simply been ignored or excluded without just cause. Given that the information presented to Jacques Whitford regarding additional testing in the Wignell and Michener Drains is of utmost importance to the natural environment presently impacted by Inco's historic emissions, I would presently ask that this information be added to the current report as an addendum.*

Jacques Whitford Response # 19

The issue regarding recent sediment sampling in the Wignell and Michener drainage systems in the ERA study area has been brought to Jacques Whitford's attention. Jacques Whitford has reviewed the reports prepared by Niagara Environmental Dynamics Ltd and provided the PLC with a letter (November 25/04) detailing our review. This review found that the sediment data collected for the ERA and those collected by Niagara Environmental Dynamics Ltd. are similar.

With respect to the ERA, it is important to note that an assessment of risk to the aquatic environment of these drains was not within the scope of the ERA. For the drains in the study area, the chemicals found in the sediment do not solely originate from atmospheric deposition. As a result, for the CBRA assessing risk to the aquatic environment of the drains as a direct result of atmospheric deposition of the CoCs is not possible.

For these drains, sediment sampling was undertaken for the ERA for the purpose of assessing the movement of CoCs in the environment only with respect to frogs and tadpoles. As a result, sediment sampling was undertaken *at locations where frog and tadpole samples were collected* so that the relationship between the concentrations of CoCs in the environmental media, sediment, water and frog/tadpole tissue could be understood. This analysis is presented in Figure 6-6 (page 6-11) and Figure 6-7 (page 6-12). It is Jacques Whitford's opinion that sufficient samples of sediment, water and tissue of frogs and tadpoles were collected to assess the movement of CoCs from sediment to frog/tadpole tissue.

With respect to the assessment of risk assessment to frogs and tadpoles as a result of CoCs in the sediment and surface water of local ponds and drains, the assessment of risk is based on the exposure of frogs and tadpoles to the concentration of CoCs in the surface water. No toxicity reference values (TRVs) for sediment to frog/tadpole pathway were found in the literature and therefore the potential risk to frogs and tadpoles due to sediment exposure to CoCs is not possible. However, with respect to potential risk to frogs and tadpoles to elevated levels of chemicals in a local environment, the literature indicates that the exposure through water concentrations is the most significant exposure pathway. Therefore, "new" sediment sample data do not alter the findings of the risk assessment following methods used in this ERA.

Appendix "B" Jacques Whitford response to public comments (Ellen Smith):

- Page B-3, 3rd bullet, *Where is the given MOE reference to "metals in tree foliage" found within the report? JW states that the reference, which refers to and is provided in section 9.0 Table H-2, but when the reader locates the information there is no mention of the MOE reference document.*

Jacques Whitford Response # 20

The second paragraph on page 9-12 in Section 9.0 provides the discussion and reference to the MOE document. Table 9-1 on the same page presents the concentrations of the CoCs in leaf tissue from the study area and the MOE Guideline Upper Limit of Normal Concentration for the CoCs in leaf tissue.

- Page B-3, 5th bullet, *JW gives a definition of what they understand is an "unacceptable risk" or "safe values" as per the ERA which may be different to that of the regulatory agency, the Ministry of Environment. Is this information stated in the report so that the reader will be informed of the difference of meanings?*

Jacques Whitford Response # 21

The first paragraph in Section 1.4.6 on page 1-15 provides Jacques Whitford's definition of an unacceptable risk. This definition was given to provide the MOE the context in which the risk assessment was undertaken, that is, at the population level for the study area. Generally, the MOE considers a concentration of a CoC that is equal to or less than an 25% effects concentration (EC_{25}) or No Observable Adverse Effects Level (NOAEL) or Lowest Observable Adverse Effects Level (LOAEL) as "acceptable risk" levels. For the ERA, EC_{20} were used for tadpoles while NOAEL and LOAEL were used for birds and mammals.

- Page B-4, 2nd bullet, *JW states, "it was clearly identified early in the process at PLC meetings that pets would not be considered VEC's with respect to the natural environment..." I believe there was and still is a difference of opinion between JW and the public as to whether or not pets should be included in this area of study. Early in the process JW stated they could possibly look into the inclusion of pets within this study, and it wasn't until possibly last year when JW stated publicly that they wouldn't be including pets in the Natural Environment report. Reasons given for the exclusion were not acceptable to some members of the public.*

Jacques Whitford Response # 22

The issue regarding the assessment of risk to pets has been noted in a number of Jacques Whitford responses to public comments presented in the draft report as well as at PLC meetings. When assessing pets (as opposed to wildlife), risks are typically evaluated with consideration for pets as individuals because of the importance that people place on their individual pets. In the ERA-NE environment report, we evaluated the endpoint of an effect level at or near the NOAEL. In an assessment of pets, the NOAEL would be considered appropriate so there is only a small deviation from this.

Reviewing the specific TRVs selected for mammals in the ERA-NE, LOAELs were selected for nickel, cobalt and arsenic. A NOAEL was selected for copper. For copper, there would thus be no difference in TRVs if pets were evaluated and thus the consideration of wildlife as surrogates for pets exposed to the same environmental concentrations is conservative.

For nickel, cobalt and arsenic, somewhat more conservative values may have been selected, estimated as follows:

- Nickel – TRV a factor of 3 lower
- Cobalt – TRV a factor of 2.6 lower
- Arsenic – TRV a factor of 2.5 lower

The implication of this is that it is reasonable to assume that wildlife are suitable surrogates for pets exposed to similar concentrations if pets are not likely to receive more than 1/3 of the exposure of wildlife (e.g., receive 1/3 or less of their diet from hunting and/or foraging). This would seem to be a reasonable assumption for pets. Given that the potential risk to mammals in the natural environment is very low, the overall conclusion would be that the potential risk to pets (dogs/cats/rabbits/guineapigs/llamas/hamsters/ferrets/chinchillas/mice/rats/pony/horses/hedge-hogs, etc.) is low.

– Page B-5, 1st bullet, *JW states that requested reports would be given to the PLC. Why couldn't the reports requested by the reader not be given directly to the reader?*

Jacques Whitford Response # 23

The reports listed have been presented to the PLC. Any member of the public can request a copy from the PLC.

– Page B-5, 2nd bullet, *JW discusses the rationale for estimating emissions while the facility was on "shut down". Is this discussion included in the report in the appropriate section thereby informing the reader the rationale for the estimation?*

Jacques Whitford Response # 24

The discussion is provided in the third paragraph on page 1-8 in Section 1.

– Page B-5, 4th bullet, *JW discusses the flow of contaminated groundwater off site of the Inco Refinery and states that it flows south to Lake Erie but is not representative of an exposure pathway for the natural environment. This reader tends to disagree with this statement as the CBRA process is supposed to encompass ALL*

environmental media including soil, air, and water. Contaminated groundwater is an environmental media that deserves further study because of its effect on the natural environment, the aquatic environment as well as rural residential drinking wells.

Jacques Whitford Response # 25

Based on the study's review of groundwater flows in the local area, exposure to groundwater is not a potential exposure pathway for receptors (birds/mammals/frogs/plants) in the study area. The aquatic environment of Lake Erie was not within the scope of the ERA and potential risk to residents from drinking wellwater is addressed in the Human Health Risk Assessment (HHRA). Also see Jacques Whitford response # 14.

- Page B-6, 2nd bullet, *JW states that the purpose of the CBRA in the Port Colborne area was conducted for CoC's that have elevated concentrations in soil as a result of historical emissions form the Inco Refinery. This reader feels that there should be the inclusion in the wording to this statement...."The CBRA was conducted for CoC's in the Port Colborne area that have elevated concentrations in soil, air and water, as a result of historical emissions from the Inco Refinery."*

Jacques Whitford Response # 26

For the ERA, the concentrations of CoCs in soil, sediment, water and air were assessed and used in the exposure assessment for the various receptors studied.

- Page B-7, 2nd bullet, *JW states that the diversity of birds, mammals, frogs, trees, shrubs, etc., is typical for the Port Colborne area contrary to general public opinion. Where is the proof that shows this diversity of species exist contrary to that of public opinion? Has there been additional studies within the Study Area that JW has undertaken that shows or gives factual evidence that all the species they have stated exist, actually exist in this local? Wouldn't experience from local residents that have lived here for 20, 30, 40 or more years of the types of species they've encountered be more realistic than say studies that are dated, or "field explorations" that were done over the course of a few months??*

Jacques Whitford Response # 27

The species identified to occur in the study area as detailed in Section 3.0 were identified by qualified field biologists over a two year period. In addition, a representative of the PLC's consultants, a biologist, accompanied the Jacques Whitford biologists during many of the field surveys to verify the occurrence of the species reported for the study. Finally, local residents can

be good sources for information for identifying the ***occurrence*** of birds, mammals, plants etc. in a local area. However, during public meetings, local residents made the point that many ***species were absent.*** These statements were not supported by the field work conducted for the ERA by Jacques Whitford and Stantec biologists.

- Page B-8, Continuation of last bullet on page B-7, *JW discusses their particular interest in the Fowler's Toad and that a "good data set could be collected", but yet this wasn't the case for other rare species such as birds. This discussion is contradictory to the previous answer JW gives for diversity of flora and fauna in the Study Area.*

Jacques Whitford Response # 28

The discussion provided on page B-8 is not a contradiction. It only states that some species are harder to collect data for than others (based on a number of different factors such as abundance, visibility or detectability). The determination of the level of diversity of a local area's flora and fauna is based on the observations or documentation of the number of species.

- Page B-9, Continuation of last bullet on page B-8, *JW discusses the need for data collection protocols to be changed in the field but in the response to the original question is not answered. When changes in the field were made, was it documented and by whom? Where are those changes located in the report?*

Jacques Whitford Response # 29

The protocols presented in the September 2004 Report in Volume II present the data collection methods. The maps at the back of Volume I present the actual location of the sample sites. Field notes document all data gathering activity; however, there is no official documentation form to record protocol changes while in the field. The PLC consultant was present when most data were collected, and has reviewed the protocols and maps in the September 2004 report.

- Page B-10, 1st bullet, *JW discusses the use of the 0-5 cm soil profiles used in the sampling program and also states that "this discussion will be inserted into the report in place of the referenced statements". This reader did not find any insertion of this information in the September report. Could JW please specify where it has been added?*

Jacques Whitford Response # 30

Please refer to section 2.1.3.1 where the distribution of CoCs in soils is discussed. Additional text is provided in the second paragraph on page 2-5 and in Table 2-2 on page 2-10.

- Page B-10, 3rd bullet, *JW states that the ponds of Figure 6-7 are identified as TM1, TM2 and TM3. When the reader refers to that section of the report the text only identifies the sample #'s and not the location of the 3 ponds in question. TM1, TM2 and TM3 refer the reader to tadpole samples not the location of the ponds. Could JW be more specific as to where the 3 ponds are located?*

Jacques Whitford Response # 31

Tadpoles live in ponds. Therefore, the location of the tadpole sample sites is the same as the pond's location.

- Page B-11, 3rd bullet, *JW refers "to a comment above (previous) regarding including wild grapes in the data set". This reader can not find any previous comments regarding wild grapes in the data set. Could JW specify or answer the original question in more detail?*

Jacques Whitford Response # 32

See comment to the second bullet on page B-9.

- Page B-12, 4th bullet, *JW discusses the difference between ESG and Environmental Science Group as per the question posed but the answer given doesn't explain whether the two are one in the same. Could JW be more specific in their response? Also conflicting response to similar question posed by another member of the public. (see Appendix B, page B-38)*

Jacques Whitford Response # 33

ESG and Environmental Science Group are two different companies; therefore they are not one in the same.

- Page B-13, 3rd bullet, *JW discusses the definition of "community". Has this statement been changed within the report or were the peer reviewers aware of this definition? Should they have been?*

Jacques Whitford Response # 34

With respect to the term "community", Jacques Whitford's statement as presented in the initial response remains the same in that the findings of the ERA are applicable to all natural environments in the Port Colborne area where soil CoC concentrations exceed current MOE guidelines. With respect to the reviewers, the report clearly identifies the study area on which the assessment of risk was undertaken.

- Page B-14, 1st bullet, *JW states that the reader request certain reports from different agencies. How would a member of the public know what to ask for or have interested in reading when these reports have just been presented in this report? How would a member of the public know what reports the PLC has or hasn't? Is it not the responsibility of the author(s) of this report to make available other reports that were used in the formation of their report? Some of the requested reports that are used in reference to this Natural Environment report (i.e. Jacques Whitford 2002b. Ambient Air Monitoring....Human Health Risk Assessment...June 3,2002) have not been made available to the public as of yet. So how is it that the public can request them from the PLC Chair? Would JW further clarify?*

Jacques Whitford Response # 35

Jacques Whitford is not responsible for providing the public with copies of reference documents. The references section of the ERA and other CBRA reports prepared by Jacques Whitford indicate the source of the reference should an individual wish to obtain a copy. With respect to documents prepared by Jacques Whitford for the CBRA, copies can be acquired by the public from the PLC when they have been presented to the PLC.

- Page B-15, 1st bullet under Volume 2, *JW advises that the text will be changed to "for review by the Technical Subcommittee (TSC) and Public Liaison Committee (PLC)". This reader suggests that the text be changed to read, "for review and approval by the Technical Subcommittee (TSC) and review by the Public Liaison Committee (PLC)" as this seems to be a more fitting statement.*

Jacques Whitford Response # 36

It is Jacques Whitford's understanding that the TSC has a review and comment role, not an approval authority.

- Page B-16, 1st bullet, *JW discusses the use and inclusion of ambient air CoC concentrations that were undertaken for the HHRA program. How is it that HHRA data can be used in this Natural Environment report when the HHRA report and data has yet to be released and approved of by anyone?*

Jacques Whitford Response # 37

Collection of data for the determination of ambient air CoC concentrations for the HHRA followed protocols that were reviewed by the TSC. In addition, the collection and analysis of air data for the HHRA followed QA/QC procedures that included the PLC Consultant.

- Page B-16, 3rd bullet, *JW discusses the QA/QC procedures used in the laboratory for cross-contamination and the potential for cross-contamination. Has this explanation been made in the text?*

Jacques Whitford Response # 38

No, the QA/QC procedures used by the laboratory are not specifically addressed in the report. These QA/QC procedures are the responsibility of the laboratory and are required for their certification. Laboratories used for CBRA sample analysis are SCC/CAEAL accredited.

- Page B-17, 3rd bullet, *JW discusses the inclusion of an area of the Rodney St. Community for collection of samples. First of all, this discussion has nothing to do with the question posed regarding sample collection prior to protocols being reviewed and approved. Secondly, the Rodney St. Community is a residential area not ecological, therefore, as per JW definition not part of the Natural Environment Study area.*

Jacques Whitford Response # 39

The response provided by Jacques Whitford on page B-17 clearly states that the protocol was presented to the PLC prior to the collection of field data. With regard to the inclusion of the Rodney Street community residential area for the ERA, the reviewer is correct, this area is not a natural environment and not part of the Study Area as identified in the ERA Report. The frog calling survey conducted for the Rodney Street residential area was undertaken by Jacques Whitford at the request of the PLC.

- Page B-18, 2nd bullet, *JW in response to a question regarding two survey stations in the Rodney St. Community for frog calling, states that this request was included at the specific request of the PLC. This reader is of the opinion that given that discussion, more sample locations should have been identified within the Rodney St. Community and further sampling should have been undertaken.*

Jacques Whitford Response # 40

Based on Jacques Whitford's survey of the Rodney Street community, the two sample sites chosen represented the only areas where there could be a reasonable possibility for the occurrence of a breeding habitat for frogs and toads. It is therefore Jacques Whitford's opinion that the location of two calling stations is sufficient for detecting the potential occurrence of frogs and toads for the Rodney Street community.

- Page B-18, 3rd bullet, *JW discusses the inclusion of the "backshore areas of Nickel Beach" being in fact within the Study Area then proceeds to state that the potential breeding areas for the Fowler's Toad includes the Nickel Beach area* ***adjacent to the Inco Refinery****. Earlier in response to a question regarding the location of the Fowler's Toad habitat being on Inco property and hence NOT within the Study area, JW stated that the breeding ponds were in fact east of Inco property along the lakeshore. Would JW clarify where exactly the breeding pond(s) are located for the Fowler's Toad and whether or not they are within the Study Area or on industrial property per JW definition?*

Jacques Whitford Response # 41

Investigations undertaken in 2000 identified the ***potential*** for breeding areas for Fowler's Toad in the Nickel Beach area and lands adjacent to the refinery site. Field surveys conducted in the spring of 2001 did not find the toads breeding in these areas. A breeding pond was found along the lakeshore along the west side of Cassadey Point.

- Page B-19, 1st bullet, *JW states that the reader request documents from the PLC as provided by JW. Again, please see comment for Page B-14 above*

Jacques Whitford Response # 46

As an ISO 9001 registered company, Jacques Whitford has in-house standard QA/QC policies and procedures. In addition to these in-house measures, as stated in the text of Section 15, a specific Laboratory QA/QC was developed for the CBRA.

- Page B-20, 6th bullet, *JW discusses the use of information provided by ESG as referenced in EC's "Development of Earthworm Toxicity Tests for Assessment of Contaminated Soils. Has this information been stated in the present report?*

Jacques Whitford Response # 47

Methods used in the earthworm toxicity testing are detailed in the ESG report provided in Volume IV of the ERA report.

- Page B-23, 1st bullet, *JW again directs the reader to request documents from the PLC Chair. Again, see comments from Page B-14 in regards to this type of request.*

Jacques Whitford Response # 48

See Jacques Whitford Response # 35 to comment Page B-14, 1st bullet above.

- Page B-26, 3rd bullet, *JW states that Stantec observed the forester in field collection of data and that the forester took core samples to assess age. JW also states that "the cores were later sent for analysis". Would JW clarify what the cores were analyzed for?*

Jacques Whitford Response # 49

The cores were analyzed for the four CoCs. The cores were subdivided by 20 year increments before they were analyzed. The core analysis was conducted so as to provide potential additional data should the woodlot health study find that woodlot productivity was reduced significantly in areas with high soil levels of CoCs. As the woodlot health study did not find a significant reduction in woodlot productivity, further discussion on the core analysis is not provided. However, the data of the core analysis is provided in the ERA Report in full, see Volume V, Tab 43.

- Page B-28, 2nd bullet, *JW discusses the difference between "5 scenarios" and "4 scenarios" and further states that the first scenario refers to the "overall study area". Is this explained in the report so the reader understands the difference?*

Jacques Whitford Response # 50

Please refer to Section 6.5.3 and table 6-15 for a detailed discussion on the exposure scenarios used for the ERA.

- Page B-30, 1st bullet, *JW states that the use of outside consultants was discussed at PLC meetings and that the CV's of these consultants were provided by JW to the PLC. As an avid participant of the PLC meetings, as well as being a concerned citizen, I have limited recollection of discussions at these meetings about outside consultants being retained and ultimately approved and have even less recollection of CV's being provided to the PLC as requested. Could JW clarify further who actually approved of outside consultants being used?*

Jacques Whitford Response # 51

The PLC consultant (Beak/Stantec) were responsible for the review of qualifications of the outside consultants used in conducting the ERA.

In conclusion, I find that this version of the Natural Environment report was somewhat easier to follow but there still is confusion as to where certain information is located within the report. It is uncomprehendable to this reader as to why certain areas of the natural environment have been subject to limited testing or study, when the concept of the CBRA process is to encompass all media that may be impacted by Inco's historic emissions. To exclude or limit areas would surely result in an unbalanced report of Port Colborne's true natural environment.

Respectfully,
Ellen Smith
Resident of Port Colborne

Jacques Whitford Response # 52

It is Jacques Whitford's opinion that the delineation of the Study areas, identification of VECs and collection and analysis of data from various biota and environmental media both over the area of CoC impacts, and from reference areas, provided sufficient and credible scientific data to determine the potential risk to the Natural Environment in the Port Colborne community.

Jacques Whitford Response # 42

Please see Jacques Whitford Response # 35 to comment Page B-14, 1st bullet above.

- Page B-19, 3rd bullet, *JW discusses the difference of transects on and off of Inco's Refinery site and whether or not they are within the Study area. This reader requests that this information be included in the section of this report that defines the "Study Area" if it is not already.*

Jacques Whitford Response # 43

The definition of the study area for conducting the site characterization and collection of field data for the ERA is clearly identified in the text in Section 1.4.8 and on Map 1.

- Page B-19, 4th bullet, *JW states that Fig 1-1 should have been provided in Volume II but that Map 1 in Volume 1 is the same map. Could JW please clarify this statement? Again, what if the reader has only one version of the ERA – Natural Environment report? This information wouldn't be readily available for the reader to locate in whatever version of the report they were reading.*

Jacques Whitford Response # 44

For the ERA, survey locations and sample site locations are presented on Map 1 and Map 2 at the back of Volume I.

- Page B-20, 1st bullet, *JW discusses the reasoning for collecting maple keys from one tree as compared to collecting from a number of trees, but part of the original question regarding the location of Fig 1-1 and 1-2 has not been answered and cannot be located in the present document.*

Jacques Whitford Response # 45

For the ERA, survey locations and sample site locations are presented on Map 1 and Map 2 at the back of Volume I.

- Page B-20, 4th bullet, *JW does not answer the question posed regarding the QA/QC protocols under the "Company's ISO 9001registration" as compared to the QA/QC process under the present CBRA process. Would JW please clarify this question again?*

TAB 5

Summary of Jacques Whitford Responses to
Specific Comments raised by the PLC's Consultant and Community Members.

SUMMARY OF JACQUES WHITFORD RESPONSES TO SPECIFIC COMMENTS RAISED BY THE PLC'S CONSULTANT AND COMMUNITY MEMBERS.

Following a Technical Sub-Committee (TSC) meeting held on January 20, 2005 to review the comments on the Final ERA-Natural Environment Report (September 2004) and Jacques Whitford response, the TSC Chair prepared Chairman Notes (Tab 6) and a Recommendations Report from the TSC (Tab 7). The Recommendations Report was presented at a PLC meeting held on February 17, 2005. During this meeting it was requested by the PLC that Jacques Whitford prepare summary responses to a number of specific issues that were raised in the TSC Chairman Notes on the January 20, 2005 TSC meeting and Recommendations Report.

The following provides Jacques Whitford summary response to six specific issues raised by the TSC and public following their review of the final report.

1. Exclusion of Pets and Residential Areas For Conducting the ERA

For the CBRA the purpose of conducting the ecological risk assessment was to determine whether elevated soil levels of the chemical of concern (CoCs), nickel, copper, cobalt and arsenic were having an adverse effect on the populations of naturally occurring populations of flora and fauna and ecological functions found in local Port Colborne area. As stated in Jacques Whitford's first report presented to the PLC in March 2001, based on CCME 1997 guidelines, "For the purposes of an ecological risk assessment for the natural environment, social features in the environment or humans are not considered to be ecological receptors in the assessment of adverse effects" (Jacques Whitford 2001, section 3.1, page 28).

Following these accepted government guidelines for conducting an ERA in Canada and the Province of Ontario, urban/residential areas of Port Colborne were not considered to be part of the study area as defined for the ERA-Natural Environment for the CBRA. As a result, site-specific data for environmental media (water, soil, biological tissue) was not collected for residential areas where elevated levels of soil CoCs were known to occur. Similarly pets, primarily dogs and cats, were not specifically identified as Value Ecosystem Components (VECs) on which an assessment of potential risk would be conducted, as pets do not represent naturally occurring native fauna and are therefore outside the typical scope for conducting an ERA. That pets were not identified as VECs for the CBRA ERA was clearly identified in the Data Interpretation Protocol prepared by Jacques Whitford in February 2002 and presented to the PLC and Open House.

Nevertheless, following the completion of the draft and final ERA Reports the issue regarding the assessment of potential risk to pets has been raised as an outstanding issue by both the PLC's Consultant and public. As a response Jacques Whitford has stated that the results of the assessment of potential risk to natural occurring mammals that were identified as VECs for the ERA can be used as a surrogate for assessing potential risk to pets in residential areas. For example, based on body weight and exposure through diet, which are important factors when assessing potential risk to mammals, dogs and cats are very similar to Fox and Raccoon, which were VECs used in conducting the ERA. In addition, based on the assessment of soil CoC concentration levels found to occur in residential areas, soil CoC concentrations in the natural environment are higher or equal to those found in the residential areas.

When assessing pets (as opposed to naturally occurring wildlife), risks are typically evaluated with consideration for pets as individuals because of the importance that people place on their individual pets. In the ERA-Natural Environment report, we evaluated the endpoint of an effect level at or near the NOAEL. In an assessment of pets, the NOAEL would be considered appropriate so there is only a small deviation from this.

Reviewing the specific TRVs selected for mammals in the ERA-NE, LOAELs were selected for nickel, cobalt and arsenic. A NOAEL was selected for copper. For copper, there would be no difference in TRVs if pets were evaluated and thus the consideration of wildlife as surrogates for pets exposed to the same environmental concentrations is conservative.

For nickel, cobalt and arsenic, somewhat more conservative values may have been selected, and these are estimated as follows:

- Nickel – TRV a factor of 3 lower
- Cobalt – TRV a factor of 2.6 lower
- Arsenic – TRV a factor of 2.5 lower

The implication of this is that it is reasonable to assume that wildlife are reasonable surrogates for pets exposed to similar concentrations if pets are not likely to receive more than 1/3 of the exposure of wildlife (e.g., receive 1/3 or less of their diet from hunting and/or foraging). This would seem to be a reasonable assumption for pets. Given that the potential risk to mammals in the natural environment was found to be very low, the overall conclusion would be that the potential risk to domestic mammalian pets such as dogs and cats is also very low.

2. Exclusion of Aquatic Environments –Lake Erie/Municipal Drains

For conducting the ERA, the assessment of potential risk to flora and fauna due to exposure of elevated soil levels in the terrestrial environment was identified as the scope of work for the ERA. As a result, aquatic environments, namely the aquatic nearshore of Lake Erie and local municipal drains, were not included for assessment for the ERA. That the Lake Erie nearshore aquatic environment was not within the scope of the ERA-Natural Environment was presented in the first ERA report prepared by Jacques Whitford and presented to the TSC and PLC in March 2001. It was also stated that the Lake Erie nearshore was not within the scope of the ERA in a Data Interpretation Protocol prepared by Jacques Whitford and presented to the TLC and PLC in April 2002. In the Jacques Whitford 2001 report, it was noted that previous studies had addressed the potential impacts of chemicals, including the CoCs, on local fish and benthic organisms that live in the lake sediment in the vicinity of the Inco Port Colborne refinery. The report found no significant effect on the local benthos community or fish. In addition in the same report, it was noted that the chemicals found in the sediment and water did not solely originate from atmospheric deposition. As a result, for the CBRA assessing risk in Lake Erie as a direct result of atmospheric deposition of the CoCs is not possible.

Jacques Whitford agrees that CoCs identified for the CBRA could possibly enter the aquatic ecosystem of Lake Erie from a number of sources including surface water and groundwater from historic operations at the refinery site proper. However this is why the Lake Erie nearshore lies outside the scope of the ERA, as the assessment of risk for the ERA was to address the potential adverse effects of CoCs in terrestrial soils as a result of historic air deposition. Sediment in Lake Erie has a number of other potential sources for CoCs that are not directly related to atmospheric deposition. The same is true for CoCs levels in the sediments of the local municipal drains, where historic sources of CoCs in the sediment may not be limited solely to atmospheric deposition.

The issue regarding recent sediment sampling in the Wignell and Michener drainage systems in the ERA study area was also brought to Jacques Whitford's attention through the PLC. Jacques Whitford has reviewed the reports prepared by Niagara Environmental Dynamics Ltd and provided the PLC with a letter (November 25/04) detailing our review (Tab 2). This review found that the sediment data collected for the ERA and those collected by Niagara Environmental Dynamics Ltd. are similar and thus no new information was provided to the ERA.

However, as stated, with respect to the ERA, assessment of risk to the aquatic environment of these drains was not within the scope of the ERA. For these drains, sediment sampling was undertaken for the ERA for the purpose of assessing the movement of CoCs in the environment with respect to frogs and tadpoles. As a result, sediment sampling was undertaken at locations where frog and tadpole samples were collected so that the relationship between the concentrations of CoCs in the environmental media, sediment, and water and frog/tadpole tissue could be understood. This analysis is presented in Figure 6-6 (page 6-11) and Figure 6-7 (page

6-12) in the final report. Regardless of the results of recent sediment sampling conducted for the local municipal drains, it is Jacques Whitford's opinion that sufficient samples of sediment, water and tissue of frogs and tadpoles were collected so as to be able to assess the movement of CoCs from sediment to frog/tadpole tissue.

With respect to the assessment of risk to frogs and tadpoles as a result of CoCs in the sediment and surface water of local ponds and drains, the assessment of risk is based on the exposure of frogs and tadpoles to the concentration of CoCs in the surface water. No toxicity reference values (TRVs) for sediment to frog/tadpole pathway were found in the literature and therefore the potential risk to frogs and tadpoles due to sediment exposure to CoCs is not possible.

Finally, it should be noted that with respect to potential risk to frogs, tadpoles and fish to elevated levels of the CoCs in the local aquatic environments, the literature indicates that the exposure through water concentrations is the most significant exposure pathway. Therefore, "new" sediment sample data do not alter the findings of the risk assessment following methods used in this ERA.

3. Changes to TRVs and Risk Quotients in Final Report

Refinement and improvement of the assumptions, data and calculations led to changes in calculated hazard quotients between the final draft report and the final report. The values in the draft report can be discarded and those in the final report are considered as final. The following should be noted.

Changes to the risk quotients from the first draft report to the final report were explained in the appendices of the final report, specifically Jacques Whitford's response to questions posed by draft report reviews from CH2M HILL and Stantec. Revisions were made that reflected changes to the values input into the risk quotient, including the following:

- Toxicity Reference Values were re-examined and modified to more accurately present toxic values to receptor species, amended in particular to body weight;
- Diets of some receptors were re-examined and modified to reflect more accurately actual diets in the Port Colborne area;
- Potential exposure of CoCs due to inhalation of air was omitted as part of the exposure calculation; and,
- Ingestion rates modified based on a re-examination of normalizing the ingestion rates in relation to body mass and moisture content of diet items (i.e., ensuring ingestion rates from the literature were amended to specific body weights and moisture content of diet items used in the parameter estimates).

Detailed explanations of how the Toxicity Reference Values were chosen, and the parameter estimates used in calculating exposure, are presented in Volume III of the ERA Final report.

4. Primary and Secondary Study Areas, sampling and "Averaging" of Data

The ERA looked at the potential risk of the CoCs on *populations* of receptors, with a population spatially defined as those animals within the Study Area (both the Primary and Secondary Study Areas used for data collection purposes). This was discussed with members of the Technical Sub-Committee and Public Liaison Committee throughout the process, and was an approach selected due to the large spatial scope of the ERA, rather than the usual smaller scope of a Site Specific Risk Assessment (SSRA). The use of UCLMs for assessing risk at the population level is typical risk assessment practice, and was an approach presented to the TSC and PLC. For those data sets with 10 or more data, a UCLM was derived. For data sets with fewer than 10 data, the maximum was used. The values used to estimate exposure of receptors to CoCs were high, largely based on UCLMs or maximums within data sets collected on the Site. For example, the soil nickel concentrations inputted into exposure calculations were as follows (from Tables 6-17 and 6-18 of the final report):

- Overall – 2650 mg-Ni/kg
- Woodlots on clay soils – 1630 mg-Ni/kg
- Fields on clay soils – 1090 mg-Ni/kg
- Woodlots on organic soils – 15,200 mg-Ni/kg
- Fields on organic soils – 2020 mg-Ni/kg

The areas within the study area where the above soil nickel values are found to occur are presented in Figure 1 of Tab 3 of this Addendum. A review of Figure 1 graphically demonstrates that for the assessment of potential risk to a population in the study area, the assessment area is in fact based only on a small area of the total study area. As can be seen by the above numbers, the soil nickel concentrations used to estimate soil exposure to receptors are far higher than the 200 mg Ni/kg used to define the outer boundary of the Study Area, and far higher than even the outer boundary of the Primary Study Area, which is 500 mg Ni/kg (see Figure 1). If one wishes to assess the risk of receptors in the area with the highest soil nickel concentrations (i.e., the Reuter Road Woodlot), the scenario of "woodlots on organic soils" actually represents these values, with a high soil nickel concentration of 15,200 mg Ni/kg.

Trends in data were assessed in statistical analyses reported in Chapter 6, and effects potentially caused by CoC concentrations were statistically analysed and reported in Chapter 8. Variability of such data as earthworm CoC concentrations is controlled for by modeling it against the variable soil nickel concentrations (i.e., quantitative data) rather than Primary and Secondary Study Area (i.e., categorical data). The "averaging" of data was used for calculating exposures for derivation of a risk quotient; this was largely done for multiple scenarios, representing a variety of conditions. Additionally, the summary values inputted into exposure calculations represent areas with the highest soil nickel concentrations, as can be seen in Figure 1.

Finally, with respect to the concern that a specific assessment for the potential risk to an ***individual*** of a population that inhabits a ***specific individual area*** with the ***highest levels*** of soil CoCs, the reader is directed to Sections 11.2 and 11.3 and 11.4 of the Final Report, where an assessment of risk was undertaken for earthworms in the Reuter Road area.

It is Jacques Whitford's opinion that the data analysis and statistical methods applied to the data provide realistic estimates of VEC exposures to CoCs and of the potential risk to population sustainability in the Port Colborne community.

Dropped Earthworm Data

A comment was made by the PLC's Consultant that earthworm data presented in an earlier draft report were omitted from the final report. Although they did not provide the specific case, we presume they are referring to data collected in 2002, where data from one sample site (OW-H-24) was incorrectly thought to have been taken within the Study Area, and was reported as such in the draft ERA report produced in January 2003. However, confirmation of the sample site's location was conducted following the release of that early draft, and the sample site is actually outside of the Study Area, near the southern end of Miller Road. As a result, it was correctly considered to be within the Reference Area but outside the Study Area for subsequent drafts.

Irregular Distribution of Sampling Stations

As stated by Jacques Whitford in response to the same comment raised by the PLC's Consultant following their review of the draft report, Jacques Whitford does not share their opinion that there is an irregularity in the sampling locations. For the study, sampling sites were identified based on a set of predetermined criteria (located in the secondary and primary study areas based on soil Ni concentrations, organic and clay soils, and woodlots and fields). As the study area is heterogeneous with respect to these criteria, the resulting sampling pattern appears to be "irregular" when mapped; nevertheless the data collected are scientifically representative of environmental media and potential receptors in the study area.

Regarding the question as to whether the sampling program as undertaken may compromise the study, it should be pointed out that over 700 samples of environmental media and biota were collected. As stated in the cover letter of the independent third party reviewer, CH2M HILL, October 2, 2003, "It is apparent that great effort was spent to thoroughly assess risk to the natural environment. Few ERA's have the benefit of having such an extensive site specific data to support the analysis". As a final point, a critical review of the location of sample sites as presented on Map 1 shows that a significant portion of the sample stations are located in the area where soil CoCs are known to be at their highest concentrations. In this respect the "irregularity"

or "patchiness" of the sampling can be considered to have generated a data set that is **conservative** for the assessment of potential risk.

With respect to incomplete mapping of inland water bodies and its importance to the assessment of risk to amphibians, Jacques Whitford does not understand the relevance of this question. To assess the potential risk to frog and toad populations in the study area, sampling of frogs, tadpoles, surface water and sediment in water bodies (i.e., ponds, drains, ditches) was undertaken at locations throughout the study area. Sample sites were identified so that collectively the samples were representative of amphibian exposures to the CoCs in the study area. A detailed map showing the location of all ponds is not required to assess potential risk to frogs and toads as only a sub-set of these ponds would be/have been sampled.

5. Importance of Field Data as a critical line of evidence for ERA's

The ecological risk assessment undertaken examined three lines of evidence to examine the potential risk to biological receptors in the Port Colborne environment:

1 Detailed field observations (qualitative) and data collection (quantitative) of the Study Area's flora, fauna and environmental media;

2 Controlled laboratory experiments on specific VECs using soils collected from the Study Area; and,

3 Quantitative risk characterization using the Quotient Method with dose exposures based on specific data collected for the Study Area.

Each of the three lines of evidence were examined in Risk Characterization of individual VECs. Conclusions were drawn upon the interpretation of the lines of evidence available to the ERA team. Field evidence is only one of three lines, however, whether quantitative or qualitative, it is the "groundtruthing" mechanism used by risk assessors to ascertain whether or not laboratory or Quotient Method risks have under- or over-estimated potential risk to receptors. Therefore, careful consideration was given to field data in the interpretation of potential risk to VECs in the CBRA.

6. Lead as CoC for the CBRA

As part of the CBRA, Jacques Whitford undertook a review of historic operations of the refinery and a detailed mapping of existing soils concentrations of metals and other chemicals in the soil in the local Port Colborne area. Following a set of criteria established for identification of chemicals of concern (CoCs) for CBRA, Jacques Whitford analysis identified four CoCs: nickel, cooper, cobalt and arsenic. As a result, the assessment of potential risk was undertaken for these four CoCs only.

Following the review of a number of reports detailing the analysis for the identification of the CoCs, the TSC and PLC identified the need for further assessment be undertaken with respect to lead as a potential CoC. In June 2004, Jacques Whitford issued a report entitled *"Rev-evaluation of Lead as a Potential Chemical of Concern (CoC)"* which, based on further detailed analysis, supported the findings of the initial studies that lead did not full fill all the criteria for its inclusion as a CoC for the CBRA. Following review of 2004 report by the TSC, due to a lack of consensus within the TSC as to whether lead is a CoC for the CBRA, the issues of lead for the CBRA was deferred to the establishment of a Lead Task Force with a mandate outside of the CBRA process. At a PLC meeting held on January 13, 2005, the TSC recommended to the PLC that the decision regarding lead as a CoC for the CBRA be reserved until the outcome of the Task Force.

As the issue of lead as a CoC remains outstanding for the CBRA, at this time the final ERA-Natural Report will be submitted to the regulatory authority, the Ministry of the Environment, based on the assessment of potential risk for the four identified CoCs. Should in the future lead be identified as a CoC for the CBRA, an addendum report will be prepared by Jacques Whitford that will detail the analysis of the assessment risk for lead in the natural environment. If this study should be required a full assessment of the potential risk of lead to the identified VECs for the ERA can be undertaken as, during the course of the study, Jacques Whitford collected a full data set for lead in environmental media (soil, water, biological tissue) in the study area. However, it is noted here at this time that based on existing data with respect to lead concentrations in the natural environment in the Port Colborne area, and the sensitivity of natural ecological receptors to lead, it is not anticipated that lead will be identified as having a significant adverse effect on local populations of flora and fauna in the ERA study area.

TAB 6

TSC Chair's Notes on the January 20, 2005
TSC Meeting regarding the Jacques Whitford Final Report dated September 2004.

WATTERS ENVIRONMENTAL GROUP

Chairman's Notes

To:	Members of the TSC	From:	TSC Chair
Date:	February 9, 2005	Ref. #:	04-0007

Re: Chairman's Notes – January 20, 2005 TSC Meeting
Natural Environment ERA Report Review

In attendance:

Rob Watters, Chair, TSC, Watters Environmental Group
Jim Bishop, Stantec
Harry Wells, PLC Chair, Resident
Paul Dayboll, PLC member, Resident
Rosemari Quesnelle, PLC member, Resident
Bernie Sumbler, Resident
Ellen Smith, Resident
Dave McLaughlin, Ministry of the Environment
Bill Hunter, Niagara Region Public health Department
Del Fraipont, Inco
Maria Bellantino Perco, Inco
Bruce Conard, Inco consultant
Maggie Riopelle, Tribune / In-Port
Mike Sturman, PC Leader
Eric Veska, Jacques Whitford (JW)
Oliver Curran, JW
Chris Ollson, JW
Matt Holder, JW
Ron Huizer, JW

Purpose of Meeting:

The purpose of the meeting was to: (i) confirm whether Ellen Smith's comments on the JWEL Lead Report were addressed or considered by TSC members in their discussions; (ii) to discuss changes to the TSC Recommendations regarding the Integration Report, and (iii) discuss JWEL's responses to the various questions and concerns raised by TSC members and the community concerning the JWEL Natural Environment ERA report.

THE LEAD REPORT COMMENTS

In June 2004, Inco's consultant, Jacques Whitford Environment Limited (JWEL), issued a report entitled "*Re-evaluation of Lead as a Potential Chemical of Concern (CoC)*". This was the final report in a series that attempted to address whether lead should be considered a CoC under the Port Colborne Community Based Risk Assessment (CBRA).

At a Public Liaison Committee (PLC) meeting held on January 13, 2005, the TSC recommended that the PLC consider and accept the following:

- That there is a lack of consensus within the TSC as to whether lead is a CoC for the CBRA; and

- That the decision regarding the JWEL report be reserved until the outcome of a Task Force, which is to be established to continue addressing the matter of lead in Port Colborne.

The question was raised at this PLC meeting of whether Ellen Smith's comments were considered by TSC members through this process. It was confirmed at the meeting that all TSC members received Ellen Smith's comments and, although they were not dealt with point-by-point, these comments were considered and ultimately helped lead to the inability of the TSC members to gain consensus on whether lead was or was not a CoC for the CBRA. At this point, no further specific comments are being considered on the JWEL report itself; rather, the Task Force has been given the responsibility of addressing the lead issues in the City of Port Colborne.

THE INTEGRATION REPORT

At the January 13, 2005 PLC meeting, there was also presentation of a document concerning the TSC's recommendations on the Integration report. Following considerable discussion, the PLC requested that certain modifications be made to the TSC Recommendations Report, namely:

- That there is a desire to clarify the break between Part I and Part II of the CBRA;

- That the Integration Report should highlight the findings of Part I, and thus contain the intervention numbers and an outline of the implementation strategy. Part II should deal with the specifics of the implementation;

- That Sections 6.0 through to 10.0 of the proposed Table of Contents for the Integration Report (submitted as part of the TSC Recommendations document) be modified to consider the process for implementation, and not the specific tasks; and

- That the Integration Report also address storm water, drainage and lot grading.

It was decided that the TSC Chair would modify the TSC Recommendations report and re-submit to the PLC at the February 17, 2005 PLC meeting.

COMMENTS ON THE NATURAL ENVIRONMENT ERA REPORT

Peer Reviewers' Comments

- Ron H. advised that the peer review process involved CH2MHill first reviewing JW's July draft report and providing written comments to JW. JW responded in writing and CH2MHill responded back with outstanding issues. Ron advised that CH2MHill is satisfied that all of their comments have been addressed in this latest version of the report. Ron said that CH2MHill is in full agreement with JW's findings and conclusions.

- Ron H. was asked to highlight the main issues of the peer reviewer. He noted:

  - Inconsistency in rounding;
  - Changes to the Toxicity Reference Values (and to remove the "air" component);
  - Their view was that the most sensitive mammal was the shrew; and
  - Address woodlots specifically, and earthworms as indicators.

Community Members' Comments

- It was outlined that several community members put forth a considerable effort in providing comments on the report. Ron H. was then requested to highlight the community's concerns. He noted that the community wanted:

  - The aquatic environment to have been included in the assessment; and
  - Pets within the urban area to have been included.

- After being questioned by Rob Watters, Ron H. replied that pets were not mentioned by the peer reviewer. Several members of the JW team added that pets are simply not assessed in standard risk assessment protocols and procedures. It was raised that the CBRA is not simply another SSRA, and that the community (and PLC Consultants) have been raising this issue for some time. Following some discussion, Ron H. provided an explanation on how pets could be indirectly addressed through a surrogate analysis (i.e., using one of the studied VECs as reference). The group commented that they want JW to ensure that their response to the pets issue includes a reasonably complete discussion of a surrogate assessment, rather than to say that pets were simply excluded.

PLC Consultants' Comments

- The PLC Consultants argued that JW's approach to averaging all of the data within the primary and secondary study areas is inappropriate. In JW's previous (July 2003) report, these study areas were separated for analysis and discussion of findings. The problem with averaging over such a large area is that the standard deviation on the mean is very large, and it is not possible to identify whether any specific relationships exist. Ron H. responded that they separated the overall study area into these two smaller areas for the purpose of data collection, but not for the purpose of risk assessment. Ron argued that they were focused on population effects rather than effects on an individual. The PLC Consultants argued that a population assessment could still be carried out within each of the study areas. It was suggested that this may be a residual issue between the consultants.

- It was questioned why JW removed the data collected from two earthworms. Ron advised that JW did not remove any data.

- A member of the PLC questioned why JW used the upper confidence limit (UCLM) when previous discussions centered on the 95th percentile. Chris O. said that the 95th percentile is used mainly when there are less than 10 data points, or if doing a screening-level risk assessment. He added that, if JW had less than 10 data points, the maximum value was used.

- It was raised that JW provided an insufficient explanation of why they changed the risk quotients (e.g., 0.87 for woodcocks in a previous report – changed to 0.24 in the latest JW report). Ron commented that this rationale is included on Page 8 of the JW response to the comments received (undated document, but emailed to TSC members and the community earlier that week). One of the TSC members outlined to JW that more rationale is needed as to why the change was made, not just that JW accepted CH2MHill's recommendation. Ron H. responded that there was sufficient explanation in their responses. Ron added that revisions were made that reflected changes to the values input to the risk quotient, including the following: (i) Toxicity Reference Values were re-examined and modified to more accurately present toxic values to receptor species; (ii) diets of some receptors were re-examined and modified to reflect more accurately actual diets in the Port Colborne area; (iii) potential exposure of CoCs due to inhalation of air was omitted as part of the exposure calculation; and (iv) ingestion rates were modified, based on a re-examination of normalizing the ingestion rates in relation to body mass and moisture content of diet items. Despite this information, it was still suggested that JW need to provide a more thorough explanation and justification for these changes.

- Despite JW's comments in the report that their approach to the ERA was conservative, it was highlighted that some aspects of the analyses show a lack of conservatism. For example, the VECs will be exposed to much more than just the four CoCs. It was outlined by several participants that the currently accepted approach to SSRAs was to look at individual exposures to individual CoCs, and that quotients could only be added if there were identical toxicological endpoints. JW commented that they feel this matter

has been adequately addressed this matter in their uncertainty analysis. Several TSC members requested that JW explain why they combined copper and arsenic, and that they need to explain why they didn't combine the others. A representative from JW responded that synergistic effects were discussed in the report. Dave McLaughlin added that determining risks associated with the synergistic effects of CoCs is not common in ERAs due to an absence of information on the interaction of many elements. It was commented that, even though there may be technical issues with combining effects with different toxicological endpoints, it remains the fact that species are exposed to a wide range and number of chemicals at any one time.

Other Issues Raised

- It was raised that this report does not address lead. There was a question concerning changes to this report if lead is determined at some later date to be a CoC for the CBRA. Several TSC members commented that the TSC had no consensus on lead as a CoC for the CBRA, and that the Lead Task Force is given the mandate to address lead issues in Port Colborne. If the Task Force cannot effectively meet this mandate, then the JW lead Report will be re-tabled for consideration and discussion. An Inco representative further explained that, if the Lead Task Force could not fulfill its mandate, Inco plans to submit the JW lead report to the MOE. It would then be up to the MOE to evaluate whether lead should or should not be a CoC for the CBRA. Depending on the outcome, lead would be considered in the CBRA (and an addendum report would be prepared), or it would not be considered further in the CBRA. Dave McLaughlin added that lead is not a significant concern for ecological receptors.

NEXT STEPS

- The Chair will prepare a TSC Recommendations Report, for submission to the PLC at the next PLC meeting.
- The JW submission will include their latest (September 2004) report; the addendum document concerning JW responses to comments received; these Chairman's Notes, and the Minutes from the next PLC meeting.

NEXT MEETINGS

- January 27, 2005 – 6:00 pm Lead Task Force Introductory Meeting
- February 17, 2005 – 7:00pm Public Liaison Committee Meeting

TAB 7

TSC Chair's Recommendation that the PLC receive the Jacques Whitford Final Report dated September 2004 and associated documents.

ERA – Natural Environment

Recommendations Report from the TSC

To:	Members of the PLC	From:	TSC Chair
Date:	February 17, 2005	Re:	TSC Recommendations Report

Background

A Community Based Risk Assessment (CBRA) is being undertaken in the City of Port Colborne by Inco Limited (Inco) to determine the potential risks to the natural environment, crops and human health associated with historical emissions from the Inco refinery in Port Colborne. The CBRA considers certain chemicals of concern (CoCs), namely nickel, copper, cobalt and arsenic, which were determined by a lengthy process involving extensive data collection and analysis. Although lead was suggested as a possible CoC, the Technical Sub-Committee (TSC) for the CBRA could not reach consensus, and a separate Lead Task Force has been formed to address lead issues within Port Colborne. The general process for the activities of the CBRA was presented in a *Technical Scope of Work* document that was prepared by Inco's consultant, Jacques Whitford (JW), and dated November 2000.

The CBRA is comprised of three key risk assessment reports, namely Ecological Risk Assessment (ERA) reports for the Natural Environment and for Crops, and a Human Health Risk Assessment. The report being considered in this report is the ERA for the Natural Environment, which was prepared by JW.

An Ecological Risk Assessment for the Natural Environment

The purpose of the ERA-NE was to determine if the CoCs in soils, as a result of refinery emissions, present a potentially unacceptable risk to the natural environment within Port Colborne. JW define an unacceptable risk as an estimated risk linked to the occurrence of soil concentrations of CoCs that prevents sustainable populations of flora or fauna, or prevents a sustainable level of ecological functioning, within the defined area of study.

The ERA-NE involved studies and assessments of selected Valued Ecosystem Components (VECs), including decomposers (earthworms, woodlot litter), amphibians (frogs (tadpoles & adults), Fowler's Toad), plants (maples (leaves & seeds) and woodlots (tree species)), mammals

(meadow voles, raccoon, red fox and white-tailed deer), and birds (red-tailed hawk, American woodcock, American robin, and Red-eyed vireo).

JW prepared written protocols for each of the studies completed, which were reviewed at TSC meetings and presented at Public Liaison Committee (PLC) meetings. Prior to issuance of any draft of the ERA-NE Report, JW prepared a document that outlined the intended approach to data analysis & interpretation of the ERA-NE data, which was presented and discussed at TSC meetings, which outlined how the specific ERA-NE data would be analyzed and interpreted.

In addition to the specific protocols for the individual ERA-NE studies, JW prepared several other related documents, including the following:

- "*Quality Assurance and Quality Control for Field Sampling and Laboratory Procedures*" (Final Draft), prepared by JW and dated November 2002, which outlined sampling and chemical analysis protocols for samples from various environmental media;
- "*Laboratory Protocol for Analysis of Biological Tissues - Ecological Risk Assessment & Human Health Risk Assessment*" (Final Draft), prepared by JW and dated November 2002;
- "*Soil / Sediment Sampling and Analysis Protocol – Ecological Risk Assessment*" (Final Draft), prepared by JW and dated November 2002; and
- "*Surface Water Sampling protocol – Ecological Risk Assessment*" (Final Draft), prepared by JW and dated November 2002.

Report Chronology for the ERA-NE

Although not intended as a complete list, the following are the major milestone reports issued for the ERA-NE:

- A document entitled, "*An Approach to Data Analysis and Interpretation – Natural Environment Ecological Risk Assessment*" was prepared by JW and dated November 2002 (Final Draft);
- Draft ERA-NE reports, prepared by JW and dated November 2002, with some modifications in December 2002;
- A revised draft ERA-NE report, prepared by JW and dated January 2003;
- A further revised draft ERA-NE report, prepared by JW and dated July 2003; and
- A final ERA-NE report, prepared by JW and dated September 2004.

Each of the previous report drafts was reviewed technically by members of the TSC at TSC meetings, and presented at public Open Houses. Comments were provided to JW by community members, the PLC Consultants and the Niagara Regional Public Health Department (NRPHD). The July 2003 report was also reviewed by a third-party reviewer (CH2MHill).

The September 2004 Final ERA-NE Report

The following activities were undertaken for the review of the September 2004 report:

- JW tabled the report to the TSC and PLC during meetings held on October 21, 2004;
- A TSC meeting and public Open House were held on November 4, 2005;
- Written comments were submitted to JW by two community residents (Ellen Smith and Diana Wiggins) and the PLC Consultants (Watters Environmental Group) on or about December 20, 2004;
- JW provided written responses to the comments received from the community residents and PLC Consultants (January 19, 2005);
- A TSC meeting was held on January 20, 2005; and
- Discussions that will occur at the PLC meeting held February 17, 2005.

The TSC noted that JW did not provide specific responses to the comments submitted by the NRPHD.

There were also several telephone discussions and document exchanges between JW and the peer reviewer prior to issuance of the September 2004 report. JW advised the TSC that CH2MHill is in agreement with JW's findings and conclusions in its September 2004 report.

Nature of the Issues Identified

The PLC Consultants and community members identified several issues with the JW report, including certain technical matters, and a requirement for clarification, rationale and justification. JW responded to these concerns and comments in its January 19, 2005 document, and also provided verbal responses during the TSC meeting held January 20, 2005.

The Need for Clarification and Rationale

A large number of the comments received related to a request for clarification and additional rationale / justification, which JW provided either in their written responses or verbally at meetings. Such comments included:

- **The need to clarify whether the 200 µg/g isopleth was drawn using all of the available data**. JW responded in their January 19th report by stating that the isopleth in the September 2004 report was, in fact, based on all of the collected data.
- **The request for additional rationale and justification for excluding pets from the study**. JW responded in their January 19th document (and verbally at the January 20th TSC meeting) by suggesting that the potential risks to pets could evaluated by using one of the studied VECs as a surrogate. *The TSC commented that JW should provide a complete discussion of this surrogate analysis for pets.*
- **The request to provide a more complete rationale / justification for changing the risk quotients**. Although JW explained in their responses that this was requested by the peer reviewer, *the TSC still required the rationale for making such changes.*

Residual Issues with the ERA-NE Report

PLC Consultant Issues

Despite the discussions and correspondence between JW and the PLC Consultants, the following are residual issues that the PLC Consultant continues to have with the ERA-NE report, including the following:

- The irregular distribution of sampling stations, and the possible bias this may represent. There are many parts of the study area with little-to-no sampling coverage.
- Weighting of various studies in determining overall findings. There remain concerns with the preference to use the observational data and not to consider the risk calculation results.
- Averaging of the ERA-NE data across the Primary and Secondary study areas.

Community Member Issues

The issues that the community members may still have with the ERA-NE Report will be identified and discussed at the PLC meeting on February 17, 2005. However, the community has made several comments regarding the fact that there has been no formal decision on whether lead is or is not a chemical of concern (CoC) for the Community Based Risk Assessment (CBRA). Community members have expressed the need to remind reviewers that an amendment may be required to the ERA-NE report if lead does, in fact, become accepted as a CoC for the CBRA.

Overall Documentation for the ERA-NE Report

Given that there were several issues and points of clarification addressed in the various comments and responses outlined above, it is important that any reviewer of the ERA-NE be made aware that they need to read [at least] all of the materials presented below:

- The JW September 2004 ERA – NE report (including the comments on a previous [July 2003] version of the ERA-NE Report from community members, the PLC Consultants, and the peer reviewers), and JW's responses to each comment;
- The comments of the NRPHD on JW's July 2003 draft report;
- The comments on the 2004 report provided by the community residents and PLC Consultants, and JW's responses to these comments;
- The Chairman's Notes from the January 20, 2005 meeting;
- The Minutes of the PLC meeting held February 17, 2005;
- Any additional comments on the September 2004 submitted directly to the MOE by any party; and
- Any amendment to the ERA-NE report that may be required to address possible lead issues within the community (if lead is accepted at some later date to be a CoC for the CBRA).

Recommendations

The TSC Chair recommends that the PLC consider and accept the following:

- That the PLC request its consultant to prepare a final comments review, highlighting any residual scientific issues from themselves, the PLC and the community;
- That the PLC acknowledge that the September 2004 document does not consider lead, and it recognizes that an addendum report may be required if lead is deemed at some later date to be a CoC for the CBRA;
- That the PLC receive the September 2004 JW ERA-NE report and the associated documents (listed above);
- That the PLC prepare a final summary report (including its consultants report), which highlights the PLC's position on the NE-ERA, and that this be forwarded to the MOE for their receipt; and
- That the PLC advises that the final review from the MOE must consider all of the CBRA reports and comments received.

TAB 8

Public Liaison Committee Minutes of PLC Meeting of Thursday February 17, 2005.

PUBLIC LIAISON COMMITTEE
for the
COMMUNITY BASED RISK ASSESSMENT

MINUTES OF MEETING

THURSDAY, February 17, 2005 - 7:00 p.m.
COUNCIL CHAMBERS, CITY HALL

COMMITTEE:

Harry Wells	Chairman	
Paul Dayboll	Member	
Vivian Moskalyk	Member	
Heather Sherk	Member	Absent
Rose Bisson	Member	Absent
Rosemari Quesnelle	Member	
Leonid Pavlov	Alternate Member	Absent

OTHERS:

Del Fraipont	Inco
Maria Bellantino	Inco
Ron Huizer	JWEL
Eric Veska	JWEL
Dave McLaughlin	MOE
Bob Slattery	MOE
Rob Watters	Watters Environmental
Chuck Miller	City of Port Colborne/Acting Secretary

Chairman Wells noted that there is not a "quorum" of PLC members present. He indicated that the Committee would proceed with the business on the agenda excepting those matters requiring formal action by the PLC which will be dealt with at the next meeting.

1. Approval of Agenda

Moved by Paul Dayboll
Seconded by Vivian Moskalyk

That the Agenda for the Public Liaison Committee Meeting of February 17, 2005 be approved as submitted.
Carried.

2. APPROVAL OF MINUTES

Chairman Wells asked if there were any outstanding issues related to the "draft" minutes of December 16, which had been previously circulated.
Chuck Miller indicated that some changes had been made to the "draft" minutes based on comment received from Ellen Smith. He indicated that as the "acting secretary" he agreed that those changes accurately reflect the December discussion.
Eric Veska referred the Committee to Paragraph 4 on page 3 of the "draft" minutes. The paragraph deals with discussion about when public comments related to the "Lead Report" would be addressed. He raised issue with the last sentence of the paragraph which states ".....Dr. Veska stated that JW staff would address the comments and provide answers to whomever submitted them." He suggested adding "when the lead report becomes active again" and indicated that is what was "inferred" by his statement.
Chuck Miller indicated such addition would not reflect the December 16 discussion and, for that reason, it is not included in the "draft" minutes. He indicated that Dr. Veska's qualifier would be included in minutes of tonight's meeting.

It was then;

Moved by Vivian Moskalyk
Seconded by Paul Dayboll

That the Minutes of the Public Liaison Committee Meeting of December 16, 2004 and January 13, 2005 be tabled until the next Public Liaison Committee meeting.
Carried.

3. DELEGATIONS

Chuck Miller reported that there are no delegations to tonight's meeting.

4. GENERAL COMMITTEE BUSINESS

Chairman Wells indicated that the Committee needs to address a matter. He noted the difficulty the PLC is having in reaching a "quorum" at recent meetings. He also indicated that he had recently received verbal resignations from Dr. Pavlov and from Rose Bisson.
Chuck Miller indicated that the Terms of Reference" for the PLC had been

established by City Council in 2000. He also indicated that the "Terms" had been amended twice based on recommendation from the PLC. He read certain "clauses" of the current "Terms of Reference" which are relevant to this discussion;

"3. MEMBERSHIP
The PLC shall consist of seven individuals and an "alternate" to be appointed by City Council. City Council will attempt to appoint a committee representative of the community. PLC members will be appointed at the pleasure of Council."

"5.e) Five members of the Committee will form a "quorum". The Committee will strive for consensus. However, decisions can be made by a simple majority of members present."

Chuck Miller also advised the PLC that another "clause" in the "Terms" permits the PLC to:

"2.a) Advise Council of the City on the adequacy of the Terms of Reference for the Committee, and, to make recommendation for changing the "Terms" if necessary."

Chairman Wells entertained discussion on the matter.
Wilf Pearson asked if Dr. Watters is a member of the Committee. Chairman Wells indicated he is not.
Ruth Kramer indicated that the "Terms" need to be revised for the Committee to continue operating. Harry Wells indicated that he shared Ruth's feelings about dedication to the Committee.
Mrs. Kramer stated it would be difficult to appoint a "newcomer" to the committee at this stage of the process excepting someone who has been present from the beginning.

Chairman Wells indicated that the five remaining members of the Committee have recommended to City Council that the "Terms of Reference" for the PLC be changed to reduce the "Membership" to a total of five members, and, to reduce the requirement for "quorum" to three members.

Chuck Miller indicated that he would prepare a report for City Council consideration as quickly possible.

5) REPORTS FROM THE TECHNICAL SUBCOMMITTEE, and, LEAD TASK FORCE

1) "Final" Ecological Risk Assessment Report; Natural Environment.

Ron Huizer of Jacques Whitford provided "overview" of the report and the review process. A copy of Mr. Huizer's presentation is attached.

Wilf Pearson asked Ron Huizer how many comments were received from the public for the "draft" report. Ron Huizer indicated that comprehensive comments were received from two members of the public. Dr. Watters noted that comments received for the "draft" report are addressed in the back of the "Final" report.
Chuck Miller asked if comments from the public relating to the "Final" report, and which comments were due in December, have been addressed. Mr. Huizer indicated not yet.
Ellen Smith asked what will be in the "addendum" report which has been referred to. Mr. Huizer indicated the "addendum" will include response to the comments received, and, documentation of the process.
Dr. Watters asked if the "addendum" report will "tie" questions and answers together on an "issue" basis. Dr. Veska indicated the "addendum" will likely reference where answers are given in the main report.

Dr. Watters then summarized a report from the Technical Subcommittee titled "ERA-Natural Environment", Recommendations Report from the TSC" dated February 17. 2005. A copy of that report/memo is attached.
The recommendations contained in the TSC report are on page 6.

Ellen Smith asked if it would be valuable if the "draft" (2003) Natural Environment Report, along with comments received, be submitted to the MOE. Ron Huizer indicated that the addendum to the "Final" report (2004) notes where changes have been made to the "draft" report.
Dr. Watters asked the MOE representatives about submission of both the "draft" and "final" reports. Bob Slattery stated that submission of one report is preferable.
Harry Wells noted that the first recommendation of the TSC memo calls for a report from the independent consultant. He asked about the timing of that report. Dr. Watters indicated that report might be completed in time for the March PLC meeting.
Del Fraipont asked what is the MOE deadline for receiving comments to this report. Specifically, he asked if the PLC report could be submitted later. Dave McLaughlin indicated the Ministry would prefer to receive both the final report

from Inco, and, the report from the PLC.
Dr. Watters asked what the Ministry would want to see in the PLC report to the Director. Dave Mclaughlin indicated that the Ministry would be seeking endorsement from the PLC that the public has been sufficiently consulted, and, outlining any outstanding technical matters relating to the reports.
Chuck Miller read the "mandate" of the PLC as established by the "Terms of Reference" which states, in part;
"The Mandate of the PLC is to:

e) review the findings and recommendations of the CBRA and provide input to INCO and the Director,
f) provide input to INCO and the Director on the methods of implementing the recommendations of the CBRA as may be appropriate,
g) submit a final report including comments and advice to the Director with respect to the PLC and CBRA processes.

Paul Dayboll indicated concern about using the term "endorsement" from the PLC. Dave McLaughlin said the MOE would only require endorsement from the PLC for the public "process" and not for technical matters.
Chuck Miller read further from the PLC "Mandate" which states, in part;
"The PLC will provide input to INCO and the Director with respect to the CBRA but will not make decisions. Rather, the Director will make decisions pursuant to the provisions of the Environmental Protection Act."

Ellen Smith asked what the fourth recommendation of the TSC report, dealing with the PLC "receiving" the Natural Environment Report, means. Harry Wells pointed out that the PLC cannot do much with the report tonight given that there is not a quorum.
Harry Wells asked Mr. Huizer when the PLC will receive the addendum report.
Ron Huizer indicated the addendum is almost done but requires "process" related matters to be included.
Diana Wiggins asked if the Ministry has received the Natural Environment report.
Del Fraipont said that the report could be submitted to the Ministry shortly.

2) Draft Table of Contents for the CBRA Integration Report

Dr. Watters presented the report, dated February 15, 2005, representing the TSC recommendation respecting the "Table of Contents" for the Integration Report. A copy of the TSC report/memo is attached. The recommendations contained in the TSC report are on page 1.

Dr. Watters made specific reference to the changes made to the report since the previous discussion at the PLC in January. He noted changes contained on

page 4 relating to the division between "Phase 1" of the CBRA process and "Phase 2". Specifically, Section 6 of the Draft Table of Contents now proposes "Outlining a Process for Remediation of Properties Potentially at Risk Based on CBRA Findings"

Paul Dayboll indicated that he appreciates the changes to the report. He remained concerned about some of the specifics in Section 6.0 such as the "documentation" reference. He noted that there has been change in Provincial regulation. He asked what the MOE would require in the Integration report.
Dave McLauglin indicated the Ministry is reviewing Regulation 153/04 as it applies to the CBRA and will do presentation to the PLC and TSC.
Dr. Watters asked if the new recommendation in the TSC report relating to a "process recommendation" is adequate from the MOE perspective. Dave McLaughlin indicated that, in general terms, the Ministry needs a "risk management plan" as per the SSRA requirements of the regulation.
Paul Dayboll said the overall concern is that the CBRA will "fit" the new regulation. Bob Slattery indicated that the regulation did not ignore the CBRA process and repeated that the MOE will meet with the PLC and TSC to review same.
Del Fraipont indicated that Section 6.0 as now drafted is a good dividing line between Phase1 and Phase 2. Dr. Watters summarized that the Ministry will need to know that the remediation process will work.
Paul Dayboll expressed concern about how the "public" comment will be handled relating to Section 6.0, given the issues involved.
Chuck Miller asked Del Fraipont if INCO has considered the details of how the remediation plan/process will be implemented. Del Fraipont indicated they have not.

3) Lead Task Force, Status Report to the Public Liaison Committee

Dr. Watters presented a status report on the Lead Task Force (LTF) which report is dated February 17, 2005. A copy of that report is attached.
There were no questions from the committee or public related to the "status report"

6) UPDATES OF CBRA ACTIVITIES

Dr. Watters provided a verbal update of CBRA activities summarized as follows;
The "Natural Environment" report and process has already been discussed this evening.
The "Integration" report "Table of Contents" has already been discussed. The report will be written by INCO.
The "Crops Report" has been circulated to the public. The report has been sent to Prof. Murray McBride at Cornell University for further peer review input. After

Prof. McBride's comments are received, Dr. Watters will schedule a TSC meeting to introduce the report.

Dr. Watters has received draft of the "Human Health Risk Assessment" which is being reviewed by the independent consultant. Once the consultant level review is complete, the report will be tabled at the TSC.
Paul Dayboll asked if it is possible to "fast track" the HHRA to the public review stage. He noted the report is now scheduled for release about March 31. Del Fraipont indicated it is now likely the report will be tabled after March 31, likely in April or May.
Paul Dayboll asked if the report could be circulated for comment by the public, TSC and PLC at the same time the report is being reviewed by the consultants and peer reviewer, in order to speed up the process. Dr. Watters indicated that the reason for the peer and Independent Consultant review, in advance of public release, is to identify significant "technical" errors in the report.
Chuck Miller indicated that, if the HHRA is not released until May, it would not appear possible to finalize the matter by year end.
Bob Slattery asked if the PLC has considered how the public process for the HHRA will occur. Dr. Watters indicated that the detail of that process will need to be discussed.

Dr. Watters indicated that CHAP "A" and CHAP "C" have been reviewed by the "EAC", which review he has now received. He indicated that the "release" of those reports is now scheduled for March 8, 2005. He indicated that the EAC will be involved in that release.
Dr. Watters indicated that there is question whether CHAP "D", being the cancer study as proposed by Ventana, is feasible. This will be a topic of further discussion.
Dr. Watters indicated that CHAP "E", being the reproduction study, will be tabled when the other reports are released.
Wilf Pearson asked if Ventana will be attending the release of the CHAP reports. Dr. Watters indicated that Ventana's attendance is not confirmed.
Diana Wiggins asked how the CHAP "A" plus "C" report, being the review of need for case control studies, will be handled. Dr. Watters indicated that, as the Chair of the TSC, he has asked the EAC and Ventana for a "proposal" to produce the "A" plus "C" report.
Diana Wiggins indicated that she had e-mailed Linda Kasprzak at Ventana about further involvement with CHAP, and that Linda indicated that the Ventana contract is done.
Del Fraipont indicated that INCO is discussing contract issues with Ventana.
Diana Wiggins asked why Ventana has not been attending meetings, after the PLC had requested they attend. She referred to the minutes of August 19 which indicate Ventana would be asked to attend. Harry Wells indicated he would review same.

7) General Question and Answer Session

Ellen Smith asked Eric Veska about her request for documents which are referenced in the ERA report. There was general discussion about that request. Dr. Veska indicated that documents referenced which are "Draft" will not be released. Other documents referenced should be in the public library.
Chuck Miller indicated that only the major CBRA reports are filed in the library, and that, "protocol(s)" forming part of those reports are not.
Ellen Smith asked about her request for copy of the document referenced in the Lead Report, related to address on Rodney Street. Dr. Veska indicated the reference is to report relating to her address and that same will not be released.
Bernie Sumbler indicated that his property had been cleaned up as part of the INCO program. He indicated he now has standing water. He asked if there will be a contamination issue as a result of that water.
Del Fraipont indicated that the INCO consultant is currently reviewing the matter.
Wilf Pearson raised concern about the grading adjacent to his property which he indicated was changed by the recent remediation. Harry Wells asked Del Fraipont how the grading was undertaken. Del Fraipont indicated that properties were returned to the original grade levels. Bernie Sumbler indicated that grades are not the same as before.
Tara Grabell asked if the "report" of the Regional level Lead Task Force has been forwarded to the "LTF". Chuck Miller indicated that he wasn't aware that a report had been produced at the regional level, but that if there is one, it could be of value to the "LTF". Del Fraipont suggested a request for same be made to the Regional Health Department.
Diana Wiggins noted that the Natural Environment Report is intended to be submitted to the MOE shortly. Given that the "lead as a C. of C." issue is outstanding, she asked how lead will be referenced in that report and addendum. Del Fraipont said the lead will be referenced in the PLC and Independent Consultant report.
Diana Wiggins asked the MOE how lead is a C. of C. in Sudbury but not in Port Colborne. Dave McLaughlin indicated he would have to look into same, but he understands that the INCO operations in Sudbury differ from those in Port Colborne.
Diana Wiggins then quoted from a 1987 workplace health and safety report dealing with lead at the Port Colborne facility. Del Fraipont indicated that report deals with internal handling of lead at the facility. Diana Wiggins asked if the report deals with emissions from the stack to which Mr. Fraipont answered in the negative. Diana Wiggins then asked if internal reports form part of the lead as a C. of C. report. Del Fraipont indicated that only information relating to emissions are relevant.
Diana Wiggins asked whether low pH in Port Colborne soils affects the mobility of nickel. Ron Huizer indicated that the more acidic the soils, the more mobile the metals, such as nickel. Mr. Huizer added that amendments were added to

the soils to get the same pH. Diana Wiggins asked why this was done. Mr. Huizer suggested that this discussion occur when the Crops study is considered. He added that the issue of blending the soils and "standardizing" the pH will be part of the crops review.
A question was raised respecting what information used in the Natural Environment report was obtained from the greenhouse studies. Mr. Huizer indicated the he used results from the germination of maple seeds.
Diana Wiggins asked why the earthworms used in the toxicity tests were not indigenous to the Port Colborne area. Ron Huizer responded that they used the species of earthworms normally used in toxicity testing. He commented further that he did not rely solely on the toxicity test data; rather, they looked at several lines of evidence to make their conclusions.

Ellen Smith then asked if, given the late hour, public comments related to the Natural Environment report could be submitted later. Dr. Watters suggested meeting with him to consolidate those comments, and, which could form part of his and the PLC report on the Natural Environment ERA.

8) NEXT MEETINGS

Chuck Miller indicated that the upcoming meeting schedule appears as follows;

February 24 - 6:00 p.m.	Lead Task Force
March 8- 7.00 pm	CHAP "A" and "B" release
March 24 - 7:00 p.m.	PLC Meeting

9) ADJOURNMENT

The meeting adjourned at 10:40 p.m.

CBRA
Ecological Risk Assessment – Natural Environment

PLC Presentation
Summary of Final Report

February 17, 2005

Jacques Whitford

Objective of the ERA-Natural Environment Study

- The objective was to assess the potential risk of adverse effects on the local populations of flora and fauna that inhabit the area where soil concentrations of the CoCs (nickel, copper, cobalt and arsenic) exceeded MOE generic guidelines.

- To assess this potential risk, 14 VECs were identified and extensive site-specific field data was collected and studies undertaken.

Jacques Whitford

Key Milestones for the ERA-Natural Environment

A. STUDY DESIGN AND DATA COLLECTION

Year 2000

- Identification of the Scope of Work for the CBRA
- Site Characterization of the Natural Environment

Year 2001

- Existing Conditions Report
- Definition of Study Area
- Selection of VECs
- Development of Data Collection Protocols
- Field Data Collection

Year 2002

- Completion of Field Data Collection
- Finalization of Data Interpretation Protocol
- Initiation of Data Analysis

Jacques Whitford

Key Milestones for the ERA-Natural Environment

B. ANALYSIS AND REPORTING

Year 2003

- Completion of Data Analysis
- Initial Draft Report and Review and Comment by PLC Consultant (April)
- Draft Report (July)
- TSC/PLC/Open House Presentations (July, August)
- Public Review and Comment
- Independent Third Party Review (CH2MHill)

Year 2004

- End of Public Review on Draft Report (June)
- Final Report (September)
- TSC/PLC Presentations (September/October)
- End of Public Review of Final Report (December)

Year 2005

- PLC Consultant and Public Comments on Final Report
- TSC Meeting for JW Response to Review Comments (January)
- PLC meeting – ERA Final Report (this meeting)

Jacques Whitford

Final Conclusions for the ERA- Natural Environment

- Based on the assessment of a number of lines of evidence, both qualitative and quantitative, the study found no unacceptable risk to the sustainability of the populations of flora (trees and shrubs) and fauna (birds, mammals, amphibians) that inhabit the lands where soil CoCs concentrations exceed MOE generic guidelines.

- For woodlots on organic soil located directly adjacent to the refinery where soil levels of CoCs were found to be significantly higher, specific "generic safe soil values" were identified based on an assessment of the potential risk to local earthworm populations.

Jacques Whitford

ERA – Natural Environment

Recommendations Report from the TSC

To:	Members of the PLC	From:	TSC Chair
Date:	February 17, 2005	Re:	TSC Recommendations Report

Background

A Community Based Risk Assessment (CBRA) is being undertaken in the City of Port Colborne by Inco Limited (Inco) to determine the potential risks to the natural environment, crops and human health associated with historical emissions from the Inco refinery in Port Colborne. The CBRA considers certain chemicals of concern (CoCs), namely nickel, copper, cobalt and arsenic, which were determined by a lengthy process involving extensive data collection and analysis. Although lead was suggested as a possible CoC, the Technical Sub-Committee (TSC) for the CBRA could not reach consensus, and a separate Lead Task Force has been formed to address lead issues within Port Colborne. The general process for the activities of the CBRA was presented in a *Technical Scope of Work* document that was prepared by Inco's consultant, Jacques Whitford (JW), and dated November 2000.

The CBRA is comprised of three key risk assessment reports, namely Ecological Risk Assessment (ERA) reports for the Natural Environment and for Crops, and a Human Health Risk Assessment. The report being considered in this report is the ERA for the Natural Environment, which was prepared by JW.

An Ecological Risk Assessment for the Natural Environment

The purpose of the ERA-NE was to determine if the CoCs in soils, as a result of refinery emissions, present a potentially unacceptable risk to the natural environment within Port Colborne. JW define an unacceptable risk as an estimated risk linked to the occurrence of soil concentrations of CoCs that prevents sustainable populations of flora or fauna, or prevents a sustainable level of ecological functioning, within the defined area of study.

The ERA-NE involved studies and assessments of selected Valued Ecosystem Components (VECs), including decomposers (earthworms, woodlot litter), amphibians (frogs (tadpoles & adults), Fowler's Toad), plants (maples (leaves & seeds) and woodlots (tree species)), mammals

(meadow voles, raccoon, red fox and white-tailed deer), and birds (red-tailed hawk, American woodcock, American robin, and Red-eyed vireo).

JW prepared written protocols for each of the studies completed, which were reviewed at TSC meetings and presented at Public Liaison Committee (PLC) meetings. Prior to issuance of any draft of the ERA-NE Report, JW prepared a document that outlined the intended approach to data analysis & interpretation of the ERA-NE data, which was presented and discussed at TSC meetings, which outlined how the specific ERA-NE data would be analyzed and interpreted.

In addition to the specific protocols for the individual ERA-NE studies, JW prepared several other related documents, including the following:

- "*Quality Assurance and Quality Control for Field Sampling and Laboratory Procedures*" (Final Draft), prepared by JW and dated November 2002, which outlined sampling and chemical analysis protocols for samples from various environmental media;
- "*Laboratory Protocol for Analysis of Biological Tissues - Ecological Risk Assessment & Human Health Risk Assessment*" (Final Draft), prepared by JW and dated November 2002;
- "*Soil / Sediment Sampling and Analysis Protocol – Ecological Risk Assessment*" (Final Draft), prepared by JW and dated November 2002; and
- "*Surface Water Sampling protocol – Ecological Risk Assessment*" (Final Draft), prepared by JW and dated November 2002.

Report Chronology for the ERA-NE

Although not intended as a complete list, the following are the major milestone reports issued for the ERA-NE:

- A document entitled, "*An Approach to Data Analysis and Interpretation – Natural Environment Ecological Risk Assessment*" was prepared by JW and dated November 2002 (Final Draft);
- Draft ERA-NE reports, prepared by JW and dated November 2002, with some modifications in December 2002;
- A revised draft ERA-NE report, prepared by JW and dated January 2003;
- A further revised draft ERA-NE report, prepared by JW and dated July 2003; and
- A final ERA-NE report, prepared by JW and dated September 2004.

Each of the previous report drafts was reviewed technically by members of the TSC at TSC meetings, and presented at public Open Houses. Comments were provided to JW by community members, the PLC Consultants and the Niagara Regional Public Health Department (NRPHD). The July 2003 report was also reviewed by a third-party reviewer (CH2MHill).

The September 2004 Final ERA-NE Report

The following activities were undertaken for the review of the September 2004 report:

- JW tabled the report to the TSC and PLC during meetings held on October 21, 2004;
- A TSC meeting and public Open House were held on November 4, 2005;
- Written comments were submitted to JW by two community residents (Ellen Smith and Diana Wiggins) and the PLC Consultants (Watters Environmental Group) on or about December 20, 2004;
- JW provided written responses to the comments received from the community residents and PLC Consultants (January 19, 2005);
- A TSC meeting was held on January 20, 2005; and
- Discussions that will occur at the PLC meeting held February 17, 2005.

The TSC noted that JW did not provide specific responses to the comments submitted by the NRPHD.

There were also several telephone discussions and document exchanges between JW and the peer reviewer prior to issuance of the September 2004 report. JW advised the TSC that CH2MHill is in agreement with JW's findings and conclusions in its September 2004 report.

Nature of the Issues Identified

The PLC Consultants and community members identified several issues with the JW report, including certain technical matters, and a requirement for clarification, rationale and justification. JW responded to these concerns and comments in its January 19, 2005 document, and also provided verbal responses during the TSC meeting held January 20, 2005.

The Need for Clarification and Rationale

A large number of the comments received related to a request for clarification and additional rationale / justification, which JW provided either in their written responses or verbally at meetings. Such comments included:

- **The need to clarify whether the 200 µg/g isopleth was drawn using all of the available data**. JW responded in their January 19th report by stating that the isopleth in the September 2004 report was, in fact, based on all of the collected data.
- **The request for additional rationale and justification for excluding pets from the study**. JW responded in their January 19th document (and verbally at the January 20th TSC meeting) by suggesting that the potential risks to pets could evaluated by using one of the studied VECs as a surrogate. *The TSC commented that JW should provide a complete discussion of this surrogate analysis for pets.*
- **The request to provide a more complete rationale / justification for changing the risk quotients**. Although JW explained in their responses that this was requested by the peer reviewer, *the TSC still required the rationale for making such changes.*

Residual Issues with the ERA-NE Report

PLC Consultant Issues

Despite the discussions and correspondence between JW and the PLC Consultants, the following are residual issues that the PLC Consultant continues to have with the ERA-NE report, including the following:

- The irregular distribution of sampling stations, and the possible bias this may represent. There are many parts of the study area with little-to-no sampling coverage.
- Weighting of various studies in determining overall findings. There remain concerns with the preference to use the observational data and not to consider the risk calculation results.
- Averaging of the ERA-NE data across the Primary and Secondary study areas.

Community Member Issues

The issues that the community members may still have with the ERA-NE Report will be identified and discussed at the PLC meeting on February 17, 2005. However, the community has made several comments regarding the fact that there has been no formal decision on whether lead is or is not a chemical of concern (CoC) for the Community Based Risk Assessment (CBRA). Community members have expressed the need to remind reviewers that an amendment may be required to the ERA-NE report if lead does, in fact, become accepted as a CoC for the CBRA.

Overall Documentation for the ERA-NE Report

Given that there were several issues and points of clarification addressed in the various comments and responses outlined above, it is important that any reviewer of the ERA-NE be made aware that they need to read [at least] all of the materials presented below:

- The JW September 2004 ERA – NE report (including the comments on a previous [July 2003] version of the ERA-NE Report from community members, the PLC Consultants, and the peer reviewers), and JW's responses to each comment;
- The comments of the NRPHD on JW's July 2003 draft report;
- The comments on the 2004 report provided by the community residents and PLC Consultants, and JW's responses to these comments;
- The Chairman's Notes from the January 20, 2005 meeting;
- The Minutes of the PLC meeting held February 17, 2005;
- Any additional comments on the September 2004 submitted directly to the MOE by any party; and
- Any amendment to the ERA-NE report that may be required to address possible lead issues within the community (if lead is accepted at some later date to be a CoC for the CBRA).

Recommendations

The TSC Chair recommends that the PLC consider and accept the following:

- That the PLC request its consultant to prepare a final comments review, highlighting any residual scientific issues from themselves, the PLC and the community;
- That the PLC acknowledge that the September 2004 document does not consider lead, and it recognizes that an addendum report may be required if lead is deemed at some later date to be a CoC for the CBRA;
- That the PLC receive the September 2004 JW ERA-NE report and the associated documents (listed above);
- That the PLC prepare a final summary report (including its consultants report), which highlights the PLC's position on the NE-ERA, and that this be forwarded to the MOE for their receipt; and
- That the PLC advises that the final review from the MOE must consider all of the CBRA reports and comments received.

WATTERS ENVIRONMENTAL GROUP

MEMORANDUM

To:	Members of the PLC	From:	TSC Chair
Date:	February 15, 2005	Ref. #:	04-0007
Re:	**Draft Table of Contents for the CBRA Integration Report**		

Please find attached a proposed Table of Contents for the Integration Report for the CBRA. As you know, there was significant discussion on this matter, through:

- TSC meetings held April 6 and April 22, 2004;
- Open House and presentation on June 17 and September 8, 2004;
- PLC meeting held January 13, 2005; and
- TSC meeting held January 20, 2005.

Following presentation of a previous version of this document at a PLC meeting held January 13, 2005, certain changes were requested by the PLC, which were discussed at a TSC meeting on January 20, 2005. This document incorporates the changes requested by the PLC and discussions at the TSC.

As noted previously, Inco commented that they would consider this information and draft Table of Contents as they prepare the Integration Report for the CBRA.

Recommendations

The TSC recommends that the PLC consider and receive the following:

- That the attached proposed Table of Contents were prepared based on inputs from the community and TSC members through several community forums and TSC meetings;
- That the attached proposed Table of Contents be forwarded to Inco for their consideration as they prepare the Integration Report for the CBRA;
- That the PLC request that Inco provide regular updates of progress, and that they return to the TSC and PLC with an outline of intended scope and structure for the Integration Report; and
- That the PLC request that Inco and/or the MOE provide the PLC with information on how the new Ontario Regulation 153/04 will affect the Port Colborne CBRA.

PROPOSED TABLE OF CONTENTS

The PLC expressed comments that the Integration Report should clearly define the end of Part I of the CBRA (Investigation and Findings) and the process for Part II (Implementation). As such, the Integration Report is to include appropriate details on the work completed to-date (without significant duplication of materials from the three risk assessment reports), and an outline of a process for the nature of activities that may be involved with implementation of the CBRA. The proposed Table of Contents reflects this focus.

1.0 BACKGROUND

History of the CBRA

Purpose and Objectives of the Integration Report

- To relate findings of HHRA and ERA reports to the whole of Port Colborne
- To identify and address supporting information between reports
- To address identified gaps in reports
- To present intervention level(s) for the CoCs
- To identify possible remedial options

Description of the Port Colborne Natural Environment and Socio-Economic Environment

- Soil types
- Landforms
- Agriculture
- Industry
- Community

[Include maps showing study areas; soil type distribution; landforms, areas of special interest, water courses, etc; distribution of CoCs; sampling locations, etc]

Description of the CBRA

- Objectives
- Approach
- Process
- Scope

Objectives of the HHRA studies

- Scope
- Exclusions
- General approach to the study
- Key limitations

Objectives of the ERA Natural Environment studies

- Scope
- Exclusions
- General approach to the study
- Key limitations

Objectives of the ERA Crops studies

- Scope
- Exclusions
- General approach to the study
- Key limitations

2.0 FINDINGS OF THE CBRA STUDIES

Findings of the HHRA studies

- Key conclusions
- Intervention level(s)
- Scientific basis for the conclusions
- Degree of certainty in the findings

Findings of the ERA Natural Environment studies

- Key conclusions
- Intervention level(s)
- Scientific basis for the conclusions
- Degree of certainty in the findings

Findings of the ERA Crops studies

- Key conclusions
- Intervention level(s)
- Scientific basis for the conclusions
- Degree of certainty in the findings

3.0 SUPPLEMENTAL INFORMATION

Address data gaps in HHRA and ERA reports, e.g.,:

- Herbaceous plants
- Pets
- Backyard gardens
- Lake Erie

- Urban wildlife
- Linkages between studies (e.g., bioavailability)
- Storm Water Management (drainage and lot grading)

4.0 INTERVENTION LEVELS

Table(s) showing intervention levels for CoCs in different soil types and geographic settings

- Discussion of approach to be employed in assigning intervention levels [One number?, One number/soil type?, One number/CoC?, Several numbers?]
- Application of intervention numbers

5.0 REMEDIATION OPTIONS

- Identify the various technologies/approaches available to remediate lands contaminated with the CoCs. Highlight "pros" and "cons" for each remedial option, and provide considerations on where most / least applicable.

6.0 OUTLINING A PROCESS FOR REMEDIATION OF PROPERTIES POTENTIALLY AT RISK BASED ON CBRA FINDINGS

Sections 1.0 through 5.0 above will provide a summary of the findings for Part I of the CBRA; namely, the background information required for implementation of the CBRA findings on a property-by-property basis. This section of the Integration Report should outline the process for the remediation of properties potentially at risk, based on CBRA findings. This process should include an outline for implementation of the following steps that are to be carried out on a property-specific basis:

- Identifying whether remediation is required;
- Identifying the best technology / approach for the remediation;
- Determining how the remediation will occur;
- Determining the level and scope of QA/QC required; and
- Determining the documentation that will be issued.

It is recognized that the details and specific tasks for these activities would be an initial activity for Part II of the CBRA.

NOTE:

The Integration Report should provide an assessment of the implications of Ontario Regulation 153/04 on the CBRA.

LEAD TASK FORCE

Status Report to the Public Liaison Committee

To:	Members of the PLC	From:	Members of the Lead Task Force
Date:	February 17, 2005	Re:	Lead Task Force Status Report

Following receipt of the TSC Recommendations Report for addressing lead issues within the City of Port Colborne, the Public Liaison Committee requested a report on the status of the Lead Task Force, specifically addressing the Task Force mandate and list of members.

An initial meeting of the Task Force was held on January 27, 2005. The notes from this meeting are attached. The next scheduled meeting is February 24, 2005 @ 6:00 pm at City Hall.

The Task Force mandate and list of members is provided below.

Mandate for the Lead Task Force

To develop a strategy for:

(i) *properties potentially at risk from environmental lead contamination,*

(ii) *identifying exposure mitigation options available to property owners who decide to reduce / eliminate soil-lead contamination on their property, and*

(iii) *outlining what possible advice / assistance might be offered to such homeowners from the City of Port Colborne, the Ontario Ministry of the Environment, the Niagara Regional Public Health Department and other stakeholders (including Inco).*

Lead Task Force Participants

The Lead Task Force participants are as follows:

- PLC Member (Paul Dayboll) – as Chair
- City of Port Colborne (Chuck Miller)
- CBRA's City/PLC Consultant (Robert Watters)
- Ministry of the Environment (Dave McLaughlin, Bob Slattery)
- Niagara Region Public Health Department (Bjorn Christensen, Evert Nieboer, Bill Hunter)
- Inco (Bruce Conard, Del Fraipont, Maria Bellantino Perco)
- Member of the community at-large (selected following an advertisement in local papers)

WATTERS ENVIRONMENTAL GROUP

Lead Task Force Meeting Notes

To:	Members of the Lead Task Force	From:	Robert Watters
Date:	February 15, 2005	Ref. #:	04-0007
Re:	Lead Task Force Meeting Notes – 6:00pm January 27, 2005		

In attendance:

Rob Watters, Chair, TSC, Watters Environmental Group
Harry Wells, PLC Chair, Resident
Chuck Miller, City of Port Colborne
Paul Dayboll, PLC member, Resident
Ellen Smith, Resident
Wilf Pearson, Resident
Diana Wiggins, Resident
Dave McLaughlin, MOE
Bill Hunter, NRPHD
Evert Nieboer, NRPHD
Bruce Conard, Inco Consultant
Del Fraipont, Inco
Maria Bellantino Perco, Inco
Maggie Riopelle, Tribune / In-Port
Mike Sturman, PC Leader

Purpose of Meeting:

The purpose of the meeting was to confirm participants and establish a mandate and schedule for addressing lead issues within the City of Port Colborne.

Lead Task Force Participants

Following some discussion, it was concluded that the initial Lead Task Force participants would be as follows:

- PLC Member (Paul Dayboll) – as Chair
- City of Port Colborne (Chuck Miller)
- CBRA's City/PLC Consultant (Robert Watters)
- Ministry of the Environment (Dave McLaughlin, Bob Slattery)
- Niagara Region Public Health Department (Bjorn Christensen, Evert Nieboer, Bill Hunter)
- Inco (Bruce Conard, Del Fraipont, Maria Bellantino Perco)

In addition, it was concluded that an additional member would be added from the community-at-large. As such, the Task Force members requested that Rob Watters, Chuck Miller and Paul Dayboll prepare a draft advertisement to appear in the local newspapers on February 2nd and 9th. The draft advertisement should be circulated to Task Force

members for comment, and then Chuck should finalize and submit to the newspapers. All submissions must be made to Chuck on or before February 14th. Chuck will distribute to task Force members any information received, with the Task Force to meet at 6:00pm on February 17th (i.e., immediately before the scheduled PLC meeting) to select a new member.

Task Force Mandate

Following discussion, the Task Force members agreed on the following mandate:

"*To develop a strategy for: (i) properties potentially at risk from environmental lead contamination, (ii) identifying exposure mitigation options available to property owners who decide to reduce / eliminate soil-lead contamination on their property, and (iii) outlining what possible advice / assistance might be offered to such homeowners from the City of Port Colborne, the Ontario Ministry of the Environment, the Niagara Regional Public Health Department and other stakeholders (including Inco)*".

Other Matters

- Evert advised that Health Canada has issued a Request for Proposal to have someone re-evaluate lead issues, and to bring their documents up-to-date. This is a longer-term assignment, and will not likely be completed in the same timeframe as the Lead Task Force.

- Evert referred the Task Force members to a document published by the Ontario Public Health Association (OPHA) entitled, "Childhood lead exposure and housing sources: Does a problem exist in Ontario?" This document is available on the OPHA website at www.opha.on.ca

- Chuck received confirmation from Task Force members that the Lead Task Force will operate under administrative "rules" similar to the TSC meetings of the CBRA (particularly as related to notices and information distribution).

- Rob to prepare a Status report on the Lead Task Force, for presentation at the next PLC meeting on February 17th

Next Lead Task Force Meetings

- February 17, 2005 – 6:00 pm
- February 24, 2005 – 6:00 pm

The February 17th meeting will be held immediately before the scheduled PLC meeting for the purpose of reviewing the applicant information for the additional member. The group will select a member, and then introduce this at the PLC meeting.

The February 24th meeting will be the first formal meeting of the Task Force. The purpose of this meeting will be to review the state of the science and knowledge on lead. Specifically, this will include presentations by Dave McLaughlin (i.e., what we know about how lead criteria were derived in other jurisdictions) and Evert Nieboer (i.e., what we know about lead and human health). We will have maps of the existing known lead levels in Port Colborne available for review (provided by Rob Watters).

It was raised that Chuck Miller should invite someone to the February 24th meeting from the financial community to inquire about any policies they may have on lead-contaminated areas or homes. It was also raised that Chuck should contact the Canadian Mortgage and Housing Corporation (CMHC) to inquire about any specific policies they may have on lead.

TAB 9

Compilation of Public Notices, TCS and PLC meetings for documenting the public process for the CBRA.

NOTICE

PORT COLBORNE COMMUNITY BASED RISK ASSESSMENT
ECOLOGICAL RISK ASSESSMENT - NATURAL ENVIRONMENT
"FINAL REPORT" dated SEPTEMBER 2004

FINAL "CALL" FOR PUBLIC INPUT/COMMENT

In September of this year, the **"Final" Ecological Risk Assessment Report** related to the **"Natural Environment"**, and which forms part of the Community Based Risk Assessment (CBRA), was submitted to the Technical Subcommittee of the CBRA. The Report was prepared by **Jacques Whitford Limited on behalf of Inco.**

The purpose of the study was to determine the concentrations of **Chemicals of Concern** that present an unacceptable risk to the **"Natural Environment".**

In 2003, a "draft" of this Report was the subject of considerable review both by the Technical Subcommittee, and through a "public" comment and input process. The "Final" version of the Report (dated September 2004) is intended to address the "technical" and "public" comment/input received in 2003.

The "Final" Report is currently being reviewed by the Technical Subcommittee and the Public Liaison Committee. A copy of the Report is available for review at the Port Colborne Public Library, or at City Hall as explained below.

Public comment/input related to the "Final" Report is welcomed. Public comment will be addressed by Jacques Whitford through an "addendum" to the Report, and will form part of the consideration of the Technical Subcommittee and the Public Liaison Committee.

The Public Liaison Committee has now set a **final date for submission of "comments"** from the public related to the Report, as follows;

FINAL DATE for Submission of Comments:

FRIDAY DECEMBER 17, 2004

Any person wishing to submit comments, or seeking additional information about the Report, may do so through the office of;

Charles V. Miller
Manager of Strategic Projects
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario
L3K 3C8
(905) 835-2900 (ext. 303)

NOTICE OF MEETING

TECHNICAL SUBCOMMITTEE
of the
PUBLIC LIAISON COMMITTEE
for the
COMMUNITY BASED RISK ASSESSMENT

At **6.00 p.m.** on **Thursday, January 20, 2005** the Technical Subcommittee of the Public Liaison Committee will meet in the **Third Floor Committee Room, City Hall** to discuss certain matters relating to the Community Based Risk Assessment.

The public is welcome to attend the meeting as observers. **The public can make submissions respecting the agenda items by submitting same in advance to Martha Toscher at City Hall (see below).**

The topics scheduled to be considered this Thursday are as follows:

- **Review of public and technical comments received in response to the "Ecological Risk Assessment-Natural Environment" "Final Report", dated September 2004**

- **Continuation of discussion respecting the content of the "Integration Report", particularly relating to matters referred by the Public Liaison Committee.**

Martha Toscher
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario
L3K 3C8
Phone: (905) 835-2900 ext. 319
Fax: (905) 835-2969
marthatoscher@portcolborne.com

NOTICE OF MEETING

PUBLIC LIAISON COMMITTEE
for the
COMMUNITY BASED RISK ASSESSMENT
for Soils Contaminated in the Port Colborne Area

Thursday February 17, 2005----7.00 p.m.
Council Chambers, City Hall

AGENDA

---

1 Approval of Agenda

2 Approval of Minutes
-PLC Meeting of January 13, 2005
-PLC Meeting of December 16, 2004

3 Delegations

4 General Committee Business
-PLC recommendation to City Council respecting the "Membership" and "Quorum" of the Committee

5 Reports from the Technical Sub-Committee, and, Lead Task Force
-Recommendation from the TSC respecting the "Final" Ecological Risk Assessment Report; Natural Environment.
-Recommendation from the TSC respecting "revisions" to the "Draft" Table of Contents for the Integration Report.
-Status report from the Lead Task Force

6 Updates of CBRA Activities
- Status of CBRA Activities
- General CHAP Activities

7 General Question and Answer Session

8 Next Meeting

9 Adjournment

Persons wishing to be "delegates" to the Committee should register, in advance, with Martha Toscher at (905) 835-2900 ext. 319