REPORT

SUMMARY REPORT ON CHEMICALS OF CONCERN EVALUATION

VALE INCO LIMITED

PORT COLBORNE COMMUNITY BASED RISK ASSESSMENT

PROJECT NO. ONT 34645

SUMMARY REPORT ON
CHEMICALS OF CONCERN EVALUATION

PORT COLBORNE COMMUNITY
BASED RISK ASSESSMENT
PORT COLBORNE, ONTARIO

Prepared For

VALE INCO LIMITED

Prepared By

JACQUES WHITFORD LIMITED
7271 Warden Avenue
Markham, ON L3R 5X5

JWL Project No. ONT34645

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Document 2: JWL report entitled "*Potential CoC Identification using Soil Chemical Concentration Data in Exceedance of MOE Generic Guidelines*" dated March 28, 2008.

Document 3: JWL report entitled "*Potential CoC Identification using Statistical Analyses*" dated March 28, 2008.

Document 4: JWL report entitled *"Re-Evaluation of Lead as a Potential CoC"* dated June 2004.

1.0 INTRODUCTION

Vale Inco Limited (Inco) operated a nickel refinery in the City of Port Colborne from 1918 to 1984. Nearby, the former Algoma Steel and former Canada Blast Furnace had operated a steel plant that reportedly sintered and smelted iron ore to form pig iron from the early 1910's to 1977, located approximately 500 m southwest and upwind of the Inco refinery. Historical operations at the Inco refinery and the former steel plant released particulate emissions that subsequently resulted in atmospheric deposition of these particulates on Port Colborne soils surrounding the Inco refinery and the former steel plant.

Jacques Whitford Limited (JWL) was retained by Inco to carry out a Community Based Risk Assessment (CBRA) for the City of Port Colborne. The CBRA was undertaken in accordance with a Technical Scope of Work (JWL, 2000) prepared in consultation with a Public Liaison Committee (PLC). The Technical Scope of Work (TSOW) requires that a number of scientific studies and investigations be undertaken to obtain the community specific information necessary to complete the CBRA. One of these studies was to conduct various investigations for the identification and evaluation of potential chemicals of concern (CoC) based on CBRA Condition Numbers 1, 2 and 3 as outlined in the TSOW summarized below.

The definition for a CoC within this CBRA is a chemical found in Port Colborne soils originating from an industrial source(s) where all of the following Conditions are met:

Condition 1) Chemicals that were historically used or generated by the industrial source(s) or its processes, **and**

Condition 2) Chemicals that are present at a community level at concentrations greater than MOE generic effects-based guidelines (Table 'A' Generic Guidelines (MOE, 1997)), **and**

Condition 3) Chemicals whose presence in soil show a scientific linkage to the historical operations of that industrial source(s).

INCO is the proponent of the CBRA. Only chemicals that meet all three of the above stated COC conditions and had originated from INCO's historical operations were considered COCs for the CBRA.

Three individual CoC studies were undertaken to identify and evaluate potential CoCs in accordance with the three CoC Conditions as stated above. In 2001, the findings from these three studies were documented in three separate draft reports:

- JWL report entitled "*Potential CoC Identification using an Emissions Inventory and Dispersion Modelling*" dated November 23, 2001.

- JWL report entitled "*Potential CoC Identification using Soil Chemical Concentration Data in Exceedance of MOE Generic Guidelines*" dated November 23, 2001.

- JWL report entitled "*Potential CoC Identification using Statistical Analyses*" dated November 16, 2001.

A draft summary report by JWL entitled "*Summary Report on Chemicals of Concern Evaluation*" dated November 23, 2001 summarized the findings of the three separate CoC studies and based on the presented weights of evidence, concluded on the identification of CoCs related to Inco as ***nickel, copper, cobalt*** and ***arsenic***. The Ministry of the Environment (MOE) conducted a technical review of the above-mentioned reports and produced a letter (letter of January 11, 2002 "*Review of JWEL CBRA CoC Reports*") that concurred with the outcome of JWEL's findings. At a December 2001 meeting of the Technical Sub-Committee to the Public Liaison Committee of the CBRA, it was decided to leave the CoC issue open ended, that if other additional information in the future becomes available, that it too be examined for CoC identification.

After the release of JWL's 2001 draft CoC reports, four additional sources of soil lead data became available for review. The first source of additional data of soil lead data were from AMEC Earth & Environmental (AMEC) on soil samples collected from federally-owned, surplus Seaway properties bordered by the Rodney St. area to the east and the Welland Canal to the west. AMEC presented their findings at a public meeting held in Port Colborne on February 15, 2002 and distributed four reports, entitled:

- "Phase I Environmental Site Assessment on Parcel #NP-021-B (Site #1) Vacant Lands Between Clarence & Rodney Streets, Port Colborne, Ontario", dated November 2001,

- "Phase II Environmental Site Assessment on Parcel #NP-021-B (Site #1) Vacant Lands Between Clarence & Rodney Streets, Port Colborne, Ontario", dated December 2001 (AMEC, 2001a),

- "Phase I Environmental Site Assessment on Parcel #NP-022-B (Site #2) Vacant Lands Between Rodney Street & East Breakwater, Port Colborne, Ontario", dated November 2001,

- "Phase II Environmental Site Assessment on Parcel #NP-022-B (Site #2) Vacant Lands Between Rodney Street & East Breakwater, Port Colborne, Ontario", dated December 2001 (AMEC, 2001b).

A second source of additional soil lead data became available on April 24, 2002 regarding concentrations of soil lead north of the Rodney Street area, in particular north of Louis Street and south of Durham Street. These data were provided by Inco, through their consultant DCS Consultants (DCS).

The third source of additional soil lead data came from the MOE in their final report entitled "*Soil Investigation and Human Health Risk Assessment for the Rodney Street Community, Port Colborne*" released in March 2002. Within this MOE report, the MOE mapped identifiable 'pockets' of soil lead concentrations within the Rodney Street area above the MOE Table 'A' Generic Guidelines (MOE, 1998). The MOE attributed the source(s) of these 'pockets' to be domestic and urban sources, including but not limited to lead paint, lead acid batteries, leaded gasoline, etc.

A fourth source of additional soil lead data were soil samples collected by JWL from 2001 to 2003 and analyzed to satisfy other requirements of the CBRA, such as the Human Health and Ecological Risk Assessments, the Crop Studies, and the Food Basket Survey.

The four above-mentioned additional soil lead data sets that became available after 2001 were examined by JWL in the context of either meeting or rejecting CBRA CoC Conditions 1, 2 and 3. Condition 3 was not met for lead and thus lead is not a CoC under the Inco-led Port Colborne CBRA. Details on the basis of this conclusion can be found in JWL's report "*Re-Evaluation of Lead as a Potential CoC*" dated June 2004.

The report under this cover represents the finalization of the November 23, 2001 draft CoC summary report regarding the evaluation of the CoCs for this CBRA. The findings and conclusions of this final summary report are based on the weights of evidence gathered in various sections of this report as well as supporting documents in addressing each of the three CBRA CoC Conditons.

For Condition 1, refer to:

- Section 2.0 of this report; and
- JWL report entitled "CoC Identification using Emission Inventories and Dispersion Modelling of INCO and ALGOMA Operations" dated March 28, 2008 (JWL, 2008a).

For Condition 2, refer to:

- Section 3.0 of this report;
- JWL report entitled "Potential CoC Identification using Soil Chemical Concentration Data in Exceedance of MOE Generic Guidelines" dated March 28, 2008 (JWL, 2008b); and

- JWL report entitled "CoC Identification using Emission Inventories and Dispersion Modelling of INCO and ALGOMA Operations" dated March 28, 2008 (JWL, 2008a).

For Condition 3, refer to:

- Section 4.0 of this report;
- JWL report entitled "Potential CoC Identification using Statistical Analyses" dated March 28, 2008 (JWL, 2008c); and
- JWL report entitled "CoC Identification using Emission Inventories and Dispersion Modelling of INCO and ALGOMA Operations" dated March 28, 2008 (JWL, 2008a).

Section 5 of this report provides the overall evaluation of CoCs for the CBRA.

2.0 EVALUATION OF CONDITION 1 – CHEMICALS USED/GENERATED

The premise for Condition 1 is that chemicals found in soil in Port Colborne must be related back to those historically used or generated by the industrial source(s) or its processes. Two industrial sources were considered, including the Inco Refinery and the former steel plant.

2.1 Inco Refinery as the Industrial Source

Information on Condition 1 for the former Nickel Refinery was obtained by JWL through a literature review of Inco's current and historical processes at its Refinery. Based on this review and on the Klohn-Crippen Report dated July, 1996, *Site Characterization Study: Port Colborne Refinery*, the findings were summarized into two broad categories. Chemicals in Category 1 are those that could have been released as air particulates from stack and fugitive emissions and have some potential for off-site airborne migration. Chemicals in Category 2 are those that could be found within or next to the Refinery buildings and operations with little to no potential for offsite airborne migration.

Category 1: Chemicals with Some Potential for Offsite Airborne Migration:

- Metals and Inorganic Parameters: Nickel, Copper, Cobalt, Iron, Lead, Zinc, Chromium, Antimony, Aluminum, Silver, Boron, Arsenic, Selenium, Tellurium, Manganese, Sulphur, Gold, and precious metals released from the processing of ore material.

Category 2: Chemicals with Low to No Potential for Offsite Airborne Migration:

- Inorganic Parameters: Mercury (source: vapour lighting), Ammonia, Sodium, Chloride, and Sulphate (source: process chemicals, road salt, etc).

- Organic Parameters: PolyAromatic Hydrocarbons (source: tar/roofing waste), PCBs (source: transformers, lighting ballasts), Volatile Organics (source: paints, cleaning solvents, refractory organic chemicals, petroleum type wastes, etc), Phthalate Esters (source: plasticizers), Formaldehyde and Phenols (source: resins and epoxies).

- Acids: Boric, Hydrochloric, Nitric and Sulphuric (source: process chemicals).

- Alkali: Sodium Hydroxide (source: process chemical).

Chemicals as identified above in Category 1, *Nickel, Copper, Cobalt, Iron, Lead, Zinc, Chromium, Antimony, Aluminum, Silver, Boron, Arsenic, Selenium, Tellurium, Manganese, Sulphur, Gold, and precious metals,* were those that could have been

released in airborne particulates from stack and fugitive emissions from Inco's Refinery. Of these, Nickel would be the chemical indicator in soils with regards to fingerprinting soil contamination originating from the Inco Refinery as it was the major component of the feed material used in the process.

2.2 Former Steel Plant as the Industrial Source

Available information (The Welland Telegraph dated September 30, 1913) indicates that in the fall of 1913 at the beginning of its operation, the former steel plant consumed 800 tons of iron ore, 500 tons of coke and 200 tons of limestone per day. Figures 2.1 and 2.2 show historical photographs of the former steel plant in proximity to the Inco refinery.

Information on the former Algoma Steel sintering and smelting operation in Port Colborne is scarce. The plant was decommissioned in 1977 and any remaining information on the steel making process can only be obtained from literature sources.

The literature does give information on another Algoma Steel operation from 1939 to 1997 in Wawa in Northern Ontario. There, the operation was sintering only. The type of contaminants released to the environment in the form of atmospheric particulates in Wawa may have been the same as those released by the former Algoma Steel operation in Port Colborne because iron ore was the raw material used in both operations.

As there was no major industrial activity in Wawa other than the Algoma Steel sintering operation, any contaminants found in the environment were attributed principally to the sintering operation. Lake sediment studies by the Ontario Ministry of the Environment (MOE) indicated that "sediment-borne concentrations of Cadmium, Iron, Arsenic, Zinc, Copper, Nickel and Lead bore significant relationships to sintering activity" (MOE, 1979) in the lakes located downwind of the Algoma operation. Vegetation and soil analysis by the MOE indicated a large soil plume of contamination with Iron, Arsenic, Sulphur and Manganese in the prevailing wind direction northeast of the Algoma Steel sintering plant (MOE, 1979). The soil contamination plume length northeast of the Algoma operation measured approximately 3 km long and the plume width was approximately 1 km wide. Subsequent studies by the MOE in 1998 and 1999 (MOE, 1999) indicated similar findings of elevated concentrations of Arsenic, Iron, Manganese and to a lesser extent, Lead, Copper, Nickel, Chromium, Molybdenum and Magnesium.

Beryllium is also a chemical related to dust/slag from a steel plant (MOE, 2001c).

In summary, the chemicals that could have been released as air particulates from stack and fugitive emissions from the former steel plant in Port Colborne are: Beryllium, Cadmium, Iron, Arsenic, Zinc, Copper, Nickel, Lead, Chromium, Manganese, Molybdenum, Magnesium and Sulphur. Of these, Iron would be the chemical indicator in soils with regards to fingerprinting soil contamination originating from the former steel plant as it was the major component of iron ore used in the process.

Figure 2.1 Former Steel Plant (Algoma Steel / Canadian Furnace Company

Picture of former steel plant (foreground)
Courtesy of the Port Colborne Historical Museum.
circa 1950's

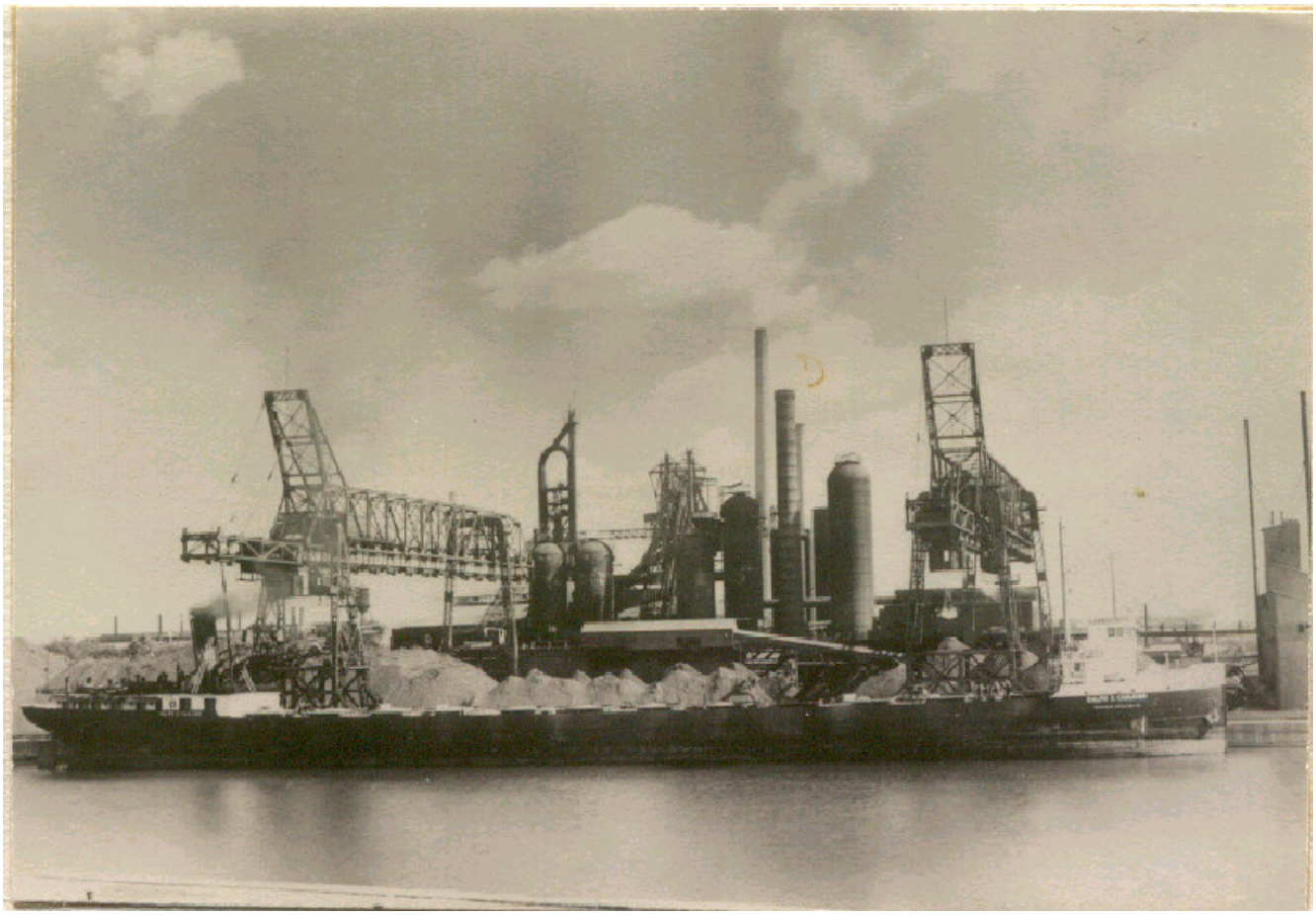


Figure 2.2 Former Steel Plant (foreground) and Inco Refinery (background)

(Courtesy of the Port Colborne Historical Museum) circa 1950's

2.3 Relative Contributions from Inco Refinery and Former Steel Plant

Emissions inventories of particulate matter, nickel and iron were developed for both the Inco refinery facility and the former steel plant facility utilising available operating records and standardised methodologies and techniques specified by United States Environmental Protection Agency (US EPA) and the Ontario Ministry of Environment (MOE). Details are provided in JWL report entitled "*CoC Identification using Emission Inventories and Dispersion Modelling of INCO and ALGOMA Operations*" dated March 28, 2008 (JWL, 2008a).

Estimated total particulate matter emissions are presented in Figures 2.3 and 2.4. These figures show the estimated annual emissions of particulate matter (PM) and the cumulative PM emissions over the operating lives of each facility. These figures show that Algoma was estimated to be a slightly greater emitter of particulate matter than Inco.

Estimated annual air emissions of nickel from the Inco refinery is presented in Figure 2.5. The estimated annual air emissions of iron from the Inco refinery and the former steel plant is presented in Figure 2.6. Annual iron emissions from Inco to the air were estimated to be less than 1% of the Algoma emissions.

Algoma was estimated to be the predominant emitter of iron (about 99% of all iron was estimated to be emitted from Algoma). Other than iron, speciation data for potential CoC's were unavailable for Algoma; therefore comparisons between the two facilities for other potential CoCs could not be made. However, the relative magnitude of PM air emissions from each facility is expected to be an indicator of the relative environmental impact of each facility for other contaminants. The estimated PM emissions between Inco and Algoma were within 4% of one another; therefore Algoma also may have emitted other potential CoCs.

Figure 2.3 Comparison of Estimated Annual PM Emissions from Inco and Algoma over the Operating Life of Each Facility

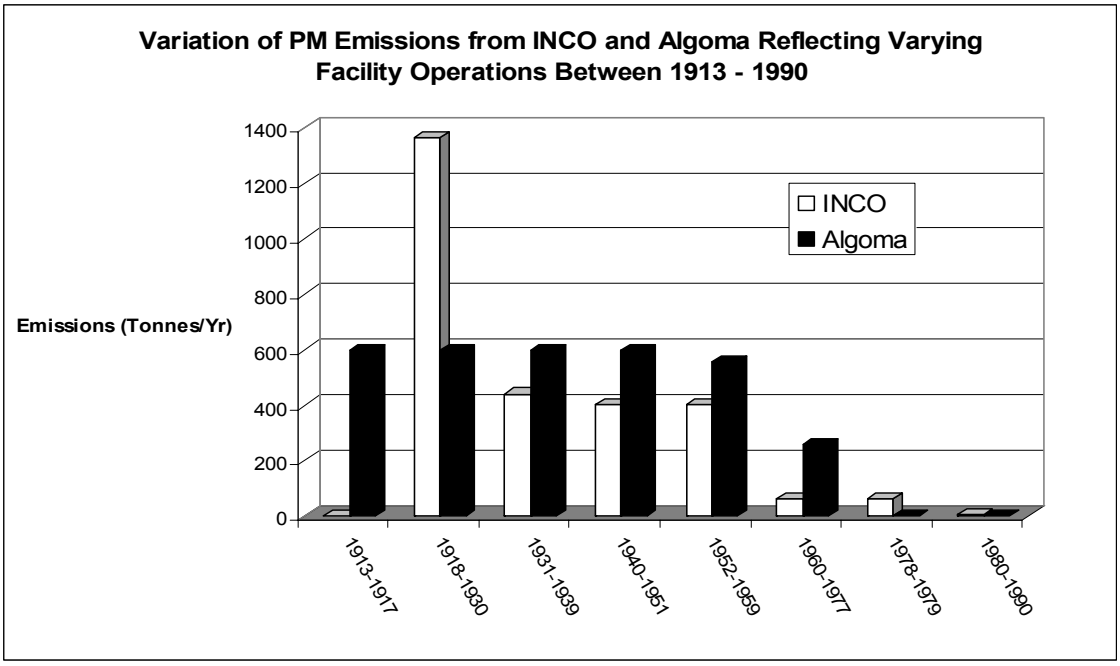


Figure 2.4 Comparison of Cumulative PM Emissions from Inco and Algoma Emissions over the Operating Life of Each Facility

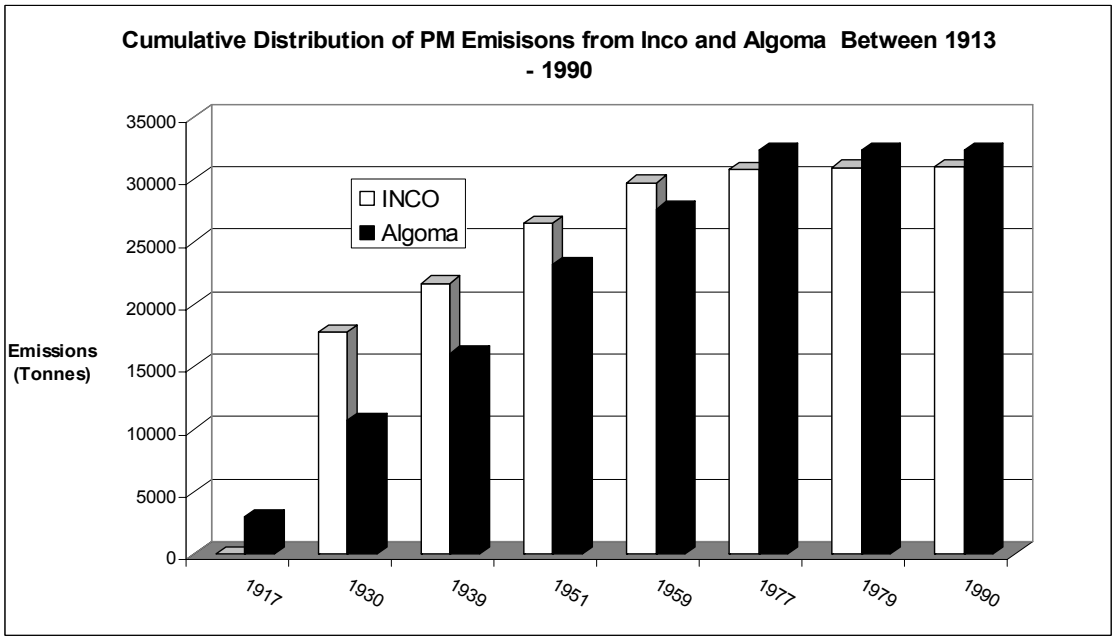


Figure 2.5 Variation of Estimated Inco Nickel Emissions Due to Variations in Facility Operations

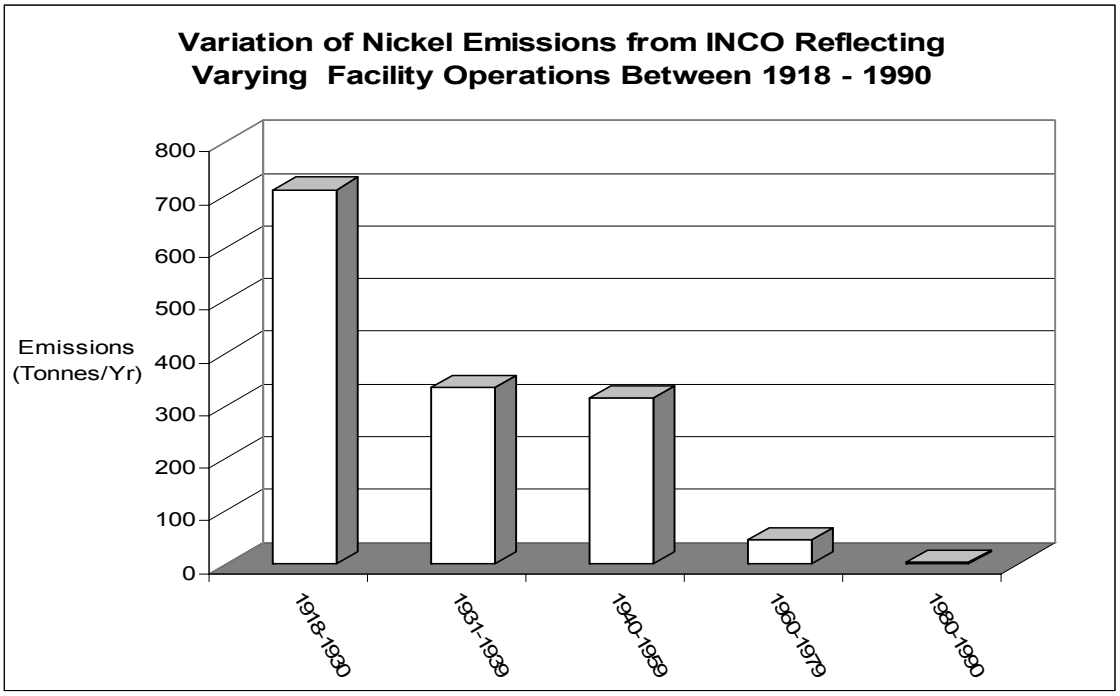
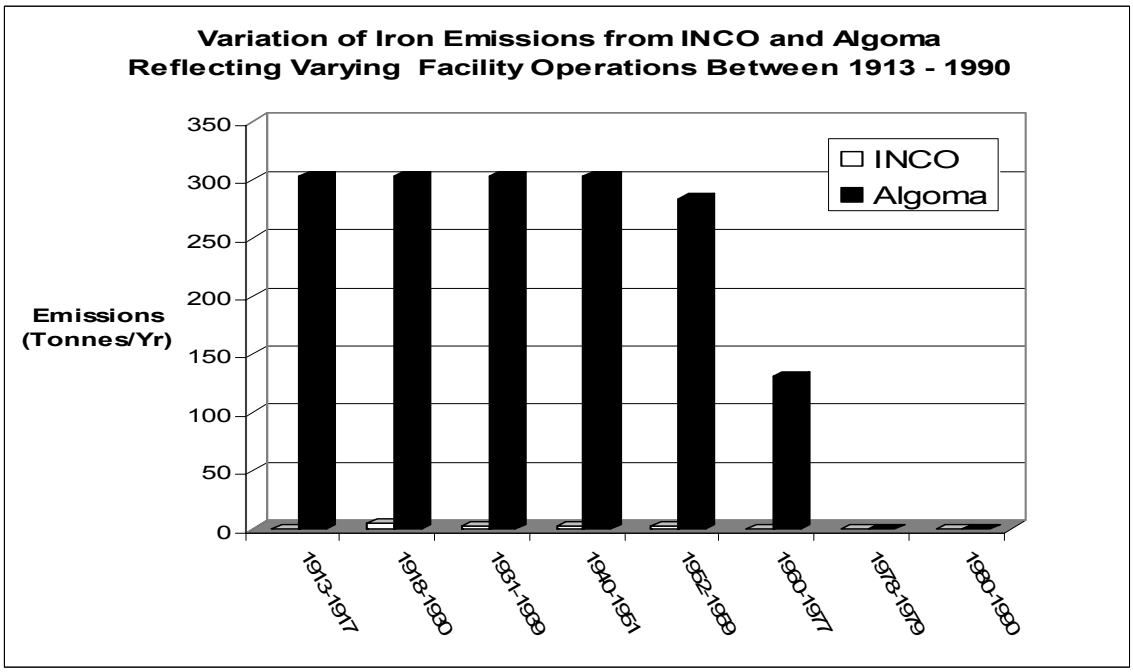


Figure 2.6 Estimated Annual Iron Emissions (Metric Tonnes/Year) from Inco and Algoma Due to Variations in Facility Operations



3.0 CONDITION 2 – SOIL CHEMICAL GUIDELINE EXCEEDANCES

The premise of Condition 2 requires that any exceedances of a chemical found in soil in Port Colborne must be on a **community level** basis as opposed to one or several exceedances in a localized area(s). Exceedances are defined as those concentrations of a chemical that are above the MOE Table 'A' Generic Guidelines (MOE, 1997) for that given chemical.

JWL's report "*Potential CoC Identification using Soil Chemical Concentration Data in Exceedance of MOE Generic Guidelines*" (JWL, 2008b) documents a surface soils investigation and a test pit soils investigation that were conducted by JWL in 2001 to supplement findings from previous MOE soils investigations (MOE, 2000a,b). The purpose of this work was to obtain sufficient scientific information to identify those chemicals in soil as potential CoCs as part of Condition 2.

JWL's 2001 surface soils investigation included the following:

- chemical analyses of ten (10) additional surface soil samples (0 to 5 cm depth) in the Port Colborne area in the vicinity of and downwind of the Inco Refinery for an extensive list of inorganic and organic parameters;
- chemical analyses of 149 MOE-archived 1998 and 1999 soil samples (0 to 5 cm depth) for non-metals, arsenic and selenium. The original MOE 1998 and 1999 soil samples had been analyzed for only metals; and
- mapping surface soils (0 to 5 cm depth) concentration data for each chemical analyzed that exceeded the MOE generic effects-based and determine if there exists any noticeable patterns that link these exceedances on a community wide basis back to the Inco Refinery or to some other industrial source.

JWL's 2001 test pit soils investigation included the following:

- review of site background and historical land use of other potential industrial sources of contamination in the former industrialized area west of Inco that may have contributed to the observed concentrations of chemicals in soil;
- air dispersion modelling to delineate the areal extent of historical particulate loading and fallout deposition that may have resulted from the Inco Refinery and the former steel plant and to provide guidance for test pit locations;
- collection of surface and subsurface soil samples from 17 test pits excavated down to one (1) meter at locations on the former steel plant (ie. upwind of the Rodney Street community), on the Inco Refinery property (ie. downwind of the Rodney Street community), as well as on several residential properties within the

Rodney Street community. Chemical analyses of these samples were done for inorganic parameters, including 17 metals and the nonmetallic chemicals, arsenic and selenium;

- collection and analyses of surface soil samples from four (4) additional test pits TPA, TPC, TPD and TPE located in the residential areas north and northwest of the Inco refinery and south of Killaly Street East. Data on the chemical analyses of these samples were used in conjunction with data sets on the above mentioned samples in order to obtain a better understanding of the soil chemical concentration distribution patterns; and
- mapping soils concentration data for each chemical analyzed that exceed the MOE generic effects-based guidelines to determine if there exist any noticeable patterns that link these exceedances back to the Inco Refinery, to the former steel plant or to some other industrial source on a community wide basis.

The findings and conclusions of the soils investigations are found in JWL's report *"Potential CoC Identification using Soil Chemical Concentration Data in Exceedance of MOE Generic Guidelines"* (JWL, 2008b). Potential CoCs for the CBRA under Condition No. 2 attributed to Inco's historical Nickel Refinery operations were *Nickel, Copper, Cobalt and Arsenic.*

Those potential CoCs under Condition No. 2 attributed to the former steel plant's iron ore operation are Beryllium, Zinc, Arsenic and Lead (JWL, 2008b).

4.0 CONDITION 3 – SCIENTIFIC LINKAGE

Condition 3 was evaluated to determine if chemicals in soil from Port Colborne show a scientific linkage to Inco's operations.

The JWL report entitled *"CoC Identification using Emission Inventories and Dispersion Modelling of INCO and ALGOMA Operations"* dated March 28, 2008 (JWL, 2008a) presented results and findings of an emission inventory and dispersion modelling study in finding scientific linkages between measured surface soil chemical concentrations in samples taken from Port Colborne and the two potential industrial sources of these chemicals, as originating either from Inco or its neighbouring former steel plant, Algoma.

Predicted depositions of soil chemical concentrations over Port Colborne were based on a five-year data set of hourly meteorological data for the region. The five-year meteorological data set used was determined to be representative of the meteorological conditions experienced by Port Colborne in previous decades. Using this approach, total deposition during the operating life of each of the Inco and Algoma facilities was calculated over a 7-km by 7-km domain covering the Port Colborne area for particulate matter , nickel (chemical indicator of Inco as the source) and iron (chemical indicator of Algoma as the source). The dispersion/deposition modelling analysis predicted the following:

- Algoma particulate matter (PM) emissions resulted in significantly higher PM depositions in the Rodney Street area and Port Colborne as a whole than those from Inco. In the Rodney Street area, PM depositions due to Algoma were predicted to be between 11-12 times greater than those from Inco.
- Emissions of nickel by Inco resulted in significantly higher nickel depositions to the north-east of the refinery than in the Rodney Street area.
- Algoma was responsible for the majority of the iron deposition in the Port Colborne area. Algoma emissions resulted in significantly greater iron depositions in the Rodney Street area than those from Inco.

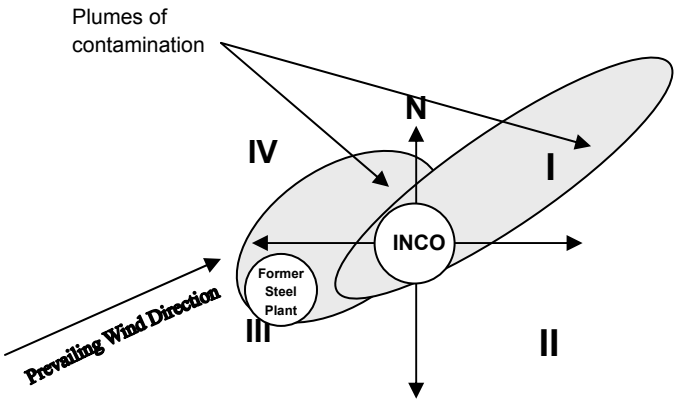
Scientific linkage of other potential CoCs, other than nickel and iron, was addressed by statistical analyses. Details of these statistical analyses are found in JWL's report "*Potential CoC Identification using Statistical Analyses*" dated March 28, 2008 (JWL, 2008c). The burden of proof was to resolve through statistical analyses which soil chemicals were scientifically related to the historical emissions of each of the two potential industrial sources, Inco and Algoma.

Two statistical methods, Methods 1 and 2, were followed to address the scientific linkage issue:

Method 1	Regression analysis of a chemical concentration in soil versus distance from potential industrial sources (Inco and Algoma) using Analysis of Variance (ANOVA); and
Method 2	Regression analysis of soil chemical concentrations with industrial source indicator concentrations in soil using Analysis of Variance (ANOVA). Soil Nickel was the indicator chemical for Inco's historic nickel operation and soil Iron was the indicator chemical related to the former Algoma steel plant's iron ore sintering and smelting operation.

Statistical analyses by Methods 1 and 2 were done on two data sets with each data set representing locations of influence from each industrial source (JWL, 2008c). The data sets were configured within quadrants of the Port Colborne community, with the Inco Refinery at the center. A conceptual drawing showing these quadrants is shown in Figure 4.1. Based on the findings of emission inventory and dispersion modelling study conducted by JWL, the available soil chemical data set within Quadrant I of Figure 4.1 was used to represent atmospheric deposition of chemicals originating from the Inco Refinery and the data set in Quadrants III and IV of Figure 4.1 were used to represent the atmospheric deposition originating from the former steel plant.

Figure 4.1: Data Set Quadrants Considered



With Inco as the assumed source of atmospheric deposited particulates in Port Colborne, the statistical findings of Method 1 on the soil chemical concentration-distance relationship and Method 2 on the relationship of soil chemicals to soil Nickel indicated that those chemicals associated with the former Inco Nickel Refinery in accordance with CoC Condition 3 are *Nickel, Copper, Cobalt, Arsenic and Selenium* (JWL, 2008c).

With the former steel plant as the assumed source of atmospheric deposited particulates in Port Colborne, the statistical findings of Method 2 on the relationship of soil chemicals to soil Iron indicated that those chemicals associated with the former steel plant's iron ore smelting operation in accordance with CoC Condition 3 were Iron, Barium, Beryllium, Aluminum, Chromium, Manganese, Molybdenum, Zinc, Selenium and Lead (JWL, 2008c).

5.0 EVALUATION OF CHEMICALS OF CONCERN

Chemicals must meet all of the three conditions as set out in Section 1.0 of this text to be considered as a CoC for the Port Colborne Community Based Risk Assessment.

5.1 CoCs Attributed to Inco Refinery

A matrix table that summarizes the CoCs attributed to the Inco Refinery according to acceptance or rejection of Conditions 1, 2 and 3 are provided in Table 5.1. As shown in the table, **Nickel, Copper, Cobalt and Arsenic** are the CoCs for the Port Colborne community as attributed to the Inco Refinery.

Table 5.1: Screening for Chemicals of Concern Related to Inco's Nickel Refinery

Chemical	Condition 1	Condition 2	Condition 3	CBRA CoC (Y*/N)
Barium	X	X	X	N
Beryllium	X	X	X	N
Nickel	**√**	**√**	**√**	**Y**
Cobalt	**√**	**√**	**√**	**Y**
Copper	**√**	**√**	**√**	**Y**
Aluminum	√	X^{nv}	X	N
Cadmium	X	X	X	N
Calcium	X	X^{nv}	X	N
Chromium	√	X	X	N
Iron	√	X^{nv}	X	N
Magnesium	X	X^{nv}	X	N
Manganese	√	X^{nv}	X	N
Molybdenum	X	X	X	N
Strontium	X	X^{nv}	X	N
Vanadium	X	X	X	N
Zinc	√	X	X	N
Arsenic	**√**	**√**	**√**	**Y**
Selenium	√	X	√	N
Lead	√	X	X	N
Antimony	√	X	nd	N
Silver	√	X	nd	N
Boron	√	X	nd	N
Tellurium	√	X^{nv}	nd	N
Sulphur	√	X^{nv}	nd	N

*Notes:

√ Affirmative

x Negative

Y Confirmation of a chemical as a CoC based on a chemical meeting all 3 CoC Conditions

N Rejection of a chemical as a CoC based on a chemical meeting all 3 CoC Conditions

nv No value given in MOE Table A Generic Guidelines (MOE, 1997)
nd No statistical analysis done for this chemical

5.2 Screening for Chemicals of Concern Related to Former Algoma Steel Plant

A matrix table that summarizes the possible CoCs attributed to the former Algoma steel plant according to acceptance or rejection of Conditions 1, 2 and 3 are provided in Table 5.2 below. As shown in the table, **Beryllium, Lead** and **Zinc** are the CoCs for the Port Colborne community as attributed to the former steel plant.

Table 5.2: Screening for Chemicals of Concern from Former Steel Plant

Chemical	Condition 1	Condition 2	Condition 3	CoC (Y*/N)
Barium	X	X	√	N
Beryllium	**√**	**√**	**√**	**Y**
Nickel	√	X	X	N
Cobalt	X	X	X	N
Copper	X	X	X	N
Aluminum	X	X nv	√	N
Cadmium	√	X	X	N
Calcium	X	X nv	X	N
Chromium	√	X	√	N
Iron	√	X nv	√	N
Magnesium	√	X nv	X	N
Manganese	√	X nv	√	N
Molybdenum	√	X	√	N
Strontium	X	X nv	X	N
Vanadium	X	X	X	N
Zinc	**√**	**√**	**√**	**Y**
Arsenic	√	√	X	N
Selenium	X	X	√	N
Lead	**√**	**√**	**√**	**Y**
Sulphur	√	X nv	X	N

*Notes:

√	Affirmative
x	Negative
Y	Confirmation of a chemical as a CoC based on a chemical meeting all 3 CoC Conditions
N	Rejection of a chemical as a CoC based on a chemical meeting all 3 CoC Conditions
nv	No value given in MOE Table A Generic Guidelines (MOE, 1997)
nd	No statistical analysis done for this chemical

6.0 CLOSURE

This document is but a sole element of the Community Based Risk Assessment (CBRA) that is being conducted in the City of Port Colborne. It can stand by itself in its scope but must be considered as only one of the elements of the CBRA.

This report should not be taken out of the overall context, goals and scope of the CBRA without the input of Jacques Whitford Limited.

Yours very truly,

JACQUES WHITFORD LIMTED

Original Signed By:

Eric Veska, Ph.D., P.Geo., C.Chem.
Principal and Project Manager

Enclosures (2)

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