

Human Health and Environmental Risk Assessments:
Politics or Science?

by

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Abstract

Human Health and Environmental Risk Assessments are being used by both governments and industries to determine whether or not existing and/or proposed pollution levels are safe for human populations and/or the natural environment. My personal experiences with a “Community Based Risk Assessment” in Sudbury, Ontario, Canada, left me rather doubtful as to the validity of both the science involved and the level of community involvement in the process. After meeting other people who had participated in the same kind of process in other communities, I came to the conclusion that these three risk assessments needed to be analyzed and chronicled, not only for historical purposes, but as a reference to how the process was carried out in the three communities in question: Sudbury and Port Colborne, Ontario, and Belledune, New Brunswick. The risk assessment in Sudbury, Ontario, resulted in the highest permissible levels of ambient nickel air pollution in the province to become the norm only for Sudbury. Of note, extensive water pollution of multiple heavy metals was left out, at the insistence of the mining industry polluters, who not only funded the process, but were allowed to be involved. The Government of Canada would later charge one of the polluters, Vale, for allowing exactly this kind of pollution to occur. Areas of the Belledune fishery are now unfit for human consumption after being subjected to “risk free” pollution; however, rather than close the lobster fishery, all lobsters caught within a 4-mile radius of the smelter in Belledune, are bought by the polluter, and then incinerated, rather than face the public relations fallout of having to close the fishery. Another case in point concerning contamination levels being increased to match local levels, as opposed to recognized standards, is the case of the nuclear accident in Fukushima, Japan. The accident occurred while research into the three CBRAs mentioned was being carried out. These cases clearly indicate human health and environmental risk assessments are a political process, not a scientific one, and meant to match whatever form and level of local contamination was occurring, in order to keep corporate profits and government tax revenues flowing, despite the very real risks to human health and the environment.

Keywords

Community Based Human Health and Environmental Risk Assessment, Grounded Theory, Strauss and Anselm, site-specific standard, lowest observable effects level, National Pollution Release Inventory, Port Colborne Class Action Lawsuit, Environmental Commissioner of Ontario, Environmental Bill of Rights, Inco, Falconbridge, Xstrata, Glencore, cancer incidence, cancer mortality, Local Health Integration Network, Sudbury and District Health Unit, Ontario Ministry of the Environment, Environment Canada, Belledune, New Brunswick, Port Colborne, Sudbury, Chernobyl, Fukushima, Spanish River Harbour, peer review, Diana Wiggins, Inka Milewski, Homer Seguin, Chris Wren.

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Abbreviations

| | |
|-------------------|---|
| ABC | American Broadcasting Corporation |
| AECB | Atomic Energy Control Board |
| AQI | Air Quality Index |
| BBC | British Broadcasting Corporation |
| BC | British Columbia |
| BEI | Bennett Environmental Incorporated |
| BLB&G | Bernstien, Litowitz, Burger and Grossman, LLP |
| CAO | Court of Appeal of Ontario |
| CAW/Mine-Mill 598 | Canadian Autoworkers/Mine-Mill Local 598 |
| CBC | Canadian Broadcasting Corporation |
| CBRA | Community Based Risk Assessment |
| CCNB | Conservation Council of New Brunswick |
| CCSSS | Community Committee on The Sudbury Soils Study |
| CCO | Cancer Care Ontario |
| CELA | Canadian Environmental Law Association |
| CEO | Chief Executive Officer |
| CFDD | Canadian Food and Drug Directorate |
| COC | Chemical of Concern |
| CSC | Communications Subcommittee |
| DEP | Dominant Epidemiological Paradigm |
| DFO | Department of Fisheries and Oceans |
| EA | Environmental Assessment |
| EAA | Environmental Assessment Act |
| EBR | Environmental Bill of Rights |
| <i>EBR</i> | Environmental Bulletin Registry |
| ECO | Environmental Commissioner of Ontario |
| ERA | Environmental Risk Assessment |
| GCM | Global Community Monitor |
| HHRA | Human Health Risk Assessment |
| IC | Independent Consultant |
| Inco | The International Nickel Corporation |
| IPO | Independent Process Observer |
| IRIS | Integrated Risk Management System |
| LEL | Lowest Effects Level |
| LHIN | Local Health Integration Network |
| LOAEL | Lowest observable adverse effect level |
| MAC | Maximum Acceptable Concentration |
| MaC | Mining and Communities |
| MIRARCO | Mining Innovation Rehabilitation and Applied Research Corporation |
| MISA | Municipal Industrial Strategy for Abatement |

| | |
|----------|---|
| MMND | Ontario Ministry of Mines and Northern Development |
| MNR | Ontario Ministry of Natural Resources |
| MOE | Ontario Ministry of the Environment |
| MOL | Ontario Ministry of Labour |
| MPP | Member of Provincial Parliament |
| NAS | National Academy of Science |
| NGO | Non-Governmental Organization |
| NB | New Brunswick |
| NDP | New Democratic Party |
| NOAEL | No observable adverse effects level |
| NPRI | National Pollution Release Inventory |
| NYAS | New York Academy of Sciences |
| NYSDOH | New York State Department of Health |
| ON | Ontario |
| ONCA | Ontario Court of Appeal |
| OPDWO | Ontario Provincial Drinking Water Objectives |
| OPG | Ontario Power Generation |
| OWRA | Ontario Water Resources Act |
| PAC | Public Advisory Committee |
| PLC | Public Liaison Committee |
| PTTW | Permit to Take Water |
| PWQO | Provincial Water Quality Objectives |
| QAQC | Quality Assurance Quality Control |
| Rfd | Reference Dose |
| SA | Scientific Advisor |
| SARA | Sudbury Area Risk Assessment |
| SEL | Severe Effects Level |
| SES | Sudbury Environmental Study |
| SLAPP | Strategic Lawsuit Against Public Participation |
| SSS | The Sudbury Soils Study |
| Statscan | Statistics Canada |
| TC | Technical Committee |
| Tepco | Tokyo Electrical Power Company |
| TSC | Technical Subcommittee |
| UCCCRJ | United Church of Christ Commission for Racial Justice |
| UMass | University of Massachusetts |
| UNOCAL | Union Oil Company of California |
| US | United States |
| USACE | United States Army Corps of Engineers |
| US EPA | United States Environmental Protection Agency |
| USW 4623 | United Steelworkers of America, Local 4623 |
| USW 5762 | United Steelworkers of America, Local 5762 |
| USW 6500 | United Steelworkers of America, Local 6500 |
| UNSCEAR | United Nations Special Committee on the Effects of Nuclear Radiation |
| WBC | Workmen's Compensation Board |

WG
WSIB
WHO

Working Group
Workmen's Safety and Insurance Board
World Health Organization

Chapter 1

Introduction

Risks are calculated in many areas of endeavor; auto insurance companies calculate the risk of accidents for their clients, investment companies will calculate the risk of financial loss when investing in a particular venture, to name only two examples. However, this thesis will examine a kind of risk assessment which is becoming more and more prevalent as a way to calculate the risk to human populations and the environment from forms of industrial pollution.

According to Tom Adams, a spokesman for Energy Probe, a Canadian environmental organization first founded in 1970, it was the nuclear industry which developed the concept and methodology of risk assessment for large human populations. The following quote from The Toronto Star, regarding risk assessment, was actually made in reference to a Port Colborne, Ontario, risk assessment, a heavy metals risk assessment completed in 2010. It was carried out by, and financed entirely by, the principal local polluter, International Nickel, (which would later be sold to Vale S. A., a Brazilian mining company) The Ontario Ministry of the Environment also participated along with the Niagara District Health Unit, and The City of Port Colborne, although neither of these last three organizations contributed any funding. Energy Probe, an organization which believes that: “environmental protection and economic progress go hand in hand, and that the interests of one need not be achieved at the expense of the other.” (Energy Probe Webpage), is skeptical of risk assessment, and believes that risk assessment is a questionable method of determining human health and environment risks. In a 2001 newspaper article by Kate Harries, of The Toronto Star, Tom Adams of Energy Probe summed up his opinion of human health and environmental risk assessment in the following way:

‘Environmentalists are suspicious of risk assessment, a new research methodology that originated with the nuclear industry’, says Tom Adams of Energy Probe. The environment ministry has embraced the trend of ‘basing their criteria on calculated results rather than actual measured health impacts,’ Adams said. ‘The purpose of it is to demonstrate that there is no potential for harm, not to study whether there is any harm’ (Harries 2001).

The fourth chapter of this thesis, “Chernobyl and Fukushima: Controlling Information”, will look at the reactions of both the Soviet and Japanese governments after they were forced to construct the risk from nuclear accidents for their respective societies. Above all, both governments and the nuclear industry involved felt the need to control information relating to the risk to human health. It would also be a recurring feature in two of the risk assessments I examined, one in Sudbury and another in Belledune, New Brunswick. The third risk assessment examined, the Port Colborne Community Based Risk Assessment (CBRA), actually had a fully-funded, qualified environmental science representative acting on the public’s behalf, who was highly critical of both the science and methodology of the Port Colborne CBRA. The Sudbury CBRA would have no such funded representative for local citizens by design, nor would Belledune.

The impetus for researching this topic of human health and environmental risk assessment, was my failed attempt to participate in what was proffered as a local public process in my city, i.e., a “community-based risk assessment” or CBRA, in March 2008, called “The Sudbury Soils Study”. This CBRA consisted first of a Human Health Risk Assessment, followed by an Ecological Risk Assessment some months later. These two components of the Study would be based on the risk presented by the levels of six heavy metals in the soils of the Sudbury area (nickel, lead, cadmium, arsenic, selenium and cobalt), which in many soil samples tested, exceeded the Ontario Ministry of the Environment’s (MOE) allowable generic background levels. The sources of these metals in local soils were from mining industry smokestack pollution from three facilities: a nickel smelter and refinery in the community of Copper Cliff, owned by

International Nickel, later bought out by Vale SA, a Brazilian mining company, and a nickel smelter in the community of Falconbridge, owned by Noranda Metals at the beginning of the CBRA, which was then sold to Xstrata metals during the CBRA, and was later sold to Glencore, an Australian mining company, after the CBRA. The Sudbury CBRA was based on only recent pollution levels i.e., the last five years of smokestack pollution, despite this pollution having been present in the area for almost 100 years. And of this pollution, the largest single component, sulphur dioxide, was not considered in the calculation of risk, nor was the solid waste runoff from both inactive and active mining and ore processing facilities. I would later learn that it was the two local mining companies which insisted on the exclusion of both sulphur dioxide and solid waste pollution from the CBRA.

Sudbury, at the time the local CBRA began, in 2001, had a population of 155,219 and in area, the CBRA “encompassed approximately 40,000km² (Wren and Mucklow 2010:3); Port Colborne’s population was 18,600 (ibid). after the initial completion of their CBRA and covered an area of approximately 29 km². No public funds were used in either the Sudbury or Port Colborne CBRA and the cost of the Port Colborne CBRA would eventually be \$30 million over 11 years, with \$10 million being spent on additional health studies, all of which were funded by Vale (Wren and Mucklow 2010:21). The Sudbury CBRA was completed in 8 years, at a cost of \$12 million dollars, (ibid) with Xstrata (now Glencore) contributing \$3 million dollars (Bradley June 13th, 2008); in total, these two CBRA’s cost a total of \$42 million dollars. (ibid).

Chapters 5 through 8, plus Chapters 14 and 15, detail my initial involvement with the Sudbury CBRA. My original plan as to how to participate in the Sudbury CBRA, was to become as informed a layperson as possible on matters of local pollution, hoping to place myself in a position of at least being able to understand the basic concepts and issues of what I believed

would be the facts of the matter. To accomplish this, I began an internet search of both publicly accessible, peer-reviewed research and publicly available documents. Such data is within the reach of any member of the public with minimal computer skills and access to the internet. Relevant documents and articles were also gleaned from newspapers — local, national and international — and from earlier published peer-reviewed research conducted locally by researchers such as scientist Dr. Glen Parker, Professor of Biology at Laurentian University in Sudbury, and Dr. Jerome Nriagu, Professor of Environmental Health Sciences at The University of Michigan, in Anne Arbour, Michigan, to name only two. While not a local research scientist, it should be pointed out that Dr. Nriagu obtained his undergraduate degree from Brock University in St. Catharines, Ontario, and his doctorate from the University of Toronto. He has researched Sudbury specifically, co-authoring and publishing nine articles in scientific journals on different effects of mining pollution in and around Sudbury (1978a, 1978b, 1982, 1983a, 1983b, 1984a, 1984b, 1985, and 1987). I was very surprised to learn during the presentation of the findings of the Human Health Risk Assessment that even pertinent research from the Government of Canada, through Environment Canada (Nriagu, Jerome, Wong, Henry K.T., Lawson, Gregory, Daniel, Peter (1998).” Saturation of ecosystems with toxic metals in Sudbury, Ontario, Canada” was not included in the scientific literature which the Sudbury CBRA would use as a basis for evaluating how to assess the risk to human and environmental health.

My own experience with Sudbury’s mining pollution is both personal and firsthand, as I have lived in Sudbury for almost 50 years. I learned through my research that I lived in a community which now has the highest cancer mortality rate in the province of Ontario (Statistics Canada 2013). This geographic region which I live in, for administrative purposes, is now termed “The Northeastern Local Health Integration Network (LHIN)” by the province of

Ontario's Ministry of Health. In the course of my research, I also learned that two of the smaller local health units within this LHIN, in the gold mining towns of Timmins and Kirkland Lake, also have substantially higher cancer mortality rates than the provincial average, and that the mortality rates are similar to that of The Sudbury and District Health Unit): all are 20% higher than the provincial average (Statistics Canada, 2013). Although the Sudbury CBRA examined the risk of cancer from only airborne pollutants, no data concerning cancer mortality was presented to the public during the public presentations of the findings of the Human Health Risk Assessment component of The Sudbury Soils Study. What was mentioned, by Dr. Penny Sutcliffe, the representative from the Sudbury and District Health Unit in The Sudbury Soils Study, at all three public presentations of the CBRA findings, was the following statement, which is etched in my memory: "This is not a health study. We are not counting the number of sick people." To my mind, it seemed that the numbers of "sick people", and/or cancer mortality levels, would be a good indicator of whether or not the estimations of risk levels posed by the multiple pollutants we are exposed to in Sudbury, could be confirmed by related illness levels; however, that data does not form the basis of risk assessment. Risk assessment estimates illness levels; it does not examine sickness levels in an area that is already heavily polluted, such as Sudbury, Port Colborne and Belledune.

Human health risk assessment is in fact based on scientific principles first articulated in the 1500s, by a Middle Ages scientist [born Philippus Aureolus Theophrastus Bombastus von Hohenheim, (1493 —1541)], commonly referred to as simply "Paracelsus", who believed that all substances contain varying amounts of poisons, stating that:

All things are poison, and nothing is without poison: the dose alone makes a thing not poison (Society of Toxicology of Canada webpage).

This interpretation of toxic effects is the basis of the science known as toxicology, whereby dose and effect move together in a predictably linear fashion. At some levels, a poison has no effect, while only at higher doses is that chemical a poison. This assumption is the foundation upon which risk assessment rests. Martin Mittelstaedt, environmental reporter for the Canadian newspaper *The Globe and Mail*, wrote in a 2010 article commenting on risk assessment, that:

(...) laboratories give test animals huge quantities of chemicals to establish what will damage them, then lesser amounts to determine at what point exposure is harmless (Mittelstaedt 2010).

For the human health risk assessment done in Port Colborne, the research which determined what was a safe level of nickel in residential soils, was based on a 1972 feeding experiment by Ambrose et al, in which rats were force-fed oral doses of nickel soluble salts, which was not the form of nickel primarily present in the Port Colborne environment, nickel oxide. In the Ambrose et al (1972) feeding experiment, lab rats were given daily oral doses of “0, 100, 1000 or 2500 ppm nickel (estimated as 0, 5, 50 and 125 mg Ni/kg bw) in the diet” [(EPA, Nickel, soluble salts CASRN Various)]”. At these different levels, different effects were observed:

Groups of female rats on the 1000 or 2500 ppm nickel diets (50 and 125 mg Ni/kg bw) had significantly higher heart-to-body weight ratios and lower liver-to-body weight ratios than controls. No significant effects were reported at 100 ppm (United States Environmental Protection Agency website. 2012).

From this data:

(...) a ‘Lowest Observable Adverse Effects Level’ [LOAEL] was established and a ‘No Observable Adverse Effects Level’ [NOAEL], the effect being decreased organ and body weight: NOAEL: 100 ppm diet [5 mg/kg/day], and LOAEL: 1000 ppm diet [50 mg/kg/day] (ibid).

Once the level of NOAEL had been established, the “safe” level for humans was arrived at through the following method, by the United States Environmental Protection Agency (EPA):

An uncertainty factor of 10 is used for interspecies extrapolation and 10 to protect sensitive populations. An additional uncertainty factor of 3 is used to account for inadequacies in the reproductive studies (ibid).

From this methodology, The United States Environmental Protection Agency (EPA) determined that the safe level of dietary intake of nickel for humans was the Lowest Observable Effect Level (LOEL) divided by 300, which yielded a result of 0.016 milligrams per kilogram of body weight (0.016mg/kg/bw). This level of intake would produce “negligible risk” for human beings. Of the six chemicals studied in the Sudbury CBRA, nickel, copper, lead, cadmium, arsenic, selenium and cobalt, only nickel was calculated to be at the level of minimal risk (1 in 100,000 to 1 in 1,000,000) when considered as airborne pollution. Some levels of nickel and lead in residential soils were also found to be above the Ontario recommended generic levels, and in some cases, resulted in the soil being removed and replaced, but present-day levels of nickel as air pollution was the main concern for Sudbury residents. This concern was found to be “negligible”:

Based on the analysis conducted for this risk assessment, it is unlikely that any additional respiratory cancers would be detected as a result of nickel exposure over the 70-year lifespan considered in the risk assessment. However, these results identify the need for risk management to reduce the exposure to nickel in these localized areas (Human Health Risk Assessment Results 2008:3).

Just what “risk management” measures would be taken to reduce the risk of “negligible” nickel exposure in these areas was a very curious exercise. During the Human Health Risk Assessment component of the CBRA, nickel levels were recorded at ten different monitoring stations located throughout the Sudbury area. The monitor in Sudbury West, adjacent to the east side of the smelter property line, recorded the highest airborne nickel concentration: “The maximum single nickel concentration measured during the year was 0.87µg/m³ (PM10 fraction) at the Sudbury Centre West Station” (Wren 2012:22). For purposes of calculating the risk of health effects described as “both cancer and non-cancer endpoints” to Sudburians. (Wren 2012:219):

Data from both Sudbury Centre West and Sudbury Centre South were used to represent exposure to residents of Sudbury as a whole (...) and would likely overestimate actual exposure to the broader area (Wren:122).

This data produced a finding of elevated health risk from nickel in Copper Cliff above the one in a million mark, approximately 3.5 per million with nickel in ambient air at $0.24\mu\text{g}/\text{m}^3$ (negligible risk) and in Sudbury West, (Gatchell) a risk of 12 per million (minimal risk) with nickel at $0.87\mu\text{g}/\text{m}^3$. According to Dr. Wren:

This information, as well as other elements from the weight of evidence approach was used as a basis for making informed risk management decisions on addressing potential health risks related to airborne Ni in the study area (Wren 2012:223).

Just over 6 months after the release of these findings, on December 11th 2008, Vale applied for, and received, an exemption from the proposed new Ontario pollution standards for nickel in ambient air, which were: $0.2\mu\text{g}/\text{m}^3$ 24-hr. average and an annual average of $0.04\mu\text{g}/\text{m}^3$.

Paradoxically, the ambient atmospheric levels for nickel which are now (2016) allowed by law, for Sudbury, one the highest in the province, are now also the norm for the rest of the province. Ontario's allowable nickel levels are an annual average, ($0.04\mu\text{g}/\text{m}^3$ and a 24-hr average $0.2\mu\text{g}/\text{m}^3$ for Ontario vs. $1.0\mu\text{g}/\text{m}^3$ for Sudbury as both an annual and 24-hr. average). The full details are contained in Chapter 19: "The Environmental Registry and Permissible Pollution Levels for Sudbury." This is an apparent contradiction in terms, between what risk management seemed to mean in the context of the social construction of the term, "risk management "as per the Sudbury CBRA, and what risk management would come to mean: higher air pollution levels for nickel in Sudbury than anywhere else in the province. This implies a higher level of harm to local citizens is acceptable.

The process of risk assessment and the sorts of calculations it involves has become highly scientific and specialized, and is categorized by environmental sociologist Robert Bullard, a Texas A&M Professor of Environmental Sociology, in his book "The Quest for Environmental Justice: Human Rights and the Politics of Pollution" (2005) as a process which has become

“scientized”. By that, he means that laypersons and residents of polluted areas, such as the residents of places like Sudbury, Port Colborne and Belledune, for whom these risk assessments are purported to be carried out, are for the most part incapable of participating as individuals in the process, as it is now the purview of highly specialized scientific experts hired by government and/or industry. Bullard also notes that:

(...) workers and their unions have long been the first line of discovery of harmful effects of unsafe machinery and production processes, as well as of a variety of toxins (2009:9).

According to Bullard, unions can be a valuable asset in determining the risk from exposure to harmful chemicals in the workplace, as they are exposed to the same chemicals residents are being exposed to. Unfortunately, unions were given no role in any aspect of the actual Sudbury CBRA process. Chapter 9, “Union Attempts at Participation in the Sudbury Soils Study and the Past Activism of Homer Seguin” examines the role of the two leading local unions of the mining industry in the local CBRA. It also puts into context the reception given to the past president of the United Steelworkers Local 6500, Homer Seguin, by mining industry participants in the Sudbury CBRA, which was decidedly cool, to say the least.

Chapter 10, “Chronicling the CBRA Through Public Documents” provides further background to the events leading up to the presentation of the findings of the CBRA through public documents, such as the personal observations of Rick Grylls president of Mine-Mill/CAW Local 598 and the published comments of other actors in the process.

My attempts to participate in, and hopefully understand, the Sudbury CBRA brought me into contact with two remarkable women, Inka Milewski and Diana Wiggins. My first meeting with these two women took place shortly after the presentation of the Sudbury CBRA, and is documented in Chapter 11, “Inka Milewski and Diana Wiggins Arrive in Sudbury”. Both gave presentations in Sudbury regarding their experiences with the CBRA processes where they live.

Both were quite familiar with the processes of human health and environmental risk assessment. Inka Milewski, Science Officer for the Conservation Council of New Brunswick, had opposed findings of “no risk” in the community of Belledune, New Brunswick from pollution generated by a local lead smelter for years, but to no avail. Pollution levels remained high, and in the future would only get higher in Belledune, thanks to the siting of additional industrial installations. The primary polluter for many years, was Xstrata metals, (now Glencore) one of Sudbury’s long-time polluters, and a participant in the Sudbury CBRA. How that ongoing process in Belledune functioned and the events which ensued up to the year 2006, were compiled by Milewski in a publication titled “Dying for Development: the legacy of lead in Belledune: (Milewski 2006). This publication, along with publicly accessible documents and newspaper accounts, will form the basis of my research data for Belledune. Milewski’s efforts were not to end with this presentation, as she would later face a defamation lawsuit for daring to question the findings of a risk assessment funded by a company wanting to construct a toxic waste incinerator in the town of Belledune. Chapter 12, “The Risk of Being an Environmental Activist and the Legacy of Pollution in Belledune” examines the kinds of battles Inka Milewski not only faced on her own, but also how she fought on behalf of local residents in both New Brunswick courts and at Federal Government hearings in Ottawa. At one of the same local presentation which Inka Milewski spoke at in Sudbury, Diana Wiggins was also a speaker on the matter of a CBRA that took place in her community, Port Colborne, Ontario.

Diana Wiggins, along with fellow Port Colborne residents Wilf Pearson and Ellen Smith, launched the first environmental related class action lawsuit in Canada against Inco, later Vale S.A., not for a single pollution incident, but for decades of past pollution which had left Port Colborne soils contaminated with primarily nickel oxide, but also lead and arsenic. Chapter 13,

“Diana Wiggins and Class Action Against Past Pollution” provides an overview of that process. It was the first such lawsuit of its kind in Canada, which initially succeeded, but was overturned upon final appeal in the Ontario Court of Appeal. There was another earlier lawsuit in Port Colborne, launched by a family of local farmers, the Augustines. It came to a successful conclusion for the Augustines shortly before both the Port Colborne CBRA and the class action lawsuit was commenced. The Augustine lawsuit was successful, although as per legal practice in litigation matters, the amount of compensation in the settlement could not be divulged to the public. The activism of Inka Milewski and Diana Wiggins prompted me to seek out other concerned individuals in Sudbury, and to briefly join the local opposition to the findings of the Sudbury CBRA, known as: The Community Committee on the Sudbury Soils Study. My involvement was brief, due to a difference of opinion on how to garner public support for our cause. Chapter 14, “My Short Involvement in the Community Committee on The Sudbury Soils Study” is rather self-explanatory. A difference of opinion on how to engage the community in our cause led me to leave the group. I continued on as an individual activist, however. An account of this phase of my involvement with the Sudbury CBRA is contained in Chapter 15, “Carrying on as an Unaffiliated Activist”. It was my experiences during this period which led to a decision to do a Master’s thesis on the matter, with the Environmental Sociology Department of Laurentian University.

Chapter 16, “Class and Individual Activism in Port Colborne” is a further exploration of the legal and environmental issues which would develop during the research stage of my thesis. This research includes several very interesting documents concerning the Port Colborne CBRA, by Rick Watters, of Watters Environmental. His assessment of the CBRA outlines what he believed were deficiencies in the methodologies, and with the assumed “safe” blood level of lead

in local residents. Rick Watters held the title of “Independent Consultant” and his position evolved into being the public’s voice in the process.

Much to my amazement, it was brought to my attention by another source, who also wished to remain anonymous, that the results and methods of the two CBRAs in Sudbury and Port Colborne were being taught as a “how — to” course at my own alma mater, Laurentian University, in Sudbury, Ontario. The perspectives offered on the two CBRAs in this accredited course were quite surprising to me, as my experiences as a member of the public and my research findings were quite different. Chapter 17, “Comparison of the Port Colborne and Sudbury CBRA Structures: A Combined Perspective” is just that. The perspective of the evaluators of the two CBRAs, one of whom, Dr. Chris Wren, was employed as a paid researcher of Vale S.A. in both, are combined with my own experiences and research, to produce an evaluation with more than just the perspective of one person who was paid by the polluter to be a researcher in both (Wren), and another who was employed by the local mining industry in Sudbury (Mucklow) at the time it was written.

My research also led me to discover that Ontario is the only jurisdiction in North America which has a piece of legislation guaranteeing the rights of citizens to have a say in determining pollution levels in their communities. It is called “The Environmental Bill of Rights”. Chapter 18. “CBRAs, Environmental Justice and Ontario’s Environmental Bill of Rights” looks into this matter and the role of the Environmental Commissioner of Ontario, who reports to both the Ontario Government and the public, and on the general state of affairs not only of the environment, but also on the status of the Environmental Bill of Rights as a whole. Through this piece of legislation, public involvement in the process to determine acceptable pollution levels in their community is not a limited courtesy extended to the public by industry

and government, but was intended to be a legislated right, at least here in Ontario. Risk assessments, which in Sudbury and Port Colborne were financed entirely by the polluter(s), are apparently outside of this legislation, with government and industry determining how much involvement they feel the public should have, and most importantly, whether they will fund a public representative for the public in their process. The Port Colborne CBRA had a qualified scientist to represent the public, the Sudbury CBRA did not. Belledune continues to have Inka Milewski as a public science advocate, although she is affiliated with The Conservation Council of New Brunswick, a non-profit environmental organization. funded entirely by public donations. With the highly scientific nature of the process of risk assessment, it is questionable whether the public interest was served without adequate qualified public representation in the Sudbury CBRA.

The “scientization” of the risk assessment process will also be viewed from the perspective of two sociologists in the United States: Robert Bullard, Professor of Environmental Sociology at Texas A&M, who first coined the term “scientization”, and by Phil Brown, Professor of Sociology and Environmental Studies at Brown University and his most recent book: “Toxic Exposures: Contested Illnesses and the Environmental Health Movement” (2007). In addition, for further perspective on the matter of community opposition to findings of “no risk” in a community, layperson Lois Gibb’s experiences in Niagara Falls, New York, will also be given an overview. Much of what Gibb experienced in the 1970s in the Love Canal area is relevant to other communities experiencing high pollution levels to this day, in terms of government rejection of any data other than that of which they approve, of an industry/government alliance determining acceptable research methodology, and how the process

can be manipulated through total control of the methodology and the input information, to determine community risk levels.

Chapter 19 “The Environmental Bulletin Registry and Permissible Pollution Levels for Sudbury” examines how our environmental rights are actually functioning in Ontario, by following applications from two of Sudbury’s local polluters, Vale and Xstrata, for the right to pollute to levels well above what is allowed for the rest of Ontario. Applications to temporarily permit the highest ambient air pollution levels in the province for cadmium, sulphur dioxide, arsenic and nickel are examined in Chapter 19. The applications examined were made through the Environmental Registry, as per Ontario law, and concluded with the highest permissible levels for nickel in the province being allowed in Sudbury on a temporary basis. Eventually, the allowable sulphur dioxide, arsenic and cadmium levels in Sudbury will match the standards for the rest of the province, but nickel will not.

After learning how to use the Environmental Bulletin Registry, which keeps tabs on what local polluters were proposing to do, I learned that the issue which had occupied a good portion of my thoughts during the Sudbury CBRA, i.e., the pollution of the Spanish River and the local waterways which all empty into it, was indeed an issue which the Federal Government believed needed to be addressed, the opinions of the local mining companies and the Ontario Ministry of the Environment (MOE) notwithstanding.

As set out in Chapter 20, “The Spanish Harbour”, The Environmental Bulletin Registry” alerted me to the fact that in the vicinity of Vale’s Copper Cliff Refinery in 2014, had been granted the right to withdraw, a possible 303 million litres of ground water for “remediation” to prevent the contamination of adjacent commercial and residential wells

(EBR # 011-3979). More notices for decontamination wells would appear on the Environmental Registry for both the smelter and refinery areas, all of which were located on Vale property; however, eventually two decontamination wells were placed on public property, both of them in a storage facility property of the Sudbury Catholic District School Board facility on Travers Street. The facility is located near the fence line of the smelter property in Sudbury West. The area is known locally as “Gatchell”, but in the Sudbury Community Based Risk Assessment was referred to as “Sudbury Centre West.” Clearly, waste pollution was migrating off-site of the Copper Cliff Smelter, via ground water. In addition, Environment Canada now possesses its own research which indicates that nickel and copper levels in the sediments of The Spanish Harbour are not going down as air pollution diminishes, but appear to be going up by “two percent per year.” (Gandhi, Nilima, Satyendra P. Bhavsar, Diamond, Miriam. “Dynamics of Ni and Cu in the Spanish Harbour, Lake Huron — A Modelling Study.” 2012:2) It appears that to address this issue, according to the Gandhi et al research, we must now take into consideration upstream loading by solid waste mining pollution and effluent runoff, from both mining and processing facilities in Sudbury (Gandhi et al:27, 28). This information was obtained from Environment Canada through contact person Kate Taillon, who connected me with the research from the University of Toronto, who were contracted by Environment Canada to investigate this matter. The research remains unpublished.

Documented records of how the parameters of the Sudbury CBRA were determined, indicate that the local mining industry participants in the Sudbury CBRA insisted the matter of solid waste runoff leaving mining and surface processing facilities be left out of the Sudbury CBRA (Mariotti, Franco. Independent Process Observer’s Progress Report No.2. Fall 2002). During the review process of this thesis, the Ghandi et al (2012) research would come into even

greater significance, as Environment Canada would obtain a search warrant for Vale's offices in Copper Cliff, seizing computers, passwords and files, in relation to an investigation into the discharge of a substance harmful to fish into a local waterway, an offence under the Criminal Code of Canada. The waterway in question, is an unnamed creek, which empties into Nolin Creek, which is a part of the Spanish River tributary system. In the past, local residents would use this water in their vegetable gardens and their children played in it, even drinking it occasionally. The Sudbury CBRA concluded long before the raids happened at the Vale offices, and the process was viewed as incomplete, by myself and others, for not including this issue of the effect solid waste runoff may have had on the health of local residents and those downstream.

Chapter 21, "An Overview of Cancer Mortality in Northeastern Ontario", compares cancer mortality for the three main mining communities in Northeastern Ontario: Sudbury, Timmins and Kirkland Lake. Unfortunately, my research revealed that Northeastern Ontario overall, has the highest cancer mortality rate in Ontario, and the rate is 20% above the provincial average, as a percentage of the area's population.

Chapter 22, "Bucket Brigades and Wounded Communities", examines what seems like a hopeful beginning for community activists to monitor pollution in their communities, with a basic, homemade monitoring piece of equipment, known as a "bucket tester". However, in the community of Sudbury, the matter is no longer as simple as measuring a single emission level and determining compliance or not. The monitoring protocols for Sudbury now require an annual average to determine compliance with pollution levels. To pay the cost of daily, or even multiple daily readings to obtain such an average, is out of the financial reach of everyday citizens. With so many readings required to obtain an annual average, this method of citizen monitoring has been rendered financially impossible. Sudbury's largest single polluter now not only does its

own monitoring of its pollution — not the Ministry of the Environment — it can now pollute on an hourly basis, provided the annual average of its readings does not exceed the highest allowable levels for nickel pollution in the province of Ontario. It is an example of the “scientization” of pollution, which has changed concrete pollution limits for Sudbury into limits based on the monitoring protocols devised, which may now require hundreds of readings, not a few, to establish compliance.

Chapter 23 is a list of conclusions based on the preceding data, and possible avenues of research in the future. Beginning with Sudbury, where amongst other things, solid waste pollution, left out of the CBRA, is now being investigated as a potentially criminal matter by the Royal Canadian Mounted Police. Decontamination wells, with a potential for processing up to 6 billion litres of groundwater have been constructed in and around both the Copper Cliff Smelter and Refinery properties. In Port Colborne, where residents went to court with Vale in Canada’s first-class action lawsuit against past heavy metals pollution (ultimately unsuccessful), it appears that groundwater contamination, also not examined in the CBRA there, has become an issue. Decontamination wells have been constructed to decontaminate up to 110 million litres of groundwater annually around the Port Colborne facility.

Since a finding of no risk to human health was calculated for pollution caused by the lead smelter in Belledune, lobsters caught in the vicinity of Belledune Harbour must now be incinerated due to unsafe levels of cadmium in their tissues. The alternative is to ban the fishery, but this would be very bad public relations for the local economy, and undeniable proof that the previous findings of no risk to this fishery were clearly in error. In addition to the lobsters in Belledune Bay being unfit for human consumption, the local shellfish fishery around Belledune has also been closed to the public since 2005 due to unacceptably high levels of lead in local

clams and mussels. Lead and cadmium contamination are now present in clams and mussels 28 km from the smelter as well. In all three communities, Belledune, Sudbury and Port Colborne, after a CBRA process found minimal risk or no risk from the pollutants studied, local pollution levels were not reduced, but increased. In the aftermath of the Fukushima accident, the daily “safe” radiation level in the contamination zone has been set at a level 20 times higher (20 millisieverts) than the level at which residents of Chernobyl were allowed to return home (1 millisievert), one final confirmation that government and industry risk assessments should never be taken at face value, but with a critical eye.

Chapter 2

Theoretical Perspective and Methodology

This thesis is not based on a general sociological theory that I am trying to either confirm or refute. The research methodology for this thesis was inspired by sociological approaches as articulated by Bruno Latour in his 2005 book: “Reassembling the Social: An Introduction to Actor-Network Theory” and the general principles of Grounded Theory. After familiarizing myself with the principles of Actor-Network Theory, I decided to follow not only the actors, but the “actants” as Latour terms them, non-human influences such as legislation and the bureaucracies which govern environmental pollution, which influence the assemblages, or the narratives of the issue of risk assessment. Often, one piece of information, no matter how seemingly insignificant, would lead me in a new and unanticipated direction of research if I followed wherever it led me. In this way, my body of research information would grow, almost organically, into a form which could not have been anticipated.

For the first semester of the Interdisciplinary MA Program in Sociology I was required to study and digest different social theorists, such as Marx, Durkheim and Weber to name only three. From these and other established social theories it was assumed that we would find a theory that would explain our research findings. For me, none did, although German sociologist Ulrich Beck has speculated about the risk posed by global industrialization in his books, such as the seminal “Risk Society: Towards a new Modernity” (1992). Unfortunately, I found his writings to be rather general in nature. Beck writes of how pollution is global in nature and that the entire world is at risk from what begins as localized pollution; as pollution does not respect

the borders of any country, but travels to wherever the environment takes it; pollution that is produced locally becomes a global problem over time. What I was interested in were the mechanics of a local process, which determined what “safe” levels of pollution were for my community, not on global pollution issues. Other people in Sudbury, and beyond, had personally experienced this process, and it seemed to be more at the heart of the issue I wanted to research than generalities about a world at risk from the sum total of localized pollution sources. So, again, I felt it was more appropriate for me to adopt more of a localized and site-specific approach, where one detail leads to another, and by adding these details, I ended up with a map of where the actants, or influences led to. It was, however, a very long process. I began this process in the absence of any knowledge of Latour’s approach to research; however, in hindsight, the following quote from Latour certainly was appropriate:

(...) either we follow social theorists and begin our travel by setting up at the start which kind of group and level of analysis we will focus on, or we follow the actors’ own ways and begin our travels by the traces left behind by their activity of forming and dismantling groups (Latour 2005:29).

It was this theoretical approach, of following the actors and the groups that they formed and dismantled, in addition to the groups and associations that influenced them, which dictated my methodology and where my research led to. This aspect of Latour’s theory is very similar to Grounded Theory, which is both a theoretical approach and a research methodology, whereby the research itself determines what the conclusions about the social phenomena being studied will be. It is an approach whereby any hypotheses about the matter being studied are made after all the data has been collected, as opposed to gathering information which supports an existing theory or hypothesis, about the matter being studied.

The text which guided me on the concept of Grounded Theory is titled: “The Discovery of Grounded Theory, Strategies for Qualitative Research” (1967) by Barney Glaser and Anselm

Strauss. Grounded Theory, according to Glaser and Strauss, is best used when the researcher finds that: “the speculative theory has nothing to do with his evidence unless he forces a connection.” (Glaser and Strauss:29). Had I used an existing theorist, even Beck, I would have had to limit my thesis to data which related to his research, possibly leaving out important data on the procedural and regulatory aspects of the localized pollution issues I was researching. It is, after all, localized sources of pollution, which taken collectively, produce the global risk conditions Beck speaks of. As I had already participated in the local process I was going to be researching, I could not claim to be an outsider merely making impartial observations. Much of what I wished to include in my research was both anecdotal and experiential, which I had been led to believe was generally considered a *faux pas* in sociological research. I was not just a researcher into a social process, I was also a participant, an actor. Based on what I had been led to believe about sociological theory, lived, personal experiences were generally frowned upon as acceptable data for inclusion in one’s research, as they lacked impartiality, and were considered subjective in nature. However, I could not elaborate upon the experiences of the local general public on this matter, if I did not include myself as part of the participating public, which I was. I am on public record as having participated in the Sudbury CBRA process prior to my thesis research; therefore, my personal experiences and anecdotal evidence could not be selectively excluded from the existing data on public record. Fortunately, according to Glaser and Strauss, this is not considered unacceptable in Grounded Theory research:

Another slice of data that should be used is the ‘anecdotal comparison’. Through his own experiences, general knowledge, or reading, and the stories of others, the sociologist can gain data on other groups that offer useful comparisons. This kind of data can be trusted if the experience was ‘lived’ (ibid:67).

In the course of what I shall call my “pre-thesis, lived research” I encountered other actors with

lived experiences in separate risk assessment processes, such as Diana Wiggins of Port Colborne, who, along with Ellen Smith and Wilf Pearson of the same city, launched the first class-action lawsuit in Canada, over past pollution by International Nickel (Inco), later to become Vale SA. Through Diana Wiggins, I learned that a parallel process of Community Based Risk Assessment had been funded earlier by International Inco, now Vale, in Port Colborne, as well as the one in Sudbury. At the same public meeting in Sudbury, sponsored by The Centre for Research in Social Justice and Policy at Laurentian University, of which Professor of Social Work Carol Kauppi was director at the time (2008), I met Inka Milewski, Science Officer of The Conservation Council of New Brunswick. She is also the daughter of an Elliot Lake, Ontario, uranium miner. She had been opposing the findings of ongoing risk assessments by Falconbridge, later Xstrata Metals, and a local polluter in Sudbury as well, for years, in the town of Belledune, New Brunswick. Her account of events there was condensed into a publication titled: “Dying for Development: the legacy of lead in Belledune” (2009). This publication provided an important comparison, in terms of providing another example of what occurred both before and after a community-based risk assessment (CBRA). Her experiences, like mine, were personal in nature and formed part of her narrative about the issue. The Belledune polluter, Falconbridge, later Xstrata, was also a participant in the Sudbury community-based risk assessment (CBRA).

Due to the fact I was on public record as being less than trustful of the findings of the Sudbury CBRA, I felt it would be best not to conduct any interviews of the other actors involved, lest a perception of bias be suggested. Rather, I decided to let the actors involved (myself included) contribute their own public statements to my research through previous public

statements, without any editing or paraphrasing of their words into footnotes by me. As to whether using the public statements made by the actors concerned is an appropriate methodology, as opposed to interviewing them, it is considered entirely valid by Glaser and Strauss:

Every book, every magazine article, represents at least one person who is equivalent to the anthropologist's informant or the sociologist's interviewee. In those publications, people converse, announce positions, argue with a range of eloquence and describe events or scenes in ways entirely comparable to what is seen and heard during field work. The researcher needs only to discover the voices in the library to release them for his analytic use (Glaser and Strauss:74)

According to Glaser and Strauss, another valid reason for using the public statements of the actors involved as research material, as opposed to conducting interviews, is that by using public statements, a researcher:

(...) can also minimize the possibility that your informant may lie to you, as living informants do, when they cannot otherwise protect themselves against a researcher's inquiry. (Glaser and Strauss:177).

I did not find a sociological researcher who had attempted to personally participate in a community-based risk assessment, as an affiliated, or unaffiliated, individual member of the lay public, as I had, before deciding to research the larger issues involved. Therefore, I concluded that the best approach to take in presenting my research would be to present it, at least partially, in the form of a personal narrative of my own experiences. My decision to formally research the matter of risk assessment as a Master of Arts student in sociology, came over a year after the Community Based Risk Assessment (CBRA) process in Sudbury had concluded.

In short, this thesis is somewhat of a personal narrative, combined with public document research, to inform not only myself, but hopefully other readers of this research, about a methodology for determining safe public levels of pollution in Ontario and elsewhere, which many may not be aware of. It was a methodology of utilizing both public and personal data

which Inka Milewski, Science Officer for the Conservation Council of New Brunswick, used to great effect in her informational/autobiographical work “Dying for Development: the legacy of lead in Belledune” (2009). A somewhat similar methodology was also taken by American sociologist Robert Bullard, in his book “The Quest for Environmental Justice. Human Rights and the Politics of Pollution” (2005). Bullard’s book is a compilation of case studies in the United States, examining state-sanctioned settings of toxic waste dumps in minority communities. These communities received no shortage of reassurances on the part of both government and industry actors that these toxic storage facilities presented no (calculated) risk to the population(s) affected. The more Bullard examined the issue, the siting of toxic waste dumps, the more he found that there was both a social element to pollution, in terms of who is affected, and also where polluting industries are sited: i.e., in either economically disadvantaged communities or communities with a high proportion of visible minorities. (2009:20). Bullard uses the term “environmental sacrifice zone” to describe the communities where government allows industry to either begin operating a toxic storage facility and/or a polluting industry, typically in economically impoverished and/or politically marginalized areas. Bullard elaborates upon the concept that living free of potentially harmful pollution should be considered a civil right, as much as freedom of speech and freedom from discrimination are civil rights. He chronicles the actions of different communities in the United States and their struggles in this sphere, in everyday people’s quest for justice on the environmental front, which is instructive to any activist seeking to reduce pollution in their community.

A second American researcher who used essentially the same methodology as Bullard was Phil Brown, Professor of Sociology and Environmental Studies at Brown University. His book, titled: Toxic Exposures. Contested Illnesses and the Environmental Health Movement

(2008), examines in one section how the Dominant Epidemiological Paradigm (DEP) concerning illness, particularly cancer, is in many cases the preferred explanation of illness by both industry and government. The DEP almost completely absolves environmental factors, i.e., industrial pollution, as a causative and/or contributing agent. Instead, it posits that a person's diet and lifestyle choices are the root of disease according to the DEP. He chronicles different struggles on the parts of affected groups in society to contest this DEP, in the United States, from Gulf War Veterans, to breast cancer activists and poor, rural and urban communities affected by industrial pollution. Brown's book deals with both the successes and failures of grass roots activism in the United States and with the nuts and bolts of efforts at the community level to control their exposure to pollution, not the writings of social theorists. Therefore, I felt that the approach taken by both Brown and Bullard was a very good fit for what I felt needed to be examined, but that my methodology would be somewhat different. It would include only the public statements of the actors involved, sometimes in material written by themselves, sometimes in material which appeared in local and national news media, in addition to my personal anecdotes and experiences as a local activist with the matter being researched. The aim of this methodological approach is that it will provide a sort of roadmap for laypeople to follow, should a community-based risk assessment (CBRA) process come to their community. And more to the point: is this CBRA process a matter of science or politics? Within that question came a need to examine relationships of power within my own community and others, along with some of the historical aspects of the pollution involved, and eventually, to examine whether similar situations existed in other communities. After evaluating the writings of Bullard, Brown and Milewski, I became convinced that their narrative method, along with Milewski's combination of personal narrative of her experiences in this process, backed with factual data, was the most

effective method of communicating a very complicated process. With the use of Grounded Theory research approaches and the Actor Network Theory approach of environmental sociologist Bruno Latour, I felt this methodology would best suit my research. It is Latour's belief that it is the role of the researcher:

(...) to trudge toward the many local places where the global, the structural, and the total were being assembled and where they expand outward thanks to the laying down of specific cables and conduits. If you keep doing this long enough, the same effects of hierarchy and asymmetry that before were visible will now emerge out of strings of juxtaposed localities groups (Latour 2005:191).

Letting the data which I uncovered guide the direction of my research, was for me the most appropriate theoretical approach and methodology. It would allow me to provide as part of my research both empirical, and in my case, experiential data.

The “juxtaposed localities” which Latour speaks of, or the threads of data, which led me and emerged out of my research were: Sudbury and Port Colborne in Ontario, and Belledune, in New Brunswick. However, while I was researching these communities, the unexpected nuclear accident at Fukushima, Japan, took place, opening up the possibility of actually exploring a contemporary nuclear industry/government approach to risk assessment, one which should have learned from the mistakes committed some years earlier at the Chernobyl nuclear generating station. Although this incident occurred after the three Canadian CBRAs in question had taken place, it is again an instructive example as to how government and industry decide the social construction of risk to a population experiencing contamination from industrial sources. It is for this reason that I chose to include in my thesis, a brief overview of the events at Fukushima, Japan, and of the previous nuclear meltdown in Chernobyl, Ukraine, formerly a part of the Soviet Union, in Chapter 4. “Chernobyl and Fukushima: Controlling Information.” However, first of all,

how risk calculations are carried out, categorized and presented to the public, will be examined in Chapter 3: “The Construction of Risk.”

Chapter 3

The Construction of Risk.

My original plan as to how to participate in the Sudbury CBRA, was to become as informed a layperson as possible on matters of local pollution, hoping to place myself in a position of at least being able to understand the basic concepts and issues of what I believed would be the facts of the matter. Relevant documents and articles were also gleaned from newspapers — local, national and international — and from earlier published peer-reviewed research conducted by independent researchers, such as local scientist Dr. Glen Parker, Professor of Biology at Laurentian University in Sudbury, and Dr. Jerome Nriagu, Professor of Environmental Health Sciences at The University of Michigan, in Anne Arbour, Michigan, to name only two. While not presently a local research scientist, it should be pointed out that Dr. Nriagu, originally from Nigeria, obtained his doctorate from the University of Toronto; he has researched Sudbury specifically, co-authoring and publishing nine articles in scientific journals on different effects of mining pollution in and around Sudbury (p 4). I was very surprised to learn during the presentation of the findings of the Human Health Risk Assessment that even pertinent research from the Government of Canada, through Environment Canada (Nriagu, Jerome, Henry K.T. Wong, Henry, Gregory Lawson Gregory, Peter Daniel, Peter [1998] “Saturation of ecosystems with toxic metals in Sudbury, Ontario, Canada.”), was not included in the scientific literature which the Sudbury CBRA would use as a basis for evaluating how to assess the risk to human and environmental health from local heavy metal pollution.

My own experience with Sudbury's mining pollution is both personal and firsthand, as I have lived in Sudbury for 50 years. I learned through my research that I lived in a community which now has the highest cancer mortality rate in the province of Ontario, according to Statistics Canada (2012). This geographic region which I live in, for administrative purposes, is now termed "The Northeastern Local Health Integration Network (LHIN)," by the province of Ontario's Ministry of Health. In the course of my research, I also learned that two of the smaller local health units within this LHIN, which encompasses the gold mining towns of Timmins and Kirkland Lake, also have substantially higher cancer mortality rates than the provincial average, and that the mortality rates are similar to that of The Sudbury and District Health Unit (Statistics Canada 2012). Although the Sudbury CBRA examined the risk of cancer from only airborne pollutants, no data concerning cancer mortality was presented to the public during the public presentations of the findings of the Human Health Risk Assessment component of The Sudbury Soils Study. What was mentioned, by Dr. Penny Sutcliffe, the representative from the Sudbury and District Health Unit in The Sudbury Soils Study, at all three public presentations of the CBRA findings, was the following statement which is etched in my memory: "This is not a health study. We are not counting the number of sick people." To my mind, it seemed that the numbers of "sick people", and/or cancer mortality levels, would be a good indicator of whether or not the estimations of risk levels posed by the multiple pollutants we are exposed to in Sudbury, could be confirmed by related illness levels; however, that kind of data does not form the basis of risk assessment. Risk assessment estimates whether harm is occurring and it does not examine sickness levels in an area that is already heavily polluted.

Human health risk assessment is in fact based on scientific principles first articulated in the 1500s, by a Middle Ages scientist [born Philippus Aureolus Theophrastus Bombastus von

Hohenheim, (1493 –1541)], commonly referred to as simply “Paracelsus”, who believed that all substances contain varying amounts of poisons, and that only the dose determines whether substance is a poison (p 6). This interpretation of toxic effects is the basis of the science known as toxicology, whereby dose and effect move together in a predictably linear fashion. At some levels, a poison has no effect, while only at higher doses is that chemical a poison. To determine what level is harmful, research is conducted on mice, then extrapolated to humans. For the human health risk assessment done in Port Colborne, the research which determined what was a safe level of nickel in residential soils, was based on a 1972 feeding experiment by Ambrose et al, in which rats were force-fed oral doses of nickel soluble salts, which was not the form of nickel primarily present in the Port Colborne environment, nickel oxide.

From this methodology, The EPA determined that the safe level of dietary intake of nickel for humans as 0.016 milligrams per kilogram of body weight (0.016mg/kg/bw) . This level of intake was calculated to produce “negligible risk” for human beings (p. 9). The EPA sums up the basic process of human health risk assessment as follows:

Planning - Planning and Scoping process

EPA begins the process of a human health risk assessment with planning and research.

Step 1 - Hazard Identification

Examines whether a stressor has the potential to cause harm to humans and/or ecological systems, and if so, under what circumstances.

Step 2 - Dose-Response Assessment

Examines the numerical relationship between exposure and effects.

Step 3 - Exposure Assessment.

Examines what is known about the frequency, timing, and levels of contact with a stressor.

Step 4 - Risk Characterization

Examines how well the data support conclusions about the nature and extent of the risk from exposure to environmental stressors.

Source: US Environmental Protection Administration (EPA) website. Human Health Risk Assessment:1.

For both the Sudbury and Port Colborne Community Based Risk Assessment (CBRA), the levels of calculated risks from metals exposure were explained to the public in the following way:

High: fairly regular events occurring at a rate greater than 1 in 100. They may also be described as frequent, serious or significant.

Moderate: A risk of between 1 in 1,000 or 1 in 100. This would apply to a wide range of medical procedures and environmental events

Low: Predicted increased risk of 1 in 10,000 and 1 in 1,000. Other words which might be used include reasonable, tolerable and small.

Very Low: A risk between 1 in 100,000 and one in 10,000.

Minimal: A risk is in the range of 1 in 1,000,000 to one in 100,000. The conduct of normal life is not generally affected as long as reasonable precautions are taken to minimize exposure. Some policy makers consider a probability of anything lower than 1 in 100,000 as acceptable.

Negligible: An adverse event occurring in less than 1 per 1 million episodes. While still important to identify and monitor, such a risk would be of little concern for normal living. Other words that could be used in this context are remote or insignificant.

(Source: Sudbury Soils Study Human Health Risk Assessment Results 2008:3).

Of the six chemicals studied in the Sudbury CBRA, nickel, copper, lead, cadmium, arsenic, selenium and cobalt, only nickel was found to be above the level of minimal risk (1 in 100,000 to 1 in 1,000,000) when considered as airborne pollution. Some levels of nickel and lead in residential soils were also found to be above recommend generic levels, and in some cases, resulted in the soil being removed and replaced, but present-day levels of nickel as air pollution was the main concern for Sudbury residents. This concern was found to be “negligible”

according to the Study:

Using conservative assumptions, the study calculated a minimal risk of respiratory inflammation from lifetime exposures to airborne nickel in the areas of Copper Cliff and the western portion of Sudbury Centre (Sudbury Soils Study: Volume 2 Human Health Risk Assessment (HHRA) Results.2008:4).

Just what risk management measures would be taken to reduce the risk of “negligible” nickel exposure in these areas was a very curious exercise. During the Human Health Risk Assessment component of the CBRA, nickel levels were recorded at ten different monitoring stations located throughout the Sudbury area. The monitor in Sudbury Centre West, adjacent to the east side of the smelter property line, recorded the highest airborne nickel concentration:

The maximum single nickel concentration measured during the year was $0.87\mu\text{g}/\text{m}^3$ (PM10) at the Sudbury Centre West Station (Wren. 2012:122).

On the west side of the smelter property, in the town of Copper Cliff, a maximum reading of $0.34\mu\text{g}/\text{m}^3$ was recorded (ibid). For purposes of calculating the risk of health effects to Sudburians, described as “both cancer and non-cancer endpoints” (Wren:219) and the study concluded that using these readings would likely overestimate the amount of risk to the broader area of Sudbury (p 7).

This data produced a finding of elevated health risk in Copper Cliff above the one in a million mark (approximately 3.5 per million) and in Sudbury West, a risk of 12 per million. This information was used as a basis for what were termed “informed management decisions” (p 7) on how to minimize the risk to Sudburians from airborne nickel pollution.

Just over 6 months after the release of these findings, on December 11th 2008, the actual meaning of “risk management” would be revealed. Vale applied for, and received, an exemption from the proposed new Ontario pollution standards for nickel in ambient air, which were: $0.2\mu\text{g}/\text{m}^3$ as a

24-hr. average and an annual average of $0.04\mu\text{g}/\text{m}^3$. As part of the program of “risk management”, the eventual ambient atmospheric levels for nickel which are now allowed (2016), by law for Sudbury, are the highest in the province of Ontario: $1.0\mu\text{g}/\text{m}^3$ as a 24-hr average, and also as an annual average. That annual average level is 25 times higher than what is permissible anywhere else in Ontario, rendering the conventional understanding of the term “risk management” in need of revision (pp 233,234).

The process of risk assessment and the sorts of calculations it involves has become highly scientific and specialized, and is categorized by environmental sociologist Robert Bullard, a Texas A&M Professor of Environmental Sociology, in his book *The Quest for Environmental Justice: Human Rights and the Politics of Pollution* (2005) as a process which has become “scientized”. By that, he means that laypersons and residents of polluted areas, such as the residents of places like Sudbury, for whom these risk assessments are purported to be carried out, are for the most part incapable of participating as individuals in the process, as it is now the purview of highly specialized scientific experts hired by government and/or industry.

Bullard also notes that:

(...) workers and their unions have long been the first line of discovery of harmful effects of unsafe machinery and production processes, as well as of a variety of toxins (Bullard:9).

According to Bullard, unions can be a valuable asset in determining the risk from exposure to harmful chemicals in the workplace, as they are exposed to the same chemicals residents are being exposed to. Unfortunately, unions were given no role in any aspect of the Sudbury CBRA process. Chapter 9, “Union Attempts at Participation in the Sudbury Soils Study and the Past Activism of Homer Seguin” examines the role of two leading Sudbury unions of the mining industry in the local CBRA, Mine-Mill/CAW Local 598, (now Mine Mill Local 598-Unifor) and

the United Steelworkers Local 6500. It also puts into context the reception given to past president of the Steelworkers Local 6500, Homer Seguin, by those who controlled the CBRA, which was decidedly cool, to say the least.

My research also led me to discover that Ontario is the only jurisdiction in North America which actually has a piece of legislation guaranteeing the rights of citizens to have a say in determining pollution levels in their communities. It is called “The Environmental Bill of Rights”. Through this piece of legislation, public involvement in the process to determine acceptable pollution levels in their community is not a limited courtesy extended to the public by industry and government, but a legislated right, at least here in Ontario. Risk assessments, which in Sudbury and Port Colborne were financed entirely by the polluter(s), are apparently outside of this legislation, with government and industry determining how much involvement they feel the public should have, and most importantly, whether they will fund a qualified representative for the public in their process of determining community risk from industrial contamination.

Chapter 4

Chernobyl and Fukushima: Controlling Information.

After the nuclear generating station accident in Fukushima, Japan, Chernobyl was once again in the spotlight. It was the nuclear plant accident in Japan that first alerted me to the fact that there was an abundance of information concerning the nuclear plant meltdown at Chernobyl, but much of it was not considered in calculating the public risk that the Fukushima accident presented. Japanese citizens had been directed, by special legislation enacted shortly after the Fukushima accident, to not publish any information about the Chernobyl accident. Perhaps the most important information in question, was contained in “The Annals of The New York Academy of Sciences”, and freely available to the world over the internet. The New York Academy of Sciences (NYAS), founded in 1817, has consistently published articles on the forefront of science over time; Pasteur, Darwin and Einstein have all published research through the NYAS. One of its more recent contributions to science was the establishment of an organization it named: “Scientists Without Borders,” and the establishment of a free website where scientific and technical data could be openly shared amongst people around the world. Part of their mission statement is quoted below:

For nearly 200 years — since 1817 — the Academy has brought together extraordinary people working at the frontiers of discovery. Among the oldest scientific organizations in the United States, it has become not only an enduring cultural institution in New York, but also one of the most significant organizations in the global scientific community (NYAS webpage:2017).

After the accident at Fukushima, a group of activists began to devise a method for taking their own radiation level readings, with homemade radiation detectors. This group of international and

Japanese activists founded a group they called “Safecast” and began broadcasting their radiation level findings on the internet, in a manner similar to the NYAS website “Scientists Without Borders”, for all citizens of Japan and the world to see (Safecast webpage:2017). They obtained radiation level readings by having volunteers drive their personal vehicles through what the Japanese government claimed were “non-contaminated zones” — only one time per volunteer, for safety reasons — with a radiation meter counter mounted on the dashboard of their cars. The device was situated where it could be viewed by an on-board cell phone camera, and the readings were then relayed to a home base. These real time readings were then made known around the world via the internet, to anywhere there was internet access to be had. In many cases, these readings showed radiation levels to be above acceptable standards in what was considered to be areas not at risk from radiation by government and industry. The recorded radiation levels were archived, so that all readings for all days were readily available around the world, via the internet, upon request. In addition, more than one newspaper in Japan had published some of the research findings on the Chernobyl meltdown of 1986, based on data compiled by independent researchers in Russia, Belarus, the Ukraine, Scandinavia and Europe. The research in question was available to any member of the public on the NYAS free web platform. The article, based on information contained in the book *Chernobyl: Consequences of the Catastrophe for People and the Environment* (Nesterenko, A., Nesterenko, V., Yablokov, A. 2009) documented independent European and Russian research on the issue of the resultant deaths due to radioactivity exposure from the nuclear accident at Chernobyl.

The Japanese Government, shortly after this information on the NYAS website was made public, attempted to restrict Japanese media outlets from reporting what research and information they were discovering, and insisted that only “official” radiation levels and research could be

reported in the Japanese media. (Makiko 2011). This included all public media, including the internet. The Japanese Government appeared to be making an attempt to be the sole source of “official” Japanese radiation levels, but also of international research on the matter of radiation effects on human health. The Japanese government also announced that: “A new project team has been created by the Ministry of Internal Affairs and Communication, the National Police Agency, to combat ‘rumors’ deemed harmful to Japanese security in the wake of the Fukushima disaster” (ibid). Just what action would be taken to combat “rumors” that were “harmful to Japanese security” was soon revealed by the new project team of the Ministry of Internal Affairs, when it began:

(...) to send ‘letters of request’ to such organizations as telephone companies, internet providers, cable television stations, and others, demanding that they ‘take adequate measures based on the guidelines in response to illegal information. The measures include erasing any information from internet sites that the authorities deem harmful to public order and morality’ (Makiko 2011).

According to these “letters of request”, it appeared that The Central Institute for Meteorology and Geodynamics in Vienna, was disseminating “illegal” information. So too, was anyone quoting research made publicly available by The New York Academy of Sciences (NYAS), concerning the potential risk to human health in Japan, by using Chernobyl research as a basis for comparison. Of course, all postings of radiation levels by Safecast were also now “illegal”.

The forward to the NYAS article: “Chernobyl: Consequences of the Catastrophe for People and the Environment” (Nesterenko, A., Nesterenko, V., Yablokov, A., 2009. “Annals of The New York Academy of Sciences” Vol. 1181.) was written by Prof. of Biology Dr. Dimitro M. Grodzinsky, Chairman, Department of General Biology, Ukrainian National Academy of Sciences and Chairman, Ukrainian National Commission on Radiation Protection. In the forward, Grodzinsky explains what happened in the Soviet Union in the immediate aftermath of

the Chernobyl accident:

(...) apologists of nuclear power began a blackout on data concerning the actual amounts of radioactive emissions, the doses of radiation, and the increasing morbidity among the people that were affected (Nestorenko et al 2009:vii).

He also makes the point that as a result of the Chernobyl accident that “With the passage of time, oncological diseases with longer latency periods, in particular, breast and lung cancers, became more frequent” (Nestorenko et al:vi), and that “From year to year there has been an increase in nonmalignant diseases, which has raised the incidence of overall morbidity in children in areas affected by the catastrophe” (Nestorenko et al:viii).

On the twentieth anniversary of the Chernobyl accident, April 26th 2006, a conference was convened in Kiev, and attended by such agencies as The International Atomic Energy Association (IAEA), The World Health Organization (WHO) and The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR). This conference was billed as “the fullest and objective review of the consequences of the Chernobyl accident, yet mentions only 350 mainly English publications” (Nesterenko et al:xi), whereas the authors note that: “The scientific literature on the consequences of the catastrophe now includes more than 30,000 publications, mainly in Slavic languages” (ibid). In their preface, B. Nesterenko et al state in the New York Academy of Sciences article concerning Chernobyl that:

The list of the literature incorporated into the present volume includes about 1,000 titles and reflects more than 5,000 printed and Internet publications, primarily in Slavic languages (ibid).

Obviously, the authors could not incorporate all the 30,000 research papers which they had access to. Still, this discrepancy in the amount of Chernobyl data available, as opposed to the amount of data which was considered relevant and acceptable by international monitoring and regulatory bodies, is an important detail, as it establishes what the range of facts concerning the

scientific reality of the issue of risk level to human health actually was. This full repository of data could have conceivably formed a body of knowledge upon which a basis for the predictions of risk related to Japan’s own nuclear accident could have been established. **Table1** has been reproduced from the NYAS article and is an estimate of the additional deaths from radiation exposure, for only European Russia (west of the Ural Mountains), Belarus and the Ukraine, after the Chernobyl accident.

Table 1: “Number of Additional Deaths in Belarus, Ukraine, and the European Part of Russia, 1990–2004, That Can Be Attributed to the Chernobyl Catastrophe” (Khudoley et al:2006).

| Region/Country | European Russia | Belarus | Ukraine | Total |
|--|-----------------|-----------|-----------|-----------|
| Population living in highly contaminated areas | 1,789,000 | 1,571,000 | 2,290,000 | 5,650,000 |
| Number of additional deaths | 67,000 | 59,000 | 86,000 | 212,000 |

Source: B. Nestorenko et al 2009. “Chernobyl: Consequences of the Catastrophe for the People and the Environment.” *Annals of the New York Academy of Sciences*, Volume 1181, p 210.

However, if we compare the totals for estimated deaths in the three areas of European Russia (west of the Ural Mountains), Belarus and the Ukraine, with the “official” death statistics from The International Atomic Energy Association and the World Health Organization, we get a dramatically different figure:

The Chernobyl Forum (WHO, 2006) calculated a total number of 9,000 total cancer deaths in Belarus, Ukraine, and Russia, can be attributed to the Chernobyl catastrophe for a period of 90 years after the meltdown (Nesterenko et al:210).

When we compare estimates of what will be the total deaths due to the Chernobyl accident, the estimates vary widely, according to who is doing the estimating, and by extension, what procedures they were using, and what data was included or excluded. **Table 2** has been reproduced from The NYAS article as well, and shows cancer death estimates from cesium isotopes and strontium 90 that vary from 4,000 to 1.7 million people, depending on who, or which agency, is doing the estimating.

Table 2: “Estimates of the Number of Cancer Deaths Resulting from the Radionuclides Cs-134, Cs-137, and Sr-90 Released from the Chernobyl Reactor.” (B. Nestorenko et al, Table 7.9:208) From J. Fairlie and D. Sumner (2006: table 6.2).

| Number of deaths | Author | Comments |
|-------------------|--|--|
| 4,000 | Press release to the Chernobyl Forum (2003). | 90 years, Belarus, Ukraine European part of Russia |
| 8,930 | Chernobyl Forum (2006) | 90 years, Belarus, Ukraine, European part of Russia |
| 14,000 | Nuclear Regulatory Commission, USA | For all time, entire world |
| 17,400 | Anspaugh et al. (1988) | 50 years, entire world |
| 28,000 | U.S. Department of Energy (Goldman, 1987) | 50 years, entire world |
| 30,000 | UNSCEAR (Bennett, 1996) | For all time, entire world |
| 30,000–60,000 | Fairlie and Sumner (2006) | For all time, entire world |
| 93,080 | Malko (2007) | 70 years, entire world |
| 180,000 | Malko (2007) | 70 years, all Chernobyl causes |
| 495,000 | Gofman (1994a, b) | For all time, entire world |
| 899,310–1,786,657 | Bertell (2006) | For all time, all radionuclides, entire world |

Source: Nestorenko et al, 2009. Chernobyl: Consequences of the Catastrophe for People and the Environment, Annals of the New York Academy of Sciences, Vol 1181:208.

The authors of the 2009 NYAS article, Nesterenko et al, state very bluntly what they believe the biggest impediment has been to collecting accurate and useful data about radiation levels and

health effects after the Chernobyl accident and has been reduced to four main facts:

1. The official secrecy that the USSR imposed on Chernobyl's public health data in the first days after the meltdown, which continued for more than 3 years—until May 23, 1989, when the ban was lifted.
2. The USSR's official irreversible and intentional falsification of medical statistics for the first 3.5 years after the catastrophe.
3. The lack of authentic medical statistics in the USSR and after its disintegration in 1991, as well as in Ukraine, Belarus, and Russia, including health data for hundreds of thousands of people who left the contaminated territories.
4. The expressed desire of national and international official organizations and the nuclear industry to minimize the consequences of the catastrophe (...) The situation of the liquidators is indicative. Their total number exceeds 800,000 (...) Within the first years after the catastrophe it was officially forbidden to associate the diseases they were suffering from with radiation, and, accordingly, their morbidity data were irreversibly forged until 1989 (Nestorenko et al:33).

The group mentioned above, the “liquidators,” were the workers contracted to clean up the radioactive debris at Chernobyl. If we begin to compare the actions of the Soviet Government with that of the Japanese Government, i.e., downplaying or misrepresenting radiation levels in the midst of a state of emergency, and a desire to impose government mandated control over all sources of relevant information, we see similarities. In response to the publication of raw data regarding radiation levels; the Japanese government attempted to impose censorship in order to make itself the sole arbiter of “legal” scientific facts concerning radiation levels and “requesting” the Japanese media self-censor radiation information from their broadcasts and from all internet sites. Both governments made it a point to suppress data other than their own, thereby constructing a reality of risk based on “scientific” data from only government and/or government-approved actors.

Safecast activists in Japan refused to be controlled in such a manner, and continued their own radioactivity measurements.

According to the Safecast website, as of 2016:

Some tangible results can be expressed in metrics, such as the size and rate of growth of the database (currently over 40 million data points, adding approximately 1 million per month) (...) intangibles include perceived shifts in attitudes in society, a growing sense of community, increased interest in the capabilities of citizen scientists worldwide, and greater recognition of Safecast on the part of official agencies and regulatory bodies (Safecast webpage).

This detailed database, which is continually being added to, will allow residents of Japan to monitor radiation levels for themselves over an extended period of time, independent of the government and industry actors which normally control matters of environmental contamination. At a later date, it may facilitate the comparison of illness with radiation levels over an extended period of time, as well. It is an anomaly, in that citizens, not just government and industry, are involved in the accurate monitoring of contamination levels, instead of being told what these levels are.

While my interest was originally a local process of risk assessment, I soon became aware of the fact that the process termed a “Community Based Risk Assessment” (CBRA), which had occurred in Sudbury Ontario, had also occurred elsewhere, in Port Colborne Ontario and Belledune, New Brunswick. In each CBRA, the issue of just what data was included or excluded in assessing the degree of risk to the public was also a contested matter between citizens and government/industry actors. While the exclusion of information in each CBRA was not a case of blatant government censorship, as it was in Russia and to a lesser extent in Japan, it was a case of government and industry establishing a research protocol which precluded the use of selective forms of data, a subtle difference.

Chapter 5

Personal Standpoint and the Beginnings of the Local Risk

Assessment Process

The Sudbury Soils Study was a matter of highly personal relevance to me, as I have lived in Sudbury for 50 years and I have seen firsthand the degree of environmental carnage that the mining industry has wrought upon this area; therefore, I cannot claim to be a dispassionate, detached observer in this matter. When I first moved here in 1967, at the age of 12, I was appalled by the environmental destruction I saw, and asked my new-found friends at school what had left the landscape so denuded of anything resembling life — plant or animal. The answer of course was the mining industry, which was not a satisfactory answer for me. I wanted to know why people had let it happen, and wanted to know: “didn’t anyone try to stop it?” The answer from one of my schoolmates was: “I’m sure someone probably did, but when Inco (the polluter) and the government decide to do something, there’s not much anyone can do about it.” I made a promise to myself then and there, at the age of 12, that if I was ever in a position to do something to prevent a pollution situation like this from occurring, that I would say something about it.

I would see both of my older brothers go to work for Inco, (now Vale Canada Ltd.) the second oldest who went to work underground in the late 1960s would quit shortly after due to health concerns, and the other lasted a few years in the Copper Cliff Copper Refinery in the early 1970s, before leaving for essentially the same reason. I would also end up working later on at Inco, in the Copper Cliff Smelter in the mid 1970s, but also not for long. Of all the places to

work, the Copper Cliff Smelter, and specifically the converter aisle where I worked, had some of the worst working conditions imaginable. Due to high levels of sulphur dioxide in the facility, I began having nosebleeds at work, in spite of wearing the company-supplied respirator. At home I would cough up grey phlegm, and my bed sheets would start to turn grey — nickel grey — within a day or two of being washed, despite my having a shower at work at the end of every shift. It quickly dawned on me that what was responsible for this was the pollution present in the smelter air and coming out of its smokestack, that also seemed to have killed every living thing in sight in and around much of Sudbury. Like my brothers before me, I didn't last long in my dangerous Inco working environment, and quit approximately 6 months after I started: however, the memory of the experience is burned into my memory — and into my lungs.

It was with great interest that I learned from the local media, in 2007, that there would be a presentation of a public process' findings that had determined whether or not Sudbury pollution levels posed a threat to human and environmental health. The research in question was part of what was called “The Sudbury Soils Study”, a Community Based Risk Assessment (CBRA), and it would be a joint research effort by the two local mining companies, Vale and Xstrata, The Ontario Ministry of the Environment, Health Canada, The City of Greater Sudbury and the Sudbury and District Health Unit. This study was welcome news for me, as local pollution levels and their possible effects on the environment and human health had always been a matter of personal concern for me. But before I could begin to understand the findings of The Sudbury Soils Study, I felt I had to have some grasp of the health and environmental issues it would be dealing with; therefore, I began to look at whether or not scientific literature existed on Sudbury's historical pollution levels. As a graduate of Laurentian University, I had library privileges, so I began by simply typing in the search topic “Sudbury Pollution” into the

Laurentian Library database. The first piece of research on the subject I found was by Dr. Jerome Nriagu, Henry K.T. Wong, Gregory Lawson and Peter Daniel, titled: "Saturation of ecosystems with heavy metal pollution in Sudbury, Ontario, Canada" (1998). The fact that the term "saturation" not "contamination" was used piqued my interest immediately. This was due to the fact that for that first time, I learned that Sudbury's pollution contained more than just sulphur dioxide. Up until then, both the mining companies and the Ontario Ministry of the Environment had constructed the issue in public as being a matter of a single pollutant, sulphur dioxide, not heavy metals pollution as well.

Carrying on, I located more interesting local research carried out by Dr. Glen Parker, a research scientist at Laurentian University's Biology Department. Dr. Parker had researched metal levels of cadmium (Cd) and nickel (Ni) in muskrats living near the Copper Cliff Smelter (Parker, G.H., 2003. "Tissue metal levels in Muskrat [*Ondatra zibethica*] collected near the Sudbury, [Ontario] ore-smelters: prospects for biomonitoring marsh pollution.") and had found that:

(...) animals collected in the vicinity of the local ore-smelters contained elevated burdens of Cd and Ni in their liver and kidneys. Respective tissue concentrations averaged 2-fold and 3-fold higher than background values and are believed to reflect accumulations from food chain contamination (Parker 2004:1).

Dr. Parker also studied an elk herd some years earlier in the Killarney Park-Burwash area approximately 25 km south of Sudbury, and found that:

Cu and zinc (Zi) levels were four to six times higher in livers and one and a half to two times higher in the bones of fetuses as compared to post – natal animals. Enhanced pre-natal tissue burdens were also noted for cobalt (Co), Ni and lead (Pb) in muscles (Parker 2000:1).

The fact that these effects were clearly demonstrated in large mammals was a revelation to me, but also that these levels were recorded in animals quite a distance away, 20-30 km south of the Copper Cliff Smelter, the main historical source of air pollution in the Sudbury area. Based on

the metal readings in fetal tissues of these large mammals, it seemed to me an indication that pregnant women in Sudbury should perhaps have their blood and tissues tested, followed by the same for their children, post-natal. I was sure that this research would be part of the human health risk assessment, and was glad that I had located it, so that the implications of it could be discussed in a public forum.

Another piece of very interesting research I located on the internet was a paper that was presented as a poster at a Mining and the Environment Conference at Laurentian University, by two young students of Long Lake Public School, located in the south end of the city. It concerned testing sediments of mine tailings done by a Laurentian student in 2003, Allan Locke, now Dr. Allan Locke, (2007) of the Center for Environmental Monitoring, at Laurentian University. He tested the sediments of the tailing ponds of the abandoned Long Lake Gold Mine in the south end of the city, located approximately 2 kilometers south of the western extremity of Long Lake. Long Lake is approximately 10 km long, and less than 1 km wide, and water flows through it from roughly east to west. The gold mine had operated at the east end of the lake from 1909-1916, and had extracted gold from the mined ore by cyanide leaching on the mine site. This process released mercury, arsenic and cadmium as waste products in the finely ground ore, called "tailings". Dr. Locke tested the sediment in the tailing ponds area, and it was found that "the only potential contaminant of concern is arsenic which occurs in high abundances, up to about 6 %" (Johns, Warren. Willey, Robert. Willey, Matthew. 2003). Where the mercury and cadmium disappeared to is not known. However, toxicity for arsenic is normally measured in parts per million (ppm), not parts per 100, and that 6% translates to 60,000 ppm. I concluded that level of contaminant couldn't be good for either the people living at the west end of Long Lake who may be drinking the water of the lake, nor for the people of the Whitefish Band First Nation,

who both inhabit and fish the area Long Lake drains into. I wanted to make sure I asked about this issue of tailings pollution at the upcoming public presentation of The Sudbury Soils Study findings.

I also located material from a researcher from Trent University, Prof. T.C. Hutchinson et al, who had performed soil readings around the abandoned Coniston smelter, east of Sudbury, and at other locations around the Sudbury area. His findings indicated that although leaching, washing and wind transportation were moving the accumulated metal contamination in area soils, it was not reducing it, only changing its location from high, to lower-lying areas (Dudka, S., Ponce-Hernandez, R., Hutchinson, T.C., 1997). That seemed to confirm the Nriagu et al (1998) hypothesis of how soil pollution was ending up in our lakes and by extension, our drinking water. Dr. Hutchinson also conducted research on the old O'Donnell roasting yard, where ore was partially processed in open air beds during the early 20th century, by piling wood on top of it and setting it alight. The fire's heat would release sulphur dioxide and other pollutants from the ore during the process, at ground level. According to Hutchinson, this activity was very destructive:

The impacts of sulphur dioxide on the forests in the Sudbury area were extremely detrimental and the phytotoxic gases killed the trees and ground flora over an area in excess of 1,000 km² (...) in the valley bottoms airborne particulate matter accumulated in the acidified lakes and ran off into the numerous lakes, streams, and rivers of the area [Gunn 1995] (Hutchinson et al 1997:323-324).

Once again, here was more proof, from a second researcher, of how our lakes had been polluted and possibly still were, not just by present-day air pollution, but from what had been produced over the past 100 years. Confident that I was now familiar with the relevant matters I felt were sure to be discussed, I proceeded with my research in hand, to the public presentation of the

findings for The Sudbury Soils Study, the Human Health Risk Assessment (HHRA) portion, which was being held at Science North, May 14th, 2008, at 3 pm, in The Cavern.

Chapter 6

The Public Presentation of the Sudbury CBRA Findings

The public presentation of the findings was at a location known as “The Cavern” at Science North, Sudbury’s Science Centre. The Cavern is aptly named. It has high walls hewn out of solid rock, and it is literally, a large, circular, cave-like room. The authors of The Sudbury Soils Study were seated on a raised stage, with an IMAX movie screen behind them, with the words “The Sudbury Soils Study” looming over them — and the rest of us. I was struck by how it seemed to be an almost church-like setting, with “The Sudbury Soils Study” standing in for the Christian cross, behind the high priests of science. There was an open area in front of the stage, with a single microphone in the middle, illuminated by a bright circle of light from multiple overhead spotlights. This was where the public would emerge from the crowd, then stand to ask questions from. Behind that illuminated area was temporary seating for about 300 people. There were lights and cameras everywhere, some of which were from the local media, while some of the cameras and their crews belonged to the mining companies, who would be recording all of it, including any comments made by any member of the public.

I spotted someone in the crowd I recognized to be Rick Grylls, President of CAW/Mine-Mill Local 598, from seeing his picture in the local media, and struck up a conversation with him. It was at this point I learned that sulphur dioxide (SO₂), the most prevalent pollutant of all in the Sudbury area, was eliminated from The Sudbury Soils Study (SSS) as a pollutant. Also eliminated from the study of pollution effects on human health, were all unionized employees of the mining industry and any non-union workers who either work, or

had worked, in a mining facility (which therefore included me), and finally, anyone over the age of 5. The age limitation was invoked due to the assertion by the authors of the study that no accurate data on past pollution levels existed, and was based on the belief that this age group, in particular the female toddler, was most at risk. Therefore, only the last 5 years of pollution would factor in to the assessment of risk to our health, as citizens of Sudbury. A local television reporter, Lynn Bulloch, interrupted our conversation, and began conducting an interview with Grylls, so I moved on.

I was very surprised to find out that much of the research that I had located during my time spent in the Laurentian University Library was quite possibly not relevant, due to the focus of the study, the female toddler, and that I may not be anywhere near prepared enough, for what was to be presented. I learned this after I had struck up another conversation with someone holding a large video camera, who turned out to be a cameraman from Radio-Canada. He asked me what I thought of the fact that the acceptable soil lead levels for Sudbury were determined to be 400 ppm, while the acceptable provincial generic level was 200 ppm. I had no idea what he was talking about, as the contents of the Sudbury Soils Study were withheld from public scrutiny until the day of its release, and for a brief period at that, before it was presented. As a member of the media, this Radio-Canada cameraman was given access to the document a few hours earlier, but I hadn't. I began to get the impression, once again, that the research on pollution levels in Sudbury which I had located on my own, may not be relevant to the Sudbury Soils Study. I managed to locate a copy of Sudbury Soils Study at a nearby booth, and began examining where soils had been tested, and how high the metal content of the sites were. I had approximately 10 minutes to peruse the document, before the findings were presented publicly; the document turned out to be hundreds of pages long.

After the formal presentation of the findings of the Human Health Risk Assessment, which concluded there was little or no risk to human health in Sudbury, local politicians made speeches that were full of both glowing praise and gratitude for the people who had done the research and the findings it produced. All politicians, past and present, seemed especially relieved that a finding of “no risk” to human health had been determined. Then, it was time for the public to ask questions.

When it came my turn to step up to the microphone, as I had no knowledge of what was actually in the document, I could only think to ask whether or not any testing for nickel had been done of Sudbury's drinking water. It was made known to me by the representative from The City of Greater Sudbury, Stephen Monet, that Sudbury's drinking water was risk free, but he then acknowledged that there are in fact no provincial standards for nickel levels in municipal drinking water, which therefore made it technically free of risk. I then asked why, if all beaches in Sudbury had been tested for metal levels, why Silver Beach, located at Silver Lake, in the south end of town where I live, hadn't been tested. Locating the section dealing with the metal levels of area beaches in the huge document that was the Human Health Risk Assessment (HHRA), the first part of the Sudbury Soils Study, was one of the few things I'd had time to do in the limited time available to me, before the presentation of the findings began. I explained that according to research by Environment Canada which I had located, Silver Lake, located in the south end of Sudbury, was the second most polluted lake in Sudbury in terms of heavy metals (Nriagu et al 1998). It was second only to Kelly Lake, a lake which is actually used as a sewage lagoon and into which smelter effluent had been discharged directly for decades (ibid). Everyone on the panel seemed mystified, and claimed to have no idea if a public beach even existed at Silver Lake. I assured them there was in fact a municipal beach there, and that it had been there

for decades, as did several people in the audience who spoke out from the darkness behind me. I was assured the matter would be looked into. My next question dealt not with the findings, but with the participation of the Government of Canada in The Sudbury Soils Study. I pointed out that the Government of Canada had a booth at the presentation, but there was nobody occupying it to ask questions of. As transcripts of the proceedings are not available, my recollection of the event is that I was told by Dr. Chris Wren, one of the official spokesmen for the CBRA, that they were involved in “an advisory capacity”. The public record would later show that the relationship with the Federal Government and the Sudbury Soils Study was problematic, for reasons which were not stated publicly by Dr. Chris Wren. I had no way to know what The Sudbury Soils Study actually contained; therefore, I felt I had nothing to base any further questions on, and concluded that the best thing to do was to go over my research papers and prepare for the next public presentation of the HHRA findings at the Italian Club, in Copper Cliff, the following day.

On that day, after a cold and rainy bicycle ride of about 8km, I managed to make it to the Copper Cliff presentation on time. When the public presentation began, it was the *verbatim* presentation that took place at Science North, with the industry and government actors reading from the identical scripts they had read the day before; then, the question and answer session began. I awaited my turn, and then began quoting from Nriagu et al (1998) telling all present that according to this research, our soils were not polluted or contaminated, but “saturated” with pollution. As a result, our waters and lakes had become the collection points for heavy metal runoff. According to this research, I continued, our lakes will continue to see high or possibly higher levels of these heavy metal’s pollution, “for the next 1,000 yrs.” (Nriagu et al:99). Why then, I asked, hadn't this research been used as a basis for research into the matter of human

health and the environment in the Sudbury area? Dr. Chris Wren informed me that he was aware of the research, and that it was relevant to the next stage of the study, the Ecological Risk Assessment. There isn't much you can say when you get an answer like that; however, Fred Stanford, the Ontario CEO of Vale/Inco was present to field questions, and I had a few for him.

In the previous year, 2007, I had worked as a surveyor for a construction company which had built and paved roads in the back area (the north side) of the Copper Cliff Smelter complex. In all the time which I had worked in The Copper Cliff Smelter, in the converter aisle from 1974-5, I had never been to the grounds on the north side of the smelter. During my next visit to the smelter in 2007, while working as a surveyor, my co-workers and I were often surrounded by huge stockpiles of what was known amongst my fellow smelter workers in the 1970s as “nickel concentrate”. It consists of partially processed ore which has been ground up into a very fine powder, then mixed with chemicals to extract the ore component. This chemical reaction partially separates the sulphides and waste rock from the ore without first heating it to its melting point, and what remains of the ore is a waste product called “tailings”. Water is added to the tailings, and they are then pumped as a slurry to an impoundment area. What has been extracted from the ore in this process, is what we used to call “nickel concentrate” as smelter workers. Nickel concentrate was being stored in stockpiles not only in the open, but upon the bare ground near the smelter. From these stockpiles it was being transported by dump truck to the smelter and fed into the furnaces. The problem was, there were literally thousands of tons of it lying around in the ground at the back of the smelter, and it had apparently been stored that way for decades. I observed that the ground in the storage area had become saturated with this black powder, and when the soils in question were excavated to construct a proper gravel roadbed, the top 0.5 m (1.5 ft.) of soil was saturated and stained the same dark black as the pure nickel concentrate,

instead of being light brown in colour like the deeper layer of soils, as it should have been. In addition, I noticed unionized workers in some areas were all equipped with a form of self-contained breathing apparatus, which means they were breathing artificial air in the area. Those of us who were not members of the United Steelworkers Local 6500, the union for the company's facility, didn't even have so much as a paper dust mask to wear.

When the Copper Cliff question and answer session began, we were advised to speak privately to someone if our question concerned "matters behind the gate," i.e., anything to do with the Copper Cliff Smelter operations. I decided that I would attempt to make this matter of what I considered to be the reckless storage of potentially toxic material a public issue, instead of talking to a company official about my concerns in private, off the public record. Since none other than the boss, Fred Stanford, President of Ontario Operations for Vale/Inco, now Vale Canada Limited, was present, I requested his presence at the microphone and began asking him about this storage issue. I got some very interesting answers. Fred Stanford revealed that there were "approximately 80,000 tons" of this material being stored in the open air. This meant, to me, it was free to blow over the nearby residential areas of Copper Cliff and Gatchell, and to also possibly find its way into local groundwater. He then revealed that he was aware of the fact that this material was not only being potentially blown offsite and leaching into the water table, but that there were no plans to clean up the site. I then asked Brian Cameron, who represented the Ontario Ministry of the Environment (since renamed the Ontario Ministry of the Environment and Climate Change) to approach the microphone to answer to this revelation, and to inform myself and others what the Ontario Ministry of the Environment (MOE) was intending to do about it. Brian Cameron stated for the public record that he had "issued a clean-up order" to Vale/Inco, regarding the area I had been inquiring about. I asked him what the result of that

clean-up order had been. He shrugged, said nothing looked at Fred Stanford and stepped away from the microphone. Seemingly on cue, Mr. Stanford once again took over the microphone and stated for the public record that there were no plans to clean up anything on the smelter property until the termination of operations, at some point in the future. I stated that the end of operations could well be in another one hundred years, and that got no response from Fred Stanford, merely a shrug. Fred Stanford was then asked by me, bluntly, whether or not he planned to follow the clean-up order issued by the MOE. His answer was one word: “no.” Since I still had the floor, I called Brian Cameron of the MOE back to the microphone, and asked him if he was aware of the Long Lake Gold Mine, and the polluted tailings there, which contained arsenic. He claimed to have no knowledge of the matter, but said that he was glad I had brought the matter to his attention, and that he would look into it, if I could supply him with any information. We agreed to meet after the session was over and exchange e-mail addresses. I decided to let others have the floor for a time, but later asked what I believe was the best question I had asked all day: “Were there any plans to do an epidemiological study in the years following this study, to back up the calculated finding of “no risk” to human health?” The answer: “no.”

Before the meeting broke up, I exchanged e-mail addresses with several people in the audience, but also with Brian Cameron of the MOE and Stephen Monet of the City of Greater Sudbury. I e-mailed both officials, and any other interested members of the public, including Rick Grylls, president of Mine-Mill/CAW 598 who was present, all the relevant research I had on the Long Lake Gold mine, and also some of the other research I had located, by Nriagu et al (1998) and by Dr. Glen Parker (2001, 2003), of Laurentian University. At the end of the meeting, I noticed that there was a reporter from the local media present, interviewing members of the public who had spoken up, or simply listened, but she chose not to speak to me. I left the

meeting feeling that I had made my point: there was much research and important issues that had been ignored in The Sudbury Soils Study that shouldn't have been. I anxiously awaited the coverage of the meeting in the local media.

Not a single thing I had said was mentioned in the account by Carol Punch, of The Sudbury Star, who was the only member of the media present for that session. She interviewed a mother from Copper Cliff, Diane Brown, who stated that “I don't believe this study for a minute” (Punch. May 15th 2008: A1, A4). Tanya Ball, also a mother with a two-year old son was interviewed and she was quoted as saying that “it's not realistic to expect parents to keep their children away from soil, wash their hands repeatedly and keep their houses extremely clean, to reduce lead exposure” (ibid). The article also quoted an elderly woman, Edith McGinn, as saying “I'm glad to see everything's going so well” (ibid). It was difficult for me to believe the article was referring to the same meeting I had attended, as it did not reflect any of the substantive matters that were raised by myself and others. There was another public presentation the next day in the community of Falconbridge, where Xstrata Metal's smelter is located.

Once again, it was a bicycle trip for me, this time about 20 kilometres out to the town of Falconbridge. While it wasn't raining, it was a warm spring day, and I arrived almost as soaked as I had in Copper Cliff the previous day, only this time it was due to the sweat of exertion. The presentation by the authors of the study was identical to the previous two: scripted and read from a raised stage. Then, questions were taken from the public. At this Falconbridge presentation there were more people from The Sudbury Soils Study, the mining industry and the local media present, than there were members of the public. I would estimate that there were possibly 8-10 members of the public at the meeting, and they had no questions. The meeting ended, I got back onto my bicycle and began the return trip home, feeling that I hadn't accomplished or

contributed anything at all. I made a detour on the way home and stopped at the apartment of an old friend, telling him about how much research had not been a part of The Sudbury Soils Study. I then told him “I made it a matter of public record that there was a very real possibility that potentially dangerous chemicals were blowing off Vale property over Copper Cliff and Gatchell, and guess what? Nobody cares”. There wasn’t any mention made of this matter, nor of the research I had quoted, in the newspaper coverage of the Copper Cliff meeting where I had raised these matters. I concluded the account of my experiences at the Community Based Risk Assessment process to my friend by saying: “I don’t know what happened, and I don’t know what’s wrong with people in this city.” I had expected to see far more people at these meetings and I had also expected to see media coverage that reflected what had taken place at these public meetings, but saw neither.

I had at least managed to obtain a copy of The Sudbury Soils Study, the Human Health Risk Assessment (HHRA) component, on CD, at the Copper Cliff session. I could now begin to pore through the thousands of pages it contained. It would prove to be very interesting, just how the process had changed from what I had assumed would be a straightforward scientific process, into both a negotiation process and a contested process. It became a process where many important decisions about what research and pollution issues would be considered, became a matter of negotiation, not science, between industry and government actors, negotiations which had been carried out behind closed doors, without the public’s participation or knowledge.

Chapter 7

Personal, Public and Media Reaction: Comparing Notes and Research

Shortly after the public presentation of the Human Health Risk Assessment (HHRA), I noticed an article in one of our local papers, Northern Life, written by Bill Bradley, which was later reprinted, with permission, in The Republic of Mining, an on-line newspaper. It contained a picture of Homer Seguin, past president of the United Steelworkers Local 6500, in a seated position, holding up a copy of the Nriagu et al (1998) research someone had given him, and I assumed the Bradley article would address the findings. I had raised the matter of this research at the Copper Cliff session, and had passed on a hardcopy of the research paper to Rick Grylls, President of Mine-Mill/CAW Local 598. From there, it had possibly found its way to Homer Seguin, and it was Seguin who Bradley had interviewed, as well as Dr. Chris Wren, one of the architects of the Human Health Risk Assessment (HHRA). Unfortunately, the salient point concerning the conclusion of the research, that: “mobilization of metals stored in soils and glacial overburden by surface runoff (...) can sustain the high concentrations of Cu and Ni in many lakes for well over 1000 years” (Nriagu et al 1998:99), was never mentioned. Instead, the media version of the research regarding metal levels in our lakes stated that:

One common element of the lakes studied was a high level of dissolved copper, lead, zinc and nickel. Levels in some lakes declined over the study period. In others, such as Clearwater and Lohi Lakes in the city’s south end, concentrations of zinc, for example, remained constant” (Bradley June 7th,2008).

From this, but also other data, the Nriagu et al (1998) study concluded that:

Saturation of ecosystems with pollutant metals has thus far been ignored in the scientific literature (...) Our data suggest that the yields of pollutant metals from the catchment now exceeds the atmospheric inputs, and that the phenomenon of metal exhalation from catchment is dominating the metal levels in many surface waters of the Sudbury basin. The benefits of further emission controls must remain questionable until something is done about metal release from the saturated ecosystems (Nriagu et al 1998:116).

This conclusion is stated on both the very last page of the Environment Canada research paper, and again in the abstract; however, the assessment of the research contained in the article, by the author of the article, Bill Bradley, concluded by stating that: “The authors state that the saturation of ecosystems with pollutant metals is not well understood in the scientific literature,” (Bradley June 27th, 2008). What the Nriagu et al (1998) research actually stated, to paraphrase, was that the process is not well understood in the scientific literature due to the fact that it is being ignored (see above quote) And once again, Dr. Chris Wren avoided making any public comment about the research by repeating almost the same answer I was given when I asked him directly, at the Copper Cliff presentation of the Human Health Risk Assessment (HHRA), about the implications of this research. He is quoted in the Bradley article as saying: ““The next report, the ecological risk assessment, will look at the accumulation of the metals in the landscape, said Wren”” (ibid). That statement, when evaluated on the basis of whether or not the Ecological Risk Assessment would actually consider this piece of Environment Canada research and/or the process it spoke of, “metal exhalation” from catchment areas into area lakes, would prove to be not only misleading in hindsight, but demonstrably false. The Ecological Risk Assessment would indeed look at “the accumulation of metals in the landscape”, but not in any lakes. The state of our local lake water and lake sediments would not be considered by either the Human Health Risk Assessment (HHRA) or the Ecological Risk Assessment (ERA) at all. It was to be

exempted from consideration altogether. However, as a member of the public, there was no way to determine the truthfulness of Dr. Wren's statement at that time, as the actual terms of reference and the process of the upcoming ERA were never a matter of public knowledge, just like the Human Health Risk Assessment, until its release.

As with the earlier coverage of the Copper Cliff presentation of the Human Health Risk Assessment findings by The Sudbury Star, and the subsequent coverage by Carol Punch, I was left wondering how this interpretation of the Nriagu et al (1998) research in the Bill Bradley piece could be construed as an accurate interpretation and portrayal of the facts by our local media. I felt that to what level metals in our lakes had declined to, needed to be stated in absolute, not vaguely relative terms, as I knew people actually drink the water from some of these polluted lakes directly. Water from Long Lake, McFarlane Lake and Richard Lakes is consumed, directly from these lakes, and may or may not be filtered by the residents' private water system — if they even have a filtration system. **Table 3** lists how many times over the Provincial Water Quality Guideline Objectives (PWQGO) level some of the critical area lakes i.e., those from which residents may be drinking water directly and not mentioned by Dr. Wren actually are, in absolute terms, in relation to the Nriagu et al 1998 data. Those metals that were within the Ontario PWQGO are noted as “acceptable”, while exceedances are expressed as a multiple of the PWQGO, and are in italics.

Table 3: Comparison of Dissolved Trace Metals Concentrations in the Waters of Sudbury Lakes in Nriagu et al. 1998 to the 1994 Ontario Provincial Water Quality Guideline Objectives (PWQGO).

| Lake | Depth | Metal | Nriagu et al (1998) | **PWQGO (1994) | Relative to PWQGO |
|----------------------|-------|---------|---------------------|----------------|--------------------|
| Ramsey (E. Basin) | 0.9 m | nickel | 114µg/l | 25.0 µg/l | <i>4.6x higher</i> |
| | | cadmium | 0.06µg/l | 0.2 µg/l | acceptable |
| | | copper | 14 µg/l | 5.0µg/l | <i>2.8x higher</i> |
| Ramsey (W. Basin) | 0.5 m | nickel | 127µg/l | 25.0 µg/l | <i>5.1x higher</i> |
| | | cadmium | 0.07µg/l | 0.2 µg/l | acceptable |
| | | copper | 14 µg/l | 5.0µg/l | <i>2.8x higher</i> |
| McFarlane (W. Basin) | 0.7 m | nickel | 73 µg/l | 25.0 µg/l | acceptable |
| | | cadmium | 0.01µg/l | 0.2 µg/l | <i>2.9x higher</i> |
| | | copper | 6.6 µg/l | 5.0µg/l | <i>1.3x higher</i> |
| Richard | 0.5 m | nickel | 72 µg/l | 25.0 µg/l | <i>2.9x higher</i> |
| | | cadmium | 0.02µg/l | 0.2 µg/l | acceptable |
| | | copper | 6.1 µg/l | 5.0µg/l | <i>1.2x higher</i> |

Sources : MOE PWQGO 1994.
Nriagu et al 1998:104.

It should be noted that this research was available to the authors of the Human Health Risk Assessment before the time it was compiling and interpreting data.

Now that I had a CD copy of the Human Health Risk Assessment (HHRA) component of the Sudbury Soils Study, I decided to locate any data on present (2008) contamination levels in Sudbury area lakes from which a significant number of people drink their water directly. The

reference for this data was also available from the City of Greater Sudbury website and was a part of what was titled: “Sudbury Environmental Study (SES) Intensive Monitoring Lakes”, a survey carried out by the Co-operative Freshwater Ecology Unit of the Center for Environmental Monitoring, at Laurentian University, and published in 2003. In all locally affected lakes, the results showed a general decline of dissolved metal levels, but the levels of dissolved particles in the water still exceeded the Ontario Provincial Water Quality Objectives (PWQO) in almost all cases. For some metals, in some of these lakes, it appeared that contamination levels in sediments were in fact increasing, not decreasing over time, as the Nriagu et al (1998) research predicted.

Table 4 on page 63 shows the comparative values for the PWQOs and the Sudbury Sudbury Environmental Study (SES) values of some of the lakes from which residents in some areas of Greater Sudbury obtain their drinking water directly, in addition to Ramsay Lake, a source of municipal drinking water. The metals listed are only those that were identified as “chemicals of concern” by The Sudbury Soils Study. Exceedances from the Sudbury Environmental Study (SES) data are denoted in italics, then expressed as a multiple, under the heading “Relative to PWQO”, while levels that do not exceed the Provincial Water Quality Objectives (PWQO) are listed as “acceptable”. One of the more striking increases occurred McFarlane Lake, and Richard Lake, where cadmium readings in 2003 were 3 times higher than the Provincial Water Quality Objectives (PWQO), while in Ramsey Lake cadmium was 5 times above PWQO. In 1998, five years earlier, all lakes were within the PWQO, according to Nriagu et al (1998). Copper and nickel remained well above the PWQO in 2003 in all lakes examined; however, in 2003 lead, not measured in the Nriagu et al (1998) research was also above the PWQO in Ramsey, Richard and Long Lakes.

Table 4: Water Chemistry of Local Lakes Comparing 2003 Sudbury Environmental Study (SES) Research to PWQGO for Dissolved Metal Content.

| Lake | Metal | **PWQGO (1994) | ***SES Levels (2003) | Relative to PWQGO |
|-----------|----------|----------------|----------------------|--------------------|
| Ramsey | arsenic | 5.0 µg/l | 1.0 µg/l | acceptable |
| | cadmium | 0.2 µg/l | <i>1.0 µg/l</i> | <i>5.0x higher</i> |
| | copper | 5.0 µg/l | 5.0 µg/l | acceptable |
| | lead | 5.0 µg/l | <i>11.0 µg/l</i> | <i>2.2x higher</i> |
| | nickel | 25.0 µg/l | <i>55.0 µg/l</i> | <i>2.2x higher</i> |
| McFarlane | selenium | 10.0 µg/l | 0.5 µg/l | acceptable |
| | arsenic | 5.0 µg/l | 0.5µg/l | acceptable |
| | cadmium | 0.2µg/l | <i>0.6µg/l</i> | <i>3.0x higher</i> |
| | copper | 5.0 µg/l | <i>8.0 µg/l</i> | <i>1.6x higher</i> |
| | lead | 5.0 µg/l | 5.0 µg/l | acceptable |
| Richard | nickel | 25.0 µg/l | <i>51.0 µg/l</i> | <i>2.0x higher</i> |
| | selenium | 10µg/l | 0.5 µg/l | acceptable |
| | arsenic | 5.0 µg/l | 0.5 µg/l | acceptable |
| | cadmium | 0.2 µg/l | <i>0.6 µg/l</i> | <i>3.0x higher</i> |
| | copper | 5.0 µg/l | <i>0.6 µg/l</i> | <i>3.0x higher</i> |
| Long | lead | 5.0 µg/l | <i>8.0 µg/l</i> | <i>1.6x higher</i> |
| | nickel | 25.0 µg/ | <i>57.0 µg/l</i> | <i>2.3x higher</i> |
| | selenium | 100.0 µg/l | 0.5 µg/l | acceptable |
| | arsenic | 5.0 µg/l | 0.5 µg/l | acceptable |
| | cadmium | 0.2 µg/l | <i>0.6 µg/l</i> | <i>3.0x higher</i> |
| Long | copper | 5.0 µg/l | <i>12.0 µg/l</i> | <i>2.4x higher</i> |
| | lead | 5.0 µg/l | <i>11.0 µg/l</i> | <i>2.2x higher</i> |
| | nickel | 25.0 µg/l | <i>47.0 µg/l</i> | <i>1.9x higher</i> |
| | selenium | 100.0 µg/ | 0.5 µg/l | acceptable |

Sources : SES Intensive Lakes Survey (2003).
Ministry of the Environment. PWQO (1994).

Should it be discovered that water quality in a given area does not meet the PWQO, some interesting terms and conditions begin to take effect, which provide exemptions to the PWQO under certain conditions, such as when:

- 1) the Provincial Water Quality Objectives are not attainable, because of natural background water quality; or
- 2) the Provincial Water Quality Objectives are not attainable because of irreversible human induced conditions; or,
- 3) to attain or maintain the Provincial Water Quality Objectives would result in substantial or widespread adverse economic and social impact; or,
- 4) suitable pollution prevention techniques are not yet available; then deviations from this policy may be allowed, subject to the approval of the Ministry of the Environment. (MOE. OPWQG 1994:6)

It appears that the limits on contaminants that the Ontario Ministry of the Environment (MOE) has established as guidelines, do not apply if you live in an already polluted area and/or the polluting industry or industries claim it would cost too much money to implement reductions and/or will terminate jobs at their facility as a cost-cutting measure to pay for any pollution reductions

Soils in this part of Northeastern Ontario are generally very thin, and bedrock is often just below the surface, or actually forms the surface people's homes sit on. It is quite expensive to sink a well into solid rock; therefore, many people in Sudbury and environs obtain their drinking water directly from lakes, if they are situated on one, as do many people in other communities throughout Northeastern Ontario. Another difference between ground/surface water standards and drinking water standards is the fact that once water leaves the natural environment and enters a municipal water distribution system, for what were formerly contaminants, there is either no longer a Maximum Acceptable Concentration (MAC), or the MAC is markedly higher for municipal drinking water. While there are limits listed for nickel in Ontario water if it is in the

form of surface water and lake sediments, there are no limits for nickel content once it becomes part of a municipal drinking water system. In addition, the acceptable level of lead in a municipal drinking water system doubles, acceptable arsenic levels increase 500%, and cadmium by 2500%. **Table 5** on page 66 summarizes the differences between what the maximum acceptable concentrations (MACs) of toxic metals are for ground and surface water — which many people in Sudbury drink untreated — and what the MACs are for people who drink treated water from a municipal water system. All the toxic metals which were being examined as part of the Human Health Risk Assessment portion of The Sudbury Soils Study seem to have a higher maximum acceptable concentration once they enter a municipal drinking water system. The only exception is selenium. Nickel, apparently no longer has an upper limit at all, since it is not listed as a contaminant in the Ontario Drinking Water Objectives (ODWO). Under the provisions of the ODWO, the procedure for dealing with exceedances falls under the provisions for “Assessment and Corrective Action” P. 28, Section 4.3 (2). The relevant section states the following:

If the MAC (maximum acceptable concentration) is exceeded the water should be immediately resampled. If any result in the water exceeds its MAC, then the MOH (Ministry of Health) and the MOEE (Ministry of Environment and Energy) should be notified and monitoring at a frequency designated by the District Officer shall continue in order to define the source. Monitoring shall continue until the problem has been eliminated. (MOE. ODWO:4.3[2])

The metals in question are listed in **Table 5** as Provincial Water Quality Objectives (PWQO), and as Ontario Drinking Water Objectives (ODWO), with the value for “CHANGE (±)” indicating the relationship between the PWQO/ODWO, at the time of the Sudbury CBRA. The change factors are listed in italics.

Table 5: Comparison of Provincial Water Quality Guideline Objectives (PWQGO) to Ontario Drinking Water Objectives (ODWO).

| Metal | *PWQGO | **ODWO | Difference (+/-) |
|----------|------------|----------------|--------------------|
| Arsenic | 5.0 µg/l | 25.0 µg/l | <i>+5x higher</i> |
| Cadmium | 0.2µg l | 5.0 µg/l | <i>+25x higher</i> |
| Copper | 5.0 µg/l | 100.0 µg/l | <i>+20x higher</i> |
| Lead | 5.0 µg/l | 10.0 µg/l | <i>+2x higher</i> |
| Nickel | 25.0 µg/l | no upper limit | no upper limit |
| Selenium | 100.0 µg/l | 10.0 µg/l | 1000% lower |

Source: MOE (1994).

With nickel eliminated as a contaminant, with the acceptable level for lead increased by 200%, the acceptable level for arsenic increased 500%, and by increasing the acceptable level of cadmium by 2500%, much of Sudbury’s untreated lake water now meets the provincial guidelines for Ontario Drinking Water Objectives, as opposed to surface water standards. However, the lead limit for the Ontario Drinking Water Objectives was shown to exceed the Maximum Acceptable Concentration (MAC) in Ramsey Lake and Long Lake, both at 11.0 µg/l (**Table 4**). Long Lake is a lake from which people draw their drinking water directly, in many cases, and Ramsey Lake is a municipal water system source. Since I had earlier given the research by Nriagu et al (1998) to Rick Grylls, and by extension to Homer Seguin, I was confident this would get it public exposure beyond the local media. I informed Dr. Nriagu by e-mail of this development, and received a reply.

A portion of his reply is quoted below:

(...) The people who did the work obviously know (or should know) that heavy metals in soils do not migrate downward and hence tend to accumulate in the top (0-2 cm) layers. By collecting samples down to 5 cm, they have intentionally diluted the polluted (topmost) layers with unpolluted soils.

All I can say is that I had no vested interest in the outcome of my research. I still stand by our results. What you are dealing with is another example of what I call "scientific magic" where one purposely collects data to prove preconceived ideas. I'd like to know what they'll say about my paper at the hearing. I am glad that you are the voice in the wilderness; otherwise, the problem would have been swept under the carpet. Do not give up; hopefully others will see the light.

Regards

Jerome

I e-mailed Dr. Nriagu a transcript of the article by Bill Bradley, which characterized metals accumulations in local lakes as "not well understood". He did not reply.

Amongst the first pieces of research which I uncovered in my literature review of data on Sudbury pollution was by Dr. David Pearson, a research scientist from Sudbury with decades of research experience into the issue of local pollution effects, among other subjects. The rather long title of this research paper written in 1998 is: "In-situ Sediment/Water Interface Reactions Experiment Examining the Aerobic and Anaerobic Mobility of Ni, Cu, and PO₄ in Kelly Lake, Sudbury, Ontario. (Pearson, David. Lock, Alan. Whitehead, Robert. Morris, Robert. Belzile, Nelson. Richard, Jacqueline. Gomm, Alison. and Graham, Paul). In this article by Pearson et al (1998) it states:

One hundred kilometers downstream from Kelly Lake, water from Sudbury enters Lake Huron, having first joined the Vermillion and then the Spanish River. In 1985 the International Joint Commission identified the area around the mouth of the Spanish River, known as the Spanish Harbour as one of forty-two 'areas of concern' within the Great Lakes Basin. High levels of copper and nickel in both the sediment and the water of the harbor have been attributed to mining, milling and smelting in the Sudbury area (Pearson et al:682).

If these elevated nickel and copper sediments in the Spanish Harbour were of concern to the United States through the International Joint Commission, which deals with cross-border issues between the United States and Canada, just how high did they have to be? Comparing these levels of concern to what Sudbury levels are is illuminating. The results of sediment readings by the Ontario Ministry of the Environment in 2004 were summarized as follows:

Sediment samples collected from stations located downstream of the mouth of the Spanish River were contaminated with Cu, Fe, Mn and Ni. Concentrations of these metals in sediment at several stations were greater than the SEL [Severe Effects Level] (Ministry of the Environment “Great Lakes Reconnaissance Survey” 2004:15).

The sediments at two of the Spanish Harbour testing stations in the Whalesback Channel are listed on the next page, in **Table 6**. They are the average of the two samples taken in 1999. Sediment metal levels which the Ontario Ministry of the Environment (MOE) terms the “Lowest Effects Level” (LEL) and the “Severe Effects Level” (SEL) for aquatic life are compared to the Sudbury Environmental Study (SES) lake sediment readings contained in The Sudbury Soils Study (2004). The SES sediment levels are only for Lake Ramsey, a source of municipal drinking water in Sudbury. For both areas, exceedances of the LEL and SEL levels are listed in italics, as a multiplier. Apparently, what are considered safe levels of pollution become a relative matter, depending on whether or not pollution levels are affecting water which Canadians share with Americans, or affecting water which Canadians in Sudbury share with other Sudburians. The data indicated that exceedances of nickel and copper in the sediments of Ramsey Lake were many times above the Ontario Ministry of the Environment (MOE) Severe Effects Level (SEL), and many times higher than the Whalesback Channel sediments — which were deemed to be in need of remediation and a matter of international concern in 1999.

Table 6: Comparison of Spanish River Harbour Sediments (1999) and Ramsey Lake Sediments (SES 2004) to the Lowest Effects Level (LEL) and the Severe Effects Level (SEL) for aquatic life. (MOE 1996).

| Area Tested | Metal | Sediment level | LEL | Exceedance of LEL | SEL | Exceedance of SEL |
|------------------------------|---------|----------------|----------|----------------------|-----------|----------------------|
| Whalesback Channel (MOE1999) | arsenic | 20.0µg/g | 6.0µg/g | <i>+3.3x higher</i> | 33.0µg/g | no |
| | cadmium | 2.6µg/g | 0.6µg/g | <i>+4.3x higher</i> | 10.0µg/g | no |
| | copper | 136.7µg/g | 16.0µg/g | <i>+8.5x higher</i> | 110.0µg/g | <i>+1.2x higher</i> |
| | lead | 76.7µg/g | 31.0µg/g | <i>+2.5x higher</i> | 250.0µg/g | no |
| | nickel | 676.7µg/g | 16.0µg/g | <i>+42.3x higher</i> | 75.0µg/g | <i>+9.0x higher</i> |
| Ramsey Lake (SES 2004) | arsenic | no data | 6.0µg/g | - | 33.0µg/g | - |
| | cadmium | 7.4µg/g | 0.6µg/g | <i>12.3x higher</i> | 10.0µg/g | no |
| | copper | 2933.3µg/g | 16.0µg/g | <i>183.3x higher</i> | 110.0µg/g | <i>+26.7x higher</i> |
| | lead | 243.2µg/g | 31.0µg/g | <i>7.8x higher</i> | 250.0µg/g | no |
| | nickel | 4300 µg/g | 16.0µg/g | <i>268.8x higher</i> | 75.0µg/g | <i>+57.3x higher</i> |

Sources: MOE Great Lakes Reconnaissance Survey (1999: Table 2. Metal concentrations in water collected from Lake Superior and the Spanish River, 1999). SES Survey. (2003–4: Appendix 1–Water Chemistry [2003]).

I was looking forward to the findings of the Ecological Risk Assessment portion of The Sudbury Soils Study, which I was told was going to examine this matter of what may be saturated, not just contaminated, catchment areas in the Sudbury area, resulting in heavy metals contamination of

both our local lake water and sediments. At least that was the impression I got concerning this issue from Dr. Chris Wren at the Copper Cliff session of the Human Health Risk Assessment — that the matter of “metals in the landscape” would be looked during the next phase of the CBRA, the Ecological Risk Assessment (p. 59).

With a CD copy of the Human Health Risk Assessment (HHRA) in my possession, it was with no small amount of interest that I eventually discovered the matter of arsenic pollution of Long Lake by the abandoned Long Lake Gold Mine had actually been addressed — sort of. Pollution effects from this mine were mentioned in the Fish Survey portion of the HHRA, dealing with concentrations of toxic metal levels in the tissues of fish species native to the Sudbury Area. In characterizing arsenic levels found in walleye in Long Lake, it was stated:

The concentration of arsenic was highest in Long Lake. There is apparently an old gold mine at the end of Long Lake, which is locally thought to be leaching arsenic into the ground water and surface waters. This may partially explain the elevated arsenic levels observed in walleye in Long Lake. (Sudbury Area Risk Assessment (SARA), Human Health Risk Assessment. “Metal Levels in fish tissues from Sudbury Lakes” Volume II, Appendix G [26]).

When I inquired at the Copper Cliff sessions of the Human Health Risk Assessment (HHRA) whether or not the Ontario Ministry of the Environment (MOE) was aware of this mine and the associated arsenic pollution, the answer was “no”, according to the MOE representative, Brian Cameron (p 55). He seemed quite surprised when I quoted the contamination levels that Dr. Allan Locke had detected in the tailings ponds in the area of the Long Lake Gold Mine: 60,000 ppm arsenic, and that this information was in the public domain. After discovering this particular passage in the Human Health Risk Assessment regarding arsenic levels in walleye, it gave me pause for thought. I began to wonder whether or not Brian Cameron of the Ontario Ministry of the Environment had actually read the Human Health Risk Assessment component, or whether

an underling had read it and given him a summary, which did not include any mention of the mine. The second possibility was that the Ontario Ministry of the Environment (MOE), and by extension, the Community Based Risk Assessment (CBRA) would prefer not to acknowledge the problem of solid waste pollution at all. Either way, the presence of The Long Lake Gold Mine was a stated fact in The Sudbury Soils Study, and yet, Brian Cameron of the MOE had claimed no knowledge of the mine in public, and is on record as saying just that, in his official capacity as the MOE's representative in this CBRA.

Unknown to me at the time I began to research the matter of heavy metals pollution in the Sudbury area, a community committee had been formed, calling itself "The Community Committee on the Sudbury Soils Study (CCSS)". Based on the first news of the organization in the local print media, all I could ascertain was that two of the members of this committee were Rick Grylls, president of the Mine-Mill/CAW Local 598, and Homer Seguin, past president of The United Steelworkers Union Local 6500 (USW 6500). This group had located the funding necessary for an outside expert to do an evaluation of the Human Health Risk Assessment, Environmental Defence Canada, an environmental non- Governmental Organization (NGO). The funding for this was provided by the current leadership of the two local unions, Mine-Mill/CAW 598 and the United Steelworkers Local 6500.

Chapter 8

The Official Critique: A Dissenting Opinion

In a statement about the findings of the first portion of The Sudbury Soils Study, published in The Sudbury Star, October 24th, 2008, Aaron Freeman, policy director of Environmental Defence, Canada, noted that “communities often don't have the means to critique a study like the Human Health Risk Assessment (HHRA), "so they asked us to come in “(Mulligan October 24th, 2008).

Dr. Kapil Khatter, a family physician with past experience working with Environmental Defence, Canada, was chosen to review the HHRA. When the analysis was released to the public, a Sudbury Star article quoted the Environmental Defence Canada report as noting that: “local vegetables contain more than 10 times the typical Canadian levels of lead, arsenic and nickel” (ibid) and:

One of the more startling suggestions in Khatter's analysis is that a ban on growing local vegetables might be considered given their level of contamination. ‘Given there is no safe level of lead for children, feeding them vegetables with 10 times the normal levels of lead seems a poor health choice,’ it says in the report (ibid).

Unfortunately, Dr. Khatter was not available to answer questions personally, but I was thankful for the information. The HHRA text was so massive, that I hadn't even noticed the data concerning levels of lead in Sudbury vegetables yet. I was grateful that Dr. Khatter had raised the matter. Whenever possible, I had always bought local vegetables in order to support local farmers, but if they were as contaminated as our water, I concluded that I should avoid them in the future. The Environmental Defence report outlined the rationale for such a controversial

statement with this qualification by Aaron Freeman, policy director of Environmental Defence Canada:

‘We weren't calling for a ban on growing local vegetables,’ said Freeman in a telephone interview, ‘but we did want to highlight that this should be on the table.’ He said the consultants who wrote the soils study's risk assessment recommended the high levels of metals in vegetables ‘should be very concerning to those who are eating locally grown food’. ‘Now, they assumed people were eating imported food, so they didn't take that into account’ (ibid).

Another of the recommendations by Dr. Khatter was that:

Better tracking of health issues in the community should also be done with biomonitoring — testing people for the levels of pollution in their bodies (ibid).

I had asked at the Copper Cliff Session of the HHRA whether or not there were any plans to do an epidemiological study of the citizens of Sudbury, to back up both the mining companies’ and the government’s claim that there was little, if any, health risk from the different forms of pollution they were subjecting local citizens to. The response at the afternoon session at Copper Cliff to my question was that there were no plans to do an epidemiological study. I now knew that there were also no plans to monitor pollutant’s levels in local citizen’s tissues.

The Community Committee released a ten-point critique of the HHRA, concurrently, with Environmental Defence. The ten-point summary of the Community Committee’s recommendations to make the HHRA more relevant to local concerns were posted on their website and are listed here:

We make the following recommendations:

1. We recommend that the Ontario Ministries of Environment, Health and of Labour step up and assume their responsibility for the health of Sudburians, by facilitating a community process to ensure that the Sudbury public decides what level of risk it can accept, what will be done to clean-up affected properties, and what will be done to treat those whose health is at risk”. As the Environmental Defence Report states. ‘The HHRA cannot demonstrate that there is no harm occurring, it can only estimate level of risk. The assessors have inappropriately decided what that acceptable level of risk should be. This is a decision the community should make.’

2. The Ecological Risk Assessment (ERA) has yet to be released, and we want an improvement in community engagement compared to the HHRA process. The community needs and deserves real involvement in reviewing these results, and the government needs to be ready to take real action at the end of the process. We believe this should happen without the presence of Vale or Xstrata representatives, as they are in a serious conflict of interest, as they are investigating themselves.
3. The francophone community and the community in general have the right to information in their language and to the tools and resources that will allow them to participate effectively in the Ecological Risk Assessment. The studies must be available simultaneously in French and English.
4. We recommend further studies that incorporate the findings of prior studies on SO₂ and heavy metal fallout, that evaluate past and current exposures, that address the health risk to the adult population as well as children, and that address the possible synergistic effects of exposure to a number of heavy metals at one time (including metals that may or may not be in the metals of concern).
5. The need for further studies is especially true of the highest risk group of residents- the current and past employees at Inco, Falconbridge and their sub-contractors, and successor companies. We recommend that both epidemiological analysis and bio-monitoring of the employees be undertaken.
6. We recommend that the Technical Committee, which has been overseeing the studies to date, provide resources for effective participation of the community (such as funds for independent technical advice); that its minutes (current and past) be made public and that it cease to operate by consensus. While consensus decision making can be very useful in a context where the values of participants are shared, in situations where the interests of participants may be in conflict, such as this one, it can mean that more powerful representatives are able to block decisions and to lower safety and/or health standards.
7. As lead contamination is above safe levels in Greater Sudbury based on international standards, and children may be harmed at even lower levels, we recommend testing of the blood lead levels of children in Sudbury, and treatment for those children with excessive lead in their bodies.
8. We want the same testing and treatment for residents exposed to arsenic, nickel and any other metals of concern that may surface during further studies.
9. We strongly recommend bio-monitoring (human hair, blood and/or urine sampling) be made available free of charge for any current or past residents of the communities of concern. We also recommend further testing of daycares, schools, homes and farms that are, or are adjacent to, sampling “hotspots”.

10. We recommend that the Ministry of the Environment develop a plan with the Sudbury public to ensure the clean-up and/or containment of all contaminated areas on an urgent basis.

Source: Community Committee on the Sudbury Soils Study webpage, October 31st 2008.

Dr. Chris Wren, one of the architects of The Sudbury Soils Study, responded to criticisms regarding the approach taken in the Human Health Risk Assessment (HHRA) regarding local vegetables by stating:

‘The results indicated that exposure to these chemicals through the consumption of local produce poses no unacceptable risk’, he said. ‘In some cases, local produce was found to contain metal levels higher than supermarket produce’, said Wren. ‘Those results were taken into account in the Human Health Risk Assessment’ (Mulligan October 24th, 2008).

Environmental Defence responded that they stood by their conclusions, and Aaron Freeman is quoted further in The Sudbury Star article as saying:

(...) toxic metals in soils in some parts of Sudbury are higher than the Canadian average. In Coniston, for example, the level of lead in soil is 35.6 times the market-basket, or average, Canadian level of the toxic metal. Falconbridge soils were found to contain 49 times the market-basket level of nickel, he said. What concerns the committee, and Environmental Defence, said Freeman, is that the Human Health Risk Assessment does not look at the cumulative effect of residents ingesting higher levels of toxic metals. That is, the study doesn't look at the combined exposure to toxic metals in soil, air and water (ibid).

Unfortunately, after these observations from his evaluation were released to the public, Dr. Khatter was “unavailable for comment as he is out of the country for several weeks on his honeymoon, according to an Environmental Defence spokesperson” (Bradley October 29th, 2008). In Khatter’s absence, two local commercial farmers, Emile Rainville, of Beaulieu Farms in Chelmsford, and Don Poulin, co-owner of Don Poulin Potatoes of Chelmsford, wanted clarification of just what was meant by the Khatter evaluation. As suggestions of metal contamination could adversely affect his business, Rainville remarked ““I hear there is a meeting Thursday at Tom Davies Square about this report so I want to hear more first before I

contemplate legal action” (Bradley October 29th, 2008). The Rainville remark was a reflection of what Don Poulin, another local farmer, also felt were the implications of such a finding by Environmental Defence, when he noted that:

‘This negative publicity could jeopardize our whole industry here,’ said Poulin. Lou Mullally, customer service representative for Don Poulin Potatoes, said Tuesday she is already hearing concern from her customers (ibid).

As to the concerns of lead in local soils, Dr. Wren stated that “Lead can come from automobile engine exhaust locally, transported by winds and rain from afar and can come from local smelters as well,’ he said” (ibid).

However, the Community Committee on the Sudbury Soils Study (CCSSS) had been adamant about the need for further testing. Spokesman Rick Grylls felt that what are known as “hotspots”, i.e., places where contamination was higher than average, needed to be identified, and not only local produce, but also local residents tested for metal levels at these sites:

‘These hot spots have to be identified, fully investigated and given to the people so they know how safe it is to grow vegetables there (...) arsenic levels tested for residents of Falconbridge were high and there should be an investigation of why that is the case’ said Grylls (Bradley May 11th, 2008)

Another criticism of the Human Health Risk Assessment (HHRA) by Dr. Khatter, which Chris Wren took issue with, was addressed by Aaron Freeman, of Environmental Defence, in a published letter to The Sudbury Star:

Wren took issue with several more technical critiques in our report. For example, we criticized the assessment team's removal of ‘outliers’ sites with the highest pollution levels from their analysis. It is not clear, from the assessment documents, how many sites were removed. Wren argues this is standard statistical convention. But this convention is used to account for false readings, and there is nothing in the data to suggest that the high readings were erroneous. For those living near the ‘outlier’ sites, the high pollution levels are quite relevant. For the overall assessment, removing the highest pollution readings skews the results toward declaring pollution levels lower than they are (Freeman March 11th, 2008: A4).

Sudbury's commercial vegetables tested higher for toxic metals than produce from outside the area, a fact that was confirmed by Chris Wren of the SARA group:

(...) we did not state that local produce was 10 times "recommended" levels as he suggests; we clearly stated it is sometimes 10 times the levels of store-bought food. We made this finding based on the same Canadian and U. S. government studies used by Wren's Sudbury Area Risk Assessment (ibid).

Unfortunately, this message seemed to be overwhelmed by the suggestions in the local media that Environmental Defence had declared that all produce from all commercial operations in Sudbury were unsafe for consumption. Dr. Khatter had stated that contamination levels in local produce were sometimes 10 times higher than produce not grown in Sudbury soils. In addition, the fact that cumulative levels of consumption were not taken into account, was a complaint of all aspects of The Sudbury Soils Study by Dr. Khatter and the Community Committee on the Sudbury Soils Study (CCSSS), whether it concerned air pollution, water pollution, or contaminated food grown in local soils. The entire incident did not enhance the image of the CCSSS, nor of Dr. Khatter, who should have been present to answer the concerns of both local farmers and citizens and to clarify his position. Local farmers could have been a valuable source of support for the Community Committee, and it seemed to me that an opportunity for the Community Committee to reach out to this segment of the community had been lost.

In spite of the initial missteps on the part of Environmental Defence and the Community Committee on the Sudbury Soils Study (CCSSS), it was reassuring to see that someone other than CCSSS and me felt that there was a scientific basis for opposing the findings of the Human Health Risk Assessment (HHRA), which had been presented to the public. It was also reassuring to me that local unions were still active in representing the community's interests, as they had a long history of doing so in Sudbury. As a longtime citizen of the community, I had witnessed

how unions had in the past represented both the community and their memberships, in matters of both workplace and community health and safety. At this point I began researching the historical relationship between the local mining industry, The United Steelworkers Local 6500 and Mine-Mill/CAW 598 actually was. It was an interesting matter, not just from a historical perspective, but also just what had transpired when these unions attempted to participate in the Sudbury Soils Study. All I knew about the matter, in my brief conversation with Rick Grylls, at the presentation of the Human Health Risk Assessment (HHRA) at Science North, was that he felt unions were excluded from the process of determining the methodology and parameters of the Community Based Risk Assessment (CBRA). After examining the historical relationship between the two local mining companies, and the unions which represent their employees, I felt it necessary to include a section on this historic relationship. It may well have been factor in the resistance by the authors of The Sudbury Soils Study, to the participation of local unions in the Sudbury CBRA, despite their experiences in dealing with the pollutants in question through workplace exposure.

Chapter 9

Union Attempts at Participation in the Sudbury Soils Study and the Past Activism of Homer Seguin

The Sudbury Soils Study became a contested process from both a local union standpoint and from local activists, who felt that the process was dominated by the Ontario Ministry of the Environment (MOE), who allowed the pollution of Sudbury soils to occur, and the two mining companies, Vale/Inco and Xstrata Metals (formerly Falconbridge Metals) and now Glencore, who polluted to the levels allowed by the MOE.

Local unions attempted to participate in the Sudbury Soils Study, and the two unions in question, the United Steelworkers Local 6500 (USW 6500), and Mine-Mill/Canadian Autoworkers Union Local 598 (Mine-Mill/CAW 598) have represented local mine and surface workers for decades. Both were denied representation on the Technical Committee (TC), which decided how the study would be carried out. There are historical parallels in that decision by the mining companies and the government, which I feel should be made light of, for purposes of this research. I would like to chronicle some of the events concerning this matter not only through the local mainstream media accounts, but also through the alternative media. I feel the alternative media, i.e., internet postings by some of the principals, provided an interesting and more personal account of events, and offered a different perspective on events which were not seen in the mainstream media. The historical relationship between local unions and different branches of the Ontario Government, such as The Ministry of Labour and the Ministry of the Environment (MOE), should be examined. As well, the actions of the two local mining corporations should be

put into a measure of perspective, and the matter of their historical relationship to local union leadership should be given an overview.

Union attempts to have the right to represent themselves in matters of health and safety was a decades-long battle. Although the two main mining companies in Sudbury, Inco and Falconbridge at the time, were first unionized in 1942, in the matter of health and safety concerns, labour legislation still did not allow unions to participate in matters of workplace health and safety until thirty years later. According to labour law, at the time of unionization, the responsibility for ensuring working conditions for mine and smelter workers were safe, was determined by a company appointed representative. Labour law stipulated that only “qualified persons” were allowed to make the judgement as to whether working conditions were safe. By this definition, miners and surface workers were not considered qualified to make that judgement; however, company mine engineers were considered qualified, on the basis of education alone, despite the fact they were part of the non-unionized, managerial staff of the mining companies. Even if a condition was clearly dangerous, mine engineers could apply for an exemption to existing legislation, which they often did. One example of this was an incident in a mine just north of the town of Renfrew, Ontario, in 1975.

According to an article in The Sudbury Star, in April of 1975, members of The United Steelworkers Local 4623 (USW 4623), felt compelled to call for the resignation of the provincial mine inspector, Mr. E. G. Thomas, over an incident that occurred at a mine owned by the mining company Chromasco, at a magnesium mine at Haley Station, 12 miles north of Renfrew, Ontario. According to the Sudbury Star, Charles Clarke, president of USW 4623, sent a brief to the Ham

Commission, a sitting Royal Commission investigating Mine Safety, that:

(...) the union did not want to see a recurrence of a recent situation at the mine in which men worked on an experimental basis with SF-6 carbon dioxide gas, which when in contact with sulphur powder, usually is fatal (...) Miners worked on the project without full knowledge of the hazard while the company had full knowledge (CP Renfrew. April 4th, 1975:9).

Union representative Charles Clarke identified the problem as being one of participation, in that union personnel were not part of the mine safety inspection team. He pointed out that only E.G. Thomas, a mine engineer, along with a representative of the company, ever inspected conditions at the Renfrew mine, adding:

(...) the mere possession of an engineering degree does not qualify a person as a mining inspector, he should have some knowledge of working conditions...an inspector should not have the right to make certain exemptions to regulations (ibid).

The incident was allowed to occur, and was legal, due to the provisions of the inspection process, whereby a provincial inspector could essentially grant an exemption to hazardous conditions, merely if the company requested it and he was in the mood to oblige. United Steelworkers Union Local 4623 President Clarke called for the formation of tripartite participation for all future mine inspections, with the mine inspector, a company representative, and a union representative participating together as equals, to determine what was safe or not safe for workers.

Apparently, miners were deemed to be incapable of evaluating whether their working conditions were unsafe or not, and what level of risk was acceptable to them. In response to union demands for the right to participate in workplace safety inspections, the president of the Professional Engineers of Ontario, C.A. Campbell, stated before The Ham Commission, looking into workplace safety in the Ontario Mining sector, that:

(...) professional engineers are best qualified to make such inspections. According to the engineering code of ethics, engineers' duties to the public welfare are paramount (ibid).

When asked if the association of professional engineers would discipline an engineer who made a bad decision on safety matters, Campbell stated: “We might — it depends on who lodges the complaint” (ibid). On the proposition that miners should be allowed to participate in mine inspections, Campbell testified that “Allowing miners to participate in safety inspections would have a deteriorating effect on standards” (ibid).

The safety concerns of mine and surface workers and the concerns of ordinary citizens in mining communities often coincide, and one of the first examples of this was an incident in 1968, in Sudbury. I had moved to Sudbury in the late fall of 1967, and had become accustomed to being forced indoors when sulphur dioxide (SO₂) clouds from the Copper Cliff Smelter would descend upon the city. You stayed indoors until it was safe to go out, or risked choking on the high levels of SO₂. By the summer of 1968, the United Steelworkers (USW) Local 6500 president Homer Seguin was aware of the fact that the Ontario Government had installed SO₂ monitors in the Sudbury area, but refused to share information as to what the levels were, only telling the public that “everything was acceptable” (Seguin 2006:52). Given the readily apparent pollution in the city at the time, it was difficult to accept the term “acceptable”, and Seguin decided to challenge it. USW 6500 installed a SO₂ monitor of their own, on the roof of their union hall near downtown Sudbury and began to measure the atmospheric levels of SO₂ for themselves; the readings were almost twice as high as the acceptable level allowed by Ontario law, but apparently not above the “acceptable” level allowed for Sudbury (Seguin:52). Unknown to the residents of Sudbury, Inco had a special exemption from Ontario law for allowable limits on SO₂ emissions, and “they could exceed the provincial allowable limit by 100%” (ibid). Obviously, the term “acceptable” even in the late 1960’s, was a political construct, in terms of what levels of pollution posed a risk to the health of Sudburians. USW Local 6500 found an ally

in Judy Erola, a news broadcaster with a local AM radio station, CHNO, and she began to relay the SO₂ readings taken by USW Local 6500 to local residents every hour, during radio news broadcasts (ibid:52). The activism of USW Local 6500 and radio station CHNO paid off, as the provincial government eventually agreed to put two monitors in Sudbury, one on Ash Street, near the downtown core, and one on Montague Street, in the north end. The hourly readings were released to the public on a daily basis. When the readings became high, Inco was ordered to reduce emissions by cutting back on production, and on the odd occasion, to cease operations. It was an important achievement for USW Local 6500 and for the people of Sudbury as well, in terms of local air quality.

Homer Seguin had begun working at Inco in 1950, at a time when, despite heavy pollution, very little concern was shown for the residents of Sudbury and for the men working in terrible conditions in the Copper Cliff Sintering Plant and other ore processing surface facilities. At this time, according to Seguin, to escape sudden downdrafts of sulphur dioxide within these facilities:

Some of the older guys taught us what to do when you had those bad down drafts. They'd lie flat on the ground, dig a hole with their hands and put their mouth in the hole. The temperature would keep the gas out of the hole for a minute (Seguin:16).

In 1967-68, as president of USW Local 6500, Seguin turned his attention to bettering the conditions at the surface plants where sulphur dioxide was a major issue. Inside the Copper Cliff Smelter, the gas was thick due to:

(...) open furnace doors, cracks in the furnaces spewing this stuff out, the air was frequently blue (...) we know now that is accompanied with arsenic, cadmium, nickel, cobalt, copper, iron, selenium, and other heavy metals (Seguin:53).

Whenever the matter of workplace pollution was raised with either Inco or the Ontario government, the reply was: "it's well within limits" (ibid), just as the Ontario Government had

claimed previously that sulphur dioxide (SO₂) pollution levels in The City of Sudbury were within permissible limits. Finding this answer unacceptable, Seguin decided to train members of USW Local 6500 on how to use portable meters, called “Draeger meters” to measure SO₂ in the Copper Cliff Smelter; the company's reaction was to begin “searching lunch pails, disciplining people they caught with the meters, and confiscating the expensive equipment we had bought” (ibid). However, confiscation of equipment would prove to be the least of the union's worries. The SO₂ levels in the Smelter which they managed to record were so high that they often exceeded the maximum level that the meters were capable of measuring (ibid).

Eventually, with all the publicity that USW Local 6500 had generated with the rooftop monitor at their downtown office and with the hand-held meters at the Smelter, positive results were obtained. Shortly after the actual pollution levels in Sudbury became public knowledge, the Ontario Government ordered Inco “to reduce emissions, but gave them a number of years to do it” (Seguin:54). As a compromise:

The company's response was to build the superstack at the Copper Cliff Smelter (...) it worked extremely well reducing SO₂ emissions at ground level in the Sudbury area (...)There was considerably less SO₂ in the Smelter (...) with high velocity, the stack sucked the gases that leaked from the cracks and open furnace doors inside the Smelter itself (Seguin:54).

The new 330 metre stack did not reduce pollution. It only diffused it higher in the atmosphere, where it could impact other areas, although it did provide local residents and the local environment with some much-needed respite, after years of heavy pollution not experienced anywhere else in Ontario. In Seguin's estimation,

The kind of fumigation that regularly killed your garden in a matter of minutes and did Lord knows what to human health was greatly improved... it provided the best short-term solution for Sudbury (...) It was the pressure from Local 6500 and the community at large that caused INCO to reduce the emissions of SO₂ and other contaminants” (ibid).

While pollution in Sudbury itself was greatly reduced, what the stack also succeeded in doing was transporting the pollution much, much further than the Sudbury area. In a documentary film about mining in Sudbury, titled: “Riches Beyond Our Rocks: Tales from Greater Sudbury.” (Melnick:2008), Professor of Geography at Laurentian University, Dr. G. Tapper, stated that satellite imagery from the early 1970s showed Sudbury’s stack plume reaching northern Florida on one occasion, and the Cape Verde Islands off the west coast of Africa on another. The new stack had also succeeded in turning Sudbury’s local pollution into international pollution.

In 1975, Seguin became president of USW Local 5762, in the uranium mining town of Elliot Lake, 80 kilometers west of Sudbury. One of the first issues he dealt with was the employee’s water supply at the Denison Mine, which was contaminated with radiation. With so much background radiation in the local geology, lake waters would absorb it, making them unacceptably radioactive for drinking water in some cases (Seguin:103). One particular example of how mining companies in Elliot Lake viewed the problem of radiation contamination involving local miners was illustrated by an article in The Sudbury Star, which published the test results of radiation readings for water that miners at the Denison mine in Elliot Lake were drinking (Lamarche 1975). Listed in **Table 7** are the test results of the water being supplied to uranium miners at the Denison mine measured in picocuries, since the start of testing, to the date at which the complete results of the tests were first made public. The limit for residential water at the time was 3 picocuries per litre for the general public, but for water which miners drank: “the accepted level for radiation workers was 30 picocuries, as recommended by the Atomic Energy Control Association” (ibid), a level 10 time higher.

Table 7: Radiation levels in drinking water of Elliot Lake miners

| Year | High | Low |
|------|-----------|-----|
| 1958 | 18 | 13 |
| 1959 | 22 | 20 |
| 1960 | no record | |
| 1961 | 39 | 29 |
| 1962 | 38 | 29 |
| 1964 | 38 | 35 |
| 1965 | no record | |
| 1966 | 30 | 10 |
| 1967 | 25 | 15 |
| 1968 | 26 | 15 |
| 1969 | 24 | 11 |
| 1970 | 16 | 10 |
| 1971 | 16 | 9 |
| 1972 | 16 | 9 |
| 1973 | 12 | 7 |
| 1974 | 10 | 7 |

Source: The Sudbury Star, August 8th, 1975: A2.

In addition to radiation in the drinking water miners were forced to drink, another health and safety matter was radiation levels in the mines themselves, and the realization that miners were likely absorbing radiation into their bodies and accumulating it. Fearing that miners could be absorbing radiation into their brain tissue as well, USW 5762 made arrangements with The Atomic Energy Control Board (AECB) to test miners at the local union hall (Seguin:102) However, “the equipment was reading off the scale. They couldn't do the testing, because the equipment was picking up background radiation in the building!” (ibid) By this time, 1975, Seguin had been elected by the townspeople of Elliot Lake to the municipal council of Elliot Lake for a 2-year term. He used this position and the governmental authority that came with it, to

begin testing for radiation in and around the town of Elliot Lake. This testing revealed:

(...) there were several hundred homes in Elliot Lake with high radiation levels (...) almost everywhere you went - the streets, the road to the hospital, the municipal government offices – was high in radiation, even workers in the office of the municipal government were being exposed to high radiation at work (ibid).

The main culprit causing radiation in people's homes was found to be the ground water, which was contaminated with radon. Seguin pressured the Ontario Government to amend the provincial building code to safeguard homes in Elliot Lake against radon gas infiltration, which it did. With the new measures in effect for all homes in Elliot Lake, the town "ended up with the safest radiation levels in Canada" (Seguin:103). With his constant pressure and the help of New Democratic Party (NDP) Members at Queen's Park, eventually all Ontario towns subject to radon infiltration on the North Shore of Lake Huron, which included Blind River, Spragge, Massey, and all of the area between Massey and Spragge, had their homes inspected by government officials for the presence of radon. If radon was detected above the level of 0.02 work levels i.e., the amount of radiation a uranium miner receives in one working day "a so called standard safe level" (Seguin:102), then remedial action would be taken to correct the problem.

However, there were other problems with radiation which needed to be addressed. Not only did the local geology contain radioactivity which local water absorbed, when coupled with radioactive mine tailings, there was a problem with radioactive drinking water not only in Elliot Lake, but also in surface water downstream from the town. The area around Elliot Lake contained storage areas for uranium tailings, a by-product of ore processing, which were heavily contaminated with thorium, and with Radium 226 (Seguin:87). Radioactive fine particles from these tailings were being blown out of, as well as leaching out of, their containment areas.

Radioactivity linked to these areas had shown up not only in local waters around Elliot Lake, but also in the nearby waters of the Serpent River, and 88 km downstream from Elliot Lake, in the Town of Serpent River. Seguin decided to take action, and “With the power of the Steelworkers behind me, I led the fight to clean up the drinking water supply on behalf of the Serpent River Community” (Seguin:87). Radioactivity was not only in the drinking water of the people of the Town of Serpent River, but also in the water which people drank in the Serpent River First Nation, across the river from the town. The same union activism that precipitated the construction of the 330-meter stack in Sudbury and to more awareness of environmental issues associated with mining activities, union activism also led to changes in Elliot Lake, a mining community found to share the hazards of its miners as well:

Just as the issue of air pollution inside the Copper Cliff Smelter in Sudbury led to more generalized environmental hazards in the community as a whole, so too did the uranium mining industry create environmental problems far beyond the immediate workplace (Seguin:86).

Eventually, the Ontario government sent the Minister of the Environment to Serpent River “to announce that they were going to build a \$1.7 million water treatment plant to remove the Radium 226 from the drinking water supply for the community of Serpent River” (Seguin:88).

What the government would not do, however, was supply any of the treated water to the Serpent River First Nation, which was on the opposite bank of the river. They would be forced to continue consuming contaminated, radioactive water:

(...) we pressured the provincial government to hook the First Nation up to the clean water as well. But the Ontario Government refused to do so, saying it was a federal matter and they only looked after provincial matters. So the natives were not hooked up after the treatment plant was built. Can you imagine that (Seguin:88)?

Seguin would also learn about the matter of presenting only peer-reviewed, published

research, concerning community and workplace contamination issues. By 1977 he learned a valuable lesson about how to present data at hearings regarding the health and safety of not only union members, but of the public at large:

I had learned to back up my opinions with solid research because during a previous hearing with the WCB (Workman's Compensation Board), I had given opinions and I couldn't back them up with expert opinions (...) the cross-examiner asked me: 'So who are you? And where did you get the right to make an opinion' (Seguin:104)?

One source of "expert" information which Seguin eventually made use of was the Ontario government itself. In 1977, The Government of Ontario was planning on releasing an epidemiological study concerning the cancer incidence of miners in Elliot Lake, to be presented in Bordeaux, France, in an attempt "to try to get brownie points on the international scene" (Seguin:103). Union leaders had not been officially notified of the existence of the study, nor of the fact that the findings would be presented internationally. Seguin does not reveal in his book how this matter came to the attention of the United Steelworker's Union, just that it did, and that a union representative was sent to the conference and obtained a copy of the epidemiological statistics for Elliot Lake. The data showed that the cancer incidence for Elliot Lake uranium miners was 300% higher than the provincial average (ibid), despite assurances of "no risk", conveyed to local unions by government and industry. This government data would make compensation claims for diseased miners much easier to justify in the future. Also, in 1977, the Province of British Columbia (BC) was holding a Royal Commission into uranium mining, which Seguin attended. Seguin presented the Ontario Government's own Elliot Lake data to the chair of the Royal Commission, identified as one Dr. Bates, and told him:

If you are going into uranium mining you should know that it is very dangerous to human health and very dangerous to the environment. I gave them the statistics on the damage uranium mining had caused in Elliot Lake and to its miners (ibid).

The result of the BC Royal Commission was that “Bates came up with a nine-year moratorium on uranium development in British Columbia, and to this day they have not allowed it” (ibid).

Seguin’s efforts on behalf of miners and mining communities would see him awarded an Honorary Doctor of Laws from Laurentian University in 2006, two years before the release of the Sudbury Soils Study’s Human Health Risk Assessment (HHRA). As Seguin noted: “This recognition is one of the highest forms of recognition you can receive within your community” (Seguin:143). Despite this academic and community recognition, it was made very clear as events concerning establishing the process of investigation for The Sudbury Soils Study unfolded, that both Seguin, and the president of Mine-Mill/CAW 598, Rick Grylls, were not welcome in any capacity. The process eventually allowed union observers, but not union participation, in the meetings which determined the issues to be studied. In order to provide some context concerning this conflictual element of the Sudbury Soils Study (SSS), I felt that Seguin's background in community, union and environmental activism needed to be summarized beforehand, on who he was, and what he represented to not only members of the Steelworkers Union and the community of Sudbury, but to members of outlying communities as well. It is this past history of union and community activism that needs to be taken into account when considering how both mining companies and the Ontario Government might view his participation, as both a community and union activist in the Sudbury Soils Study. Rick Grylls offered this observation on the attitude of government and industry members of the Technical Committee, who decided the course of the Sudbury Community Based Risk Assessment (CBRA), in reference to Homer Seguin’s appearance at the May 13th, 2008 evening public forum

held at Science North:

(...) when Homer was making his way to the mike, many TC members, especially the company ones I was sitting behind, reacted with disgusted facial expressions, comments and laughing between themselves. This ongoing disregard of unions and others is still very evident (Grylls 2008).

This apparent disdain for unions in general, and Homer Seguin specifically, is a matter I felt needed to be put into historical context. Local unions have been responsible for improving not only the workplace environment of their members, but also the environment of the communities in which their union members and non-union members lived, benefitting all citizens of those communities.

Chapter 10

Chronicling the Sudbury CBRA Through Public Documents

When I began to try and make sense of what had transpired during the Human Health Risk Assessment (HHRA) presentations, I decided to embark on a document search on how the process had evolved into what it had become, using the resources of the Laurentian University Library as my home base, since I had library privileges as a member of Laurentian's alumni. The first newspaper account I located concerned an informational meeting in 2003, at which a local mother of two, stated that she wanted to know what the government safe standard for nickel in drinking water was, as she believed her daughter was sick due to high levels of nickel in her body. I decided at that time to begin a more thorough public document search of The Sudbury Star, at the Laurentian University library, and began attempting to understand how this polluted drinking water could have occurred.

One of the first articles I located in the mainstream media concerning the process of the Sudbury Soils Study was a Sudbury Star article titled: "Study set to confirm or allay 100 years of suspicion" (Mulligan October 16th, 2003).

The "100 years of suspicion" refers to the duration of pollution which the Sudbury area had been subjected to, which many in the area believed was still having a detrimental effect on both the environment and on local residents. Present at the meeting was lawyer Eric Gillespie, who was representing 20,000 Port Colborne residents in a class action lawsuit against Vale/Inco for past pollution.

In the same Sudbury Star article, it stated that:

Eric Gillespie, a Toronto lawyer representing some Port Colborne residents in lawsuits against Inco Ltd. over contaminated soils, has been following the Sudbury Soils Study closely (...) He would like to see private citizens play a greater role in the study and have the scientific support and resources to keep up with the process as it is unfolding (ibid)

The first mention I was able to locate in the mainstream media concerning The Sudbury Soils Study was on September 17th, 2003. A front-page story in The Sudbury Star: “Soils study blasted for not being ‘friendly to the public.’” (Mulligan 2003:A1) outlines the opinions of Homer Seguin, past president of USW Local 6500, and Rick Grylls, the current president of Mine-Mill/CAW Local 598, and their assertion that the local mining companies should be removed as voting members of the Technical Committee (TC). This took place at a meeting of what was called the Public Advisory Committee (PAC), a committee which “is meant to advise the TC on public concerns related to the study and to communicate the work of the TC, which is done in private meetings, to citizens “(ibid). It was at these “private meetings’, where the direction and content of the study was being decided. Both Seguin and Grylls wanted the polluters removed from the Technical Committee and replaced by union representatives. By the end of the meeting, the matter was unresolved. Why the unions had waited until this point in time to present this letter was never explained in the Sudbury Star article. I later managed to locate an on-line posting by Rick Grylls on the matter, posted in March of 2008, which provided very interesting facts on the matter.

When it was first announced that the Sudbury Soils Study would be undertaken, it was actually on September 12th, 2001; therefore, given the events which took place the day before, September 11th 2001, the destruction of the World Trade Center in New York, the local media can be forgiven for not attending the meeting and being unaware of what had transpired (Grylls 2008). The only media account of this fact is in an on-line alternative media source, Republic of

Mining, by Rick Grylls. In a posting on the Republic of Mining website, Grylls noted that at that 2001 meeting:

One other person other than me showed up that day as people were preoccupied by the Twin Towers destruction. At this meeting The Falconbridge manager of that day assured me that the companies would take on the expense of the study and that the study was completely independent with the companies only input to the structure of the review would be supplying technical data to the committee.

As the next year unfolded I felt as a Union President of Mine Mill 598/CAW representing the workers of Falconbridge (now Xstrata) I would also stay at arms (*sic*) length and not apply for the Public Advisory Committee (PAC for short). In 2002 the process begins to take form and the study begins in January 2003 (Grylls 2008).

It was this understanding, i.e., that the mining companies would not be directly involved, which prompted the local unions to initially stay at arm's length from the process as well; however, by the end of 2003, the process had taken on a markedly different form, with the two mining companies participating fully in the Sudbury Soils Study (SSS) In The Sudbury Star, on September 17th, 2003, there appeared an interesting, although unattributed editorial, concerning union participation in the SSS, titled "Protect the Study". The unattributed editorial states three reasons why the SSS should be "protected" from union participation:

The unions' requests are poorly conceived, poorly timed and even more poorly worded. First, so much work has already been completed. To raise these concerns about the companies now, 18 months and nearly halfway into the process, is more than late, it's delinquent (...) Second, the companies will undoubtedly be expected to play a lead role in whatever remedies stem from the study, so it's only fair they be part of the process (...) We've already learned that levels of heavy metals in area soils are significant – in fact the companies' own soils surveys told us that, and that's what led to the creation of the Sudbury Soils Study (...) Third, the unions' accusations are less insulting to the companies than to the complex web of checks and balances that has been built into the Sudbury Soils Study. This group is headed by Franco Mariotti who as process observer is the eyes and ears of the public's interest. Mariotti's credentials are impeccable, and there's no evidence whatsoever that the companies are even attempting, let alone succeeding, in influencing the study (...) There's no room in the Sudbury Soils Study for labour-company antagonisms, and if that's what the unions want to bring to it, then their request should be rejected" (Letters to the Editor. September 17th, 2003:A4).

As mentioned earlier, union representative Rick Grylls stated that he was misled as to the

involvement of the two polluters; therefore, the unions were not so much “delinquent”, but deceived, as to what the role of the two polluters would eventually be. On the second matter, it should always be kept in mind that Inco, now Vale Canada Ltd., was at this point in time being sued for past pollution in Port Colborne, in a class action lawsuit. The pollutants in question there, nickel, arsenic, lead and cadmium, had already been detected in Sudbury soils in addition to other local communities by the Ontario Ministry of the Environment (MOE). It could also be considered a potential conflict of interest having Vale and Xstrata possibly predetermining its own legal liability in Sudbury, through a risk assessment process they were involved in, should a lawsuit also arise here. On the third matter, that the unions were insulting the integrity of the people involved in the process, and in particular, that “This group is headed by Franco Marriotti” (ibid). it should be noted that Mariotti’s only function was to communicate to the public what decisions the Technical Committee (TC) made, as to how the Community Based Risk Assessment would proceed. His official title was “Independent Process Observer (IPO). He was in no way involved in determining the content or procedure of inquiry in the Sudbury Soils Study; therefore, to suggest that the public’s interest was being served by Marriotti is questionable, and to say that the study was being headed by him is completely inaccurate. The next public meeting I found that was reported in the local media took place on March 16th, 2004. The article, “Soils study group wants firm answers”, stated that “After collecting thousands of soil samples (...) the study is ready to begin looking at what its findings mean” (Mulligan:A1, A5). This article does not address the matter of union participation, but it does contradict the unattributed Sudbury Star editorial quoted earlier (p.94) as the Mulligan article states that “The Ministry of the Environment called on Inco and Falconbridge Ltd. to fund a

major study of the soils in the Sudbury district after its own tests showed elevated levels of several chemicals of concern” (Letters to the Editor. September 17th, 2003:A4).

Apparently, it was not the concerned vigilance of Inco and Falconbridge which led to the testing of Sudbury soils and the Sudbury Soils Study, but a directive from the Ontario Ministry of the Environment (MOE). This article again clearly contradicts the editorial “Protect the soil study “, which suggested that the two polluters were acting both independently and in the public’s interest, by determining levels of pollution in Sudbury soils of their own volition. This false assertion was also one of the reasons stated for “protecting” the Sudbury Soils Study from local union participation i.e., the companies were acting in the public interest of their own accord and in the best interests of everyone involved. Eventually, Grylls, president of Mine-Mill/ CAW 598, was allowed to observe, but not to participate in, the decision-making process, along with John Fera, at that time the president of United Steelworkers Local 6500:

Union representatives were reluctantly allowed to observe the public meetings starting February 12th, 2004, but not the many working group meetings they held without observers and support staff. Homer being retired was not accepted here or the PAC committee because you needed unanimous votes from the TC committee. (Grylls 2008).

The powers that be within the Technical Committee (TC) established which union members qualified for union participation which allowed them to exclude retired members, such as Homer Seguin. This resistance to union participation, in particular the participation of the now-retired Homer Seguin, and union exclusion from the decision-making process, seems to have been a matter of consensus in The Sudbury Soils Study from the beginning. Franco Mariotti, who was hired to communicate the process to the public, decided to take sides in the debate, and wrote in one of his quarterly reports that:

With regard to the union’s initial request that they become full members of the TC, it is my opinion that although the unions represent a large group in the Sudbury community, they do not represent everyone (...) I believe the three agencies on the TC (the Sudbury

& District Health Unit, the Ministry of the Environment and the City of Greater Sudbury) represent all Sudburians. As such, these three agencies also broadly represent the concerns of union members (Mariotti Quarterly Report #7, Winter 2004:2, 3).

The next article, in chronological order, was the account of a Public Advisory Committee (PAC) meeting which took place on March 11th, 2004, at Tom Davies Square, and was attended by local resident Donna Reed. Her concern was whether or not the Sudbury Soils Study would be testing Sudbury's drinking water for the same toxic metals which it was testing Sudbury soils for, and in particular, nickel. Brian McMahon, a spokesman for the Ontario Ministry of the Environment (MOE), told Reed that "municipalities aren't required to test for nickel in water" (Mulligan. March 11th, 2004: A4), but she was assured that "the matter would be evaluated as part of the risk assessment of the study" (ibid). With the benefit of hindsight, it is now known that even contaminated drinking water obtained directly from area lakes, by residents who are not on the municipal water system, would be excluded from the process. Reed was advised by Public Advisory Committee (PAC) vice-chairman John Hogenbirk to attend the next meeting. If she did, The Sudbury Star account of that meeting, as written by Carol Mulligan, on March 17th, 2004, "Soils study group wants firm answers", contained no reported information on the matters raised at the previous meeting. The newspaper account of the March 17th 2004 meeting mentions neither Reed nor the issue of nickel levels in municipal and untreated lake water Sudburians were drinking. In his capacity as president of Mine-Mill/CAW Local 598, Grylls later organized a local conference on risk assessment that was attended by such people as Eric Gillespie, lawyer for the Port Colborne class action lawsuit against Inco, and Tom Hutchinson, Professor of Environmental and Research Studies, Trent University. Details of this conference, which took place on October 26th, 2004, did not appear in any of the mainstream local media I had searched the Laurentian University archives for, but Grylls did eventually make note of the event in the

alternative media, through an internet posting on Republic of Mining in 2008. In the article, Grylls quoted some of what Prof. Hutchinson had to say about both the cumulative effects of the chemicals of concern (COCs) in the Sudbury Soils Study (SSS), and about risk assessments in general:

Risk assessments do not look directly at the health of the people. Risk assessment would probably conclude that there is no health risk. One at a time, not a problem, together there is a problem. There are interactions between chemicals such as nickel, copper, cobalt, cadmium, selenium, mercury and arsenic. We need to know more about the additive affect. An example, nickel and copper and sulfur dioxide and nitrogen, these mixes cause cancers... (Grylls 2008)

The next article in The Sudbury Star concerning the Sudbury Soils Study (SSS) was written by Dr. Chris Wren, of the Sudbury Area Risk Assessment (SARA) Group, to clarify what the SSS would be examining. What the SSS would not be looking at was what Professor Hutchinson believed should be looked at, i.e., the cumulative effects of the six different chemicals of concern (COCs) in the SSS: arsenic, cobalt, copper, lead, nickel and selenium.

Wren stated that:

The science of risk assessment is largely based on understanding the toxic effects of one chemical at a time, sometimes two at a time, but rarely more (...) to accurately predict the countless potential interactions of six COCs is beyond the limits of the scientific methods of this study (Wren. 2005: B7).

Unknown to Grylls and others was that in future, (2008) Technical Committee meetings would be held without their being informed, and according to Grylls, at some of these meetings, Fred Stanford, President of Vale/Inco's Ontario operations, and Mike Romaniuk, Vice President of Xstrata's Sudbury operations, had become involved in deciding the direction of the Sudbury Soils Study (ibid). For the last 4 months of the process, union representatives were not informed that any Technical Committee meetings were being held, and were effectively shut out of the process without their knowing (ibid). In fact, Grylls claims that he only found out that the

Sudbury Soils Study had been completed as a matter of chance, in April of 2008, when he read a notice in The Sudbury Star, that the study was completed:

Unknown to the unions, because we were not informed and did not find out until 3 p.m. Tuesday May 13th at the 2008 public meetings that the company managers Fred Stanford and Mike Romaniuk had gotten involved months earlier and forced the process forward. We had no knowledge or observation of what took place for the last four months up to these public meetings (Grylls 2008).

There is an interesting explanation for this lack of notification, according to Grylls:

The last four months of the process were comprised of individual meetings involving technical committee members. That was because the decision making process was stuck on a few issues related to individual members (ibid)

It was at this point in time, at the release of the Human Health Risk Assessment, that members of the public first got a chance to see what was, or more importantly, what was not, in the Sudbury Soils Study (SSS). On the matter of past pollution being excluded from SSS, Mariotti explained that:

We just had no access to proper data from the past (...) I grew up in Copper Cliff myself, but there are no records of what my blood contained 40 years ago. If people are that concerned, they are advised to meet with their doctors to have their blood tested (Bradley June 7th, 2008).

In the same article, Chris Wren claimed:

(...) because of the lack of good historical data, any conclusions from past exposures would be speculation. Yes, we knew emissions were higher so we can say that 40 years ago there would be a higher risk for citizens (ibid).

Rick Grylls had summed up his opinion on this matter as follows:

This study is in no way associated to the previous 100 years of health risks and exposures from the 100 million tons of pollutants our historical Sudbury citizens faced and the effects it might have caused, which citizens personally live with today (Grylls 2008).

In closing, I would like to include two comments about the Sudbury Soils Study. First is a 2009 final report by Franco Mariotti, regarding the overall level of public participation in the

Sudbury Soils Study:

Overall public engagement in the Sudbury Soils Study was, in my opinion, very disappointing. Members of the public rarely took advantage of opportunities to ask questions at TC meetings and only one member of the public consistently attended most of the Public Advisory Committee meetings in the last few years of the study (Mariotti Quarterly Report # 23: June 2009:2 [A]).

I suspect the member of the public who consistently attended meetings may be me; often, I was the only member of the public present at the later Public Advisory Committee (PAC) meetings I attended. Rick Grylls summed up the Human Health Risk Assessment of The Sudbury Soils Study with this comment, in reference to how it addressed the “elephant in the room” i.e., health issues for Sudburians:

Like a good illusionist who has mesmerized the audience and in pulling down the curtain, it has made the elephant disappear and replaced it with a mouse (Grylls 2008).

Chapter 11

Inka Milewski and Diana Wiggins Arrive in Sudbury

Perhaps the most important event I would attend regarding the Sudbury Soils Study (SSS) was not related to an official event of it, but a lecture that was given by Inka Milewski, of The Conservation Council of New Brunswick (CCNB), at Laurentian University, in early 2009. As a member of the Laurentian University Alumni Association, I receive occasional blanket e-mails about upcoming events at Laurentian University — lectures, film presentations and the like. One such blanket e-mail was from The Center for Research in Social Justice and Policy (CRSJP) a Laurentian University organization, headed at the time by Professor Carol Kauppi, a Professor of Social Work at Laurentian University, which partly describes its' function as follows:

The CRSJP supports research about a wide range of issues pertaining to social justice. The aim of such research is to inform social policy, enhance social inclusion and promote social justice. (CRSJP website).

The featured speaker at this event, Inka Milewski, Science Officer of The Conservation Council of New Brunswick, had been an advocate for the people of Belledune, New Brunswick, regarding levels of toxic metals such as lead and arsenic in their soils and fisheries resulting from years of lead smelting in the town. It seemed an eerily similar situation to that of Sudbury. I would later learn that Inka Milewski was originally from Elliot Lake, a mining town which I have discussed earlier, and her father was a uranium miner, now deceased from lung cancer. Milewski was therefore quite familiar with the accomplishments of union activist Homer Seguin,

and his challenging of “safe” risk radiation exposure levels for not only uranium miners, but for Elliot Lake’s townspeople (such as herself), the Town of Serpent River, The Serpent River First Nation, and in other towns along the North Shore of Lake Huron as well.

Milewski’s first presentation was at Laurentian University, where she outlined the problems facing Belledune, in terms of not only the existing pollution, but in trying to get any recognition of this problem. Those responsible for Belledune’s pollution were the provincial government of New Brunswick and the mining company originally involved, East Coast Smelting, which was later taken over by Noranda Metals, (Falconbridge) then changed hands once again, to Xstrata Metals, one of the companies involved in the Sudbury Soils Study. Before my research into this matter would finish, the company changed hands once again in 2013, to Glencore Plc, an Australian mining company. What didn’t change was the fact of continuing community pollution. Milewski’s presentation included many quotes from her written summation of the issues in Belledune, a book titled: “Dying for Development: the legacy of lead in Belledune” (2009). After her lecture at Laurentian University, I explained briefly to her about what I had experienced attempting to participate as a member of the public in what was proffered as a Community Based Risk Assessment (CBRA), she generously donated a copy of her book to me. One of the first things which struck me in the opening pages was the similarity to events in Sudbury, when Milewski made the following observation about how pervasive the mining pollution in Belledune was:

Although emissions of lead, cadmium, mercury, zinc, nickel, thallium, copper, vanadium and arsenic have been reduced (not eliminated) over the past 40 years, their smokestacks and effluent pipes have left a toxic legacy that extend well beyond plant gates (Milewski:5).

Even before the beginning of smelting activity in early 1966, the company that began running

this operation, East Coast Smelting, was granted exemptions from not only many existing pollution regulations, but also given extraordinary rights and powers such as:

The right to negotiate long-term tax agreements with county councils, the right to expropriate and re-zone land, a 10-year monopoly on smelting ore mined in the province, the right to divert streams and rivers and protection from nuisance prosecution (Milewski:9)

“The right to divert streams and rivers” seems disturbingly close to a violation of The Navigable Waterways Act, Federal legislation first enacted in 1882. It was enacted to protect waterways from people erecting structures over them, withdrawing water, destroying fish and/or their habitat people were also making use of, or doing anything that would prevent the public from either utilizing or benefiting from, or enjoying any body of water. Waterways were in many cases the only way to travel in early Canada, in addition to providing not just potable water, but also food for many people during all seasons. As The Navigable Waterways Act was a matter of federal legislation, it seems questionable that a provincial government had the right to override or ignore it, but it seems the government of New Brunswick believed it had this right. Also of interest was the government’s assertion that it had the right to exempt the company from nuisance prosecution. This is the legal means by which ordinary citizens can take a polluter to court, i.e., that the polluter is preventing them from enjoying, or benefiting financially from, their property. This legal principle was established as part of English common law in 1868, in *Rylands v. Fletcher*, meaning it predates even early Canadian legislation like The Navigable Waterways Act (1882). The common law principle of *Rylands v Fletcher* was what the class action lawsuit in Port Colborne would be based upon. It seemed as though the government of New Brunswick also believed it could override common law, at will, to allow unrestricted pollution of the Belledune area and to prevent any litigation by ordinary citizens to seek redress for environmental damage to their property from pollution. Before the smelter was built, Federal

Government scientists at the St. Andrews Biological Station weighed in on the matter, noting:

Five metals were expected to be released from the smelter complex, copper, silver, lead, cadmium and zinc. In 1965, federal scientists had pointed out that measuring toxicity on animals was complex because different stages in an animal's life cycle differed in their 'resistance to a poison' and different species differed in their resistance (Milewski:17).

In spite of these doubts on the part of federal government scientists on the matter of toxicity of smelter emissions to local marine life, the smelter was approved for construction, even though federal scientists had pointed out:

For copper, one part per million (ppm) was considered lethal for marine fish. For adult invertebrates, the lethal value was 0.2 ppm and for the larvae of a shellfish (like scallops or lobsters) and other marine invertebrates the value was 0.05 ppm. They determined the toxic level for each metal and pointed out that the presence of several metals in the effluent would probably require that the allowable concentration of each metal would have to be lowered because the additive effect of multiple metals increased the toxicity of each individual metal (ibid).

In spite of the concerns of these scientists, construction of the smelter and associated buildings was completed by 1966, and before long, employees at the smelter were beginning to show signs of lead poisoning, although the definition of this condition depended upon who you spoke with. According to the officials operating the smelter, employees were exhibiting signs of "lead absorption", not lead poisoning, in line with the province's definition of the condition:

Lead rings along the gum line were viewed as an indication of lead absorption not poisoning. Similarly, increased blood lead, increased urinary lead, and a reduced or falling hemoglobin was viewed as evidence of lead absorption – nature's way of eliminating a 'natural' element in the body (Milewski:22).

At the request of the rank and file of the smelter workers' union, The United Steelworkers Union Local 7085 bypassed the provincial process they were obliged to follow in New Brunswick for labour safety, bypassed the company with whom they had been dealing, and went public with their concerns, due to the fact that:

(...) previous meetings with the company had failed to result in a study of the pollution problems inside and outside of the smelter (ibid)

Once again, just as in Sudbury, it was the United Steelworkers Union that was representing the health concerns of not only its union members, but also those of the community at large. Federal air quality tests released in May of 1968, taken within the smelter, showed that “In one area of the plant, lead levels were 800 times above safe limits. In other areas, lead levels were 2, 8, 10, 60, 80 or 400 times over safe limits” (Milewski:23,24). As to pollution effects on the community, the federal report noted:

(...) there were 1,000 people living within a 1-2 mile (1.6–3.2 km) radius of the smelter and it noted the close proximity of the school to the smelter. Within a 10-mile (16 km) radius of the smelter, there were 5,700 people. Stack tests by the company showed that lead discharges to the atmosphere were in the range of 5000 pounds (2.2 metric tonnes) per day (Milewski:23).

The province of New Brunswick responded to the federal study by commissioning one of their own. What the provincial report neglected to mention was the fact that the federal scientists had looked at the lead levels within the community, and particularly the local primary school:

The federal investigation had found high levels of lead inside the school (2000 parts per million - ppm) and outside the school (5200 ppm). Federal officials expressed concern that the large discharges of lead from the smelter were causing air and water pollution in the community and recommended further investigations. (Milewski:25).

A provincial investigation recommended that a committee be struck to investigate the matter; however, “The Joint Committee on Lead Hazards was dissolved four months after it was formed” (Milewski:26). Four years later, in May of 1972, compensation claims for lead “intoxication” by smelter workers were up to 57 cases:

By the end of the year, this number would rise to 104” ...but only 50% of the referrals to the Compensation Board were coming from the company doctor, the rest were being made by the family physicians of workers” (ibid).

The company’s solution was transferring workers with high blood lead levels to other areas, but:

The Union representative pointed out that, even though the company had a policy of relocating workers with high blood lead levels, workers were still being exposed to lead in the relocation areas (ibid)

The following tables, summarizing the contamination levels of lead in the community of Belledune, and corresponding standards for lead according to other jurisdictions, have been reproduced from page 31 of Inka Milewski’s publication “Dying for Development: the legacy of lead in Belledune”. While different “safe” values for lead point out the fact that there is some disagreement within the scientific community which advises governments responsible for regulating pollution, it also points out the fact governments play a very important role in determining official “safe” levels of pollutants, and by extension, health outcomes for the citizens they serve. Ontario, New Brunswick and the Government of Canada, all have / had different guidelines regarding the lead levels which they believe people could be safely exposed to. Any tables from Milewski’s publication have been reproduced faithfully, as they appear in her publication.

Table 8: Lead in Soils 1.6 km Southeast of Belledune Smelter (parts per billion)

Lead in Soils 1.6 km Southeast of Smelter (parts per billion).

| Soil Depth | 1975 | 1978 | 1980 |
|------------|------|------|------|
| 0-5 cm | 450 | 925 | 1135 |
| 5-10 cm | 304 | 655 | 540 |
| 10-15 cm | 290 | 605 | 275 |

Source: Brunswick Mining & Smelting

Environmental Effects Monitoring Data obtained

from New Brunswick Department of Environment

Source: Dying for Development (2006:31).

Table 9.: Guidelines for Lead Levels in Ontario Soils (ppm).

Guidelines for Lead Levels in Soils (ppm)

Ontario Ministry of Environment Phytotoxicology Excessive* Levels
for Surface Soils

| | Urban | Rural |
|------|--------------|--------------|
| 1978 | 600 | |
| 1982 | 600 | 150 |
| 1989 | 500 | 150 |

**Excessive did not necessary mean toxic, but*

was evidence of contamination above normal levels

Source: Dying for Development (2006:31).

Table 10: Canadian Council of Minister of the Environment Soil Quality Guidelines.

Canadian Council of Minister of the Environment

Soil Quality Guidelines

| | Residential | Agricultural |
|-------|--------------------|---------------------|
| 1990 | 500 | 3 |
| 2003* | 140 | 70 |

**These are health risk-based guidelines.*

Source: Dying for Development (2006: 31).

In her second presentation, given the next day at Sudbury's City Hall, in Tom Davies Square, Milewski pointed out a passage from The Sudbury Soils Study which I had not noticed. It dealt with the matter of how and why lead standards can vary between jurisdictions, and by extension, constitutes a very important statement regarding the nature of risk assessment in general:

It is important to note that the selection process behind the choice of most of these input parameters is largely based on policy, not science (Sudbury Area Risk Assessment [SARA] Human Health Risk Assessment, Vol. II, Ch. 5, p 5-41).

Without analyzing the meaning of the term “policy”— as there are multiple meanings, some with very negative connotations — it will have to suffice to say that the quote indicates that there is a political dimension to risk assessment that even The Sudbury Soils Study felt compelled to acknowledge. If an individual or a jurisdiction were looking for definitive guidance and leadership in the matter of environmental pollution, it appears hard come by. As the previous three tables indicate, data can be found from different political jurisdictions to justify a range of either high or low levels of pollutants as being “acceptable”.

Another industry which was established in Belledune was a fertilizer plant, which made fertilizer by importing calcium phosphate rock from Florida, and combining it with some of the by-products of the local smelter, such as sulphur acid. Under full production, the plant was expected to generate 1.5 million tons of calcium sulphate (gypsum) waste rock per year, which would be piped out into Belledune Harbour (Milewski 2006:16). This was in addition to some of the other pollutants which the smelter would generate, such as copper lead, cadmium, silver and zinc. By 1979, company officials from the smelter were of the opinion that:

(...) the harbour had inadvertently become “somewhat of the apple in the garden of Eden” thanks to the smelter’s “sister company,” Belledune Fertilizer (Milewski:37).

Apparently, the waste gypsum which had been piped out to the harbor had altered the previously rocky bottom, ideal habitat for lobsters, and was now providing a type of soil for plant life to establish itself. But while plant life may have appeared healthy and flourishing, the effect on local lobsters was quite different. Smelter effluent was also present in this “Garden of Eden”, as East Coast Smelting had also been permitted to dispose of their waste chemicals in the harbor. The cadmium level in lobsters was beginning to become a matter of concern; but at this time, the position of the smelter manager was dismissive of these concerns:

(...) a company scientist in Montreal had determined that 70 contaminated lobsters would have to be eaten before there would be any apparent increase in cadmium levels in an individual (ibid).

In the meantime, the federal Department of Fisheries and Oceans (DFO) had been monitoring the contamination levels at Belledune, in spite of assurances from the smelter operators and the Government of New Brunswick that local pollution was at an acceptable and safe level. One provincial politician, Eric Kipping, the Minister of Environment, stated that a person would have to eat lobster “a few times a day, every day of the year in order to be affected by the cadmium levels in the lobster” (ibid).

The federal government’s Department of Fisheries and Oceans (DFO) took a very different view, and on May 8th 1980, it closed the entire lobster fishery in Belledune (ibid). The reasons were quite simple. When compared to a reputable and neutral third party’s standards, which in this case was The World Health Organization (WHO), cadmium levels were dangerously high. Dr. Jack Uthe, head of DFO’s Fisheries and Environmental Research Section in Halifax stated that:

(...) a person eating one lobster from Belledune harbour would ingest 2.5 - 7.5 milligrams (mg) of cadmium. He noted that the maximum intake of cadmium recommended by the World Health Organization was 0.4 -0.5 mg per week (ibid).

On the basis of this information from the Department of Fisheries and Oceans, eating a single lobster from the Belledune area would result in a dose of cadmium 6-15 times what is recommended as safe by the World Health Organization (WHO). This statement would seem to be in direct contradiction of New Brunswick's Minister of Environment, Eric Kipping, yet it can be argued that both statements are defensible. One has to take into consideration the methodology behind both statements. The New Brunswick Government's data and the polluter's data were based on samples of lobster flesh only. The Federal Government's data was based on tests of what parts of a lobster people actually eat, including a digestive organ known as the "tomally", which retains cadmium. It was this part of the lobster, which many people consume, that led to the discrepancy in cadmium contamination levels in lobster between the Federal Government and the studies carried out by the province of New Brunswick and the polluter. As mentioned, both are defensible positions, when considered from the standpoint of what the parameters of the studies in question were. If the provincial and company parameters of study dictated that only the flesh of the lobster was to be tested, then contamination levels indicated that there was less reason for concern. If the federal parameters are the guidelines for testing, which include testing of the *tomally*, then there was a contamination problem. In this case, it is a matter of which political power was deciding the parameters of the study that determined the risk to the public, not science alone. In spite of assurances by the province and the polluter that lobster from the harbour were safe, the federal Department of Fisheries and Oceans (DFO) decided to take a precautionary approach:

On May 8th, 1980, DFO closed the harbour and lagoon to fishing, declaring a one-mile area beyond the harbour a controlled fishing area (...) Two weeks later after further sampling by DFO, the control zone was expanded to four miles (ibid).

While the DFO decision would seem to indicate that the Federal Government was prepared to be the final arbiter of what levels of contaminants posed a risk to the general public, it would prove to be a misperception. It was true that the Federal Government had based its decision to limit fishing — and therefore consumption — of local lobsters on the basis of external, recognized standards; however, that scenario was unlikely to occur again. After closing the fishery, Health and Welfare Canada decided:

(...) lobster digestive gland containing up to 40 µg/g (ppm) of cadmium (wet weight) posed “little consumer danger” (Milewski:38).

Once again, there seems to be a discrepancy between regulatory agencies, although it is not a federal-provincial difference, but one between federal agencies themselves. Health and Welfare Canada seemed to be operating on the basis of yearly doses, which is to say that the ingestion of cadmium was considered to be an averaged total yearly intake. DFO scientist Dr. Jack Uthe, who recommended closing Belledune harbour to lobster fishing, cautioned that:

(...) it was extremely difficult to judge the effects of “slug doses” of 2.5-7.5 mg of cadmium ingested “a relatively small number of times per year but all essentially consumed within the short period of the lobster season (Milewski:37).

Therefore, the decision to consider a specific problem at a local level, i.e., the frequent ingestion of contaminated lobster during a brief period of time, was discarded, and instead the short term lobster season dose was averaged over a much longer period of time, one year. As a backstop to protect the people of the area, Dr. Uthe’s findings also stated:

(...) the kidneys were the main organs affected by cadmium and suggested that an immediate assessment of urinary protein [which was diagnostic of chronic cadmium induced kidney damage] for individuals eating lagoon and harbour lobster was warranted. (ibid).

Milewski also notes that the testing of lobster for lead content never occurred, although lead contamination of other shellfish in the area was confirmed. Along with the levels of cadmium in lobster, the results were not good. The lead and cadmium levels in local mussels tested by the Canadian Food and Drug Directorate (CFDD), a federal department, revealed:

Lead and cadmium levels in mussels from Belledune harbour ranged from 50 to 100 times above CFDD guidelines. Further sampling showed that cadmium levels in mussels exceeded the guidelines as far away as 23 km east (down current) from the smelter. Food safety standards for lead were exceeded 13 km down current (Milewski:39).

However, an interesting shift in perspectives seems to have occurred with Health and Welfare Canada during this period of time, in that after consultations with the Department of Fisheries and Oceans (DFO) officials:

A year after the cadmium in lobsters was discovered, provincial environment officials were told that federal health officials “no longer considered [the CFDD Guidelines] as ‘guidelines’ but ‘levels of concern’ (Milewski:38).

This shift in interpretation led to a shift in federal policy, in that although contamination levels exceeded those set by The World Health Organization:

Health and Welfare officials did not view this as a legally binding standard but a guideline for “making decisions” on whether to intervene if there is an unusual increase in cadmium content in food. (ibid).

The shift from an exceedance of a pollution standard being interpreted as a reason to act, into an occurrence that may or may not need to be acted upon, seems to coincide with how the Ontario Ministry of the Environment (MOE) now presents its soil contamination levels to the public (**Table 9:** p. 107). In the chart regarding soils contaminated by metals, titled “Guidelines for lead levels in soils” the MOE lists levels of contamination which it terms “excessive”. It then defines “excessive” in an unusual manner. The following explanation accompanies the MOE information:

*Excessive did not necessary mean toxic, but was evidence of contamination above normal levels (Milewski:31).

With this shift in interpretation regarding how public environmental safety should be regulated, neither the federal nor provincial governments banned shellfish harvesting in the Belledune area, even though there were exceedances of federal safety standards. The following information, reproduced in form from page 39 of *Dying for Development: the legacy of lead in Belledune* shows the contamination levels which were recorded for mussels in the vicinity of Belledune, in parts per million.

Table 11: Lead and Cadmium Levels in Blue Mussel Pointe-Verte (8.0 km. southeast of smelter).

Lead and Cadmium Levels in Blue Mussel Pointe-Verte (8.0 km. southeast of smelter)

| | Lead | Cadmium |
|------|------|---------|
| 1972 | 10 | 0.6 |
| 1977 | 29 | 2.6 |
| 1978 | 15 | 2.2 |
| 1979 | 16 | 4.0 |
| 1981 | 17.1 | 5.9 |

Source: Report by R.L. Levaque Charron, Noranda Research Centre. May 1980. Ecological survey for Brunswick Mining and Smelting Corporaton Ltd, Belledune, New Brunswick; Brunswick Mining & Smelting Environmental Effects Monitoring Data obtained from New Brunswick Department of Environment.

Source: *Dying for Development* (2006:39)

On the same page, Milewski lists both the standards of the day for lead and cadmium in food, in addition to standards that were later adopted by the Federal Government in 2005.

Table 12: 1970 Canadian Food and Drug Directorate Guidelines “Poisonous Substances in Food.” Sect. B 15.002 parts per million (ppm)

**1970 Canadian Food and Drug Directorate
Guidelines “Poisonous Substances in Food”
Sect. B 15.002 parts per million (ppm)**

| | |
|---------|--------|
| Lead | 10 ppm |
| Cadmium | 1 ppm |

Source: Dying for Development (2006:39)

Clearly, shellfish exceeded guidelines for lead and cadmium in the Belledune area in 1977, and by 1981, these levels were considerably higher.

Table 13: 2005 Canadian Food Inspection Agency Action Levels for Fish and Fish Products parts per million (ppm).

**2005 Canadian Food Inspection Agency
Action Levels for Fish and Fish Products
parts per million (ppm)**

| | |
|---------|--------------------|
| Lead | 0.5 ppm |
| Cadmium | no level specified |

Source: Dying for Development (2006:39).

By the standards of either era, whether in 1970 or later, lead levels for Belledune shellfish were above guidelines which were termed levels to be concerned about, yet no action was deemed necessary. As to the effect of Belledune pollution on the marine environment, a 1998/1999 study by the Geological Survey of Canada tested the sediments of The Bay of Chaleur, the body of oceanic water between the south shore of the Gaspé Peninsula, in Quebec, and the north shore of New Brunswick:

The study found that emissions from the smelter had raised the concentration of lead, at least three to four times above presmelter levels, in surface sediment throughout the entire Bay of Chaleur as far away as 100 km east of the smelter. Federal officials never issued any public bans on consuming clams or mussels between Belledune and Petit Rocher (ibid).

This is consistent with the decision to do nothing about high cadmium levels in lobsters, and not to ban the clam and mussel fishery either, and needs to be viewed from a political perspective.

According to information obtained by Milewski under the Federal Access to Information Act, The Department of Fisheries and Oceans (DFO) had political considerations to consider, which were of more concern than scientific realities:

The bigger issue for DFO was the ‘severe socioeconomic and ecological consequences’ if high levels of cadmium were confirmed. ‘Any sustained focus on cadmium in foods could result in developing regulated tolerance levels which could effectively remove a variety of fishery products, particularly lobsters over a wide area, from the market place. High levels of cadmium could raise havoc in European and U.S. markets’ (Milewski:36).

The Federal Government’s reasoning concerning Belledune, that “The bigger issue for DFO was the ‘severe socioeconomic and ecological consequences if high levels of cadmium were confirmed’” (Milewski:39), suggests that both the socioeconomic impact and international implications of closing the fishery due to contamination were more important than local, and even national or international public safety; New Brunswick lobsters from other areas were being

sold across Canada, and even outside of Canada, and sustaining these markets was a matter of greater concern than the safety of local citizens in Belledune..

Another very important topic of Milewski’s lecture at Tom Davies Square was the fact that community based risk assessments can yield very different results for the very same pollutants, depending on the type of evaluation procedure, or process, that was put in place for the risk assessment in question. Three communities within which risk assessments were carried out, Sudbury, Port Colborne and Belledune, yielded very different results on what levels of lead in local soils were safe for the communities being assessed, despite the fact that they assessed the risk for a similar heavy metal. By the time of the 2005 CBRA carried out in Belledune, the Federal Government’s recommended safe level for lead in residential soils was 140 ppm and the Province of Ontario’s safe level for lead in residential soils was 200 ppm. However, the three community based risk assessments (CBRAs) done in Belledune, Port Colborne and Sudbury all determined that these residential soil levels (140 ppm and 200 ppm) could be exceeded at no risk to the public. The following are the outdoor soil levels of lead that each of the three CBRAs concluded were safe for their respective communities, which Milewski compiled and presented at both the Tom Davies Square and Laurentian University presentations:

Table 14: Comparison of Safe Lead Levels Determined in Three Separate CBRAs.

| | |
|---------------|---------|
| Belledune | 500 ppm |
| Sudbury | 400 ppm |
| Port Colborne | 300 ppm |

An initial analysis of these numbers should give pause for thought, as Belledune is an area where lead-zinc smelting is the main industry, yet it has the highest permissible lead levels of the three

communities studied. One of the reasons this occurred, according to Milewski, is a value used in risk assessment equations for lead, to calculate blood uptake. It is called the “Integrated Exposure Uptake Biokinetic” model, or IEUBK and it can vary from one risk assessment to another. If lead is the substance whose risk is being evaluated, how much lead entering a person’s body from different sources, air, water, soils food or occupational exposure is a value which is interpreted by those doing the risk assessment, study by study. Risk assessments also look at cancer risks, and at what is known as a “hazard quotient.” The latter term refers to non-fatal effects of pollutants, the Lowest Observable Non Adverse Effects Level (LONAEL). Risk is calculated as the level of exposure at which non-adverse effects are first noticed, but the determination of the hazard quotient seems to be entirely dependent on the researchers who process the collected data. Within a given population there would be huge variations in exposure levels, limited only by the number of physical and environmental differences between subjects. Once sufficient data is believed to have been obtained on exposure levels, the differences in absorption rates are averaged down to a single level, called the hazard quotient. According to Milewski, had a hazard quotient of 0.2 been used, which she stated the Government of Canada recommends when there are multiple exposure pathways, instead of 1.0 when there is only one, (which the Sudbury Soils Study used), then all of Sudbury’s soils heavy metal levels except selenium would have posed a risk to human health. The risk assessment calculations in Belledune allowed a generic soil level of 500 ppm lead to be considered as safe. Milewski pointed out during her presentation that the Province of New Brunswick was prepared to accept the present (2005) federal guideline concerning lead in soils, and declare that the Federal Government guideline of 140 ppm lead in residential soils to be the maximum allowable.

However, another risk assessment carried out soon afterward by the owners of the Belledune smelter, Xstrata Metals, determined the safe risk level for lead in Belledune soils to be 500 ppm, in 2005, and this level was accepted by the province of New Brunswick instead. The process of risk assessment and the methodology to determine risk, seemed to have fallen under the control of the company producing the pollution and the researchers whose salaries were paid entirely by the polluter, not the provincial government, nor the federal government.

Milewski made mention of the fact during her presentation, that another industrial complex was being planned for Belledune, this time a toxic waste incinerator. She made it clear at the Sudbury presentation that she did not believe it was a facility that should be sited in Belledune, due to existing levels of pollution in the soil and the fact that such incineration facilities are known polluters. She also made it clear that she did not believe a proper risk assessment had been done regarding the risks to local citizens and the environment. However, criticizing risk assessments would become a risky activity for Milewski, from a legal standpoint.

Chapter 12

The Risk of Being an Environmental Activist and the Legacy of Pollution in Belledune

For asserting, publicly, that a planned toxic waste incinerator was an ill-advised addition to an already-polluted area, Milewski would be served with a defamation suit by the company planning to build the facility, Bennett Environmental Incorporated (BEI), of Ontario, on October 7th, 2008. The suit contended that claiming a risk assessment was not done properly, constituted defamation of the company who paid for the risk assessment, BEI. Some of the statements Milewski made in public, which BEI claimed were defamatory, are listed here, from the lawsuit launched by BEI:

7.(...) burning hydrocarbons and creosote will result in a release to the atmosphere of 80 chemical pollutants totaling more than 28,000 kg annually. Of this amount, 4,000 kg will include cancer-causing chemicals such as dioxins and furans (...)

11. Toxic waste incinerators create toxic pollution...There isn't a toxic waste incinerator in operation where contaminants have not appeared in the surrounding landscape, and when they backfire, as happened in Alberta, the nearby environment can become badly contaminated

(Court of the Queen's Bench of New Brunswick:2004).

Those two statements, amongst others, were considered to be defamatory to BEI, as was a list of deficiencies of the risk assessment, listed by The Conservation Council of New Brunswick (CCNB), which it felt needed to be considered before a license to operate the incinerator should be issued. Some of those concerns of the CCNB are listed here:

- No specification in the Approval for an Emergency Response Plan.

- Contradiction between condition (18) that stipulates no chlorinated hydrocarbons will be treated and Schedule B which permits and the treatment and importation of chlorinated hydrocarbons.
- No requirement to address the fate of polyethylene (plastic) liners used in the transportation of contaminated material (estimated quantity of liners used to ship 100,000 mt of contaminated soils per year is 160 -245 mt): if incinerated, the liners can be a significant source of chlorinated compounds as well as polycyclic aromatic hydrocarbons (PAHs);
- No requirement for storing, testing or disposing of the estimated 2000 tonnes per year of “filter cake waste”, that is the product of filtering the secondary combustion chamber and gas conditioning chamber;
- No requirement for monitoring fugitive emissions from the estimated 4,500 trucks per year that will travel through the Belledune area;
- No requirement for continuous monitoring of contaminants of concern (PCBs, dioxins/furans, arsenic, benzo(a)pyrene, and chromium V) in the thermal process stack. (These contaminants were identified by the Jacques Whitford Human Health Risk Assessment as materially increasing the hazard quotients and incremental excess cancer risks criteria set by the Province of New Brunswick).
- No requirement to continuously monitor or test emissions from the thermal relief vent which allows gases to by-pass the combustion chamber and filtering process in the event of process upsets;
- No requirement for testing contaminated soils for radioactivity.

(ibid).

There were numerous other deficiencies concerning the risk assessment which Milewski and the Conservation Council of New Brunswick (CCNB) had spoken of in different New Brunswick media sources, which were also considered to be defamatory by Bennett Environmental (BEI), but they have not been listed. As to the contents of the Deficiency Statement by CCNB concerning the proposed BEI incinerator, BEI believed that:

17.25 As a whole, the Deficiency Statement misstates the facts and the results of the Assessment and the impact of the Thermal Oxidizer in such a manner as to exaggerate the impact of a Thermal Oxidizer in such a manner to mislead and alarm the public. The Deficiency Statement taken as a whole is false and defamatory of BEI.

20. BEI says that the defamatory publications cited herein have brought BEI into hatred, ridicule, odium, and contempt, and have resulted in injury to its character and professional reputation, thereby causing it to suffer damages. BEI claims from the Defendants, and each of them, as follows:
- a) general damages;
 - b) special damages, particulars of which will be provided prior to trial;
 - c) punitive or exemplary damages;
 - d) costs on a solicitor-client basis;
 - e) pre-judgment interest; and
 - f) such further and other relief as the Honourable Court deems just.

(ibid).

What this sort of action has become known as, is a “strategic lawsuit against public participation”, or SLAPP. The Canadian Environmental Law Association (CELA) is quite familiar with the intent of SLAPPs, and how they are used as a tool to stifle public participation in matters of environmental concern:

The power of a SLAPP comes from the use of the court system to intimidate the target and to exhaust its often-limited resources. It is not the strength of the case, but the threat of onerous and expensive proceedings which makes SLAPPs so harmfully effective (...) While the action is dismissed in the majority of SLAPPs that reach the courts, the real issue is the silencing effect it has on citizens who are sued and its impact on the public generally (Canadian Environmental Law Association (CELA), 2010:6,7).

The prospect of being sued for speaking out against questionable science, which if accepted as fact would result in a favourable result for a corporation, speaks to the power corporations enjoy in the legal system due to their financial resources. When compared to the resources of ordinary citizens, it becomes questionable whether or not it is a suitable venue in which to conduct a process of how communities can determine the relative merits or demerits of siting an industrial facility in their midst.

The CELA believes SLAPPS also undermine the democratic process:

SLAPPS affect the monitoring and enforcement of environmental laws and the activities of polluters. Research suggests that SLAPPS have measurable negative impacts on the enforcement of environmental laws and allow polluters to generally take a less diligent approach to pollution abatement. In other words, when they know the public will be reluctant to complain or speak against them, polluters are more prone to pollute (CELA 2010:9).

Or, in the case of Belledune, a polluting industry may tend to be less diligent in its efforts to maximize the pollution abatement of its proposed facilities, thereby reducing its operating costs, and increasing its profits. It may well be cheaper to sue those who question both the pollution levels and the risk these present, than it is to construct a plant that pollutes less. The suit was dropped, without ever making it to court, and as it turned out, BEI would not be locating this plant in Belledune, due to its actions in the United States.

According to extradition documents filed on Feb. 15th, 2012, John Bennett, the President of Bennett Environmental Incorporated, became a wanted man by legal authorities in the United States. The extradition document outlined the particulars of the activities of Bennett's company in the US, regarding its conduct in a bidding process in New Jersey, to remediate soils contaminated with creosote. The extradition request alleged illegal actions in conjunction with Severson Environmental Ltd., the main contactor at the site, beginning in December 2001. It was alleged by the United States Department of Justice, that Gordon McDonald, Severson's project manager allowed Bennett Environmental knowledge of competitor's bids, before submitting their own, which allowed Bennett to win the bid, and that:

In exchange for the subcontracts, Bennett's bids would be inflated to cover the costs of kickbacks to McDonald and other Severson employees. These kickbacks took many forms, including wire transfers to a shell company owned by McDonald and a luxurious Mediterranean cruise. The scheme continued until at least August 2004 and, all told, Bennett and his co-conspirators paid Severson and its employees over \$1 million in kickbacks and defrauded the United States of over \$1 million. (US Court of Appeal. Third Circuit 2016: 2,3).

In another judgment rendered by The United States District Court, Southern District of New York, regarding a different matter, i.e., a class action lawsuit against BEI filed by its own shareholders, more information is available. The lawsuit stated, in part, that the actions of management at BEI had led to a loss of share value, due to the fact that the US Corps of Army Engineers had withdrawn its consent to have BEI awarded the entire New Jersey Creosote Contract. The shareholder's lawsuit then alleged that BEI management then:

(...) misled the investing public by claiming that the Creosote Contract would provide adequate soil for operating Bennett's largest facility at Saint Ambroise, Quebec, and warranted the construction of a new treatment facility at Belledune, New Brunswick. Indeed, as a result of Bennett's inadequate soil supply, the Saint Ambroise facility was in fact shut down during a portion of the Class Period, and Bennett's new facility in Belledune has not yet been used (Bernstien, Litowitz, Burger and Grossman, LLP. August 22nd, 2012.).

Apparently, what Milewski felt were exaggerated claims by BEI, concerning the Belledune plant's pollution levels, were not the only questionable claims put forward by BEI. It appears that the entire enterprise of constructing an incinerator in Belledune may in fact have been dependent on an elaborate fraud being successful. On September 12th, 2011, one BEI executive, Robert Griffiths was sentenced to "50 months in prison for participating in money-laundering and fraud conspiracies" (US Department of Justice: 2011). He cooperated with the US Department of Justice, testifying in the case against Robert Bennett, owner of the company, BEI. Bennett, president of the company was also found guilty, and was:

(...) sentenced Tuesday to serve five years and three months in prison in connection with the payment of kickbacks to obtain subcontracts at a New Jersey Superfund site overseen by the EPA and the U.S. Army Corps of Engineers, according to officials. Judge Susan D. Wigenton also ordered John Bennett, of Vancouver, British Columbia, to pay a \$12,500 criminal fine and \$3.8 million restitution. (American Justice Notebook 2015).

While this is disturbing behaviour on the part of a business, one which purported to be defamed by allegations of a lack of due diligence in assessing the environmental risk its operations would pose to Belledune, the behaviour of The Government of New Brunswick is also disturbing in this

matter. According to Milewski, previous corporate risk assessments concerning the lead smelter in Belledune also predicted no risk to the local fishery. Past industry-funded risk assessments concerning smelter pollution were proven over time to be plainly wrong, and resulted in the smelter operator being forced to buy up the cadmium-contaminated lobsters from the local exclusion zone at market prices, and then incinerate them, as they were too toxic for human consumption. (Lindsay 2004). However, in this way, the mining company and the provincial and federal government could publicly claim, technically, that the fishery was not closed and that a miscalculation of the risk posed by the harbour's pollution levels had not occurred.

In spite of the pollution problems the lead smelter caused, the Province of New Brunswick approved the construction of the toxic waste incinerator; however, the criminality and fraud of the incinerator operators, Bennett Environmental Incorporated, resulted in a reprieve for the town, not Milewski's critique of the environmental impact the incinerator would have on Belledune.

Despite the publicity that Inka Milewski managed to generate about pollution levels in Belledune, pollution levels only seem to have gotten higher, according to National Pollution Release Inventory (NPRI) data. The smelter originally started production in 1966, as an East Coast Smelting facility until it was bought by Noranda in 1968, and Noranda changed its name in 2005 to Falconbridge. In 2006, Falconbridge was bought by Xstrata Canada Corporation and in 2013 it was in turn bought by Glencore Canada Corporation. Inc., who continues as owner and operator to this day. Since 1966, the Belledune Smelter had also begun to obtain lead and zinc from adding old batteries to their furnace feed, which also yielded recycled plastic for export.

The battery recycling operation, which began in 1996, processes between 200,000 and 400,000 batteries per year, the majority from the Atlantic provinces, with the rest coming from other parts of Canada (Ecoweek September 10th, 2001).

From the time that National Pollution Release Inventory (NPRI) data began to be compiled, the year 1994, the Xstrata smelter in Belledune self-reported the amount of air emissions in **Table 15** to the (NPRI), from 1994-2010. Mercury emissions have only been reported since 2000.

Table 15: Air Emissions from Belledune Smelter, 1994-2010 and 2011-2015.

| Air Emissions | Arsenic (and its compounds) | Cadmium (and its compounds) | Lead (and its compounds) | Mercury (and its compounds) | Zinc (and its compounds) |
|---------------|-----------------------------|-----------------------------|--------------------------|-----------------------------|--------------------------|
| 1994-2010 | 51.1 t | 18.4 t | 164.0 t | 0.69 t | no data |
| 2011-2015 | 207.0 t | 34.9 t | 571.0 t | 12.0 t | 2,708.0 t |

Source: National Pollution Release Inventory (NPRI), Xstrata Canada Corporation, Belledune, and National Pollution Release Inventory (NPRI) Glencore, Belledune Smelter Facility #4024.

Between 1994 and 2010, and 2011-2015, the smelter discharged the following metals to the water in Belledune Harbour, listed in **Table 16**.

Table 16: Discharges to Water from the Belledune Smelter, 1994-2010 and 2011-2015.

| Discharges to Water | Arsenic (and its compounds) | Cadmium (and its compounds) | Lead (and its compounds) | Mercury (and its compounds) | Zinc (and its compounds) |
|---------------------|-----------------------------|-----------------------------|--------------------------|-----------------------------|--------------------------|
| 1994-2010 | 3.3t | 5.5 t | 3.1 t | no data | 11.1 t |
| 2011-2015 | 310.6 t | 16.9 t | 199.6 t | 3.2 t | 2,491.0 t |

Source: National Pollution Release Inventory (NPRI), Xstrata Canada Corporation, Belledune, and National Pollution Release Inventory (NPRI) Glencore, Belledune Smelter Facility #4024.

When considering the cumulative pollution for the 16 years indicated from 1994 to 2010, it should be remembered that there are 28 years of previous pollution which has not been documented by the NPRI, as the Belledune smelter began production in 1966 (Milewski:18). The amounts of pollution being disposed of in both the air and water for only 2011-2015 is a dramatic increase; despite all of the attention the Conservation Council of New Brunswick and Inka Milewski have brought to the issue, pollution levels appear to be increasing.

The term “environmental sacrifice zone” comes to mind when considering the attitude of the Government of New Brunswick to Belledune. It is a term I had come across in my reading of Robert Bullard’s “The Quest for Environmental Justice” (2005:13), According to Mary Ann Coleman, Coordinator for the New Brunswick Environmental Network, in Canada:

Sacrifice zones lack political clout, money and resources. Often marginalized, they are deemed an expendable environmental cost to maintain North American culture (...)
Belledune fits the profile of a sacrifice zone. (Lindsay December 6th, 2004).

Testifying before a Department of Fisheries and Oceans (DFO) subcommittee hearing in 2006, Milewski testified just how the local environment in Belldune had been sacrificed. After the local harbour’s lobster fishery was destroyed by pollution, the mussel and clams in the area were later found to be too contaminated to eat, due to cadmium and lead pollution, and:

In 2005, after the Belledune area health study revealed that seafood consumption, specifically mussels, was one of the main pathways of exposure to metals and a significant contributor to the high cancer and disease rates of local residents in the area, DFO placed a ban on shellfish harvesting near Belledune (Department of Fisheries and Oceans 2006:1120).

Milweski also testified at the committee meeting of the regarding the pollution already occurring in Belledune, during the period when Bennett Environmental Inc.(BEI) was proposing to build a waste incinerator in Belledune. She testified that she believed this facility would only increase the types of pollution that the partially contaminated fishery was already being subjected to.

Testifying at the same committee of the DFO, a fisherman, Daniel Landry, representing The Acadian Regional Federation of Professional Fishermen Inc., testifying in relation to the BEI incinerator proposal, pointed out that:

(...) the fishing industry accounts for 22 per cent of jobs and 23 per cent of employment income in the Acadian Peninsula. There are approximately 55,000 of us in the Acadian Peninsula. This represents a rather large number of jobs and a substantial economic contribution. In contrast, the Bennett plant is expected to create 32 jobs. For how long Department of Fisheries and Oceans (ibid)?

The Bennett facility was completed in 2004, but operation did not commence due to a lack of soil to decontaminate, due to the legal difficulties it had had brought upon itself. The soils from New Jersey it was supposed to decontaminate by incineration, were tied up in an investigation of fraud perpetrated by Bennett Environmental, for which more than one executive was sentenced to jail over. Bennett Environmental itself, describes this problem with the Belledune plant as: “a slowdown in the industry in which BEI operates” (Bennett Environmental Inc., Annual Information Form, March 16th, 2010). The facility was sold in 2010, and now produces sheet metal products.

The Belledune smelter continues to operate, now owned by Glencore SA, as of 2015. Lobsters caught in Belledune Harbour, which are still considered too contaminated for human consumption, continue to be bought by the smelter operators, then incinerated, not sold. Clams and mussels in other parts of the local fishery are now considered too contaminated with lead and cadmium to eat, and parts of this local fishery were closed as well in 2005 (Milewski:103). Inka Milweski continues in her position as a science advisor to the Conservation Council of New Brunswick, and continues to advocate for both sustainable development and continues to monitor east coast environmental issues for New Brunswick communities, evaluating development proposals on their scientific merit, as opposed to accepting the science behind what are often

questionable corporate sponsored risk assessments. In her closing comments to “Dying for Development: the legacy of lead in Belledune”, Milewski called for a new legal position in environmental issues, one that begins with an Environmental Bill of Rights, which would:

(...) provide citizens with accessible and affordable legal remedies when government officials fail to uphold their responsibility to protect citizens from environmental contamination and degradation (Milewski:77)

She also believes that such legislation should protect civil servants who (...) “‘blow the whistle’ on government inaction that threatens the health and well-being of citizens and the environment” (ibid). The province of Ontario has had such Environmental Bill of Rights since 1993 and it enabled a class action lawsuit to be initiated in Port Colborne.

Chapter 13

Diana Wiggins and Class Action Against Past Pollution

After the Milewski presentation at Tom Davies Square, the next speaker was Diana Wiggins, who at the time was involved in a class action lawsuit against Inco, now Vale Canada Ltd., in Port Colborne, over soils contamination. The lawsuit was not just for present levels of pollution, but past pollution, and the effects of that pollution on their property values. Diana Wiggins had found, as I did, that there seemed to be little opportunity to participate as a member of the community in the Port Colborne Community Based Risk Assessment (CBRA), and doubted it would accomplish anything meaningful. For this reason, she opted out of the CBRA in her town and initiated the first class action lawsuit against a polluter in Canada, for past pollution which had contaminated many local properties. The CBRA in Port Colborne, like those carried out in Sudbury and Belledune, also determined there to be no danger to human health from existing pollution levels in local soils. The following is a collection of public document and local media accounts of the Port Colborne CBRA, but also includes internet postings by Diana Wiggins herself, which provided some of her personal insights into her journey with this process known as “community-based risk assessment”. From what information I have been able to obtain on Port Colborne, people there with little or no science background challenged the validity of a government/industry CBRA, as motivated, working class people.

Diana Wiggins was a Port Colborne resident whose son was becoming sick with an unidentifiable illness in 1998. Living near a nickel processing facility, the Inco nickel refinery, along with others in her community she suspected nickel contamination. At this time, the

community requested that the Ontario Ministry of the Environment (MOE) test the soils in the city, which they did. As she proceeded from her first point of contact with the institutions of government and industry, who were repeatedly telling both her and others that there was no risk posed by the levels of nickel in their soils, she began to investigate the documentation which was constructing this social reality of her life. From this standpoint, she began to discover through the public documents she had located, that the problem may well be nickel contamination, since:

According to the standards issued by the Ontario Ministry of the Environment (MOE) for residential areas, the level of nickel in the soils should be no higher than 200 parts per million (ppm). In Port Colborne, there are some areas where there is evidence of more than 20,000 ppm of nickel in the soil. It has been shown that the majority of nickel in the soils is in the form of nickel oxide. Nickel oxide is not only a hazardous substance, but also a recognized carcinogen under Health Canada (Wiggins, Diana.2010:78).

According to Wiggins, in the spring of 2000, she decided to discover for herself just what the level of nickel contamination was in her son's body; she had him tested by a local doctor, but when she returned to his office for the results: "The doctor wouldn't look me in the eye, stood with his back to me, and stated that 'he wasn't allowed to discuss the issue' "(Wiggins:78).

After this experience with what is normally considered a trusted, neutral observer, a medical doctor, Diana Wiggins stopped attempting to work within the institutional structures of government and industry, the Community Based Risk Assessment, and commenced independent legal action. I have been able to determine from her own internet postings that she retained legal representation through the Canadian Environmental Law Association (ibid). The Canadian Environmental Law Association (CELA) is a non-profit organization which gives free legal advice to only non-business owners, just everyday working people, and advises them on whether or not they have the basis for a legal case against either polluter(s) that are affecting their lives, or against proposed industrial activities that they believe will, in the future. A decision to launch a class action lawsuit was eventually made to challenge the industry-government study, entirely

funded by the polluter, Inco, and Wiggins, along with Ellen Smith and Wilf Pearson, launched a \$750 million (Canadian) class action lawsuit in Inco, Her Majesty the Queen, (represented by the Ontario Ministry of the Environment), Niagara Department of Health, Niagara Catholic School Board, Niagara District School Board and the City of Port Colborne (ibid).

Inco, and the other defendants had begun a Community Based Risk Assessment (CBRA) earlier in 2000, which eventually set the safe level of the pollutant in question, nickel oxide, at 8,000 ppm in residential soils. But having researched the matter herself, Wiggins was aware that “According to the standards issued by the Ontario Ministry of the Environment (MOE) the level of nickel in soil should be no higher than 200 parts per million (ppm)” (ibid:78). During one of the local public hearings held in November of 2000, a research scientist with the MOE conducting soils tests in the Port Colborne area, Al Kuja, stood up and announced:

‘I might get into trouble for this but there's something going on,’ a worried Kuja said.
‘There's areas where every single household has someone sick, every single family, some member has something - cancers, rashes, leukemia . . . Personally I think that something is going on’ (Harries 2001: A01).

According to Wiggins, in the official transcript of the public meeting at which this statement took place, “official accounts do not reflect this statement” (Wiggins 2010:77).

However, a Toronto Star reporter, Kate Harries, was at the meeting and the statement was printed verbatim in the February 11th 2000 edition of The Toronto Star, Sunday Edition 1. Also in the article is a comment made after Al Kuja's statement by his supervisor, Dave McLaughlin, co-coordinator of field investigations in the soil standards section of the MOE: “Al won't be speaking for the ministry for a while” (Harries 2000: A01). One of the first pieces of scientific literature I found on the matter of the Community Based Risk Assessment (CBRA) in Port Colborne, was an evaluation of the study done by a European researcher, Tor Norseth, a Norwegian scientist who had researched nickel effects in the Russian nickel industry in both

Russia and Norway. Norseth had also been selected as a peer reviewer of the Port Colborne CBRA, and felt it was imperative to point out some of the differences between the risk assessments that he had been a part of in Europe, and the CBRA in Port Colborne. The article from which I will be quoting appeared in the Scandinavian Journal of Work, Environment and Health, in March, 2003:

In the Ontario case, the “Red Book” paradigm was required, and used, for all it was worth for the application of science in politics. This much-used modern risk assessment paradigm depends to a large extent on animal experiments with *NOAELs and/or **LOAELs, safety factors, and inference guidelines in the cases (which often is the case) with default data. This is, in my opinion, much like a political number game, but it must be taken deadly seriously in our present risk oriented world, even given the paradox that there can be no safety without risk (Norseth 2003:3N)!

* NOAEL= No observable adverse effects level.

**LOAEL= Lowest observable adverse effect level.

The “Red Book’ paradigm” to which Dr. Norseth is referring to, is the current method used in the United States for calculating risk, and goes by the rather cumbersome title of: “Risk Assessment in the Federal Government: Managing the Process. Committee on the Institutional Means for Assessment of Risks to Public Health, Commission on Life Sciences, National Research Council, National Academy Press, Washington, DC, 1993.” Norseth elaborated on what the risk assessment process entails and whether or not the Red Book model was appropriate in the case of the Port Colborne study, and what it examined. Regulatory risk assessment, as in the Port Colborne case, required:

(...) comparing the estimated intake with an accepted guideline, often in fact a legal provision (...) Furthermore, the US EPA *IRIS **RfD value is based on a paper from 1976 [Ambrose et al., 1976], which is a feeding experiment in rats with a decreased body weight and decreased organ weights as end points and based on a NOAEL with a safety factor of 300. Weight loss has never been experienced as an adverse health effect of nickel in humans. (Norseth 2003:35N-36N).

*IRIS = Integrated Risk Management System

**Rfd = Reference Dose

To paraphrase what the Norseth evaluation stated, the Port Colborne Human Health Risk Assessment (HHRA) was looking only for what dosage of nickel produced immediate health effects, not the effects of long-term exposure, also noting that: “Weight loss has never been experienced as an adverse health effect of nickel in humans” (Norseth:35N), although it, along with death, was considered an endpoint for the Ambrose et al (1976) feeding experiment, which the Port Colborne HHRA was based upon. The effects of long-term, low-dose chronic exposure to nickel was not considered. There was also other data which was not considered as part of the Port Colborne HHRA, which Norseth believed should have been:

(...) what about species differences between the preferentially assumed nickel oxide in the Port Colborne case and the largely unknown exposures in the refinery data (Norseth:35N)

Norseth found this government policy, of separating adverse health effects of workers from the general public in Ontario to be perplexing. He is apparently expressing the view that occupational exposure data, such as statistical data on health outcomes in the workplace, are a valuable source of information and should not have been excluded from the HHRA. As stated earlier in this thesis, this was also a complaint of The Sudbury Community Committee on the Sudbury Soils Study, concerning the Sudbury Human Health Risk Assessment (page 55 [5]).

In closing, Norseth commented on the need for further research on nickel health effects:

From the epidemiological point of view we still need data on exposure specified by speciation and cancer risk even if exposures are lower than before and may not constitute a cancer risk (Norseth:36N).

The fact that a determination of a non-risk level of exposure will be safe for a community is viewed by Norseth as “administrative constructs made to make possible the transformation of science to politics. And this transformation is not a scientific process” (ibid).

Norseth also noted that:

We need more knowledge about the tumorigenic mechanisms of nickel...If the nickel ion has a general promoting effect, or other effects possibly related to calcium metabolism, nickel may have health effects not thought of before (ibid).

This evaluation by Norseth of the Port Colborne CBRA, convinced me that this method of calculated, as opposed empirical, effects of pollution on human health was a matter that needed to be contested in my own community and was something I needed to do.

In the meantime, the class action lawsuit was ongoing in Port Colborne; it would not be resolved until 2010.

Chapter 14

My Short Involvement in the Community Committee on The Sudbury Soils Study

It was at the information session at Tom Davies Square, sponsored by the Center for Research in Social Justice and Policy, from Laurentian University, in February of 2008, that I heard the presentations of Inka Milewski and Diana Wiggins, and made contact with some of the people involved in The Community Committee on the Sudbury Soils Study (CCSSS). I was invited to an informal meeting of the committee the next morning, where I was welcomed into the organization. It was a great day for me, but also somewhat puzzling, as there was only myself, Homer Seguin, a retired executive of The United Steelworkers Union, Rick Grylls president of union Mine-Mill/CAW Local 598, Joan Kuyek of the Non-Governmental Organization (NGO) Mining Watch, Tanya Ball, a local citizen who had spoken at the Copper Cliff session and Monique Beaudoin, from the Centre de Santé, a French language health services provider, on this committee. Inka Milewski and Diana Wiggins were also in attendance as guests. This was a community committee? I had expected far more people to be a part of this committee, as it contained the title “community”. I was certain there were many more people who had doubts about the Sudbury Community Based Risk Assessment (CBRA), and I was looking forward to building community opposition to this partnership of industry and government, which had shut us out of the supposedly “public” process. The Sudbury CBRA was telling us all was well in our community, in terms of mining industry pollution, when many of us were convinced it wasn't. My involvement in the Community Committee on the Sudbury Soils

Study (CSSS) would turn out to be quite a shock, in terms of how it operated, and the fact that it was essentially an exclusive organization. As an organization which claimed to be not only representing the community and to be a part of the community, I soon came to the conclusion that it seemed to have no interest in growing its membership within my community, nor in seeking out new members.

One of the first things I did as a member of the CCSSS was volunteer to represent it at a press conference at Laurentian Hospital, for the launching of The Ontario Health Study (OHS). The OHS was an initiative by the Federal Government, the Ontario Government, and other provincial and territorial governments, to track long-term health trends in not just Ontario, but the rest of Canada as well. It had been agreed by the committee, that at this press conference I should raise the issue of high accumulated levels of toxic metals in our environment from both past and present pollution, as being a factor that should be taken into consideration for Sudbury health statistics. At this first meeting, I learned that on the basis of research carried out by an unspecified member of The Community Committee on the Sudbury Soils Study, an information sheet had been produced for public consumption. It stated that Sudbury, as a community, had the highest incidence of cancer in Ontario, the second-highest rate of heart disease in all of Canada, and the lowest life expectancy of any metropolitan area in all of Canada.

On May 8th, 2008, I attended the press conference for the launching of the Ontario Health Study (OHS) at Laurentian Hospital in Sudbury, and listened to a presentation by Dr. John McLaughlin, the interim chair of the OHS. Penny Sutcliffe, who I recognized from the public presentations of the Human Health Risk Assessment (HHRA) was in attendance, in the capacity of a representative from the Sudbury and District Health Unit. Representatives such as Penny Sutcliffe from the Health Unit and what I assumed to be other local medical establishment actors,

based on the fact they were all in suits, made it difficult to get noticed in the Question and Answer session, but I did eventually get to ask a question. Dr. McLaughlin had spoken of developing a “template” approach to health issues across Canada as being one of the advantages of this study, and he observed that it could well serve as a model for future health studies. When I finally got a chance to speak, I made the point that we have levels of heavy metals in our soils and water that are unique not only in Ontario, but also Canada, and possibly the world. My point was that a template approach to Sudbury, which did not take the local environment into account, would not render an accurate picture of our local health issues. Dr. McLaughlin’s response to this was that there was “no local data” concerning what I had spoken of. I apprised him of the fact that this was in fact a misperception, and that I would be happy to send him some of the relevant data I had located, and that I had tried to have this data considered as relevant in the recent Human Health Risk Assessment (HHRA) component of The Sudbury Soils Study. He agreed to consider this data, and gave me his e-mail address. I eventually sent him “Saturation of ecosystems....” by Nriagu et al (1998) and two more pieces of research. The second was Dr. Glen Parker’s research into elk herds to the south of Sudbury, (Parker: 2001) and the third was by a group of researchers from Nipissing University. Gauthier, Charles. Couture, C. Pyle, Greg G. (2005). “Metal effects on fathead minnows (*Pimephales promelas*) under field and laboratory conditions.” The Gauthier et al (2005) research involved raising minnows in the waters of Kelley Lake. The mortality rate for these minnows was 100%. The research showed laboratory minnows raised in water that had the individual, speciated levels of metal pollutants, i.e., individual metals at the level they were found in Kelly Lake, yielded much lower mortality rates than those raised in water with the combined levels of metals found in Kelly Lake water. I felt this research in particular should be brought to his attention, as it seemed to reinforce the belief that the metals in

our local pollution had to be considered for their cumulative and combined effects, not by their individual, speciated levels. Even the possibility of there being cumulative effects from metal pollution had not been considered in the Sudbury Human Health Risk Assessment (HHRA), and this had been one of the principle complaints of the Community Committee and others, including Homer Seguin and Rick Grylls, both before and after they joined the Community Committee. It was also one of Dr. Khatter's observations about the shortfalls of the HHRA as well, although I did not mention this in my e-mail to Dr. John McLaughlin. I was initially elated at the thought of someone so high up the food chain at the Ministry of Health was actually showing an interest in this matter and had asked to see some relevant research on the matter; however, months would go by without a reply from John McLaughlin.

In the meantime, the Ecological Risk Assessment (ERA) was released to the public in March of 2009, once again at Science North. Although there were two presentations of the findings of the ERA, one in the afternoon, and one in the evening, the first presentation did not generate any questions from the public, me included. The reason for that was quite simple: neither I nor the public had access to the document beforehand in order to comment on it.

Once I managed to get a look at a copy of the ERA at the Laurentian University Library, I had about 2 hours to digest the over 1000 pages before the evening presentation. After doing so, I had to attempt to formulate both an opinion and any questions I had about what it contained. One of my first questions dealt with the issue of The Long Lake Gold mine, and what the Ontario Ministry of the Environment (MOE) planned to do about it. At the evening session, once again, Brian Cameron of the MOE claimed to have no knowledge of the mine, even though the presence of tailings pollution from this mine was used to disqualify Long Lake from any further environmental risk assessments; it was a form of pollution, tailings runoff, which the authors of

the Ecological Risk Assessment (ERA) had chosen to exclude from to study. Once again, the issue of heavy metal accumulations in our local lakes was to be ruled out of the ERA, as it had been for the Human Health Risk Assessment. Earlier reassurances by Dr. Wren, that the matter of our “contaminated landscapes” being saturated with toxic metals which may be leaching into our lakes, as per the Niriagu et al (1998) research indicated, would be looked at in the ERA portion of the CBRA, were demonstrated to be false.

Once this second presentation at Science North was over, there would not be another opportunity to ask questions in front of members of the community and local media. Experience had taught me that both local people and the local media rarely attended Public Advisory Committee (PAC) meetings, and generally had no interest in the CBRA beyond these initial public presentations of the findings. I was highly critical of the fact that certain local lakes and entire geographic areas were exempted from study, simply due to the assertion that they were being affected by pollution other than the specified airborne emissions from Sudbury. To say that I was angry at both the findings and the attempts to sweep the matter of our polluted drinking water, lakes and streams under the carpet, would be to understate my reaction. I raised these matters at the public presentation in the evening, and was told by Dr. Wren that matters pertaining to pollution of local lakes were best monitored through “other means”, which the mining companies would not be a part of.

Coverage by Bill Bradley in the local print media the next day did not report any of these matters. In order to have at least some sort of press coverage of what I felt the real issues were, I decided to attempt to have an article published in the Laurentian University newspaper, Lambda. I was successful, although at the time, I was very surprised that my article was accepted. It was written in haste, and with a degree of anger. It could have been a better piece of writing, but I

had only part of one afternoon to compose it before the deadline for submissions to the campus newspaper. In any case, it was published. It contains the points I raised in public, which were never reported in the local media coverage of the public presentation of the Ecological Risk Assessment:

The Sudbury Soils Study: Further Exclusions

This last portion of the Sudbury Soils Study is the final chapter, or the last nail in the coffin, if you prefer, and now that it's all over, I can't help thinking we've been had. Vale/INCO and Xstrata have made billions of dollars in the course of their operations, and we've always had to pay out of the public purse to determine whether or not our health or environment was being damaged. This time around things were supposed to be different. The mining companies were going to pay for a comprehensive study of their own to determine the risk to human health and our environment. It was supposed to be an inclusive study, but the exclusions started at the outset.

The Human Health Risk Assessment (HHRA) began by excluding all union members, past or present and even non-union members of the work force, who happen to have passed through the gates of any mining or smelting facility. Once you do that, any health effects are the concern of the Ministry of Labour, thanks to legislation passed by the Harris regime in the '90's. Then, members of the general public were also excluded, and the only people that were included in the final analysis by the HHRA were children born after 2005. This process managed to produce a risk assessment that eliminated almost 100% of the population, and it produced a final result that predictably showed there to be little risk from smelter emissions. The question of responsibility for past pollution and/or compensation for any sickness attributed to said pollution was *verboten*, based on the parameters of the study. Deep in the 1000+ pages of the HHRA is a sentence that answers the question of why the risk assessment proceeded by exclusion: "It is important to note that the selection process behind the choice of parameters is largely based upon policy, not science" (Vol. II, Ch. 5, p 5-41). Up until I read that, I'd only suspected. The study then proceeded into its next phase, the Ecological Risk Assessment, or ERA.

This, I thought, would be some objective science. We've learned an awful lot about how to regreen the land that has been devastated by the mining companies' pursuit of their billion dollar profits. The costs and implications of doing what's right for the environment are much less costly and have nowhere near the legal implications of health effects. The framework of the risk assessment was released on March 18th, but nobody even saw this sentence, or saw the implications of the opening statement of its objective, I suppose:

"Objective 1: To evaluate the extent to which the chemicals of concern (metals from emissions) are preventing the recovery of regionally representative, self-sustaining

terrestrial plant communities” (Ecological Risk Management Framework for Greater Sudbury, p 9).

You have to be careful how you read these things, and I thought I learned my lesson from the HHRA. I managed to glean from the depths of this study that the ERA is only going to address the effects caused by one kind of pollution, stack emissions. If there’s any kind of pollution that can be attributed to any other cause, even other forms of mineral extraction, and the lakes in question are to be exempted and excluded from further environmental study. “For example, those lakes that receive industrial or municipal effluents, including sewage and direct releases of mine tailings should be exempted” (Vol III, Ch. 5, p 5-74).

I didn’t see the ERA until 2 hours before it was released. Nobody was allowed to, although many had protested. At over 1,000 pages, it’s hard to get a handle on what it’s saying generally, let alone specifically; however, I did manage to notice that there was a list of lakes that the mining companies felt should be exempted from further study. Vale/INCO and Xstrata are of the belief that certain lakes should be excluded from any further study on their part, due to the input of pollution from sources other than smokestack emissions. Some of these bodies of water are: Junction Creek, Kelly Lake, Whitewater Lake, Long Lake, Whitson Lake, Vermilion Lake, Larder Lake, and “those lakes found within Killarney Provincial Park and those northeast of Lake Wahnapeitei” (Vol III, Ch. 5, p 5-41). And then to take the shock value off that, there’s this: “While it is not recommended that these lakes be excluded from further consideration, it is recommended that this influence be recognized should these lakes be selected” (Ibid). As you proceed with this ERA, however, it becomes clearer what the mining companies really want to say. Consider Table 5-17, with the unambiguous title: “Rationale for Excluding Lakes From an ERA”.

Larder Lake: “Direct input of liquid effluent from mine tailings and other mine - related wastes”.

Long Lake: “From 1909 to 1916, The Long Lake Gold Mine operated on the Lake.”

Vermilion Lake: “A tributary of the Vermilion River receives mining effluents from an ore-processing area”.

Whitewater Lake: “Effluent from tailings dam.”

Whitson Lake: “Direct input of liquid effluent from mine tailings and other mine related wastes”.

All this nonsense is the result of the parameters being established as assessing the risk from smokestack emissions only. I certainly didn’t see that one coming, and I doubt that anyone thought the mining companies had the audacity to even try something like that.

As I mentioned earlier, it’s hard to get a handle on what is or isn’t in the ERA, due to its size, and the fact that nobody was allowed to see it. Here’s how it works to the advantage of someone who would prefer to be evasive about the truth of its contents. It was asked of the presenters if the matter of a soil’s metal content vs. bioavailability was addressed by the ERA. The short answer was yes. The question addressed the matter of what fraction of toxic metals the plants actually absorb from the soils they’re in. It has implications for the re-greening efforts in the area, as plants are believed essential in the clean-up of our soils. The truth of the matter is that the study looked at this matter, concluded that it was a very complicated matter, and ended the discussion by saying “Further analyses, which are outside the scope of this

study are required to quantify this effect: (Vol. III, Ch. 3, p 3-96). Does this qualify as having addressed such a crucial matter?

Public discussion with the authors of this report is now over, until May 12th. After realizing what the ERA actually says, I can't decide whether the companies wasted \$17 million, or if they got exactly what they wanted, and paid for. I guess that's up to us, and how we react to it. (Montgomery, Allan. 2008. "The Sudbury Soils Study: Further Exclusions. *Lambda*, April 2008.)

Soon after the publication of this piece in *Lambda*, I was asked to represent the Community Committee at the local Farmer's Market on Earth Day, and told that I should not attempt to distribute any peer reviewed research material to the general public, only material that had been approved by the committee. I was also told later, via e-mail, that I would "terrify" the public with research on Sudbury's known pollution levels, and that I should instead direct people who wanted information, to people on the Community Committee on the Sudbury Soils Study i.e., people other than me. I was dumbfounded as to this approach, especially after I discovered that only Community Committee members Rick Grylls and Homer Seguin had actually read any of the research which I had distributed to all members and had also submitted to John McLaughlin of the Ontario Health Study for consideration. The favoured approach of the majority of the Community Committee seemed to be locating funding to obtain the services of a scientist who would critique the findings of the Sudbury Soils Study (SSS), not to read any relevant research on the matter in order to become at least partly aware of the issues as laypersons, nor to make this research known to the general public. I ignored these directives, and on Earth Day I distributed the following summation of some of the research I had located on the internet database Science Direct, or from other sources, all of which were listed.

I titled this collection of research: "Relevant Research" at the time, and distributed approximately 30 copies to fellow Sudburians.

Relevant Research

Nriagu, Jerome, Gregory Lawson, Henry K.T. Wong, Peter Daniel. "Saturation of ecosystems with toxic metals in Sudbury basin, Ontario, Canada." Science of the Total Environment 223 (1998): 99-97. <http://www.sciencedirect.com>.

Synopsis:

Dr. Nriagu's research explores the hypothesis that soils have a limited capacity to absorb pollution, and then regenerate themselves at any point. This paper contends that Sudbury's soils have been subjected to so much pollution over time that they have become saturated. Further, the excess metal pollution which can't be absorbed by soils or plants is entering our lakes through rain and melt water runoff, plus wind erosion. He theorized that metal levels both in suspension in the water, and in the sediments of Sudbury's lakes would remain high, if not rise to higher levels. Testing for this research was done in 1997, in the labs of the National Water Research Institute, a branch of Environment Canada.

Interesting sediment levels of nickel were recorded in Ramsey Lake, ≥ 2500 ppm, and McFarlane Lake at ≥ 4000 ppm, to name only two, and in all lake sediments profiled, the highest sediment levels were found in the topmost levels, confirming recent deposition. This condition had occurred despite massive reductions of emissions output by local smelting operations, which seems to confirm Dr. Nriagu's views on the mechanics of soil saturation, and its effects.

Dr. Nriagu concludes that as a result of this condition of toxic saturation of terrestrial soils, the toxic metal concentrations in lake sediments may be sustained at high levels for the next 1000 yrs. Also, rather than further reductions of emissions, methods of stopping the erosion of these pollutants and their isolation would be a more productive method of reducing high levels of toxic metals in our lakes.

Pearson, David, *et al.* "Background for a Remediation Plan: Characterizing Sediment and Water Chemistry in Kelley Lake, Ontario – A Lake Contaminated by Sewage Effluent and High Levels of Copper and Nickel From Mining and Smelting." (1999).

Synopsis:

This paper observes that “In 1985 the International Joint Commission identified the area around the mouth of the Spanish River, known as the Spanish River Harbour, as one of forty-three ‘areas of concern’ within the Great Lakes Basin. High levels of copper and nickel in both the sediment and water of the 144ones144 have been attributed to mining, milling and smelting in the Sudbury area”... (p 682). While Dr. Pearson concludes that more pollutants are leaving Kelly Lake than are entering it at this point, in time that may not bode well for people downstream. The paper proposes that “Remediation options that might be applied to the lake range from dredging and off-site disposal, to capping or in-situ treatment of the sediment, to aeration or oxygenation of the bottom water....” (p 689).

Despite the obvious downstream pollution that is occurring, it appears none of these proposals were ever considered.

(Available at the Laurentian Library, as an e-resource.)

Gauthier, Charles, *et al...*” Metal effects on fathead minnows (*Pimephales promelax*) under field and laboratory conditions.” Ecotoxicology and Environmental Safety. 63 (2006): 353-364. <http://www.sciencedirect.com>.

Synopsis:

Minnows from three different environments showed remarkably different survival rates, when exposed to toxins in the lab vs. the combined levels found in the natural environment. The group of control minnows was raised in water from the North Bay area. Under lab conditions, this clean water was modified to reflect the pollutant levels of different metals currently found in Kelly Lake, and another group of caged minnows were raised in Kelley Lake itself. The mortality rate of minnows raised in Kelly Lake was, in almost all cases, twice as high as the lab minnows exposed to the individual, or speciated, metal levels found in Kelly Lake, but not the entire range.

The mortality rate for minnows in Kelly Lake was almost 100%, believed attributable to higher acidity and exposure to multiple metals. Therefore, testing metal effects by speciation, as opposed to the actual combined environmental levels, may not yield an accurate picture of how these metals interact to affect the health of living organisms.

Parker, G. H. "Tissue metal levels in Muskrat (*Ondatra Zibethitica*) collected near the Sudbury (Ontario) ore-smelters: prospects for biomonitoring marsh pollution." Environmental Pollution. 129 (2004): 23-30.
<http://www.sciencedirect.com>.

Synopsis:

Muskrats and beavers in the vicinity of the Copper Cliff smelter were tested for the accumulation of metals in their tissues, and compared to a control group in the North Bay area. For both muskrats and beavers, nickel and cadmium levels were higher in both the liver and kidneys. For muskrats, nickel levels in the liver were from 3-6 times higher, and cadmium levels were 2 times higher.

Muskrats eat primarily cat-tails, or *Typha latifoli*, in summer, and during winter, eat the roots. They may ingest soil sediments inadvertently as a result, which would tend to increase their dietary intake as well. This research tested aquatic soil sediments for nickel at over 9,000 ppm, and copper at over 3,000 ppm, and the roots of cat-tails were near 400 ppm nickel, in a 1-2 km range from the smelter. As less than 5% of muskrats reach the age of 2 – due to trapping pressure- it is suggested that this species be used as a biomonitor. They would be a good indicator of present environmental metal levels, and as they are trapped extensively as a matter of course, specimens would be easy to obtain.

Parker, G.H., and J. Hamr. "Metal levels in body tissues and fecal pellets of elk (*Cervus elaphus*) living near the ore smelters at Sudbury, Ontario." Environmental Pollution. 113 (2001): 323-30.

<http://www.sciencedirect.com>.

Synopsis:

Members of an elk herd that ranges from Burwash, approx. 25 km south of Sudbury, and from the Killarney-French River area, approx. 45 km south of Sudbury were tested for metal levels in their organs and muscle tissues. The specimens were collected as a result of accidental deaths, by such causes as drowning, road kill, and starvation. Mean cadmium levels in this herd were $24.6 \mu\text{g}/\text{g}^{-1} \pm 8.2 \mu\text{g}/\text{g}^{-1}$ dry weight. However, one older cow, showed very high renal cadmium levels at $111.4 \mu\text{g}/\text{g}^{-1}$, but was considered an outlier, and not included in the study. These elevated readings were nevertheless within the range of province –wide levels, and were actually lower than levels for Sudbury area white tailed deer tested in 1988, which were in the 46-170 $\mu\text{g}/\text{g}^{-1}$ range.

However, what stands out in this research is in the conclusion reached which states that kidneys of elk — and therefore moose and deer — of any age should not be consumed. Cadmium levels in moose, deer and elk regularly exceed the Canadian regulatory standard of $5 \mu\text{g/g}^{-1}$. The mean level for cadmium found in Ontario elk, moose and deer is over 500% higher than the recommended Federal Government standard; yet there is only a recommendation that kidneys not be consumed.

Hutchinson, Tom C., M. Sheena Symington. "Persistence of metal stress in a forested ecosystem near Sudbury, 66 years after closure of the O'Donnell roast bed." Journal of Geochemical Exploration 59 (1997): 323-330.

Synopsis:

The O'Donnell roasting yards were the worst ground level polluters in the Sudbury area. Ore was piled on logs, and more logs were placed on top of the ore and burned. The resultant ground level pollution killed trees and ground flora in an area exceeding 1000 sq.km. While the forest margin was kilometers away at the end of production in the 1930's, the margin is now within meters of the original roast bed, although it would not be considered typical of the area. It is composed of metal-tolerant species, up to a range of 5km from the site. Nickel levels at the site of the old roasting bed were recorded at over 5,000 $\mu\text{g/g}$.

Cooperative Freshwater Ecology Unit – 2004 Nordic Fish Survey

Synopsis:

This research by the City of Sudbury, Laurentian University and others is the most up to date research on metal levels in our local lakes. It examines the metal levels in suspension and in the sediments, in addition to surveying the biodiversity of our local lakes. In reference to the research done 11 years earlier by Dr. Nriagu and Environment Canada, it appears that metal levels in our lakes continue to remain high, as he predicted they would. In fact, Lake Ramsey's sedimentary nickel levels have apparently doubled in the last 10 years, to over 4000 ppm. This is the lake which part of Sudbury gets their drinking water from. However, there's reason for optimism, as many lakes are improving, with lower acidity and higher biodiversity, thanks to the efforts of the City of Sudbury and the Provincial Government, not the mining companies.

It's a very informative report, packed with relevant data, and it's available online, free of charge to anyone interested.

[http://www.city.greatersudbury.on.ca/content/div_lakewaterquality/
documents/Co-op_Unit_2004Report_Format.pdf](http://www.city.greatersudbury.on.ca/content/div_lakewaterquality/documents/Co-op_Unit_2004Report_Format.pdf).

After it was communicated to me via e-mail by a committee delegate that I should not share any peer-reviewed scientific data concerning what was known about Sudbury's pollution with other members of the public, I concluded that there was an irreconcilable difference in our approach to the matter, and that I would no longer participate in The Community Committee. I had great difficulty fathoming how it could possibly be counterproductive or undesirable to educate fellow residents about what was known in peer reviewed scientific literature about pollution in our community. I found myself in the rather ironic position of once again being prevented from having relevant research considered by even the Community Committee on the Sudbury Soils Study, which seemed disturbingly close to reflecting the approach taken by the mining companies and the Ontario Ministry of the Environment in the Sudbury Soils Study process.

Chapter 15

Carrying on as an Unaffiliated Activist

I was pleasantly surprised to see that my hastily written Lambda article, the Laurentian University student newspaper, was not only published, but seemed to get a reaction from some of the authors of the Sudbury Soils Study. I attended the next Public Advisory Committee (PAC) meeting (once again as an unaffiliated member of the public), and none other than Dr. Chris Wren was there. He commented, without being prompted, on the matter of the article, by saying in his opening comments that there had been some “editorial comment” about the Human Health Risk Assessment (HHRA) and the Ecological Risk Assessment (ERA) in the local media. He stated that the HHRA and the ERA were peer reviewed by “international experts” and that the authors of the Sudbury Soils Study (SSS) stood by its findings. I was not disputing the peer reviewers who had evaluated the data; what I was disputing was a finding of “no or little risk” when important and relevant data had been excluded from both the HHRA, the ERA, and the peer reviewers. To further emphasize this point, I submitted for consideration by the Public Advisory Committee (PAC), my summation of a previously published article from the Canadian environmental journal “Alternatives”.

The article in question was written in 1973, by Dr. James R. Kramer, Professor of Geology at McMaster University. It compared data collected by the U.S. Environmental Protection Agency (EPA) and the Ontario Ministry of the Environment (MOE), on the matter of nickel fallout in Ontario, and the sources of it. The following piece was submitted by me, in person, on May 12th, 2009, to the Public Advisory Committee (PAC) and also to Dr. Chris Wren,

in particular. Of note, Franco Mariotti, the Independent Process Observer (IPO), whose mandate it was to communicate the process of the Community Based Risk Assessment (CBRA) to the public, seemed resentful, almost belligerently so, about the fact that I wanted to present data about an area that was “outside the Study area” in his words, and repeatedly demanded to know: “Why would a scientist even bother with such data?” When I asked him if he had seen the data in question — and after being compelled to ask him repeatedly for an answer — he replied that he had not. It was actually Chris Wren who encouraged me to present my data, not Franco Mariotti. I distributed copies of the following short summary of the article in question, along with my concluding statement to the members of the PAC, but not to Franco Mariotti, the man whose job it was to be the public’s eyes and ears in the CBRA. It was not a deliberate act on my part, but was necessary due to a lack of sufficient copies of my submission. My submission included much of the original article from the Alternatives journal article, which contained maps, charts and other data (which are not included here), plus peer reviewed research I had submitted earlier, regarding metal levels in elk that were studied in the Killarney area. I suggested that this elk herd should have been examined as part of the Ecological Risk Assessment (ERA), and that the Killarney and Lake Wahnapeitei areas should also not have been excluded from the ERA.

Metal Fallout In Killarney Park and In Lakes to the North and Northeast of Sudbury

By Allan Montgomery

The Ecological Risk Assessment (ERA) of the Sudbury Soils Study (SSS) recommended that the lakes in the Killarney Park area and Lake Wahnapipei to the north of Sudbury be excluded from further ERA. The basis for this decision in the ERA is that the Killarney Provincial Park area and Lake Wahnapipei have been “Primarily affected by acid rain, and not metals from smelter air emissions”. (Vol. 3, Ch. 5, p 5-87). However, data previously collected by the Ministry of the Environment shows that is not the case.

A 1973 research paper written by James R. Kramer, Professor of Geology at McMaster University, compares both sulphate and nickel rates of fall measured at MOE monitoring stations in and around the Sudbury area. The rates are correlated to wind direction and to data for the same period from the U.S. EPA. The five stations Dr. Kramer referenced were: Skead, Gogami (*sic*), Temagami, Jamot, and Killarney. All of these stations, with the exception of Skead, are 50 or more miles from Sudbury.

Figure 1 on page 22 shows the change in rate of sulphate fall for all five stations, referenced to both the mean and maximum rates of fall measured in the U. S. The study notes that there were some declines in some years, but the biggest decline recorded was during the August-September shutdown in 1972, which resulted in a ten-fold reduction of both nickel and sulphate fall at the reference stations. The conclusion reached was that “this dramatic decrease for the most part must be due to the shut-down.” (Kramer, p 22).

Figure 2 on page 23 shows the change in rate of fall for nickel at the 5 reference stations, and these results are compared to the both mean rate of nickel fall in the U.S., and the average maximum falls recorded in the entire U.S. network. Dr. Kramer concluded that “The mean of all analyses for Northern Ontario (4.6×10^{-5} gram nickel /meter²/day) is about 6 times the mean for all stations in the continental USA” and that “the mean rate of fall for all stations in Northern Ontario is only slightly less than (80%) the maximum measured rate of fall of nickel for all stations in the U.S.A.” (Kramer, p 23). The maximum level of nickel fallout was recorded at Philadelphia. (Kramer p 22)

As a way of integrating the U.S. and Ontario studies, Kramer compared the readings of four stations downwind from Detroit and adjacent to Sarnia and two major power plants and found the “rates of fall of nickel slightly less than the mean rates of fall for continental U.S.A. This is no artifact; the rate of fall

of nickel is excessive and is very widespread in Northern Ontario. One is not exaggerating to conclude from the data that most of Northern Ontario has been subjected to rates of fall of nickel ten times the rate of fall of nickel in the continental U.S.A. "(Kramer, p 23).

Also of note is that "Killarney exhibits a rate of fall of nickel and sulphate in excess of the mean rate of fall for the continental U.S.A. This is true for all periods except one! The rate of fall for Killarney is in excess for all periods sampled in comparison to the mean rate of fall of adjacent stations in the U.S.A." (Kramer, p 23).

As this pollution had existed for decades before Dr. Kramer's analysis of the 1970-1972 data, it is safe to assume that these pollution levels have deposited nickel particulates in both the Killarney Park area, in the Lake Wahnapeitei area, as well as further north and east of Sudbury. The assertion by the ERA that these two areas have been "Primarily affected by acid rain, and not metals from smelter emissions" (Vol. 3, Ch 5, p 5-87) is open to doubt. These areas should be given the same level of concern as the Sudbury area, as they have clearly been subjected to same kinds of metal pollution. If the purpose of the Sudbury Soils Study was to fill in data gaps on the effects of metal particulate emissions, excluding these areas from further study would only perpetuate gaps in our data of metal pollution in areas which were clearly subjected to it.

Dr. Wren's only comment was to advise me to examine the aluminum levels in the Killarney area lakes which had been excluded from the Study. At first I had no idea what that comment meant, but after additional research it became clear. The metal aluminum is the most prevalent metal in the earth's crust, and the fact that there were high levels of it in Killarney area lake water was indicative of acid decomposition of the rocks in the surrounding area, which released it to the local lakes. Since sulphur dioxide (SO₂), was responsible for this, and SO₂ was eliminated from the Sudbury Soils Study (SSS) as a pollutant, the article in question by Prof. Kramer was out of order, based on the parameters established for the SSS. There could be no denying the fact that Sudbury's SO₂ pollution, and all the accompanying metals that come with it, had affected a much larger area than SSS was prepared to admit to, yet it was deemed irrelevant due to multiple reasons, none of which were based on science, but on the path of the study agreed upon, in private, by industry and government actors. Franco Mariotti may have

actually been attempting to save me from wasting both my breath and my efforts, by seeming to discourage me from presenting the data which I did, particularly concerning metal levels in elk herds in this region. He did, however, apologize for his behavior in a roundabout way, when he summarized his role as Independent Process Observer at a later date:

Throughout the Sudbury Soils Study my perspective has always been based on the interests of Sudburians and the natural environment. I have one regret. I recall a specific moment when I stepped out of line as an independent observer. At the Public Advisory Committee meeting of May 12, 2009 I questioned a member of the public on a comment made about the ERA. This person recommended that the SARA Group look at a scientific study that involved an animal that was not found here in Sudbury. I made the comment that that study was not pertinent to this area. **I was out of line!** Clearly it was not up to me as Independent Process Observer to make such a comment. I am sorry. (Mariotti: Quarterly Report #23 June 2009:13).

It should be noted that the intent of my submission was to draw attention to the fact that the limits of the study area were far too confined, and that animals and lakes to both the southwest and northeast of Sudbury needed to be included, not excluded. The area I felt should have been considered in the south was bounded the Ontario Ministry of the Environment's own SO₂ and nickel monitoring stations, which were all more than 100 kilometers from the main sources of emissions, the Copper Cliff smelter and refinery, and the smelter located in Falconbridge. The MOE data showed the area affected by air emissions that they felt needed to be studied to assess metal deposition in earlier years, was much larger than what was being studied for the Ecological Risk Assessment (ERA). Marriotti's comments might be construed as meaning that I was attempting to have irrelevant information brought into the study, claiming that I was concerned with an animal that "was not found here in Sudbury". The parameters of the study state that the animal is outside the area of study. Reality states that the animal was to be found within the area bounded by the geographic area where the MOE had been monitoring Sudbury's metal pollution

and nickel particulate deposition for years previously, but this area was not included in the Ecological Risk Assessment (ERA). Mr. Mariotti does not mention this, nor the research which precipitated my submission and comments, in his “apology”.

The next Public Advisory Committee meeting, which I did not attend due to work commitments, saw the release of the Community Committee on the Sudbury Soils Study (CCSSS) evaluation of the ERA by Glen Fox, a former wildlife toxicologist with The Canadian Wildlife Service. Unfortunately, as with Dr. Khatter and the Human Health Risk Assessment (HHRA) evaluation, Glen Fox was not present to explain his findings due to “personal reasons”, which were not explained. The evaluation was presented by CCSSS, the absence of Glen Fox notwithstanding. Fox noted in his evaluation that:

‘Measuring and analyzing the presence of metals in appropriate target tissues (liver and kidneys) of valued ecosystem components, is needed,’ said Fox in his report. ‘Doing so would bypass the assumptions and mathematical modeling, dietary sampling etc. by providing a real measure of likely toxicity and the concentration of the toxic metal in the animals’ tissues collected on the study site in question’ (Northern Life Staff August 31st, 2009).

Joan Kuyek agreed on the need for dietary and tissue sampling, stating that:

‘We wanted this for the human health risk assessment study as well. What they are using to model the risk to wildlife is primarily a mathematical model which lacks hard data- 80 per cent of the inputs into the model they are using are only estimates,’ she said (ibid).

Particularly satisfying for me, was the fact that Glenn Fox’s evaluation included the research by Dr. Glen Parker which I had forwarded to him. Dr. Parker’s research papers looked at not only elk herds to the south of Sudbury, but also local beaver and muskrat populations in the areas adjacent to the Copper Cliff smelter and nickel refinery. I had made a point of requesting of Joan Kuyek, chair of the CCSSS, that Glen Fox receive this research for his evaluation. The Parker research indicated that levels of cadmium, lead and nickel in the organs of these animals were considerably elevated.

During this time, between the release of the Ecological Risk Assessment and Glen Fox's evaluation, it appeared the matter of just how much tailings dust and other heavy metals were entering our environment may finally come to light, thanks to the Non-Governmental Organizations (NGOs) MiningWatch, Great Lakes United and Ecojustice. Their efforts had managed to force the Federal Government of Canada to finally begin taking the matter of solid mine waste pollution seriously. The article below is from the MiningWatch website. I was unable to locate any coverage about this event in Sudbury's local news media:

TORONTO – Great Lakes United, MiningWatch Canada and Ecojustice are hailing a landmark decision from the Federal Court of Canada released late yesterday that will force the federal government to stop withholding data on one of Canada's largest sources of pollution – millions of tonnes of toxic mine tailings and waste rock from mining operations throughout the country.

The Federal Court sided with the groups and issued an Order demanding that the federal government immediately begin publicly reporting mining pollution data from 2006 onward to the National Pollutant Release Inventory (NPRI). The strongly worded decision describes the government's pace as "glacial" and chastises the government for turning a "blind eye" to the issue and dragging its feet for "more than 16 years". (MiningWatch webpage:2009)

The Canadian mining pollution figures were being withheld either by the Federal Government of Canada and/or the mining industry and presumably were not available for The Sudbury Soils Study (SSS). In any case, the data concerning solid waste pollution from mines and ore processing facilities were excluded from consideration for SSS, due to the fact that this was the "wrong" kind of pollution. On the bottom of this webpage by MiningWatch, containing the names of the people who had worked to achieve this court decision, appeared a name which was quite familiar to me: Joan Kuyek, Chair of The Community Committee on the Sudbury Soils Study. In her position as national director of MiningWatch, she had played an integral part in bringing the Federal Government to court, over its lack of both oversight and accountability,

regarding its duty to keep citizens informed of just how much pollution, and of interest to Sudbury, how much solid waste mining pollution, is entering our environment. The decision was explained in an article by MiningWatch spokesman James Kneen the following way:

Canadians living in places like Sudbury, with mining operations in their backyards, were blindfolded while millions of kilograms of carcinogens and heavy metals accumulated in tailings ponds and waste rock piles across the country,” said John Jackson of Great Lakes United. “With this decision, the blindfold comes off and citizens can truly hold these companies to account for their pollution and the environmental and health dangers they pose. (ibid).

Shortly after this court decision, the first test of whether or not mining companies and the Ontario Ministry of the Environment (MOE) would actually be any more open and responsive with the general public, and held to account over Sudbury’s pollution levels in particular, occurred at a public hearing concerning low-level emissions from the Copper Cliff Smelter, in October 2008.

The meeting in question was attended by activists such as Homer Seguin, Rick Grylls, and by approximately 50 members of the public at large (Scappatura September 24th, 2008). Vale was applying for an exemption to new MOE standards for ground level emissions for nickel and held a public meeting about the issue at The Italian Club, in Copper Cliff. It was the same venue where I had some months earlier questioned the MOE representative for the Sudbury Soils Study, Brian Cameron, and Vale’s President of Ontario Operations, Fred Stanford, over the stockpiles of what I’d heard my fellow smelter workers refer to as “nickel concentrate”, when I worked there. This material, which has been stockpiled in the open for decades, was observed by me to be leaching into both surface and ground waters in the smelter property and also being transported off-site by wind and in the tires of vehicles To reiterate, at that meeting, my questions were not supposed to be asked; they concerned a matter which the Technical Committee had been decided would not be addressed by the Sudbury Soils Study — solid toxic

materials on Vale/Inco property being transported off-site. At the time, Fred Stanford had specifically said to the audience that that any questions regarding matters “behind the gate” of the smelter were to be addressed to Vale/Inco personnel privately. Obviously, I had ignored that directive. This time Vale/Inco had structured the meeting in such a way that would prevent such an event as my questioning of these officials directly, from recurring. The procedure for asking questions was very different, one which Homer Seguin clearly did not like:

After the presentation, attendees were told to write questions on a form to be asked by a moderator. ‘It is deliberately set to prevent participation of the public,’ said Seguin. ‘There was obviously an undercurrent of concern in the room, but no one could say anything.’ Seguin wrote his complaint about the controlled forum on the comment sheet, and when it was read aloud by the moderator, many audience members clapped enthusiastically (Scappatura October 24th, 2008).

It should be noted that the Federal Government of Canada had researched the matter of nickel pollution in Sudbury more than 20 years earlier, and had recommended a safe standard for ambient air pollution containing particles of nickel compounds, a matter of great concern for those residing in areas like Copper Cliff and other adjacent areas of Sudbury:

Values calculated for populations residing in the vicinity of point sources based on early, limited available monitoring data are within the same range [i.e., the priority for further action is considered to be moderate to high based on a concentration of total inorganic nickel in ambient air of 0.021 µg/m³ determined in an early survey in Sudbury [Chan and Lusic, 1986] (Health Canada Nickel 2012).

The Ontario Government standard for nickel in ambient air in 2008 was 2.0 µg/m³, over a 24-hr. average, and was already almost 100 times higher than what the Federal Government believed was a limit necessary to protect human health. The temporary limit that Vale/Inco proposed was 15µg/m³, was almost 700 times the Federal Government’s recommended level to protect human health, and more than 7.5 times the current Ontario level. It also appeared that Ontario’s new regulations were unlikely to be decided upon anytime soon, judging by the

comments of the Ontario government's representative at the meeting, Catherine Grant, from the Air Standards and Risk Management Technology Standards Section of the MOE, who stated the Ontario Government's position in 2008 as follows:

We don't know when a decision will be made, but we hope to have one by February, 2010 (Scappatura October 24th, 2008).

During the intervening time, residents were left to cope with Vale/Inco's pollution, at whatever level it may have been, as best they could. One of the members of the public who attended the meeting, as she did the Human Health Risk Assessment (HHRA) presentation in Copper Cliff previously, was long-time Copper Cliff resident Marjorie Reynolds:

Reynolds said her neighbours started complaining about a dry cough in the morning after sleeping with their windows open during the evening. She is convinced the smoke is causing it. 'We get very heavy black emissions,' she said. 'I do not have my windows open at night. I've lived here too long for that.' Others were concerned Inco waited less than two weeks before the application deadline to hold a public forum (ibid).

Given that Sudburians have already been inhaling heavy concentrations of nickel dust for decades did not go unnoticed by Homer Seguin, who observed:

'Nickel is a carcinogen,' said Seguin. 'They've been talking about their reduction since 1970. Imagine how much of that stuff we've inhaled and they still can't meet government regulations' (ibid).

It seemed Ontario Ministry of the Environment regulators had taken the same view as Health and Welfare Canada officials had years earlier, concerning arsenic levels in Belledune lobsters, when levels exceeded both the standards of the Canadian Federal Government and The World Health Organization. To reiterate, on the matter of federal standards for cadmium in lobsters being exceeded in the Belledune fishery:

Health and Welfare officials did not view this as a legally binding standard but a guideline for "making decisions" on whether to intervene (Milewski 2006:38).

I had tried my best to become an involved member of my community in determining what levels of pollution were safe for me and my fellow Sudburians, and came away feeling despondent and

frustrated. I began to wonder if my initial experiences as a 12-year-old child with Sudbury's pollution levels were in fact the truth of the matter, when I first moved to Sudbury and witnessed a small area of the environmental carnage wrought by Inco's pollution. When my new schoolmate had told me that "when Inco and the government decide to do something, there's not much anyone can do about it." In hindsight, it seemed to be a fact that I should have taken to heart, not taken exception to. There seemed to be little doubt that all my efforts had been for naught; however, when I checked my e-mail account at Laurentian University the next day, I found the following message from John McLaughlin:

From: "McLaughlin, John" Wednesday - October 28, 2009 10:51 AM
<John.Mclaughlin@cancercare.on.ca>
To: "jnriagu@umich.edu" <jnriagu@umich.edu>
CC: Allan Montgomery <am_montgomery@laurentian.ca>
Subject: RE: Relevant Research
Attachments: Mime.822 (7015 bytes) [View] [Save As]

Dear Dr. Nriagu,

Your name was passed on to me by Allan Montgomery whom I met when I presented plans to the Sudbury community for a new health study that I am launching across Ontario (<http://www.ontariohealthstudy.ca/>).

I am pleased to learn of your research expertise and productivity. I can see that you have experience in issues that remain as major concerns in the Sudbury region, but indeed, there are relevant links to broader concerns about health impacts of the environment.

If you remain active in this area, I would be happy to speak with you. (Indeed, I have close colleagues in Ann Arbor, so I may be visiting in the next 6 months.)

To get started, would you be willing to speak by phone? Let me know your availability in about 3 weeks.

Thanks,

John

John McLaughlin, PhD
Vice President, Population Studies & Surveillance, Cancer Care Ontario
Professor, Dalla Lana School of Public Health, University of Toronto
Program Director, Ontario Health Study, Ontario Institute for Cancer Research Senior Investigator, Prosserman Centre for Health Research at the Samuel Lunenfeld Research Institute CCO Mail - 620 University Avenue (#1612), Toronto, Canada M5G2L7

Apparently, if Dr. McLaughlin's blind copy of his e-mail to Dr. Nriagu was any indication, he appeared willing to consider data outside of what had been mandated as "acceptable" by the Technical Committee, and others, of The Sudbury Soils Study. I actually began to feel optimistic that Sudburians may actually have a chance at an objective, scientific investigation of just how high pollution levels were in Sudbury, and the possible health effects this may be having on us over time.

However, there was also to be some news merely months later, which I found rather intriguing. An article in a local newspaper, Northern Life, titled "Wren Roosts an LU", indicated that the methodology of The Sudbury Soils Study could well become the standard for how Community Based Risk Assessments would be done in the future, as it was now being taught as fact at my *alma mater*:

Chris Wren, who directed the Sudbury Soils Study, has joined Laurentian University's MIRARCO - Mining Innovation team (...). Wren is preparing publications on the study and a short course on human and ecological risk assessment to be given in February 2010 (Northern Life Staff. September 14th, 2009).

Chris Wren was now a part of the Mining Innovation, Research, and Rehabilitation Corporation (MIRARCO), is a corporate presence on campus, principally funded by the two local mining companies, Vale/Inco and Xstrata. The two mining companies' funding of MIRARCO pays for student research into more efficient ways of mining, and into the environmental issues of the pollution which mining invariably produces. Under this arrangement, research methods used in The Sudbury Soils Study, also funded by these two corporate entities, would be taught on campus as a credit course. As I would later find out, the course was to be taught not only during Winter Session, but during Winter Study Break, a period of one week in February when almost no Laurentian students are on campus. The MIRARCO poster, which was posted on their official website, included instructions on how to arrive at the university from the airport, indicating that

it was primarily for people from out of town, who would be flying to Sudbury, not driving or taking a bus, as most regular students do. As to what was taught at this course, it was not stated in the poster, however, I learned through an anonymous source that there was a published evaluation of both the Sudbury and Port Colborne CBRAs released by Chris Wren and Laura Mucklow, in existence. Laura Mucklow was at the time an employee of Xstrata Nickel, and like Dr. Chris Wren, affiliated with MIRARCO. What makes this evaluation noteworthy is the fact that it is a self-evaluation by (now) Professor Wren and another employee of the mining industry, of not only the Community Based Risk Assessment (CBRA) process Dr. Wren was involved with in Sudbury, but also of the CBRA process he was involved with in Port Colborne. In both cases, he was employed by the funders of the CBRAs being evaluated: Vale in Port Colborne, along with Vale and Xstrata in Sudbury as well.

This self-analysis of his work for the mining industry apparently formed the basis of his course in risk assessment, also addresses some of the public criticisms of the two processes, but only from the perspectives of those who authored it and participated in its construction, not from a single member of the public. When compared to outside sources of information and evaluation, such as interested members of the public, the Wren and Mucklow evaluation forms an interesting piece of research into not only how the CBRAs were carried out, but also into the evolution of the CBRA process from Port Colborne to Sudbury. However, before Wren and Mucklow's evaluation is examined, I would like to expand upon what happened in Port Colborne with the CBRA carried out there, and some of the legal and historic issues that were involved.

Chapter 16

Class and Individual Activism in Port Colborne

I decided to do a further public document search to find out as much as I could about The Port Colborne Community Based Risk Assessment (CBRA), and the class action lawsuit, to compare with the Wren and Mucklow evaluation of the CBRA which occurred there, to provide additional perspective. As it turns out, another separate lawsuit, in addition to the class action lawsuit, also addressed an issue which at least one local farming family had been trying to have addressed for decades. As reported in The Toronto Star, the family in question, the Augustines, had lived on a local farm since 1808, almost 200 years, and made the following claims in their lawsuit against Inco (later to be Vale):

In court documents, they allege that Inco allowed them to market foods for human consumption that the company knew were contaminated with nickel. The \$100-million suit was launched in 1994 by Lorne and Erma Augustine, who died while waiting for the matter to go to trial (...) The suit focuses on the Augustine's' struggles since the 1950s with crop failures and mysterious cattle deaths and alleged efforts by Inco to conceal the true nature of the damage (Harries 2006).

Court documents also revealed that the Augustines were refused a request to sell their property when they:

(...) tried to develop a subdivision on their farm, which adjoins the city of Port Colborne and is a kilometer south of the refinery. In order to get Ontario Environment Ministry approval for the development, soil tests were done, which revealed nickel levels greater than 10,000 parts per million. Nickel persists in soil for decades. The ministry has an "intervention level" of 200 ppm, requiring that levels in excess of this be cleaned up before it will approve land-use change (ibid).

The reasons for cleaning up the Augustine's farm were now two-fold. Nickel had contaminated the farm's soils to the point that their crops were failing, and cattle were allegedly dying from the effects of this contamination, in addition to this contamination preventing resale of the property.

Inco had been aware of just how much pollution had been falling on the Port Colborne area, but considered the matter only in terms of monetary loss to their operations. As reported in *The Globe and Mail*, by Kate Harries, documents released to the public during the discovery period of the Augustine court case revealed that:

The company was losing large quantities of nickel and copper through its stack, an internal summary of 'annual accounting metal losses' shows. From 1919 to 1981, the total comes to £149-million [approximately \$313-million Canadian] (ibid).

For reasons known only to the company, Inco had begun purchasing properties in the areas where metal fallout had occurred. One of those properties which Inco had purchased was later transferred to the District of Niagara School Board, land with high nickel levels in the soils:

The original landowners farmed the [property]. It had been said that the lady of this house suffered from a severe skin rash, so severe that it was difficult for her to work on the land. A few years after Inco purchased the land from the couple, the Niagara District School Board acquired it and built Humberstone School," said Wiggins. (Glynn 2010).

This event is eerily similar to what had occurred at the infamous Love Canal site, in upstate New York, a landfill area where:

Beginning in 1942, the landfill was used by Hooker Chemicals and Plastics (now Occidental Chemical Corporation (OCC)) for the disposal of over 21,000 tons of various chemical wastes (...) Dumping ceased in 1952, and, in 1953, the landfill was covered and deeded to the Niagara Falls Board of Education (United States Environmental Protection Agency (EPA) Love Canal, New York. EPA ID # NYD000606947).

What first alerted Diana Wiggins in 2000 to the fact that something may be toxic at Port Colborne's Humberstone Public School, which her son attended, were the rashes that kept appearing on her son's skin. Any suspicions she may have had at that time were at least partly confirmed when her seven-year-old son returned home from school one day with a letter:

(...) which announced a meeting pertaining to the soil contamination on school property. I wanted trustworthy information about the contamination. Unfortunately, it appeared that the municipal and school board authorities at the meeting were deliberately misleading about the levels of nickel, copper and cobalt in school drinking water (Wiggins 2010:76).

Community meetings about soil contamination had allowed Wiggins to begin to network within the town, and to make the acquaintances of other people in her community. Two of those included Ellen Smith and Craig Edwards, who lived on Rodney Street, at the fence line of the Inco refinery. Her concerns about polluted water, not just soils pollution, were shared by her fellow Port Colborne residents. Wiggins learned through her community contacts, that for decades, Inco had been pumping what is known locally as “green liquor, “or electrolyte nickel, a byproduct of the refining process, into a deep aquifer below the city, which Inco believed to be empty:

By 2000, this “green liquor” was seeping into the water table and into the Welland Canal, where the City of Port Colborne draws its drinking water, as well as into Lake Erie and surrounding areas. When we questioned the safety of our drinking water, we were told that the nickel (a known carcinogen) found in our tap water did not exceed the Ontario drinking water standards. This statement is technically correct, but it is misleading. There are no existing provincial standards pertaining to nickel content in drinking water. (Wiggins:77).

As outlined earlier in this document, Wiggins had noticed a persistent rash on her son’s skin, which led her to have him tested by a local pediatrician in 2000, to determine what the nickel levels were in his urine; however, the doctor involved in this testing refused to release the results to her, claiming he wasn’t allowed to discuss this issue with her (ibid:77). At this point, contamination levels at her son’s school were known to be in the range of 1200 parts per million (ibid). Contamination levels in Port Colborne soils were also not unknown to Inco officials.

In 1995, Inco’s own soils testing in unspecified parts of the community had indicated nickel:

(...) ‘appeared at 4,100 parts per million, much higher than the environment ministry's residential guideline of 200 ppm, and lead at over its 200 ppm guideline level’, said Del Fraipont, manager of Port Colborne's Inco plant (...) Similar results - for nickel - were turning up in tests conducted by the environment ministry, going back to 1991 and updated in 1998 and 1999 (Harries 2001).

Some soils tested even higher, such as the soil on the property of Craig Edwards, and his partner, Ellen Smith, which the couple requested the Ministry of the Environment (MOE) test, in 2000.

Wren and Mucklow described the Port Colborne process this way:

The Port Colborne CBRA was designed with a strong mandate to be a completely open and transparent public process. A Public Liaison Committee (PLC) was developed to oversee the CBRA process and provide input to Vale, the MOE and the City of Port Colborne. A Technical Subcommittee (TSC) was established as an afterthought several months into the process when it was decided that technical discussions were consuming a disproportionate amount of time at PLC meetings, allowing less time for public participation. The TSC was a subcommittee of the PLC.

Public Liaison Committee (PLC): A committee of volunteer community members appointed by the City to solicit public input, inform the public and provide input to the CBRA process;

Technical Subcommittee (TSC): A subcommittee of the PLC comprised of representatives from Vale (the proponent), the City of Port Colborne, the MOE, Niagara Public Health, the project consultants and the independent consultant.

Project Consultants: A group of consultants that was hired by Vale to conduct the HHRA and ERA (Jacques Whitford, now Stantec);

Independent Consultant: A consultant hired to assist the PLC (originally Beak, then Stantec, then Watters Environmental Group Inc.) and who was also selected to be chair of the TSC;

Community: The residents of Port Colborne who were invited to participate in local surveys, open houses and PLC meetings, and to observe at TSC meetings;

External Peer Reviewers: International experts in HHRA and ERA who conducted a technical peer review of the HHRA, ERA and Crop Studies reports.

(Wren and Mucklow:8).

However, due to disagreements on how to proceed with the Port Colborne CBRA at public meetings, it was decided that the Technical Committee should begin meeting in private. The point at which the Technical Committee began to operate in private, was the beginning of less transparency, in hindsight. Private meetings, out of the public eye would also become the norm with the Sudbury CBRA process, but from the outset. The Project Consultant was an expert retained by Inco to design and carry out the Port Colborne CBRA. The Independent Consultant was an expert designated to represent the citizens of Port Colborne and their interests

at the table. He was also designated as chair of the Technical Subcommittee (TSC). The Wren and Mucklow document states that:

The independent consultant was selected to be the chair of the TSC. There is no consensus among participants about how the independent consultant was selected to be the chair, but most agreed that at the beginning of the project, this made sense, as this was, at the time, viewed as the only truly independent member of the TSC (Wren and Mucklow:12).

From this mandate, it seems assured that the public was involved in the investigation process that would tell them if their town was contaminated to unsafe levels; however, entering into the process also meant that a community-wide, not a site-specific, risk assessment would take place. For people like Harry Wells, chairman of the Public Liaison Committee (PLC), there were some preconceptions about what the risk assessment would lead to.

As he told Kate Harries, he believed that:

'Inco's goal is to demonstrate that 5,000 ppm of nickel in soil is safe. If through their risk studies they find that there's no human health risk at levels less than 5,000, then they can present a proposal that they can remediate to that level,' he said. 'My committee is to get them down to one of these other levels - to get the best deal we can.' (Harries 2001).

Harries' article also points out that the process which was being undertaken in Port Colborne was a departure from how contamination issues had been dealt with in the past. Risk assessment was a departure from fixed limits on pollution levels, whereby violations of these limits would automatically trigger a response for reductions of these levels.

Previously, there were only two acceptable levels: the naturally occurring background level (43 ppm in the case of nickel); and a level at which the contaminant starts to affect human health or the environment (200 ppm). The risk assessment approach allows for a higher third number. It involves calculation of new contaminant levels based on different soil types and differing property uses - whether industrial, residential or agricultural. (ibid).

With the benefit of hindsight, we now know that the Environmental Consultants hired by Inco to carry out the risk assessment, Jacques Whitford Environmental Limited, released a report

recommending much higher background levels for nickel than the provincial guidelines, or even the 5,000 ppm that the chairman of the Public Liaison Committee, Harry Wells, believed would be the contamination level Inco would “agree” warranted clean-up:

(...) the final report by consulting company Jacques Whitford recommends intervention on properties where nickel levels exceed 20,000 ppm (Tayti May 6th, 2008).

Ellen Smith and Wiggins decided to take matters into their own hands. They would eventually found a group called “Neighbors Helping Neighbors” in 2001, and along with Port Colborne resident Wilf Pearson, launched a class action lawsuit against Inco and others in February of 2001. (Glynn 2010:70). The lawsuit’s initial defendants included Inco, the Ontario Ministry of Health, the Ontario Ministry of Environment, the Niagara Regional Health Department, the Niagara District School Board, the Niagara Catholic School Board and the City of Port Colborne. (ibid). The suit was deemed to have merit and went to trial 4 years later, on November 18th, 2005. Since that time, “settlements with all defendants — except Inco — have been signed” (Wiggins, 2010:78). The exact amounts of the settlements reached with defendants other than Inco, are not listed in Wiggins’s article. That is standard in cases of litigation — the amounts of settlements are not made public. The Augustine family settled their dispute for an undisclosed amount before the class action suit received approval to proceed through the courts, in 2001.

Inco would be the last defendant in this class action lawsuit. As a defendant, it put the corporation into a rather unique position: it was paying for the studies that may well determine whether or not it deserved to be sued for its past pollution. While local people were concerned about specific locations in the community where contamination levels may be quite high, Inco chose instead a “community approach”.

By a “community approach”, it is meant that specific sites would not be considered for

the local risk that may be present, but that the overall threat to the community at large would be estimated, i.e., averaged, by what would be known as a “community based risk assessment” (CBRA). Although she had begun attending the community meetings in September of 2000, Wiggins quickly became disenchanted with the process and she concluded that:

(...) it was becoming increasingly clear that nothing was going to be done to ensure the safety of people living with such high levels of contamination. I doubted this company sponsored process (Glynn 2010).

It was at one of these meetings, in November of 2000, that Wiggins and others witnessed an employee of The Ministry of the Environment, Al Kuja, stand up in public and say that he suspected that, given the number of illnesses he had in some of the households where he had been testing soils, ‘something is going on’ (p 131).

According to Kate Harries, Al Kuja was “a scientist in the environment ministry's standards development branch who became well-known here as he investigated soils across Port Colborne for the ministry's studies in 1998 and 1999” (ibid). His comments underscore the difference between calculating the risk of harm to a community through the CBRA process, and actually measuring community health effects in locally affected areas where illness clusters may be appearing. As outlined earlier, allowable levels of contaminants have a way of being a variable number, as in Belledune, when safe levels for cadmium ceased to be guidelines, but “levels of concern” (p 112). Therefore, the shift in interpretation of environmental protection from being a site-specific and precautionary approach, to one of indeterminate levels and estimated, not actual, health effects for pollutants, had already taken place at the federal level, at least in reference to Belledune. It was apparently the approach now being taken by Inco and the Ontario Ministry of the Environment, in Port Colborne.

In March, 2002, the Human Health Risk Assessment portion of the Community Based

Risk Assessment (CBRA) published its findings. However, before I present any findings, it should be noted that the public's voice in the CBRA, the Independent Consultant, Mike Watters, expressed very strong opinions about both the validity of the results and the methodology of the CBRA. The first portion of the Independent Consultant's evaluation of the CBRA to be examined will be the Crop Environmental Risk Assessment. In his conclusions, Rick Watters, of Watters Environmental, broke down the study into four components and commented on them. A brief summary of some of his comments concerning the Crops Environmental Risk Assessment are listed here:

1. Planning: "The lack of specificity in the protocols is a major problem for the Crops Study. Unknown inconsistencies in methodology and the influence of decisions made in the field, mid-study, have an unquantifiable influence on the results derived from the Studies" (Watters Environmental Group, Inc. Independent Consultant QAQC Review of the Crops ERA 2010:34).
2. Sample Taking: "decisions on sampling were made without the benefit of well thought out study design. Some of the protocols were not followed by those carrying out the field work" (34).
3. Analysis: "There are no concerns with the analytical work carried out by the Crop Study" (34).
4. Reporting: "The protocols presented in the Final Crop Studies Report are not the same ones that were used to guide the conduct of the Studies. Rather, they were written after the completion of the work to explain what was actually done, not what was required to be done to insure a credible study (...) There is no record provided in the Crop Study Final Report of the **actual** protocol that was available at the time of field work, and which should have been used to direct the conduct of the Study. The reader of the Crops Report is, therefore, not able to independently determine whether the initial intent of the study was actually achieved, which in turn, reduces the credibility of the Crops Report (Watters Environmental Group Inc., 2010:34-5).

The Human Health Risk Assessment portion of the CBRA, first published in March and October of 2002, was a contentious study on a number of topics, including long-term versus short-term effects of exposure to toxic metals on human health, and just how the conclusions of

the study was derived. Its release came shortly after the successful application by Pearson, Smith and Wiggins to have their class action lawsuit heard, in October, 2001. After it was formally launched in February, 2001, the class action lawsuit suffered a setback in 2002, when the Ontario courts refused to hear the case. The Court did not accept that the plaintiffs could attribute health effects to Inco's pollution. The plaintiffs subsequently dropped their claims for health effects. Whether the availability of the evaluations of the Independent Consultant (IC) of the CBRA had been available for the hearings would have had an effect on the judgment can never be known. All that is known is that the Independent Consultant's evaluations were not available to the plaintiffs in time for this stage of the trial; they are dated 2010, 8 years after the launch of the class action lawsuit. A brief overview of some of the information that could have been used as evidence is presented here. Rick Watters, of Watters Environmental, the Independent Consultant, felt that there were technical concerns "which have considerably affected the reliability and the confidence in the Human Health Risk Assessment (HHRA) findings offered by Inco and its consultants, and the validity of the methods used to develop the HHRA model" (Watters Environmental Group 2010:53). The report then lists the most "notable" concerns it has with the HHRA:

1. The HHRA did not follow the established requirements of regulatory guidance documents, despite its commitment to do so.
2. The transparency and public disclosure of the exact methods and information used in the derivation of the RBSC, a requirement for Environmental and Human Health Risk Assessments in Ontario, did not match the commitments made by Inco at the outset of the CBRA.
3. Inco would not make the HHRA model available to the Independent Consultant for review and assessment.
4. The HHRA report does not show what specific values were used to calculate proposed "safe" soil nickel concentration of 20,000 mg/kg.

5. The HHRA report provides no analysis of the potential for immediate health threats (i.e., acute toxicity) in children and others in the population from soil ingestion for respiratory and/or skin sensitization from contact with nickel in soils concentrations above the existing regulatory health-effects standard, including the proposed value of 20,000 mg Ni per kg soil.
6. There is inadequate evidence to provide assurance that the additional lung cancer risk from contaminated soils at 20,000mg/kg (and other levels significantly above the current MOE standard) would meet an acceptable cancer risk of one- in- a million from environmental sources as required under the Ontario Environmental Protection Act (OEPA).
7. The HHRA report did not contain an analysis of possible impact to human health from the chance of error that such health impacts might occur at a soil nickel concentration at 20,000 mg/kg.
8. The estimated total daily intake of nickel and metals used in the HHRA were not reliable representations of daily exposures for the general population in a lifetime, and would have underestimated the range in total daily exposures and possible risks to public health.
9. The estimated total daily intake of nickel and metals used in the HHRA were not reliable representations of daily exposures for the general population in a lifetime, and would have underestimated the range in total daily exposures and possible risks to public health.
10. Established regulatory methods for estimating total cumulative daily exposures to contaminants in food were not followed and, therefore, the MOE regulatory requirements for delivering reliable source allocation factors for contaminants in soil were not followed.
11. The reliance on only a few grab samples of some local food items collected over a short time period meant that the study did not take fully into account the amount of variation in metal concentrations in the wide range of food items consumed in a lifetime. This would have underestimated the nickel and other metal intakes from dietary sources.
12. The daily lifetime exposure to nickel and other metals from consumer products was not included in the calculation of cumulative exposures.
13. The soil intervention value would actually have been much less than 20,000 mg/kg if reliable estimates of the daily nickel intake from food and consumer products were used in the calculation.
14. A significant adjustment factor was applied to the calculation of the “safe” soil nickel concentration to account for how much nickel in food becomes released for uptake (i.e., is bioavailable) compared with the total amount of nickel in the soil (...) the best available science supports that there should be no appreciable difference in bioavailability when differences in media influences are minor...The removal of this

inappropriate correction to the soil intervention calculation reduces the proposed 20,000 mg/kg safe concentration value by several orders of magnitude.

15. Reasonable maximum exposures for different areas of the community were inconsistently determined, thus making comparisons between the areas inappropriate, and statistically invalid.

16. Significant uncertainties associated with the various technical studies, as well as cumulative impacts from exposure to several CoCs, media and other stressors, were not adequately considered in the calculation of the 20,000 mg/kg soil intervention value.

17. Inco offered insufficient public consultation on this final version of the HHRA Report. Although the required meetings and Open Houses were held, only superficial responses were provided to comments and questions from TSC members and the community.

(Watters 2010:53-55 [10.0]).

After the final version of the official results of the HHRA were published in March, 2002, the recommended safe level for nickel oxide in soils was reduced to 8,000 ppm from 20,000 ppm (Port Colborne Human Health Risk Assessment. March, 2002: Part B: 82 7.1.1 [1]). Lead, however, remained a controversial topic in terms of how much was a safe level in local soils. The HHRA's first recommendation for dealing with lead in local soils was linked to United States Environmental Protection Association (EPA) studies:

The value of 10 micrograms of lead per deciliter of blood (10 µg/dL) in children has been broadly recognized as an accepted benchmark trigger for concern since 1991 [USDCDP, 1991] (Port Colborne Human Health Risk Assessment, 2002 Part B:82-3, 7.3 [1]).

Using this as a reference, the Human Health Risk Assessment (HHRA) went on to calculate safe lead levels for Port Colborne, concluding that:

An intervention level be established for this community at a soil lead level of 400 µg/g for children's play areas with bare soil on residential properties or in public areas, and at a level of 1,000 µg/g for all other areas of these properties to which children have access (Port Colborne Human Health Risk Assessment, 2002 Part B:83 7.3 [8]).

From the outset, Inco had denied responsibility for any lead in local soils, and beginning with this assertion, it denied any responsibility for further investigation of lead levels in local soils, refusing to name lead a “chemical of concern” (CoC). Inco also asserted that the presence of a steel mill to the east of the Inco refinery, operated by Algoma Steel during the early decades of the 20th century, in addition to other local sources, such as automobile exhaust, was responsible for the lead in local soils. However, a community lead study was undertaken all the same, which was commented on. Independent Consultant Rick Watters pointed out at the beginning of his assessment, titled: “Independent Consultant Review of the Chemicals of Concern and the Status of lead. Port Colborne Community Based Risk Assessment” (2010), that research by Richard Canfield et al (2003), originally published in *The New England Journal of Medicine* stated that:

(...) blood lead concentrations, even those below 10µg per deciliter, are inversely associated with children’s IQ scores at three and five years of age, and associated declines in IQ are greater at these concentrations than at higher concentrations [Canfield et al 2003:1517]. (Watters 2010:4 [2.0]).

On the matter of what levels should be considered “safe” and at what level concern is warranted,

Watters quotes the United States Environmental Protection Agency (EPA):

Lead can cause a variety of adverse health effects in humans. At relatively low levels of exposure, these effects may include interference with red blood cell chemistry, delays in normal physical and mental development in babies and young children, slight deficits in the attention span, hearing and learning abilities of children, and slight increases in the blood pressure of some adults. It appears that some of these effects, particularly changes in the levels of certain blood enzymes and in aspects of children’s neurobehavioural development, may occur at blood lead levels so low as to be essentially without a threshold (ibid).

Watters’ evaluation also notes that the World Health Organization (WHO) has stated that: “lead levels as low as 5µg/dl can irreversibly impair the development of a child’s brain, reducing their IQ” (ibid). As to how much confidence the Ontario Ministry of the Environment (MOE) had on the proposed “safe” blood lead level, Watters notes that “The MOE expressed concern that the

current 10µg/dl Level of Concern should not be interpreted as an acceptable level” (ibid). Inco remained steadfast in its opposition to the suggestion that it was primarily responsible for lead levels in local soils, although Watters was quite clearly not in agreement, stating in his conclusion that:

The data from the east of the Refinery, that they have chosen not to discuss, indicates that there is a scientific linkage between lead in soil in Port Colborne and the operations of the Inco Refinery and that the linkage is significant (Watters 2010:32 [6.0]).

While Inco was successful in having lead removed as a “chemical of concern”, which in this case means one it was not responsible for; nevertheless, the community health study to test blood lead levels in local citizens was undertaken in Port Colborne, due to concerns about lead levels being expressed by citizens at Public Liaison Committee meetings. In the calculus of risk assessment, residents of Rodney St. and the Eastside Community in general, were categorized as being at “no risk”. The first conclusion of the study states that:

1. Based on the results of the blood lead screening program, average Eastside Community blood lead levels are low and are similar to those for the rest of Port Colborne, and other Ontario communities. Phrased differently, children and pregnant women in the Eastside Community are not at an increased risk of lead exposure as compared to other communities in Ontario, even considering the localized elevated soil lead levels. (Regional Niagara Public Health Department Lead Screening Report. 2001:11).

The children who lived on contaminated soils were also deemed to be at no risk, due to the fact that their blood lead levels tested below 0.48 µmol/L, or 10µg/dL:

2. All children who lived on properties with surface soil lead contamination levels greater than 400 ppm, at the end of this study (having screening, and where required, venous testing) tested below the level for medical review of 0.48 µmol/L [10µg/dL] (ibid).

As for the average blood lead level for Port Colborne, including adults and children, “The study determined that the median level across the study was approximately 0.10 µmol/L [2.0 µg/dL]” (ibid). With data indicating that blood lead levels well below 10µg/dL could result in permanent brain damage to children: “The MOE expressed concern that the current 10µg/dl Level of

Concern should not be interpreted as an acceptable level” (Watters 2010:4 [2.0]). However, the legally “acceptable” blood lead level of 10µg/dl was used for the Port Colborne lead study. Once again, it raises the prospect of “acceptable” not necessarily meaning “safe”, depending on what standard of “safe” the process of risk assessment is based upon.

The last report by the Independent Consultant to be examined will be “The Integration Report”. Its purpose was “to provide guidance on how the findings of a Community Based Risk Assessment (CBRA) would be integrated and applied to individual properties located within the City of Port Colborne, Ontario” (Watters 2010:1 [1.0]) As Watters had obviously disagreed on so many of the previous conclusions of the CBRA research, integrating what he felt to be flawed pieces of research into a series of recommendations and conclusions would be based on erroneous information and made no sense to do so:

The current structure of The Integration Report assumes that the findings of the three study reports are correct. In our opinion, this is not a reasonable assumption. (ibid).

The Independent Consultant did not endorse a very significant portion of the work carried out in the Port Colborne CBRA by Inco’s environmental consultant, Jacques Whitford Environmental.

Inco was taken over by Brazilian multinational, Vale SA, in 2006. Vale essentially “inherited” the CBRA process in Port Colborne and the class action lawsuit against its operations there, and a CBRA process begun later, involving its Sudbury operations as well. There was a \$750 million class action lawsuit filed in Port Colborne making its way through the Ontario courts the entire time, from 2001. Even without the Independent Consultant’s reports, in 2010 the courts ruled in favour of the plaintiffs, i.e., the people of Port Colborne, not Inco, or Vale, as it was now called, and awarded the plaintiffs \$36 million. That decision was later overturned

upon appeal, with Vale winning back the settlement of \$36 million, in December of 2011, by virtue of an Ontario Court of Appeal ruling.

The opinion of Barry Weintraub, practicing litigation lawyer, adjunct Professor at The University of Toronto, and Chair of the Environmental Law Section of the Ontario Bar Association, and Rueter Scargall Bennett, a partner in Rueter Scargall Bennett LLP and adjunct professor at University of Toronto Faculty of Law, will form the basis of a short evaluation of the decision. According to Weintraub and Bennet, the Ontario Court of Appeal:

(...) interpreted the doctrine of strict liability under the rule in *Rylands v. Fletcher* in a narrow and restrictive fashion, rejecting the interpretation and cases that would apply it to dangerous activities by saying that any further changes would have to be made by provincial legislatures (Weintraub, Bennet 2012:1).

On the matter of pollution by Inco, that matter was accepted as fact:

(...) evidence at trial confirmed that 11 million pounds of nickel settled over a 10 km area. There was no instance of non-compliance with any regulations, perhaps because for most of the plant's history our laws did not reflect much sophistication regarding environmental matters, as the main environmental laws were municipal bylaws. To illustrate the point, Ontario's Environmental Protection Act was not enacted until 1971 (Weintraub, Bennet 2012:2).

Part of the case which Inco presented to the court, contended that statements by the legal counsel for the plaintiffs, Eric Gillespie, had not only contributed to the unease the community had concerning its property values, but also how the contamination of their property might affect their health:

These included statements that the cancer risks in Port Colborne were 8 to 40 times higher than provincial standards, that there were 'serious health risks' (...) The local Medical Officer of Health criticized these remarks, saying that there were no signs the city had a higher cancer rate than the rest of province (Weintraub, Bennet 2012:3).

While this information was released by Gillespie, the statement was in fact made by a recognized researcher in the field, who was:

Dr. Mark Richardson, former head of Health Canada's Air and Waste section and an internationally recognized health risk assessor (CBC News December 15th, 2003).

The CBC article was then posted on the website of Mines and Communities, an on-line database of news articles concerning mining issues. Richardson's services were retained by Gillespie to perform an independent evaluation of the earlier Inco study data, and Richardson determined that in comparison to other areas of Ontario:

Inco's own testing in fact demonstrates the air inside many homes contains between 50% and 350% more nickel, with two having more than 3,400% more total nickel than the average Ontario community. 'Inco's consultants only compared the smaller particles that likely cause lung cancer, when larger particles are also known to be associated with nasal cancers in humans. You cannot ignore this risk' said Richardson (Mines and Communities June 4th, 2003).

The same Mines and Communities article also summarized Richardson's conclusions on the Inco study, which used values for conducting risk assessment which were of a different methodology than recommended by the World Health Organization, the US Environmental Protection Administration (EPA) and Health Canada, concluding:

Health Canada, the U.S. Environmental Protection Agency and the World Health Organization have all published recognized values for determining cancer risks. If these are used, residents in these homes are being exposed to long term cancer risks at least 4 times higher than Ontario standards allow. In some homes the risks are up to 290 times greater. Inco has admitted it has no scientific explanation for this extraordinary level (ibid).

Risk calculation is shown once again to be a determination based on a preferred process, using arbitrary values, a matter discussed earlier (pp. 116-118). Also, the comment attributed to the local Medical Officer of Health (p. 176) regarding cancer incidence the Port Colborne area, should be put into perspective. In the absence of any hard data being presented as evidence by the lawyers for the defendant, Inco, now Vale, it would be difficult to say that Port Colborne's cancer rates were, or were not, higher than the rest of the province on the basis of an uncorroborated statement alone. The Niagara region, of which Port Colborne is a part, does indeed have both a higher cancer incidence than the rest of the province, and a higher

cancer mortality rate, at least as reported by Statistics Canada, in 2012:

Table 18: Cancer Incidence and Mortality (per 100,000 population), in Niagara LHIN, Compared to the Rest of Ontario. June 2012.

Cancer incidence Niagara Regional Area Health Unit (2012).

| | Overall | Male | Female |
|---------|---------|-------|--------|
| Ontario | 398.8 | 454.7 | 358.0 |
| Niagara | 423.5 | 467.1 | 394.1 |

Source: Statistics Canada. 2012. Health Profile. Niagara Regional Area Health Unit 3546-A.

Cancer mortality (per 100,000 population), Niagara Regional Area Health Unit (2012).

| | Overall | Male | Female |
|---------|---------|-------|--------|
| Ontario | 159.1 | 192.0 | 135.9 |
| Niagara | 171.0 | 207.3 | 145.7 |

Source: Statistics Canada. 2012. Health Profile. Niagara Regional Area Health Unit 3546-A

Another health study was conducted for Inco in 2003, which compared hospital admissions in Port Colborne to those of 35 other communities over two decades. The study in question, was done by Ventana Research, which:

(...) focused on 19 medical conditions related to the toxins – including nickel, cobalt, copper and arsenic- that Inco has acknowledged came from its refinery (...) The study concluded that for five of those conditions, Port Colborne residents tested higher, and found high rates of acute respiratory infections and asthma, as well as kidney, bladder and genital problems. It also found elevated levels of coronary artery disease and circulatory problems (CBC News December 15th, 2003).

A Ventana spokesman categorized these findings as follows:

I don't think that it's something that needs to cause alarm, (...) but sort of a concerned vigilance would probably be warranted (ibid).

A specialist in the field of air pollution and its human health effects, Dr. David Pengelly, associate Clinical Professor, Department of Medicine and Associate Professor of Medicine at McMaster University, had a decidedly different opinion on the same data, noting:

The hospitalization rates are high, and not just a little bit high (...) They are well over, for some diseases over 50-per-cent higher than the rest of the province (ibid).

However, none of these issues ever became part of the case that was heard by the Ontario Court of Appeal (OCA), although in the original lawsuit:

Alleged damages included personal injuries, health effects, property damage and diminution in property value... What remained at the end was a mere shadow of the original claim (...) In my view, the case that went to court was an unfortunate product of the limitations of the class action process as a legal format for addressing the issues which the facts of this case presented. (Weintraub, Bennet 2012: 3,4).

Due to opposition from Inco, in order to obtain legal certification for the class action lawsuit, personal injuries and health effects were dropped from the alleged damages. The suit instead focused on strictly diminution of property values caused by Inco's refining activities, which were alleged to have deposited hazardous pollution in community properties. The class action suit eventually only claimed loss of value to property as a result of these hazardous activities, as the nickel and other pollutants found in residential soils had damaged those soils, and therefore both the use, and the resale value of, the affected properties. However, in the absence of proven harm to human health or the natural environment, Inco contended that its' activities were not hazardous; therefore, there was no realistic case to claim that there was property damage. In Weintraub and Bennet's opinion:

(...) the dicta of the Court of Appeal should not lightly be interpreted as saying that the only way there can ever be physical damage to property is if there is a realistic risk of actual harm to human health. If that is what the court is saying, then in my opinion it is

simply and clearly wrong, but it is difficult to believe that the court intended to lay out a rule of general application (Weintraub, Bennet:2).

Inco lawyers made the analogy of metal pollution altering, but not damaging soils, and that it is similar to what happens when farmers add fertilizer to their fields. The application of chemical fertilizer alters the chemical makeup of soils, but does not render the soils no longer usable (Ontario Court of Appeal [55]), and Inco lawyers further asserted that:

The claimants cannot show, and indeed did not attempt to show, that the nickel particles in the soil had any impact on their ability to use their properties for any purpose (Ontario Court of Appeal [56]).

Perhaps that could be said about the class action claimants in this case, who lived in the urban confines of Port Colborne; however, Inco lawyers did stop short of saying there was no evidence to the effect that their pollution had damaged any local soils. The first lawsuit against Inco was filed by the Augustine family, as mentioned earlier in this section. They filed a lawsuit against Inco for \$100 million for damage to their farmland, some of which had been rendered no longer arable for the cultivation of metal-sensitive crops, such as wheat (Harries.2006. This fact was noted by Weintraub and Bennet:

There was at least one other Port Colborne case that proceeded to trial against Inco. Augustine v. Inco went to trial in 2006, a few years before the Class Action. (...) The case settled upon confidential terms shortly after the commencement of trial, according to a publicly filed Inco Sustainability Report. (Weintraub, Bennet 2012:4).

Inco settled out of court with the Augustines for an undisclosed amount, shortly before the class action lawsuit was launched, although how much of the \$100 million the Augustines were seeking and actually received, is not known. This is clearly a case of damage occurring to local soils from Inco's refining activities resulting in a diminution of property value and the settlement is an admission of responsibility on the part of Inco (Vale at this point in time). However, due to the matter of awards paid in civil settlements being confidential once they are finalized, Vale

lawyers could state, legally, that there was no record of soil damage having occurred in the Port Colborne area as a result of their pollution, which it did in court. It is a legally accurate statement, although in a case of legal vs. physical reality, we see a contradiction. The statement meets the legal standard of truth, yet the legal reality stated is clearly untrue in the real world; nevertheless, on the matter of whether or not the pollution activities of Inco were a known hazard, or presented a dangerous use of the land adjacent to the refinery, the Ontario Court of Appeal ruled in 2012 that:

(...) evidence suggests that Inco operated a refinery in a heavily industrialized part of the city in a manner that was ordinary and usual and did not create risks beyond those incidental to virtually any industrial operation (Ontario Court of Appeal 2012: [III The Nature of the Claims [[B]] iv 103)).

In their closing comments, Weintraub and Bennet noted that the court could have moved beyond such strict interpretations of nuisance claims, and developed the common law interpretation further, but at the same time:

(...) it is less than ideal to make significant changes to common law environmental torts in the context of a class action case where recognizable causes of action were stretched to the limit simply to accommodate the requirements of the Class Proceedings Act, 1992 for certification as a class action. There is a real danger that the nature of the allegations in the class action skewed the results and that future nuisance and strict liability claimants may pay the price (Weintraub, Bennet, 2012:15).

Furthermore, “The aspects of the case that got left on the cutting room floor would have made for a better case for a plaintiff to bring before the court, in my opinion” (Weintraub, Bennet, 2012:4). It is on the basis of that statement that I felt the need to include some of my own research findings, to provide further insight to the matter, including some of the opposing views regarding the human health aspects of the Port Colborne class action lawsuit eventually submitted by the Independent Consultant, Risk Watters (pp 170-172, 176) which were not available to be considered by the Ontario Court of Appeal. In the final analysis, the Ontario

Court of Appeal was of the opinion that it is the responsibility of governments to address the matters that it was asked to rule upon, not the courts.

It appears that in cases of environmental law, the highly contentious legal process, a political construct, was responsible for shaping both the perceptions and definitions of risk — as much, or, one could argue, even more so, than science itself.

Chapter 17

Comparison of the Port Colborne and Sudbury CBRA Structures: A Combined Perspective

In 2010, Dr. Chris Wren became affiliated with Laurentian University, through the Mining Innovation Research and Rehabilitation Corporation (MIRARCO), which describes itself as: “a not-for-profit corporation that operates with support from the private and public sectors” (Mirarco webpage: 2016). Its mission statement, in part, is presented as: “Our Vision: To develop and deliver quality applied research to manage risks in the mining sector and beyond.” (ibid). And: “Our Values: Trust, Collaboration, Quality, Innovation, New Knowledge, Responsiveness, Integrity, Efficiency, Economic Sustainability.” (ibid), In 2010, Dr. Wren also issued his own evaluation of the Port Colborne and Sudbury Community Based Risk Assessments (CBRAs). Dr. Wren participated in both CBRAs as a paid researcher of the polluters. The evaluation was titled “Comparison of Community Based Risk Assessments in Port Colborne and Sudbury, Ontario”. It was co-authored by Laura Mucklow, an employee of Xstrata Nickel in Sudbury, who like Chris Wren, was affiliated with Mining Innovation Research and Rehabilitation Corporation (MIRARCO) at Laurentian University.

It should also be noted that the Sudbury Soils Study did not begin as a result of community concerns; it was the Ontario Ministry of the Environment (MOE) which initiated the process. It would be funded entirely by the two principle polluters, Inco, later Vale, and Falconbridge Metals, which became Xstrata, and is now owned by Glencore (2010), and the study began, in 2001. The Port Colborne CBRA, begun in 2000, was also funded entirely by the

single local polluter, Inco, later Vale. According to Wren and Mucklow, with the Sudbury CBRA “Openness and transparency were built into the process through the use of an Independent Process Observer (IPO), PAC member observers and union observers” (Wren and Mucklow 2010:9).

The structure of the Sudbury CBRA was described by Wren and Mucklow as follows:

- **Technical Committee (TC):** A committee comprised of up to three representatives of six organizations (Vale, Xstrata Nickel, MOE, Sudbury & District Health Unit, the City of Greater Sudbury and the First Nations and Inuit Health Branch of Health Canada) who provided technical direction for the study. The TC was the primary group directing the CBRA;
- **Working Group (WG):** A subcommittee of the TC, comprised of one representative of each organization on the TC (with the exception of Health Canada) who conducted the detailed day to day work with the Project Consultants on behalf of the TC between TC meetings and who attended all TC and PAC meetings;
- **Independent Facilitator:** A third party individual retained to chair and facilitate the TC meetings and help to bring consensus for decision making;
- **Communications Subcommittee (CSC):** A subcommittee of the TC, comprised of communications experts from each of the TC organizations (with the exception of Health Canada) and the project consultant team that was responsible for developing and overseeing implementation of the communications plan;
- **Public Advisory Committee (PAC):** A committee of volunteer community members that provided public perspective and facilitated two-way communication between the TC and the public;
- **Project Consultants:** A group of consultants hired by the TC to conduct the HHRA and ERA (the SARA Group);
- **Independent Process Observer (IPO):** An impartial observer and recorder of the process who was invited to attend all TC, WG, CSC and PAC meetings, open houses, workshops and other events to ensure that the process was transparent and that communication to the public was timely and effective;
- **Unions:** Representatives of the Canadian Auto Workers and United Steel Workers Locals who observed the process on behalf of their members who are employees of Vale and Xstrata Nickel;
- **Scientific Advisors (SA):** Two specialists in HHRA and ERA who reviewed the work of the project consultants, provided advice to the TC and delivered presentations to the PAC;

- **Community:** The residents of Greater Sudbury who were invited to participate in open houses, local surveys, PAC meetings and a portion of TC meetings; and
- **External Peer Reviewers:** Panels of international experts in HHRA and ERA selected by an independent organization who conducted peer reviews of the HHRA and ERA.

(Wren and Mucklow 2010:9-10).

It should be noted that the participant from Health Canada, identified by Franco Mariotti, the Independent Process Observer, as Ray Alatalo, Environmental Health Officer, Health Canada First Nations & Inuit Health Branch, informed the Technical Committee (TC) that he would not participate in all meetings. He also informed the TC that if he was present, he would only be there as an observer, not as an active participant. This was acknowledged by Franco Mariotti, the Independent Process Observer of the Sudbury CBRA in 2003:

According to Mr. Alatalo, his role is similar to that of the Process Observer which is non-voting in nature. Therefore, it is my understanding that Mr. Alatalo will continue to sit on the TC, but as a non-voting member. He will continue to liaise with and inform the band councils, and ensure that reports from the study are reviewed by Health Canada. (Mariotti 2002-2003. Quarterly Report #3, Winter 2002/2003:8).

By the spring of 2004, the Independent Process Observer seemed annoyed at the attendance level of the Health Canada representative, and made note of the matter in his public statements:

Attendance at TC meetings by the Health Canada representative has not been consistent. There have been times when their representative has not attended TC meetings and has failed to notify the Facilitator of his intentions. This kind of irresponsibility is not acceptable (Mariotti 2004. Quarterly Report # 8, Spring, 2004:3).

Mariotti's annoyance with the Health Canada Representative continued into 2005:

If indeed Health Canada accepts their role as an equal partner on the TC, then as representative of Native health issues, they should make every effort to attend TC meetings (Mariotti. 2005. Quarterly Report #11, Spring 2005:2).

By the spring of 2005, the Technical Committee, presumably by consensus, had relegated Health

Canada to a decidedly diminished role:

(...) decisions are made with or without Health Canada's presence; however, decisions cannot be made if one of the other five members is absent. I have no concern with this specific arrangement; my concern is with Health Canada's sporadic attendance at TC meetings as the representative for native health issues (...) If the Health Canada representative is not in attendance at a particular TC meeting, obviously issues around native health concerns will not be raised at that meeting. (Mariotti 2005. Quarterly Report #12, May-June, 2005:3).

This situation continued into 2006:

Health Canada has never commented on the Human Health Risk Assessment draft report nor has it ever commented on any decision made by the Technical Committee (...) Members of the Technical Committee have expressed concern that Health Canada may unexpectedly respond long after deadlines have passed or at worst, comment at the end of the study.

RECOMMENDATION: The Technical Committee and Health Canada should be quite clear as to Health Canada's position and stance on the Sudbury Soils Study when the Human Health Risk Assessment and Ecological Risk Assessment Reports are released to the public.

RESULT: There has been no comment from Health Canada although the Technical Committee has been informed that all draft reports have been forwarded to the appropriate authorities by the Health Canada representative (Mariotti 2006 Quarterly Report #15, Spring 2006, January-March:3).

To compensate for this lack of participation by Health Canada, the designated representative for First Nations people, another level of meetings was initiated, which involved the Technical Committee (TC), the Working Group (WG) and unnamed consultants, to meet directly with First Nations groups:

(...) the Sudbury TC directed the WG and project consultants to consult directly via special meetings held in the First Nations communities (Wren and Mucklow, 2010:13).

Unfortunately, anyone wishing to know what issues were discussed and what concerns local First Nations people themselves had, it will never be known — they will need to consult with local First Nations people themselves, as First Nations issues did not make it into the Human Health

Risk Assessment, and their specific concerns were never mentioned in the CBRA:

Because of the confidential nature of the information provided by the First Nations community, the data were not used in the CBRA. However, these studies helped to address some of the issues expressed by the First Nations communities (Wren and Mucklow 2010:39-40).

These meetings, held in the two local First Nations communities of Whitefish Lake and Wahnapeitei, are also not shown to have occurred on the Wren and Mucklow graphic representation of the Sudbury CBRA, despite the fact that this facet of the process consisted of “12 First Nations Meetings” (Mariotti, Franco. Quarterly Report # 23, June 2009:6). I observed at the public presentation of the Human Health Risk Assessment (HHRA) at Science North, in Sudbury, that while the Federal Government was indicated as a participant in the Human Health Risk Assessment (HHRA) and there was a booth set up with the Government of Canada logo on it, there was nobody occupying it (p.52). It seems that Health Canada chose to assume the same role which unions were relegated to, that of a non-participant observer. The designated representative from Health Canada, or any other representative from the federal government for that matter, apparently had no desire to appear at the public presentation of the findings of the HHRA. However, the presence of First Nations representatives from Whitefish Lake and Wahnapeitei were certainly visible on the day the HHRA released, although not in the same location where the official release of the HHRA took place, Science North.

On the front page of The Sudbury Star, on May 14th, 2008, there were two major stories. One dealt with the findings of the Human Health Risk Assessment and some of the public’s initial reactions. The other the other main story of the day, which received greater column space read: “Land claim worth \$500B. Whitefish Lake First Nation says Crown breached 1850 treaty.” (Stradiotto 2008). The land claim in question apparently covered all of the land which contained both Vale and Xstrata mining properties, and much more. The Whitefish Lake Band and

Wahnapeitei Band lawyer, Aaron Detlor, termed the claim figure, which was actually \$550 billion, “a conservative estimate, given the mining industry’s \$1 trillion impact originating from the Sudbury basin and from land which once belonged to the Whitefish First Nation” (ibid)

The statement of claim revolved around the signing of an 1850 treaty, whereupon the Whitefish First Nation:

(...) entered into the Robinson Huron Treaty with the Crown to set aside a reservation which is more than five times larger than the current reservation than was set aside in 1885 (ibid).

There was also another earlier, separate land claim brought forward by the Whitefish Band, which revolved around the sale of the band’s timber rights by their Indian Agent, in 1886.

“Indian Agent” was the term used to denote an appointee of the Federal Government, whose role was to act on behalf of, and in the best interests of the Bands they were appointed to represent, in the Band’s dealings with white society. One year after the 1885 land settlement was imposed, the statement of claim alleges that the Indian Agent responsible for administering the Band’s affairs had agreed to the sale of some of the Band’s timber rights, to a member of the Government of Canada. In 1886, the Indian Agent:

(...) sold the timber rights to 76 acres of the reserve for \$316. The purchaser was a Member of Parliament, who flipped the timber rights for \$43,000 in 1887. The following year, the timber rights were flipped again for \$50,000 to \$55,000 (Devlin 2007:1 [A]).

This portion of the Band’s claim was partially successful, in that the judgment rendered agreed that the alleged actions occurred, but that the Band was not entitled to interest on the lost income.

Mr. Justice Wright of the Supreme Court of Ontario ruled on January 24th, 2006:

(...) that the correct valuation of the timber rights in 1886 was \$31,600. He held that Whitefish would have ‘dissipated’ or wasted the monies it received from the sale of the timber rights (...) He therefore awarded simple pre-judgment interest from 1992 to 2005 on the \$31,600. This award accounted for inflation, but not for loss of use of the trust asset. The total award granted was just under \$1.1 million [in contrast with the \$37 million claimed] (Devlin:2 [C]).

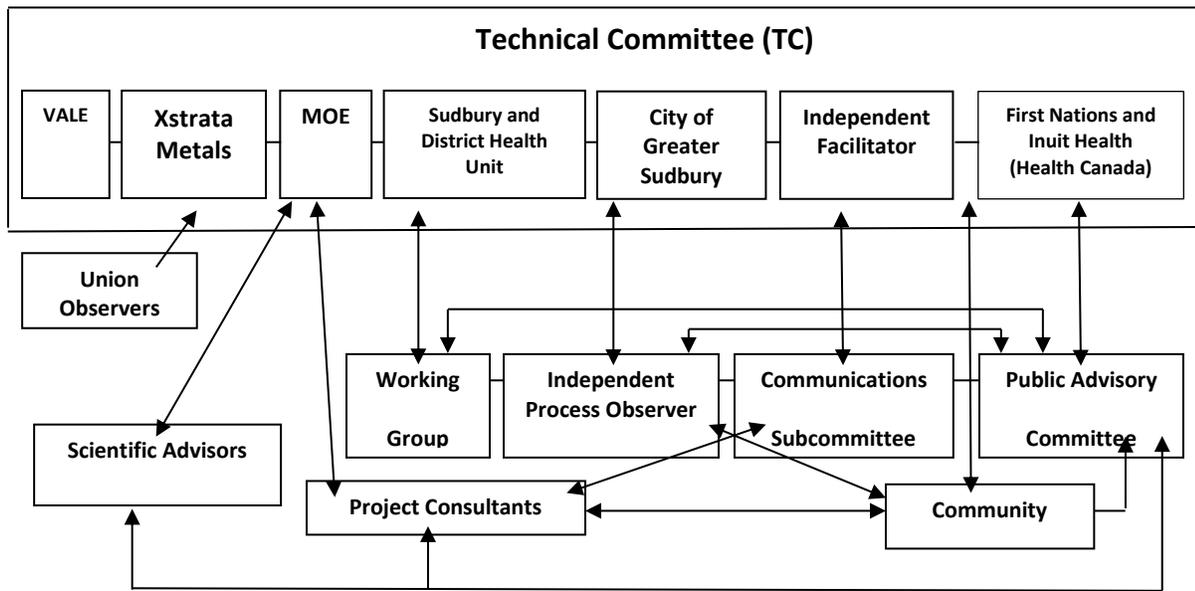
The date of this settlement is relevant to the Sudbury CBRA. It occurred just over two years before the release of the Human Health Risk Assessment (HHRA) on May 14th, 2008. Therefore, there was more than one case of litigation between the Whitefish Band and the Government of Canada occurring during the time the Sudbury CBRA was underway, this one, and the larger claim regarding the Huron-Robinson claim. The 12 Technical Committee (TC) meetings which were held in the two local First Nations communities would likely have alerted the TC to these issues, but all the Wren and Mucklow evaluation mentions of the meetings was that the information obtained from these communities could not be shared publicly:

Whether this was information of a medical and/or legal nature is also not elaborated upon. The Wren and Mucklow evaluation of the two CBRAs makes no mention of any litigation in the Sudbury CBRA, but does mention the class action lawsuit in Port Colborne as being a factor inhibiting both the openness and the progress of the process there (Wren and Mucklow:iv). The fact that the designated representative from the Federal Government of Canada, Ray Alatalo, withdrew from active participation in the Sudbury CBRA should perhaps be viewed from the perspective of it being connected with legal issues, possibly making his withdrawal an ethical concern, and not simply an arbitrary decision to not participate.

Therefore, when representations of the Sudbury CBRA process are shown, the actual degree of participation of the Federal Government's Health Canada representative from the department of First Nation's and Inuit Health, should have been indicated by Wren and Mucklow. It should also have indicated the fact that 12 meetings with First Nations people occurred outside of the official description of the CBRA process; however, the Wren and Mucklow representation does not indicate any of these meetings as having occurred. Their graphic does indicate just how little contact union observers had with the actual decision makers

in the process, and how limited the public input was with the decision making process. The community had contact with the Independent Process Observer (IPO), who communicated decisions already made by the Technical Committee, and on occasion met with the Technical Committee itself, who would merely communicate the reasons for decisions already made.

Fig 19: Wren and Mucklow representation of the Sudbury CBRA.



Source: Figure 4-2 Sudbury Soils Study: Organizational Structure (Wren and Mucklow:10)

The IPO would also be present at the Public Advisory Committee meetings, which was where one could attempt to provide input about the study as a member of the public. Noted earlier, in Chapter 10: “Chronicling the Sudbury CBRA Through Public Documents”, there were also an unknown number of Technical Committee (TC) meetings in the Sudbury CBRA which were held in private, and an unknown number of one-on-one meetings where the Independent Process Observer was not present, where union observers were not present and with no minutes of these

meetings kept for the public to view (p.99). These meetings were to try and resolve differences of opinion, regarding issues in the Human Health Risk Assessment (HHRA). As Rick Grylls wrote of his attempts at participation in the process of the Sudbury Soils Study, Grylls was required, as the price of admission to Technical Committee meetings, to return any documents the union observers were given to examine by the end of the Technical Committee meetings, and not to speak about, nor make any copies of this information, nor to publish any record of what had occurred at these meetings. Unions were to be seen, but not heard. The only information available to the public concerning technical committee meetings, which was posted on the official Sudbury Soils Study website, was an edited version, and was not endorsed by Grylls. He believed that these internet postings were a less than accurate record of what had occurred behind closed doors:

The clinical cleaning of the minutes of the meetings that were going on the web site was another area of expertise (Grylls 2008).

The Wren and Mucklow document makes no mention of what the nature of any disagreements amongst members of the Technical Committee (TC) were, only that there was a need for a “facilitator” defined as: “A third party individual retained to chair and facilitate the TC meetings and help to bring consensus for decision making” (Wren and Mucklow 2010:9). While the facilitator(s) remained nameless, Grylls made an observation that indicated, at the very least, that there was a need for both greater oversight and transparency in the matter of what occurred during TC meetings, the venue where the course of the Sudbury Soils Study was charted. By the fall of 2007, union observers were not informed of TC meetings taken place for the last 4 months of the process; union observers were informed that the two company managers of Vale (Fred Stanford) and Xstrata (Mike Romaniuk) had gotten involved to force the resolution of

disagreements between TC members; union observers were also not informed that the process had finished; the only notification Grylls saw was a public notice in a local newspaper (p.99).

With regard to the one-on-one meetings which occurred between the individual members of the Technical Committee (TC) and an unknown “facilitator” or mediator, when members of the TC disagreed, behind closed doors, on aspects of the Sudbury Soils Study and on how to proceed: There is no record of what was discussed at these meetings, or who the facilitator(s) may have represented. According to the Wren and Mucklow evaluation of the Sudbury CBRA process, having this unknown facilitator involved in the process was one of its merits:

The Sudbury model was more successful overall because the facilitator was not affiliated with any of the TC member organizations and did not represent any specific interests. Because of this, he was able to focus on the process and remain neutral and objective to the issues at hand communities (Wren and Mucklow:14).

This unidentified participant in the Sudbury process could have been any number of people; unfortunately, without any record of what occurred in these meetings, a member of the general public has no way of knowing who it was. If in fact the position of process facilitator was filled by who Rick Grylls believed it was, i.e., that in 2008 “the company managers Fred Stanford and Mike Romaniuk had gotten involved months earlier and forced the process forward” (Grylls:2008), then the composition of the actors in the process had a very corporate character, and this contradicts the Wren and Mucklow version of events, which stated that: “the facilitator was not affiliated with any of the TC member organizations and did not represent any specific interests.” (ibid). A very real ethical concern in this is the matter of the possible implications to the polluters, Vale and Xstrata, should it be discovered they were in fact responsible for harmful and/or excessive pollution. A polluter is unlikely to support a process — which it is also paying for — that may leave it open to potential lawsuits and/or liabilities, as in Port Colborne; therefore, if there was any degree of corporate influence, whether in the form of the facilitator or

any other study participant at this level, it should be noted as having been present. Unfortunately, the secrecy, not the transparency, inherent in the process prevents this determination from being made. Wren and Mucklow, in their evaluation of the two CBRA's, felt this complete secrecy was a necessary feature of the Sudbury process and that no minutes of any of the TC's closed meetings should have been made available to the public, in addition to the Independent Process Observer and union observers being excluded from an unknown number of TC meetings. A rationale was provided in the 2010 Wren and Mucklow document, stating that the public was necessarily excluded from the Sudbury process, in the name of efficiency and productivity:

The completely open process in Port Colborne was conducted amid an on-going class action lawsuit by affected property owners. The process of consensus building requires frank, open discussion among parties. However, due to the presence of the lawyer, plaintiffs and/or media at technical meetings, conversations were often stifled and statements were guarded. The Sudbury process was not subjected to this external factor and the majority of technical meetings were held in private, allowing opinions to be freely expressed and difficult discussions to be conducted to reach consensus (Wren and Mucklow:iv).

However, with privacy comes lack of transparency, but Wren and Mucklow felt this lack of transparency was offset by how much was able to be accomplished in the Sudbury process:

Discussions among members of the Sudbury TC were often very frank with members presenting contrasting opinions. TC members agreed that these types of discussions likely would not have taken place if members of the public were present (Wren and Mucklow:14).

Exactly what it was that could not have been discussed if members of the public were present, since the Sudbury CBRA was to determine whether or not the public's health and the local environment were being affected by local pollution, is not known. In Sudbury, there was also a lawsuit occurring, but with no lawyer representing the plaintiffs (Whitefish and Wahnapeitei First Nation) being present at Technical Committee (TC) meetings, or any other meetings for that matter, at any time. The member of the Sudbury CBRA process who was supposed to communicate the decisions of the process, the Independent Process Observer (IPO),

did only that — communicated decisions made with little or no public input. Franco Mariotti would not provide any information or insights as to the viewpoints of any participants in the process, or whether there were any substantive disagreements between parties he may have witnessed. Mariotti addressed the matter of the need for closed door meetings, and also felt that the lack of transparency regarding discussions and/or disagreements that occurred in the decision-making process was both necessary and justified:

I have witnessed lengthy discussions and have been privy to arguments that may have been interesting headlines had they been made public, but they would not have been useful to the interests and goals of this study. I believe that the right of Sudburians to know what the impacts of chemicals of concern in the soil have on our health would have been compromised or redirected by distractions irrelevant to this issue (Mariotti 2009. Quarterly Report #23 June, 2009:3 B] [1]).

The “irrelevant” issues relating to decisions taken by the TC in private were never communicated to the public, only the decisions themselves, which apparently made the position of Franco Mariotti rather superfluous at times. Decisions could simply have been handed down from the Technical Committee (TC) directly to the local media, without Franco Mariotti’s rephrasing of the same information. Speaking from experience, what was presented to the public in the Sudbury Community Based Risk Assessment (CBRA) as the final product was complete unanimity, with a united front being presented by all the members of the TC and with no hint of disagreement between them concerning any part of the CBRA. This avoided a repetition of what happened in Port Colborne, “where the independent consultant and PLC (Public Liaison Committee) were not in agreement with the study findings” (Wren and Mucklow, 2010:14). It is for this reason that consensus was imposed upon the Technical Committee of the Sudbury Soils Study, and led the architects of the study to conclude that: “Without a previously established alternative decision-making process, there is a danger that the final product will not be supported by all parties (ibid). The Sudbury CBRA process did in fact result in a public display of

unanimity, without any hint of disagreement between all the parties who authored it, during public presentations of the findings. The alternative decision-making process, which required complete unanimity on the part of all parties, could conceivably have enabled any participant, including the polluters, who represented a minority viewpoint, to veto any data or methodology of which they did not approve, thereby halting the entire process. If that were to occur, the alternative process seemed to be to resolve the matter by further closed-door committee meetings, and/or one-on-one meetings with an unknown facilitator mediating the disagreements. Either way, the requirement of consensus was carried on either in whole or in part, in a non-transparent manner, and with a secret dispute settlement process involving unknown parties, with no public knowledge or record of what occurred, or what the disagreements were about. The Wren and Mucklow evaluation concluded that these two features of the Sudbury CBRA, consensus on all matters and closed-door meetings, were actually an improvement over the Port Colborne CBRA; the requirement of consensus in the Sudbury CBRA, i.e., complete agreement on all matters, would result in an agreed-upon final product:

Cohesiveness allowed the TC in Sudbury to produce final reports and communications materials that all members could support, while the final reports submitted by Vale for the Port Colborne CBRA were not supported by all members of the TSC. (Wren and Mucklow:15).

Vale's findings in Port Colborne, as noted earlier, were not supported by the Independent Consultant, Mike Watters, a scientific expert meant to provide public oversight on the findings, and to explain the science of the CBRA to the general public. His role was not simply to communicate to the public what decisions had been made on scientific matters behind closed doors, like Franco Mariotti, but to question the process whenever he felt it necessary to do so.

The Wren and Mucklow evaluation stated that Watters was in a conflict of interest:

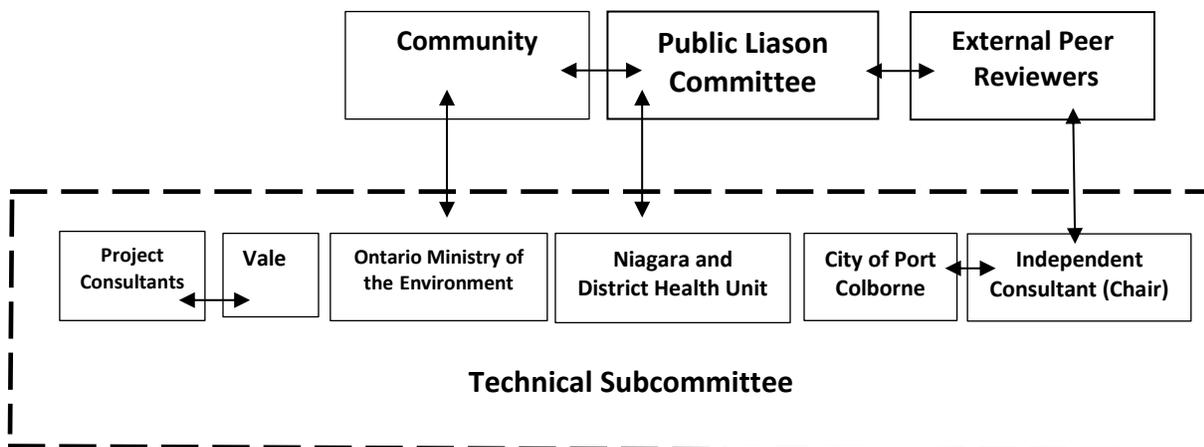
(...) in Port Colborne, the independent consultant could not remain neutral and objective in the role of chair to the TSC because he was also representing the interests of the PLC and public (Wren and Mucklow:14).

That is a somewhat curious statement, given that the composition of the Public Liaison Committee (PLC) was:

A committee of volunteer community members appointed by the City to solicit public input, inform the public and provide input to the CBRA process; (Wren and Mucklow:7).

From this statement, it would be reasonable to infer that Wren and Mucklow are acknowledging that risk assessment is a confrontational process, with conflicting interests being represented by the public, which are apparently at odds with those of the polluters. Wren and Mucklow represented the Port Colborne process in the following manner:

Table 20: Port Colborne CBRA: Organizational Structure



Source: (Wren and Mucklow, 2010:8).

With no public participation in the Sudbury process, in the form of an Independent Consultant, such as Mike Watters in Port Colborne, and no public observers monitoring and reporting on how the process was conducted, the Sudbury CBRA was less open and had less active public participation:

In Sudbury, closure has been achieved at a technical level for the risk assessment. The final reports were accepted by the MOE and the project has moved on to the risk management phase. However, some participants have argued that closure was not achieved among the public for the HHRA (Wren and Mucklow:46).

Wren and Mucklow then make a rather interesting statement concerning what they felt may have been a contributing factor to the lack of closure with the community of Sudbury, i.e., why the public was not generally supportive of the Sudbury CBRA findings:

(...) a small group of citizens challenged the results of the study and received media coverage that may have left the public with a confusing collection of messages (Wren and Mucklow:47).

The fact that public challenges to the findings of the Sudbury CBRA had resulted in local media coverage was apparently not well received by an unspecified number of the participants in the Sudbury CBRA according to the Wren and Mucklow evaluation:

(...) most participants of the Sudbury Soils Study indicated that local media coverage of the study was poor overall and not beneficial to the project (...) Most participants indicated that a disproportionate amount of media attention was given to vocal opponents of the project (ibid).

In assessing the quality of media coverage during the Sudbury CBRA overall, the Wren and Mucklow research concluded that:

(...) members of the public who relied solely on media reports for information would not have received sufficient information to be adequately informed about the studies (Wren and Mucklow:48).

From my experience as a participant in the Sudbury CBRA, I would tend to agree — but for very different reasons. I would add that much of what local citizens said at public information sessions was not accurately conveyed by the local media, if at all. The most glaring example I

observed in this matter was in the interpretation of the research by Jerome Nriagu et al (1998) in the local media (pp. 59-60). In general, the CBRA evaluation by Wren and Mucklow took a rather dim view of local media coverage during both the Port Colborne and Sudbury CBRA processes:

In Port Colborne, the class action lawsuit and media sensationalism (particularly from the national media sources at the beginning of the project) were external factors that were challenging to deal with throughout the project. Poor and often sensational local media coverage was also an external factor that was challenging for the Sudbury Soils Study (Wren and Mucklow:53).

Wren and Mucklow do not specify what they felt represented “sensational” or “poor” media coverage. Perhaps one of the “poor” pieces of press coverage may have concerned a local telephone poll taken by local newspaper The Sudbury Star, on May 19th, 2008. It asked whether or not the respondent trusted the findings of the Sudbury Soils Study:

About 71 per cent of the 90 respondents said they didn't trust the result of the five-year study, while 29 per cent said they did (Sudbury Star Staff, 2008:4)

Another poll conducted by local newspaper Northern Life was taken one week later, between May 14th and May 27th 2008, and revealed that:

(...) 68.87 per cent of contributors (73) said they were not assured by the results, compared with 31.13 per cent (33) who were (Bradley 2008).

The authors of the Sudbury Soils Study’s Human Health Risk Assessment (HHRA) had also conducted a telephone poll of their own, earlier in the Fall of 2004, in an attempt to gauge both the levels of public awareness of the CBRA at that time and to ascertain whether or not the respondent wanted to participate. The poll discovered that of out of a total of 606 people surveyed:

Approximately 67% of respondents suggested that the amount of public communication to date was insufficient, while 24% suggested there was nothing further the study team could do to encourage them to participate (Wren and Mucklow, 2010:42).

At the time of this 2004 poll by the Sudbury Area Risk Assessment (SARA) group, which was conducting the Community Based Risk Assessment, no results of either the Sudbury Human Health Risk Assessment (HHRA) or the Ecological Risk Assessment (ERA) had even been released. Members of the public, including the Community Committee on The Sudbury Soils Study, who did participate in contesting the findings of the CBRA after their eventual release to the public, were categorized in an interesting fashion by Wren and Mucklow:

Perhaps, if there was a greater understanding by this interest group of the rigour and arms-length nature of the external peer review process conducted for the Sudbury Soils Study, they wouldn't have determined the need to seek another opinion. Alternatively, they may have benefited from having the opportunity to ask their questions directly to the peer reviewers, rather than seeking other external reviewers who were not as qualified (Wren and Mucklow:24).

As a former member of this “public interest group” who Wren and Mucklow never identify as The Community Committee on the Sudbury Soils Study (CCSSS), I can state unequivocally, that being able to ask questions of the peer reviewers, even before the results were released, would not have satisfied any of us. It was also not a lack of understanding of the issues that led us to oppose the findings. As a former member of the CCSSS, I also found the suggestion that those who disagreed with the findings simply didn't understand the process of peer review, to be quite condescending. Again, it was not the peer review process which was being contested. The area of contestation was the complete lack of public input over the methodology which had been employed in the Sudbury CBRA, and the findings that this methodology produced. In the estimation of Rick Grylls, (a member of the Community Committee on the Sudbury Soils Study, the “vocal minority” in question), who was as close to the actual process as a member of the public managed to get, had no quarrel or questions

concerning the researchers and scientists employed by the Sudbury CBRA:

The people who did the science provided 100% accuracy to what they were instructed to do” (Grylls 2008).

The Wren and Mucklow evaluation also states that there was a reason why the matters about which not only me, but other members of the public were most concerned, were not addressed by the Sudbury CBRA:

Community health studies, risk assessments of historical or occupational exposures and property value assessments were considered to be outside the scope of the CBRA (Wren and Mucklow, 2010:50).

The Community Committee’s biggest point of departure with the study, in our capacity as citizen activists, was the fact that it was only meant to predict the risk of harm to human health and the environment, not to examine actual health levels in our community. It also did not look at the risk from the multiple pollutants we are exposed to and did not examine body burdens of the pollutants being studied in Sudbury residents. We felt that such data would have either validated or disputed the calculated risks to the community, as determined by the Human Health Risk Assessment. The matters of methodology and how to proceed with the study were off-limits to all members of the public, and the decisions on these crucial matters were made long before the release of the CBRA. These decisions were made in a forum, The Technical Committee, where the public could not participate; however, there is an interesting rationale by Wren and Mucklow for this decision as well, which suggests that two elements of the process were believed to have adequately represented the public. Both the Independent Process Observer (IPO) and some members of The Public Advisory Committee (PAC), seemed to be convinced that the public had no place in Technical Committee (TC) meetings, to help decide the methodology as to how a community based risk assessment should be conducted. These matters were decided during

Technical Committee meetings, which the public were never invited to attend:

PAC and IPO observers at TC meetings also believed that there was no need to have these technical discussions in a public forum because most members of the public would not be interested in the scientific debate over details of the methodology, and there may be a chance that these debates would be taken out of context by the public or media, which could impede the progress of the study (Wren and Mucklow:37).

This suggests that the general public was incapable of understanding and discussing matters of their own human and environmental health, and/or had no interest in such matters. Public involvement in the study was apparently perceived as an impediment to progress. Further reasons for excluding the public or communicating to the public what issues were being debated, were also given by the man whose mandate it was to ensure that the people of Sudbury's interests were represented and that what was happening during the process of the CBRA would be communicated to the public. That person was Franco Mariotti, the Independent Process Observer (IPO). According to Mariotti, the Sudbury Soils Study process:

(...) The presence of all the observers mentioned above ensured that no Technical Committee member dominated or forced the opinion of any other member. The accusation that the mining companies dominated the process is not based on factual evidence whatsoever and is contrary to the findings of all the observers. (Mariotti 2009 Report #23 2009:4).

Just how much observation the "observers" were allowed to make of Technical Committee meetings was clearly very limited, as a number of these meetings were not attended by any union observers at all. The meetings in question were acknowledged earlier in this piece by the Wren and Mucklow evaluation (p. 194), as one-on-one meetings between individual Technical Committee members and the Independent Facilitator, whomever that may have been (Wren and Mucklow:14). Until such time as the minutes of all of the Sudbury CBRA Technical Committee meetings are made public, where the identities of the people involved in the one-on-one meetings are made known, in addition to the issues discussed, the IPO's claim that transparency and

openness took place behind these closed doors seems somewhat specious.

As Rick Grylls noted in his evaluation of the Sudbury CBRA:

By the time the unions reached the table as observers the course forward was set. The questions we would have liked to be part of the study did not get included. By narrowing down questions you can reach pre-concluded answers. We only viewed a small fraction of the actual work process and material at the public hearings and observed no working committee hearings (Grylls 2008).

And to put an exclamation point on the matter of whether or not this process was based on science or politics, the following observations by Franco Mariotti, concerning delays in the release of the Human Health Risk Assessment component of the Sudbury CBRA, statements 2 and 3, below, stand out as being particularly informative about the political dimension of the Sudbury CBRA:

1. Delays were due to a limited number of toxicologists being available to comment on draft HHRA reports. The MOE should have considered early on that this could possibly create delays.
2. Delays were caused when the MOE wanted answers and clarifications on certain issues and details of the mitigation efforts by the mining companies. However, the mitigation efforts were not a part of the Sudbury Soils Study and should have been dealt with after the HHRA release.
3. Delays were caused by behind the scenes decisions by MOE bureaucrats which kept many in the dark

(Mariotti 2008. Quarterly Report #21, May 2008, p 5, 6]).

Just what decisions were made by Ministry of the Environment (MOE) officials outside of the mandated process of the Sudbury CBRA, especially regarding “mitigation efforts” and what was being mitigated, were never elaborated upon by Mariotti; however, the issue of “mitigation” i.e., doing something about actually regulating or reducing the effects of mining pollution on human health and the environment, would be addressed later, and in a most interesting manner. This will be discussed in Chapter 19: “The Environmental Registry and Permissible Pollution Levels for Sudbury”, and in Chapter 20: “The Spanish Harbour”. All of this secrecy and maneuvering both

inside and outside of the CBRA process, the details of which, even now, years after the fact, are being kept from the general public, should not only be considered a lack of transparency in the process; it should also be viewed from the perspective of a piece of Government of Ontario legislation known as The Environmental Bill of Rights. This Ontario legislation, and the concept of Environmental Justice, will be discussed in the following chapter.

Chapter 18

CBRAs, Environmental Justice and Ontario's

Environmental Bill of Rights

- (...) before embarking on a large and complex CBRA, the community should be consulted to find out what their concerns are and whether these concerns are best addressed through a CBRA or through another process (Wren and Mucklow, 2010:v).
- “The question of environmental justice is not anchored in a debate about whether or not decision makers should tinker with risk management. The framework seeks instead to prevent environmental threats” (Brown, Phil. 2008.:21).
- “In February 1994, the Ontario government proclaimed into law the *Environmental Bill of Rights, 1993 (EBR)*. The proclamation of the *EBR* was intended to indicate a new era in environmental decision making - one of better public participation and greater accountability of government decision-makers. The purpose of the *EBR* is to make provincial government decision-making more transparent and accessible to all members of the public” (McRobert, McAteer 2001: [I]).

The question of how best to address community concerns about environmental pollution has been an ongoing concern for decades. During the 1960's at the same time the civil rights movement in the United States was concerned with the legal rights of African-American and other disadvantaged people, the same civil rights movement was also striving for recognition of the fact that their communities were being subjected to unfair levels of pollution, which white communities by and large, were not. One of the first studies into this issue into the matter of contamination levels in African-American communities was by the United Church of Christ Commission for Racial Justice (UCCCRJ) in 1987. This study correlated 5-digit zip codes throughout the US, (known as postal codes in Canada), to the location of toxic waste facilities

and found that:

(...) communities with two or more commercial hazardous waste facilities or one of the five largest commercial hazardous waste landfills had minority populations of 37.6% on average, compared to 12.3% of communities with no such sites (Fletcher 2003:95).

Racial minorities were 3 times more likely than the general population to be living near a hazardous waste facility in the US, according to this 1987 study. Other studies investigated the same issue, one of them at the University of Massachusetts (UMass) in 1994, and generated very different results. The different results are a function of how the matter was investigated, and as Fletcher suggests, by whom. One of the UMass studies was “funded by Waste Management Incorporated, and the Institute for Waste Management, whose loyalties clearly are to industry” (Fletcher:96). The methodology in this UMass study looked at census tracts (which are much smaller in area than zip codes), “and they also used different comparison groups” (ibid). The industry-funded study did not simply compare areas that did have a waste facility with areas that did not. Instead, this study looked only at areas with a population greater than 1 million, and “compared census tracts with facilities to those without, but only if they were within a metropolitan area with at least one facility within its borders” (ibid). This methodology assumed that rural communities do not have waste facilities within their borders, and eliminated them from the study. The findings of this UMass study led to its authors concluding that the census tract was a more appropriate unit of analysis, as:

Aggregated results are very similar to those reported from prior analyses of zip code areas. If one could find some clear rationale (that is an epidemiological demonstration that a particular hazard is characteristically distributed over a particular, larger area), perhaps these larger areas could be accepted (...) to this point, however, the proof is lacking ([Anderton et al. 1994a:238-239] (Fletcher 2003:98).

However, as Fletcher points out, according to the United States Environmental Protection Agency (EPA), “environmental and health statistics are not routinely collected by race, income

or census tract in the United States in such a way as they can be correlated with pollution (Fletcher:96). A second impediment to gathering health statistics relating race to exposure to pollution, is the “relative contribution of environmental and behavioral factors of health problems among various racial and income groups” (ibid). Later analysis by another researcher who participated in both studies, by the United Church of Christ Commission for Racial Justice (UCCCRJ) and by the University of Massachusetts (UMass), Dr. Benjamin Goldman, had an interesting perspective on the matter:

Always watch a magician’s other hand (...) Instead of comparing their waste site tracts to the twelve per cent people of color average for this country, they compared them only to other tracts in metropolitan areas with commercial toxic waste sites, which, on average, have roughly 26% per cent people of colour” [Goldman 1996:134] (ibid).

What the UMass study did was to construct risk as a relative, comparative matter, comparing similar population areas, not the actual percentage of minority populations in these census tracts that were next to waste storage facilities. Large communities containing waste sites were simply broken down into smaller units of analysis, then these units were related to adjacent areas within that very same community, which showed similar levels of racial minorities within them, as one would expect. As Goldman pointed out, this UMass method actually confirmed the conclusions of the United Church of Christ Commission for Racial Justice (UCCCRJ) study: racial minorities are at greater risk of having one or more toxic waste sites in their communities. The UMass study concluded that the percentage of African Americans living next to a toxic landfill or toxic facility (26%) was in fact more than twice that of the African-American population as a whole (12%). However, in relative terms, when one compared adjacent census tracts living near waste facilities, there was no significant statistical difference in racial composition.

In his book “The Quest for Environmental Justice, Human Rights and the Politics of Pollution” (2005), Robert D. Bullard also explored the phenomena of racial minorities being at

higher risk of having polluting industries and/or one or more toxic waste sites in their communities, and of industry attempts to cover this fact up. He notes that the first class action lawsuit in the United States (US) to block the construction of a toxic landfill site was on the basis of civil rights law and occurred in 1982, in the case known as: “Bean vs. Southwestern Waste Management Corp”. Southwestern Waste Management Corp. had planned to build a waste dump in Warren County, North Carolina, a predominantly African-American community, but the community was vehemently opposed to it. Protests and demonstrations of opposition to the proposed facility led to “more than 500 arrests” (Bullard 2005:20). The incident prompted a study by the US General Accounting Office, titled “Siting of Hazardous Waste Landfills and their Correlation With Racial and Economic Status of Surrounding Communities.”, which was published in 1983, and it revealed that:

Three out of the four off-site, commercial hazardous waste landfills in the US Environmental Protection Agency’s Region 4 (composed of 8 southern states) happen to be located in predominantly African-American communities, although African Americans make up only 20 per cent of the region’s population (ibid).

This US government study also confirms the conclusion of the aforementioned 1987 United Church of Christ Commission for Racial Justice (UCCCRJ) study, discussed earlier. The government data confirms that African Americans are disproportionately more likely, in fact just over 3 times more likely according to the US General Accounting Office, relative to their populations, to have a hazardous waste facility in their communities. It led to a mobilization of African American and minority communities into united local organizations to protect their communities’ environment. In 1991, in Washington DC, many of these community groups convened at a summit conference called “The First National People of Color Environmental Leadership Conference” to plot a course for opposing the unfair pollution and contamination of

minority communities located adjacent to industrial sites. As Bullard notes, for people living in polluted communities:

(...) environmental pollution is a life and death issue. These communities define environmental protection as a basic right (Bullard 2005:2).

The summit issued a proclamation, “Principles for Environmental Justice” (Bullard:3). In brief, it called for minority communities to unite as they had during the Civil Rights movement of the 1960s, to take control of their communities, and to not allow them to be a dumping ground for industrial waste (ibid). Three years later, in 1994, during the Clinton Administration, President Clinton signed Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.”; the memorandum to this Order acknowledged that in many cases, exposure to environmental pollution is in fact related to race and class, and that existing laws and statutes, if they were properly enforced, could address the issue and:

Prevent those minority communities and low-income communities from being subject to disproportionately high and adverse environmental effects (ibid).

While President Clinton’s Executive Order 12898 was considered a watershed achievement for the Environmental Justice movement in the US, it is necessary to point out that Order 12898 called for the implementation of existing laws and statutes which the United States Environmental Protection Agency (EPA) and other governmental agencies already had at their disposal. It was a matter of how these laws were, or were not, being enforced; that was the issue. It also established that “environmental justice highlights the political economy of illness and how discrimination shapes environmental health disparities” (Bullard:12). In addition, author Phil Brown contends in his book “Toxic Exposures Contested illnesses and the Environmental Health

Movement “(2007), that there are fundamental facts to life in capitalist societies that also need to be taken into consideration, which are:

- The need to view environmental inequality as a sociohistorical process rather than as a discrete event;
- The need to understand that environmental inequality involves a multiplicity of stakeholders with “shifting interests and allegiances: rather than a simple victim-perpetrator dyad: and
- The need to view environmental inequalities as a cyclical process of production and consumption. (Brown:12)

Another fact of industrial pollution is that workers and their unions have been dealing with the same issues and that in the struggle between unions and corporations over toxic workplaces:

Occupational health issues have often brought to light the economic trade-offs whereby profits have frequently been placed ahead of the safety of the producers (...) In many cases, corporations denied the existence of known health effects and instead blamed the victim (ibid).

However, according to Bullard, citizen activists are most often without the organizational support of trade unions, and in addition, have to deal with industry-sponsored researchers who are paid to produce research designed to minimize or deny the existence of environmental pollution. When I was carrying on e-mail correspondence with Dr. Jerome Nriagu concerning The Sudbury Soils Study, I expressed my disbelief to him over the findings of the industry-sponsored Sudbury Soils Study, and received a very interesting reply, in which he described the Sudbury CBRA as “scientific magic”, a study where data is purposely collected to in order to prove predetermined ideas (p 67).

Preconceived ideas come hand in hand with preconceived concepts of what is, or is not, valid information about pollution issues, or even what the issues are, on the part of industry-funded researchers. Brown makes the point that as front-line observers of their polluted communities, laypeople, are often considerably more aware and informed of the local issues of which they

speaking, than are outside “experts”:

First, they are often the first to notice disease increases and clusters, and they often have to fight to get recognition and action,

Second, they face corporate and governmental resistance to the recognition of environmental health effects, making them think that there are indeed problems that have not yet been adequately acknowledged.

Third, laypeople often point to environmental and occupational factors that are later found to be very accurate and that become part of the core of medical knowledge and governmental regulation.

Fourth, laypeople focus on the proximate concerns they see in their everyday lives and worries. In fact, it is likely that many of the clusters noticed by laypeople are valid observations...perhaps it is that science simply has not yet seen the clusters identified by laypeople and had not figured out appropriate methods to quantify hazards, exposures, and clusters (Brown 2007:4).

Brown concludes that this bias towards only specific types of information, in specified format and methodology, generated only by science and health professionals, is the result of two factors, known as The Dominant Epidemiological Paradigm, and the process of “scientization”. The first, the Dominant Epidemiological Paradigm (DEP), he defines as follows:

(...) the DEP is both a model and a process. The rise of professional authority, most notably in medicine, has placed experts in control of many areas previously in the purview of laypeople (Brown:18,19).

With the DEP comes a devaluation of lay observation and experience, and an exclusion of those who are not part of the dominant scientific and medical network, i.e., the “scientized” milieu of scientific experts. According to Brown, the scientization process is the logical outcome of professional authority and results in the dominance of environmental health issues by the professional class:

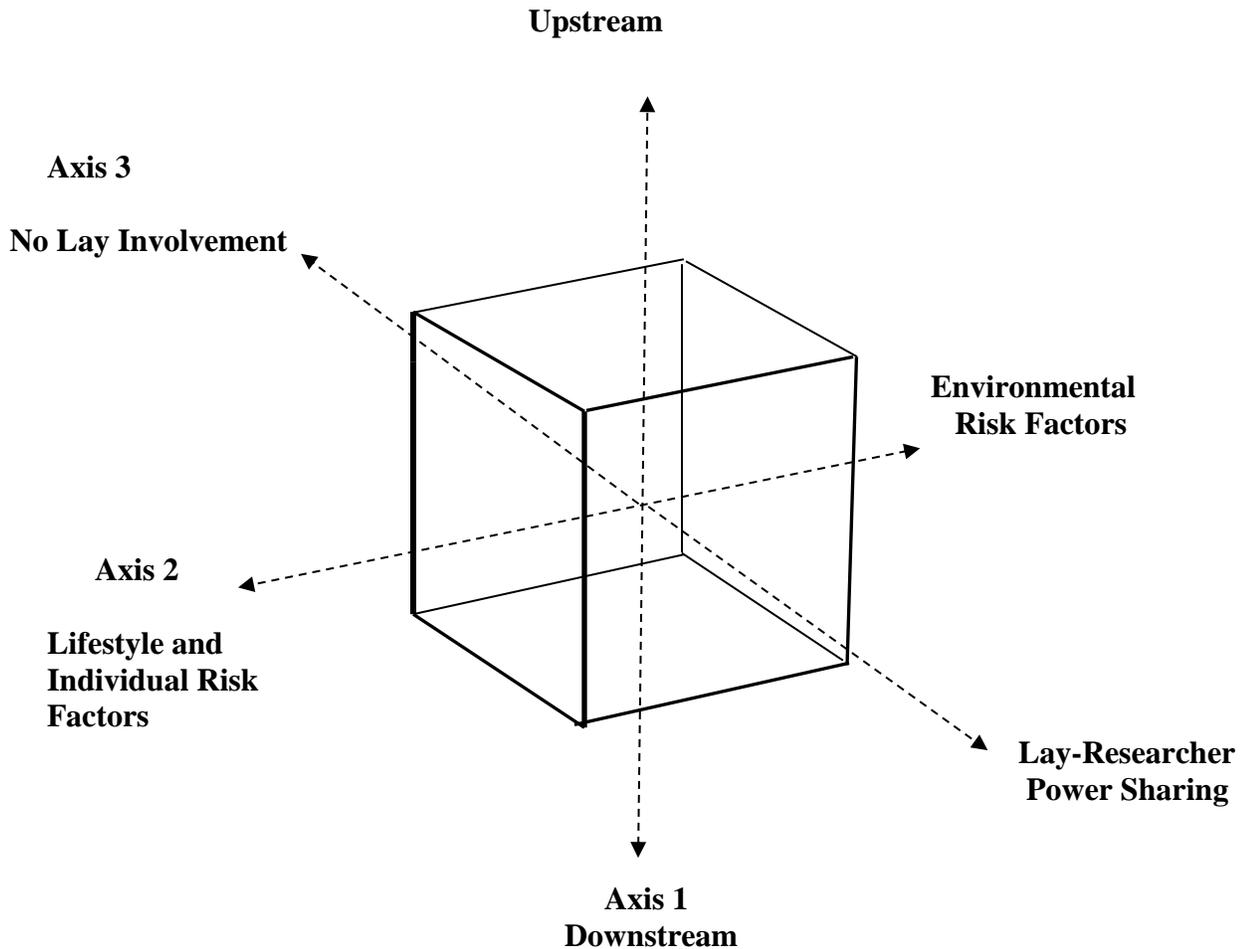
Through this scientization of decision making, industry exerts considerable control over debates... deploying scientific experts who work to ensure that battles over policymaking remain scientific, ‘objective,’ and effectively separated from their social context (ibid).

To counter this influence of science in social policymaking relating to environmental health matters, citizens must establish what Brown terms “citizen-science alliances” (Brown:24). This occurs when activist citizens have a scientific ally, a critically oriented scientist who is predisposed to participating in community health matters on the side of the public. Once citizens find such an ally, they can begin to conduct what Brown terms “community-based participatory research” (Brown:35) which is not to be confused with the process which has been called the “community based risk assessment” (CBRA), which is in most cases an industry-sponsored process with limited, or no public participation at all. This would be a very different kind of process, very unlike the Sudbury Soils Study, a prime example of an industry-sponsored CBRA:

Community-based participatory research goes beyond the traditional models of public involvement by requiring active participation at every stage in the research process. However, it is increasingly used mistakenly as a term to describe research that involves a community in any capacity even though members of these communities may have little actual input in the study (Brown:35,36).

Community-based research is also much different philosophically, from what is termed “community based risk assessment”, in that scientific expertise does not remain unchallenged, and industry-funded scientific expertise and control does not dictate roles of participants, nor set the agendas of what will or will not be part of the research into a given issue (Brown:36). The process does not simply take place in an affected community, it actually involves the community. Brown’s book contains a graphic to represent the opposing approaches to research into contested illnesses, reproduced on the next page in **Fig 1**. It represents how illness is perceived by both laypeople, and by those who both adhere to, and propagate, the Dominant Epidemiological Paradigm (DEP), concerning both illness, and research into the causation of illness.

Fig 1: Conceptual Model of Community Based Research.



Source: Figure 2.2 Dimensional model of Breast Cancer Research [adapted from a model by Todd Demelle] (Brown 2007:49).

This graphic in **Fig 1.** was originally used to demonstrate disputes over how to conduct breast cancer research, and adapted by Brown, as it can also be utilized to demonstrate how research into other contested illnesses are conducted generally. It is simplified in its approach, calling the DEP the “downstream” approach, and lay perceptions the “upstream” approach (Brown 2007: 48). **Axis 1**, “involves disputes over doing scientific research, interpreting science, and acting on

science” (ibid:62). It illustrates the two polarities of thought, one which seeks the prevention of disease, as opposed to only the treatment of disease. On **Axis 1**:

(...) the upstream approach tries to prevent the occurrence of the disease by preventing exposure (...) The downstream approach is the dominant, conventional approach, whereby disease is treated, rather than prevented” (Brown:62).

Axis 2 illustrates the underlying risks of disease, believed by many activists to be environmental in origin, i.e., pollution, while polluters tend to point to lifestyle choices of affected populations such as diet, exercise levels, and whether an individual smokes or not, as the origins of disease. The community approach at the opposite end of the axis includes community-level factors as a cause of disease, such as localized pollution, which communities believe need to be given at least equal weight in the DEP. The DEP also concentrates on treating disease, rather than exploring the possibility that environmental exposure may be a contributing or causative factor, which would make pollution exposure, prevention and regulation, a viable “treatment”.

Axis 3 shows contested power-sharing arrangements, with the scientized approach at one end of the axis, with no lay or community involvement. At this end we find the established members of the scientific and medical community, while at the other end of this axis is the affected community, which desires a sharing of knowledge and decision-making in matters which affect their collective health. Ideally, these differences can be negotiated into a compromise situation, so that a balanced approach to the causation of disease can be reached, and the final research approach will be a negotiated one, situated somewhere within the metaphorical cube shown in **Fig 1**. In this ideal scenario, the lay community will be brought into the process, and the proponents of the DEP will move from their entrenched approach to causation, to a more balanced position. Once this event occurs, the community’s concerns and

personal familiarity with the illness(es) being researched will be considered a valuable aid to assist researching the matter at hand, whatever it may be. However, Brown also points out there are enormous obstacles to making this ideal situation a reality. There are dynamics of both money and power at work, which make this new paradigm, with its consideration of prevention being as viable an option as treatment, difficult to bring into existence. Brown breaks down the causes of resistance along all three axes. To move along **Axis 1**, and to see the possibility of disease as a preventable outcome of exposure to toxic chemicals, getting corporations and government to change is hampered by the fact that:

(...) corporations and government regulators will be unlikely to accept removal of many chemicals from circulation or to bear the exorbitant costs of extracting these chemicals from the environment (Brown:97).

For movement along **Axis 2**, where environmental causation is included in research perspectives, it is much easier for a polluting industry to construct a paradigm, possibly based on an Industry-funded risk assessment, that blames the public for illnesses, not themselves. Opposition to movement along **Axis 3**, with public victims of toxic exposure involved in sharing decision making power over research and remedies is very unlikely to occur, due to the fact that:

(...) corporate and governmental actors will likely oppose strong lay participation because such involvement often stems from an approach that values community over corporate rights and that supports greater democratic participation in science, which in turn invites challenges on the other axes (ibid).

Therefore, it appears that the control of scientific methods of investigation is what governs almost all other outcomes: the degree of lay participation, the type of research paradigm which governs research i.e., prevention vs. treatment of illness, and the sharing of power in the researching and regulation of harmful substances. Whoever controls the science and communication in a risk assessment essentially controls the social perceptions and social

construction of that risk to health. This is what Brown refers to as the “scientization” of illness, which he defines as:

(...) seemingly objective notions of science that frame political and moral questions in scientific terms, that limit public participation in decision making and thus ensure that the latter becomes the purview of experts (...) where expertise wins solely by its overwhelming power (Brown:xi).

Perhaps the best example of how the power of scientization being difficult, but ultimately not impossible to challenge, is Love Canal, in Niagara Falls, New York.

Thomas Fletcher, in his 2003 book: “From Love Canal to Environmental Justice”, relates how a local resident of the Love Canal area, Lois Gibbs, a housewife, began to map incidences of illnesses in the Love Canal subdivision where she lived. This mapping of illness led to her “eventually hypothesizing that they were clustered around old streambeds (swales) and other ‘historically wet areas’ that developers had filled prior to home construction” (Fletcher 2003:50). With Dr. Beverly Paigen, a cancer research scientist at Roswell Memorial Institute in Buffalo, New York, a citizen-scientist alliance was formed, and the pair “conducted a survey to determine the validity of the swales theory” (Fletcher:50,51), but ran up against the scientized approach to identifying and quantifying the location and incidence of community illness.

Gibbs and Paigen’s research was discredited by the mainstream scientific community as “‘unscientific’ mainly because it failed to use a control group for comparison, as is necessary in the design of experimental research” (Fletcher:51). A control community is defined as one which does not have the conditions of the community being studied. Despite Gibbs and Paigen’s correlating illness clusters in the Love Canal subdivision by matching former watercourses and low points, called swales, which collected contamination in the original geography of the area, remediation of the site continued with containment being the preferred treatment, as opposed to

the removal of the toxic pollution from known areas of contamination. Eventually, a controlled study was done by the New York State Department of Health in February 1979; however, the control community in this case was none other than an area of the polluted Love Canal subdivision itself. Locations and rates of illness clusters had been mapped by Gibbs and Paigen, and the results indicated that there were three principle areas of contamination. The first area, or ring, was directly across from the canal, containing soil that was wet at the surface with contaminated water. The second ring of contamination started at the next street adjacent to this first area, and the third ring of contamination was adjacent to the second ring. As a control community for the two most polluted areas, rings one and two, the government study chose the ring three area for comparison, making their study more acceptable in terms of scientific methodology, as it used a control community. The study showed that in the ring three area, only three streets from the highly contaminated canal itself, “there were twenty children with liver problems or abnormal liver enzymes” (Gibbs 1998:106). What the study then did, was compare the liver test results for ring three with those living on rings one and two “and they found no difference...Rings one and two were the areas of highest exposure to toxic chemicals” (ibid). Through this methodology of relative levels of health effects, which were shown to be not significantly different, but also not safe, it allowed the study to conclude there was no relative danger to health, which negated the quantifiable and empirical levels of illness already documented. To Gibbs, it seemed that:

At the same time they were trying to tell us the neighborhood was normal, they were also telling us that twenty boys under eight years of age, living two and three streets from the canal, had abnormal liver tests. They were ignoring their own studies (ibid).

Actually, they were not ignoring their own results, but manipulated them in such a way as to render the actual harm that was occurring to disappear, statistically and in relative terms, by

comparing areas that were suffering the same health effects. In July of 1998, the New York State Department of Health (NYSDOH) completed their own five-year Habitability Study for the Love Canal area, and this study:

(...) concluded that portions of the Love Canal neighborhood were ‘as habitable as other areas of Niagara Falls.’ NYSDOH refused to declare these areas safe (Center for Health:14).

Once again, the definition of danger to public health was being defined in relative terms, as in a relative level of acceptable harm in comparison to another area, not in terms of the presence of toxic substances and quantified health effects. Another study was undertaken in 1998 by the New York State Department of Health, (NYSDOH), to once again determine the risk posed by living in the Love Canal subdivision. According to Gibbs, NYSDOH compared the Love Canal area to two uncontaminated areas; however, the department then added two more areas for comparison:

One of the new Niagara Falls comparison areas was found to have barrels of wastes from Occidental Petroleum Corporation – the same company responsible for Love Canal – buried and leaking under a parking lot. The second additional Niagara Falls control was downwind of the Occidental Petroleum incinerator (...) This insured that a significant portion of Love Canal would be habitable (...) The selection of appropriate comparison or control areas is the most critical factor (Gibbs 1998:207).

Once again, the control communities selected were suffering from the same pollution as the affected areas. By July, 1998, the United States Environmental Protection Agency (EPA)

(...) agreed to request the City of Niagara Falls that the agency demolish the 63 remaining homes in the portion of the Love Canal Emergency Declaration Area (EDA) deemed unsuitable for residential use. (Center for Health, Environment and Justice, 1997. [Updates in 1998 and 2002.]).

However, in a rather puzzling move: “A playground was built on the southern section (not habitable) section area of the neighborhood’ (Gibbs 1998:207), in August 1998, only one month after the area had been designated as uninhabitable and demolished. On the basis of the relative level of risk present in the control communities used, which had the same type of contamination,

this area of Love Canal was considered to be no riskier than other areas, and therefore, suitable for children to play on. It once again illustrates the dialectic of the Precautionary Principle, favoured by environmental activists, versus the Dominant Epidemiological Paradigm (DEP). The Precautionary Principle rests on the belief that the best strategy to deal with pollution is avoidance, and if possible, elimination of the risk. The strategy preferred by government and especially industry, a combination of risk assessment and the DEP, conceives of pollution as a relative matter, one of acceptable relative risk, even if harm has been demonstrated. For government and industry, all that needs to be done is a calculation of whether or not the risk to health is acceptable, relative to an external standard, which is negotiable at best, and easily manipulated, at worst. Also, the DEP can be invoked to explain unusual numbers of illnesses. As the eventual attitude to the toxic pollution at Love Canal proved:

(...) the discovery that a substance's known toxicity did not always result in its removal from the public sphere, also supported the use of precaution and prevention given scientific uncertainty clusters (Brown 2007:206).

Unfortunately, risk assessment, the method preferred by government and industry, as opposed to precaution, still appears to dominate the debate over contested illnesses and environmental pollution. According to Brown, at the forefront of the precautionary principle have been unions and their employees:

For occupational safety and health advocates, precaution has been around as long as there has been any organized concern for worker safety, easily longer than a century (Brown: 205).

Therefore, the wisdom of creating a safer workplace environment, rather than just dealing with the results of pollution and what are sometimes fatal health consequences, is not a new concept for either unions or their corporate employers. As was outlined earlier, in Chapter 9, "Union Attempts at Participation" (pp. 79-91), unions representing Ontario miners and surface workers

lobbied for years for the right to participate in matters of health and safety in their places of work. The union philosophy to workplace safety was quite simple: allow unions an opportunity to participate in matters of health and safety which affected their members' lives and to do this by preventing as many hazards as possible — a precautionary approach. It was this philosophy which Sudbury unions attempted to bring to the table in the Sudbury Soils Study, but were unsuccessful.

In terms of environmental pollution, The Precautionary Principle is both a philosophical and political approach, advocating simplicity and accountability. One of the most important political overtones of the approach is the shifting of proving a substance is not harmful to the producers of that substance, rather than allowing an “acceptable” level of harm to occur. Instead of relying on complicated scientific constructs of “acceptable risk” and the intricate use of statistics which can render communities “habitable but not safe” (as with Love Canal), The Precautionary Principle aims to eliminate as many dangers as possible from the environment. A quick overview of The Precautionary Principle also shows a concern for a holistic, as opposed to a relative risk, approach. Rather than compare one contaminated area to another, to determine the relative level of risk, The Precautionary Principle deals in absolutes, and has absolute values concerning levels of pollution and how to deal with them. The Precautionary Principle seeks to:

- 1) Take preventive action in the face of uncertainty
- 2) Shift the burden of proof to the proponents of an activity (reverse the onus)
- 3) Eliminate those substances about which we have sufficient evidence of harm.
- 4) Orient policy toward helping communities (Brown:207)

However, as Brown pointed out, such an approach would require a shift in the dominant social order, where industrial production and profits often take precedence over environmental issues

and community health. The complete elimination of all environmental pollutants is not a practical or achievable solution, but making progress by increments can possibly be achieved, provided a common ground of cooperation for negotiation of these reductions can be found. That common ground must first involve a greater voice for citizens, and a forum where their concerns are not just heard and summarily dismissed. Such an approach was advocated in Ontario, and came into law, in 1993, with the passage of The Environmental Bill of Rights.

The main features of Ontario's Environmental Bill of Rights (EBR) included the following:

1. Establishing an Environmental Registry, and allowing members of the public to comment on environmentally significant new laws, regulations, instruments and policies;
2. Allowing residents to launch third party appeals of decisions about prescribed instruments;
3. Allowing residents to submit Applications for Review of environmentally significant laws, policies and instruments to prescribed ministries;
4. Allowing residents to submit Applications for Investigation of contraventions of prescribed Acts, regulations and instruments to prescribed ministries;
5. Establishing a new right to sue if someone is breaking a prescribed law, or is not following the terms of a prescribed instrument and is thus causing significant harm to a public resource;
6. Modifying the standing rules to allow residents to sue in public nuisance if they experience environmental harm; and
7. Creating protection from employers' reprisals for employees who use the processes of the EBR or seek to protect the environment

(McRobert, McAteer 2001:[I]).

Under these provisions, Ontario citizens could contest the construction of facilities that would cause pollution, notify the province of contraventions of pollution levels, and generally participate in the management of Ontario's human and natural environments. In addition to these guiding principles, it was decided that redress for public harm caused by pollution could be

settled in court, under the provisions of *Rylands v. Fletcher*, an English case that has formed the basis of Common Law both here and in England, where the case was first heard, in 1868:

In Rylands v. Fletcher, (1868) LR 3 HL 330, the defendants employed independent contractors to construct a reservoir on their land. The contractors found disused mines when digging but failed to seal them properly. They filled the reservoir with water. As a result, water flooded through the mineshafts into the neighbour's mines on the adjoining property. (Law Teacher:2016)

It was deemed that this action was a “nuisance” i.e., it prevented Fletcher from making use of his property for financial gain. It says nothing about health effects; this case only deals with a single action causing “nuisance”, i.e., preventing the enjoyment and normal use of one's property, with both “normal use” and “enjoyment” being defined as a use which earned income for the plaintiff: the operation of his coal mine. This case forms the basis upon which the public brings legal action against a polluter in Canada. To assist the public in the courts, the Canadian Environmental Law Association (CELA) became a subdivision of the Ontario Legal Aid structure, and provided a member of the public met certain financial conditions, free legal representation by the CELA was available for nuisance claims. As such, the public was given free access to legal representation in matters involving the pollution of their property, either as an individual, or in the case of *Port Colborne*, as a class. The CELA was meant to impart a level of fairness, as members of the public could not be expected to match the financial resources of large companies, in terms of paying for legal representation, if they felt compelled to seek redress for industrial pollution, for example. As of 1982, 12 years before the proclamation of the Environmental Bill of Rights (EBR), the CELA had stated its mandate as follows:

- To provide equitable access to justice to those otherwise unable to afford representation for their environmental problems;
- To advocate for comprehensive laws, standards and policies that will protect and enhance public health and environmental quality in Ontario and throughout Canada;

- To increase public participation in environmental decision-making;
- To work with the public and public interest groups to foster long-term sustainable solutions to environmental concerns and resource use;
- To prevent harm to human and ecosystem health through application of precautionary measures.

In accomplishing all of these objectives, primary recognition is given to CELA's mandate to assist low-income people and disadvantaged communities (Canadian Environmental Law Association, 2012).

Another important development concerning the Environmental Bill of Rights (EBR) was the formation of the Office of Environmental Commissioner of Ontario (ECO). This position was similar to that of the provincial Auditor-General in overseeing government finances, although in this case, the ECO would oversee the functioning of the Environmental Bill of Rights (EBR) and the Environmental Assessment Act (*EAA*). The *EAA* provided the means by which the public could get answers about, and question, the necessity for any new development which affects the environment, and how the development would function, in addition to other proposals by industry which would impact the Environment. The Environmental Commissioner of Ontario (ECO) was to be an all-party choice, selected by committee, and the ECO answered only to the legislature. It was a non-partisan position. It is on the basis of the ECO's annual reports that the progress, or lack thereof, of the Environmental Assessment Act (*EAA*) and other environmental matters could be tracked by not only government, but by the people of Ontario as well. To help facilitate this, The Ontario Government also implemented what was known as the Environmental Registry, an internet site where decisions about environmental assessments and proposed alterations to environmental laws and standards would be made available both for public viewing and for public input. However, by 1995, just one year later, with the election of the Harris government in Ontario, a very pro-business and socially conservative government, layoffs in

both the Ontario Ministry of the Environment (MOE) and the Ontario Ministry of Natural Resources (MNR) became a fact which did not go unnoticed by the Environmental Commissioner of Ontario (ECO) of the day. In her 1996 report, the ECO at the time, Eva Legati, observed that:

In April, the Ministry of Environment and Energy announced that 750 people would be laid off over the next two years – 400 were gone by the end of 1996. The Ministry of Natural Resources announced layoffs of 2,170 people over the next two years – 900 were laid off in May alone. How will these reductions affect Ontario's environment (Environmental Commissioner of Ontario Annual Report, 1996:17)?

The ECO's rhetorical question about how cutbacks would affect Ontario's environment got a partial answer with the deaths of seven people in Walkerton, Ontario. The deaths were attributed to inadequate testing and monitoring of the town's drinking water by the local municipality.

Along with cutbacks in the Ontario Ministry of the Environment (MOE) and the Ontario Ministry of Natural Resources (MNR), responsibility for the safety of municipal drinking water systems had been offloaded to the municipalities themselves, as a cost cutting measure. The 1996 report also noted that:

Perhaps the most significant decisions made in 1996 were those that reduced the ministries' responsibility to protect the environment. The extent and pace of change were daunting. Given the enormous implications of many of these decisions, it is disturbing that many were made with a minimum amount of required public consultation (Environmental Commissioner of Ontario Annual Report, 1996:5).

In addition to offloading responsibility for the testing of municipal water to municipalities themselves:

The Ministry allowed the *Intervenor Funding Project Act* to expire. There was no opportunity for the public to comment on this decision, which reduces the ability of Ontarians to comment meaningfully on large environmental projects (Environmental Commissioner of Ontario Annual Report, 1996:7).

That same year, the Ministry of the Environment decided that "Among other things the Ministry will no longer monitor the recovery of acidified lakes in the Sudbury area" (ibid).

The opening line of the 1998 report of the Environmental Commissioner of Ontario (ECO) report begins “My 1998 Report to the Legislative Assembly documents the decline of Ontario’s capacity to protect the environment” (ECO Annual Report 1998:1). One of the most disturbing trends, according to the ECO, was the fact that government rhetoric concerning public safety did not match its actions:

The ministry said it would update the standards for 70 pollutants over three years, when, in fact, it took MOE approximately two years to finalize the rules pertaining to only nine pollutants. Even for those few pollutants, MOE merely created guidelines rather than directly enforceable standards (ibid).

This further illustrates how the Ontario Ministry of the Environment (MOE) formally adopted the policy of guidelines, as opposed to enforceable limits, on pollution, and it reflects the earlier actions of the Federal Government in relation to Belledune. When faced with disturbing levels of pollution in the local lobster fishery, safe limits on pollution ceased to be identifiable limits, and became merely guidelines to determine whether or not action should be taken (p.108). In addition, the Environmental Commissioner of Ontario (ECO) noted in 1998, that while the Ontario Ministry of the Environment (MOE) publicly claimed to be reducing the risk of cancer posed to Ontarians by pollution:

(...) the ministry has not clarified what resources it is devoting specifically to investigating the environmental causes of the disease or to supporting the elimination of pollutants and carcinogens as causative agents (Environmental Commissioner of Ontario Annual Report 1996:12).

Clearly, the Ontario government was not supporting the precautionary principle in the prevention of environmental causation of illness. In fact, it does not seem to have any guiding principle in this matter at all, according to the 1998 report of the Environmental Commissioner of Ontario (ECO). The next year, 1999, saw the appointment of a new ECO, Gord Miller, a former

14-year employee of the Ministry of the Environment (MOE). In his 2000-2001 Annual Report, an interesting observation was made concerning mercury, identified by the Environmental Commissioner of Ontario (ECO) under the category of “Significant Issues”:

Fish consumption advisories for humans have been issued for lakes near Algonquin Park due to mercury, which is believed to be predominately atmospheric in origin (Environmental Commissioner of Ontario Annual Report 2000-2001:65).

In 2002, the ECO noted that in spite of the public’s right to know how decisions are being made regarding proposals for alteration of pollution standards and environmental assessments, the Ontario Ministry of the Environment (MOE) was instead directing members of the public to the companies themselves for this information. Miller stated that the MOE should not abdicate their responsibility to inform the public “by sending an individual directly to a company to sign a non-disclosure agreement” (Environmental Commissioner of Ontario Annual Report, 2001-2:33). The ECO also began to take note of the fact that there were issues with the Environmental Assessment Act (*EAA*) “public participation rights on environmentally significant instruments issued through the (*EAA*) processes are not consistently comparable to those provided by the EBR” (Environmental Commissioner of Ontario Annual Report, 2001:35). What the Environmental Commissioner of Ontario was referring to, was the fact that exemptions to the process of assessment under the Environmental Assessment Act (*EAA*), where the public should have had a say, were increasingly being used, extinguishing a citizen’s rights to participate in these assessments, even though they are supposed to have this right under the Environmental Bill of Rights (EBR). The Environmental Commissioner of Ontario pointed out that “the *EAA* should operate in a manner that is compatible with and complementary to the EBR ” (Environmental Commissioner of Ontario Annual Report, 2001:41).

In 2003, the year after the Environmental Commissioner of Ontario (ECO) observations about mercury in Algonquin Park were made, an environmental group, The Sierra Club, a non-governmental organization, submitted a report to the ECO alleging excessive mercury emissions by the Ontario Power Generation (OPG) coal-fired electricity plants, and “that since 1999, OPG’s five plants have emitted more than 2,000 kg of mercury into Ontario’s air” (Environmental Commissioner of Ontario Annual Report, 2003-4:122). The report was forwarded by the Environmental Commissioner of Ontario to the Ontario Ministry of the Environment (MOE). While the MOE denied neither the existence nor the quantities of mercury allegedly emitted by Ontario Power Generation, (OPG), it stated that in spite of the fact that emitting mercury is a violation of the Ontario Water Resources Act (OWRA):

(...) there is not, at this time, a reasonable prospect of a successful prosecution of OPG or any of its officers or directors with respect to the mercury emissions from the coal-fired plants, nor would it now be in the public interest to commence such a prosecution under the *OWRA* (Environmental Commissioner of Ontario Annual Report, 2003-4:123).

What the statement does not indicate, is that at this point in time, OPG was 100% owned by the Province of Ontario: therefore, the province would be prosecuting itself, if it took action. In addition, the Ontario Ministry of the Environment (MOE) maintained that:

(...) it is simply not feasible to characterize mercury as a substance requiring a ‘zero tolerance’ level at this time, since mercury occurs naturally in the environment. (ibid).

This position was taken, as the Environmental Commissioner of Ontario (ECO) pointed out, even though:

(...) the MOE itself has described mercury as ‘a potent-nerve toxin’ that builds up in the food chain... even low levels of mercury exposure can adversely impact the fetus and young child (Environmental Commissioner of Ontario Annual Report, 2003-4:122:123).

It seems the Ontario Ministry of the Environment (MOE) had taken a legalistic approach, as opposed to a precautionary approach, regarding these high levels of mercury pollution, and took no action. By 2007, it appeared that the Environmental Commissioner of Ontario (ECO) was losing faith in the ability of the Environmental Assessment Act (*EAA*) to serve the citizens of Ontario with not only transparency of process, but also with the environmental protection that the Environmental Bill of Rights (EBR) was intended to provide. The Environmental Assessment Act (*EAA*) is the instrument which assesses, among other things, whether or not a proposed industrial activity should be allowed to proceed. It covers such activities as mining, waste incineration and quarrying, to mention just three. Environmental Commissioner of Ontario Miller observed that “The *EAA* has, over time, suffered so many truncations and add-ons that it no longer bears much resemblance to its original, idealistic self” (Environmental Commissioner of Ontario (ECO) Annual Report, 2007-2008:37). Miller then lists some of the major failings of the *Environmental Assessment Act (EAA)*, particularly in the matter of how the Environmental Assessment (EA) process was being carried out:

- important, over-arching decisions on policies and programs are not being made under the *EAA*;
- “No” is rarely an option, because projects are almost never rejected under the EA process;
- decisions are being made in a piece-meal fashion;
- proponents are being allowed to apply for and obtain other approvals prior to EA approval;
- the need for projects and undertakings are often shielded from scrutiny;
- important back-end technical details are also shielded from scrutiny;
- the quality of EA studies is “uneven”;
- the statutory principle of “betterment” is being neglected;

- there is poor integration between EA and the land use planning process;
- consultation processes have been discredited; and the monitoring, compliance and enforcement of EA terms and conditions has been weak

(Environmental Commissioner of Ontario (ECO) Annual Report, 2007-2008:38).

Another subject was commented on by the Environmental Commissioner of Ontario (ECO) in 2007-8, titled “Air Quality Monitoring and Reporting in Ontario - Fostering a False Sense of Security (Environmental Commissioner of Ontario (ECO) Annual Report, 2007-2008:57). It asserted that Ontario’s monitoring of air quality, which forms the basis for the Air Quality Index (AQI) was simply not adequate. The Ontario Ministry of the Environment (MOE) base of information for the AQI consists of “a network of 40 air quality monitoring stations that continually measure air pollutant concentrations in rural and urban locations across the province” (Environmental Commissioner of Ontario (ECO) Annual Report, 2007-2008:54). By contrast, cities in Europe use hundreds per city, and in London, England, “air quality information collected from over 200 continuous monitoring stations across the Greater London Area is used to map real-time data about local air quality” (Environmental Commissioner of Ontario (ECO) Annual Report, 2007-2008:68). To demonstrate to the public just how inadequate the MOE’s monitoring of pollution in Toronto was, in 2007 the office of the Environmental Commissioner of Ontario (ECO) began independent air quality readings of its own in downtown Toronto, using its own meters. The ECO results indicated that when it collected its own pollution data on particulate matter less than 2.5 microns (PM2.5) in diameter, and compared these readings to Ontario’s Air Quality Index (AQI), their measurements indicated that the Ontario Ministry of the Environment (MOE) monitoring of pollution was indeed giving the public a sense of false security:

Street level samples collected in downtown Toronto recorded concentrations of PM2.5 equivalent to an AQI in the “very poor” category. By contrast, MOE’s Toronto downtown AQI station reported air quality to be “good” at that time (Environmental Commissioner of Ontario (ECO) Annual Report, 2007-2008:59).

The Environmental Commissioner of Ontario (ECO) also commented on the fact that the cumulative effects of pollution are not being considered by the Ontario Ministry of the Environment (MOE):

Relatively high concentrations of air emissions from industrial facilities are permitted on the presumption that pollutant concentrations dilute as they move away from the stack. Industrial facilities are not required to take into account potential cumulative effects of pollutant concentrations from other sources, leading to local loadings of pollutants that could far exceed safe or acceptable ambient levels (Environmental Commissioner of Ontario (ECO) Annual Report, 2007-2008:60).

As a summation of this section on the Environmental Commissioner of Ontario (ECO) and his evaluation of how the Environmental Bill of Rights (EBR) and the Ontario government’s environmental regulatory framework have performed, some decisions regarding permissible air pollution levels which have impacted Sudbury will be examined. These decisions, which the Ontario Ministry of the Environment (MOE) believed constituted permissible levels of pollution which citizens of Sudbury can legally be exposed to, will be examined in the following chapter.

Chapter 19

The Environmental Registry and Permissible

Pollution Levels for Sudbury

Shortly after the findings of the Human Health Risk Assessment established there was a slightly elevated risk for Sudburians living adjacent to the Copper Cliff Smelter due to nickel levels their air, Vale applied for an exemption from the Ontario nickel standard for ambient air in the Fall of 2008. Vale applied for, and would eventually receive, an exemption from the new proposed 24-hour provincial standard of $0.02 \mu\text{g}/\text{m}^3$. Such applications are open to public comment, on a website run by the Ministry of the Environment (MOE), the Environmental Bulletin Registry (*EBR*). The official website of the Ministry of the Environment (MOE) partly describes the mandate of the Environmental Registry (ER) as follows:

The Environmental Registry contains "public notices" about environmental matters being proposed by all government ministries covered by the Environmental Bill of Rights. The public notices may contain information about proposed new laws, regulations, policies and programs or about proposals to change or eliminate existing ones (Environmental Registry Official Website, 2012).

Some of the comments by members of the public regarding this matter of nickel pollution revealed some interesting developments in terms of how the Ontario Ministry of the Environment (MOE) has abdicated all responsibility for the monitoring of Vale's pollution to Vale itself. One citizen used the Environmental Bulletin Registry (*EBR*) to make the following comment:

The MOE no longer performs random emission tests, either on site (where Vale Inco visibly emits on a 24-hour basis) or with its mobile monitoring vehicles. Vale Inco tests itself and since it took over, (and) uses the MOE's mobile vehicles. According to the MOE representative, the MOE can only check the calibration of the instruments in those

vehicles, and is not allowed to perform the sampling of emissions (EBR # 010-5356 Comment ID # 121551, December 2008).

Perhaps this matter is connected to an issue raised by the Environmental Commissioner of Ontario, Eva Legati, when she noted that in 1996, the Ontario Ministry of the Environment had terminated the employment of 400 of its personnel, and planned to terminate up to 750 by the end of that year (p 224). Another comment on the proposed new nickel standards posted in 2008 raised the matter of large numbers of dead migratory birds discovered in the vicinity of Vale's Copper Cliff Nickel Refinery:

100 seagulls were found dead a few hundred metres from Vale property fairly recently. (EBR # 010-5356 Comment ID # 121551, December 2008).

This comment is in reference to a disturbing incident reported in a local newspaper, The Sudbury Star, on October of 2008, regarding the discovery of dead seagulls on a Kelly Lake island, a lake which the Copper Cliff Nickel Refinery property borders upon. An Ontario Ministry of Natural Resources spokesman, Don Mark, responded publicly about the incident in the same newspaper which reported the incident, The Sudbury Star:

More than 100 dead and decaying seagulls found on an island in Kelly Lake earlier this fall probably ate some bad food or foraged in an area where fresh chemicals were, says a spokesperson for the Ministry of Natural Resources (...) 'There was not enough left of the birds to send out for a necropsy,' Mark said. 'No one knows for sure, but it is quite limited and that's about it' (Unattributed article. The Sudbury Star October 27th 2008).

Considering the fact that these deaths occurred within the borders of the Fielding Bird Sanctuary, which actually encompasses all of Kelly Lake and its shoreline, the attitude of the Ontario Ministry of Natural Resources (MNR) is indeed puzzling. For reasons known only to the MNR, the matter was not investigated, and it will never be known what caused this die-off of migratory birds. My own comments on the matter of higher permissible nickel levels concerned the difference between the federal standard for nickel which the federal government believed was

protective of human health, and what the Ontario Ministry of the Environment (MOE) and Vale were proposing. In my posted comments, I quoted directly from Health Canada's website, concerning what levels of nickel in ambient air should be a cause of concern for the general public:

(...) [the priority for further action is considered to be moderate to high based on a concentration of total inorganic nickel in ambient air of 0.021 $\mu\text{g}/\text{m}^3$ determined in an early survey in Sudbury [Chan and Lusic, 1986]] (Health Canada: "Nickel and its Compounds." CEPA, 3.2 [b]).

In my posted comment, I also noted that the interim provincial standard being allowed specifically for Sudbury, 15.0 $\mu\text{g}/\text{m}^3$, was over 700 times higher than level at which Health Canada believed action to reduce emissions should occur, in addition to the fact that:

(...) the monitoring program does not include other toxic metals which are known to be part and parcel of what comes with the pollution from the Copper Cliff Smelter. Those other toxic substances are SO_2 , lead, cobalt, arsenic, cadmium and selenium, and we are not being told what quantities of these pollutants are contained in the pollution being studied in addition to what types of speciated nickel Sudburians are being exposed to (*EBR* Registry # 011-167. Comment ID # 131526).

In the end, Vale was successful in their request for an altered nickel standard. The Ministry of the Environment (MOE) also decreed that the decision was not open to appeal by the public. The comment concerning issue of dead birds in the vicinity of the Fielding Bird Sanctuary was also not commented upon by the MOE.

This permit to pollute with nickel allowed the level of 15 $\mu\text{g}/\text{m}^3$ as a 24-hour average, until July 1st 2015. (*EBR* Registry # 011-167). After July 2015, when better environmental controls would have been constructed, Vale was allowed to pollute Sudbury's air with nickel to a level of 3.0 $\mu\text{g}/\text{m}^3$, as a 24-hour average until 2016 (*ibid*). After 2016, and until 2021, total suspended particulate (TSP) nickel levels in ambient air for Vale will be 1.0 $\mu\text{g}/\text{m}^3$ on both an annual and 24-hr average, as opposed to a 24 hr. average of 0.2 $\mu\text{g}/\text{m}^3$ originally proposed for the rest of

Ontario, and an annual average of $0.04\mu\text{g}/\text{m}^3$ for the rest of Ontario (ibid). In the final analysis, Sudbury's allowable annual average for nickel pollution was established at 25 times higher than the rest of Ontario, and Sudbury's 24-hr average at 5 times higher than the rest of Ontario, at least until 2021. (ibid).

Sulphur dioxide SO_2 pollution in Sudbury was not examined by the Sudbury Community Based Risk Assessment (CBRA), and was not included with nickel and the other chemicals of concern. Vale applied for, and received, on Dec. 24th, 2011, an exemption from the proposed new provincial 1hr. emission standard for SO_2 of $690\mu\text{g}/\text{m}^3$ (0.25 ppm) and the 24-hr standard of $275\mu\text{g}/\text{m}^3$, (0.01 ppm) receiving permission to emit SO_2 at the following levels until 2016:

(...) site-specific standards for sulphur dioxide of 5500 micrograms per cubic metre (1-hour average modelled concentration (or 1.99 ppm) and 1400 micrograms per cubic metre (24-hour average modelled concentration) (or 0.51 ppm) to be applied at all points of impingement (*EBR* Registry # 011-5562).

This 1-hour standard, $5500\mu\text{g}/\text{m}^3$ is 8 times higher than what would become the 1-hr standard for the rest of Ontario, ($690\mu\text{g}/\text{m}^3$) in 2012, and the 24-hr standard, $1400\mu\text{g}/\text{m}^3$ is 5 times higher than what would be the new provincial standard ($275\mu\text{g}/\text{m}^3$). None of the previous pollution levels of sulphur dioxide (SO_2) were made known during the Sudbury CBRA, as SO_2 was exempted as a pollutant. After 2016, Vale believed it would be able to meet the new Ontario standards.

However, on April of 2016, Vale would apply for an extension of its compliance date, asking for further permission to pollute to the above levels, until June of 2018. Of note, The

International Joint Commission, which deals with matters of concern to both Canada and the United States, states that:

The largest source of SO_2 emissions in Canada continues to be the non-ferrous smelting and refining sector, which accounted for 39% of national SO_2 emissions in 2008, despite an almost 60% decrease in SO_2 emissions from this sector since 1990 (International Joint Commission 2010: 5).

Also of interest, the United States Environmental Protection Agency (EPA) had proposed a new standard for SO₂ for the United States in November, 2009, which did not contain either a 24-hr standard or an annual standard, only a 5 minute and 1-hr standard. The rationale for this decision was that imposing shorter time limits on allowable levels of this form of pollution would eliminate the need for both the 24-hr and annual standard, and that a 5 minute and 1-hr standard would be more protective of public health (United States Environmental Protection Agency [EPA], 2009:1). The EPA rationale is also based on the fact that some people sensitized to SO₂, such as asthmatics, suffer health effects within 5 minutes of exposure to this pollutant (ibid). The EPA's proposed new 1-hr standard for SO₂ is 75 parts per billion (ppb), which makes the new Ministry of the Environment (MOE) 1-hr standard of 275 parts per billion 3.3 times higher than the US Environmental Protection Agency (EPA) 1-hr standard. The rationale for the EPA's decision is based on both a precautionary and cost-saving approach to the issue; the cost saving issue has nothing to do with saving industry money, but is a precautionary measure meant to protect people's health:

EPA estimates that the revised standards would yield health benefits valued between \$16 billion and \$100 billion. Those benefits would include reduced hospital admissions, emergency room visits, work days lost, cases of aggravated asthma and chronic bronchitis, among others (ibid).

Xstrata Metals also made a successful application for permission to pollute with SO₂, to 4,382µg/m³, (1.59 ppm) as a 1-hr average, from December 2012 to December 31st 2018 This level is 6.4 times higher than the standard for the rest of Ontario, and 21.2 times higher than the proposed US Environmental Protection Agency (EPA) 1-hr standard. When this permit expires, Xstrata will then be permitted to pollute to 2453µg/m³ SO₂, (0.89 ppm) as a 1-hr average, from January 1st 2019 to August 2022 (*EBR* Registry Number: 011-2540). This allowable level of

pollution is still 3.6 times higher than the standard for the rest of Ontario, and 11.9 times higher than the EPA 1-hr standard. There were no comments received from the public regarding their opinions on this matter. Xstrata Metals also applied for, and received, a site-specific standard for their cadmium emissions from the Falconbridge smelter. According to Environment Canada, when it comes to identifying where cadmium releases come from on a national basis:

The most recent estimates identified indicate that base metal smelting and refining operations account for 82% (130 t) of the total releases to air and water (Environment Canada, “Cadmium and its Compounds.” 3.0 CEPA 11 [a] Environment).

Xstrata self-reported to the National Pollution Release Inventory (NPRI) in 2010, cadmium releases of 1.26 tonnes (NPRI, Xstrata, Sudbury Smelter: 2010). This consisted of 763.9 kg via its smokestack, and ground level emissions of 493.8 kg (ibid). How much of these ground level emissions reached the town of Falconbridge, was not made public. The site specific exemption which Xstrata felt it warranted was $0.190\mu\text{g}/\text{m}^3$ averaged over 24 hours. Xstrata did not feel that it would be able to meet the proposed provincial 24 hr. cadmium standard of $0.025\mu\text{g}/\text{m}^3$. The standard for Sudbury proposed by Xstrata was 7.6 times higher than the proposed provincial standard for the rest of Ontario; however, the approval document states that Xstrata will be able to meet the new Ontario cadmium standard by 2018, in five years’ time (*EBR* Registry # 011-5585). One of the most interesting reasons for approval of this higher temporary pollution standard contained in the official approval documentation posted online was the following:

There is no public interest sufficient to deny approval of the *Request*.
(*EBR* Registry # 011-5585, site specific standard for cadmium, page 3B 4)

This rationale for granting an exemption is interesting, in that it does not state whether or not health effects are expected to be observed as a result of higher cadmium exposure, or whether, due to lack of public comment, there appears to be no public opposition or “public interest” to the higher standard.

As a curious and concerned citizen of Sudbury who is still attempting to evaluate the pollution levels in my community and the risk these pollutants pose, one of the last pieces of data I felt I needed in order to do so, the sulphur dioxide (SO₂) levels from 17 newly-installed monitors located around the Sudbury area, arrived from the Ontario Ministry of the Environment (MOE) — incomplete. When I pointed out to the MOE contact person that the data was missing months of readings and was incomplete, I was told by the same MOE representative, who shall remain nameless, that “If you require further data in the future, your (sic) will have to go through a formal ‘Freedom of Information’ request” (MOE, Personal Correspondence 2012).

I did eventually obtain the data, which is an interesting story in itself, but here is the data: the first numbers in the sequences listed in **Table 21** indicate the number of 1 hour readings in Sudbury that exceeded 75 ppb, the proposed United States Environmental Protection Agency (EPA) 1 hr. standard for SO₂. In 2011, there were 349 exceedances of the EPA’s 1 hour SO₂ standard of 75 ppb at the 17 monitors in the Sudbury area, but no exceedances of the newly approved local standard for Vale, nor for the new Xstrata standards. These US Environmental Protection Agency (EPA) exceedances occurred in the presence of other pollutants, such as arsenic, nickel, copper, lead, cadmium cobalt and selenium, as confirmed by The Sudbury Soils Study.

Table 21: Sulphur Dioxide Readings in Sudbury, 2011, Exceeding US EPA Proposed 1-hr Standard of 75 ppb.

| Location | January-March 2011 | April-June 2011 | July-September 2011 | October-December 2011 |
|---------------|-----------------------|--------------------|------------------------|--------------------------|
| Skead | 6 | 4 | 6 | 13 |
| Hanmer | 1 | 1 | 3 | 0 |
| Coniston | 9 | 3 | 1 | 2 |
| Garson | 3 | 3 | 6 | 2 |
| New Sudbury | 4 | 4 | 24 | 1 |
| Science North | 0 | 2 | 5 | 5 |
| Rayside | 0 | 6 | 2 | 1 |
| Copper Cliff | 6 | 7 | 17 | 13 |
| Kelly Lake | 1 | 2 | 5 | 16 |
| Kinsman Park | 5 | 20 | 15 | 4 |
| Dozzi Park | 1 | 0 | 8 | 4 |
| Spruce Street | 1 | 10 | 15 | 2 |
| Algonquin | 1 | 2 | 7 | 4 |
| Edison | 1 | 7 | 12 | 3 |
| Parkinson | 0 | 15 | 27 | 2 |
| Sunderland | 1 | 8 | 2 | 0 |
| Wahnapitei | 0 | 0 | 1 | 3 |

Source: MOE Sudbury.

I would next attempt to obtain the readings for cadmium and nickel from the Ontario Ministry of the Environment (MOE), for which samples are taken at the same monitoring station near the Xstrata smelter. The sulphur dioxide readings could then be correlated to the cadmium and nickel levels, resulting in a method of calculating the approximate levels of these pollutants as a ratio of Xstrata's SO₂ levels. However, since I had been told by the Sudbury offices of the MOE after I requested this information, that: "If you require further data in the future, your (sic) will have to go through a formal 'Freedom of Information' request" (MOE Correspondence, 2012), I decided at this point to see how the Office of the Environmental Commissioner of Ontario (ECO) functioned.

I e-mailed the office of the ECO, inquiring why such basic information, upon which an alteration of provincial pollution standards was to be based, in favour of a site-specific standard, was not available to a member of the public such as me. I went on to say that according to my understanding of how the Ontario Environmental Bill of Rights actually functioned, this information should have been available. After stating the facts of the situation to the Office of the ECO, I was informed that they could not intervene on behalf of an individual, but that I should inform the Privacy Commissioner, if I felt the Ontario Ministry of the Environment (MOE) was abusing the Office of the Privacy Commissioner. Rather than pursue that avenue of action, I first forwarded a portion of the letter I had received from the Environmental Commissioner of Ontario (ECO) contact person to the offices of the Ontario Ministry of the Environment (MOE) and received an apology from their contact person, who informed me — to paraphrase — that he was sorry the information regarding cadmium and nickel readings didn't make it through the e-mail system. Even after this event, the information I received was incomplete, with whole months of readings not included. I continued to request all of the data,

and eventually received it, which in its allegedly complete form, was still incomplete. It was not complete, as there was not any time signature accompanying the nickel and cadmium readings. In addition, the cadmium readings for each station consisted of a single reading every three days, at an unknown time. Exactly how an accurate, daily 1-hr or 24-hr average can be arrived at in this way by the Ontario Ministry of the Environment (MOE) is not clear to me, as simple observation will confirm that the Xstrata smelter, in addition to the Copper Cliff smelter also emits pollution on an intermittent basis over a 24-hr period; however, this data is what a decision by the MOE to grant higher than normally allowable pollution levels was based upon. With the data I was provided, it was impossible to correlate pollution readings in the way I had hoped. According to the 2012 report by the Environmental Commissioner of Ontario Gord Miller, this was not a unique experience. Miller posted the observation quoted below, some months after my experiences with the Ministry of the Environment (MOE):

It appears that elements of the bureaucratic institution called the Ontario Public Service, which was created to support and implement the will of the people's Legislative Assembly, are somehow losing touch with their role and responsibilities, at least with regard to the Environmental Bill of Rights (Environmental Commissioner of Ontario (ECO) Annual Report 2012, Part 1:26).

Evidence of this assertion by the Environmental Commissioner of Ontario is often on posted Environmental Bulletin Registry (*EBR*) decisions for an exemption from pollution standards, (application for a site specific standard) all of which state publicly that:

(...) documentation submitted in support of the request for a site-specific standard is subject to the provisions of the Freedom of Information and Protection of Privacy Act. This Act defines what may and may not be disclosed to the public and is used to assess all requests for information under the site-specific standard process (*EBR* Registry # 011-5562).

This observation on the part of the ECO quoted above, is in compliance with the reply I received from my local Ministry of the Environment (MOE) contact person, when I requested pollution

data associated with an alteration of pollution standards, i.e., a site-specific standard. I was instructed to make an application to the Privacy Commissioner if I wanted to view any further data upon which site-specific standard for cadmium was to be based. It appears the facts of the pollution in my community environment are hidden by informational barriers, constructed by the Ontario Ministry of the Environment itself, The Environmental Bill of Rights notwithstanding. This obstructionism would occur again, in my attempts to find out what levels of pollutants were entering local waterways and groundwater, in the vicinity of the Copper Cliff Smelter and Refinery, both owned by Vale Canada, Ltd.

Chapter 20

The Spanish Harbour

As I attempted to point out during The Sudbury Soils Study (SSS), it appeared that the heavy metals levels in Sudbury's lakes and waterways should have been addressed. I had referenced my comments to research by Environment Canada, carried out by Dr. Jerome Nriagu et al (1998) (pp. 52-3); while The Sudbury Soils Study (SSS) was underway; however, the effects of solid waste mining pollution on our lakes and rivers was not considered in the SSS, even though the Ontario Ministry of the Environment was aware that heavy metal pollutants were now reaching Lake Huron. As early as 1987, the Federal and Provincial governments had identified the harbor as being polluted and developed a three stage plan to remediate the area. (Ministry of the Environment 2004:15). The plan consisted of three stages: "Stage 1: Identifying the Environmental Challenges. Stage 2: Planning and Implementing Remedial Actions. Stage 3: Monitoring Actions and Delisting of the Area of Concern" (ibid).

However, later research from the Ontario Ministry of the Environment (MOE) then observes that:

(...) delisting of Spanish Harbour as an Area of Concern will be undertaken when monitoring confirms that the environmental challenges have been addressed successfully through the remedial actions. As of September 2010, there is no estimate of when the delisting will occur: (Ministry of the Environment [MOE] 2010:3).

The remedial actions listed on the MOE website, from which the above quote can be found, lists the status of the area, now termed an "Area of Recovery", as "impaired", and identified what has been done successfully, and unsuccessfully. A survey of the loading rates for nickel and copper identified Sudbury mining operations as the source of contamination, and also noted that metal

contamination of the Harbour's sediments has not been reduced; as of 2006, the Ontario Ministry of the Environment (MOE) and Environment Canada had participated in a study which:

Undertook modeling of nickel and copper loading from upstream sources that concluded it would take 10 to 50 years for levels in the Area in Recovery to meet provincial guidelines if a 5% annual reduction in loadings were to occur (ibid).

Therefore, at the same time the MOE was involved in both a Human Health and Ecological Risk Assessment of the Sudbury region, it was also involved in an ongoing study of an area which had been, and continues to be, polluted by the very same mining activities it claimed to be studying in the Sudbury region. However, solid waste pollution from mining facilities entering waterways was a source of pollution which was not addressed in The Sudbury Soils Study (SSS). What had to have been known to the Ontario Ministry of the Environment (MOE), and by extension, to everyone on the Technical Committee of the Sudbury Soils Study (SSS), was that the sediments of the Spanish Harbour, 100 km downstream from Sudbury, were polluted to an unacceptable level, according to environmental standards for the rest of Ontario and for Environment Canada. It is the province of Ontario, through the Ontario Ministry of the Environment (MOE) which regulates pollution and the mining companies who produce it, which bear responsibility for the heavy metals pollution in the Spanish Harbour. The MOE and the other members of the Technical Committee of the Sudbury Soils Study (SSS), who also decided the course of SSS, also chose not to consider the contaminated sediments in Sudbury's Lakes as a risk to either human or environmental health. In some cases, heavy metal sediment levels in some Sudbury area lakes were up to 5 times higher than those of the Spanish Harbour (see **Table 6**, page 69), yet this issue was not examined. The Nriagu et al (1998) research paper "Saturation of ecosystems with toxic metals in Sudbury Basin, Ontario, Canada" (1998), stated very clearly in its abstract that due to past pollution levels, some Sudbury area soils were not just polluted, but

“saturated” with toxic metals. The Nriagu et al (1998) research for the Federal Government of Canada, i.e., Environment Canada, provided a very different prognosis for the continued pollution of Sudbury’s lakes. This research was brought to the attention of the local media and to other local activists; however, during the Sudbury Soils Study the implications of this research were essentially dismissed by Dr. Chris Wren, in his capacity as spokesman for the Sudbury Soils Study, as being a process which the authors of the study stated was “not well understood in the scientific literature” (p.60). The research paper by Nriagu et al (1998) had in fact calculated how long it would take for metal levels in Sudbury soils to decline to the 50th percentile level from the 70th percentile of what they were in 1994; the research calculated it would take 4,190 yrs. for copper, 960 yrs. for nickel, and 1,920 yrs. for zinc for this reduced level to be reached (Nriagu et al 1998:115). The study’s conclusion, which was excluded from any mention in the Bradley article, was paraphrased to a degree that it was out of context, by Dr. Chris Wren, when he stated that the issue was “not well understood in the scientific literature” (p. 59).

The research stated that the issue is not understood because it has to date, been ignored (ibid)

The mining companies involved in the Study were clear they did not want the issue of solid waste pollution from mining properties examined in the Ecological Risk Assessment which they were paying for:

INCO and Falconbridge expressed their belief that mining properties located within the study area should not be included as part of the ERA study. Their reasoning is that mining closure plans are covered by the Mining Act, under the jurisdiction of the Ministry of Northern Development and Mines, and therefore should be separate from the ERA (Mariotti 2002. Independent Process Observer’s Report No. 2, Fall 2002, p 8 [6]).

The mining companies were successful in having the matter excluded. The Sudbury Soils Study left this problem unaddressed, i.e., the effects of decades of solid waste pollution leaving their

mine and ore processing sites and the effects this was having on our lakes and rivers. Sudbury residents were never informed of the research by Pearson et al (1998) or of Nriagu et al (1998) by any of the authors of the Technical Committee of the Sudbury Soils Study, at any point during the 7 yrs. it took to complete it. It seems The Sudbury Soils study, which was later evaluated and characterized as having “openness and transparency by those employed to carry it out by the local mining companies” (Wren and. Mucklow 2010:9), was somewhat less than open and transparent, and was actually carried out in partnership with the local mining companies. The mining industry participants had clearly influenced the input data, and therefore the results, of the CBRA.

According to information contained on the official Environment Canada (EC) website, in 2008, EC had commissioned a field survey of the loading rates for nickel and copper in the Spanish Harbour. However, when I inquired via e-mail of the EC contact person for the Spanish Harbour, Mark Chambers, as to the status of this report, I was informed that “the data was found to be insufficient to meet the study needs” (Chambers, Personal Correspondence:2012). After numerous inquiries, I eventually contacted people involved in this matter at Environment Canada, concerning the current status of the polluted Spanish Harbour area, and the matter of “insufficient data”. I requested the latest research and received an EC document which was already posted for public viewing on the official EC website in 2009. It was not useful in providing any insight as to why data the latest data on loading rates was “insufficient”. Further requests resulted in a copy of the actual study I was looking for. As it turned out, EC did not conduct the 2008 metals input modeling research on this matter, nor did the Ontario Ministry of the Environment (MOE). It was performed by researchers at the University of Toronto (U of T), on the basis of raw data supplied by Environment Canada and the MOE. The U of T researchers

then submitted their own modeling study to Environment Canada for evaluation. It appears it was Environment Canada data that determined the modeling of nickel and copper inputs by the U of T researchers was insufficient for the study needs. One of the most interesting passages from this research document elaborates upon the upstream loading of nickel and copper contaminants from Sudbury. It partly addresses whether or not a 5% reduction of metals from smokestack emissions in Sudbury for the next 10 years, would actually result in a cleaner Spanish Harbour in 10-50 years:

(...) the model focuses on the downstream portion of the system and does not incorporate important upstream watershed areas such as tributaries and industrial areas (...) If contaminant retention and release in these areas were considered, then the lag between emission reductions and changes in Whalesback Channel sediment quality would be significantly greater (...) While the 5% annual loading reduction presents a convenient modelling exercise, it may be difficult to implement in reality. This is mainly because the loading has remained constant if not increasing by 2% per year for last 10 years despite the significant reductions in stack emissions (Gandhi, Nillma. Bhasavar, Satyenda, P. Diamond, Miriam. 2008:30).

The last conclusions made in the final draft of the modelling study by the U of T researchers in 2008 was that “results suggest that the preferred remediation strategy would be a combination of reasonable loading reductions and natural attenuation” (ibid). Attenuation, the natural reduction over time of metals in these sediments, appears to be insufficient on its own; therefore, what would constitute “reasonable loading reductions”?

The Environmental Bulletin Registry (*EBR*) was where local residents, myself included, voiced our concerns about alteration of emission standards tailored to match pollution levels being emitted by Vale and Xstrata. However, what nobody seemed to notice on the *EBR* was the fact that Vale had made two applications to draw groundwater, known as a “permit to take water” (PTTW) in Sudbury, in 2008, both of which were quite unusual. What makes them unusual is the fact that a PTTW submitted by Vale is usually for industrial uses, but the purpose

of these two permits was “groundwater remediation”. The PTTW (*EBR* Registry # 010-4943) posted on October 20th, 2008, sought for, and obtained by Vale, was for five purge wells in the Town of Copper Cliff. These purge wells allowed Vale to remove and remediate a possible combined total of approximately just over 400 million litres per year. These five wells are located on the Vale Smelter’s west fence line, adjacent to the town of Copper Cliff; however, they were only a precursor of what was to come. For the wells covered by *EBR* # 011-3979, posted June 29th, 2011, dealing with the Copper Cliff Nickel Refinery, the permit allows the taking of possibly as much as, 64 million litres of groundwater per year for remediation, from nine more decontamination wells. When I enquired of the Sudbury office of the Ontario Ministry of the Environment (MOE), I was told by their contact person that the water would be sent to the Copper Cliff Water Treatment Plant, a Vale-owned facility, which processes production waste water and tailings water and then releases it into Kelly Lake. The description of just where these wells are located was included as part of *EBR* Registry # 011-3979 in a supplemental document (MOE PTTW #3558-8L8LKF). There are five wells located on the west side of the property line of the refinery bordering an industrial park, with four more on the south side of the property, on the slope of a hill leading to Kelly Lake. These four wells on the south end of the property are located between a waste storage area of Vale’s and Kelly Lake, a bird sanctuary.

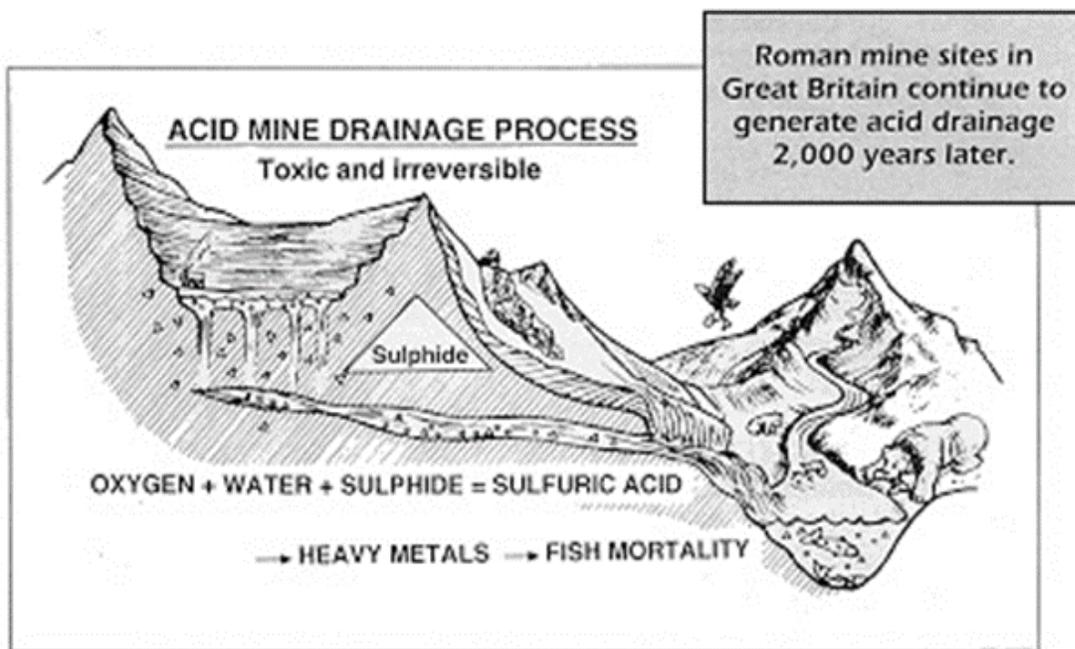
On September 19th, 2013, another application for a permit to take water (PTTW) was posted for three more wells, one on Vale Smelter property, while the two others were located on public property (*EBR* Registry # 012-0075) for the first time. The public property in question is a storage facility for the Sudbury Catholic District School Board, located adjacent to the smelter property, on Travers Street. Travers Street is the westernmost street in an area of Sudbury known locally as Gatchell, but this area was identified in the Sudbury Soils Study simply as Sudbury

Centre West. The permit to take water was approved for these three more wells, for the decontamination of over 5.8 billion liters of groundwater, making the total allowable amount of groundwater permitted to be remediated by Vale just over 6.2 billion litres annually. A visit to the Travers Street site on my part, in August of 2014, confirmed that the southeast sump is in fact located within metres of private property and a municipal storm sewer manhole near Travers Street. Whether or not contaminated water has been seeping into the municipal storm sewer system, could not be ascertained. It is also not known if contaminated groundwater has been infiltrating the basement of people's houses, or into a small creek, which empties into Nolin Creek as well, a waterway in the neighbourhood, which drains into Junction Creek. However, it does indicate that the matter of solid waste runoff and the contamination of local lakes, which the mining companies involved in The Sudbury Soils Study (SSS) insisted be left out of the study, was indeed quite a serious one, given the amount of groundwater that apparently must be remediated. Just what the contaminated water may contain was never stated in the Environmental Bulletin Registry application for these three wells or the others.

Canadian mining companies are now required, as per the North American Free Trade Agreement (NAFTA) signed in 1994, to report all of their pollution releases into the environment to the Federal Government of Canada, including solid waste pollution stored on site. Although it required a court order from The Federal Court, thanks to the hard work of Canadian environmentalists, one of whom was Sudbury activist Joan Kuyek of MiningWatch, who was also a member of The Community Committee on The Sudbury Soils Study, solid waste pollution amounts produced in Canada are now made public on the National Pollution Release Inventory, along with air pollution releases. Companies like Vale have been quite vocal in their public relations work, to make it known to the public that their air emissions are a fraction of

what they were at their worst period (1970s), when the Copper Cliff smelter was emitting well over 1 million tonnes of air pollution annually. However, this focus on air emissions diverts attention from what our most pressing pollution issue may well be in Sudbury: the residue of past emissions in our soils, plus mine tailings and mine waste rock pollution finding its way into our waterways and ground waters. In one posting on its website, MiningWatch presented a graphic representing tailings pollution to illustrate the mechanics of solid waste pollution which mine tailings generate generally.

Plate 1: Mechanics of Tailings Pollution. Source: MiningWatch



When I inquired of the contact person for this matter at the Sudbury office of the MOE in 2012, as to what the purpose was of an annual purging of (potentially) over 64 million litres of contaminated ground water on Vale's refinery property, I received the following explanation:

The purpose of this water taking was to remediate contaminated groundwater before the contamination migrates off of the nickel refinery property. The contamination is associated with historical mine sites, such as heavy metals; low pH and high sulphate. The water taking supposed (*sic*) to help improve the water quality of wells along Fielding Road as they are the closest residential and commercial wells (MOE Correspondence:2012).

While not clearly stating the fact, it appears that the Ontario Ministry of the Environment (MOE) has at least some knowledge of the fact that both residential and commercial wells in the Fielding Road area, adjacent to the Copper Cliff Nickel Refinery, were in fact polluted with heavy metals. And upon further inquiry, as to whether or not these purge wells, whose stated purpose is decontamination, were specifically related to the Spanish Harbour contamination which the federal government and the MOE are jointly investigating, I received another e-mail from the same contact person, informing me that:

The two permits to take water which you are enquiring about are not related to the remediation of the Spanish River harbour. There were never any remedial actions for the Spanish River directly connected with Vale. Vale's waste water discharges continue to be monitored under the MISA regulations (MOE Correspondence:2012).

However, if we define in practical, not bureaucratic terms, just what MISA is, (Municipal Industrial Strategy for Abatement) we see that it is a strategy for reducing pollution entering the Great Lakes, and the Spanish Harbour is located in Georgian Bay, part of Lake Huron. The following quote concerning the intent and mandate of the MISA initiative was obtained from a report compiled by Elaine MacDonald and Anastasia Lintner, of the environmental organization Ecojustice, in 2010. The report in question was prepared for two other environmental organizations, Great Lakes United and Environmental Defence, the latter being the organization which critiqued the Human Health Risk Assessment portion of the Sudbury Community Based Risk Assessment (CBRA). These organizations helped to bring a case forward to the Government of Canada in Federal Court, to force the federal government to begin the public

reporting of both air pollution and solid waste amounts and types sited on mining facilities and to make this information public (pp. 154-155). However, the MISA legislation may have dealt only with direct, intentional discharges, not seepage of industrial waste storage sites, such as tailings areas, a different type of pollution. In addition to that information, there is an even earlier statement regarding the efforts to remediate the Spanish Harbour that appeared on the Environment Canada website in 2003, which addressed the issue of Vale's pollution entering the Spanish River system:

INCO Ltd. has begun a multi-year initiative of several million dollars to reduce effluent bypasses at their central tailings area and wastewater treatment facilities in Copper Cliff, in the City of Greater Sudbury. This will result in reduced metal loadings to the Spanish River system during high flow periods. Initiatives are also underway to reduce the discharge of uncontrolled runoff to the Spanish River system (Environment Canada: 2003).

The local office of the MOE in Sudbury still denied, as of 2012, nine years after this posting, any connection between groundwater remediation efforts in Sudbury and efforts to clean up the Spanish Harbour. Therefore, the MOE representative I was dealing with, either misinformed me about Vale's involvement in the remediation of the Spanish Harbour, or was misinformed as an individual. At the time of the Sudbury Soils Study (SSS), I could not understand why the matter of solid waste mining pollution entering Sudbury waterways was not part of the Ecological Risk Assessment. The only answer I got from Chris Wren concerning this matter during the public presentation of the Ecological Risk Assessment (ERA) findings at Science North, was that there were "more appropriate" ways of monitoring solid waste pollution than by further environmental monitoring on the part of the two local mining companies. Unknown to me, at the time the results of the Sudbury CBRA were released, in 2008, during the early phases of the process, Franco Mariotti, the Independent Process Observer (IPO) stated in

his scheduled IPO summary for August, 2002, that:

INCO and Falconbridge expressed their belief that mining properties located within the study area should not be included as part of the ERA study. Their reasoning is that mining closure plans are covered by the Mining Act, under the jurisdiction of the Ministry of Northern Development and Mines, and therefore should be separate from the ERA (Mariotti 2002. Quarterly Report, Fall 2002 Vol 2:8).

Within a year of Mariotti's disclosure that the mining companies' solid waste pollution from their mining properties would be shielded from scrutiny, decontamination efforts to reduce effluent bypasses and groundwater contamination were under way. However, in the final analysis, it was the two mining companies who successfully made the case that solid waste pollution from tailings and ore processing facilities should not be investigated in the Sudbury Soils Study (SSS), and they were successful. Under the agreement brokered by the mining companies during the SSS process, it appears that when Vale spokesman Fred Stanford stated, on public record, during the Copper Cliff presentation of the Human Health Risk Assessment, that he believed nothing would be done about the apparent pollution of groundwater from the Copper Cliff Smelter property I had personally observed, his position was that Vale was under no obligation to do anything about the matter until the termination of operations; however, later developments concerning the decontamination of groundwater migrating off of Vale's active Copper Cliff facilities seem to have contradicted that public statement.

The ministry which Vale spokesman Fred Stanford believed should deal with the matter of this form of pollution, solid waste from abandoned mine sites, the Ministry of Northern Development and Mines (MNDM) is an interesting institution, from a public information standpoint. If a member of the public would like action taken by The Ministry of Mines and Northern Development (MNDM) or information on a specific matter, such as surface and /or groundwater pollution from abandoned or active mine sites and ore processing facilities, for clean-up decisions made by the MNDM, or for a matter to be investigated, and applies for access

to this information through the provisions of the Environmental Bill of Rights (EBR), the chances of success are not good. The Environmental Commissioner of Ontario (ECO), Gord Miller, observed in his 2012 report, that in the past 18 years:

The Ministry of Northern Development and Mines (MNDM) has denied all 12 EBR applications filed by the public since the inception of the Act (ECO Annual Report 2012:21).

What the groundwater being remediated by Vale on Big Nickel Road and on the Travers Street wells in Gatchell may actually contain, was not indicated on the Environmental Bulletin Registry (*EBR*); however, logic dictated that it was very likely the contaminants contained in the tailings area that must be migrating off-site from the Copper Cliff Smelter and onto municipal property on Travers Street. The same could be said of the Nickel Refinery site, which the Ontario Ministry of the Environment (MOE) now admitted was contaminating local wells on Fielding Road, (p 250) and there was still the matter of the open-air stockpiles of partially processed ore, a matter which I made note of during the Copper Cliff sessions of the Human Health Risk Assessment (HHRA). On September 26th 2014, an admission was finally forthcoming, not from the Ministry of the Environment, but from Vale itself, what at least one set of decontamination wells they had proposed for the Copper Cliff Nickel Refinery was intended to do. This application for a new set of three decontamination wells and an interception trench, to permit the potential withdrawal of an additional 219 million more litres of groundwater annually, is very clear on what their function will be. This application was:

(..) for an interception system (that) will prevent groundwater contaminated with heavy metals (Nickel, Cobalt and Cadmium) from seeping or flowing into Kelly Lake, part of the Vermillion River watershed (*EBR* Registry # 012-2431).

At last, an admission (at least for these wells) of what at least some of Vale's decontamination wells are actually for: not only the prevention of contamination of residential and commercial

wells near the refinery complex, but to prevent pollution of Kelly Lake, which flows into the Vermilion River, which joins the Spanish River and empties into the Spanish Harbour, a part of Georgian Bay, which is a part of Lake Huron, one of the Great Lakes.

Listed on page 254, in **Table 22**, is a seven-year amount of the on-site disposal totals of tailings contaminants from Vale's principal raw ore-processing facility, The Clarabelle Mill, located on the Copper Cliff Smelter property. It is this facility which produces the solid waste known as tailings. These totals in **Table 22** represent a small fraction of what has been dumped into the tailings area, and additional, unknown quantities of tailings have been generated by Vale, formerly Inco, for decades at other facilities. In personal e-mail correspondence with Amanda Brosseau, who holds the position of Public Affairs Specialist at Vale, Sudbury, I learned that:

Clarabelle Mill was built between 1969 and 1970. Started operation in 1971. Frood-Stobie Mill was built and commissioned around the same time but closed in 1990. Ore was milled at other INCO mills prior to that. Copper Cliff Mill, Levack Mill, Creighton Mill. [all long since closed] (Brosseau:2012).

Therefore, there are other contaminated tailings at multiple sites being stored in the Sudbury area, in addition to Clarabelle Mill tailings, which are contained in the smelter property. For only the 7 years of information available from the National Pollution Release Inventory (NPRI) public website concerning this issue of on-site disposal of mine tailings, we can relate the following data to recent concerns about groundwater contamination coming off of this site:

Table 22: On-site disposals from 2006-2013 generated by the Clarabelle Mill, Copper Cliff

| | |
|---------|------------|
| Arsenic | 663 tonnes |
|---------|------------|

| | |
|-----------|----------------|
| Cadmium | 76 tonnes |
| Chromium | 51,480 tonnes |
| Cobalt | 23,656 tonnes |
| Copper | 166,832 tonnes |
| Lead | 11,112 tonnes |
| Manganese | 170,325 tonnes |
| Mercury | 9.52tonnes |
| Nickel | 562,864 tonnes |
| Selenium | 4,512 tonnes |
| Vanadium | 28,968 tonnes |
| Zinc | 27,384 tonnes |

Source : National Pollution Release Inventory. Facility & Substance Information For Vale Canada Limited. Clarabelle Mill 2006-2013.

On the matter of protecting local well water from contamination, which was the reason stated by the Ontario Ministry of the Environment (MOE) for the purge wells in the Copper Cliff area, The Sudbury Soils Study Human Health Risk Assessment claimed to have surveyed local well water, and found there to be no risk to the public from the wells they tested. When I inquired further about the Sudbury Soils Study results from wells located close to the smelter at the public presentation of the Human Health Risk Assessment (HHRA), I was told that due to the fact they were on private property, no information could be divulged. Later developments revealed that Vale was remediating groundwater at its Nickel Refinery site to prevent the contamination of nearby industrial and residential wells in 2012; the Ontario Ministry of the Environment contact person then assured me that these decontamination wells located on Vale property were in no way related to clean-up initiatives in the Spanish Harbour. (p. 249). However, Vale itself admitted, in its application on the Environmental Bulletin Registry, (EBR Registry # 012-2431), in August of 2014, that a set decontamination wells and an interception trench on its refinery site were intended to prevent contaminated ground water from entering the Spanish River watershed, via

Kelly Lake and the Vermilion River (p. 252). When it comes to contamination of local waterways by solid waste pollution, the cat had been out of the bag, to put the matter into the vernacular, long before 2012, as later events would prove. The events in question formed the basis of an article in one of Canada's national newspapers, The Globe and Mail, which stated: "Environment Canada is investigating Vale SA's Sudbury, Ont., smelting operations for allegedly leaking toxic run-off into local waterways since at least 1963. (Bickis. October 23rd, 2015). The event was also covered by Carol Mulligan, of local newspaper, The Sudbury Star:

The warrant was part of an active Environment Canada investigation that began in November 2012, said Nathalie Huneault of Environment Canada. (...) police and government officials seized files, computers, passwords and data during the raid. They also collected security cards from employees who left the building when the search was being conducted so they could not re-enter the building (Mulligan October 10th, 2015).

The local branch of the Ontario Ministry of the Environment (recently re-named The Ontario Ministry of the Environment and Climate Change (OMOEECC) was formally contacted by Environment Canada investigators, one of whom was Enforcement Officer (EO) Ed Moore and by a peace officer, Joel Ladouceur, on November 27th, 2012. This was in relation to section 490(1) of the Criminal Code, which deals with knowingly discharging a deleterious substance into a waterway frequented by fish (Fisheries Act RSC, 1985, c. F-14) and for the discharge of mining effluent (Metal Mining Effluent Regulations SOR/2002 -222). The Canadian Broadcasting Corporation (CBC) news posted a portion of the warrant on their website:

12. On November 27th, EO Moore and I interviewed potential witnesses of the occurrence reported on October 20h, 2012. One of the witnesses was Marc Donato, Inspection Officer for the Ontario Ministry of the Environment Environmental Inspector Marc DONATO. Officer DONATO is the provincial contact for Vale Canada Ltd. During officer DONATO's statement it was revealed that DONATO has in his possession two Vale Canada Ltd. applications for environmental compliance approval and for water use relating the site in question with supporting documentation and reports of the on-going deleterious discharge.

13. On December 18th, 2012, I contacted Officer Donato regarding the permits of the latest Amendment Application for Environmental Compliance Approval Number 2942-738KH4a for Vale Canada Ltd. and Vale Canada Ltd. application for a permit to take water Permit # 3733-92MHS. Officer DONATO disclosed the fact that the permits had been approved.

14. Ministry of the Environment Officer Marc DONATO is not a person under investigation for offences under the Criminal Code or any other act of parliament in respect to the offences set out in this information. (CBC News October 27th, 2015).

The CBC article alleged that Environment Canada had been investigating Vale Canada Limited's Sudbury, Ont., smelting operations for leaking toxic runoff into local waterways since at least as far back as the 1960s, and that no action was taken by the mining company until ordered to do so:

(...) aerial photographs from 1963 show water flowing from the waste heaps onto the nearby property, and that the width and depth of the erosion around the stream also indicate the flow has been going on for decades (...) Moore says in the warrant that studies dating back to the 1990s showed further evidence of waste water seeping from the slag piles, but that the company did nothing about it until ordered to by Environment Canada (CBC News October 27th, 2015).

While that allegation has not been proven in court, it alleges, by extension, that this issue of seepage was known before the Sudbury Soils Study (SSS) began in 2001, and another known fact is that the issue of effluent leaving both active and abandoned ore processing facilities was an issue the mining companies wanted left out of the Ecological Risk Assessment (ERA) portion of The Sudbury Soils Study (SSS). With the benefit of hindsight, and the reporting of Ian Bickis, we now know that the Federal Government had taken issue with this matter of contaminated runoff, well before the inception of the Sudbury Community Based Risk Assessment (CBRA), as in the Environment Canada warrant, it states that the company was aware of the matter in the 1990s but did nothing about it until ordered to by Environment Canada. (Bickis. October 23rd, 2015). A rather interesting explanation for the greenish liquid flowing out of Vale property was

recorded by Enforcement Officer Moore during conversations with a Vale lawyer and a company manager:

A Vale lawyer suggested the cause of the green-coloured substance in the water could be from anti-freeze entering the storm sewer system, according to Moore (CBC News October 28th, 2015).

Antifreeze, or engine coolant, if one prefers that designation, is composed primarily of ethylene glycol, with a few rust inhibitors added. An analysis of the green fluid in Nolin Creek was contained in the Environment Canada warrant, and reported in the Bickis article:

Samples from the creek showed nickel levels to be 68 times higher than regulated limits and copper levels 2.6 times higher, while tests on water from the school board property showed nickel levels to be 305 times the limit, the warrant says (Bickis October 23rd, 2015).

Once these revelations became part of the local conversation, one of the more interesting articles on the matter appeared in the alternative media, on an internet website called: activehistory.ca.

The purpose of the article was to explore the effects of this past pollution on local people, noting that:

Understanding the visible and invisible tolls that heavy industry has taken on residents' bodies requires a willingness to explore these unfinished histories, a subject that is deeply implicated in an Environment Canada investigation in the region (Zembrzycki December 5th, 2015).

In an article that goes beyond the dry, polished, legalese of warrants and press releases by government and industry actors, Stacey Zembrzycki interviewed a longtime resident of the neighbourhood adjacent to the smelter property, Gatchell, identified in the Sudbury Soils Study as part of Sudbury Centre West. The resident interviewed, Franck Stradiotto is described by

Zembrzycki as:

(...) an Italian immigrant whose family came to Copper Cliff in 1948, and lived with relatives until his parents were able to purchase their own home on Dean Street in Gatchell in 1951, just a few streets east of where Inco dumped its hot molten slag (ibid).

As a child, Stradiotto and his friends not only played and splashed around in Nolin Creek water, but he revealed during the Zembrzycki interview that he and his friends drank the creek water as well:

‘We drank it.’ (...) Calmly, Frank went on: ‘We’d take our shoes, we used to play with it, walk in it ... it was clear eh. But there were never any frogs or turtles I remember. [half laughs] We always looked for ’em, there’s no fish, there’s nothing but it was clear and there was these green algae in it...’ (ibid).

In the absence of any warnings or information about the hazards of this water, by any government agency of any description, or from the polluter, local children drank it, played in it, and residents even watered their gardens with it:

Residents, like Frank and his gang of friends, touched and even drank it. They also watered their gardens with it, and then ate the food that grew in those gardens; high sulphur dioxide levels also meant that acid rain and the resulting toxins made their way into residents’ food chains too (...) Gatchell remains a predominantly postwar Italian immigrant neighbourhood, where every second or third house in and around Frank’s childhood residence still has a large backyard garden (ibid).

While walking through the neighbourhood in the course of her interview, an encounter and conversation with another older resident of the neighborhood revealed a disturbing cluster of illness amongst those who had used the water of Nolin Creek to water their vegetable gardens:

A lot of them died of cancer,” Frank continued (...) Frank and his childhood friend went on to recall the old-timers who had since passed away, making clear that there was a pattern of illness in the neighbourhood. For them, incidents of cancer were tied to water (ibid).

For many residents of Sudbury and the surrounding area who followed the events of the Sudbury CBRA, the omission of this matter, solid waste pollution finding its way into our ground and surface waters, and from there possibly into our bodies, was a serious shortcoming of the CBRA. Predictions of risk from only air pollution did little to assuage the nagging doubts in the

community as a whole. Whether cancer mortality figures were linked to this matter, solid waste pollution, went unexamined, by design and by the insistence of those responsible for producing it, the local mining industry actors in the Sudbury CBRA,

Chapter 21

An Overview of Cancer Mortality in Northeastern Ontario

While the Sudbury Soils Study's Human Health Risk Assessment discovered a slightly elevated risk of cancer to people living near the smelter in the area known as Sudbury Centre West, (which includes Gatchell) from only present-day air pollution, that finding did not include the risk posed to Sudburians by the cumulative effects of multiple pollutants, only one pollutant at a time. The Community Based Risk Assessment (CBRA) exempted a major pollutant here in Sudbury, sulphur dioxide, SO₂, from any assessment whatsoever. Pollution in the form of run-off from slag heaps, tailings and mine waste rock was also exempted.

What I and other Sudburians wanted, and still want, in addition to a complete and open study of all types of pollution and their levels in our community, is some acknowledgement of the cancer rates in our community, not just a comparison to other mining communities with high cancer rates. The Sudbury CBRA stated that it would only assess risk, not look at health indicators, even though health indicators are the one thing that have any real substance to them, in the minds of many Sudburians. Statistics compiled by the late K.V. Nagarajan, Professor of Economics, at Laurentian University, (who died of cancer in 2013) and published in 2008, give an indication of a serious cancer problem in Sudbury, in the book "Mining Town Crisis", (Leadbeater, David. 2008). Statistics for the Sudbury area indicated that cancer rates in Sudbury were higher than the provincial average. As per 1997, 11 years before the release of the Sudbury Soils Study's Human Health Risk Assessment.

According to the Nagarajan data, Sudbury had:

- 1) a total death rate from cancer that was 5% higher than the provincial rate
- 2) a lung cancer rate that is 14% greater than the provincial rate. For males it was 28% higher, for females, 2% lower (Leadbeater 131).
- 3) a colorectal cancer rate that was 9% above the provincial rate (Leadbeater 130)
- 4) a prostate cancer rate that was 4% above the provincial rate (ibid)

If we apply the tenets of the Dominant Epidemiological Paradigm (DEP) to the cancer statistics for Sudbury, and Northeastern Ontario generally, a case could be made, and in fact was made, to attribute these statistics to bad lifestyle choices. Nagarajan noted that Sudburians had higher rates of smoking, alcohol consumption, and obesity than the provincial average (Leadbeater 136-137).

What is known is that at least one member of The Sudbury Soils Study's Public Advisory Committee (PAC) from The Sudbury and District Health Unit, Ido Vettereti, is a firm believer in the tenets of the Dominant Epidemiological Paradigm (DEP), in reference to Sudbury's cancer statistics. Vettereti made his views very clear in public, during the presentation of The Community Committee on the Sudbury Soils Study (CCSSS) review of the Ecological Risk Assessment by Glen Fox, presented at The Day's Inn, Sudbury, in the Fall of 2008. Although the presentation was concerned with environmental issues related to Fox's critique of the Ecological Risk Assessment, I recall Vettereti took exception to the informational literature being circulated by the Community Committee on the Sudbury Soils Study (CSSS), stating that cancer rates in Sudbury at that time were 5% higher than they were for the rest of Ontario. Vettereti stated that cancer rates in Sudbury are comparable to other centers in Northeastern Ontario, meaning they are not significantly higher, in relative terms, *ergo*, there is no higher risk of getting cancer in Sudbury than in other centers in the region. The late Homer Seguin, present at this meeting, replied — to paraphrase — that this merely means that miners in other northeastern Ontario

communities are dying of the same diseases as miners in Sudbury. Seguin's statement may also have statistical merit, although it is not known if it is miners and mineral extraction employees that are dying in greater numbers than members of the general public. That information is not publicly available.

According to statistics published by Cancer Care Ontario (CCO), in 2007, the rate of cancer mortality in the Northeastern Ontario Local Health Integration Network (LHIN) was the highest in the province, the year the Sudbury Human Health Risk Assessment (HHRA) was completed, although this data was not part of the literature used by the Community Committee on the Sudbury Soils Study. The Northeastern LHIN includes mining communities such as Timmins, Sudbury and Kirkland Lake. At a later date, the data in question concerning cancer mortality rates was confirmed publicly, in an article by The Sudbury Star, a local newspaper. This information was obtained from Cancer Care Ontario, only thanks to a special request by MPP Gilles Bisson (NDP-James Bay), and published in The Sudbury Star. Cancer Care Ontario's own data indicated that:

Bisson's riding of Timmins-James Bay-Baie James is part of the North East LHIN, whose cancer mortality rate of 184.94 deaths per 100,000 people is the highest in Ontario. The provincial average is 158.49 deaths per 100,000 (Clarkson April 9th, 2012.).

The article also notes that "Since 2007, Cancer Care Ontario has published projected mortality rates, instead of the actual data from the LHINs" (ibid). Cancer Care Ontario spokesman Brett Tremblay justified this new practice by stating that:

'Simply publishing the raw data doesn't help, in this sense, because it doesn't explain what's behind the numbers,' Tremblay said. 'It doesn't talk about the survival rates; it doesn't talk about prevalence or incidence or anything of that sort. It's simply, this is everyone in this region who happened to have cancer as their mortality' (ibid).

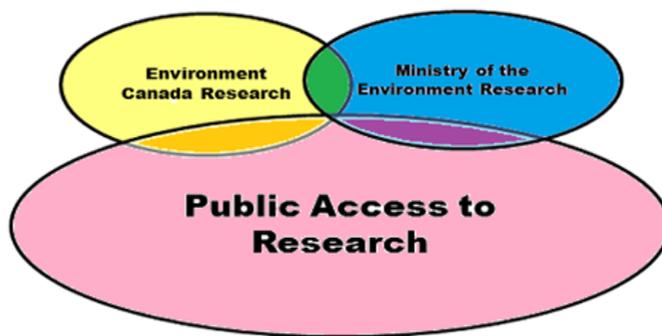
As the Statistics Canada data from 1997, compiled by K.V. Nagarajan in Mining Town Crisis (Leadbeater 2008) indicated at the time, in 1997, the overall cancer mortality rate for Sudbury was 5% higher than the provincial average, the statistic which the representative from the Sudbury and District Health Unit (SDHU), Ido Vettereti took issue with. By 2007, as indicated by Cancer Care Ontario (CCO), 10 years later, the cancer mortality rate for Northeastern Ontario vs. Ontario overall, was 184.94:158.49 (p. 266), respectively, 16.7% higher than the provincial average. Tremblay also stated that he believed Cancer Care Ontario (CCO) is totally open with its information, despite the fact that the practice of releasing actual data on cancer mortality rates was discontinued, in favor of calculated, projected mortality rates instead:

If you look at the reports we publish, more and more information has become available with the proper context. This one chart with this one format, was all that was discontinued, and we focused instead on other more meaningful charts with actual, measurable contextual data (...) data that people could do something with as opposed to simply raw numbers (ibid).

Just what the “proper context” is regarding the number of deaths from cancer could be, or how publishing estimated mortality rates is the proper context, rather than the factual data, was not elaborated upon. Until MPP Gilles Bisson made a point of obtaining the information, the actual cancer mortality rates for the Northeastern LHIN were not being made available to the public through their respective health units, apparently as a matter of government policy. During the Copper Cliff presentation of SSS, I inquired directly of Penny Sutcliffe, of The Sudbury and District Health Unit, whether or not there was any information concerning cancer rates and possible causes in the Sudbury area. I was simply given the usual Dominant Epidemiological Paradigm (DEP) response, that cancer rates in Sudbury and Northeastern Ontario are higher than

average due to smoking rates, obesity rates, etc., — all the usual factors that make up the DEP. How much higher was never stated.

Figure 2: Venn Diagram illustrating Separate Spheres of Research and How Public Access is Affected.



What information we manage to obtain from the two different levels of government, federal and provincial, is often different, as symbolized by the different spheres in the Venn diagram above. Environment Canada research and standards occupies its own sphere, while Ontario's Ministry of the Environment research and standards also has its own sphere. Eventually, with some diligent research, a member of the public can combine the two sites of information to obtain overlapping information and a broader context of what the issues are, the actual information

about the human and natural environment, but it is a slow process. It is the combination of federal and provincial research which has provided me with the most comprehensive information, but not the separate spheres of government on their own. Information seems to be scattered in any number of locations, which makes locating it similar to a shell game. As members of the public, if we access only one or the other, we often do not obtain the complete information we need. As stated earlier, Ido Vettereti, The Sudbury and District Health Unit's representative on the Public Advisory Committee of the Sudbury Soils Study, stated at the public presentation of Glenn Fox's review of the Ecological Risk Assessment — to paraphrase — that cancer rates in Sudbury were comparable to other population centers in Northeastern Ontario; however, that was a simply relative comparison of one area of high cancer mortality to another. The same sorts of comparisons were used in assessing the risk to human health at Love Canal, a suburb of Niagara Falls, New York (pp. 216-217). According to the most recent information posted on the internet by Statistics Canada, the overall cancer mortality rate for Bisson's riding of Timmins-James Bay is even more disturbing than he was informed of. Bisson was informed by Cancer Care Ontario (CCO) that cancer mortality for the Northeastern LHIN was 17% higher than the rest of the province in 2005-2007, the last year that information was available. On the other hand, with 2012 Statistics Canada data we can now further break down the Northeastern LHIN into the constituent Health units of: The Sudbury and District Health Unit, The Porcupine Health Unit (Timmins and area) and the Temiskaming Health Unit, (which includes the gold mining area of Kirkland Lake) for the year 2005-2007. The cancer mortality rates are even higher than claimed by the Community Committee's literature in 2007, at 5% above the Ontario average, which were disputed by Ido Vetteri of the Sudbury and District Health Unit.

Table 23: Cancer Mortality Statistics for The Sudbury and District Health Unit, 2005-7.

| Type of Cancer | Provincial Mortality Rate per 100,000 | District Mortality Rate per 100,000 | District Mortality Rate as % of Provincial Rate (+/-) | Male Mortality as % of Provincial Rate (+/-) | Female Mortality as % of Provincial Rate (+/-) |
|----------------|---------------------------------------|-------------------------------------|---|--|--|
| All | 159.1 | 188.9 | +19% | +23% | +15% |
| Colorectal | 17 | 18 | +6% | +3% | +10% |
| Lung | 40.3 | 52.6 | +31% | +28% | +33% |
| Breast | 12.0 | 11.4 | -5% | ... | -5% |
| Prostate | 8.0 | 10.6 | +33% | +31% | ... |

Source: Statistics Canada. 2013. Sudbury and District Health Unit (Health Region), Ontario and Ontario (table). Health Profile. Statistics Canada Catalogue no. 82-228-XWE. Ottawa. Released December 12, 2013

Table 24: Cancer Mortality Statistics for The Porcupine Health Unit, 2005-7.

| Type of Cancer | Provincial Mortality Rate per 100,000 | District Mortality Rate per 100,000 | District Mortality Rate as % of Provincial Rate (+/-) | Male Mortality as % of Provincial Rate (+/-) | Female Mortality as % of Provincial Rate (+/-) |
|----------------|---------------------------------------|-------------------------------------|---|--|--|
| All | 159.1 | 189.4 | +19% | +20% | +16% |
| Colorectal | 17.0 | 20.4 | +20% | +66% | -2% |
| Lung | 40.3 | 52.6 | +31% | +27% | +6% |
| Breast | 12.0 | 16.6 | +38% | ----- | +40% |
| Prostate | 8.0 | 7.6 | +5% | -1% | ----- |

Source: Statistics Canada. 2013. Porcupine Health Unit (Health Region), Ontario and Ontario (table). Health Profile. Statistics Canada Catalogue no. 82-228-XWE. Ottawa. Released December 12, 2013.

Table 25: Cancer Mortality Statistics for The Temiskaming Health Unit, 2005-7.

| Type of Cancer | Provincial Mortality Rate per 100,000 | District Mortality Rate per 100,000 | District Mortality Rate as % of Provincial Rate (+/-) | Male Mortality as % of Provincial Rate (+/-) | Female Mortality as % of Provincial Rate (+/-) |
|----------------|---------------------------------------|-------------------------------------|---|--|--|
| All | 159.1 | 194.8 | +22% | +26% | +16% |
| Colorectal | 17.0 | 18.1 | +30% | +30% | -40% |
| Lung | 40.3 | 58.7 | +46% | +50% | +35% |
| Breast | 12.0 | 11.6 | -3% | ... | -1% |
| Prostate | 8.0 | 9.1 | +14% | +3% | ... |

Source: Statistics Canada. 2013. Timiskaming Health Unit (Health Region), Ontario and Ontario (table). Health Profile. Statistics Canada Catalogue no. 82-228-XWE. Ottawa. Released December 12, 2013.

Therefore, in relative terms, Ido Vettereti’s public assertion that Sudbury’s cancer mortality rates are not higher, in terms of statistical significance, when compared to other population centers in Northeastern Ontario, was in fact true. But what is of most significance to me, as a citizen of the Sudbury LHIN, is that all of the population centers in Northeastern Ontario have a much higher cancer mortality rate than the overall provincial average, and should not be compared to each other, as this will yield little or no statistical difference. Combined, the three District Health Units have an average cancer mortality rate which is 20% higher than the provincial average. Whether or not these cancer mortality rates can be attributed to an aging population, to the Dominant Epidemiological Paradigm, to the pollution present in mining

environments putting the local population at higher risk, or whether they are occupational — related cancers, or some combination of all possibilities cannot be determined.

In her research paper on the matter of approaches to pollution, and how to manage it, Professor Nadine Scott, Assistant Professor, Osgoode Hall Law School and the Faculty of Environmental Studies, York University, outlined some of the background of the concept of environmental protection, noting that instead of limiting the entry of pollution into the environment, there has been a subtle, but steady, shift to the concept that:

(...) air, water, and land components, could, through careful management, be used to dispose of, dilute, and cleanse the waste produced by human activity (Scott 46 (2):321).

Scott contends that it may have led to this pollution of the natural and human environment becoming an accepted risk of everyday living and a necessary byproduct of the consumer society that we all participate in, and are all assumed to benefit from (Scott 46[2]:313). This is also apparently the rationale behind creating environmental sacrifice zones, where local residents are assured that the pollution generated is permissible, within limits (possibly due to a site — specific standard), and/or manageable and/or will dissipate over time. In return, local citizens are assumed to benefit from the employment this this local pollution brings:

It is in this context that environmental justice activists talk about “sacrifice zones”—those communities located in close proximity to industry that are seen as powerless and expendable (Scott 46 [2]:318).

What does not appear to be taken into account by this present paradigm, whereby pollution is managed, not prevented, is the cost to specific social and geographic sectors of society, and those are the sectors of society living in close proximity to, and/or working within, the facilities producing the pollution. As Scott points out, for some people, there is no escaping this chronic pollution, especially those who are rooted to their location, such as First Nations people

(Scott 46 [2]:333) and those who are unable to relocate due to their socioeconomic standing (Scott 46 [2]:332). Therefore, simply leaving a polluted area is not always an option, even once harmful levels of pollution are detected and made public. For those who are dependent upon a workplace environment containing toxic pollution to support their families, the risk is even greater, due to their workplace exposures and the possibility that their residential environment may well contain the same pollutants as their workplace — placing them in double jeopardy. It is this possibility which could not be explored in my research, and which was intentionally not addressed in the Sudbury, Port Colborne and Belledune CBRAs.

The separation of data into departments, such as Health Canada and Environment Canada standards vs. Province of Ontario standards is also an impediment to understanding what constitutes a health risk to the public. A case in point is the information posted by Health Canada's official website regarding nickel in drinking water. While Ontario has no standard for nickel in drinking water, Health Canada, a federal department, notes that in a 1985 study in Iowa:

Mortality due to bladder and lung cancer was greater in a population whose drinking water contained elevated levels of nickel (up to 1.3 µg/L, form unspecified) compared to the statewide population-based cancer incidence in an ecological study of residents of towns (population of 1000 to 10 000) in Iowa whose drinking water supply was from a single stable ground source (Health Canada. 2011. "Nickel and its Compounds" 3.3 11).

If we compare nickel levels in the water of the Iowa study to nickel levels in local lakes from which local residents may well drink their water directly, at the time of the Human Health Risk Assessment component of the Sudbury CBRA, we find the following nickel levels in these local lakes: MacFarlane Lake: 51.0 µg/l, Richard Lake: 57.0 µg/l and Long Lake 47.0 µg/l. (SES Intensive Monitoring Lakes 2003-4 Appendix 1) for an average of 52.0 µg/l. This level of nickel in these Sudbury lakes, from which residents obtain their drinking water is 40 times higher than the nickel levels cited by the Health Canada research referred to.

However, Environment Canada, through Health Canada, falls short of linking nickel contamination of drinking water to lung and bladder cancer, only stating that where groundwater wells are contaminated with nickel:

(...) the incidence of cancer may be elevated in populations consuming water from wells subject to anthropogenic contamination [Isacson et al., 1985] (ibid).

It would seem prudent to take precautions in the case of Sudbury's untreated drinking water, as there are more metal pollutants in it than just nickel; however, there remains no standard whatsoever for nickel in not only Sudbury and Port Colborne's drinking water, or for drinking water anywhere in Ontario. That includes anyone living along the Spanish River, particularly First Nations people living in the Whitefish, Sagamok and Spanish Reserves. The Ontario Ministry of the Environment would not release any information to what nickel and other contaminant levels are in the decontamination wells adjacent to the Copper Cliff Smelter and Nickel Refinery, both Vale facilities, even though the stated purpose of the purge wells constructed on both locations was to prevent the contamination of both commercial and residential well water. Similar purge wells were placed at the fence line of Vale's facility in Port Colborne to decontaminate just over 136 million litres of ground water per year (PTTW # 0575-6YNN6Y), in 2016. This permit was issued after a Community Based Risk Assessment (CBRA) was conducted there as well, and the Port Colborne CBRA also concluded there was no risk to human or environmental health from nickel in the community's ground water; however, there is no nickel standard in Ontario; therefore, no risk. What is abundantly clear is that neither the lack of a nickel standard in Ontario drinking water, nor the possibility of groundwater contamination in the vicinity of the Copper Cliff Smelter and Refinery, nor the downstream contamination of the Spanish Harbour, were addressed by The Sudbury CBRA, in either the Human Health Risk

Assessment, or in the Ecological Risk Assessment. It was done at the insistence of the mining companies that were allowed to participate in establishing what sources of pollution would be examined in the CBRA, and they believed this data should be dealt with by a specific branch of the Ontario government, The Ministry of Mines and Northern Development, which was not involved in the Sudbury CBRA.

The separation of data vital to the understanding of both our human health and environmental issues into other departments of government, as portrayed in **Fig 2**, (p. 261), also hampered the public's ability to obtain information regarding the effects of pollution in the Sudbury area during the CBRA. In the public comments section of the Human Health Risk Assessment (HHRA), it was suggested by different commenters that members of the workforce who are employed in the mining industry are the most at-risk members of the community, and should have been included in the HHRA. To that, came this verbatim reply:

Any current worker has medical services available that includes biological monitoring for nickel, lead and arsenic if they wish to assess on-site exposure (Sudbury Area Risk Assessment (SARA) 2008.Human Health Risk Assessment (HHRA) Appendix: Public Comments and Responses. Partial Response to Comments 11,40).

It seems that the logic behind not including workers in a community health study is that they have free and regular access to a form of health care, biomonitoring of their blood levels, which members of the community do not. Therefore, workers should not be included in a community based risk assessment which is only estimating exposure, not verifying it. (The general public only has free access to blood lead level testing through their local health unit). Relating tissue or blood levels of the Sudbury CBRA's Chemicals of Concern in citizens to the health outcomes of industrial workers exposed to similar pollutants, could have provided a basis for evaluating the risk to citizens and their health outcomes. Unfortunately, this was not possible, due to the

selective exclusion of data, by those who decided the course of the Sudbury CBRA. Therefore, a valuable epidemiological database was excluded from the Sudbury HHRA, health effects in mining industry employees, due to the parameters of the process, not science. As one resident pointed out in her comment concerning perceived shortfalls of the Human Health Risk Assessment, (HHRA), she had her own tissue testing done. Donna Reed, in her comment to the Sudbury Area Risk Assessment (SARA) website, regarding the HHRA in Sudbury, pointed out that when she enquired about nickel in Sudbury's drinking water, she had been directed to the Sudbury Area Risk Assessment (SARA) consultant, Dr. Lesbia Smith, and:

(...) your consultant assured there were no concerns with nickel in the water (...) Upon reading EPA guidelines, a hair analysis showed nickel at 97 ppm (with 0.1 – 1 ppm being normal) and I followed EPA recommendations [regulate nickel] (SARA 2008. Human Health Risk Assessment (HHRA) Appendix: Public Comments and Responses Comments Comment #32).

In response to her concerns, and to other residents of Sudbury, who felt that tissue sampling should have been carried out as part of the Human Health Risk Assessment (HHRA), the following response appears verbatim, 10 times in response to comments about this matter:

The HHRA predicted minimal to negligible risk for Greater Sudbury residents of health effects associated with metals in the environment based on current environmental conditions in the Sudbury area. The HHRA findings do not point to the need for community-wide blood lead level testing. There may be other valid reasons (e.g. to further scientific knowledge, to investigate individual exposure concerns) to test blood lead levels. However, knowledge of community blood lead levels is not required in order to evaluate the potential for health risks to residents of the Sudbury area from exposure to lead in soil, air, drinking water and food that may be related to mining and smelting operations. (Sudbury Area Risk Assessment (SARA) 2008. Human Health Risk Assessment (HHRA) Appendix: Public Comments and Responses. Partial Response to Public Comments 6,9,11,16,17,18,19,27,28,39).

Actually, what Donna Reed, The Community Committee on the Sudbury Soils Study, Environmental Defence's Dr. Kapil Khatter and Sudbury citizens were asking for, was not blood level testing, but tissue testing, which Donna Reed had done at her own expense, to determine her accumulated body burden level of nickel. Apparently, even proof of elevated nickel levels

accumulating in the tissue of a Sudbury resident, Donna Reed, would not sway the official, agreed-upon position adopted by the Sudbury Soils Study. This concern was addressed by a set response, known as a talking point, in response of citizens who would have preferred to see tissue testing to determine just what levels of the Chemicals of Concern (CoCs) — lead, nickel, arsenic, copper cadmium and selenium- were actually getting into the bodies of Sudburians. Instead, calculated estimates would continue to be referenced, a practice which Cancer Care Ontario would also adopt, by coincidence, after the completion of Sudbury Soils Study (SSS) in 2007, concerning even cancer mortality numbers in Northeastern Ontario, even though cancer mortality is verifiable, empirical data.

In her official statement to the public, read three times, once at each of the formal public presentations of the findings of the Human Health Risk Assessment (HHRA), as the representative from The Sudbury and District Health Unit, Dr. Penny Sutcliffe, stated: “This is not a health study. We are not counting the number of sick people”. Therefore, the researchers who planned and executed The Sudbury Soils Study (SSS) all came to a consensus that mathematical estimates of health risks were more useful to the public than actual, verifiable data. Further, in the opinions of the authors of SSS, if the mathematical constructs that risk assessment produces indicate that there is no risk, then the results cannot and should not be questioned by the public, at least partially on the basis of who is supporting these claims. In the official responses to public questions regarding the trustworthiness of the Sudbury Human Health Risk Assessment (HHRA) findings, due to public unease over the fact that the two biggest community polluters were involved in framing the study, the following statement addresses that concern and appears verbatim, no less than 11 times, in the public response section: “Sudbury HHRA

Appendix: Public Comments and Responses”:

The Sudbury & District Medical Officer of Health Dr. Penny Sutcliffe stated that she supports the results of the HHRA. She was involved in the study for several years and she had a fully independent statutory duty to protect the health of community members (Sudbury Area Risk Assessment (SARA), 2008. Human Health Risk Assessment (HHRA) Appendix: Public Comments and Responses. Partial Response to Public Comments 6,7,9,16,17,18,21,27,28,36,39).

At 11/40 responses, it makes this answer the partial response to 28% of all comments. The issue that was raised most during and after the public release of the HHRA, was the matter of tissue testing to detect accumulated levels of the heavy metal pollutants known to be in the air, water and soils of Sudbury. This concern was responded to verbatim 10 times (p. 271, 272) plus two more variants of this response appear (Appendix: Public Questions and Responses: Nos. 11, 39. SARA 2008), to give us a total 12/40 public comments responded to with this talking point, or 30%, of all public comments. When combined with the comments outlined on page 248, concerning the opinion that tissue testing of residents should have been carried out, and the concern that the mining companies should not have been involved in determining the course of the CBRA, these two issues total 58% of all public comments as matters of concern which local citizens felt the need to comment upon, as a matter of public record.

Chapter 22

Bucket Brigades and Wounded Communities

In response to environmental pollution in their communities, some communities have initiated a very important challenge at the community and citizen level, in the form of what has become known as “bucket brigades”, a term which requires some contextual clarification. Before the time in which fire departments were considered an essential public safety measure, citizens were required to pay for fire protection in the form of an insurance payment. Once you paid your local fire brigade, you were given a medallion to affix to your house, and in the event of a fire, the fire department would attempt to put out the fire at your house, provided you had the correct medallion from the right fire service provider. If not, a fire crew would let your house burn down if they attended the fire. Later, fire services were made a public service, available to all. However, before that time, if an uninsured person’s house was on fire, they were left to their own defenses. Often, citizens would form a chain from the nearest water source to the building on fire, and pass buckets of water to throw on the fire, hence, the term “bucket brigades”. In the matter of pollution in people’s community affecting people’s health and property, citizens have begun to monitor pollution in ways that neither government nor industry is often prepared to do for them. The concept of empowering citizens to conduct their own pollution monitoring was first proposed by California lawyer Ed Masry who hired Erin Brokovich as a paralegal to assist him in his investigating a Union Oil Company of California (UNOCAL) oil refinery in 1985 (Global Community Monitor: 2012). According to the official website of Global

Community Monitor (GCM), after their experiences monitoring complaints about a petrochemical factory in Contra Costa county, California, Masry and Brokovich both became ill from fumes emanating from this factory merely viewing the complex. Masry noted that “agencies monitoring the emissions never seemed to be around when the factory had a particularly bad release” (GCM. 2012). The inadequacy of both government and industry monitoring of intermittent industrial pollution led Masry to retain the services of an environmental engineer, to design a very simple sampling device called a “bucket sampler”, shown below in **Plate 2**. It is an air sampler made of very cheap and simple parts, including a plastic bucket, a plastic bag, an air valve, and a pump to draw air into the bucket through a filter upon which airborne pollutants are retained.



Plate 2: A Bucket Tester.
Source: Global Community Monitoring.

The filters containing the air samples are then sent to a trusted lab for analysis. The bucket sampler can be used to test for “more than 70 gasses-Volatile Organic Compounds (VOC’s) and 20 sulfur compounds” (GCM 2012). According to the GCM website, with these measuring

devices, actual pollutant levels can be determined at any time of the night or day, giving:

(...) communities living near refineries, chemical plants, or other toxic emitting sources, a chance to even the playing field with indifferent regulators and polluting companies
(...) No longer do communities have to rely on outsider (*sic*) to tell them what they're breathing. The Bucket Brigade allows industrial neighbors to collect valid scientific data which can then be used to win impressive reductions of pollution, safety improvements and increased enforcement of environmental laws. (Global Community Monitoring [GCM]:2012).

This program has succeeded in setting up numerous community testing programs, and as of 2012, according to the GCM website. "Bucket Brigades have been active in 27 different countries and have a proven track record of effectiveness" (ibid). Canada became the 17th country to make use of bucket testers with the advent of bucket brigade testing in the Aamjiwnaang First Nation in Sarnia, in 2007, another in Prince George, BC, in 2009, and two testing brigades in the Alberta tar sands area were added later in 2010 (ibid). According to Denny Larson, of Global Community Monitor (GCM), once communities begin gathering their own scientific data on their actual pollution levels, "the community can collapse the house of cards built by the government and industry that pollution doesn't cross the industry's fence line." (ibid). GCM believes that with this knowledge, the monopoly on environmental pollution data enjoyed by government and industry can be broken. For a fence line community like Belledune, the actual lead, arsenic, cadmium and mercury emission levels people were being exposed to could have been quantified, and perhaps pressure could have been exerted by the community to have these levels reduced. That scenario is still possible, as the pollution of the community continues to this day. For a community like Sudbury, this would be a return to the kind of activism the late Homer Seguin and USW Local 6500 engaged in over 40 years ago in the late 1960s, when the local union paid for their own SO₂ meter to monitor pollution from atop their union hall (See Chapter 9: "Union Attempts at Participation in the Sudbury Soils Study and the

Past Activism of Homer Seguin, pp 79-91). With this independent, union monitoring of SO₂ pollution levels, which the provincial regulators were assuring the community were “within limits”. Sudbury pollution levels were in fact found to be twice the level considered acceptable anywhere else in Ontario. Unfortunately, the new monitoring protocols for nickel, approved for the Vale and Glencore smelters in 2011, based on an annual average, would make the annual monitoring cost to citizens prohibitive. According to GCM, a single test can cost as much as \$500 US. Unfortunately, for citizens of Sudbury, the prospect of citizen monitoring has been “scientized” to the point that it is impossible for citizen involvement; the cost of monitoring is also now out of the reach of ordinary citizens, thanks to the science of annual average values of pollution. An annual average of 1.0µg/m³ in total suspended particulate (TSP) is 50 times higher than the permissible level for the rest of Ontario, but with annual averaging, small numbers of daily exceedances are meaningless, in the context of an annual average, which could conceivably require hundreds of readings to monitor accurately. For heavy metals air pollution, even if what most of us experience in Sudbury is now categorized as “low-level” in that it is believed to not produce immediate, visible health effects, it may not preclude physical harm.

Danya Nadine Scott, in the Osgoode Hall Law Journal in 2008, contended that chronic exposure to low-level pollution, while not immediately harmful, constitutes the equivalent of a physical wound, and a profound one at that, which is no accident:

Profound human wounding, through chronic low-dose exposures to toxic chemicals, should not continue to be understood as accidental (...) accepted patterns and practices of production link pollution with profit (Scott 46 (2):343).

As Scott also observed: “The new instinct in social thought must instead be to link sick bodies and wounded communities with known pollutants” (ibid). However, there is no established biomonitoring program to determine how much of this pollution is entering people’s

bodies in Sudbury. The authors of The Sudbury Soils Study felt that body burden testing was of minor community interest, and of no interest to them. Calculated values formed the basis of their assertion that the pollution they were producing was not entering the bodies of local residents at unacceptably harmful levels. With a community-based research program, where affected community members themselves participate and help direct the research, the tightly controlled knowledge of actual pollution levels and what they may be doing to people's health and the environment would be taken out of the hands of the alliance of industry and government. If the scientized view of the risk to human health, which tends to blame the individual for adverse health outcomes, not industrial pollution, could be at least challenged, then so too could the authority which upholds the Dominant Epidemiological Paradigm. If community based biomonitoring and/or community based atmospheric testing could be correlated to health outcomes, there may be no choice but for industry and government to move closer to the precautionary principle as well. This would inevitably involve a compromise in the upstream/downstream approach to disease causation, where environmental causation is also considered as a factor in disease, not simply individual lifestyles. However, as this research indicates, community members often have difficulty obtaining even official Ontario Ministry of the Environment (MOE) data on local pollution levels which should be available to every member of the public, with the existence of Ontario's Environmental Bill of Rights. My experiences attempting to gather the most elementary of data concerning measured pollution levels from the MOE monitors here in Sudbury are not unique. In one of his annual reports, the Environmental Commissioner of Ontario (ECO), Gord Miller, in 2012, gave his assessment of how the Environmental Bill of Rights (EBR) was functioning in Ontario and stated that:

(...) it astounds me to report on the degree of disregard and contempt that is shown to statutory requirements of the EBR each year. Especially because the EBR is about the

rights of citizens to participate in decision making as it relates to our environment (ECO Annual Report 2011-2012. "Losing Touch" Part 1:28).

The Environmental Commissioner of Ontario also notes in his 2012 report that the worst offender, in terms of acting upon requests by the public for information, is none other than The Ministry of Northern Development and Mines (MNDM):

The Ministry of Northern Development and Mines (MNDM) has denied all 12 EBR applications filed by the public since the inception of the Act. MNDM's actions over this time show a total disregard for the will of the Ontario Legislature in giving the public the right to file EBR applications for review related to the ministry's legislation and policies (ECO Annual Report 2012. "Losing Touch" Part 1:21)

The minister of this government ministry, from 2003 to 2007 was the elected representative from Sudbury, MPP Rick Bartolucci (Liberal). As of 2012, this ministry had denied 100% of applications by the public for information regarding environmental pollution at mining sites for the last 18 years. In reference to this closed door policy of the MNDM, the Environmental Commissioner of Ontario (ECO) also makes the point that:

The ministry's actions-or lack thereof – constitute a flagrant disservice to the public and its rights. This trend also could give the public the impression that the ministry insufficiently weighs environmental concerns in its decision making (ibid).

I would like to close out this section by revisiting a matter raised earlier: the issue of arsenic levels in Long Lake. When The Sudbury Soils Study tested fish in local lakes for the chemicals being examined by the Community Based Risk Assessment (CBRA) as part of the Human Health Risk Assessment (HHRA), Long Lake received special mention, as it was assumed that high arsenic levels in the lake were caused by an abandoned gold mine at the west end of the lake (p. 70). Long Lake is approximately 8 kilometers long, flows roughly southwest, and is less than 1 km wide in most locations, with the upstream, or eastern, portion being the most inhabited. Also at this eastern end of the lake is a public school, Long Lake Public School. Public

documents posted on the internet by the Ontario Ministry of the Environment in 2007 indicated that the school's well water was contaminated with arsenic as of 2005.

In 2005 an arsenic removal system was commissioned, along with a water softener system. Subsequently arsenic levels have been reduced below the Maximum Acceptable Concentration of 25 ug/L and also below the proposed new MAC of 10 ug/l (Ministry of the Environment (MOE), 2007. Drinking-Water Systems Regulation O. Reg. 170/03 Annual Report. Long Lake Public School, April 1st, 2007- March 31st 2007:2).

However, the school's well water recorded an arsenic reading of 33.2ug/L on November 13th, 2007 (ibid). In a November 17th, 2008 meeting of the Rainbow and District School Board, which administers the Long Lake Public School, it was noted:

In response to Regulation 243/07, drinking water samples were taken at all schools by August 15. All samples were below the Ontario Drinking Water Quality Standards after flushing. Long Lake Public School remains on bottled water until the Health Unit provides clearance to use the water (Rainbow District School Board,2008:7).

For exactly how long pupils of this Sudbury school had been ordered not to drink the local well water is not clear; however, in 2005 an arsenic removal system was installed to remove this contaminant from the water supply, which is a well on school property (Ministry of the Environment [MOE]. Drinking-Water Systems Regulation O. Reg. 170/03 Annual Report. Long Lake Public School, April 1st, 2007- March 31st 2007:2). Therefore, at some point earlier than 2005, it had come to the attention of both the Ontario Ministry of the Environment (MOE) and the Sudbury and District Health Unit (SDHU) that untreated ground water in this part of Sudbury was a risk to human health, due to unacceptable arsenic levels. None of this information came to light at the May 13th 2008 presentation of the Human Health Risk Assessment (HHRA) presentation at Science North. In fact, as stated earlier in this thesis, Brian Cameron denied all knowledge of even the existence of the Long Lake Gold Mine and arsenic-contaminated tailings when I asked him about the matter at the Copper Cliff presentation of the Human Health Risk

Assessment component of the Sudbury Soils Study (p. 55). He requested any and all research I had on the matter, which I e-mailed to not only him, but also to Stephen Monet of the City of Greater Sudbury. Penny Sutcliffe, the representative of the Sudbury and District Health Unit on the Technical Committee was also present on that occasion, and said nothing. At the presentation of the Ecological Risk Assessment, approximately 6 months later, I inquired once again about what was going to be done about the Long Lake Gold Mine, and Brian Cameron of the MOE once again denied having any knowledge of the matter (p.138), despite receiving information on the matter earlier, for which he had personally thanked me by e-mail.

My reason for including this information at this point of my thesis is to put into context an article which appeared in The Sudbury Star, on July 31st 2012, “Arsenic in Long Lake” by Laura Stricker. The article states that a Long Lake resident, Stephen Butcher, contacted the Ministry of the Environment about the possibility of contamination of Long Lake from the same abandoned gold mine at the south end of the lake I had attempted to draw attention to. Butcher stated that:

I read some reports on that mine a few years back, and it said the tailings were heavily loaded with arsenic. Logic put together that it would be creeping in by Long Lake (Stricker July 31st, 2012).

After contacting the Ontario Ministry of the Environment (MOE), Butcher received the following reassurances from MOE spokesman Max Kasper:

‘Looking at the data we have collected ... despite water chemistry results that are above Provincial Water Quality Objectives for some parameters, the drainage from the former gold mine is having little impact on Long Lake,’ Kasper told him in an email dated May 26, 2010 (ibid).

Refusing to accept those assurances from the MOE, Butcher and other residents of Long Lake commissioned local business Testmark Laboratories to analyze a separate set of samples taken by local residents from the lake in 2010, one from near the part of the lake closest to where the

tailings effluent enters the lake, one from the opposite shore, and a sediment, or soil sample from the area of tailings outflow. According to Butcher, the results were not reassuring:

The results from the samples Testmark analyzed showed an arsenic level of 571 ug/L in the part of the lake closest to the mine. The control sample, from the opposite side of the lake, had an arsenic reading of 1.5 ug/L. The soil sample clocked in with 12,800 ug (micrograms) of arsenic. However, the MOE disputes that anything is wrong with Long Lake's water (ibid)

The limit for arsenic in Ontario drinking water is 25 µg/l (MOE 2007:1). While the Health Canada limit for arsenic in drinking water was lowered to 10 µg/l in 2006, the Ontario Ministry of the Environment has not followed suit. (Canadian Environmental Law Association [CELA]: 2014). The Ontario Government commissioned a second set of tests for Long Lake in December of 2011, carried out by the Ministry of the Environment:

When Butcher contacted the ministry to see the results, his request was turned down and he was told to contact the Ministry of Northern Development and Mines (MNDM) instead. Butcher still has not seen the results of the government's tests. The contacts at MNDM who he was told have the test results have all said they don't (ibid).

Butcher makes it very clear at this time that he believed the Ontario Government through both the MOE and the Ministry of Northern Development and Mines was not being protective of human health with this apparent lack of concern, action and disclosure. As Butcher noted in July of 2012, there is now enough tailings that have leached into this portion of Long Lake that the tailings outflow now has the appearance of a beach:

'I would like to see official signs up there (...) I was just down there on the weekend, and there was a family with children (playing there). It looks like a sandy beach. But it's not. It's loaded with arsenic' (ibid).

Almost an entire year later, a response came to Mr. Butcher from the Ministry of the Environment, in December of 2012. As reported by The Sudbury Star:

Ministry of Environment technicians collected samples throughout the length of the lake Sept. 11. Those readings taken near an abandoned gold mine recorded higher than acceptable levels of arsenic (...) The Sudbury and District Health Unit sent out a letter to

area residents warning against drinking the water or using it in cooking unless it has been treated (Perth December 15th, 2012).

Therefore, it has now been confirmed by the Ontario Ministry of the Environment and the Sudbury and District Health Unit that there are at least two areas of Long Lake where drinking water, one from well water at the eastern extremity of the lake area, (the well water from Long Lake Public School) and one area of the lake water itself at the extreme western end of the lake, adjacent to the contaminated outflow from the tailings area, are confirmed to be a risk to human health. The Sudbury Community Based Risk Assessment (CBRA) did not come to this finding, and as stated more than once in this thesis, Brian Cameron, the Ontario Ministry of the Environment (MOE) representative on the Technical Committee, denied any knowledge of the existence of the Long Lake Gold Mine when I first asked him about it in 2007 (p 55). Mr. Butcher, a local citizen like myself, also experienced difficulties attempting to get the same issue addressed by another Ontario Ministry of the Environment (MOE) representative, Max Kasper, in 2010. However, the results have now been made both public and official, and an official health advisory has been issued by The Sudbury and District Health Unit. The Health Unit has advised local residents to neither wash with, nor drink from, the water from this area of the lake unless they have an appropriate filtration system to remove the arsenic in their water.

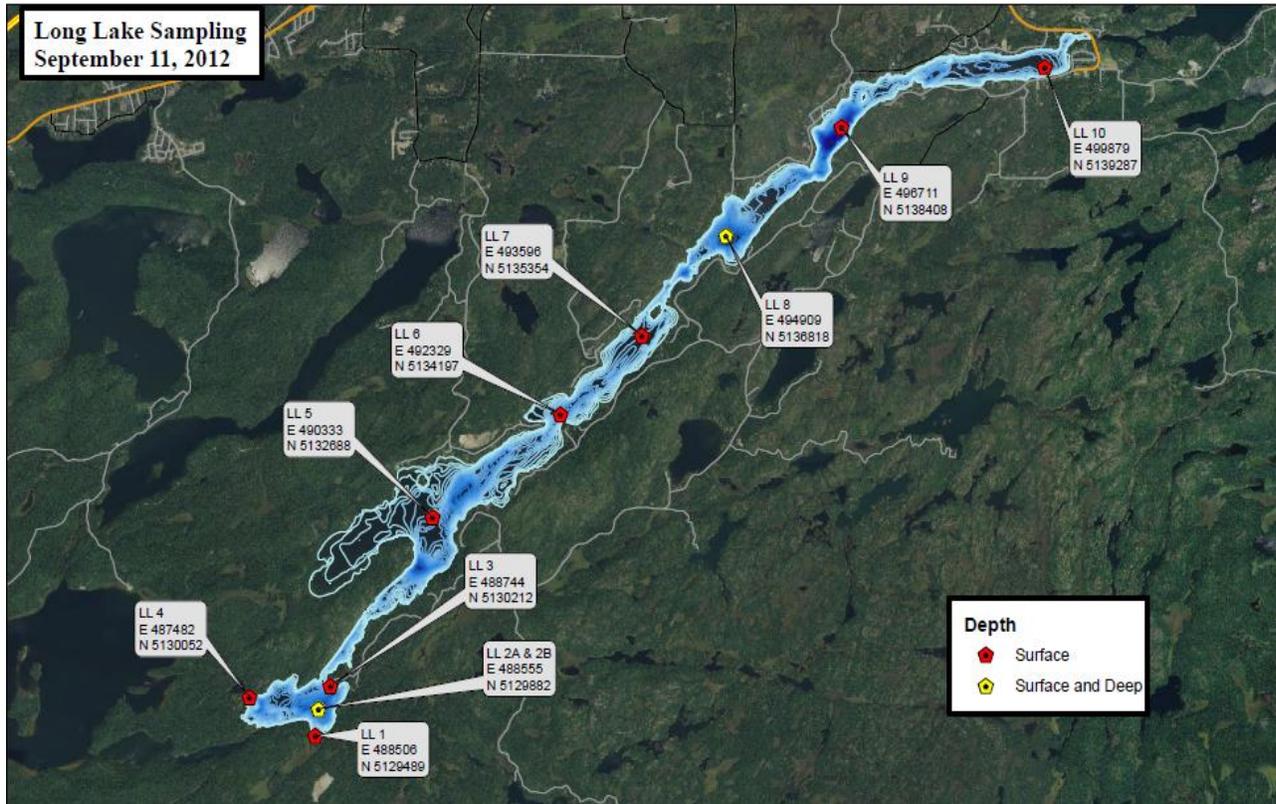
This local incident points to the need for citizens to do as much environmental monitoring of community pollution as they possibly can. The issue of arsenic leaching into Long Lake from the abandoned gold mine was officially dismissed in 2010 by Ministry of the Environment (MOE) spokesman Max Kasper as “having little impact on Long Lake (Stricker July 31st, 2012). In terms of the effect of arsenic on the lake overall, the worst contamination from the mine tailings appeared to be confined to one relatively small area at the end of the lake,

at the downstream end. Therefore, in very general, relative terms, this would appear to have little impact, or relative risk to the greater area of the lake, as the MOE stated. However, the lake overall is a much larger geographic area, and much of the lake is in fact upstream from this source of arsenic pollution. After Butcher confronted the MOE with independent citizen-driven research, the matter of arsenic in Long Lake was revealed for what it actually was: one endangering public health. **Table 26**, below, lists the MOE readings for dissolved solids taken at Long Lake. **Plate 3** shows where the tailings effluent in question enters Long Lake. A small white patch in the lower left part of the frame, surrounded by trees, is part of the tailings area itself. Samples LL 1, LL 2A, LL 2B, LL3 and LL4 are from the area nearest the point where the mine tailings enter the lake. Sample LL 10 is nearest the former Long Lake Public School, which was closed in 2012. As the LL 10 sample in Plate 3 and Table 26 indicate, the lake water near the location of the Long Lake Public School in 2012 does not contain anywhere near the same levels of arsenic as the ground water in the school's well water did in 2007, even though the well is approximately 100 meters from the lake. The lake water in the vicinity of the school (LL 10) tested at 0.5 µg/l in 2012 (**Plate 3**, and **Table 26**), while the well water for the school tested at 28µg/l on September 15th, 2010. (Long Lake Public School Annual Report. April 1, 2010 – March 31, 2011:4).

Table 26: MOE Long Lake Test Results, September 11th, 2012. Source: MOE, 2012

| Sample location | arsenic | nickel |
|-----------------|----------|-----------|
| LL 1 (Sediment) | 480 µg/l | 29.3 µg/l |
| LL 2A | 38 µg/l | 25.9 µg/l |
| LL 2B | 34 µg/l | 27.0 µg/l |
| LL 3 | 37 µg/l | 25.2 µg/l |
| LL 4 | 47 µg/l | 25.0 µg/l |
| LL 5 | 20 µg/l | 23.0 µg/l |
| LL 6 | 15 µg/l | 23.6 µg/l |
| LL 7 | 10 µg/l | 24.1 µg/l |
| LL 8A | 10 µg/l | 28.7 µg/l |
| LL 8 B | 10.5µg/l | 41.2 µg/l |
| LL 9 | 0.5µg/l | 28.7 µg/l |
| LL 10 | 0.5µg/l | 28.6 µg/l |

Plate 3: Location of MOE Long Lake Water Samples, September 2012. Source: MOE, 2012.



The Federal Government believes a safe level for arsenic in drinking water to be 10 µg/l and the Ontario Government is “considering” making this Ontario’s safe level as well. At the present time, the Ontario level remains at 25µg/l. While the Long Lake water was tested for other contaminants, the tests indicated that they were below allowable provincial limits and they have not been listed here. There is no limit for nickel in Ontario drinking water, but these levels are indicated in **Table 26**, for comparison purposes. The World Health Organization (WHO) and the European Union (EU) believes a maximum allowable concentration (MAC) for nickel in drinking water to be 20µg/l (Lenntech, 2012).

All Ministry of the Environment (MOE) tests for Long Lake water indicated a nickel level above 20µg/l (**Table 26**). In **Plate 3**, all readings for the lower half of the lake (LL 1 to LL 4) nearest the tailings effluent outfall were above both the present Ontario guidelines for arsenic in drinking water, 25µg/l, and the federal level of 10µg/l. Arsenic levels in Long Lake in the MOE testing declined steadily as they sampled upstream and away from the source of contamination, as to be expected, to the point where arsenic was within both federal and provincial guidelines for drinking water. However, only 2 upstream samples are within the federal level for safe drinking water for arsenic, 10µg/l. (LL 9, LL 10). If the ground water in the Long Lake Public School well is any indication, logic dictates it may be wise to exercise precaution, and test any other groundwater wells along the length of Long Lake as well, from the tailings area, upstream to the eastern end of the lake, as there are hundreds of people drinking water from groundwater wells in this area. In addition, there are also residences that draw water directly from the lake.

In closing, I would like to state that after the recent events concerning Long Lake, it is reassuring to see that there is still a spirit of activism in my community, regarding environmental

pollution. It appears that in at least some quarters, apathy concerning not just air pollution levels has not yet won the day, as I was afraid it had during my experiences with the Sudbury Soils Study. As the late Homer Seguin had repeatedly shown in the past, and Stephen Butcher has shown recently, local citizen-led activism concerning environmental pollution gets results. It is also encouraging to see that the Federal Government, through Environment Canada, has stepped in where the Ontario Ministry of the Environment appears unwilling to tread, and may be filing charges against Vale Canada Ltd, for pollution migrating off of the Copper Cliff Smelter's slag and tailings area and entering the source waters of the Spanish River; this matter went unchecked for decades (p. 256), and was not examined in the Sudbury Soils Study. Now that this sojourn of mine through the pollution regulatory framework has come to an end, my perspective on risk assessment and what occurred in my community during The Sudbury Soils Study has altered.

It was alleged by some, specifically union representatives Homer Seguin and Rick Grylls, that having the polluters influencing the course of the Sudbury CBRA would lead to health and environmental matters being examined to a lesser extent than they should have been. On the basis of evidence of widespread groundwater pollution in the mining and processing areas of Sudbury, I would posit that it has indeed been the case: however, based on the behavior of the Ontario Ministry of the Environment (MOE) and their reluctance to first acknowledge, and then to investigate, the issue of tailings pollution from the Long Lake Gold Mine, it appears that the Ontario government actors may also have preferred not to acknowledge the issue of groundwater pollution from mining activities not only in the Sudbury Community Based Risk Assessment, but in general. Information is crucial to any scientific venture, but so too, is the analytic structure the data is placed in for processing, if it is to be processed at all. To revisit the Chernobyl disaster once more, researcher Dr. John Gofman, predicted that in his estimation, the projected number of

deaths from Chernobyl's radiation just for cancer and leukemia, would be "approximately 475,000 cancer deaths, plus an additional 475,000 non-fatal cancers" (Yarachinskaya 1994: 2,3).

Gofman's mortality estimate is in stark contrast to that of the U.S. Government funded US Nuclear Regulatory Commission's estimate of 14,000 deaths in the entire world, for all time (**Table 2** p. 40). In the forward to the book by Russian environmental activist and former *Politburo* member Alla Yaroshinskaya, Professor John Gofman, (M.D., PhD, Professor Emeritus, Molecular and Cell Biology, University of California at Berkley), stated in the forward to Yaroshinskaya's book that:

(...) my research for the last thirty years has been in the evaluation of the health risks posed by ionizing radiation from nuclear activities associated with the "peaceful" and "warlike" atom: Yarachinskaya 1994. 1).

Gofman also makes it clear that controlling the results of a study examining the harm being done to people by radiation contamination of their environment — but could also be applied to chemical contamination studies — needs only the following requirement (the upper case emphasis is entirely Gofman's):

THE ESSENTIAL REQUIREMENT IS TOTAL CONTROL OVER THE INPUT TO THE DATA BASE, THE PROCESSING OF THE DATA AND THEIR ANALYSES (Yarachinskaya 1994:9).

To prevent this kind of deception he believed took place after the Chernobyl accident from occurring again, Gofman suggests the creation of a scientifically qualified public watchdog body, funded by industry, to represent the public interest in health studies involving nuclear accidents in the future. While Sudbury, Port Colborne and Belledune were not dealing with nuclear accidents, it is not an exaggeration to state that all three areas are contaminated. If the risk to public health is to truthfully be determined through a community based process, it should also be community-driven, not simply take place in the community in question. Perhaps then,

meaningful participation by the public in determining the parameters of a study to determine the risk to their health and/or to the local environment they live in, would produce results which the community could have more trust in. As I come to the end of my research in these matters, I will list some observations and conclusions based on what this research revealed.

Chapter 23

Conclusions

Better public representation in a CBRA can be achieved by the appointment of a qualified scientist, or scientists, for the public to confer and consult with, both in shaping the CBRA process, and interpreting the results. The public representative(s) should be a permanent feature of pollution regulation, and should be adequately funded by industry, government, or some combination of the two, to represent the interests and concerns of citizens living in polluted communities. As Phil Brown observed, the term “Community Based Risk Assessment” is a term being used increasingly to describe a process which involves the community in any capacity, and does not necessarily denote community input into the study (p. 214). Community involvement does invites challenges to the construction of environmental issues, but community members can also bring important local knowledge of environmental issues to the table; the arsenic contamination issue in Long Lake was a prime example. The Sudbury CBRA failed to include the important local issue of solid waste mine pollution entering our waterways without any community input into the parameters of the CBRA. Only after the CBRA was finished was the issue of arsenic contamination in Long Lake given any notice, only thanks to the community activism of people from the most affected area of the lake. The issue was finally addressed by the MOE, who has devised a plan to contain the contamination, and addressed by the Sudbury and District Health Unit, who issued a health advisory for the affected area of the lake. Remediation measures around the Copper Cliff Smelter and Refinery now involve the remediation of up to 6.2 billion liters of groundwater per year, and the prospect of criminal charges relating to the

unwillingness of the facilities' operators to address the matter of solid waste runoff from these sites in any meaningful way, for decades (pp. 255-257). The issue was left out of the Sudbury CBRA at the insistence of the polluters, who were allowed to participate in establishing the direction of the CBRA, while the public was not. In the Sudbury Community Based Risk Assessment (CBRA), the exclusion of some of the actual issues affecting both the human and natural environment, led to an incomplete evaluation of the risk from local pollution. Not including sulphur dioxide as a pollutant and also excluding all mines and processing facilities producing ground and surface water contamination from the CBRA, had the effect of reducing the acknowledged health risk both to Sudburians in the Long Lake area, and to First Nations people and others living along the Vermillion and Spanish Rivers. The Spanish Harbour continues to be a receptacle for solid waste heavy metals pollution from Sudbury. According to the most recent research (2016), metals levels in the sediments of Whalesback Channel, the most affected area, are not declining along with air pollution reductions, but are continuing to rise at the rate of 2% per year. Better public input and less influence from the local polluters could have resulted in a more thorough, more accurate assessment of pollution issues in the Sudbury CBRA. The public was excluded from participating in the direction of the Sudbury CBRA, even though public participation concerning environmental issues is actually a legislated right in Ontario, through the Ontario Environmental Bill of Rights.

Ontario's Environmental Bill of Rights is a little known piece of legislation, which, in placing environmental rights into the legislated legal fabric of Ontario society, is a piece of legislation which is unique to Ontario; an equivalent counterpart does not exist anywhere else in Canada. It is supposed to allow citizens of Ontario a greater say in environmental issues in Ontario, and provide a forum, along with free legal representation if needed, to address

environmental issues, such as the siting of polluting facilities in their community, or any alteration to pollution standards in Ontario.

A part of Ontario's Environmental Bill of Rights is the Environmental Bulletin Registry, where, amongst other things, the public can voice their concerns over pollution levels in their community, does function as a place for this exchange of ideas. Unfortunately, even simple requests for existing information, such as measured community pollution levels, are now routinely referred to the Office of the Privacy Commissioner, instead of being supplied as requested. Decisions on allowable site-specific pollution levels, appear by and large to be not open to appeal by the public and are established by decree of non-elected civil servants. However, it was through the Environmental Bulletin Registry that we learned that polluted groundwater around both the Copper Cliff Refinery and Copper Cliff Smelter, both Vale facilities, is leaving these sites and is contaminated with heavy metals. Postings on the Environmental Bulletin Registry indicate that Vale has been issued permits to extract, for decontamination, up to 6.2 billion liters of groundwater under these two Copper Cliff facilities. Two of the highest capacity decontamination wells are actually located on public property, a Sudbury and District Catholic School Board storage facility located on Travers Street. These two wells on public property are separated from the smelter property only by Big Nickel Road, a public thoroughfare.

In the final stage of the Human Health Risk Assessment portion of the Sudbury Community Based Risk Assessment (CBRA), where an identifiable risk from airborne nickel pollution was calculated, the process called for risk management. Higher permissible pollution levels, much higher than anywhere else in the province, somehow became the risk management strategy for people living in Sudbury. With health risk assumed to be a linear progression, with

increasing levels in pollution resulting in a predictable, arithmetic increase in health effects, it appears that higher permissible pollution levels for Sudbury can be safely allowed. For example, if an average level of pollution, such as the $0.87\mu\text{g}/\text{m}^3$ [PM 10] used to calculate risk in the Sudbury CBRA (P. 9) causes a “negligible” risk of 1: 100,000 to 1: 1,000,000, then the amount of pollution can conceivably be increased without moving the calculated level of harm out of the “negligible” risk category. It appears this may have been the rationale behind risk management resulting in higher allowable pollution levels for Sudbury than anywhere in the province of Ontario, a counterintuitive result, but one entirely in keeping with the logic of human health risk assessment.

It is this numbers game which residents of Sudbury, myself included, wanted no part of. Merely manipulating calculated values and making assumptions about the health effects of some forms of pollution — but not all forms — did not satisfy many people in Sudbury. As the Community Committee on the Sudbury Soils Study clearly pointed out, monitoring of actual heavy metals in the tissues of Sudbury residents would be a much better indication of what levels of contaminants are in people’s bodies (P. 75), than mathematical calculations, carried out by scientists employed by the producers of the heavy metals pollution in question.

In his evaluation of the two CBRAs carried out in Port Colborne and Sudbury, Dr. Chris Wren makes this comment in the Executive Summary of the evaluation, summing up both in the following way:

Finally, before embarking on a large and complex CBRA, the community should be consulted to find out what their concerns are and whether these concerns are best addressed through a CBRA or through another process. These two projects have demonstrated that CBRA can be a lengthy, costly and logistically complex process, and it may or may not address the underlying concerns within the community (Wren and Muckow 2010:v).

Those fine sentiments would have been most welcome at the beginning of the Sudbury and Port Colborne CBRA processes, not years after they were completed. Whether the kind of funding, \$42 million (p. 3) that went into the two CBRAs will ever become available again for community health and environmental issues, is not known. If there is a next time for a Sudbury CBRA, then perhaps the data collected in this research will help point out that community interests and those of government and industry actors are quite different. A community based study that actually involves the community and its concerns should ensure a more meaningful and thorough examination of the issues and how the results are interpreted. It was what many members of the Sudbury community wanted, but did not receive in their CBRA.

Port Colborne

In tandem with the Port Colborne CBRA, a class action lawsuit was occurring. In order to advance their case to court, litigants in Port Colborne were forced to drop health effects from their Class Action Lawsuit. The case proceeded on the basis of only the calculated loss of residential property values resulting from heavy metals contamination of area properties. This may have been a major setback for all future litigants in cases of long-term pollution effects on human health, if in fact any cases can be brought forward for health effects, after this judgment. Another group of litigants, the Augustine family, were successful in their litigation against Inco, now Vale Canada Ltd., for the contamination of their farm property with nickel fallout, which they claimed damaged the health of their farm animals and their soils. Compensation of \$100 million (CDN) was being sought, but what amount was awarded is not known.

On September 6th, 2016, a permit to take water (EBR Registry # 012-2296) was issued for the Port Colborne Refinery, allowing for the decontamination of up to 131 million litres of groundwater per year. The six wells in question are all located on Vale Canada Ltd. Property; two are adjacent to the Rodney Street area, two are on refinery property between buildings and two are within 1-2 km of the Welland Canal, from which the City of Port Colborne draws its drinking water, and Lake Erie. During the Sudbury CBRA, Vale stated publicly it believed that nothing needed to be done about the issue of solid waste pollution on its' property until the company terminated operations. Solid waste pollution is hopefully no longer a matter to be addressed only when the company in question is prepared to abandon the polluted facility before it is dealt with.

The Port Colborne Community Based Risk Assessment (CBRA) had a public advocate in the study, Mike Watters, whose official title in the process was "Independent Consultant". He submitted a Peer Review that was highly critical of the both the methodology and findings of the Port Colborne Community Based Risk Assessment. It was never published nor made public in any forum. That is still the case, although copies of his reports are certainly being circulated, as evidenced by the fact that all of his reports, on all aspects of the Port Colborne CBRA, showed up one day in my e-mail inbox.

Despite the fact that the Port Colborne CBRA finished in 2010, at the time of this writing, 2017, seven years after, there has yet to be a safe level of nickel in residential soils proposed by the Ministry of the Environment. In order for the research in the CBRA to become official, it has to be made public, and show that the peer reviewers approved of the science behind the findings. This CBRA does not have the backing of Mike Watters, the Independent Consultant, who was given the position of defending the public interest, as well as being a peer reviewer of the scientific methodology and the results the process this. He did not approve of either; he also

commented on the lack of public engagement in the process. There is still no official “safe” level of nickel in Port Colborne residential soils, due to the questions raised about the science and results by one peer reviewer.

After Vale spent \$30 million on a risk assessment which has not passed peer review, it remains to be seen how much credibility the Port Colborne CBRA will have, when or if Vale finally releases the negative peer review of the CBRA. Exactly when, or more to the point, if, Vale is prepared to face this fact publicly is not known. In the meantime, there is still no safe level of nickel in residential soils in Port Colborne. If this fact is delaying transactions of real estate, or holding up subdivision construction in the City of Port Colborne, due to a lack of a nickel standard in local soils, local business may be in a position of financial loss as a result. Under the terms of *Ryland v. Fletcher* — upon which the judgement of the Port Colborne class action lawsuit was based — where one neighbor produced something which prevented another neighbor from earning money from their affected property — the situation regarding not releasing safe nickel levels to allow the sale, transfer and/or development of local property could be seen to be an actionable offence. While the original *Rylands v. Fletcher* case involved the flooding of adjacent land to make it unusable, in terms of the property’s ability to earn money for the owner, preventing the sale or development of property due to uncertainty regarding what constitutes an acceptable level of heavy metals in its soils, could be seen as having essentially the same effect. Of note, the original settlement of the Class Action Lawsuit was for \$36 million, which was overturned upon appeal. The cost of the Port Colborne CBRA stands at \$30 million and it did not pass peer review. Whether it needs to be done again, at further cost to the polluter, Vale, remains to be seen. If it does, the cost of attempting to prove that compensation does not

need to be paid to the residents of Port Colborne, due to nickel contamination of resident's soils, will soon exceed the cost of what the awarded compensation would have cost.

Hopefully, other environmental sociology researchers will continue to monitor events in Port Colborne, as will researchers with an interest in Canadian environmental law.

Belledune

The Conservation Council of New Brunswick (CCNB) continues to advocate for the citizens of Belledune, in matters of local pollution, through Science Officer Inka Milewski; however, it appears that pollution levels in the waters and fisheries in the Belledune area, for which the local lead smelter is largely the source, have not decreased, but increased. It appears that Belledune has been chosen as an “environmental sacrifice zone”.

The CCNB advocates for sustainable development and conservation of the local fisheries in the maritime provinces of Canada and has been taken to court for its troubles, but the situation may be changing. After evaluating a 2008 Federal environmental assessment to allow the shipping of oil to the Irving Oil Refinery in Halifax, Nova Scotia, a lawsuit was filed against the Federal Government for negligence. The lawsuit, filed against the Environment Minister of the time, John Baird, was launched by Ecojustice (formerly Sierra Legal Defence Fund) on behalf of the Conservation Council and Friends of the Earth Canada (Ewing 2008). Part of the negligence alleged, concerned the fact that Right whales were not included as a species at risk from increased oil tanker traffic in the Bay of Fundy. As an endangered species, Right whales certainly should have been as a species at risk. Events overtook the lawsuit, with the plans to build a crude oil pipeline from western to eastern Canada being abandoned by the Federal Government;

however, the precedent is certainly noteworthy. The courts can be used by environmentalists as well.

I would like to refer to an article dealing with the aftermath of the Fukushima nuclear incident, printed in *The Toronto Star*, on August 31, 2015 pp. WD 4.5, written by Michael Ignatieff, former Member of Parliament (Liberal Etobicoke-Lakeshore) from 2006-2011, former leader of the Liberal Party of Canada (2009-2011) and unsuccessful candidate for the office of Prime Minister of Canada in 2011. His article, titled “Fukushima: The Price of Keeping the Lights On” noted that Japan has created an evacuation zone, an area off-limits to the public, “a contaminated area 80 by 16 kilometers” (ibid: WD4) an area of 1280km², within which the fishing community of Namie lies. Ignatieff travelled to the area, taking appropriate precautions against radiation, and noted that:

Were told it's safe to travel to Namie, but it's still not clear what safe means. The Chernobyl standard for safe return of people from a radiated zone was one millisievert per hour, while in Japan, the government has set the standard at 20. Anti-nuclear and environmental activists insist that the Japanese standard is not safe (...) Today there are parts of the town where radiation measures 26 times the Tokyo level (Ignatieff:WD4).

Although the Japanese Government has declared fish and produce from the area to be safe for public consumption, it appears the public's perceptions in Tokyo are at odds with the government's concept of “safe”: Today, Tokyo shoppers still won't buy rice, soya, or miso produced in the region and nobody will touch the catch from the local fishermen, even though the fish have been pronounced safe (ibid).

It also appears that the length of time between when the nuclear accident at Fukushima occurred, and the point in the future at which it may be safe to return to the area will not be brief:

Decommissioning the stricken reactor will take 30 years at least, and engineering challenges connected with the task have not yet been solved. Radioactive fuel in the reactors has not been recovered and while the condition of the reactors is supposedly “stable” there are unanswered questions about whether radioactive materials are leaking into ground water and the ocean (ibid).

In all four of the case studies in this thesis, Sudbury and Port Colborne in Ontario, Belledune, in New Brunswick and now in Fukushima, Japan, the contamination of ground and surface waters has come to be a serious matter for both human health and the environment. Whether the full risk of industrial pollution to human health and the environment can be rationally justified for future generations in Japan, Ignatieff believes it already has been, although in a way that does not reflect a philosophical approach to the matter, more of a rationale. Even though Japan initially shut down every nuclear reactor in the country as a precautionary measure after the Fukushima accident:

This month, Japan fired up the first of its 48 remaining nuclear reactors once again (...) Those who had hoped, as many did after Three Mile Island and Chornobyl, that Fukushima would close out the nuclear era have learned, yet again, that evacuation zones like Namie remain the price most of us are still willing to pay to keep the lights on (ibid).

We could just as well substitute Sudbury, Belledune or Port Colborne for Namie, Japan, and substitute “environmental sacrifice zone” for “evacuation zone.” Our industrial activities provide us with the material comforts we all seem to desire, yet the creation of environmental sacrifice zones, or evacuation zones like Namie, or Love Canal, often appear to be the trade-off. Human health and ecological risk assessments carried out by polluters and political regulators are highly contested processes, which, perhaps most importantly, appear as a government-industry construct cloaked in the appearance of scientific objectivity, to justify whatever contamination is occurring. As this research has demonstrated, at times these partnerships of industry and government have chosen to exclude relevant forms of contamination, (nickel in drinking water, solid waste pollution from ore processing facilities, contamination of shellfish and groundwater) due to political or corporate concerns. If that doesn’t justify and legitimize local pollution levels to the public, then perhaps the loss of material comforts due to the shutdown of polluting

industries that produce these material comforts would certainly lead to a public rethink of what are justifiable pollution levels, provided they are occurring somewhere else in that individual's society. Unfortunately, "somewhere else" can very easily become "here" and examples of high permissible contamination levels in other localities could eventually become the norm over an entire jurisdiction, justified by an industry-funded and industry-directed risk assessment process, fully endorsed by government regulators.

It appears that the legacy of the Sudbury Soils Study continues: the legacy being that one of the forms of pollution left out of the study, solid waste pollution from processing facilities entering local surface and groundwater, was revealed to be a serious exclusion. This exclusion may yet result in criminal charges being brought forward by the federal government against the polluter, Vale. A second exclusion in the Sudbury Soils Study, the exclusion of the effects of local levels of sulphur dioxide emissions on human health and the environment, may be just as serious an exclusion in the future. According to Vale, plans are underway to replace the 330 metre (1,250 ft.) stack at the Copper Cliff Smelter by 2020, which has carried local pollution away from the Sudbury area since 1970. Plans are to replace the 330 metre stack, and: "In its place two smaller, 450 foot stacks will be built that will be more efficient than the Superstack built 45 years ago" (South Side Story:2017).

The new stacks will take less energy to operate and will reduce greenhouse gas emissions by about 40% (Vale says that the company's savings in fuel consumption will be equal to that of the total of heating and cooling 17,500 homes – one third of all the houses in Greater Sudbury (ibid).

While energy efficiency and monetary savings to Vale would appear to be a win-win situation for Vale, what has been omitted from this action is the potential effects this action will have on the citizens of Sudbury.

When I first moved to Sudbury as a child of 12, I personally experienced low level smokestack pollution from the two 550 ft. stacks, which were in operation then. At that time, 1967, it was often necessary to take refuge indoors when the outside air was too polluted to breathe. From the part of Sudbury I lived in at the time (referred to as Sudbury Center in the Sudbury Soils Study), we were often subjected to smelter emissions. The tops of these 550ft. stacks could not be seen from the neighborhoods either adjacent to, or within a few kilometers of the smelter; the stacks' low height assured Sudbury residents of these neighborhoods that they would be exposed to choking levels of sulphur dioxide pollution on a regular basis i.e., often whenever the wind direction was out of the southwest, west or northwest. Lower stacks (450ft. vs 550ft.) is guaranteed to return low-level pollution to residential areas of Sudbury, after a respite of 50 years. Once again, a matter not defined as a form of pollution to be worthy of study during the Sudbury Soils Study Human Health and Environmental Risk Assessment, sulphur dioxide pollution, will most likely prove to be a matter in need of potentially serious attention in the years following the completion of the Sudbury CBRA. Had members of the affected public been allowed to actually participate in the definition of what the community believed the health and environmental issues really were, the Sudbury Community Based Risk Assessment process would certainly have examined this issue. It appears Vale will be allowed to once again expose Sudbury residents to sulphur dioxide pollution. At what levels remains to be revealed.

These two issues left out of the Sudbury Soils Study, solid waste pollution and sulphur dioxide pollution, point to the need for the definition of the issues to be studied to be as critically important as the process itself. Any community based risk assessment investigating pollution levels which is allowed to be directed by those being investigated (in this case Vale and Xstrata [Glencore]) will inevitably be one which would prefer not to examine incriminating evidence.

Public participation in defining environmental issues, certainly local environmental issues, must not be left to industry and to government regulators alone.

French environmental sociologist Bruno Latour has written of the need to democratize the scientific process, to allow more public participation, and has proposed remedies to the status quo, which values corporate concerns over community concerns. German environmental sociologist Ulrich Beck. Beck believes that the process of establishing what the actual environmental issues are, is a definitional struggle, and one would be hard pressed to find any error in their views, given the findings of this research. Local activists, including myself, struggled to define the issues, but were locked out of the process by those controlling it, government and industry actors. As Beck has pointed out, there is a very real need for a democratization of the scientific process, one which does not lead, as Dr. Jerome Nriagu has termed it, to “scientific magic” which he defined as “a process where one purposely collects data to prove preconceived ideas”. The tailoring of data to produce findings which were “acceptable”, i.e., of no risk to either human health or the environment may well be the biggest risk involved in industry/government risk assessments.

Risk assessment, in the communities studied in this research, appeared to have become the justification for chronic pollution at whatever level, in order to keep corporate profits healthy and government tax revenues healthy, but the health of chronically polluted communities and their environs at a calculated “acceptable” level of harm. Anyone in a community where this process of an industry/government risk assessment is being used to investigate either existing local pollution levels, or proposed levels, should be wary of this process; it is as much a political and corporate tool to justify any local contamination levels, existing or future, as it is a contested scientific process.

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