

SUMMARY

The purpose of this report is to summarize heavy metal and trace element data from snow, grass forage, lichens and tree samples gathered by the New Brunswick Department of the Environment in the Belledune area (1980 - 1986), and determine if the levels found in vegetation are a concern to animal or human health.

Information gathered by the New Brunswick Department of the Environment has confirmed contamination from the lead smelter at Belledune of vegetation and snow by heavy metal air emissions and railway transport of lead concentrate. Heaviest contamination was restricted to within 2.2 km of the smelter, but elevated levels of lead and cadmium were observed at one site 9 kilometers from the smelter and excessive lead and zinc within 30 meters of the railway.

A review of the literature confirms that other lead smelting operations have resulted in contamination to animals and humans near the smelter, causing significant health effects. More diversified studies involving occupational health, community health and environmental surveys would help to provide a clearer understanding of environmental impact of the smelter operation.

Recommendations include : A program to evaluate accumulation of metals by animals and humans, enclosure of railway box cars, public awareness program of contamination prevention, audits of the Approval to Operate, restriction on use of contaminated forage, reclamation program and more comprehensive monitoring of heavy metals and trace elements.

Until further information is gathered on metal levels in the terrestrial biota including humans, little can be accurately stated on the effects of smelter atmospheric metal emissions or effects of the transport of lead concentrate to Belledune.

Date:	September 12, 1991			
	Name and Title / Nom et titre	Department and Branch / Ministère et direction	Telephone/Téléphone	Reference / Référence
To: À:	Jim Knight	Operations Branch		
From: De:	Paul Monti	Policy Branch		
Copies To: Copies à:	Wilf Pilgrim Dave Besner Jane Tims			
Subject: Objet:	Belledune Biomonitoring Report			

In Dave Besner's absence, I have reviewed what appears to be the latest draft of the report compiled by Wilf (undated). I have provided, in the margins, some comments based on a somewhat cursory review of the document. These have been forwarded to Wilf. My comments here are of a general nature, and relate primarily to the fate of the work that has been done.

It is obvious that substantial work has gone into both the field studies carried out by Wilf and Jane, and the review of literature which makes up a significant portion of the study. The results of the field studies clearly indicate to me that further, more rigorously scientific work needs to be done which looks at the effects on human health, vegetation and other selected biota. The objective would be to structure a more complete picture of the ecological effects of industrial activity. This is one of the most seriously polluted areas of the province and I believe that substantial additional investigative effort can be justified.

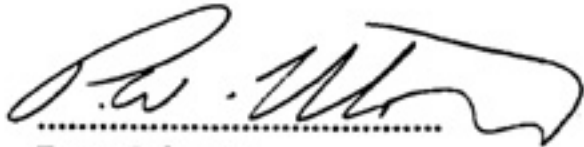
While I agree with the need for additional study, I do not think that the report, as structured, is suitable for publication. I think the writer has, based upon a long standing involvement in this project, pre-established the need for further studies. However, the strength of the conclusion is actually weakened by the appearance of bias toward this conclusion. There is clearly evidence that there is a problem in the Belledune area. However, the intermixing of literature review with evidence from our our studies is so obviously structured to support an opinion that it takes away from the overall credibility of the report. This leaves the report easily open to misinterpretation by the press and the public, and criticism by those who are implicated as responsible. Can our studies be defended on the basis of strict scientific validity? Have the results been subject to peer review?

Publication may bring about the desired result (which I assume is support for further study), but the process could be long and messy, with a lot of casualties. I would also not rule out the possibility of legal action by Brunswick Mining and Smelting.

All this having been said, I don't think the release of this report in anything close to its current form has the slightest chance of being approved by the heads of the departments involved in the component studies.

This is not to say that the report should be shelved. I think there is a solid base here to initiate a process of obtaining the resources required to conduct the desired studies. This process could be strictly a government initiative, or could involve Brunswick. I would suggest that the report be tightened up through judicious editing and consultation with the Department of Health and Community Services, and that it serve as a basis for a joint submission to government requesting approval and resources to conduct the environmental impact studies.

There may be components of the report, derived from our studies, which may be of interest to the scientists/environmental managers. These could perhaps be extracted (or separated) from the anecdotal evidence and the text which is of a literature review nature, and form the basis of a submission to a refereed journal or other publishing outlet.

A handwritten signature in black ink, appearing to read 'P. Monti', written over a dotted line.

Paul Monti

SUMMARY

ECOSYSTEM MONITORING

A lead smelter has been operating at Belledune in northeast New Brunswick since 1966. This paper presents data on the concentrations of the four primary metals emitted from the smelter, lead, cadmium, arsenic and zinc which were measured in the terrestrial environment near the smelter and the concentrate transport route. Deposition of these metals and their potential effects are discussed in relation to non-regulatory guidelines, toxicity and atmospheric emissions. The Air Quality Section is primarily responsible for monitoring air pollutants in the atmosphere. However, in the case of persistent and non-degradable hazardous air pollutants it becomes necessary to further evaluate their ultimate fate in the biosphere.

Multi-media surveys are useful; to identify the degree of heavy metal loading in the environment, to establish ecosystem guidelines, to identify pathways and subsequent fate of heavy metals emitted to the environment and to monitor deposition for dispersion of heavy metals and for risk assessment. To effectively implement the concept of sustainable development and maintain biodiversity, it is necessary to develop guidelines that can adequately assess the cumulative effects of contaminants on the ecosystem.

Despite general compliance with legislated emission guidelines, there are continued atmospheric emissions of lead, cadmium and arsenic from the smelter, and also losses of lead and zinc concentrate along the railway. Therefore, the chronic accumulation and potential effects should periodically be monitored and assessed. Although the heaviest contaminated zone is within 2-3 kilometers of the smelter, concentrations of lead remain elevated at greater distances from the smelter. Because of the known cumulative and toxic potential of lead, cadmium and arsenic and the levels found in these surveys, steps will be made to help reduce and prevent heavy metal contamination in the Belledune region, and to obtain more information on the fate of the heavy metals emitted to the atmosphere by the smelter as well as the transport of concentrates. These steps include:

- more comprehensive monitoring of the fate of hazardous air pollutants emitted by the smelter, which could include biomonitoring a greater diversity of media and more collaborative interdisciplinary long term projects to evaluate cumulative effects of heavy metals;
- an independent audit of heavy metal emissions from the smelter, this will include an estimate of mercury emissions;
- enclosure of rail cars used to transport metal concentrates both empty and full, restrictions on agricultural use within 50 meters of the railway and annual checks for contamination to private wells within 500 meters of the railway.