December 14th, 1949.

R.A. Gibson, Esq.,
Deputy Commissioner,
Administration of the
Northwest Territories,
Norlite Building,
Ottawa, Ont.

Dear Mr. Gibson:

In writing you on the subject of the arsenic situation at Yellowknife, I am reminded of the reference to a committee made in your letter of 16th November. Assuming your use of the word "committee" to have been informal I am, therefore, communicating to you the conclusions which we have reached on the basis of Dr. Kay's report of conditions.

The problem, as we see it from a health point of view, involves environmental pollution in an organized and populated area as a result of ore-roasting operations of two mines, Consolidated Mining and Smelting Company's Con, and the Giant Yellowknife mine. It is now appreciated that prior to August 28, 1949, both mines were stack-discharging their daily tonnage of arsenic to the general atmosphere and that after that date the Con mine undertook to experiment with an impinger method of stack collection which had been employed in respect to other types of chemicals at Trail, B.C. In addition, we are aware that, in experimenting with the impinger method on a full-scale basis at Con, there was substituted for air pollution, water pollution of Pud Lake and possibly the related drainage system.

There are features of the Yellowknife area which are of significance in assessing the problem. For instance, the new townsite is bracketed by the two polluting mines, Con Mine lying roughly one mile south, Giant Yellowknife roughly three miles north. Furthermore, all three lie in a society of lakes, some of which constitute drainage sub-groups, while others appear to be non-draining. The general flatness of the country carries with it implications related to the free dispersal of the stack effluent and an examination of wind roses leads one to the conclusion that widespread dispersal of contamination must be anticipated where prevailing winds are not marked. Low precipitation, apparently characteristic of the country, presages a correspondingly low dilution potential for day by day arsenic accumulation.

R.A. Gibson, Esq. December 14th, 1949.

In connection with the conversations at Con Mine on Tuesday, November 29th, and Thursday, December 1st, it was gratifying to hear that a senior technical official had been sent from Trail for the conference, though it was alarming to discover that this mine has been stack-discharging a daily tonnage of arsenic from 1948 until last August.

The conversations appear to have brought into clear focus the two-fold problem intrinsic in the impinger method which was substituted after 28th August last. In the first place we gain the impression that though the collection aspect has been made to work, corrosion-proof features specifically required due to the presence of sulphur oxides, would involve considerable expense. Additionally, there was mention of a more fundamental problem related to impinger cones and even the possibility of a double set-up to ensure 100% arsenic collection.

The disposal of 16 tons of arsenic-bearing sludge, continuously formed in each 24 hours as the roaster smoke is rendered arsenic-free, presents a second problem which would obviously involve very heavy expense if this Government were to demand full assurances that the tremendous quantity of poison produced would not leak away. From his discussion with the officials of Con Mine, in connection with which Mr. Traill took a prominent part as an expert metallurgist, Dr. Kay reports that the prospect of forming an insoluble arsenic compound is remote and that even were this so, its protection against chemical effects of the elements above or below ground would have to be dealt with -- again subject to assurances satisfactory to those responsible for advising on health matters in the Northwest Territories.

In dealing with health problems associated with Canadian industry we are constantly encountering situations where everything possible must be done to cooperate with industries in reaching hazard-free operations by the most economical route. On the other hand, we must necessarily view with concern full-scale experiments which replace for pollution in one vector, pollution in another, and it was distressing to find at Yellowknife that that arsenic which had been eliminated from the air was being set free into a drainage sub-system adjacent to a populated area. Based on their own analyses, Con officials report 13 mgms. arsenic per litre of water in Pud Lake at November 28th, a highly poisonous concentration. We feel that experiments of this kind should be undertaken in a laboratory -- not in an organized community.

With regard to the situation at Yellowknife, where around 8 tons of arsenic trioxide are being stack-discharged in each 24 hours, and where discharge commenced last January, we regard it as extremely significant that as

early as February the first human case of poisoning came to medical attention from the drinking of snow water on the northerly Akaitcho property. Conversations with Dr. Stanton established clearly that a diagnosis of arsenic poisoning in this and another case from the same location was beyond question. That no deaths have occurred must be viewed as a fortuitous circumstance rather than as an assessment of the degree of hazard.

It would appear from the conversations at Giant Yellowknife held Wednesday, November 30th, that Mr. A.K. Muir, the mine manager, has been awaiting the results of the Con experiment before taking action to install tried and proved collection methods. With regard to the disposal problem inherent in the impinger method, we understand that Mr. Muir, as well as the Con officials, favoured disposal in a distant area, recognizing the virtual impossibility of giving assurances that the arsenic-bearing sludge could be imprisoned. Thus, the Federal Government would inevitably become the uneasy custodian of this dangerous legacy.

On the basis of environmental pollution data which has been assembled from various sources, we are satisfied that there is general contamination of snow, vegetation and some water bodies. We do not consider it possible, whatever the amount of survey work conducted, to arrive at answers which would permit us to assure you that health hazards to man, beast and vegetation can be avoided other than by trapping the arsenic in dry form and putting it in safe storage.

The effect of pollution already observed on life of the area permits one to imagine what the months ahead can have in store when daily quantities in tons of arsenic are dispersed over so limited an area.

Two human cases of poisoning are a matter of record. Eight cows have been poisoned and cause of death established as arsenic poisoning by autopsy and analysis of organs. Observations made in the area indicate that last spring and summer a large percentage of the dogs of the community showed full-range of signs and symptoms and many did not recover until well on in the summer. Two horses within the town limits were poisoned and poisoning of wild life was observed widely, squirrels, foxes, birds, and other fauna being affected. It is natural in these circumstances to ponder whether arsenic has not entered the wild life food chain of the area.

I think it safe to assume that the Consolidated Mining and Smelting Company, on the basis of their experience with environmental pollution in other areas, must be more than anxious to avoid a situation endangering the health of the people of Yellowknife.

R.A. Gibson, Esq. December 14th, 1949.

Certainly the reported settlement of $20,000 in the matter of Mr. Bevan's poisoned cows is an expensive initial experience at this new field. From the cooperative attitude apparently taken by the Con Mine officials and the mine manager at Giant during the investigation, we feel sure that these officials would not wish to prolong, for purposes of industrial experiment, a situation as hazardous as that now existing.

After careful consideration with my officers and having in mind the effects on human and animal life already observed, I have no alternative but to recommend strongly to you that roaster operations be stopped forthwith and that they remain so until proper arsenic collection and disposal practices which will entirely eliminate the health hazard, have been placed in operation.

You will appreciate that ending the daily arsenic contamination at Yellowknife does not render the area hazard-free and it will be necessary in the interests of health protection to institute a routine check on drinking water and to carry out certain other measures of a related nature. In this connection my officers will be placed at your disposal to render every assistance.

Yours very truly,

Original Signed by
G. D. W. CAMERON, M.D.

G.D.W. Cameron, M.D.,
Deputy Minister of National Health.

KK/GS