COMMENTS ON INFCE/DEP/WG.4/100 BY CANADA
January 2, 1979

Mr. R. Majer
International Atomic Energy Agency
P. O. Box 590
Kärnterring 11
A-1011 Vienna
AUSTRIA

Dear Sir:

Contribution to IMFCE Working Group 4 (A, B)

Would you please accept the attached short paper of comments by the Canadian Delegation to IMFCE Working Group 4, for submission to that Working Group, Sub Groups A and B.

Thank you.

Yours sincerely,

D. G. Boase
Analytical Science Branch

Enclosure

cc J. G. Collier
1. We regard the U.S. paper as a very useful preliminary description of some existing and proposed fuel cycles which, in a general qualitative sense helps to assess where the risks of diversion of nuclear material from civilian nuclear power systems may be greatest.

2. The report addresses civil nuclear power systems with the objective of ensuring that they, "do not present a route that is more attractive than other routes to proliferation ..." (page 1). However, we would prefer to see the objective stated as, "nuclear power programs should present a route to the proliferation of nuclear weapons which is less attractive than other routes."

3. In some sections of the presentation it is difficult to clearly distinguish whether sub-national or national proliferation threats are being addressed. IAEA Safeguards are intended to detect, and so deter, the diversion of nuclear material to explosives or to unknown purposes. If a diversion were detected, the IAEA would probably not be able to say whether the diversion had been carried out by the State, or by covert sub-national action. IAEA Safeguards can help to deter national diversion but not sub-national theft. Defence against sub-national threats must rely mainly on national security and national safeguards systems, allied with technical modifications to the fuel cycle where appropriate. Prevention of national diversion can be addressed through IAEA Safeguards, technical modifications and institutional arrangements. These points might be clarified in the report.

4. As a result of the considerations given in the preceding paragraph, it is not clear if the T.C.C. decision to eliminate "Physical Protection" as an item for consideration means also that other methods which may deter sub-national diversion are eliminated from discussion. Perhaps this is a matter of uncertainty to other delegations also and we would appreciate comments from the Co-Chairmen on this matter.
5. We suggest that further discussion is required on Safeguards, and the question of the timely detection of diversion. For example, while the greatest risk of diversion from fuel reprocessing plants may occur at the pure plutonium oxide product state, the Safeguards diversion-detection capability may be high for this material. The most accurate chemical analysis accounting methods can be applied to plutonium oxide, and surveillance and containment (e.g. sealing in store) should be applicable with high efficiency by Safeguards personnel. On the other hand, a diversion of somewhat less-pure plutonium nitrate from the plant in-process inventory may be more difficult to detect. However, plutonium oxide may be diverted more rapidly than impure plutonium nitrate.

The potential risk of diversion of a given material can be related more or less directly to its suitability for explosive use, and is inversely related to the material's Safeguardability.

6. On page 13 it is stated that HWR reactors produce more plutonium per gigawatt-year of operation than LWR reactors.

We suggest a second way of comparing these reactors, by reference to the number of tonnes of each fuel type which would need to be diverted to yield one threshold amount of plutonium - as defined by the LAZA. For CANDU-HWR fuel this quantity is three tonnes, whereas for LWR fuel it is approximately 1.2 tonnes.

7. International or regional fuel cycle centres are discussed in the U.S. paper. It is not immediately obvious that the same facilities will be suitable for processing all fuel types. For example, facilities may have to be optimized separately for LWR, HWR, and FBR fuels.