OPENING ADDRESS

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Good morning ladies and gentlemen, invited speakers and Panel chair. My name is Judy Tamm and I would like to welcome you to Ottawa on behalf of the Canadian Nuclear Society and the Canadian Radiological Protection Association.

We believe this Symposium is timely and necessary.

It is timely because Environment Canada is assessing (and the Atomic Energy Control Board is moving to include in its regulatory regime) radiological impacts from nuclear facilities on non-human biota. What is being proposed could have a significant impact on the nuclear industries' environmental protection and compliance programs; it is therefore necessary that we learn about these.

Under the *Canadian Environmental Protection Act* and its Priority Substances List 2, Environment Canada must assess the radiological impacts on non-human biota. This is not optional for Environment Canada. The method by which this assessment will be performed is ecological risk assessment.

This Symposium is necessary because ecological risk assessment of radioactivity is relatively new and complex, and the results of such assessments may influence later regulations. Therefore, the assumptions used, the data and the specific applications of this methodology are very important. These should be critically evaluated, as should the overall relative value of the results and their role in setting regulations.

I am told the existing body of publications relating to research on the radiological impacts on non-human species has been reviewed by international organizations like the International Commission on Radiological Protection, the United Nations Scientific Committee on the Effects of Atomic Radiation and the International Atomic Energy Agency. These organizations have come to conclusions about the level of exposure which would be required to lead to significant impacts on populations. Based on these judgements, they have stated that environmental protection is achieved within the present approach, which is focused on human health as the arbiter for regulatory control of radionuclide releases.

This anthropocentric approach is still supported by the ICRP and UNSCEAR, although they acknowledge that further investigations are warranted.

Environment Canada's ecological risk assessment hopes to provide a more direct evaluation. To do this, a large body of relevant data is called for. It is not clear how much of the desired information is currently available or how difficult it would be to obtain the rest.

This Symposium is happening now because people from a wide array of organizations — from nuclear facilities to regulatory agencies — have cooperated to quickly organize an excellent international collection of presenters, with two major goals in mind:

i) critically evaluate ecological risk assessment as applied to radionuclides; and

ii) contribute to the wide consultation sought by our regulator, the AECB, on their new environmental initiatives, and to provide some opportunity for feedback to them.

There may be divergent views within the nuclear community on this process. We wish very much to encourage input and discussion on the material being presented. To accomplish this, we have scheduled fairly generous time slots for questions, especially in the latter part of the afternoon. We therefore encourage and urge you to take an active part in the discussions today.

The organization of the presentations is as follows. First we have two talks which outline Canadian environmental actions, proposed and existing. The Technical Committee thought it logical to have these discussed first, to provide a framework into which you can fit the information on basic issues, on the present state and possible limitations of data quality and methodology, and on the "case studies" in a Canadian context, provided later today.

In the first presentation Rob Maloney is outlining the Atomic Energy Control Board's proposed regulatory approach to protection of the environment. The AECB has been working for some time on program updates focused on more direct evidence for protection of the environment and of non-human species. Wide consultation is planned; today is part of that.

Environment Canada's Priority Substances List 2, which comes under *the Canadian Environmental Protection Act* (CEPA), includes radionuclide emissions from nuclear facilities among the twenty-five substances to be evaluated using an ecological risk assessment (ERA) methodology. Patsy Thompson has been seconded from the AECB to Environment Canada to perform this assessment. The process judges whether a substance is "CEPA-toxic" or not, and if it is, characterizes toxicity. Toxicological methodologies are employed; these differ from the traditional radiation protection approaches.

A background issue has been whether the paradigms for protection against radiation versus chemicals are irreconcilable. Alternately, do the two risk management methods have strengths in common which might allow an eventual harmonized approach? A joint working group involving Health Canada and the three AECB independent advisory committees (the Advisory Committee on Radiological Protection, the Advisory Committee on Nuclear Safety, and the Group of Medical Advisors) has been grappling with this problem, albeit with an emphasis on human health. An impetus for the formation of the group was the debate over what the Ontario Drinking Water Objective for tritium should be. One of the co-chairs, Dave Myers, will discuss in general terms what lessons or parallels may be useful to today's wider issue of the application of ecological risk assessment to radionuclides.

The "three E's" of ecological risk assessment under CEPA are Entry, Exposure and Effects. There is a good handle already on the amount of radionuclides entering the environment, in the form of legally-mandated annual reports by the licensees, for example. The three next speakers thus address:

a) The exposures these releases may give rise to, via different environmental compartments, by means of pathways analysis and dosimetry (Gordon Blaylock);

b) The sorts of effects and related endpoints which might be appropriate, as well as their degree of relevance to continuing ecosystem functioning (Florence Harrison);

c) How to extrapolate risks within the hierarchy of individuals →populations →communities →ecosystems, and provide an overview of radiation effects on biota (Larry Barnthouse).

This ought to provide us with some appreciation of the ecological risk assessment methodology and what it can and cannot do. Within their talks in their areas of expertise, these three presenters have been asked to inform us about:

1. The power and limitations of the methodologies employed;

2. What is the availability, quality and adequacy of existing data;

3. What gaps and uncertainties there may be in the data, and whether we can expect to reasonably fill or reduce these; and lastly,

4. What further work would be needed to significantly advance ecological risk assessment in the areas of their expertise.

With this framework in hand, another "cluster" of speakers has been provided to tell us about Canadian experience to date relating to impacts (or assessment of impacts) on non-human species for power reactors (Don Wismer, presenter), nuclear fuel waste management (Reto Zach, presenter), and uranium mines and mill tailings (John Takala, presenter). These provide a snapshot of where we currently stand in regard to monitoring and assessing the impacts on non-human species. The question is "How far does this go to meeting the AECB's planned changes?"

The latest attempt by an international body of experts to address whether the present regulatory approach adequately protects the health of the environment is the just-published report by the United Nations Scientific Committee on the Effects of Atomic Radiation. This topic, for which the annex was completed this spring, was considered important enough to be published on its own: thus the "Effects of Radiation on the Environment" is the entire UNSCEAR '96 Report. It is a critical review of all the research to the past year, and comes to conclusions about what are tolerable levels of radiation. The consultant for the UNSCEAR review, Dennis Woodhead, will summarize the Report and its salient conclusions.

After all this, perhaps you will be more "primed" to ask questions. As well the speakers may need to re-cap and re-consider. The Panel Wrap-up format will therefore provide the speakers with a few minutes to comment on what they heard today. Then the show is opened again to all participants.

For all question-and-answer periods, including the Panel Wrap-up and Q/A Period, we have a hard-working group of scribes committed to capturing and reporting both the tenor and the particulars of the discussions; their reports will form part of the Proceedings of the Symposium.

A lot of people have to be thanked for bringing this Symposium to fruition. Some, but by no means all, are listed in the program. Special mention should go to our sponsors — in alphabetical order, the Atomic Energy Control Board, Atomic Energy of Canada Limited, Cameco Corporation, the CANDU Owners Group, Cogema Resources, Environment Canada, the Montreal Foundation for Radiation Protection and Ontario Hydro — without which today's event would not have been possible.