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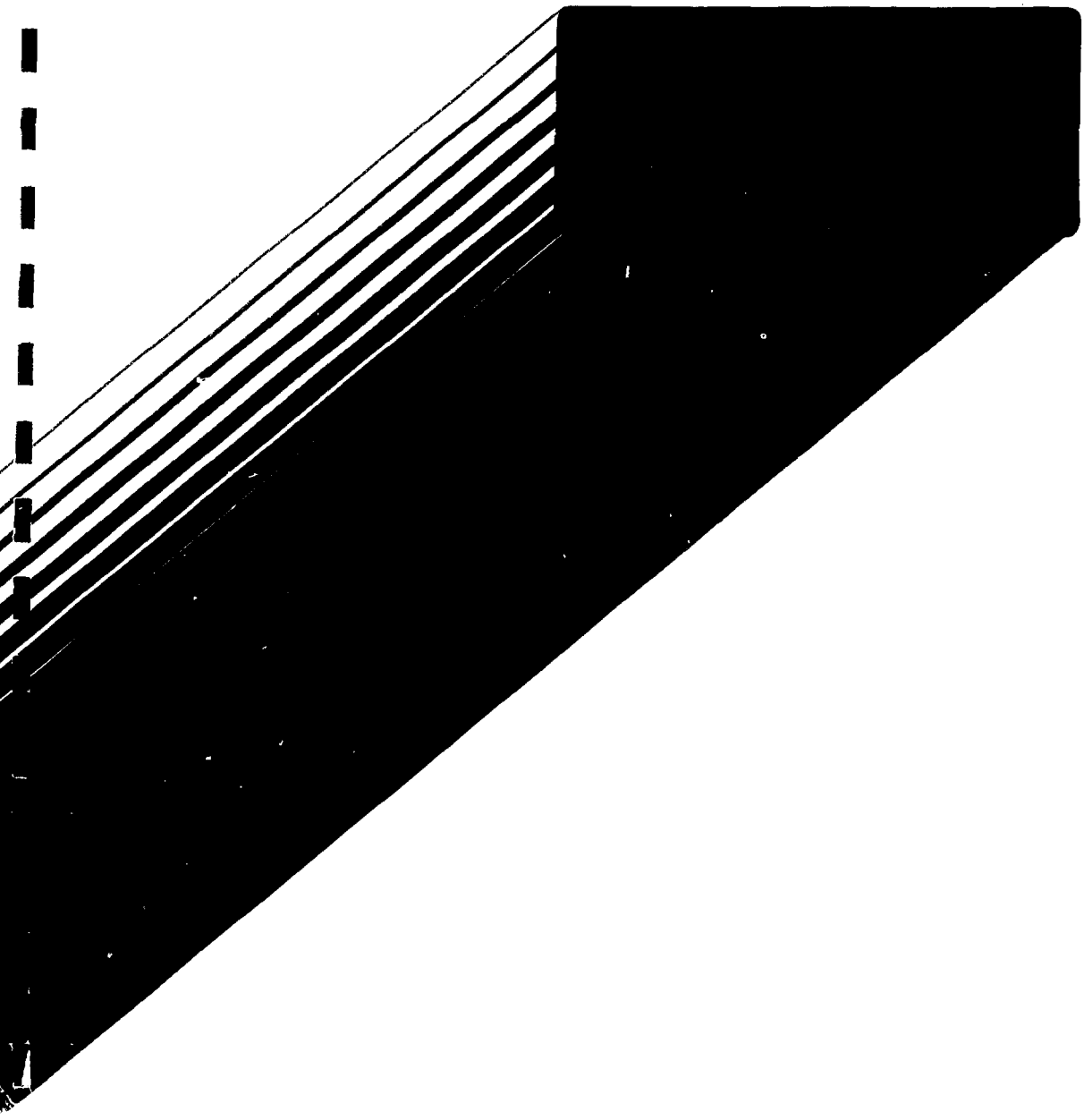

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ATOMIC ENERGY CONTROL BOARD AND ITS ROLE IN THE REGULATION OF URANIUM AND THORIUM MINING

by

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PRESENTATION

February, 1981

ATOMIC ENERGY CONTROL BOARD AND ITS ROLE IN THE REGULATION OF URANIUM AND THORIUM MINING

ABSTRACT

This brief, presented to the N.W.T. Legislative hearings into Uranium Exploration and Mining provides an overview of the jurisdiction role and regulatory philosophy of the AECB in uranium mining in Canada.

RESUME

Ce mémoire, soumis lors des audiences législatives des Territoires du Nord-Ouest, dresse un aperçu général de la juridiction, du rôle et de la conception de la réglementation de la CCEA, en ce qui concerne les mines d'uranium au Canada.

Presentation to NWT Legislature

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I. JURISDICTION

The parliament of Canada passed the "Atomic Energy Control Act" in 1946 to control and regulate the development and use of atomic energy.

The Atomic Energy Control Board (AECB) created under the authority of this Act is empowered to make and enforce regulations pertaining to all facets of the nuclear industry.

Briefly, under these regulations any person or organization wishing to mine, refine, process or use prescribed substances, import or export such substances, or construct and operate a nuclear facility is, unless exempted by the Board, required to obtain a licence from the Board.

II. THE ATOMIC ENERGY CONTROL BOARD

The Atomic Energy Control Board reports to Parliament through a Minister designated by the Governor in Council, currently the Minister of Energy, Mines and Resources. The Board consists of five members, one being appointed as a full time President and Chief Executive Officer of the Board.

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The Board is advised and assisted in discharging its mandate by a staff of scientific advisors and administrative personnel currently numbering about 200. In addition, the Board has established various advisory committees of independent experts to advise on generic issues.

III. REGULATORY OBJECTIVES

The Board's philosophy for radiation protection has been developed over the years and can be summarized as follows:

- all unnecessary radiation exposures are to be avoided;
- national standards for radiation exposure should not be exceeded under operating conditions, and should be based on:
  - medical evidence;
  - epidemiological studies;
  - in the absence of a threshold value in the dose-response relationship, lower objectives based on the best practicable technology;
- all radiation exposures of individuals and the population are to be kept as low as reasonably achievable, social and economic factors being taken into account;
- the principle of action levels as a practical technical tool to achieve exposures as low as reasonably achievable in operating nuclear facilities should be given strong emphasis;
- the objective of maximum self-regulation of the facilities should be promoted to increase responsibility of the management;

- every new practice should be viewed as part of the total occupational hazard in optimization of radiation protection;
- every new practice should be technically justified and should result in lowering the radiation exposures;
- every effort should be expended to resolve the problem of dealing with radioactive wastes, e.g. tailings, and to minimize the responsibility left to future generations or to future technology;
- the hazard to future generations from radioactive waste should be no greater than present generations would accept.

IV. THE ROLE OF THE AECB IN URANIUM MINING

Because mining in general has traditionally been under provincial jurisdiction, during the period 1946-1975 the Board concentrated mainly on the security aspects of uranium mining. The hearings of the Ontario Royal Commission on the Health and Safety of Workers in Mines (Ham Commission) concluded that this arrangement was not totally satisfactory for the proper protection of the health and safety of uranium mine-mill workers. Consequently the Board decided to assume a more direct role in the regulation of uranium mining. The recently completed hearings of the Ontario Select Committee on Hydro Affairs further affirmed the necessity for the Board's role.

A) Worker Health and Safety

The initial concern of the Board, based on the potential health effects to the workers, was to establish limits for

exposure to radon daughters and gamma radiation and to concentrate on reliable means of measuring and keeping track of these exposures. This task has been materially completed with the exception of personal alpha (radon daughter) dosimetry. Work is continuing in this area and promising equipment is being tested.

Radon daughter exposures based on area monitoring are now included in the National Dose Registry at Health and Welfare Canada. Gamma exposures will be recorded on a national basis this summer.

The Board is now working at establishing exposure limits for thoron daughters, radioactive ore dust, i.e. long-lived radionuclides and respirable silica dust.

Currently used methods for monitoring the concentration of radionuclides and dust in the workplace have been found to vary significantly from facility to facility. Accordingly, the AECB has developed and is continuing to develop a series of guides standardizing these methods.

As mentioned previously the Board is committed to reducing radiation and silica dust exposure as far below the regulatory limits as reasonably achievable, social and economic factors taken into consideration (the ALARA principle).

One of the important tools in implementing the ALARA principle is a strict application of a "Code of Practice". This code has a set of action levels (concentrations or dose rates) specifically set for the individual facilities based on actual facility specific conditions. Each action

level triggers a specific corrective action. The higher the action level, the more serious the corrective action required. The code is developed by the licensee, reviewed by the Board staff and its inspectors and modified if necessary. When the code is approved by the Board, it becomes a condition of the facility licence.

B) Waste Management

Unlike when uranium mining and milling first began in Canada on a large scale in the early 1950's, uranium mill tailings are now controlled much more rigorously than other tailings, even though the environmental hazards of uranium mill tailings are generally of the same order of magnitude as those associated with other tailings.

The Board currently requires that tailings management facilities be sited, designed, constructed and operated in a manner resulting in the exposures of workers and public to radioactive and other contaminants which are:

1) as low as reasonably achievable social and economic factors being taken into account, below the regulatory limits for releases and exposures; and
2) below the levels which might be set for a specific facility as a result of site specific conditions.

The use of new technology coupled with appropriate site selection, quality construction and good operating procedures, can ensure that the impact on health, safety and on the environment will be acceptably low over the period of operation. Further, the methods of retention should

be compatible with shut-down procedures - namely chemical and physical stabilization of the tailings and the retention structures, which will ensure that any releases to the environment and radiological exposures of man will continue to be within the requirements.

With respect to the control of liquid effluents during the mine-mill operating phase, the Board currently invokes the Mining Effluent Regulations of Environment Canada. In addition, the Board again applies the principle of ALARA in this area and is directly involved with the mining companies and other agencies in researching and developing more effective and efficient treatment technology.

Current evidence and recent pronouncements by the International Commission on Radiological Protection (ICRP) indicate that present effluent limits are well within safe levels and actually approach drinking water objectives with respect to radium 226.

C) Licensing Process

The present regulatory process is a co-operative one with the AECB occupying the lead role and co-ordinating the joint process with other federal and provincial regulatory agencies which have a mandate in occupational health and safety and environmental protection.

The staged licensing process which has developed as the best suited to achieve the objective of maximum protection of health and safety is as follows:

- Ore Removal Permit is required if removal of uranium or thorium in excess of 10 kg in a concentration exceeding

0.05% grade in one calendar year is involved. It should be noted that the Board does not become involved directly in simple uranium exploration; however, it has indicated to the provinces or regional governments that advice will be given upon request.

- Underground Exploration Permit is required when significant excavation work (surface or underground) is contemplated, and if there is a likelihood of radiation exposure of workers and/or environmental impact. Before this permit is issued, the following requirements have to be fulfilled:
  - a safety report must be submitted and approved;
  - an environmental impact overview of the planned work is completed, reviewed and approved.
- Site and Construction (Development) Approval - is issued after a detailed environmental impact statement has been submitted and reviewed and a public information process on the proposed project has been completed. The conceptual design of the facility is approved at this stage. The detailed design is approved through a continuous review process as it becomes available during construction.
- Mining Facility Operating Licence - is issued usually for a year after a detailed safety report is submitted and approved. The time limitation of the licence provides for thorough performance assessment when the application for renewal of the licence is considered.
- Shut-down (decommissioning) Approval - none has been issued yet, since no facility has been shut-down from

the time of implementation of the staged licensing process in 1976.

The staged licensing process provides assurance that the facility, when developed, will conform to the present regulatory requirments, since these are being incorporated at the early design stage.

The process also provides for a public information process at the appropriate time. This process might be in the form of public hearings - if the province where the facility is being proposed requires it, or a more informal public meeting. Guidelines for conducting the public meeting, as a minimum requirement of the Board, have been finalized.

C) Compliance

In an effort to avoid duplication of the activities and to use available human and material resources, most effectively, the AECB has made informal arrangements with other federal and provincial regulatory agencies to utilize their expertise. Compliance with the regulations and licence conditions is monitored mainly by inspectors appointed from the staff of provincial agencies, with the Board staff exercising a senior auditing function.

The main function of an inspector is to ensure compliance with the general and specific regulations and requirements of the Board, leading to the maximum possible protection of health, and safety and the environment from harm resulting from operation of uranium mine-mill facilities.

The powers of an inspector are outlined in Section 12 of the Atomic Energy Control Act. When any breach of these regulations or of a condition of a licence occurs, the inspector can direct the licensee to take such action as he deems necessary to remedy the breach. Such action may include closure of the work area where the breach has occurred and should be in effect until remedial measures are implemented by the licensee to the inspector's satisfaction.

The severity of the measures in the inspector's directive will depend on the seriousness of the breach and its potential effect on health and safety. The objective is to assure compliance with the Regulations and licence conditions as soon as possible.

V. Conclusion

The AECB has no interest in the promotion or the development of nuclear energy. The mandate of the AECB is simply to ensure that any nuclear facility, which is to be developed, meets the regulatory requirements.

With regard to the development of new facilities, the AECB is now involved from the early planning stages through the development of the mine-mill facility. As a result of this involvement, new facilities are designed and developed to a much higher standard of both conventional and radiation health and safety than previously.

To ensure that research into outstanding issues continues at a desirable pace, the Board is assuming a leading role in its co-ordination and in some cases directly initiates and finances certain research programs.

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The Board increasingly participates in the work of international agencies like the International Atomic Energy Agency, the Nuclear Energy Agency of the Organization for Economic Co-operation and Development, and the International Commission on Radiological Protection, in seeking answers to concerns connected with the operation of nuclear facilities. In turn, Canada benefits from the results of research and development in other member countries of these organizations.

The unfortunate lack of proper understanding and regulation of the radiological hazards associated with uranium mining in the past has resulted in considerable harm to the health of miners and the environment; however, the issues are now much better understood and the mechanisms for regulation are in place for controlling the uranium mining industry such that the impacts on both worker health and safety and the environment are acceptable to society.

Therefore although there is a highly vocal and learned segment of society opposed to all forms of nuclear development, it must be noted that all public inquiries and hearing processes that have issued final reports after having solicited information and advice from the best available sources on both sides of these highly emotional issues have unanimously decided to support the further development of uranium mining.