THE ATOMIC ENERGY CONTROL BOARD AND THE
URALIUM MINING INDUSTRY

BY

R. M. Duncan

A paper presented to the 79th Annual General Meeting
of the Canadian Institute of Mining and Metallurgy,
Ottawa, Ontario, on 20 April, 1977
# The Atomic Energy Control Board and the Uranium Mining Industry

## Table of Contents

<table>
<thead>
<tr>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2. Legislation and Regulations</td>
<td>1</td>
</tr>
<tr>
<td>3. General Role of the Atomic Energy Control Board</td>
<td>4</td>
</tr>
<tr>
<td>4. Implementation of Role</td>
<td>5</td>
</tr>
<tr>
<td>4.1 Federal-Provincial Arrangements</td>
<td>6</td>
</tr>
<tr>
<td>4.2 Occupational Health and Safety Considerations</td>
<td>9</td>
</tr>
<tr>
<td>4.3 Environmental Considerations</td>
<td>10</td>
</tr>
<tr>
<td>4.4 Security Aspects</td>
<td>12</td>
</tr>
<tr>
<td>4.5 Licensing Procedures</td>
<td>14</td>
</tr>
<tr>
<td>4.6 Research and Development</td>
<td>18</td>
</tr>
<tr>
<td>5. Uranium Resource Management and Safeguards Policies</td>
<td>18</td>
</tr>
<tr>
<td>5.1 Uranium Resource Management</td>
<td>19</td>
</tr>
<tr>
<td>5.2 Safeguards</td>
<td>23</td>
</tr>
<tr>
<td>6. Summary and Future Plans</td>
<td>25</td>
</tr>
</tbody>
</table>
1. INTRODUCTION

The Atomic Energy Control Board has been involved in the regulation of the nuclear industry in general and the uranium industry in particular since 1946 when the Atomic Energy Control Act was promulgated. The degree and nature of this involvement, however, has varied widely over the past 30 years for a variety of reasons, most of which being related to government policy variations, prompted by security, economic and social pressures as well as federal/provincial relations.

The uranium mining industry is a good example to use in tracing the fluctuations of the Atomic Energy Control Board's involvement as it ranged between being in the background and being in the limelight.

To provide a decent insight into this relationship between the uranium mining industry and the current regulatory activities of the Atomic Energy Control Board, it is essential that some background be given about the enabling legislation, the general role of the Board, the implementation of this role, and the more important government policy statements which are applicable.

2. LEGISLATION AND REGULATIONS

The Atomic Energy Control Act was proclaimed into force on 12 October, 1946. The constitutional basis for the Act is Section 91 ("... peace, order and good government...") of the British North America Act. The constitutional validity of this basis has been upheld by the courts in a number of cases, including Pronto Uranium Mines Ltd. vs. Ontario Labour Relations Board, et al, in 1956.
The purpose of the Act is as stated in its preamble:

"WHEREAS it is essential in the national interest to make provision for the control and supervision of the development, application and use of atomic energy, and to enable Canada to participate effectively in measures of international control of atomic energy which may hereafter be agreed upon;...".

The more significant parts of the Act include:

1. Designation of "Minister" for purposes of the Act.

2. Constituting the Atomic Energy Control Board as a body corporate to exercise the powers of control and supervision.

3. Empowering the Board, with the approval of the Governor-in-Council, to make regulations for a number of things, including:
   
   3.1 encouraging and facilitating research and investigations with respect to atomic energy;
   
   3.2 developing, controlling, supervising and licensing the production, application and use of atomic energy;
   
   3.3 mining and prospecting for prescribed substances (which include uranium);
   
   3.4 regulating the production, import, export, transportation, refining, possession, ownership, use or sale of prescribed substances;
   
   3.5 keeping secret information respecting the production, use and application of, and research and investigation with respect to, atomic energy.

4. Empowering the Minister, inter alia, to procure the incorporation of companies to exercise powers conferred on the Minister by the Act. Atomic Energy of Canada Limited and Uranium Canada Limited are two companies so incorporated.

5. Provision of penalties on conviction of violation of provision of the Act and Regulations.

.../3
The Atomic Energy Control Regulations first came into force on 1 April, 1947. These Regulations provided primarily for the strategic control and security of prescribed atomic energy substances and equipment. A significant step in the evolutional development of these Regulations was the March, 1960, version which included for the first time, a part on "Health and Safety Precautions". This new part, which recognized the increasing private sector application of radioisotopes and nuclear reactors, was developed and recommended by federal and provincial government health representatives through the Dominion Council of Health. The new part also established, as Canadian regulatory standards, the maximum permissible doses of radiation for workers and the general public, generally as recommended by the International Commission on Radiological Protection.

The current version of the Atomic Energy Control Regulations became effective 3 June, 1974, and includes sections on prescribed substances and items, nuclear facilities, records and inspections, security and health and safety. The Regulations also provide for the appointment by the Board of medical advisers, radiation safety advisers, and inspectors to assist with the administration of the Regulations.

The current Regulations are further defined in a number of Orders made pursuant to the Regulations and published in the Canada Gazette, Part I, 8 June, 1974.

The Board also administers the Nuclear Liability Act which received Royal assent on 26 June, 1970, and was proclaimed on 11 October, 1976. This Act provides for the absolute liability for nuclear incidents on the part of the operators of nuclear installations. Should claims resulting from a nuclear incident exceed the statutory limit of seventy-five million dollars, the Act provides for special measures of compensation, including a Nuclear Damage Claims Commission.
Because of some of the basic problems of clarity of jurisdiction and involvement, as well as the broad nature of the powers under the existing Atomic Energy Control Act, steps are currently underway to revise the Act to render it more appropriate for today's situations.

3. GENERAL ROLE OF THE ATOMIC ENERGY CONTROL BOARD

The initial emphasis of the Board's role was the control of strategic atomic energy materials (referred to in the Act as "prescribed substances"), the supervision of early atomic energy developments including the Chalk River Project, and the provision of grants-in-aid for nuclear research.

Major steps in the evolution of this role included the separation of the developmental role by the formation in 1952 of Atomic Energy of Canada Limited and a 1954 amendment to the Act, the emergence of the health and safety control aspect with a 1960 amendment to the Atomic Energy Control Regulations, and a transfer to the National Research Council (effective 1 April, 1976) of the grant-in-aid for nuclear research function.

The current role of the Atomic Energy Control Board includes the following components:

(1) Regulatory control of the health, safety and security aspects of prescribed substances* and nuclear facilities**.

---

* "Prescribed substances" are defined in the Atomic Energy Control Act as meaning "uranium, thorium, plutonium, neptunium, deuterium, their respective derivatives and compounds and any other substances that the Board may by regulation designate as being capable of releasing atomic energy." This definition is further expanded in the Atomic Energy Control Regulations where it is indicated that "radioactive isotopes are designated as being capable of releasing atomic energy, or as being requisite for the production, use or application of atomic energy."

** "Nuclear facilities" are defined in the Atomic Energy Control Regulations to mean "a nuclear reactor, a sub-critical nuclear reactor, a particle accelerator, a plant for the separation, processing, re-processing or fabrication of fissionable substances, a plant for the production of deuterium or deuterium compounds, a facility for the disposal of prescribed substances and includes all land, buildings, and equipment that are connected or associated with such reactor, accelerator, plant or facility."
(2) Provision of technical advice on and administration of certain aspects of Canadian policy and international commitments on the safeguarding for peaceful purposes of certain prescribed substances and nuclear equipment;

(3) Provision of advice on policy development and administration of certain aspects of Canadian policy on uranium resource management.

(4) Security classification and protection of certain atomic energy information.

(5) Administration of contracted mission-oriented research in the broad field of nuclear safety.

4. IMPLEMENTATION OF ROLE

The Board controls prescribed substances and nuclear facilities through a comprehensive licensing system which involves the steps of receipt of application, evaluation of application, issuance of licence and compliance inspection.

The evaluation of applications for various types of licences, and also the assessment of compliance with licence conditions are major functions of the Board and its staff. To assist in these functions, the Board appoints both standing and ad hoc advisory committees composed of technical experts from appropriate disciplines, and enlists the aid of other federal, provincial and municipal government agencies.

In the uranium mining industry, it is only recently that this general control mechanism has begun to be applied in a manner similar to the remainder of the nuclear industry. Significant in this is the evolution of the federal-provincial responsibility arrangements and the development of appropriate health, safety, security and environmental criteria.
4.1 Federal-Provincial Arrangements

Shortly after the passage of the Atomic Energy Control Act in 1946, representatives of the Province of Saskatchewan visited the Board to point out that Saskatchewan had detailed regulations governing mining operations, and confusion would result if the Board were to attempt to set out special rules for prospecting, staking, development, and mining of uranium deposits. The Board agreed that provincial rules regarding prospecting and staking should apply, but a Board licence would be required during the development and mining stages.

In the early 1950's private operators in Ontario were anxious to develop and mine some previously known uranium deposits in that province. The AECB held discussions with officials of the Ontario Department of Mines concerning licensing arrangements. At this time, the Board's interests were directed to the security of the uranium and information regarding its reserves, production and disposition, and it was understood that the provincial authorities would take responsibility for the safety of the mines and the health of its workers. It was also agreed that the Board in its exploration and mining licences would impose a condition requiring compliance with provincial laws respecting mine safety. The actual wording agreed on was as follows:

"(3) That, subject to the Atomic Energy Control Regulations, any applicable provincial statutes and regulations, or the regulations affecting mining in the Northwest Territories and the Yukon, as the case may be, insofar as they deal with mine safety and cognate matters, are to be observed and complied with in relation to the said property and to all operations undertaken in connection therewith."

Up until recently, the above wording has been included as a condition of all licences issued by the Board to mine uranium.

.../7
During the 1960's there were repeated requests from provincial mine ministers for the federal government to transfer to the provinces jurisdiction over uranium mines. At the Conference of the Provincial Ministers of Mines in September, 1968, the Honourable J. J. Greene, then Minister of Energy, Mines and Resources, reiterated that except in matters related to national security and foreign policy, uranium mines should be subject to the same rules as those which the provinces exercise over other mines. He also expressed the wish and intention of the federal government that the provinces continue to be able to apply such controls. More explicitly, he indicated that although the Atomic Energy Control Act established federal government jurisdiction in matters relating to national security and foreign policy, in no way should it hinder or limit provisions to ensure the application of the rules applicable to other mines under provincial jurisdiction. He also referred to the AECB mining permits being conditional upon the licensee obtaining from the province concerned the necessary property rights and, subject to the Atomic Energy Control Regulations, compliance with all applicable provincial and territorial regulations. He further stated that, wherever possible, the AECB would appoint provincial officials as inspectors under the health and safety sections of its regulations, provided that there existed adequate regulatory provisions by the province and systems for maintaining them.

With the promulgation in 1974 of the revised Atomic Energy Control Regulations, the AECB took a new initiative and reviewed its procedures for the licensing of uranium mines and established the Mine Safety Advisory Committee. This Committee, like others utilized by the Board at that time, contains representatives from other federal and provincial agencies which have an involvement in the regulation of the uranium mining industry.

Recently, the position of the Atomic Energy Control Board on uranium mining and its intended courses of action were outlined in its brief to the Royal Commission on the Health and Safety of Workers
in Mines in Ontario. Of major importance were matters pertaining to the health and safety of the workers and the public, particularly with regard to exposure to radon and its radioactive daughter products, general external radiation and the inhalation of mine dust.

At a series of meetings, which were started in December, 1975, with parties concerned in current uranium mining activities, Board representatives have outlined the Atomic Energy Control Board's position, emphasizing that there was no intention of taking over the basic functions being performed as responsibilities of other regulatory agencies and the industries. The Board, however, stressed that it had to be fully informed of the control and compliance programs and procedures of others and be provided with data and information to ensure that standards were being met. The Board also stated its wish to become involved as a participant in the above programs from time to time as may be appropriate. In this connection the intention was to perform an auditing function on the existing practices, with some independent investigations to establish to the Board's own satisfaction the credibility of the results.

In order that those involved in inspection or auditing functions can achieve an adequate level of knowledge, particularly in the radiation aspects, the Board staff has set up a uranium mine inspectors training program. Candidates for the program include those persons who could be authorized as Board inspectors under the Atomic Energy Control Regulations and representatives from the producers and the unions.

As mentioned previously, lack of clarity of jurisdiction and multiplicity of involvement on the part of a variety of regulatory agencies have been significant factors in the current efforts to revise the Atomic Energy Control Act and Regulations to provide more clear and streamlined control measures for the whole nuclear industry. The Board has been consulting with the pertinent federal
and provincial agencies during this revision period in order to obtain their views on the revamped Act. Consideration is also being given to factoring in outside opinions and comments on the revised Regulations.

4.2 Occupational Health and Safety Considerations

When large-scale uranium mining started in Canada in the 1950's, both the authorities and the uranium companies were aware of the potential hazards of radon daughters and most of the companies provided considerable forced ventilation for their mines. A radon daughter concentration of "One Working Level"* (1.0 WL) was generally accepted as the "target" for use in Canadian uranium mines although most mines were operating at concentrations that were well above that level. In Ontario, the uranium mining companies were required by the provincial Department of Mines to submit periodic reports on their measurements of air contamination in different parts of the mine.

Although the Board continued to depend on the Provinces to oversee the health and safety of uranium miners, the radon daughter hazard remained of special concern and it maintained close contact with radiological protection experts in the Ontario Department of Health and at Atomic Energy of Canada Limited's Chalk River Nuclear Laboratories who were concerned with the radon daughter problem.

In 1959, the International Commission on Radiological Protection (ICRP) published a recommendation as to the maximum permissible concentration of radon in air for occupational exposure corresponding to an equilibrium concentration of radon daughters of 0.3 WL. The Ontario Departments of Mines and Health called a meeting in 1960 to consider what should be done in the light of this recommendation and the meeting ended with the consensus that the ICRP recommendation of the equivalent of 0.3 WL should be adopted as a target to be attained within the next five years.

* One Working Level is defined to be any combination of numbers of atoms of the first three daughters of Rn-222 in a litre of air, such that the total α-energy to complete decay to RaD is $1.3 \times 10^5$ MeV.
In 1967, the U.S. Public Health Service published the results of a detailed survey of the hazards in uranium mines in the U.S. which showed that the frequency of deaths from lung cancer among former uranium miners was much greater than the frequency among the population at large and varied with the radon daughter concentration to which the miners had been exposed. Acting on the advice of the Federal Radiation Council, the U.S. government set 1.0 WL as the standard to be enforced by all federal agencies having authority in this field.

In view of the U.S. Public Health Service report, the situation in Ontario mines was reviewed at a meeting held at the Ontario Department of Mines in mid-1967, following which the President of the Atomic Energy Control Board wrote to the Deputy Minister of the Ontario Department of Mines to state that the Board viewed the radon daughter problem very seriously and urged the Department to require the mines to improve the situation.

Late in 1967, the Chief Engineer of Mines of the Ontario Department of Mines issued a Mine Order requiring occupational exposure to radon daughters in Ontario mines to be controlled to 12 Working Level Months (WLM) per year. In 1972, the control level was reduced to 8 WLM for 1973 and 6 WLM for 1974, and in 1974, the control level was further reduced to 4 WLM for 1975. The Board, having received advice from its Uranium Mining Safety Advisory Committee and the Board staff informed the industry in January, 1976, that radon daughter exposure for the workers should be kept as low as is reasonably achievable, economic and social factors being taken into account, and that a 4 Working Level Months (WLM) per annum exposure limit was to be applied as an interim guideline for at least one year. The time period was stated with the belief that it should provide time for further investigation of the applicability of this limit.

Mention was also made of the desireability of making the workers aware of the ramifications of cumulative exposure and the possible complicating effect of smoking.
As a result of this investigation, the Board has recently agreed and procedures are currently underway to modify the Atomic Energy Control Regulations to incorporate limits for exposure to radon daughters of 4 WLM per annum and 2 WLM per quarter.

4.3 Environmental Considerations

In the past decade, with the increased awareness of, and concern about, environmental impact, the effluents from the mine waste and mill tailings areas have come under increasing scrutiny because of the potential hazard to the surroundings from the contained radium and other deleterious materials.

The environmental and health agencies have been involved in the regulatory control of the effluents, having established receiving water quality objectives or concentration limits for these materials in the effluents.

From the Board's point of view, uranium mill tailings facilities are considered to be nuclear facilities, and, as such, are licensable under the Atomic Energy Control Regulations.

The licence may specify any terms and conditions the Board considers necessary in the interest of the health and safety of the facility workers and the general public.

Although the jurisdiction of the Atomic Energy Control Board extends over environmental effects only insofar as these effects relate to the health and safety of workers and the public, the licensing of radioactive waste management facilities, particularly during site selection and evaluation, is coordinated with the appropriate review process of federal or provincial agencies concerned with the broad issues of environmental quality. This implies environmental assessment and provision for public input to the review process.

The Board considers the ultimate goal in the management of tailings to be their conditioning and emplacement in such a manner that continuous treatment and surveillance would be unnecessary.
To achieve the latter, consideration must be given to a variety of factors, including the following:

(a) The optimum milling process which will reduce the quantity and concentration of contaminants in the tailings leaving the mill;

(b) The reduction to a minimum, by suitable treatment, of contaminants in the tailings prior to being deposited in a tailings retention area;

(c) The maximum immobilization of the remaining contaminants in the tailings retention area by further treatment;

(d) Appropriate siting of the tailings retention area to:
   (i) minimize the movement of surface or groundwater through the tailings;
   (ii) minimize the movement of escaped contaminants by natural means such as ion-exchange with soils;

(e) Adequate design of the tailings retention area to:
   (i) render the structure as impermeable as practicable;
   (ii) minimize the potential for infiltration of water;
   (iii) minimize the possibility of gross material movement due to natural forces.

Currently, certain of these factors are employed in uranium mill tailings management. The outcome of considering these factors would be a better understanding of the extent of potential impact of this facility after abandonment. A judgement must then be made as to the acceptability of the extent of this impact.

4.4 Security Aspects

The Atomic Energy Control Regulations define the general requirements for the physical security of prescribed substances and nuclear facilities. Applications for prescribed substance licences must include "a description of the measures to be taken to prevent theft, loss or any unauthorized use of the prescribed..."
substance. Applications for nuclear facility licences must include "a description of the measures to be taken to ensure the physical security of the nuclear facility". Additionally, the Regulations define requirements for the protection of classified information and for the designation of "protected places".

In practice, applicants are required to submit a security plan with their application for a prescribed substance or nuclear facility licence. The security plan must specify policies and procedures to provide for:

1. The protection of the substance in use, storage and transit, or the protection of the nuclear facility as appropriate.

2. An appropriate security organization including duties, training and responsibilities. In this respect staff selection procedures relating to employee reliability must be defined.

3. The protection of information, the dissemination of which would compromise the security of the plant or material.

4. Special situations such as bomb threats, attempts to steal material, recovery of stolen material, attempts at sabotage, etc.

Such security plans are evaluated by a Security Adviser on the Board staff in cooperation with appropriate experts in the Royal Canadian Mounted Police. At the present time, International Atomic Energy Agency publications along with draft AECB licensing guides are used to define application requirements and evaluation criteria in this area. On approval of the security plan by the AECB, the appropriate prescribed substance or nuclear facility licence may be issued.
Part V of the Atomic Energy Control Regulations relates to the security of certain information and to the designation of "protected places". Although almost all of the information relating to the Canadian nuclear power program is unclassified (albeit some may be proprietary), there are certain types of information, including fissionable substance properties relating to weapons applications, fissionable substance production and separation, and military reactors, which are classified and protected under the Atomic Energy Control Regulations. The Board may designate certain areas as "protected places" for the purposes of keeping secret certain information and of protecting persons and property. To date only the Chalk River Nuclear Laboratories and the Whiteshell Nuclear Research Establishment have been so designated.

4.5 Licensing Procedures

As mentioned previously, control of nuclear facilities and materials is achieved through licensing. In accordance with the Regulations, therefore, the operation of a facility within which the mining and milling of uranium and the associated waste management takes place requires a Mine-Mill Facility Operating Licence (MFOL) and is subject to the requirements set down in the Regulations.

To arrive at the point where a MFOL can be issued, four stages of licensing must be gone through.

Underground exploration, defined as the determination of the extent and content of a mineral occurrence by techniques including extensive diamond drilling, sinking shafts, driving exploration drifts, raises and inclines and stripping of overburden, requires prior approval from the Board in the form of an Underground Exploration Permit. An application for this permit must outline the extent of underground exploration to be carried out, and describe the radiation protection program to be implemented for the workers and the program for the protection of the environment relative to this stage.
Before the start of the development stage, Site Approval is required. There is little flexibility in the siting of the mine itself, and hence a judgement on the acceptability of the development of the mine at the given location has to be made as a "yes-no" decision based on major factors.

The siting of the mill is more flexible, with the economics of transportation of ore and product being the major factor with consideration given to the use of the mine water in the mill.

The siting of the tailings management area is critical, because of its potential for extensive environmental impact.

Site approval is further sub-divided into conditional site approval and final site approval. Conditional site approval may be given on the submission and acceptance of a preliminary site evaluation report and is normally transmitted by letter which indicates that the Board sees no major reason, on the basis of the information submitted, why final site approval may not be given. Before a final site approval is given, the applicant must have conducted a public information program (including public meetings to outline proposed plans and resultant environmental, social and economic impacts and to collect feedback from the interested public), satisfied environmental assessment and related requirements and submitted the final site evaluation report to the Board. This report will consist mainly of the environmental assessment report.

The extent of environmental assessment required and the degree of public involvement can vary with the locale and with the process used by the agencies involved.

This particular component in the Board's overall licensing process has been substantially influenced by the environmental agencies. Their assessment requirements and their method of acquiring public input have dictated the timing and scope of information.

Development approval is required prior to the start of development of the mine and construction of the mill and waste management facilities. The application must include a Preliminary Safety Report.
It is recognized that the information in a Preliminary Safety Report might be incomplete and be subject to change. The report, nevertheless, must contain sufficient detailed information, specifications and supporting data to enable the Board to assess whether the mine-mill and associated radioactive waste facilities are being designed such that their construction and operation will conform with the health and safety guidelines and criteria for workers and the public pursuant to the requirements laid down in the Atomic Energy Control Regulations and in any other applicable legislation.

During the interval between the granting of construction or development approval and the granting of an operating licence for the mine-mill and associated radioactive waste management facilities, the Preliminary Safety Report must be revised at regular intervals to reflect the progress of design, development and analytical work. Each such revision will identify any significant changes in design or intent. The Final Safety Report supporting an application for an operating licence will cover the as-built facilities.

A document must be submitted, in support of the application for an operating licence, defining the operating policies and principles which will be instituted by the applicant to ensure a continuing high level of confidence that the facility will be operated in accordance with the appropriate health and safety requirements.

The abandonment of the facility is of major concern, particularly because of the extensive tailings areas and their potential for environmental impact in the long-term. Plans for decommissioning must be made and approved by the Board well in advance of termination of activities. These plans, in general form, are considered in the early stages of the licensing process, and are taken into account prior to issuance of an operating licence.
The timing of various licensing actions will depend upon the applicant's construction and start-up schedule for the facility, the time required to review the applicant's submissions, and on any need to seek additional information. It is recommended that discussions be held between the applicant and Board staff as early as possible to discuss scheduling of the project and the information required by the Board. One of the purposes of such discussion meetings is to ensure that all activities will be integrated into an overall schedule and to minimize the effect on a project schedule of meeting regulatory requirements.

Board staff will study the application and supporting documentation, request additional information when required, meet with the applicant when necessary and make recommendations to the Board.

At the request of the Board, the Mine Safety Advisory Committee and/or the Radioactive Waste Safety Advisory Committee may study the applications, including any supporting documentation and any additional information presented as being relevant to the application under consideration. The Committees may hold meetings, either with the applicant or in private session to discuss the application. The Committee's recommendations and comments are then submitted to the Board.

The Board considers the application, supporting documentation and the comments and recommendations of its staff and of the Safety Advisory Committees in deciding whether to approve or deny the issuance of the requested approval or licence.

Routine reports, by the applicant or licensee, on the progress of construction of the facility and on the operation of the facility are generally required under the conditions of the construction approval or operating licence. These reports are reviewed by Board staff and may also be reviewed by the Safety Advisory Committees.

In addition, members of the Board staff or other authorized representatives of the Board may make visits to the mine-mill facility or to the premises of equipment suppliers in order to
satisfy themselves that the policies, principles and procedures
described in the licensing documents are being implemented, that
the conditions set down in any licence or approval are being followed,
and that the requirements of the Atomic Energy Control Regulations are
being fulfilled.

The results of this continuing review and inspection program
will be considered when the operating licence is presented for
renewal. The review procedure for licence renewal is similar to
that for approval of an operating licence. At least in the early
years of plant operation, mine-mill facility licences are valid
for one year only.

4.6 Research and Development

The Board identifies the need for mission-oriented research
and development largely through its licensing activities, where
gaps in technical knowledge or areas requiring verification may be
encountered. The program, which is carried out under contract,
permits the Board to move in when the need is seen, and arrange for
appropriate work to be undertaken.

Studies are currently being funded in the fields of radon
daughter dosimetry, uranium miner lung cancer epidemiology,
sputum cytology, tailings management and other areas related to
the uranium mining industry.

In addition to funding the above work, the Board is active
in coordinating the programs of various government agencies, the
industry and other groups working in this field.

5. URANIUM RESOURCE MANAGEMENT AND SAFEGUARDS POLICIES

The federal government has laid down policies respecting
the management of our uranium resources to the greatest benefit
of Canada and to ensure that these resources do not contribute
to nuclear proliferation.
The Atomic Energy Control Board participation in the administration of these policies is dealt with in this section.

5.1 Uranium Resource Management

The Atomic Energy Control Board plays a significant role in assuring the fulfillment of the federal government's uranium policy as announced on 5 September, 1974 by the then Minister of Energy, Mines and Resources, the Honourable Donald S. Macdonald.

The specific objectives of the Canadian uranium policy are to ensure:

(1) That a long-term reserve of nuclear fuel will be available for existing and committed reactors as well as for reactors which are planned for operation in Canada for a ten-year period into the future; and

(2) That sufficient uranium production capacity is available for the Canadian domestic nuclear power program to reach its full potential.

These policy objectives are administered by requiring that each proposed uranium export contract be submitted to the Atomic Energy Control Board for review by a Uranium Export Contract Review Panel chaired by the President of the Atomic Energy Control Board and including representatives from the Departments of External Affairs; Industry, Trade and Commerce; Energy, Mines and Resources; and the Atomic Energy Control Board. This Panel must not only assure that the uranium policy criteria are met but also that other appropriate requirements relating to safeguards, health and safety, physical security and Import-Export Act are also met.

To fulfill these policy objectives, the following criteria are applied in reviewing each proposed uranium export contract:

.../20
A) Sufficient uranium must be reserved for domestic use to enable each nuclear power reactor operating, committed for construction or planned for operation ten years into the future, to operate at an average annual capacity factor of 80 per cent for 30 years from the start of the period, or in the case of reactors which are not in operation, for 30 years from their in-service dates.

B) A uranium resource appraisal group established within the Department of Energy, Mines and Resources will audit Canadian resources that are recoverable at prices of up to twice the current world market price. Each mining company will have a reserve margin allocated to it based on the ratio of its uranium resources to the total Canadian recoverable resources from all such companies as estimated by the uranium resource appraisal group.

C) Domestic utilities purchasing uranium should share with uranium producers the responsibility for ensuring adequate and continuous supplies of uranium to meet domestic requirements. Therefore, the Atomic Energy Control Board will require a utility to demonstrate that it is maintaining a contracted forward supply of nuclear fuel to enable each operating reactor to be operated at an annual capacity factor of 80 per cent for at least 15 years, or for reactors committed but not yet operating, for 15 years from their in-service dates. However, the government would encourage commitments to be made for periods of more than 15 years.
D) Under existing uranium export policies, the regulating agencies* are required prior to issuing an export licence to examine contracts with respect to implications of such matters as international safeguards, the relationship between contracting parties, price and volumes of sales to the export market, and reserves and rate of exploitation. These agencies, in cooperation with the Department of Energy, Mines and Resources, will now include in their review consideration as to the adequacy of the contracting company's uncommitted uranium reserves to meet its share of the Canadian domestic reserve margin. Contracts concluded with Canadian utilities will be credited to the company's portion of the reserve margin. Special consideration will be given for companies whose mining operations are within five years of being exhausted.

E) Unless specific exemption is granted by the regulating agencies, the uranium will be required to be exported in the most advanced form possible in Canada. The purchaser will be required to agree to not export the uranium unless specific authority to do so is given by the Atomic Energy Control Board after consideration by the Board of the prevailing international market situation.

* Atomic Energy Control Board, the Department of Industry, Trade and Commerce, and the Department of External Affairs.
F) Export contract approvals shall be limited to a maximum of ten years from the date of the signing of the contract with contingent approval possible for an additional five years. Such contingent approvals will not be given unless provision is made for renegotiation of price for the uranium to be supplied during the additional five years of the contract and will be subject to domestic utilities having a right to recall through the Atomic Energy Control Board on a portion of this material. A domestic utility must give the Board prior notice of at least five years that the right will be exercised and must demonstrate that it is unable by other means to maintain its 15-year forward commitment. The portion subject to recall in any of these years will be in accordance with the ratio of expected Canadian domestic demand in that year to the total uranium production capacity scheduled within Canada in that year. Contracts concluded by a producer with Canadian utilities will be fully credited to that producer thus reducing material subject to recall.

G) Uranium producers are now required to submit their sales contracts for uranium exports to the Board for examination prior to being granted a licence to export the uranium. Producers will now be required also to submit their contracts for domestic sales of uranium to the Board for information purposes. While recognizing that considerable time may elapse between negotiating a sale and completing a contract, the Board will require producers to submit, within 90 days of the acceptance of an offer by a purchaser, documentation giving the basic pricing, quantity and delivery conditions. This documentation is supplementary to the detailed contract which must still be approved by the Board. Such approval will not normally be given if the pricing conditions for foreign customers are more favourable than those offered to domestic purchasers.
H) The stockpile of uranium accumulated by the Canadian government might be used with advantage to supplement the fuel supplies being obtained by domestic utilities from existing industrial production capacity. Therefore the government stockpile of uranium will be disposed of solely within the domestic market and, prior to its total disposal, will be available on a commercial loan basis to meet any short-term needs of Canadian producers or Canadian utilities provided that at all times it will be further processed by Canadian companies. Any opportunity to dispose of the stockpile by direct sale within the domestic market would be examined. In considering such opportunity the value of the stockpile in providing short-term security of supply to Canadian utilities would be carefully assessed.

5.2 Safeguards

On 20 December, 1974, the Honourable Donald S. Macdonald outlined the latest Canadian requirements for safeguards to be met by any country seeking to purchase a nuclear facility, technology or material from Canada. His statement also included the important elements of this decision, as well as the government's intent to negotiate additional safeguards in respect to uranium supply contracts already approved.

Following is a quote from his statement, providing the background to the decision:

"It has become demonstrably clear that additional energy sources are needed urgently; nuclear power is the single most important other new source that is now commercially feasible and many countries are making the decision to use it. Canada has already made a decision to rely for part of its energy requirements on nuclear power and a number of countries have turned to us to supply fuel, technology or equipment. With uranium resources in excess of our requirements and a competitive Canadian reactor we are in the position to make an important contribution to the pressing energy needs of the world and are willing to make it."
At the same time the government is more than ever conscious of its responsibility to ensure that Canadian nuclear resources do not contribute to nuclear proliferation. This requires that Canada should apply the maximum "safeguards" or restraints attainable to inhibit importing states from using nuclear supplies to further the production of nuclear explosive devices."

The statement goes on to outline the provisions that will be required in every safeguards arrangement:

"The provisions, to be administered by the International Atomic Energy Agency, or through appropriate alternative procedures meeting the requirements of the Treaty on the Non-Proliferation of Nuclear Weapons, will cover all nuclear facilities and equipment supplied by Canada for the life of those facilities and equipment. They will cover all nuclear facilities and equipment using Canadian-supplied technology. They will cover all nuclear material - uranium, thorium, plutonium, heavy water -- supplied by Canada, and future generations of fissile material produced from or with these materials. They will cover all nuclear materials, whatever their origin, produced or processed in facilities supplied by Canada.

Most importantly, all safeguards arrangements will contain binding assurance that Canadian-supplied nuclear materials, equipment and technology will not be used to produce a nuclear explosives device, whether the development of such a device be stated to be for peaceful purposes or not."

The statement then indicates the obligation of industry:

"All potential Canadian exporters of nuclear material, equipment or technology are advised that prior to making offers of supply, they must ascertain from the Department of Industry, Trade and Commerce, and the Atomic Energy Control Board that there are no safeguards impediments."
6. **SUMMARY AND FUTURE PLANS**

The phenomenal growth in the uranium industry which is currently taking place, coupled with the increased environmental awareness of the public and the concern for improved occupational health and safety on the part of the workers, have provided sufficient rationale for the Board to take a more active role in all aspects of the regulation of the uranium mining industry.

Efforts to coordinate the regulatory activities of all the agencies involved, commitments made before the Ham Commission, research and development projects, compilation of a comprehensive "Guide to the Licensing of Uranium and Thorium Mine-Mill Facilities" and the utilization of two Safety Advisory Committees are some of the activities undertaken in the past few years in relation to this new initiative on the part of the Board.

The Atomic Energy Control Board's forward program includes increased effort as follows:

(a) There must be improved functional coordination of federal and provincial agencies in order to avoid unnecessary duplication of effort and unilateral actions that might lead to confusion and confrontation. At the same time, liaison with labour unions, producers, and utilities must keep pace.

(b) The Board must become more visibly independent of the promotional and commercial aspects of the nuclear industry. A strong, consistent regulatory function will help achieve public acceptance of the industry. The Board is trying to achieve additional strength and credibility.

(c) Regulatory controls and licensing steps for management of both low and high level radioactive wastes must be clarified. With experience from the Port Hope situation, clean-up in other areas that may be identified will proceed more readily; prevention of repetition of such situations will be the goal of all participating agencies.
Particular attention will be given to the management of mine wastes and mill tailings. Because of apparent waste problems, the whole nuclear industry tends to be questioned by the public.

(d) The development of data on occupational exposure of atomic energy workers including uranium miners is required in order to be able to identify any changes needed in exposure limits.

(e) The Board's mission-oriented research and development program must be expanded in both the engineering and the health-safety aspects of nuclear regulation.

(f) The Board recognizes the need for public hearings and for development of a public information function that is a source of reliable, independent data on nuclear and related matters. There is also a need to consult with public interest groups as well as the technological community when making regulations. Action is being planned in these areas.

(g) The objectives outlined in the Brief to the Royal Commission on the Health and Safety of Workers in Mines in Ontario must be fulfilled on a national basis.

(h) Revised licensing guides to describe in greater detail the types of information, assessment, criteria and procedures for effective regulation of the uranium mining industry must be produced.