NUCLEAR AND URANIUM POLICIES

by

G.M. MacNabb

Deputy Minister, Department of Energy, Mines and Resources
and President, Uranium Canada, Limited

INTRODUCTION

The nuclear energy and uranium industries throughout the world have been characterized by a large degree of government involvement. Canada is no exception. The federal government has been involved for over thirty years in regulation, policy development and implementation, and operation. Although this paper will deal primarily with recent developments in government policy, it is worthwhile to review briefly the history of nuclear energy and uranium industries in Canada and the federal government's role in these industries over the past three decades.

BACKGROUND

As some of you will recall, in 1942 the federal government acquired ownership of Eldorado Gold Mines which had a uranium mine on Great Bear Lake and 300 tons of uranium concentrate at Port Hope as a result of a radium refinery operation. The strategic importance of uranium had already become apparent and, in fact, in 1941 the USA had placed an order with Eldorado for uranium oxide. While the mine at Great Bear Lake has been closed for many years, Eldorado Nuclear Limited continues the operation of the refinery at Port Hope, a mine near Uranium City in northern Saskatchewan, and has now resumed active exploration for uranium both on its own and in partnership with other organizations.

In the mid-1960's the government became involved in the uranium industry in another manner. Uranium oxide production had grown to about 16,000 tons per year in 1959 under the impetus of the military based demand from the USA and UK. With the withdrawal of this demand, production fell dramatically to about 4,000 tons in the mid-1960's. To sustain at least part of the industry the government entered into a stockpiling program. Some of the uranium acquired under the stockpiling programs has now been sold but more than half

is being retained to be used as a buffer stock in connection with export policies which will be described later. Also in 1942, about the same time that the government took over Eldorado, an Anglo-Canadian nuclear research laboratory was established in Montréal at the suggestion of the UK government. While this was staffed primarily with UK, French and European scientists, many Canadians were part of the group. After several months of negotiations with the United States, agreement was finally achieved for the Montréal laboratory to proceed with the development of a heavy water reactor for the production of plutonium for weapons use. The laboratory staff moved to the site of the present Chalk River laboratory in 1944 to form the nucleus of what is now Atomic Energy of Canada Limited. The subsequent construction of the NRX and NRU research reactors and the evolution of the CANDU type power reactor is, I am sure, well known to you all.

Another important early step was the passing of the Atomic Energy Control Act in 1946. The wide power of this Act has permitted the federal government, through the Atomic Energy Control Board, not only to ensure the safety and security of nuclear activities, but also to implement desired policies in other areas. Such activities as export of uranium and nuclear equipment, construction of uranium enrichment plants, transportation, and storage of radioactive materials come clearly under the Act.

RECENT POLICY ACTIVITIES

Over the past years the government has conducted extensive reviews of its nuclear policies. Of primary concern in the past year has been the question of exports of uranium and nuclear equipment. In its recent reviews of nuclear exports two objectives were predominant:-

(1) to ensure adequate uranium for Canada's own nuclear power program, while encouraging expansion of the uranium industry, and

(2) to obtain greater assurance that Canada's nuclear exports would be used only for peaceful purposes.

Each of these major topics is discussed further below.

Several other areas were included in these policy reviews which I will only mention briefly:

The government reaffirmed the policy adopted and announced in August 1973 regarding uranium enrichment. This is, in essence, that since enrichment is not needed for the CANDU nuclear power system, uranium enrichment would be regarded primarily as a further processing opportunity. Any proposal for a uranium enrichment facility would be evaluated in this context and approval granted only if the proposed plant were shown to be in the national interest.

Direct export aid in the nuclear field will be given only to countries party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and government financing of export nuclear projects will take into account the receiving country's adherence to NPT. It is recognized that this policy places Canada in the forefront of nuclear exporting nations but it is encouraging to note from recent indications that other countries may follow our lead.

Efforts will be made to help ensure that the Canadian nuclear industry obtains optimum benefits from both the domestic and export nuclear power programs. The Department of Industry, Trade and Commerce is examining ways of selectively assisting industry to upgrade its capability to meet the needs of the nuclear power program.

Let me now outline the two major policies areas developed recently, namely, uranium and nuclear exports.

URANIUM

Most of the policies on uranium announced over the years by the Canadian government have been concerned with control of uranium or

assistance to the industry through its stockpiling program. In 1970 the Honourable J.J. Greene announced a policy with a different intent - control of the ownership of the uranium mining industry. While this policy placed no limitation on foreign participation in exploring for uranium in Canada, among other things, it limited non-resident ownership of a new producing mine to 33 percent. The foreign interest must be held through a company incorporated in Canada such that the full profit potential will accrue in Canada. Where existing mines have non-resident ownership above 33 percent, future ownership transfers must be to Canadian residents, until the 33 percent level is reached.

Since the policy was announced, and prior to the tabling of legislation to control ownership, the Foreign Investment Review Act was passed to cover ownership of Canadian enterprises in general. The firs proclamation was related to takeovers of existing businesses. The second part of this Act, not yet proclaimed, will cover new businesses. We are currently assessing the prospects of including uranium mining under FIRA in such a way that the intent of the 1970 ownership guidelines and the timing of those guidelines, will be respected. In the meantime, separate legislation is being drafted to cover the principles of ownership announced in 1970. In both possible courses of action we are seeking to provide a manageable and realistic system for implementing this policy. In the meantime if you are planning or are engaged in uranium exploration, and have any doubts as to the options open to you at the mining stage, I suggest you put your situation before my Department for the guidance which we can offer.

You are well aware that the uranium industry in Canada has not been blessed by either continuity of markets or stability of prices. The decline in markets in the late 1960's is illustrated by Canadian production figures mentioned earlier which peaked at 16,000 tons in 1959 and dropped to about 4,000 tons in the late 1960's. By the early 1970's, the fierce competition for the available uranium market and the tough and, I feel, shortsighted purchasing policies of some foreign utilities depressed prices to less than $5 per lb of U_3O_8. Few sales of Canadian uranium were made. The government's stockpiling program mentioned earlier sustained a segment of the uranium mining

industry in this country.

Various approaches were taken to try to improve the situation in anticipation of a likely heavy demand for uranium once the nuclear power programs around the world materialized.

I took part in a series of meetings in 1971 and 1972 with consumer countries in an effort to alert them to the long-term undersirable consequences of these distress prices. Exploration for uranium almost came to a standstill in Canada, partly because of our ownership restrictions but also to a considerable extent because of the low prices. There was no incentive to look for a material that was being sold at less than the cost of production. Unfortunately, while the consuming nations acknowledged the problem, no effort was made to resolve it. As a consequence they must accept a degree of responsibility for the short supply situation that is of such concern to them today.

World producers of uranium also met to discuss what was happening to the market and therefore the industry itself. We made no secret of those meetings, which I attended in my capacity as an officer of Uranium Canada - in fact on some occasions we issued press releases. As a result of the knowledge acquired through those sessions the Canadian Government moved in 1972 to advise the Atomic Energy Control Board of minimum prices below which they were not prepared to authorize exports. Fortunately, those low prices are now history and the minimum price guidelines have been removed.

The change in the market situation started in early 1974 when acceleration of nuclear programs, because of the oil crisis, together with the unexpected curtailment of marketing activities by several international uranium producers for diverse reasons, caused a dramatic shift from a surplus uranium market to a deficit one. Canadian producers were called upon to meet the rising export demand in the face of a dwindling global supply. Most of these inquiries were for long-term supplies.

To provide an orderly growth of the industry while protecting the needs of domestic nuclear programs, a new uranium policy for Canada was announced by the Honourable Donald S. Macdonald, Minister of Energy, Mines and Resources, on September 5, 1974

Specific objectives of the policy are:-

1. To ensure long-term nuclear fuel supply 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;
2. To ensure that sufficient uranium production capacity is available for the Canadian domestic nuclear power program to reach its potential;
3. To increase the economic return to Canadians from exportable surplus by requiring uranium to be exported in the most advanced form possible unless specific exemption is granted by the control agencies;
4. To strengthen the knowledge base for national decision-making;
5. To contribute to orderly world uranium development and marketing.

To meet the first objective, sufficient uranium must be reserved for domestic use to enable each nuclear power reactor which is operating, committed for construction or planned for operation ten years into the future, to operate at an average annual capacity factor of 80 percent for thirty years from the start of the period, or in the case of reactors which are not in operation, for thirty years from their in-service dates.

Current projections indicate about 18,400 megawatts of nuclear capacity is expected to be operating in Canada by 1985, so today about 92,000 tons U_3O_8 would be allocated for these reactors. Responsibility for this will be distributed among each mining company according to its uranium resources relative to the total Canadian recoverable resources from all such companies. To do this, a Uranium Resource Appraisal Group has been established within the Department of Energy, Mines and Resources to audit Canadian resources of uranium.

Since these resources are earmarked for use over a thirty-year forward period, resources recoverable at prices up to twice the current market price are being included in the assessment.

Uranium market prices in late 1974, when the Uranium Resource Appraisal Group commenced its assessment, were nearing \$15/lb U_3O_8, so resources recoverable for up to \$30/lb U_3O_8 were included in its assessment. Since then prices have continued to accelerate with some sales reported to have been made in 1975 near \$20/lb in 1975 dollars.

In general, the criteria used by the Uranium Resource Appraisal Group in assessing resources are more conservative than those employed by mining companies. While assessment of the uranium resources in the principal known deposits of Canada has been completed, the Group has not completed its assessment for other districts. Its partial assessment is shown in Table I.

PARTIAL ESTIMATE OF CANADIAN URANIUM RESOURCES

	SHORT TONS U_3O_8	
Mineable	Reasonably Assured	Estimated Additional
Up to \$15/lb U_3O_8	187,000	421,000
\$15 to \$30/lb U_3O_8	29,000	123,000
Total:-	216,000	544,000

Much of the estimated additional uranium is in the inferred reserve category and could be transferred to the reasonably assured category with a modest drilling program when the justification to do so arises. The estimated additional resources will undoubtedly increase when the Uranium Resource Appraisal Group completes its assessment later this year. The potential for finding uranium in unexplored regions of Canada is great. With the apparent

acceleration of uranium exploration in Canada in 1975, I would expect future assessments of Canada's uranium resources to be mugh higher than shown in Table I.

Returning to the main elements of the September 5 policy, utilities will be required to demonstrate that they are maintaining a contracted forward supply of nuclear fuel to enable each operating reactor to be operated at an annual capacity factor of 80 percent for at least fifteen years, or for reactors committed but not yet operating, for fifteen years from their in-service dates. Today 11,770 MWe of nuclear capacity is operating or committed for construction in Canada. Including first core requirements, the fifteen-year forward fuel supply for these reactors would require about 29,500 tons U_3O_8. While negotiations are proceeding to this end, I must observe that this condition has not yet been met. If the utilities and industry cannot meet this requirement, it will only invite further government action or an abandonment of the protection policy. Clearly only one of these options can be considered.

To ensure that sufficient uranium production is available for the Canadian nuclear program to reach its full potential, forward sales commitments by Canadian uranium producers will be limited to fifteen years with the last five years being conditional on:-

a) The contract having provision for renegotiation of price for the uranium being supplied in those five years, and

b) Canadian utilities having a right of recall on a portion of this material should they be unable by other means to maintain a contracted fifteen-year forward supply of fuel.

The requirement for utilities to maintain a fifteen-year forward supply of fuel for operating or committed reactors, together

with the time restrictions on export contracts, should provide continuity of supply to Canadian utilities for existing and committed stations and for those which may be committed for operation more than ten years in the future. The government stockpile of uranium provides a means of ensuring supply for those nuclear stations which may be committed for operation between seven years (current lead time from commitment to operation of a nuclear unit) and ten years in the future.

On July 23, 1973, the Minister of Industry, Trade and Commerce expressed the Canadian Government's objective on further processing when he stated that

> "the objective of a policy on processing before export would be to process surplus natural resources prior to export, wherever such processing would be internationally competitive and compatible with the development of a sound industrial structure."

The Minister of Energy, Mines and Resources extended this objective specifically to uranium on January 23, 1974 at the First Ministers' Conference on Energy and reaffirmed it in his statement of September 5, 1974, to the effect that unless specific exemption is granted by the regulating agencies, uranium will be required to be exported in the most advanced form possible in Canada. For most exports at this time this means conversion to UF_6 to the extent that conversion capacity is available.

NUCLEAR EXPORTS AND SAFEGUARDS

Let me now turn to the policies on nuclear exports and safeguards and especially to those announced by our Minister, December 20, 1974. Since the next two speakers will be addressing the development and implementation of our safeguards policies, I will only outline the current policy.

Nuclear power is the most attractive alternative energy source for those countries which previously relied almost exclusively on imported oil. Canada, with its uranium resources and the competitive CANDU reactor system, is in a position to make an important contribution to the energy needs of the world. At the same time, we are very concerned that the export of our uranium or nuclear equipment should not contribute to the proliferation of nuclear weapons. In this regard, the development of any nuclear explosive device is considered undesirable since it is not feasible to distinguish between a peaceful nuclear explosive device and a military one. Therefore, Canada will require the maximum safeguards attainable in the current world system.

Control against proliferation is an international responsibility and Canada is working actively towards more effective international agreements. In the meantime, we have decided to apply not only the best safeguards available internationally, but also additional constraints. These safeguards or constraints will apply to the export of uranium, nuclear equipment, including reactors, fuel fabrication and reprocessing plants, heavy water plants and their major components and to related technology.

Canada will require safeguards, administered wherever possible by the International Atomic Energy Agency, on all nuclear exports. This will apply to:-

(i) nuclear materials (uranium, thorium, plutonium, heavy water) supplied by Canada and future generations of fissile material produced from or with these materials;

(ii) nuclear facilities and equipment, supplied by Canada, for the life of those facilities and equipment;

(iii) nuclear facilities and equipment using Canadian-supplied technology; and

(iv) all nuclear materials, whatever their origin, produced or processed in facilities supplied by Canada.

Beyond these IAEA-administered safeguards Canada will require binding assurance that Canadian-supplied nuclear materials, equipment or technology will not be used to produce a nuclear explosive device, whether the development of such a device is claimed to be for peaceful purposes or not. Further, we will require an agreement that an alternative method of safeguards inspections will be applied if for any reason the IAEA is not able to carry out its safeguards inspections.

As well as these explicit requirements, Canada will continue to review areas of the world for indications of conditions which might tend to force countries to develop nuclear weapons even though they had originally intended not to do so.

Since some of the above additional requirements may take some time to negotiate, potential Canadian exporters of nuclear material, equipment or technology have been advised that, prior to making offers of supply, they should check with the Atomic Energy Control Board or the Department of Industry, Trade and Commerce to ensure that there are no impediments due to safeguards to exports.

This nation has been an active supporter of the Treat, on the Non-Proliferation of Nuclear Weapons which is designed not only to prevent the proliferation of nuclear weapons, but also to ensure that the benefits of nuclear energy are shared by all nations. The export policies outlined above have been designed within the context of the NPT. As mentioned earlier, Canada intends to give preference, in its export aid for nuclear equipment, to countries which are parties to NPT.

To ensure that Canadians enjoy the economic gains from sales abroad and to obtain some additional return on the investment in the development of the CANDU system, the government will encourage

the supply from Canada of the significant, high technology components and services. Export financing assistance will be geared in this direction. Domestically, the government has offered financing assistance for the first nuclear power plant in any province and also for a nuclear power plant which will be shared for regional benefit. The Point Lepreau Generating Station in New Brunswick is the first plant being constructed under this policy whereby the federal government will provide loans at Crown Corporation interest rates for half of the cost of the plant. A condition of such loans is that the utility have an acceptable procedure to ensure that Canadian engineering and components will be given preference. The government has asked the Departments of Industry, Trade and Commerce and Energy, Mines and Resources, in cooperation with AECL, to consult with the provinces and provincial utilities in an attempt to establish a cooperative approach for preference for Canadian materials, equipment and services in nuclear power plants.

CONCLUSIONS

The rapidly growing demand for uranium and nuclear power presents a challenge to all of us in the uranium and nuclear community. The federal government policies outlined above are intended to encourage and foster orderly growth, to obtain optimum benefits for Canadians and to minimize the possibility of Canadian nuclear exports being used for non-peaceful purposes. We expect and, indeed, to rely upon the cooperation of all parties - governments, utilities, industry - to achieve these objectives.