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ENVIRONMENTAL PROTECTION SERVICE BRIEF TO THE
CLUFF LAKE BOARD OF INQUIRY
PHASE I OVERVIEW HEARINGS

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SECTION 1 DEPARTMENT OF FISHERIES AND ENVIRONMENT, MANDATE

1.1 Introduction

Pollution control and environmental management have gained prominence with the public, industry, and all levels of government within the last decade. The Environmental Protection Service (EPS) of the federal Department of Fisheries and Environment has responsibility for pollution control and the development of technology to control pollution where such technology is currently lacking. This presentation addresses both of these areas, as EPS has identified concerns regarding application of current technology and the need for improved technology to adequately protect the environment in the long term.

This brief presents a preliminary statement of the Department's general approach to the effective management of environmental resources. It outlines the legislative mandate of the Department in general, and more particularly highlights the aspects of national pollution control applicable to Saskatchewan. The cooperation between the Department and other federal and provincial environmental regulatory agencies in the nuclear industry is described in terms of both formal agreements and working arrangements.

It should be stressed that in this brief, the Environmental Protection Service of Fisheries and Environment Canada is not addressing concerns regarding the expansion of uranium mining in Saskatchewan but, as requested by the Inquiry Counsel, is providing an overview of federal environmental legislation available and applicable to the uranium mining industry and the approaches taken by the Environmental Protection Service to ensure reasonable pollution control.

1.2 Departmental Mandate

1.2.1 The federal role in environmental management and environmental protection is one that evolves from the division of powers between Parliament and the provincial legislatures described in the British North America Act of 1867. In general, control over natural resources rests with the provinces, while cross boundary movement of pollutants; protection of the fishery resource; and, other residual powers rest with the federal government.

1.2.2 Legislation. Parliament has passed a number of pieces of legislation to carry out federal responsibilities encompassing environmental management and pollution control.

The Government Organization Act of 1970 (R.S.C. 1970 Chapter 42) established the Department of the Environment, (now the Department of Fisheries and the Environment). The scope of responsibilities assigned the Department under this Act are stated as follows:

The duties, powers and functions of the Minister of the Environment extend to and include all matters over which the Parliament of Canada has jurisdiction, not by law assigned to any other department, branch or agency of the Government of Canada, relating to

- (a) sea coast and inland fisheries;
- (b) renewable resources, including
 - (i) the forest resources of Canada,
 - (ii) migratory birds, and
 - (iii) other non-domestic flora and fauna;
- (c) water;
- (d) meteorology;
- (e) the protection and enhancement of the quality of the natural environment, including water, air and soil quality;
- (f) technical surveys within the meaning of the Resources and Technical Surveys Act relating to any matter described in paragraphs (a) to (e); and
- (g) notwithstanding paragraph (f) of Section 5 of the Department of National Health and Welfare Act, the enforcement of any rules or regulations made by the International Joint Commission, promulgated pursuant to the treaty between the United States of America and His Majesty, King Edward VII, relating to boundary waters and questions arising between the United States of America and Canada, so far as the same relate to pollution control.

The Minister of the Environment, in exercising his powers and carrying out his duties and functions shall

- (a) initiate, recommend and undertake programs and coordinate programs of the Government of Canada, that are designed to promote the establishment or adoption of objectives or standards relating to environmental quality, or to control pollution; and
- (b) promote and encourage the institution of practices and conduct leading to the better protection and enhancement of environmental quality, and cooperate with provincial governments or agencies thereof, or any bodies, organizations or persons, in any programs having similar objects.

The Department, in carrying out its pollution control and environmental management functions, administers a number of pieces of legislation. A list of Department Acts and Regulations is presented in Appendix 1. The more significant of these Acts, from the viewpoint of pollution control for uranium mining activities, include:

- The Clean Air Act
- The Environmental Contaminants Act
- The Fisheries Act
- The Canada Water Act

Since mining activities are a major cause of environmental impact, the Department's concern is reflected in the regulations and other controls developed under its legislation. These environmental controls are presented in detail in Section 2.2

1.3 National and International Obligations

Many of the Department's activities stem from obligations arising out of treaties and national and international agreements. Those most relevant to this Inquiry are:

- The Boundary Waters Treaty
- Agreements under the Canada Water Act such as the Saskatchewan-Nelson Basin and Peace-Athabasca Basin
- Other federal/provincial agreements such as the Prairie Provinces Water Board

1.4 Federal-Provincial Agreements

Many of the Department's programs require coordinated and co-operative action with the province to carry out essential pollution control and resource management functions.

In Saskatchewan, the primary federal-provincial agreement relating to environmental protection is the Canada-Saskatchewan Accord for the Protection and Enhancement of Environmental Quality. The Accord is designed to ensure comprehensive programs to protect the environment, while avoiding duplication among agencies. Generally, the federal government agrees to establish national baseline effluent and emission standards for specific industrial groups and specific pollutants, and the province agrees to establish and enforce requirements at least as stringent. Both parties agree to cooperative monitoring programs in areas of joint interest, and to the free exchange of data.

1.5 Organization of the Department

1.5.1 Overall Departmental Structure. The Department of Fisheries and Environment is organized into operational units, each concerned with a broad element of the natural environment - the atmosphere; the oceans; the fishery; the forests; or, with managing human activities as they interact with these resources - environmental protection.

The Department has two main components - the Environmental Services and the Fisheries and Marine Service.

A Departmental organization chart is included in Appendix 2.

1.5.2 Environmental Services. This arm of the Department has administrative responsibilities for Environmental Management, Environmental Protection, and, Atmospheric Environment.

a) Environmental Management Service - This service is responsible for operational and research activities pertaining to renewable resources (i.e. water, forestry, birds, wildlife).

b) Atmospheric Environment Service (AES) - In conjunction with its general meteorological activities, this Service gathers data used in providing weather forecasts, climatological summaries and analyses, and in conducting research programs.

c) Environmental Protection Service - This Service is responsible for developing and enforcing environmental protection regulations, guidelines, and other protection and control instruments used to implement federal environmental legislation. It has developed regulations under the Fisheries and Clean Air Acts controlling discharges of effluents and emissions of specific contaminants from specific industrial wastes. Regulations under the Environmental Contaminants Act control the use and distribution of certain hazardous pollutants. Implementation of programs is carried out by five regional offices - Atlantic; Quebec; Ontario; Northwest; and Pacific.

This brief has been prepared by the Environmental Protection Service, Northwest Region, (because the Province of Saskatchewan is in the Northwest Region) and has concentrated on those aspects of uranium mining over which it has program responsibility.

1.5.3 Fisheries and Marine Service. The functions of this arm of the Department are suggested by its name. It is responsible for fisheries development and fisheries operations on both coasts and in inland waters, and for fisheries research, oceanography, hydrography, and the administration of small craft harbours. Fisheries research extends to all factors affecting the conservation and utilization of marine and freshwater fisheries, flora and fauna, including the relevant aspects of water pollution.

1.6 Environmental Assessment and Review Process

By a Cabinet decision of December 20, 1973 the Environmental Assessment and Review Process (EARP) was established to ensure that:

- a) environmental effects are taken into account early in the planning of new federal projects, programs and activities;
- b) an environmental assessment is carried out for projects, programs and activities that are likely to have a significant effect on the environment;
- c) the results of these assessments are used in planning, decision-making and final construction and operating practice controls.

The Environmental Assessment and Review Process is administered by the Department of Fisheries and Environment. Background information is included in Appendix 3.

Federal projects are considered to be those that are initiated by federal departments and agencies; those for which federal funds are solicited and those involving federal property. This definition covers those projects that may originate outside the federal government but involve a particular federal department through funding or property considerations. In such cases, the federal department sponsoring the project is responsible for the environmental assessment. All federal organizations are bound by the Cabinet decisions except proprietary crown corporations and regulatory agencies who are invited, rather than directed, to participate in the process.

As contained within the Atomic Energy Control Board brief, the AECB expects a full environmental assessment and review prior to the issuance of a facility licence, be it through EARP or other programs available through provincial agencies.

SECTION 2 ENVIRONMENTAL PROTECTION SERVICE - REGULATORY FUNCTION

2.1 Legislative Authority

The Environmental Protection Service, as previously described, has direct responsibility, at the federal level, for implementation of pollution control programs. Programs have been developed for discharges to air and water, and for specific contaminants.

2.1.1 Emissions to Atmosphere. Legislative authority for the EPS program related to emissions to the atmosphere is the Clean Air Act (Appendix 4). This Act provides under Section 7 for direct federal regulation of specific contaminants deemed hazardous to health. At present, five contaminants have been so specified - lead, asbestos, arsenic, mercury and vinyl chloride. Regulations controlling their discharge to the atmosphere are developed on an industry specific basis. None of these regulations apply to the mining and milling of uranium. The Act also provides under Section 8 for the development of emission control standards for other substances, in the form of guidelines. These are set as a minimum baseline which the provinces are urged to adopt as minimum acceptable levels. None of these guidelines apply specifically to uranium mines or mills. Other guidelines are in the development

stage and some may be developed and applied to uranium mining or milling in the future.

2.1.2 Contaminants. The legislative authority for the federal environmental contaminants program is the Environmental Contaminants Act (Appendix 5), administered jointly by the Department of Fisheries and Environment and the Department of National Health and Welfare. This legislation is preventative, providing the ability to regulate the introduction, use, distribution and processing of chemical substances determined by an interdepartmental Environmental Contaminants Committee to constitute a danger to human health or the environment. The Act also establishes an inventory and assessment mechanism for all chemicals in commercial use, to determine where controls are necessary. Current regulations (Appendix 5) under this Act prohibit new non-electrical uses of polychlorinated biphenyls, allowing electrical uses; vacuum fluid applications; and, existing heat transfer uses. Regulations further restricting the uses of PCB's and dealing with disposal are in preparation. These regulations are of interest to mine operators in that underground transformers are frequently filled with transformer oil containing PCB's. As this use is phased out, proper disposal precautions will be required.

At present no activities are underway to develop regulations under this Act that would directly apply to uranium mining and milling.

2.1.3 Liquid Effluents. Legislative authority to control discharges to watercourses is found in Sections 33 and 34 of the Fisheries Act (Appendix 6). The Act prohibits discharges of materials "deleterious" to fish or man's use of fish, then provides an ability to pass regulations permitting specified discharges. As policy, and in keeping with the federal/provincial Accords (outlined in Section 1.4), the Environmental Protection Service develops regulations and guidelines under the Fisheries Act on a specific industry by industry basis. The control levels established are based on "best practicable technology". Best practicable technology is loosely defined as technically and economically viable technology, as demonstrated by current usage. Economic viability implies that a normally healthy member of the industry can install and operate

the necessary technology without undue economic disruption. Adaptation of best practicable technology on an industry by industry basis is intended to provide a minimum national pollution control standard. Any level of government is free to set more stringent standards.

Regulations and guidelines controlling discharges from base metal uranium and iron ore mines and mills were recently proclaimed, and are described in detail in Section 2.2.

Amendments to the Fisheries Act are currently under consideration by Parliament. Changes proposed in Bill C-38 (Appendix 6) would provide an improved ability to protect fish habitat, in addition to providing improved administrative procedures and refining a number of definitions.

2.2 Metal Mining Liquid Effluent Regulations and Guidelines

Fisheries Act Regulations and Guidelines controlling discharges from metal mines, entitled "Metal Mining Liquid Effluent Regulations"; "Guidelines for the Control of Liquid Effluents from Existing Metal Mines"; and, "Guidelines for the Measurement of Acute Lethality in Liquid Effluents from Metal Mines" (Appendix 7) were proclaimed on February 25, 1977.

The Regulations apply to all new, expanded or reopened metal mines and mills, including uranium, with the exception of gold mines that use the cyanidation extraction process. Expanded mines are those which increase production rates by more than 30% of their "reference mine production rate," which is the greater of the mine design rate and the maximum average annual production rate ever achieved during the operating life of a mine prior to the Regulations being in force. The Environmental Protection Service interprets "production rate" to mean the rate at which ore is processed. On this basis, the Amok operation at Cluff Lake will be subject to the Regulations upon commencement.

The Metal Mining Effluent Regulations prescribe arsenic; copper; lead; nickel; zinc; total suspended matter; and, radium 226 as deleterious substances, and set limits on the concentrations of these substances that may be discharged in effluents from the operations area of a mine-mill complex. Permitted concentrations, as determined by specified analytical techniques, are set out in Table I. Permitted levels of pH, described

TABLE I
 AUTHORIZED LEVELS OF SUBSTANCES IN MINE EFFLUENTS

SUBSTANCE	MAXIMUM AUTHORIZED CONCENTRATION		
	Monthly Arithmetic Mean	Single Composite Sample	Single Grab Sample
Arsenic	0.5 mg/l	0.75 mg/l	1.0 mg/l
Copper	0.3 mg/l	0.45 mg/l	0.6 mg/l
Lead	0.2 mg/l	0.30 mg/l	0.4 mg/l
Nickel	0.5 mg/l	0.75 mg/l	1.0 mg/l
Zinc	0.5 mg/l	0.75 mg/l	1.0 mg/l
Total Suspended Matter	25.0 mg/l	37.50 mg/l	50.0 mg/l
Radium	10.0 pCi/l	20.0 pCi/l	30.0 pCi/l

NOTE: All concentrations are given as total values with the exception of Radium 226 which is a dissolved value after filtration of the sample through a 3 micron filter.

Parameter	Minimum Acceptable Arithmetic Average Value of pH	Minimum Acceptable pH in a Composite Sample	Minimum Acceptable pH in Other Samples
pH	6.0	5.5	5.0

as minimum authorized arithmetic means are also indicated in Table I. The procedures to be followed in determining compliance with the Regulation are set out in detail, as are reporting requirements.

The Regulations further specify that any quantity or quality of deleterious substances may be deposited into a tailings impoundment that has been approved by the Minister. Only limited disposal areas confined by natural or manmade structures will be considered acceptable.

The guidelines accompanying the Regulations are not in themselves legal instruments; however, they are an expression of what the Environmental Protection Service feels represents compliance with the spirit of the general prohibition of discharges of deleterious materials found in the Fisheries Act, which applies in the absence of specific regulations. EPS expects that all existing mine-mill operations will be brought into compliance with these guidelines within a reasonable timeframe.

The "Guidelines for the Measurement of Acute Lethality in Liquid Effluents from Metal Mines" describe a bioassay test in which test fish are exposed to samples of effluent. The effluent is considered to have passed the test if 50% of the test fish survive in the specified exposure period. The test is a guideline rather than a regulation, as at the time the regulations were developed, it was not clear that a mine effluent meeting the specified concentrations allowed for prescribed substances would consistently pass the bioassay test. Despite this uncertainty, the Environmental Protection Service feels that any effluents to be discharged from the Cluff Lake area operation should routinely meet the acute lethality test.

It must be stressed that the federal controls on metal mining effluents are designed to result in the minimum acceptable level of control, which may or may not be adequate to protect a sensitive receiving environment. The Environmental Protection Service would support the application of more stringent requirements should the Saskatchewan Department of the Environment deem them necessary.

The development of the regulations and guidelines, which was performed using a "Task Force" composed of representatives of the Environmental Protection Service, the Atomic Energy Control Board, Energy Mines

and Resources, National Health and Welfare, provincial regulatory agencies including Saskatchewan Department of Mineral Resources, and the mining industry.

Some aspects of mining and milling and pollution control of its effluents are unique to the nuclear sector of the industry. The Radioactivity Subgroup was formed to investigate these areas and to make recommendations to the Task Force.

The objectives of the group were to:

1. Identify the problems of radioactive contaminants in liquid effluents from uranium mining and milling operations.
2. Examine the "state of the art" in treatment technology and recommend best practicable technology for effluent treatment.
3. Recommend concentration limits (standards) for those radioactive contaminants of major concern in the final effluents.
4. Recommend frequency of sampling and analysis of final effluents.
5. Describe analytical methods for measurement of the radionuclides of importance.
6. Identify knowledge gaps in uranium waste disposal, both solids and liquid, and recommend areas of future research.

The report of the sub-group to the regulations development task force, prepared in 1974, has not been made public; however, in summary, the group recommended that:

1. Best practicable technology for the treatment of effluents from uranium mines/mill operations consists of pH adjustment with lime or limestone/lime to pH 8 - 9 (except in the case of carbonate leaching where this step is unnecessary) sedimentation in tailings impoundment areas to as low a suspended solids level as possible (less than 10 mg/l), addition of barium chloride to the tailings pond decant and final sedimentation of the barium-radium-sulphate precipitate to the lowest level possible in the treatment lagoon.
2. Based on the diligent application of best practicable technology a maximum average monthly standard of 10 pCi/l Ra226 should be adopted for Federal regulations and guidelines. Of course, in keeping with the philosophy of the International Commission on Radiation Protection it is desirable to keep the level of all radioactive contaminants as low as practicable at all times.

These two recommendations provided the rationale for the discharge concentrations permitted in the Regulations.

3. The current practice of the barium-radium-sulphate precipitate storage in treatment lagoons is regarded as likely to be an unsuitable long term solution since it is highly probable that this material will redissolve during the post-abandonment period with further contamination of the receiving waters resulting. No long term solution was proposed by the sub-group except that disposal of the precipitate in abandoned underground workings may provide the best answer.
4. Sufficient information is not available with which to set standards, or even ascertain if such standards are warranted, for Th230, Th232, and Pb210. Analysis of effluents for these radionuclides should be carried out to assess whether additional standards are necessary.

The need for such assessment is still apparent because there is still insufficient data available to properly ascertain the need for standards.

5. The recommended limit for Ra226 is based on "dissolved" values only since almost all available analytical data is based on filtered samples. However, it is felt that standards should be set on "total" concentration rather than only "dissolved" levels (this is consistent with the approach being taken for base metal mines) and therefore analyses should be run on both a "total" and "dissolved" basis for Ra226, Th230, Th232 and Pb210. A 3 micron filter should be used for sample filtration.

The Environmental Protection Service is attempting to develop these data to provide the needed comparison, however internally it lacks the analytical capability to perform the analyses.

During the regulation development exercise a number of areas were found for which technology development was needed. Two of these areas - acid generation in tailings, and control of radium in effluents - are of interest to, and may have application to, uranium mining in Saskatchewan. Contributions to improving technology in these areas by the Environmental Protection Service are briefly discussed in Section 4.

2.2.1 Implementation of Controls Administered by the Department of Fisheries and the Environment. In section 1.4 the basic agreements between Canada and Saskatchewan providing for cooperative pollution control and environmental management operations were described. For each specific industrial discharge regulation and guideline, implementation procedures must be established to the mutual acceptance of each agency.

Since in the case of the mining industry these controls were very recently promulgated, and in fact for the most part have not yet been widely distributed, the formalized implementation approaches have not been established. However, as with other industry sectors subject to Fisheries Act Regulations and Guidelines in Saskatchewan it is expected that the minimum national standards will be incorporated into licences given to the companies by the Saskatchewan Department of Environment/Department of Mineral Resources. EPS also will identify to the AECB both radiological and non-radiological parameters specified in the Metal Mining Effluent Regulations and Guidelines that should be brought to the attention of the operator. This in fact was the procedure in the recent issuance of the two operating licences for Gulf Minerals Ltd. at Wollaston Lake. In this way the Environmental Protection Service works through these other agencies maintaining the Saskatchewan Department of Environment as the prime contact with the mining companies involved. This position is consistent with the provinces' agreement to set standards at least as stringent as the national base standards.

A support role is then assumed by the EPS, through the receipt of compliance monitoring data, joint site inspections, joint pollution control field studies and periodic interagency reviews. Should an operation not comply with the licence requirements, these licencing agencies will review with ourselves and the company any deviation from the licence requirements. However, if violations of the base minimum requirements occur, the Environmental Protection Service will review this situation with the other agencies and enforcement discussions will commence.

SECTION 3 OTHER ENVIRONMENTAL PROTECTION SERVICE URANIUM MINING ACTIVITIES

3.1 General Involvement

In this implementation role of national baseline standards and broader issues of environmental control, as described within the Environmental Code of Practice for Mines accompanying the regulations (and also included in Appendix 7), staff of the Environmental Protection Service have been involved in supportative and advisory roles on a number of committees some chaired by the Atomic Energy Control Board. At the same time we have undertaken several joint programs with Saskatchewan Environment.

3.1.1 EPS Radioactivity Subgroup - Regulations Development Taskforce.

The task force that developed the Metal Mining Liquid Effluent Regulations and Guidelines formed a number of working groups to assess the current state of technology for use in determining best practicable technology. One of these was the Radioactivity Subgroup, composed of staff from federal and provincial regulatory agencies (four from the Environmental Protection Service) and from active uranium mining companies, including those from Saskatchewan. The findings and recommendations of the Radioactivity subgroup are outlined in section 4.3.

3.1.2 AECB Mine Safety Advisory Committee. This committee is a standing committee of the Atomic Energy Control Board, with broad areas of interest including environmental effects. The Environmental Protection Service is represented on the committee to provide advice regarding pollution control and environmental impacts.

3.1.3 AECB Radioactive Waste Safety Advisory Committee. The Environmental Protection Service has a representative on this committee, formed and chaired by the Atomic Energy Control Board. Among other responsibilities, the committee considers the disposal of uranium mine/mill tailings and effluents. The EPS member provides environmental advice to the committee.

* 3.1.4 AECB Advisory Panel on Tailings. The Environmental Protection Service has a representative on this committee which was formed by the Atomic Energy Control Board, to address concerns related to long term problems of radioactive tailings disposal.

3.1.5 Federal-Provincial Cooperation. The Environmental Protection Service actively cooperates with the Saskatchewan Department in the preparation of pollution abatement programs for current operations in Saskatchewan. This type of activity is a continuing one on an as needed basis.

3.1.6 AECB Licencing. The Atomic energy Control Board calls upon the Environmental Protection Service for environmental advice when considering licence applications for producers and processors of radioactive materials. This interaction is on an informal, as required basis, in addition to those formal committees described earlier.

3.1.7 Uranium City Remedial Work. Apart from the specific mandates of the Department mentioned previously, the Environmental Protection Service has provided technical assistance to the Atomic Energy Control Board in the overseeing of remedial work performed in Uranium City during the July-September 1976 period.

SECTION 4 TECHNOLOGY ASSESSMENT AND DEVELOPMENT

4.1 Technology Assessment

The regulations for control of mine effluents described in section 2.2 were developed on the basis of assessment of best practicable technology. As such, the technology currently practicable may not be adequate to protect the environment, or may not exist at all. The regulations then specify only typical discharges from existing operations. The task force that developed the federal effluent controls divided into several groups to assess the technology available to control various aspects of effluent control. A summary of the findings of these groups has been published under the title "Mine and Mill Wastewater Treatment" (Reference I) which represents a description of the technology accepted by the task force as best practicable. Two groups in particular identified gaps in technology in areas of interest to the Cluff Lake Board of Inquiry - ^①acid mine drainage and its control were found to be poorly understood; and, ^②knowledge of the state of the art for radionuclide removal from uranium mines was incomplete. A summary of each of these reports is presented below, as they identify problems and the need to resolve them as expressed in 1974.

4.2 Acid Mine Drainage

Another major technological mining waste problem is the control of acid mine drainage. The Environmental Protection Service has initiated pilot projects, developed an acid generation potential test and is continuing to perform research in this area.

Acid generation has not been a major problem associated with uranium mining and milling in Saskatchewan in the past, however ore bodies developed in the future may exhibit acid production capability.

The uranium mining and milling industry in the vicinity of Elliot Lake, Ontario does experience the problem of acid mine drainage.

4.3 Radioactivity Subgroup

In section 2.2 the Radioactivity Subgroup's recommendations to the Task Force relative to the regulations and guidelines was outlined along with the rationale for those recommendations. Apart from the recommendations directly influencing the regulations the group also identified other areas of concern or areas of needed technology development research. These were:

1. Developing an improved understanding of the $BaCl_2$ method for Ra226 precipitation, and the effects of parameters such as suspended tailings solids and iron content of the water on the precipitation process. The effect of flocculants on settling characteristics is also required, as is investigation of the possibility of developing more effective methods for the removal of Ra226, including mechanical treatment systems as an alternative to lagoons.
2. Studies into the leachability of Ra226 from tailings solids and from barium-radium-sulphate precipitate.
3. Studies into the removal and separate storage of pyrite on acid generation in the tailings and redissolution of radionuclides.
4. Development of methods of rehabilitation of tailings solids.
5. Studies into the effectiveness of revegetation on the control of oxidation of tailings and water seepage through tailings.

The Environmental Protection Service has initiated investigations in some of these areas. Further information on the nature of this research can be obtained from our office. Other groups are addressing other identified areas of concern. Many of the research needs re-

late to long term concerns and problems that might arise after abandonment. Resolution of these concerns as quickly as possible is essential.

SUMMARY STATEMENT

This brief has outlined the organization of the Department of Fisheries and Environment and focuses on the mandate regulatory approach and the activities of the Environmental Protection Service.

The Environmental Protection Service (EPS) is that unit of the federal Department of Fisheries and Environment responsible for pollution control, having both regulatory and technology development functions. Legislative authorities to control pollution at the federal level, relevant to this inquiry, are found in the Environmental Contaminants Act, the Clean Air Act, and the Fisheries Act.

Regulations and guidelines developed under the Fisheries Act entitled "Metal Mining Liquid Effluent Regulations"; "Guidelines for the Control of Liquid Effluents from Existing Metal Mines"; and, "Guidelines for the Measurement of Acute Lethality in Liquid Effluents from Metal Mines" were recently promulgated for control of liquid effluents from base metal, uranium, and iron ore mines. The allowable limits of specified contaminants are referred to in Appendix 5 of this brief. It is to be emphasized that these limits are based on levels achievable through the good operation of control technology available and in use when the regulations were developed. They are intended to ensure that mine operators across Canada install control equipment such that these levels are met as a minimum requirement. EPS is aware that the allowable concentrations specified in the regulation and guidelines may not adequately protect the local environment in all situations, and further, the service will fully support the application of more stringent standards that may be required to ensure adequate protection.

The regulations and guidelines also include a provision for approval by the Minister of Fisheries and Environment of tailings disposal areas. New operations such as the Amok Cluff Lake development would be required to immediately comply with the regulations upon commencement of mining and milling.

In the course of development of the mining liquid effluent regulations, serious gaps in control technology were identified, and recommendations were made for research programs during the development period of 1973 and 1974. The Environmental Protection Service, has subsequently undertaken a number of research projects at its Wastewater Technology Centre to address these concerns.

We will be reviewing documents prepared by the developer for the Cluff Lake operation and would appreciate an opportunity to address the Inquiry Board at a later date when we have been able to assess the technical considerations of the proposal as well as its total environmental impact.

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