

Record of Proceedings, Including Reasons for Decision

In the Matter of

Applicant Cameco Corporation

Subject Application for a Licence to Operate the Key Lake
Operation

Date November 7, 2001

1. Introduction

Cameco Corporation of Saskatoon, Saskatchewan, has applied to the Canadian Nuclear Safety Commission (CNSC) for a Uranium Mill Operating Licence that will permit Cameco to continue operating its uranium milling operation at Key Lake, Saskatchewan. Cameco has applied for a 5-year licence period, and a continued annual production limit of 7.2 million kilograms of uranium (U_3O_8).

The Key Lake Operation is currently licensed under the Mining Facility Operating Licence AECB-MFOL-164-5.1 which authorizes the licensee to operate a uranium mill and supporting facilities.

The Key Lake Operation is located in north-central Saskatchewan, approximately 570 kilometres north of the City of Saskatoon. The Key Lake Operation includes the following facilities:

- facilities for the receiving, crushing/grinding, blending and transporting uranium ore;
- the Key Lake Mill for the production of U_3O_8 ;
- the Above-Ground and Deilmann Tailings Management Facilities (TMFs);
- the Deilmann North, Deilmann South and Gaertner waste rock disposal areas;
- the Deilmann and Gaertner mineralized waste storage areas;
- a domestic and industrial waste storage area;
- the waste water handling and treatment system for contaminated groundwater and mill effluent; and
- ancillary facilities such as the airport, warehousing, maintenance shop, administration building, powerhouse, sewage treatment, landfill, potable water treatment, housing and recreational facility, and fuel storage.

Cameco has requested CNSC authorization to continue to undertake the following activities at the above facilities:

- monitor and manage existing ore storage and waste management facilities;
- receive and store ore and mineralized rock from the McArthur River Operation;
- mill mineralized rock and ore from the Key Lake and McArthur River ore bodies;
- produce a concentrate containing no more than 7.2 million kilograms of uranium (U_3O_8) per year;

- dispose of solid waste products from milling in the Deilmann in-pit tailings management facility;
- treat waste water and release treated effluent to the environment;
- monitor and manage ancillary facilities that support the Key Lake Operation;
- conduct mill-scale tests to optimize and expand the present capability of the milling process; and
- possess, store, transfer, import, use and dispose of nuclear substances and radiation devices that are required for, or associated with laboratory studies and fixed gauge usage.

2. Decision

The Canadian Nuclear Safety Commission, in making its decision, considered information presented at a public hearing held on August 9, 2001 and October 4, 2001 in Ottawa, Ontario.

Based on its consideration of the matter, as described in more detail in the following sections,

The Commission, pursuant to section 24 of the *Nuclear Safety and Control Act*, issues a Uranium Mine Operating Licence to Cameco Corporation, Saskatoon, Saskatchewan, for the Key Lake Operation. The licence, UMLOL-MILL-KEY.02/2004, is valid from December 1, 2001 to February 28, 2004, unless otherwise suspended, amended, revoked, or replaced.

The Commission includes in the licence the conditions of the previous licence for the Key Lake Operation, and the following five additional conditions recommended by CNSC staff:

- G4. the licensee shall maintain a financial guarantee for decommissioning acceptable to the Commission or a person authorized by the Commission;
- G5. the licensee shall submit a Preliminary Decommissioning Plan and revised financial guarantee to the Commission or a person authorized by the Commission no later than February 28, 2002;
- G6. the licensee shall submit no later than April 30, 2002 a proposal and schedule for the completion of a Quality Assurance Program, acceptable to the Commission or a person authorized by the Commission.
- EP2. the licensee shall notify the Commission or a person authorized by the Commission within 24 hours that an environmental protection Action Level has been exceeded, as

specified in the Code of Practice;

- EP3. the licensee shall in the event of a release of a hazardous substance into the environment, not authorized by the licence:
- a) within 24 hours after becoming aware of the release, make a preliminary report to the Commission or a person authorized by the Commission of the location and circumstances of the situation and of any action that the licensee has taken or proposes to take with respect to it;
 - b) within 21 days after becoming aware of the release, file a full report of the situation with the Commission or a person authorized by the Commission. The report shall contain the following information:
 - i) the date, time and location of becoming aware of the situation;
 - ii) a description of the situation and the circumstances;
 - iii) the probable cause of the situation;
 - iv) the effects on the environment, the health and safety of persons and the maintenance of security that have resulted or may result from the situation; and
 - v) the actions that the licensee has taken or proposes to take with respect to the situation.

- W1. the licensee shall notify the Commission or a person authorized by the Commission within 24 hours of discovering that a radiation protection Action Level has been exceeded, as specified in the Code of Practice.

3. The Public Hearing Process

The public hearing, conducted under the *Nuclear Safety and Control Act* and the *Canadian Nuclear Safety Commission Rules of Procedure*, was held in Ottawa, Ontario over two days; August 9, 2001 and October 4, 2001. The Commission received written submissions and heard oral presentations from CNSC staff (CMD 01-H22 and CMD 01-H22.A) and Cameco Corporation (CMD 01-H22.1, CMD 01-H22.1A and CMD 01-H22.1B). The Commission also considered written submissions from two intervenors: M. Shiell (CMD 01-H22.2 and CMD 01-H22.2A); and W.R. Adamson (CMD 01-H22.3).

4. Issues and Commission Findings

4.1 Radiation Protection, Safety and Environmental Protection

The Commission considered information on the past performance of the Key Lake Operation to assess whether the licensee has demonstrated its ability to adequately provide for the protection of workers, the public and the environment.

4.1.1 Protection of Workers

The Commission considered Cameco's radiation protection programs and the results of worker dose measurements and estimates. The Commission concludes that the program provides for the adequate protection of workers, and that appropriate steps are being taken to address the issues related to worker training and general plant housekeeping identified in a CNSC staff evaluation in June 2001.

In arriving at the above conclusion, the Commission observed that doses received after the mill began processing the higher-grade (4%) McArthur River ore appear to be within the regulatory limits and consistent with original predictions for the facility. The Commission noted that although a full year of data is not yet available, a linear extrapolation of the available results indicates that radiation protection at the Key Lake Operation is acceptable. The Commission also noted that a report, taking into account a full year of operational dose monitoring data, will be prepared and submitted as part of the annual report for the facility, required pursuant to licence condition R3.

The Commission also concludes that the proponent has made appropriate provisions for the protection of workers from conventional hazards in the work place. The Commission's consideration of conventional safety included favorable reports by Saskatchewan Labour of the Key Lake Operation.

4.1.2 Environmental Protection and Monitoring

Toxicity Tests:

The Commission considered the results of aquatic toxicity tests routinely carried out during the past licensing period on the site effluent and receiving environment. The Commission noted that two tests carried out on the receiving environment water in July and August of 2000 failed to meet the acceptance criteria. Another test of the mill effluent in December 2000 failed the toxicity test. During the hearing, the Commission received additional detailed information on these failed tests from CNSC staff and Cameco.

Based on that information, the Commission is satisfied that Cameco was able to promptly identify and correct the cause of toxicity in the site effluent.

The Commission was informed during the hearing, however, that the cause of the toxicity test failures in the receiving environment has been more difficult to isolate and that the investigation continues. During the hearing, Cameco explained to the Commission that they believe the incidents may be associated with transitory or cyclical pH suppression, possibly linked to natural processes in surrounding bog areas. Cameco and CNSC staff also confirmed during the hearing that there have been no subsequent toxicity test failures in the receiving environment. The Commission noted that the plan for continued investigation of the toxicity test failures has involved input from both CNSC staff and Saskatchewan Environment and Resource Management.

On a related matter, the Commission questioned CNSC staff during the hearing on the earlier observed fish health problems in the David Creek watershed. CNSC staff explained that the earlier fish health problems were characterized by observed lesions and sores on fish that now appear to have healed. CNSC staff also explained that the problem was not one that would affect higher levels in the food chain, but that the potential effects on reproduction remain uncertain. CNSC staff further explained that although fish health has improved, investigation and monitoring of the earlier problem continues.

Based on the information provided, the Commission is of the opinion that the failed toxicity tests in the receiving environment are not indicative of a problem that would preclude consideration of the continued operations at Key Lake. Nevertheless, in light of these events, the Commission considers that close monitoring and investigation of environmental effects should continue at the Key Lake Operation. The Commission is satisfied with the specific programs that have been put in place by Cameco to accomplish that objective. The Commission requested that CNSC staff keep the Commission apprised of any future indications of toxicity of the site effluents or receiving waters.

Environmental Effects Monitoring:

In addition to the specific programs designed to investigate the above-noted past toxicity issues and fish health problems, the Commission examined during the hearing various aspects of the broader Environmental Effects Monitoring (EEM) program at the Key Lake Operation.

The Commission noted that the EEM program still has not been fully accepted by CNSC staff and considered the concerns of intervenors related to this lack of formal agreement. In response to general questions on the status of the EEM programs at a hearing on the nearby McArthur River Operation, which was held by the Commission on the same days, the Commission was assured by both CNSC staff and Cameco that the baseline for the EEM programs at all of the Cameco mine facilities is complete and that the sampling programs have been operating for some time. The Commission was also informed that the resolution of the final details on the EEM programs is nearly complete and that formal acceptance of the programs by CNSC staff is expected shortly. The Commission confirms the applicability of this general information on the EEM programs to the hearing on the Key Lake Operation.

On the matter of threshold triggers in the EEM, the Commission noted the concerns of the intervenors that sediment contamination is no longer being considered as the first level threshold trigger, and that the trigger now resides at the benthic invertebrate level. CNSC staff confirmed in response to the Commission's questions on this subject during the hearing that, in this case, direct information on the benthic communities will be more relevant to assessing the significance of the effects. CNSC staff expressed the view that the benthic invertebrate information, together with information on sediment and water contamination, will allow the cause of any observed effects to be traced.

Further with respect to the design of the EEM program, the Commission questioned CNSC staff and Cameco on how the sampling of the effluent outfall and the receiving environment are coordinated to provide meaningful cause and effect information. In response to the Commission's examination of this issue during the hearing, CNSC staff and Cameco explained the design of the sampling program, including how the *Microtox* test is used to provide immediate and flexible feedback on possible toxicity to aquatic biota.

The Commission also considered the concerns of intervenors who believe that radionuclides in benthic invertebrates should be directly measured, rather than estimated as proposed by CNSC staff. In response, the Commission was informed by CNSC staff and Cameco that, for direct measurement to be feasible, relatively large samples of benthic organisms must be gathered for laboratory analysis, and that the availability of biomass in the field precludes the gathering of such large samples.

Based on the information provided, the Commission is satisfied that the EEM program and sampling protocols are adequate.

Action Notices:

The Commission also considered information on the remaining unresolved Action Notices and Recommendations identified from an earlier CNSC evaluation of Cameco's environmental protection program at the Key Lake Operation. CNSC staff informed the Commission during the hearing that three of the seven Action Notices had been satisfactorily resolved and that acceptable commitments from Cameco had been received for the remaining Action Notices and Recommendations. The Commission is satisfied that the Action Notices and Recommendations are being appropriately addressed by Cameco.

Other Environmental Events:

The Commission considered information on a number of reported spills during the past licensing period, and an incident that occurred during the hearing that involved the release of effluent that was marginally outside the acceptable pH limits. Based on the information provided during the

hearing, the Commission is satisfied that these events do not represent a significant environmental concern. The Commission is further of the opinion that adequate measures are in place to reduce the risk of such events, and to identify and respond to events as they occur.

Effects of Alpha Radiation:

The Commission considered the concerns of intervenors who believe that the effects of high-LET alpha radiation on organisms is not sufficiently understood to allow continued operations at Key Lake. To support the concerns, an intervenor cited recent research done as part of Environment Canada's PSL-2 (Priority Substance List) assessments under the *Environmental Protection Act*, and other related scientific research on the effects of radiation on aquatic biota. The intervenors believe that long-term genetic and somatic effects of radiation are not being adequately addressed, and they are concerned that field studies of those effects are not being proposed in the affected watersheds near the uranium mines.

Based on the information provided, the Commission is satisfied that the EEM and other environmental monitoring is sufficient to identify any significant chemical or radiological effects on communities of aquatic biota and their environment. The Commission notes that the effects are limited to the immediate near-field environment and do not represent a significant or long-term adverse environmental impact.

Management of Waste and Material Storage Sites:

With regard to longer-term environmental management at the site, the Commission sought clarification during the hearing of the time-scale over which the pumping and treating of contaminated groundwater below the waste and material storage areas would need to occur. The Commission is satisfied that this practice will not be required to protect the environment once the mineralized waste rock piles are removed; either through milling as a dilutant for the high-grade McArthur River ores, or by disposal in the tailings management facilities upon closure and decommissioning of the site.

The Commission also examined during the hearing the cause of the reported damage to bentonite liners under some of the waste rock piles which has contributed to the groundwater contamination noted above. Although the cause of the problems could not be definitively ascertained, the Commission is satisfied that appropriate corrective actions are being, or will be taken to protect the environment, including, liner repairs and replacement, continued groundwater pumping, and planned site rehabilitation upon decommissioning.

In summary, the Commission concludes that adequate provisions are being made for the protection and monitoring of the environment at the Key Lake Operation.

4.2 Geotechnical Problems

During the hearing, the Commission sought clarification from Cameco on the potential for future slope failures in the Deilmann In-pit Tailings Management Facility. Cameco explained that careful monitoring of hydraulic pressure in the walls during the re-flooding process will ensure this potential for failure remains low. Cameco added that it is also monitoring for the occurrence of minor slumping due to wave action, but does not consider this to pose a significant problem.

The Commission also sought clarification from Cameco on the cause of the Gaertner Pit dewatering crib well failure. Cameco acknowledged during the hearing that the failure may have been the result of building the well up too high relative to the water level, and possibly due to shearing forces from coarse material piled next to it. Cameco explained to the Commission that the crib well is not needed to dewater the pit, but that Cameco has, nevertheless, reviewed its geotechnical inspection programs as a result of the incident.

Based on the information provided, the Commission is satisfied that Cameco is adequately addressing geotechnical issues related to the Key Lake Operation.

4.3 Quality Assurance

The Commission noted that Cameco has yet to put in place the required comprehensive corporate quality assurance program. The Commission also noted the concern of an intervenor that such a program should be in place before consideration is given to renewing the licence. The Commission considered Cameco's progress in various aspects of quality assurance at specific facilities, and its commitment to have a corporate program in place in the future. The Commission concludes, however, that greater assurances are needed of when an acceptable quality assurance program will be in place. The Commission therefore agrees with the CNSC staff's proposed licence condition that will ensure a proposal and schedule for completion of a Corporate Quality Assurance Program is submitted to the CNSC by April 30, 2002.

4.4 Emergency Preparedness

The Commission noted that Cameco's emergency preparedness documentation has been reviewed and CNSC staff finds it to be adequate. The Commission also notes that a formal CNSC assessment and evaluation of Cameco's emergency program implementation measures, is planned for the next licensing period. The Commission is satisfied that Cameco is currently able to respond to emergencies at the Key Lake Operation, and that opportunities to further improve the plan may be identified during the next licensing period.

4.5 Decommissioning and Financial Guarantees

The Commission was informed during the hearing that the decommissioning plan and associated financial guarantees for the Key Lake Operation are currently under review. Presently a guarantee exists in the form of a \$45.6 million letter of credit. CNSC staff recommended in its submission to the hearing that the Commission add licence conditions requiring Cameco to submit

its revised decommissioning plan and financial guarantee by February 28, 2002 and to maintain an acceptable financial guarantee.

The Commission questioned CNSC staff during the hearing on how the decommissioning cost estimates are evaluated. CNSC staff responded that it applies the experience it has gained on other mine decommissioning projects in a systematic breakdown of identified decommissioning tasks. CNSC staff noted during the hearing that it considers the cost estimates to be reasonable for purpose of the required financial guarantees.

The Commission confirmed during the hearing that the decommissioning plans presently envision the removal of the ore and waste materials stored on surface, thereby removing the source of the current groundwater contamination. The Commission also confirmed that the decommissioning plan currently includes the filling of Wolf Lake in order to permanently dispose of the contaminated sediments that have accumulated there.

The Commission also considered the concerns of an intervenor who believes the updated decommissioning plan and financial guarantees should be a prerequisite to the Commission's consideration of the proposed continued operations.

The Commission is satisfied with the progress being made on updating the decommissioning plan and financial guarantees, and with the proposed related licence conditions. The Commission is of the view that the decommissioning plan and financial guarantees will continue to evolve through the remaining life of the Key Lake Operation and that its use as a licensing prerequisite is not appropriate.

4.6 Public Consultation

The Commission considered information describing Cameco's efforts to involve local communities in the Key Lake Operation, recognizing that the population around the facility is relatively sparse and widely dispersed. The Commission was informed that the applicant is involved in working groups, together with two other licensed uranium mine operators, whose purpose is to involve the various communities in the Athabasca region in discussions concerning environmental protection, worker health and safety, training programs and employment opportunities. Organizations, including the South Central Environmental Quality Committee, Northern Mines Monitoring Secretariat, the Mudjatik Commission-Management Board and the Northern Labour Market Committee, were specifically identified in the hearing documentation. In addition, the Commission was informed of newsletters produced by the applicant and of various other initiatives, such as informal communications and public meetings in both northern and southern Saskatchewan that are aimed at ensuring public information exchanges. Based on the information provided, the Commission is satisfied that the applicant has an acceptable public consultation program.

4.7 Licence Term

The Commission considered Cameco's application for a 5-year licence term, together with the advice of CNSC staff for a shorter 27 month term. The Commission agrees with the rationale for the shorter licence term proposed by CNSC staff. The Commission believes that a longer licence term is not warranted in this case in light of the number of significant outstanding issues relating to longer-term worker dose monitoring, protection of the aquatic environment, decommissioning planning, and corporate quality assurance. In addition, the Commission considers it logical to align the licence term with that of the McArthur River operation (i.e., the source of the ore for the Key Lake mill). The Commission has decided therefore that the performance of the Key Lake Operation must come before the Commission for reconsideration after a period of 27 months.

4.8 Security

The Commission considered and accepts the CNSC staff finding that Cameco will make adequate provisions for the maintenance of security at the Key Lake Operation.

4.9 Canadian Environmental Assessment Act

On the basis of the information provided at the hearing, the Commission concludes that pursuant to section 3 of the *Exclusion List Regulations* and section 2 of Schedule I, Part I of the *Exclusion List Regulations*, an environmental assessment of this project pursuant to the *Canadian Environmental Assessment Act* is not required.

5. Conclusion

The Commission has considered the information and submissions of Commission staff and all participants as set out in the material available for reference on the record, as well as the oral and written submissions provided or made by the participants at the hearing. The Commission accepts the information set out in CMDs 01-H22 and 01-H22.A prepared by CNSC staff and the submissions, statements of law, conclusions and recommendations set out in these documents.

The Commission is of the opinion that the applicant satisfies the requirements of subsection 24 (4) of the *Nuclear Safety and Control Act*.

The Commission therefore issues, pursuant to section 24 of the *Nuclear Safety and Control Act*, licence UMLOL-MILL-KEY.02/2004 to Cameco Corporation. The licence will be valid from December 1, 2001 to February 28, 2004, unless suspended, amended, revoked or replaced.

George C. Jack
Secretary,
Canadian Nuclear Safety Commission

Date of decision: October 4, 2001

Date of release of Reasons for Decision: November 7, 2001