UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 21, 2000

MEMORANDUM TO: Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield

FROM: Janice Dunn Lee, Director
Office of International Programs

SUBJECT: MDS NORDION FEASIBILITY STUDY

The MDS Nordion company has submitted to the NRC (and the Departments of State and Energy), the attached public and company-proprietary versions of a report on the technical feasibility of using low-enriched uranium (LEU) targets instead of high-enriched uranium (HEU) targets in the production of medical isotopes in the MAPLE reactors and New Processing Facility at Chalk River, Ontario. The report includes information on possible changes to the facilities before operations begin there, that is, before the facilities become irradiated and thus more difficult and expensive to modify. The study was undertaken following the public Commission meeting on export license application XSNM3060 on June 16, 1999 and the Commission's Memorandum and Order of June 29, 1999.

Representatives of MDS Nordion and the Canadian Embassy provided a briefing for interested U.S. government agencies on April 20 at the Department of State. Staff from OIP, NMSS and OGC attended. The Executive Branch agencies, in coordination with Argonne National Laboratory, will now review the Nordion Report to assess its sufficiency with respect to the Commission's Memorandum and Order. As a related matter, Nordion officials also indicated at the meeting their intent to submit to the Commission by June 1 the first of the annual reports required as a condition of the issuance of XSNM3060. It is anticipated that the Executive Branch will then provide the Commission with a consolidated assessment which covers both the April Report from Nordion and the subsequent annual report.

The non-proprietary version of the report is being placed in ADAMS and will be made available to the public.

Attachments:
1. Letter from MDS Nordion, dtd April 17, 2000
2. Report in Response to the NRC Request that Argonne National Laboratory Prepare a Study of the Technical Feasibility of Converting the MAPLE Reactors and the New Processing Facility to use LEU rather than HEU targets - (Public and Company-Proprietary Versions).

cc w/attach:
EDO
OGC
SECY
OPA
OCA
CIO
CFO

March Road
Ottawa, Ontario
Canada K2K 1X8
Tel: 613 592-2790

MDS Nordion

Science Advancing Health

April 17, 2000

Ronald D. Hauber
Director
Division of Non-Proliferation,
Exports and Multilateral Relations
Office of International Programs
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Washington, D.C. 20852

Re: License No. XSNM-03060

Dear Mr. Hauber:

I am enclosing a report prepared by MDS Nordion in connection with the Commission's request in its June 29, 1999, Memorandum and Order, that Argonne National Laboratory (ANL) prepare a study of the feasibility of operating the MAPLE Reactors and the associated New Processing Facility with low enriched uranium (LEU) targets rather than the highly enriched uranium (HEU) targets that those facilities were designed to use. Although the Commission contemplated that ANL would prepare this study, MDS Nordion engaged Atomic Energy of Canada, Ltd. (AECL) to conduct a study and prepared the enclosed report, which we hope will be helpful to the Commission and the Executive Branch.

Pursuant to the NRC regulations governing access to information, MDS Nordion declares that the enclosed confidential version of the Appendix contains confidential commercial information of both MDS Nordion and AECL within the meaning of 10 CFR § 2.790. The portions of the confidential Appendix that constitute confidential commercial information, shown by "strike out" lines, have been redacted from the enclosed public version of the Appendix. In accordance with 10 CFR § 2.790, I am enclosing my affidavit addressing each of the criteria specified in 10 CFR §2.790(b)(1). The enclosed affidavit of Dr. Jean Pierre Labrie, General Manager, Research and Isotope Reactor Business of Atomic Energy of Canada, Ltd. (AECL) also supports my request that the designated portions of the confidential Appendix be deemed to constitute confidential commercial information and thus withheld from public disclosure.

Sincerely,

Grant R. Malkoske, P.Eng.
Vice President
Engineering & Technology

Enclosure

REPORT IN RESPONSE TO THE NUCLEAR REGULATORY COMMISSION'S REQUEST THAT ARGONNE NATIONAL LABORATORY PREPARE A STUDY OF THE TECHNICAL FEASIBILITY OF CONVERTING THE MAPLE REACTORS AND THE NEW PROCESSING FACILITY TO USE LEU RATHER THAN HEU TARGETS

SUBMITTED TO THE

U.S. NUCLEAR REGULATORY COMMISSION

BY

MDS NORDION INC.

APRIL 17, 2000

CONCERNING

IN THE MATTER OF TRANSNUCLEAR INC., ON BEHALF OF

ATOMIC ENERGY OF CANADA, LTD., (EXPORT OF 93.3% ENRICHED URANIUM);

Docket No. 11005070

License No. XSNM - 03060

MDS Nordion

Science Advancing Health

I. INTRODUCTION

On June 29, 1999, the Commission issued its Memorandum and Order In the Matter of Transnuclear, Inc. (Export of 93.3% Enriched Uranium) CLI-99-20, 49 NRC 469 (1999). Finding that all requirements of the Atomic Energy Act had been met, the Commission directed the Office of International Programs to issue license XSNM-03060 to Transnuclear Inc., authorizing the export to Canada of highly enriched uranium (HEU), containing approximately 121 kilograms of U-235 in the form of uranium oxide (UO_2) targets. As noted by the Commission, "the HEU targets, to be shipped quarterly over a five-year period, would be irradiated to produce radioisotopes, in particular Molybdenum 99, for medical applications." CLI-99-20 at page 1.

The Commission directed the "Applicants,"[1] "to submit in writing to the Commission a yearly status report detailing the progress of the program and Canadian cooperation in developing low enriched uranium (LEU) targets for the MAPLE reactors." As the Commission recognized in its June 29, 1999 Memorandum and Order, "the MAPLE reactors and associated processing facility will be operated by Atomic Energy of Canada, Limited (AECL) on behalf of MDS Nordion Inc. (Nordion)."

In its Memorandum and Order, the Commission referred to an undertaking by Argonne National Laboratory (ANL), at the Commission's June 16, 1999 Public Meeting regarding this export license application, "to prepare a feasibility study--the next step in the development of LEU targets for the MAPLE reactors . . . [to] enable Applicants to determine the possibility of success of conversion to LEU targets, address the technical challenges presented by the conversion process, set a meaningful schedule for conversion and make appropriate cost estimates." (CLI-99-20 at page 9). The Commission also expressed its understanding that "AECL will cooperate fully with ANL to complete a feasibility study as soon as possible . . . [so]

[1]In its Memorandum and Order, the Commission noted that "Transnuclear, AECL and Nordion will be referred to in this Memorandum and Order as 'Applicants'." CLI-99-20, page 1, footnote 1.

that AECL may have a feasibility study in hand in time to consider whether minor modifications could be made prior to the MAPLE reactors and their processing facility coming on line that would permit the use of LEU targets, or take other reasonable measures that would at least preserve the opportunity to move to LEU targets in the future." (CLI-99-20 at page 13).

The Commission's June 29, 1999 Memorandum and Order expressly assigned to ANL the duty of preparing the Feasibility Study and submitting it to the Commission. However, in order to cooperate with ANL, as requested by the Commission, AECL and MDS Nordion decided to prepare a detailed technical evaluation of the feasibility of converting the MAPLE reactors and the New Processing Facility (NPF) to use LEU targets. Work on this study was commenced soon after the Commission's issuance of its Memorandum and Order on June 29, 1999. To advise the U.S. Executive Branch and the U.S. Nuclear Regulatory Commission of progress in furnishing the cooperation envisioned by the Commission, representatives of MDS Nordion met on October 28, 1999, with representatives of the Department of State, the Department of Energy and the NRC.

Following is a summary of key aspects of the study prepared by MDS Nordion and AECL as well as conclusions in response to the Commission's request for a report on the feasibility of making changes to the NPF or the MAPLE reactors, before those facilities go into operation, to facilitate the timely and cost effective conversion to LEU targets.

As explained fully in submissions to the Commission in support of this export license and as discussed during the June 16, 1999 Public Meeting, MDS Nordion and AECL have devoted substantial time and resources to the ongoing program involving conversion from HEU to LEU targets in the MAPLE reactors and the New Processing Facility in a manner that does not jeopardize the reliable supply of Molybdenum 99 for use in diagnosing and treating seriously ill patients in the United States and Canada.

II. MAPLE REACTOR CONVERSION FEASIBILITY

As AECL and MDS Nordion have discussed with ANL, a change from an HEU to an LEU target in the MAPLE reactors is conceptually straightforward. The target design change would involve increasing the gap between the concentric cylinders that comprise the targets and replacing the HEU loaded into that gap with significantly larger amount of LEU. The current MAPLE reactor core is made up of LEU fuel rods interspersed with HEU targets. New LEU targets cannot be used in the MAPLE reactors until the Atomic Energy Control Board (AECB) determines that adequate operational safety margins were demonstrated and other re-licensing requirements were met. Based on AECL's assessment, AECL and MDS Nordion at this time do not foresee any economic or technical issues that would hinder or delay making any required changes in the MAPLE reactors in order to use LEU targets, after those reactors have commenced operation.

During recent meetings, AECB and AECL discussed operation of the MAPLE reactors with LEU targets that are conceptually similar to the HEU targets originally designed for those reactors. AECL and MDS Nordion have concluded that operation of the MAPLE reactors with LEU targets is technically feasible. The AECB have stated that in order for AECL to use LEU targets in the MAPLE reactors, AECL must demonstrate that the operating conditions will be within the bounds of the Environmental Screening Report and the Safety Analysis Report. The AECB further indicated its expectation that at least three years will be required for AECL to conduct analyses, tests and assessments of operating conditions in order to demonstrate to AECB that AECB regulatory conditions have been satisfied.

III. NEW PROCESSING FACILITY CONVERSION FEASIBILITY

MDS Nordion and AECL have worked diligently to complete a detailed study of the feasibility of converting the NPF process from HEU to LEU targets. In addition to other work, AECL consulted with SGN, which designed portions of the NPF. The study included

identifying whether minor modifications could be made prior to the NPF coming on line as well as identifying other reasonable measures that would at least preserve the opportunity to move to LEU targets in the future.

In total, MDS Nordion held seven meetings with AECL, including one on this issue with SGN in France, to review the capability of the in-cell equipment to process LEU. Following its commencement on August 9, 1999, their study proceeded vigorously and expeditiously, to address the concern that changes required to the processing facility at a later date would be much more costly and might require a prolonged shutdown of production.

With regard to the NPF, the study covered three key aspects relevant to the Commission's Memorandum and Order of June 29, 1999. The results are summarized as follows:

The ability of the existing process facility and equipment to process LEU targets.

The study recognized that processing LEU targets would result in a greater volume of liquid waste. Based on AECL's work, in consultation with SGN, the study concluded that the limiting factor for LEU supply capability is the speed at which waste could be calcined. The study also concluded that this limiting factor can best be addressed by establishing a long-term process development program aimed at improving the cycle time to process the LEU waste stream.

Minor modifications to the NPF, prior to its coming on line, which would facilitate a timely and cost effective conversion to LEU targets.

No minor modifications were identified to the NPF but two significant changes were identified and evaluated to determine whether they could better prepare that facility for a change to LEU targets. The first related to changing the existing calcining process. During discussions earlier this year, AECL and SGN noted that the in-cell waste processing equipment used in the NPF was custom designed for the HEU targets at the required production through-put rates. They jointly determined that any changes to the in-cell processing equipment would require a

lengthy development program and would cause substantial delay in completing and operating the NPF.

As the Commission recognized in its June 29, 1999 Memorandum and Order, "in determining whether changes are feasible, Applicants will have to consider the commitments it has made to the Canadian Government and its customers with respect to assuring the supply of medical isotopes and otherwise keeping costs to a minimum." (CLI-99-20 at page 13). In evaluating whether changes to the NPF were feasible before that facility commenced operation, MDS Nordion took into account its commitment to supply Molybdenum 99 for use in diagnosis and treatment each year of more than 30,000 seriously ill patients. MDS Nordion concluded that delaying operation of the NPF until such a process development program could be completed would present unacceptable risks to the reliable supply of Molybdenum 99.

The study also evaluated the feasibility of a second potential change to the NPF—installation of a pipe leading from the tanks located in the liquid waste vault, through the vault wall and to a termination outside of the vault. This pipe was evaluated as a future hook-up to additional liquid waste tanks that would be necessary to process the increase in liquid volume generated within the NPF while extracting molybdenum-99 from the LEU targets. A substantial obstacle to installation of such new piping was the need to ensure that such piping would be acceptable to the International Atomic Energy Agency (IAEA) and AECB during the time that the NPF would be processing HEU while LEU targets were being developed and qualified. In a meeting between AECL and AECB officials, the AECB took the position that any piping penetration to the liquid waste vault to enable hook-up to future liquid waste tanks would require that appropriate IAEA safeguard measures be implemented in accordance with Canada's Safeguards Agreement with the IAEA and the associated Facility Attachment that is applicable to the NPF. Furthermore, the AECB confirmed that piping and support mechanisms through the penetration in the concrete vault would have to be registered to nuclear codes.

In consultation with AECL, MDS Nordion determined that to address these safeguards and nuclear code issues alone would have required a minimum delay of at least six months in the

completion of the NPF, at a significant cost. Moreover, the use of such supplemental piping would have required that the piping hook up to an additional waste processing facility including hot-cell, waste storage tanks, calcination equipment and associated infrastructure such as active ventilation, backup electrical power, whose construction costs are substantial in relation to the cost of the New Processing Facility. MDS Nordion and AECL have not determined whether the construction of such an additional facility would be necessary at this time to process sufficient volumes of LEU targets to meet medical needs.

For the reasons stated above, MDS Nordion determined that there were no minor changes that could prudently be made to the NPF, before it began processing radioactive material, in order to minimize the future costs of conversion from HEU to LEU targets.

Take other reasonable measures to preserve the opportunity to move to LEU targets in the future.

As will be explained fully in the applicant's annual report to the Commission, MDS Nordion has taken a pro-active position in the HEU to LEU conversion initiative with AECL. Measures have been taken to preserve site space should additional process facilities be deemed necessary to allow processing of sufficient quantities of LEU targets to obtain the volume of Molybdenum 99 that is needed for medical purposes. Furthermore, MDS Nordion authorized AECL to continue the LEU target development for the MAPLE reactors to focus on the following two key technical aspects identified to date:

a) Reactor Conversion Considerations:

A development program is being established to address all technical, regulatory and operational issues to convert the MAPLE reactor to LEU targets. All costs associated with implementing this option will be identified.

b) Processing Facility Conversion Considerations:

A process development program is being established to address any technical, regulatory and operational issues to either develop improvements to the waste process which would enable

7

conversion of the existing facilities or determine what, if any, additional facilities may be required to process LEU targets. All costs associated with implementing this option will be identified.

IV. REQUEST FOR NON-DISCLOSURE OF PROPRIETARY INFORMATION

In its June 29, 1999 Memorandum and Order, the Commission noted its intent "to place both the Applicants' reports and the Executive Branch reports in the Public Document Room" (PDR). The Commission observed that "proprietary information should be handed as an Annex to the reports so that the information can be easily segregated from the rest of the reports." Therefore, in accordance with 10 CFR § 2.790 and the Commission's June 29, 1999 Memorandum and Order, a confidential version and a public version of the Appendix to this study are both attached. AECL and MDS Nordion request that the attached confidential version of the Appendix to this report be held by the NRC in confidence and not placed in the public document room.

For the reasons stated in the attached Declarations executed by Dr. Jean Pierre Labrie, General Manager, Research and Isotope, Reactor Business and Grant Malkoske, Vice President, Engineering & Technology of MDS Nordion, the enclosed confidential version of the Appendix to this report contains commercial and proprietary information of AECL and MDS Nordion whose public release would significantly harm both companies because it would disclose to competitors commercially sensitive aspects of their plans and capabilities with respect to production of Molybdenum 99.

Copies of this Report were sent to officials at the Department of State and the Department of Energy who have been involved in this matter.

ANNEX

Feasibility Study

Conversion from HEU to LEU

for

Molybdenum-99 Production

in the

New Processing Facility

April 2000

MDS Nordion

Science Advancing Health

April 17, 2000

9

Objectives of the Assessment by AECL

The objectives of the study, which MDS Nordion commissioned AECL to perform, were:

- Determine whether the equipment designed for the NPF can process LEU targets.
- Determine the production capacity with LEU targets.
- Determine changes that should be implemented prior to the introduction of radioactivity into the NPF.

Process Employed to Carry Out and Make the Assessment

AECL carried out the lead role in carrying out processing experiments. On an ongoing basis MDS Nordion scientists and technical experts met with AECL and reviewed in detail the work that was carried out. AECL and MDS Nordion visited SGN in France to review the work that had been undertaken by SGN, the designer and supplier of the NPF waste processing equipment. The objective of this meeting was to determine if any changes to the waste processing equipment / facility could be done, prior to NPF active operation, which would facilitate conversion from HEU to LEU at a later date. In addition the results of the work which started on August 9, 1999 and was complete in January 2000, were reviewed at the monthly senior management meeting between MDS Nordion and AECL.

Assessment Plan

The study was comprised of the following tasks:

Task 1 Develop the chemical processing requirements and assess process equipment design for dissolution of LEU targets and recovery of molybdenum-99, iodine-131 and xenon-133 and perform scoping laboratory tests to verify chemical flowsheet.

Task 2 Assess the design of waste treatment equipment, comprising calcination and cementation solidification systems, liquid waste storage system and off-gas delay system, including processing equipment design for treatment of wastes generated from the LEU chemical flowsheet developed in Task 1.

Task 3 Assess the design of the waste transfer and storage system and equipment for loading and storage of calcined and cemented waste identified in Task 2.

Targets

The MAPLE reactors are designed to irradiate HEU targets each containing uranium-235 with 93% enrichment. The reference LEU target for the study contains uranium-235 with 19.75% enrichment.

LEU will contain 4.7 times more uranium than HEU , the target design will minimize changes to the MAPLE reactors design and operation.

Medical isotopes, molybdenum-99, iodine-131 and iodine-133, are fission products of uranium-235. HEU and LEU targets containing uranium-235, irradiated under similar conditions in the MAPLE reactors, will produce a similar quantity of medical isotopes.

Although LEU targets would be irradiated in the MAPLE reactors, 4.7 times more uranium will be chemically processed to extract a similar quantity of medical isotopes and calcined to solidify the waste in stable form for long-term storage. The NPF, which has been built to process HEU targets, would be required to process 4.7 times more uranium with LEU targets.

New Processing Facility

The New Processing Facility (NPF) has been built to process targets containing about uranium per run. Current production levels could be met by processing about uranium weekly and the NPF was designed to process about uranium weekly.

The conversion of the NPF from HEU to LEU requires increasing its weekly uranium processing capacity from to uranium to meet current production levels and from to to maintain its design production capacity. Since the design capacity of the NPF was uranium weekly and since with the LEU target uranium would need to be processed to meet MDS Nordion's current market requirements, the assessment sought to define these parameters that gave rise to the limitations. Furthermore this facility was built with an expected useful life of . Assuming market growth of per year and , requirements for HEU would be per week, which is design capacity. In the natural course of events it was expected that MDS Nordion and AECL would find ways to improve the process capacity of the facility.

The target processing steps considered in the assessment were:

a) Uranium Dissolution: Irradiated uranium is dissolved in ;

b) Molybdenum-99 Recovery: The solution is loaded in where the molybdenum-99 is ;

c) Waste Solidification and Storage: The fissile waste solution is held in holding tanks to decay. After a decay period of about , the solution is solidified to produce a calcine composed of uranium oxide and fission products. The calcine product is transferred to concrete canisters for long-term storage.

11

The impact of converting the NPF from HEU to LEU on the above processing steps is described in the following section.

Uranium Dissolution

The optimum for uranium dissolution is about . Five tests were performed using and in each test, with between and . The results of the tests were very encouraging in that complete of the from an LEU target could be achieved used for an HEU target by adjusting the of the to .

Molybdenum-99 Recovery

Measurements of molybdenum-99 recovery were than the results of tests. The of molybdenum on has a strong dependence on (see Fig. 1). The reference solution for HEU targets . Molybdenum recovery to those with HEU targets, are observed with the solution .

Figure 1 removed

Consequently, although the uranium in a LEU target can be dissolved within the volume of used for an HEU target, the in the solution must be by a factor of about for comparable molybdenum recovery efficiencies. The greater volume and uranium concentration of waste fissile liquid from LEU targets increases the demands of the waste storage and waste calcination systems. The total volume of high level liquid waste will be about with an LEU target.

It is important to optimize the yield of molybdenum by
Significant differences from the optimum would result in increased costs by proportionately increasing the number of processes required per week. Operational experience with active targets may allow us to alter the processing parameters and reduce waste volumes and we shall learn more about optimum concentration once we are in routine operation with HEU in the NPF.

Liquid Waste Storage Capacity

An HEU process generates of high level liquid waste per process whereas with LEU per run will be produced. The NPF facility has been built with two 100L and one 50L storage tanks. It is planned that the waste be stored in the 100L tanks for prior to the start of calcination. The 50L tank was installed for back-up purposes. Consideration was given to the installation of additional tank capacity but there was not space for such an addition.

With HEU there can be processes before a is whereas with LEU each will be after processes. If the is maintained for back-up purposes, the LEU targets will the of the system by about . In terms of steps that have been considered to improve the production capacity, two areas identified: reduction of decay time to say and improvement of the calcination process which is addressed below.

Waste Calcination

In order to determine the capability of the waste calcination system SGN in France were asked to carry out a study. As was mentioned earlier the volume of waste solution for the same amount of uranium-235 would be about .

The process that is used is a batch process with the calcination taking place in the can that would be sealed and disposed of as solid waste. SGN reported back that because of the sputtering that they observe after the removal of free water, the total amount of uranium in the can is the limiting factor. They observed that with greater amounts of uranium there was danger of sputtering not being contained in the can. AECL and MDS Nordion scientists met with SGN in France to get a better understanding of SGN's experience in this matter. SGN confirmed that based on their knowledge about times the number of waste cans would be required if the change to LEU was made.

SGN believe calcination facility can process between and high level uranium waste per week. MDS Nordion's current business would equate to about LEU per week.

The option of putting additional calcination equipment into the hot cell was examined but there is not enough room. AECL have suggested that a second waste processing cell could be considered. The cost to set up a new stand alone facility consisting of a waste

processing cell was estimated to cost about today. Given the amount of investment already made in the MAPLE reactors and processing facilities, this is not an attractive solution and may not be economically viable 3-5 years from now when the transition to LEU is made.

MDS Nordion's plan is to gain operating experience with the calcination system to determine what changes could be made to manage the increased mass of uranium, for example could be of assistance. In addition evaluation will be made to determine if the process could be carried out more quickly .

In terms of actions that MDS Nordion should take, one modification was considered. In order to link the NPF with a new hot cell, the possibility of putting in a waste transfer line that would terminate in the wall of the NPF was considered. The engineering, design and installation cost was estimated to be about and the time to complete about . However, when the AECB were asked for their input on what would be required from a licensing perspective, they indicated that licensing such a change could take a minimum of ; we believe, based on other project licensing actions, that the cost would also to meet the regulatory concerns. They also noted that there could be IAEA safeguard concerns about a line leaving the building. We also had concerns that the AECB could raise safety issues related to radiation fields or leakage from this pipe. Based on our experience with the AECB we did not consider it prudent to put the timeline for the project at risk by making this change.

Solid Waste Storage

Because of the processing considerations mentioned earlier, the number of waste containers will increase to about . Because there will be less HEU per container, the arrangement of these containers in the concrete waste storage silos can be different. Nevertheless it is expected that the number of silos required will be greater and this could have an impact upon the storage capacity of the existing waste storage site. Nothing needs to be done at this stage to address this issue.

Conclusions

The assessment carried out by AECL demonstrated that an LEU target could be processed to make molybdenum-99. There would be a greater volume of liquid waste but the limiting factor for LEU supply capability was identified to be the speed at which waste could be calcined. This can best be addressed by establishing a process development program aimed at improving the cycle time to process the LEU waste stream. It was concluded that was not a need for any prudent changes to be made to the NPF facility before it became active in order to minimize future costs of conversion from HEU to LEU.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of TRANSNUCLEAR, INC., on behalf of, ATOMIC ENERGY OF CANADA, LTD., (Export of 93.3% Enriched Uranium)	)	Docket No. 11005070 License No. XSNM-03060

10 CFR § 2.790
AFFIDAVIT OF GRANT R. MALKOSKE, P.Eng.

I, Grant R. Malkoske, Vice President, Engineering & Technology of MDS Nordion Inc., do hereby affirm and state:

1. I am authorized to execute this affidavit on behalf of MDS Nordion.

2. In October 1999, Transnuclear Inc., on behalf of AECL, submitted an application to export to Canada 130 kg of highly enriched uranium (HEU) contained in U02 targets for irradiation in the MAPLE reactors to produce Mo-99 for use in producing medical radioisotopes. By a Memorandum and Order, dated June 29, 1999, in the above-captioned proceeding, the Commission directed the Office of International Programs to issue the requested export license. In its Memorandum and Order, the Commission requested that AECL assist Argonne National Laboratory (ANL) in ANL's preparation of a study of the feasibility of converting the MAPLE reactors, and the associated target processing facility, to use low enriched uranium (LEU) targets.

3. In compliance with the Commission's request, AECL has worked with MDS Nordion, on whose behalf AECL irradiates and processes the targets, to prepare the attached Report submitted to the Commission by MDS Nordion. The Appendix to that Report contains proprietary information that is held in confidence by MDS Nordion and, to the best of my knowledge, by AECL. Therefore, as contemplated by the Commission's Memorandum and Order, proprietary information is "handled as an annex to the reports so that the information can be easily segregated from the rest of the reports." (CLI-99-20 at page 12). The proprietary information that is redacted from the public version of that

15

Appendix is shown by strikeout lines on the confidential version of the Appendix. The redacted portions constitute proprietary commercial and/or financial information that should be maintained by the NRC in confidence pursuant to 10 CFR § 2.790 and 9.714, because:

i. The redacted portions of the study have been held in confidence by MDS Nordion and, to the best of my knowledge, by AECL.

ii. The redacted portions constitute information of a type that is held in confidence by MDS Nordion and there is a rational basis for doing so because public disclosure of the redacted portions would reveal commercially important information regarding the process chemistry and design of the target processing facility and disclose commercially sensitive information about the capability and plans of AECL and MDS Nordion with respect to the production and sale of Mo-99.

iii. The information that has been redacted from the public version of the Appendix is being transmitted to the NRC in confidence.

iv. The redacted portions of the Appendix comprise information that is not available in public sources and could not be gathered readily from other publicly available information.

v. Public disclosure of this information would create substantial harm to the competitive position of MDS Nordion by disclosing the Company's internal proprietary information concerning production and sale of radioisotopes.

4. I have personally reviewed the information that has been redacted from the public version of the Appendix. I am authorized, on behalf of MDS Nordion, to request that the Nuclear Regulatory Commission (NRC) withhold the non-redacted confidential version of the Appendix from public disclosure.

Grant R. Malkoske
Vice President, Engineering & Technology
MDS Nordion Inc.

Subscribed and sworn to before
me this 14th day of April 2000.

Notary Public

My Commission Expires: _____

16

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of TRANSNUCLEAR, INC., on behalf of, ATOMIC ENERGY OF CANADA, LTD., (Export of 93.3% Enriched Uranium)	)	Docket No. 11005070 License No. XSNM-03060

10 CFR § 2.790
AFFIDAVIT OF DR. JEAN-PIERRE LABRIE

I, Jean-Pierre Labrie, Ph.D., General Manager, Research and Isotope Reactor Business of Atomic Energy of Canada Limited (AECL), do hereby affirm and state:

1. I am authorized to execute this affidavit on behalf of AECL.

2. In October 1999, Transnuclear Inc., on behalf of AECL, submitted an application to export to Canada 130 kg of highly enriched uranium (HEU) contained in U02 targets for irradiation in the MAPLE reactors for use in producing medical radioisotopes. By a Memorandum and Order, dated June 29, 1999, in the above-captioned proceeding, the Commission directed the Office of International Programs to issue the requested export license. In its Memorandum and Order, the Commission requested that AECL assist Argonne National Laboratory (ANL) in ANL's preparation of a study of the feasibility of converting the MAPLE reactors, and the associated target processing facility, to use low enriched uranium (LEU) targets.

3. In compliance with the Commission's request, AECL has worked with MDS Nordion, on whose behalf AECL irradiates and processes the targets, to prepare the attached Report submitted to the Commission by MDS Nordion. The Appendix to that Report contains proprietary information that is held in confidence by MDS Nordion and AECL. Therefore, as contemplated by the Commission's Memorandum and Order, proprietary information is "handled as an annex to the reports so that the information can be easily segregated from the rest of the reports. -- (CLI-99-20 at page 12). The proprietary

17

Subscribed and sworn to before
me this 17 day of April 2000.

Notary Public - ONTARIO
BARRISTER & SOLICITOR

~~My Commission Expires:~~ 5

19