



## TRANSNUCLEAR, INC.

Mr. Ronald D. Hauber  
Deputy Director  
Office of International Programs  
United States Nuclear Regulatory Commission  
11555 Rockville Pike  
Rockville, MD 20852

August 9, 2001

Dear Mr. Hauber:

**SUBJECT: APPLICATION TO USNRC FOR AN AMENDMENT TO EXPORT LICENCE XSNM03171 TO AUTHORIZE THE EXPORT OF AN ADDITIONAL 10.0 KILOGRAMS OF HIGHLY ENRICHED URANIUM TO AECL'S CHALK RIVER, CANADA, FACILITY TO FABRICATE TARGETS FOR IRRADIATION IN AECL'S NRU REACTOR, TO PRODUCE RADIOISOTOPES FOR MEDICAL PURPOSES, AND TO EXTEND THE EXPIRATION DATE FROM APRIL 30, 2002, UNTIL SEPTEMBER 30, 2002**

This letter is to request an amendment to USNRC Export Licence XSNM03171 to extend its valid date from April 30, 2002, to September 30, 2002 and to add 10 kilograms of HEU metal, thereby increasing the authorized quantity from 10.05 to 20.05 kilograms.

The application is made to continue the production of medical isotopes in AECL's NRU reactor at the Chalk River Laboratories. The additional material is needed because of delays in bringing the MAPLE reactors and associated New Processing Facility into commercial operation. A detailed justification for the application is provided in the attached Addendum.

In accordance with regulations regarding fees, we are also enclosing a check issued to the US Nuclear Regulatory Commission for the amount of US\$9,300.

Your expedited review and issuance of an amendment to the export licence will be appreciated.

Do not hesitate to contact me if you have any questions.

Yours sincerely,  
Transnuclear, Inc.

*Mathew George*  
Mathew George  
Traffic Coordinator

Encl.:

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OFFICE OF INTERNATIONAL PROGRAMS

- c. J.-P. Labrie, AECL  
J.A. Glasgow, Morgan, Lewis & Bockius LLP

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**AECL EACL**
**Jean-Pierre Labrie, Ph.D.**

 General Manager  
 MMIR Project and  
 Isotope Sales

 Directeur général  
 Project RIMM et  
 Vente d'isotopes

 2251 Speakman Drive  
 Mississauga Ontario  
 Canada L5K 1B2  
 (905) 823-9060 + Ext.  
 (905) 823-9040  
 Fax (905) 823-6120

 2251 rue Speakman  
 Mississauga (Ontario)  
 Canada L5K 1B2  
 (905) 823-9060 + poste  
 (905) 823-9040  
 Fax (905) 823-6120

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**ADDENDUM TO THE APPLICATION OF TRANSNUCLEAR INC., ON BEHALF OF AECL, TO AMEND XSNM03171 TO AUTHORIZE THE EXPORT OF AN ADDITIONAL 10.0 KILOGRAMS OF HIGHLY ENRICHED URANIUM TO AECL'S CHALK RIVER, CANADA, FACILITY TO FABRICATE TARGETS FOR IRRADIATION IN AECL'S NRU REACTOR, TO PRODUCE RADIOISOTOPES FOR MEDICAL PURPOSES, AND TO EXTEND THE EXPIRATION DATE FROM APRIL 30, 2002, UNTIL SEPTEMBER 30, 2002**

## I. INTRODUCTION

This Addendum sets forth the reasons why Transnuclear Inc., on behalf of AECL, seeks to amend XSNM03171, to increase, by ten (10.0) kilograms, the quantity of highly enriched uranium (HEU) whose export is authorized by XSNM03171, from the currently licensed amount (10.05 kilograms) to a total of 20.05 kilograms. As discussed below, a delay in the operation of the MAPLE Reactors and the New Processing Facility (NPF) has forced AECL to continue the production of medical radioisotopes in the NRU Reactor for at least 4-6 months longer than AECL had planned when it applied, on October 29, 2000, for XSNM03171. As a result of this delay, AECL will need an additional supply of targets for irradiation in the NRU Reactor.

Although AECL had estimated that 10.05 kilograms of HEU currently authorized by XSNM03171 would produce sufficient targets for irradiation in the NRU to meet medical demands until approximately July 2002, the demand for medical isotopes has been greater than expected. Because of the increased demand for targets, AECL now estimates that the 10.05 kilograms of HEU currently authorized by XSNM03171 will be fully used to manufacture targets that will have been irradiated by approximately March 2002.

To continue the reliable supply of radioisotopes needed to treat seriously ill patients in the United States and Canada, after the HEU currently authorized by XSNM03171 is consumed, AECL must receive an additional supply of HEU. AECL anticipates that an additional 5.0 kilograms will be needed in December 2001, to allow sufficient time for AECL to fabricate the HEU into targets that are required to continue production of molybdenum 99 (Mo-99) in the NRU from



approximately March 2002, until approximately August 2002. AECL also anticipates that an additional shipment of 5.0 kilograms of HEU will be needed in early 2002 to produce targets for use in the NRU from about September 2002 until approximately the end of that year, which AECL estimates is the earliest time that the MAPLE Reactors and the NPF could operate on a commercial basis.

To avoid the accumulation of any excess inventory of HEU for the NRU, AECL and Transnuclear will initially ship no more than 5.0 kilograms of the additional total of 10 kilograms of HEU that is requested by this application for an amendment. Before shipping the final 5.0 kilograms authorized by this amendment, AECL and Transnuclear will notify the NRC Office of International Programs at least 60 days in advance of the proposed shipping date. If AECL needs the final 5.0 kilograms to produce targets for the NRU, as it currently anticipates, its notice to the NRC will set forth current information concerning the operational status of the NRU, the MAPLE Reactors and the NPF as well as other information that may be relevant to AECL's receipt of this material.

## II. RATIONALE FOR INCREASING THE AUTHORIZED QUANTITY OF HEU BY AMENDMENT TO XSNM03171 RATHER THAN A NEW LICENSE

AECL understands that the NRC is often asked to amend export licenses, to increase the authorized quantity and extend the term of the license. For this reason, AECL and Transnuclear Inc. are submitting this application for a license amendment to increase the quantity of HEU authorized by XSNM03171 and to extend the expiration date of the license from April 30, 2002, until September 30, 2002. The end user and end use are unchanged and the facility in which the HEU will be used remains the same.

During its consideration of the application for XSNM03171, the NRC Staff and the Executive Branch conducted a thorough review of the reasons why the HEU covered by this license was needed by AECL to ensure the reliable production of Mo-99 for use in medical radioisotopes. The record of this proceeding also includes comprehensive information concerning the NRU and the processing of targets irradiated in the NRU. Submission of this application as a request for an amendment of XSNM03171 avoids repetition of information that is contained in the record of that proceeding.

AECL understands that the Commission must itself review this request, whether it is styled as an amendment or an application for a new license.

## III. STATUS OF THE SHIPMENT OF THE 10.05 KILOGRAMS OF HEU AUTHORIZED BY XSNM03171

After providing the required notice to NRC, Transnuclear shipped 4.998 kilograms uranium metal to AECL on April 17, 2001. A window for shipping the second shipment has been confirmed with the NRC. The shipment of about 5 kilograms uranium metal will be made in September 2001, at which time the entire quantity of HEU that may be exported pursuant to

XSNM03171, except for tiny residual amounts, will have been received at AECL's Chalk River facility in Canada.

**IV. REASONS FOR THE DELAY IN ACHIEVING COMMERCIAL PRODUCTION OF RADIOISOTOPES IN THE MAPLE REACTORS AND PROCESSING THEM IN THE NPF**

The Annual Report that MDS Nordion filed with the Commission on May 31, 2001, ("Report") discusses the technical difficulties that have significantly delayed the date when the MAPLE Reactors and the NPF are expected to begin commercial operation. As discussed in detail in the Report, problems with the operation of the shut-down rods of the MAPLE 1 Reactor, coupled with the regulatory review being conducted by the Canadian Nuclear Safety Commission (CNSC), have prevented the MAPLE Reactors from achieving commercially operational status. On June 25, 2001, the CNSC renewed the operating licenses for the MAPLE Reactors and NPF for a period of sixteen months, ending October 31, 2002. The CNSC also directed that an additional public hearing be held before the CNSC issues a decision concerning resumption of low-power commissioning of the MAPLE 1 Reactor, fuel loading in the MAPLE 2 Reactor and active commissioning of the NPF. Although CNSC has scheduled a public hearing for October 4, 2001, the CNSC has indicated that resumption of the above-mentioned commissioning activities will not be on the agenda of that meeting. AECL will seek to have the CNSC consider these matters at public hearings that are currently scheduled for November 15 and December 13, 2001.

If the CNSC takes up these re-commissioning matters at public hearings in November or December of 2001, and a ruling allowing re-commissioning to commence is issued soon thereafter, AECL anticipates that it will be able to bring the MAPLE 1 Reactor and the NPF into full commercial operation in the fall of 2002, and the MAPLE 2 Reactor by end of calendar year 2002, at the earliest. Full commercial operation of those facilities will be further delayed if the CNSC does not hold a public hearing on these matters until 2002.

Once commercial production of radioisotopes has been established in the MAPLE 1 Reactor and their processing in the NPF, the NRU reactor will be available as backup until commercial production is achieved in the MAPLE 2 reactor. Irradiation of HEU targets in the NRU reactor should considerably reduce once the MAPLE 1 reactor and NPF could sustain commercial production and be halted after the MAPLE 2 reactor are in commercial production.

**V. ACTIONS BY AECL TO USE THE NRU AND ASSOCIATED TARGET PROCESSING FACILITY BEYOND THE SUMMER OF 2002**

The steps that AECL has taken to allow continued production of Mo-99 in the NRU until the MAPLE Reactors and NPF begin commercial operation are discussed in the responses that AECL submitted, on December 22, 2000, to questions raised by the NRC Staff in connection with the application of Transnuclear, Inc., on behalf of AECL, for XSNM03171. Additional

information on this matter was provided in MDS Nordion's May 31, 2001 Report to the Commission.

As noted in MDS Nordion's Report, in the Fall of 2000, AECL submitted an application to the CNSC, seeking to increase the uranium concentration in the Fissile Solution Tank (FISST) from 7.0 to 7.6 g/L. On July 13, 2001, the CNSC approved an amendment to AECL's Chalk River site license, allowing AECL to increase the uranium concentration in the FISST from 7.0 to 7.3 g/L.

AECL is currently preparing responses to questions raised by the CNSC with respect to increasing the concentration limit from 7.3 to 7.6 g/L. A decision by CNSC with respect to increasing the limit to 7.6 g/L is not expected before early 2002.

AECL is currently developing an operations plan to use FISST until the end of calendar year 2002, by cementing some of the fissile waste from isotope production runs while maintaining potential exposure doses to a minimum. AECL anticipates that its operations plan to use FISST will allow AECL to continue to irradiate targets in the NRU to produce Mo-99 until the MAPLE Reactors and NPF become fully operational on a commercial basis.

**VI. CONTINUED OPERATION OF THE NRU REACTOR UNTIL THE MAPLE REACTORS AND NPF BEGIN COMMERCIAL PRODUCTION OF MO-99 IS ESSENTIAL TO MAINTAINING A RELIABLE SUPPLY OF THIS MEDICAL ISOTOPE FOR TREATMENT OF PATIENTS IN NORTH AMERICA**

AECL and MDS Nordion have advised the Commission that the NRU and its associated HEU target processing facility are essential to the production of Mo-99 for medical purposes until the MAPLE Reactors and NPF are in full commercial operation. As the U.S. Executive Branch and the NRC have recognized, other sources of Mo-99 are not available to meet the needs of medical patients in the United States and Canada in the event that the NRU is unable to continue irradiating targets during the period before the MAPLE Reactors and the NPF are able to begin commercial production of Mo-99 for medical purposes. (See, memorandum from the Department of Energy to the Department of State, dated January 30, 2001, concerning XSNM03171)

There are four major commercial producers of Mo-99 located in Canada, Belgium, the Netherlands and South Africa. Based on their familiarity with these other producers of Mo-99, AECL and MDS Nordion believe that adequate supplies of Mo-99 needed for medical use in North America will not be available from these other sources, in the event that AECL is unable to continue irradiating targets in the NRU during the period before the MAPLE Reactors and NPF have begun commercial operation.

**VII. CONCLUSION**

For the reasons stated above, AECL respectfully submits that this application should be granted. AECL clearly has an urgent need for an amendment to XSNM03171, authorizing the export to

Addendum, Letter from Transnuclear to NRC re: Export Licence XSNM03171

Canada of the additional quantity of HEU that is needed to produce targets to continue production of Mo-99 in the NRU until the MAPLE Reactors and NPF are able to begin commercial operation.



Jean Pierre Labrie  
General Manager  
MMIR Project & Isotope Sales  
AECL

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