May 29, 1997

FOR: The Commissioners

FROM: L. Joseph Callan /s/
Executive Director for Operations

SUBJECT: TECHNICAL ASSISTANCE REQUEST FROM THE UNIVERSITY OF MISSOURI-COLUMBIA LICENSE AMENDMENT REGARDING URANIUM-238 USE

PURPOSE:

To apprise the Commission of the staff's intended response to a technical assistance request (TAR) regarding an amendment to the material License issued to the Curators of the University of Missouri-Columbia (the University). The amendment request concerns the one gram ($\approx 3.3 \times 10^{-7}$ Ci) limit on the use of uranium-238, imposed by the Commission in Memorandum and Order CLI-95-01 dated March 1, 1995. IMNS and OGC determined that the Commission should be advised that staff is amending the University's license since the one gram limit condition was initially approved by the Commission and it is likely that this licensing action will be of interest to the original intervenors.

BACKGROUND:

In 1990, the Nuclear Regulatory Commission granted two amendments to the University's Special Nuclear Material (SNM) and Source Material License No. SNM-247 and Broad-Scope Byproducts License No. 24-00513-32, permitting the University to perform basic research on the chemistry of actinides U-238; neptunium (Np-237); plutonium (Pu-239/240); and americium (Am-241), in their pure forms, as part of the Transuranic Management by Pyropartitioning Separation (TRUMP-S) Project. The objective of the TRUMP-S experiments is to develop an inexpensive electrochemical means to reduce the volume of high-level radioactive waste by extracting 99 percent of the long-lived transuranic elements and uranium from the shorter-lived elements in spent fuel without generating liquid radioactive waste.

The 1990 amendments were contested and the resulting 10 CFR Part 2, Subpart L proceedings addressed the primary health and safety concerns regarding the adequacy of fire safety procedures, emergency plans, and protection of the public in case of accident. The Commission, for the most part, reached the same conclusions as the Subpart L Atomic Safety and Licensing Board Panel (ASLBP) Presiding Officer (ASLBP No. 90-613-02 MLA) and affirmed LBP-91-31 and LBP-91-34 with certain modifications, and approved, subject to certain conditions, the University's license amendment applications in Memorandum and Order CLI-95-01, Section II.C.2.a.ii(a)(I). One of the conditions imposed by the Commission limits the amount of the subject actinides in the TRUMP-S experiments to no more than one gram total at any one time as a means of ensuring that the University's emergency plan is effective and sufficient to protect the public from a release of TRUMP-S materials.(1)

By letter dated July 19, 1996, the University requested an amendment to Broad-Scope Material License No. 24-00513-39 to modify the limit on the use of U-238, as specified in License Condition No. 29, from one gram for the total actinides up to 80 grams ($\approx 2.6 \times 10^{-5}$ Ci) of U-238, in addition to the one gram total for all other subject actinides (Np-237, Am-241, and Pu-239/240). The University indicates that, based on the results of the work to date, the increased amount of U-238 used in each experiment is necessary in order to continue its research.

DISCUSSION:

One of the primary issues addressed in CLI-95-01 concerns exposures to members of the public as a result of fire involving the TRUMP-S actinides. Using Am-241 as the limiting case, it was determined that the maximum expected offsite inhalation dose, for a member of the public located 150 meters ($\approx$ 492 feet) from the facility, would be about 10 mSv (1 rem) in one hour. The University states in its 1996 amendment request that, originally, one gram of Am-241 ($\approx$ 3.3 Ci) was used for determining the worst-case accident of a fire scenario because Am-241 has the highest radiotoxicity of the subject actinides. Only one gram of the subject actinides was considered by the Commission because the University did not request a higher limit since the researchers did not envision, at the time of the proceedings, that more than one gram of the four actinides would be used at any one time in any experiment.

In its request, the University provides dose calculations for an accidental release of 80 grams ($\approx 2.6 \times 10^{-5}$ Ci) of U-238, based on NUREG-1140, "A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Materials Licensees" which states that 80 grams ($\approx 2.6 \times 10^{-5}$ Ci) of U-238 will result in an exposure of 1.77×10^{-5} mSv (1.77×10^{-6} rem) at 150 meters ($\approx$ 492 feet).(2) Based on this calculation, the University contends that this additional dose contribution would not appreciably increase the maximum offsite public dose of 10.2 mSv (1.02 rem) at 150 meters ($\approx$ 492 feet) as calculated for one gram ($\approx$ 3.3 Ci) of Americium-241.

Staff has analyzed the information submitted by the University and concludes that issuance of the requested license amendment increasing the limit of U-238 from one to 80 grams ($\approx 2.6 \times 10^{-5}$ Ci) with a one gram total for all other subject actinides, would not result in a potential exposure to the public that would be significantly greater than that for the limiting case used by the Commission in CLI-95-01 for a ground release of one gram of Am-241. Therefore, granting the University's request would not compromise the Commission's decision in CLI-95-01 concerning the adequacy of the University's Facility Emergency Plan. However, due to the nexus between the University's 1996 amendment request and the 10 CFR Part 2, Subpart L proceedings which resulted in the Commission's Order limiting the University's use to no more than one gram of the subject actinides at any one time, the staff, in its discretion, also plans to notice the granting of the University's 1996 request in the Federal Register Notice (Attachment 1) to inform

intervenors involved in the earlier proceedings of NRC's action in this matter.

RECOMMENDATION:

That the Commission note that, unless directed otherwise, the staff will, ten days from the date of this paper, issue the attached TAR response (Attachment 2) approving the amendment request.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection.

L. Joseph Callan
Executive Director for Operations

CONTACT: Susan L. Greene, NMSS/IMNS
301-415-7843

Attachments:
1. Federal Register Notice
2. Proposed TAR response

ATTACHMENT 1

[7590-01-P]

NUCLEAR REGULATORY COMMISSION

Amendment to the Material License Issued to the Curators of the University of Missouri-Columbia Increasing the Limit of Uranium-238

AGENCY: Nuclear Regulatory Commission.

ACTION: License amendment.

SUMMARY: The Nuclear Regulatory Commission has amended Material License No. 24-00513-32, issued to the Curators of the University of Missouri-Columbia (the University), increasing the limit of uranium-238 (U-238) used in the Transuranic Management by Pyropartitioning Separation (TRUMPS) Project experiments.

License Condition No. 29, imposed by the Commission as a result of 10 CFR Part 2, Subpart L proceedings in Memorandum and ORDER CLI-95-01 dated March 1, 1995, limited the amounts of the subject actinides (U-238; neptunium-237, plutonium-239/240, and americium-241) used in the TRUMP-S experiments to no more than one gram total at any one time as a means of ensuring that the University's emergency plan is effective and sufficient to protect the public from a release of TRUMP-S materials. In 1996, the University requested a license amendment to increase the limit on U-238 from one gram for the total actinides up to 80 grams ($\approx 2.6 \times 10^{-5}$ Ci) of U-238, in addition to the one gram total for all other subject actinides. Staff analysis of the information submitted by the University concluded that an increase of U-238 from one to 80 grams ($\approx 2.6 \times 10^{-5}$ Ci) with a one gram total for all other subject actinides would not result in a potential exposure to the public significantly greater than that for the limiting case used by the Commission in CLI-95-01 for a ground release of one gram of Am-241 (≈ 3.3 Ci) and would not compromise the adequacy of the University's emergency plan.

ADDRESSES: A copy of Material License No. 24-00513-39 is available for inspection and/or copying in the NRC Public Document Room, 2120 L Street, NW, Washington, DC 20555-0001.

OPPORTUNITY FOR A HEARING: Any person whose interest may be affected by the licensee-initiated amendment of this license may file a request for a hearing. Any request for a hearing must be filed with the Office of the Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555, within 30 days of the publication of this notice in the Federal Register must be served on the NRC staff (Executive Director for Operations, One While Flint North, 11555 Rockville Pike, Rockville, MD 20852) and on the licensee (the Curators of the University of Missouri-Columbia, Research Reactor, Research Park Drive, Columbia, MO 65211); and must comply with the requirements for requesting a hearing set forth in 10 CFR 2.1205, Subpart L, "Informal Hearings Procedures for Adjudications in Materials Licensing Proceedings."

FOR FURTHER INFORMATION CONTACT: Larry W. Camper, Mail Stop TWFN 8-F-5, Division of Industrial and Medical Nuclear Safety, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Telephone (301) 415-7231.

Dated at Rockville, Maryland, this day of May 1997.

FOR THE NUCLEAR REGULATORY COMMISSION

Donald A. Cool, Director
Division of Industrial and Medical Nuclear Safety
Office of Nuclear Material Safety and Safeguards

ATTACHMENT 2

MEMORANDUM TO: John R. Madera, Chief
Nuclear Materials Safety and Safeguards Branch, Region III

FROM: Larry W. Camper, Chief
Medical, Academic, and Commercial Use Safety Branch
Division of Industrial and Medical Nuclear Safety, NMSS

SUBJECT: TECHNICAL ASSISTANCE REQUEST FROM THE UNIVERSITY OF MISSOURI-COLUMBIA REGARDING LICENSE AMENDMENT ON URANIUM-238 USE

I am responding to your September 19, 1996, Technical Assistance Request (TAR) (Attachment 1), transmitting the July 19, 1996, letter from the Curators of the University of Missouri-Columbia (the University), requesting an amendment to Broad-Scope Material License No. 24-00513-39.

In 1990, the Nuclear Regulatory Commission granted two amendments to the University's Special Nuclear Material (SNM) and Source Material License No. SNM-247 and Broad-Scope Byproducts License No. 24-00513-32, permitting the University to perform basic research on the chemistry of actinides uranium (U-238); neptunium (Np-237); plutonium (Pu-239/240); and americium (Am-241), in their pure forms, as part of the Transuranic Management by Pyropartitioning Separation (TRUMP-S) Project. The objective of the TRUMP-S experiments is to develop an inexpensive electrochemical means to reduce the volume of high-level radioactive waste by extracting 99 percent of the long-lived transuranic elements and uranium from the shorter-lived elements in spent fuel without generating liquid radioactive waste.

In the resulting 10 CFR Part 2 Subpart L proceedings regarding these amendments, the primary health and safety concerns addressed involved the inadequacy of fire safety procedures, emergency plans, and protection of the public in case of accident. The Commission, for the most part, reached the same conclusions as the Subpart L Atomic Safety and Licensing Board Panel (ASLBP) Presiding Officer (ASLBP No. 90-613-02 MLA) and affirmed LBP-91-31 and LBP-91-34 with certain modifications, and approved, subject to certain conditions, the University's license amendment applications in Memorandum and Order CLI-95-01, Section II.C.2.a.ii(a)(I). One of the conditions, imposed by the Commission, limits the amount of the subject actinides in the TRUMP-S experiments to no more than one gram total at any one time, as a means of ensuring that the University's emergency plan is effective and sufficient to protect the public from a release of TRUMP-S materials.

Based on the information submitted by the University, staff presented to the Commission (Attachment 2), the conclusion that issuance of the requested license amendment increasing the limit of U-238 from one to 80 grams ($\approx 2.64 \times 10^{-5}$ Ci) with a one gram total for all other subject actinides, is considered consistent with regulatory requirements and is not in conflict with the Commission's decisions in CLI-95-01. Therefore, with negative consent from the Commission, License Condition No. 29 should be amended to increase the amount of U-238 used in the TRUMP-S experiments from one gram up to 80 grams ($\approx 2.64 \times 10^{-5}$ Ci), in addition to the one gram total for all other subject actinides (Np-237, Am-241, and Pu-239/240).

Due to the nexus between the University's 1996 amendment request and the 10 CFR Part 2, Subpart L proceedings resulting in the Commission's Order limiting the University's use to no more than one gram of the subject actinides at any one time, staff also plans to notice the granting of the University's 1996 request in the Federal Register (Attachment 3) to inform intervenors involved in the earlier proceedings of NRC's action in this matter.

Contact: Susan L. Greene
(301) 415-7843

Attachments:
1. TAR dtd 09/19/96
2. Commission Paper
3. Federal Register Notice

1. That condition was based on, among other considerations, the University's commitment to use no more than that amount at any one time for an experiment.

2. In CLI-95-01, the Commission adopted NUREG-1140 as "the only technical document that specifically addresses accidental releases at materials facilities...[and] has undergone the public notice and comment process, as well as technical peer reviews."