FORM NRC-7
(5-79)
10 CFR 110

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY GAO
B-180225(R0362)

APPLICATION FOR LICENSE TO EXPORT NUCLEAR MATERIAL AND EQUIPMENT *(See Instructions on Reverse)*

1. APPLICANT'S USE →	a. DATE OF APPLICATION	b. APPLICANT'S REFERENCE	2. NRC USE →	a. DOCKET NO.	b. LICENSE NO.
	6/18/81			11002525	XSNM01841

3. APPLICANT'S NAME AND ADDRESS	RIS	4. SUPPLIER'S NAME AND ADDRESS *(Complete if applicant is not supplier of material)*	RIS
a. NAME U.S. Department of Energy			
b. STREET ADDRESS 1000 Independence Avenue, S.W.		a. NAME	
c. CITY: Washington; STATE: D.C.; ZIP CODE: 20585		b. STREET ADDRESS	
d. TELEPHONE NUMBER *(Area Code – Number – Extension)* 202-252-6183 T. Hart		c. CITY; STATE; ZIP CODE	

5. FIRST SHIPMENT SCHEDULED	6. FINAL SHIPMENT SCHEDULED	7. APPLICANT'S CONTRACTUAL DELIVERY DATE	8. PROPOSED LICENSE EXPIRATION DATE	9. U.S. DEPARTMENT OF ENERGY CONTRACT NO. *(If Known)*
8/01/81	10/81	N/A	8/01/83	DE-SC05-80-LEU-0504

10. ULTIMATE CONSIGNEE	RIS	11. ULTIMATE END USE *(Include plant or facility name)*
a. NAME See attachment, 25 below		For irradiation in the HFR-Petten, SILOE-France, and ORR-U.S. in connection with the RERTR program.
b. STREET ADDRESS		
c. CITY – STATE – COUNTRY		11a. EST. DATE OF FIRST USE
12. INTERMEDIATE CONSIGNEE	**RIS**	**13. INTERMEDIATE END USE**
a. NAME CERCA		For fabrication of fuel elements for RERTR program.
b. STREET ADDRESS Les Berauds, 26104 Romans-sur-Isere		
c. CITY – STATE – COUNTRY France		13a. EST. DATE OF FIRST USE
14. INTERMEDIATE CONSIGNEE	**RIS**	**15. INTERMEDIATE END USE**
a. NAME To be determined - for transport only		
b. STREET ADDRESS		
c. CITY – STATE – COUNTRY		15a. EST. DATE OF FIRST USE

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16. NRC USE	17. DESCRIPTION *(Include chemical and physical form of nuclear material; give dollar value of nuclear equipment and components)*	18. MAX. ELEMENT WEIGHT	19. MAX. WT. %	20. MAX ISOTOPE WT.	21. UNIT
	UO_2 or U_3O_8 powder	30.690	19.75 +–0.2	6.000	Kgs

22. COUNTRY OF ORIGIN – SOURCE MATERIAL	23. COUNTRY OF ORIGIN – SNM WHERE ENRICHED OR PRODUCED	24. COUNTRIES WHICH ATTACH SAFEGUARDS *(If Known)*
U.S.	U.S.	U.S.

25. ADDITIONAL INFORMATION *(Use separate sheet if necessary)*

Memorandum dated 5/12/81, Snelgrove to Damm

26. The applicant certifies that this application is prepared in conformity with Title 10, Code of Federal Regulations, and that all information in this application is correct to the best of his/her knowledge.

27. AUTHORIZED OFFICIAL	a. SIGNATURE	b. TITLE
		Director, Office of Nuclear Affairs

8106260473

ARGONNE
NATIONAL
LABORATORY

INTRA-LABORATORY MEMO

May 12, 1981

TO: Ronald G. Damm SPM

FROM: James L. Snelgrove AP/RERTR

SUBJECT: Shipment of Low-Enriched U_3O_8 Powder to CERCA (France) and Dispositon of Surplus and Scrap Uranium from FNR Fuel Fabrication at CERCA (France) and NUKEM (FRG)

One of the functions of the Reduced Enrichment Research and Test Reactor (RERTR) Program, managed by the Laboratory, is to perform irradiation tests of full-scale fuel elements containing high-density uranium fuels. The data obtained through these irradiations will be used to qualify these fuels (including associated materials and fabrication techniques) for use in low enrichment cores for research and test reactors. Higher density fuels for these purposes are being developed under the RERTR Program and under similar national programs and/or commercial ventures by private companies in several foreign countries. A high degree of cooperation and information exchange has been experienced with these foreign programs and ventures. In particular, CERCA, the French MTR-fuel fabricator, and NUKEM, the German MTR-fuel fabricator, have produced, on a no-cost basis, fuel elements for irradiation testing by the RERTR Program in the Oak Ridge Research Reactor (ORR), the High Flux Reactor at Petten, The Netherlands (HFR-Petten), and the SILOE reactor at the Grenoble Nuclear Research Center in France. The contribution of the RERTR Program was to provide without charge, through DOE lease contracts, the uranium for the fabrication of these fuel elements. The Program is actively pursuing extensions of these cooperative efforts to the very high density fuels whose development is nearing completion.

As one such extension, CERCA has offered to produce one fuel element to be irradiated in SILOE and one fuel element to be irradiated in the ORR containing U_3O_8-Al dispersion fuel with a uranium density in the fuel meat of 3.2 g/cm^3. This density is probably close to the practical limit for this type of fuel. We also expect to discuss with CERCA the possibility of producing one or more similar fuel elements(s) for testing in the HFR-Petten. Under such an arrangement the Program will need to supply the 19.75±0.2%-enriched uranium in the form of "HFIR-grade" U_3O_8 powder or in the form of UO_2 powder. Even though the number and type of elements to be produced is still in the discussion stage, I estimate that the total amount of uranium required will not exceed 6.00 kg of ^{235}U, or 30.38 kg of uranium, contained in the oxide powder. I expect that a better estimate of the amount of uranium needed can be made by July 1, 1981. However, since an export license must be obtained from the Nuclear Regulatory Commission for the shipment of this uranium and since the granting of such a license may require some time, it is prudent to request a license for the full amount of the material now rather than waiting until full agreement has been reached with CERCA. Of course, the amount of uranium shipped will be only that needed for the specific fabrications which are agreed upon. All of the uranium will eventually be returned to the U.S. with the exception of unrecoverable fabrication losses, uranium contained in non-destructive examination (NDE) standards or archival samples, and uranium consumed during tests in SILOE and in the HFR-Petten. The anticipated

disposition of the 6.00 kg of ^{235}U, should all proposed test elements be fabricated, is shown in Table 1, along with estimated shipping dates. A shipment to CERCA during August is necessary so that CERCA can begin fabricating the test elements for SILOE and for the ORR in September. Since approximately one-half of the material to be shipped is available now from Y-12 or ORNL and one-half must be procured, it is expected that two shipments will be required.

In addition to obtaining the export license, a modification must be made to DOE Contract No. DE-SC05-80 LEU-0504 to cover the additional uranium for these fuel elements. The Laboratory will make a corresponding modification to its fabrication contract with CERCA (Contract No. 31-109-38-5406). If the exact amount, rather than the maximum amount, of uranium to be provided to CERCA must be stated in the lease contract, that number can be supplied by July 1, 1981.

At the present time CERCA is fabricating fuel elements for use in the Ford Nuclear Reactor (FNR) under fixed-price Contract No. 31-109-38-5678, with uranium leased without charge under DOE Contract No. DE-SC05-80 LEU-0507. Upon delivery of the fuel elements (scheduled for September) CERCA is obligated through both contracts to return the unused uranium metal and any uranium-bearing scrap to the U.S. I estimate the total amount of ^{235}U contained in the unused metal and scrap to be 3.0 kg. We are currently discussing with CERCA the possibility of the fabrication of uranium silicide dispersion fuel elements for irradiation testing, for which the U.S. would be responsible for supplying the uranium. The uranium metal and possibly some of the scrap remaining from the FNR fuel element fabrication could be used in making the uranium silicide compound(s) for these elements. Therefore, rather than bringing the excess uranium from the FNR fabrication back and exporting different uranium for the silicide fabrication, it makes sense to transfer the 3.0 kg of ^{235}U contained in 19.75%-enriched uranium from DOE Contract No. DE-SC05-80 LEU-0507 to DOE Contract No. DE-SC05-80 LEU-0504. The effective date of the transfer could be September 30, 1981, or upon final acceptance of all fuel elements by the Laboratory, whichever is later. This action could save up to $10,000 in uranium shipping costs as well as the manpower involved in preparing the paperwork for the shipments and a new export license. Eventually, at the end of the uranium silicide fuel fabrications, all excess uranium and scrap would be returned to the U.S. unless some other arrangement (such as purchase) were made between DOE and CERCA. In order to allow sufficient time to complete all fabrications, the expiration date of DOE Contract No. DE-SC05-80 LEU-0504 should be changed from June 30, 1982, to December 31, 1983.

A similar situation exists with regard to NUKEM for disposition of surplus and scrap uranium of 19.75% enrichment following completion of fabrication of the FNR fuel elements there, although the quantity involved is only 0.3 kg ^{235}U. NUKEM is fabricating FNR fuel elements under fixed price Contract No. 31-109-38-5679, with uranium leased without charge under DOE Contract No. DE-SC05-80 LEU-0506. I recommend that the approximately 0.3 kg ^{235}U which will remain under this contract at the end of fabrication be transferred to DOE Contract No. DE-SC05-80 LEU-0505, which covers uranium leased to NUKEM for the fabrication of irradiation-test fuel elements. The effective date of the transfer could be the same as for the contract with CERCA. In addition; the expiration date of DOE Contract No. DE-SC05-80 LEU-505 should be changed from June 30, 1982, to December 31, 1983.

In summary, then, DOE must be requested to do the following:

1. Apply to the Nuclear Regulatory Commission for a license for the export of 19.75±0.2% enriched U_3O_8 or UO_2 powder containing 6.00 kg of ^{235}U. The license is needed by August 1, 1981.

2. Amend DOE Contract No. DE-SC05-80 LEU-0504 with CERCA to:

   a) include the 6.00 kg (or other amount to be determined by July 1, 1981) of ^{235}U contained in the 19.75±0.2%-enriched U_3O_8 or UO_2 powder,

   b) include the approximately 3.0 kg of ^{235}U contained in the 19.75 ±0.2%-enriched uranium metal and scrap remaining after fabrication of the FNR fuel elements (this material now being leased under DOE Contract No. DE-SC05-80 LEU-0507), and

   c) change the expiration date from June 30, 1982, to December 31, 1983.

3. Amend DOE Contract No. DE-SC05-80 LEU-0505 with NUKEM to:

   a) include the approximately 0.3 kg of ^{235}U contained in the 19.75>0.2%-enriched uranium metal and scrap remaining after fabrication of the FNR fuel elements (this material now being leased under DOE Contract No. DE-SC05-80 LEU-0506), and

   b) change the expiration date from June 30, 1982, to December 31, 1983.

In order that shipment of the U_3O_8 or UO2 powder to CERCA can be made beginning in August 1981, the amendment of Item 2 must be made and signed by all parties by mid-August. Since delivery of the NUKEM fuel elements for the FNR is expected during August, the amendment of Item 3 must be made and signed by all parties by about September 1, 1981, so that the Laboratory can close out the procurement contract and issue final payment to NUKEM without undue delay.

JLS:smg

cc: L. R. Dates
D. Hutchinson
A. Travelli

Table 1. Disposition of Uranium to Be Shipped to CERCA
(All quantities kg ^{235}U)

			Estimated Shipping Date
U.S. to CERCA	3.000		Aug. 1981
U.S. to CERCA	3.000		Oct. 1981
	6.000		
CERCA to HFR-Petten (ECN)	0.963		May 1982
CERCA to SILOE (CEA)	0.307		Jan. 1982
CERCA to ORR	0.695		Feb. 1982
CERCA retains (NDE standards+losses)	0.350		
CERCA to Y-12 (scrap+unused)	3.685		Sept.1983
	6.000		
HFR-Petten burnup		0.572	
ECN retains (archival samples)		0.050	
ECN to Savannah River		0.341	May 1984
		0.963	
SILOE burnup		0.141	
CEA retains (archival samples)		0.000	
CEA to Savannah River		0.166	Jan. 1984
		0.307	

SUMMARY

Total burned in Europe	0.713
Total retained in Europe	0.400
Total returned to U.S.	4.887
	6.000