THE UNIVERSITY OF MICHIGAN
MICHIGAN MEMORIAL–PHOENIX PROJECT

OFFICE OF THE DIRECTOR
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July 28, 1980

PHOENIX MEMORIAL LABORATORY
NORTH CAMPUS
ANN ARBOR, MICHIGAN 48105

License No. R-28
Docket No. 50-2

Mr. James R. Miller, Chief
Standardization and Special Projects Branch
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

The University of Michigan requests that the Ford Nuclear Reactor (FNR) license No. R-28 be amended to allow an increase in the total number of kilograms of contained uranium on-site from 16.1 to 25.

Discussion and Explanation

As part of the low enrichment uranium (LEU) program, a total of 45 standard fuel elements, each containing 167 grams of uranium-235, and 10 control rod elements, each containing 83.5 grams of uranium-235, are to be delivered to the Ford Nuclear Reactor in early 1981 for a LEU whole core demonstration. This total of 8.35 kilograms of uranium-235 added to the FNR's current licensed limit yields 24.45 kilograms. Since the reactor will be operating under its normal schedule during arrival of the LEU fuel and subsequent planning for the whole core demonstration, the LEU fuel will be an addition to the inventory of highly enriched fuel on hand.

Argonne National Laboratory, sponsors of the LEU program, are purchasing the LEU fuel from CERCA (Compagnie pour l'Etude et la Realisation de Combustibles Atomiques) in France and NUKEM (a manufacturing conglomerate) in Germany. Fuel element dimensions and characteristics when manufactured by these companies are identical to those described in the SAFETY ANALYSIS, UTILIZATION OF LOW ENRICHMENT URANIUM (LEU) FUEL IN THE FORD NUCLEAR REACTOR, October, 1979, which is under your review at the present time, except the aluminum alloys used in the fuel core powder, fuel plate covers, and fuel element structure are French and German alloys. TABLE 1 (attached) lists the chemical compositions of United States, French, and German aluminum alloys proposed for LEU fuel elements. Though each has chemical differences, all are of high quality suitable for use in reactor fuels.

The Union Carbide reactor is licensed to use CERCA fuel manufactured with the French alloys. The General Electric Test Reactor is licensed to use NUKEM fuel made with the German alloys. In addition, both companies have extensive experience successfully supplying European reactors with plate fuel including OSIRIS (70 MW), HBR Petten (45 MW), BR2 (80 MW), ORPHEE (14 MW), and the German-French-British Reactor in Grenoble.

Requested License Amendment

Change paragraph 2.b. of License R-28 to read: Pursuant to the Act and Title 10, CFR, Chapter 1, Part 70, "Special Nuclear Material," to receive, possess and use:

(1) 16.1 kilograms of contained uranium-235 as fully enriched uranium for use in connection with operation of the reactor.

(2) 9.0 kilograms of contained uranium-235 in fuel enriched to less than 20% in uranium-235 for use in connection with operation of the reactor.

(3) Up to five fission type neutron detectors which may contain up to a maximum total of 10 grams of uranium-235 as fully enriched uranium.

This matter has been reviewed and approved by our Reactor Safety Review Committee.

Sincerely,

William Kerr
Director
Michigan Memorial-Phoenix Project

WK/z

Enclosures

xc: James L. Snelgrove
Coordinator Engineering Activities
RERTR Program
Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439

Subscribed to and sworn to before me this
28th day of July 1980 at
Ann Arbor, Michigan, County of Washtenaw, U.S.A.

Donna M. Zeeb
Notary Public

DONNA M. ZEEB
Notary Public, Washtenaw County, Mich.
My Commission Expires on Oct. 21, 1981

TABLE 1

Chemical Composition of Aluminum Alloys Used in Fuel Element Manufacture by United States, French (CERCA), and German (NUKEM) Suppliers

	Fuel Core Powder				Fuel Plate Covers			Fuel Element Structure		
Maximum Percentage or Alloy Range	1100 (US)	5214 (US)	A5NE (CERCA)	(NUKEM)	6061 (US)	AG2NE (CERCA)	AL-MG-1 (NUKEM)	6061 (US)	AG3NE (CERCA)	AL-MG-Si-1 (NUKEM)
Al_2O_3	-	-	-	.70	-	-	-	-	-	-
Boron	-	.001	.001	.001	-	.001	.001	-	.001	.001
Cadmium	-	.002	.001	.001	-	.001	.001	-	.001	.001
Chromium	-	-	-	-	.15-.35	-	.10	.15-.35	-	.25
Cobalt	-	-	-	.001	-	-	.003	-	-	.003
Cooper	.20	.20	.008	.008	.15-.40	.008	.008	.15-.40	.008	.05
Iron	-	.05	.40	.20-.40	.70	.20-.40	.45	.70	.20-.40	.50
Lithium	-	.008	.001	.001	-	.001	.001	-	.001	.001
Magnesium	-	-	-	.015	.80-1.2	1.8-2.3	.70-1.1	.80-1.2	2.5-3.0	.60-1.2
Manganese	.05	-	-	-	.15	-	.15	.15	-	.40-1.0
Oil and Grease	-	-	-	.20	-	-	-	-	-	-
Silicon	-	-	.30	.30	.40-.80	.30	.30	.40-.80	.30	.70-1.3
Silicon and Iron	1.0	.25	.50	-	-	.20-.50	-	-	.20-.50	-
Titanium	-	-	-	.02	.15	-	-	.15	-	.10
Volatiles	-	-	-	.10	-	-	-	-	-	-
Zinc	.10	.10	.03	.03	.25	.03	.05	.25	.03	.05
Others	.15	0.0	.03	0.0	.15	.03	.15	.15	.03	.15
Minimum Percentage										
Aluminum	99.0	99.7	99.4	98.5	Remainder			Remainder		