UNIVERSITY OF VIRGINIA
SCHOOL OF ENGINEERING AND APPLIED SCIENCE
CHARLOTTESVILLE, 22901

DEPARTMENT OF NUCLEAR ENGINEERING AND ENGINEERING PHYSICS
REACTOR FACILITY

TELEPHONE: 804-924-7136

December 18, 1978

Director of Reactor Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Robert W. Reid, Chief
Operating Reactor Branch #4

Re: License No. R-66, Docket No. 50-62

Dear Sir:

This letter provides additional information in support of our March 9, 1977 request for approval of an amendment to extend the expiration date of license R-66 covering the University of Virginia Reactor (UVAR). This information provides a partial response to the license renewal items identified in the enclosure to your letter of October 16, 1978.

Specifically, this letter provides additional general information concerning the University of Virginia and information concerning environmental aspects related to the operation of the UVAR as requested by sections A.1 and A.2 of your letter. This additional information is provided in the following sections:

A. Additional Information Concerning Financial Consideration Related to the UVAR as Delineated in 10 CFR 50.30(f). and Requested in Review Item A.1(f)

A.1.(f)(1) The most recently published annual statement of operations of the University of Virginia.

The most recent annual financial report for the University is included as Attachment A. The State supported budget for the Nuclear Reactor is shown in Attachment B. Additional information which shows that the Reactor Facility budget is about 0.2% of the University budget for educational purposes is provided in Attachment C.

A.1.(f)(2) Estimated annual costs to operate the reactor for the license renewal period.

The State funded budget for operating the reactor for 1978-79 is $126,304. An annual increase of 7% has been used to estimate the budget figures below:

A020
S
10/10
ADD
J PETERSEN
W/ENCL

1977	$125,000	1987	$232,000
1978	126,000	1988	248,000
1979	135,000	1989	265,000
1980	144,000	1990	284,000
1981	154,000	1991	304,000
1982	165,000	1992	325,000
1983	177,000	1993	348,000
1984	189,000	1994	372,000
1985	202,000	1995	398,000
1986	216,000	1996	426,000

Total for 20 years $4,835,000.

This budget represents less than 1% of the State supported budget for the University. The University has supported the reactor facility since its inception in 1958. There is every expectation that the State will continue to support the reactor at this level. This intent is clearly shown in the letters from the Dean of the School of Engineering and Applied Science and from the University Comptroller enclosed as Attachment C.

A.1.(f).(3) Estimated costs of permanently shutting down the reactor.

		Total
1)(a) Remove, package, ship and reprocess 85 fuel elements.		
Reprocessing charge @ $1000/element.	$85,000	
Shipping charge $10,000/shipment, 20 elements/shipment	40,000	
(b) Labor. 1 month	8,000	$143,000
2) Disposal of graphite reflector elements. 58 elements, 8 elements/drum,		
(c) $70/drum	560	
Labor, 2 weeks	4,000	4,560
3) Disposal of grid plate and support structure		
1 drum of cut up material	70	
Labor, 2 days	800	870
4) Disposal of beam tubes		
2 drums	140	
Labor, 2 days	800	940
5) Disposal of miscellaneous experiments and sources		
2 drums	140	
Labor, 2 days	800	940

A.1.(f).(3) Continued

		Total
6) Disposal of demineralizers and charcoal		
10 drums	700	
Labor, 2 days	800	1,500
7) Clean pool, decontaminate and paint		
Labor, 1 month	8,000	8,000
Total		$159,800

(a) Includes the cost of removing all fuel presently at the reactor. In the past, reprocessing and shipping costs have been partially supported by DOE (AEC) through the reactor sharing program. We anticipate partial relief from these costs in the future.

(b) Labor costs are based on a State supported budget for personnel of $100,000 in 1978. Labor times represent involvement of the entire State supported reactor staff.

(c) Waste materials packed in 55 gallon drums and disposed as dry waste.

The type of permanent shutdown contemplated is the decommissioning of the UVAR and the CAVALIER reactors to the point that the space they now occupy can be released for unrestricted use.

The funds required to permanently decommission the reactors will be provided for in the regularly budgeted State appropriations or by University overhead funds when necessary.

A.1.(f).(4) An estimate of the annual cost to maintain the shut down facility in a safe condition.

It is anticipated that the facility will be decontaminated so that it can be released for unrestricted use. In that event the building would probably be used for other research activities of the University so the question of annual maintenance costs is not relevent.

B. Additional Information Concerning Environmental Considerations Related to the UVAR as Requested in Review Item A.2.(f).

A.2(f)(1a) Information concerning the reactor coolant system pressures.

The pressure of the primary and secondary coolant at the inlet and outlet of the heat exchanger was recently measured and is tabulated in the table provided below. These data show that the pressure on the secondary side is higher than the pressure on the primary side.

A.2(f)(1a) (Continued)

UVAR COOLANT SYSTEM PRESSURE WITH PRIMARY AND SECONDARY PUMPS OPERATING

Location: Heat Exchanger	Inlet	Outlet
Primary Coolant System	25 psig	15 psig
Secondary Coolant System	26 psig	25 psig
Primary to Seconday Pressure Differential	- 1 psig	- 10 psig

A.2(f)(1b) Information concerning secondary cooling system discharge.

The only loss of water from the secondary cooling system during normal operation is due to evaporation to the atmosphere. Any excess water resulting from overflow or draining of the secondary side for maintenance will go to the pond located near the reactor facility, as discussed in sections 4.5 and 4.8 of UVAR-18 Part I which is the UVAR Safety Analysis Report.

A.2.(f)(2) Information concerning radioactive effluents.

The direct radiation level of liquid effluents, which are predominantly liquid effluents from demineralizer regeneration is less than 1 mr/hr on contact. Effluents are stored in underground hold-up tanks and eventually released with water from a hold-up pond as a dilutant. Releases over the last several years are as follows:

Year	Activity (microcuries)	Total Volume (gallons)	Average Specific Activity (μci/ml)
1974	320.0	10,050,500	8.4×10^{-9}
1975	259.8	12,818,000	5.4×10^{-9}
1976	324.4	10,516,000	8.6×10^{-9}
1977	474.0	5,511,000	2.3×10^{-8}

A.2.(f)(3) Information concerning the disposal of samples.

Disposal of radioactive waste, including samples, is discussed in sections 7.6 and 7.7 of UVAR-18, Part I, the Safety Analysis Report. Presently, solid waste disposal is contracted to Teledyne, Inc.

A.2.(f)(4) Information concerning release of radioactive materials to unrestricted areas.

All solid spent activated samples are collected as waste and shipped to a burial site, therefore no activity is released to

A.2.(f)(4) (Continued)

unrestricted areas from these samples. The concentration and activity of radioactive liquids is provided in Item 2, above.

Total Argon-41 releases during the past several years have been as follows:

Year	Ar^{41} from Reactor Operation	Ar^{41} from Sample Activation
1974	314 millicuries	175 millicuries
1975	230 millicuries	220 millicuries
1976	277 millicuries	165 millicuries
1977	705 millicuries	0.5 millicuries

C. General Information Concerning the University as Delineated in 10 CFR 50.33 as Requested in Review Items A.1.(c) through A.1.(e).

The requested information which relates to the purpose and officers of the University of Virginia and a list of other NRC licenses held by the University of Virginia is included as Attachment D.

It should be noted that the University of Virginia does not own or operate a critical experimental facility at Lynchburg, Virginia and therefore all licenses held by the University of Virginia are related to activities in Charlottesville, Virginia.

Nineteen copies of Attachment D, which includes our original request to extend the license expiration date, have been included as requested by 10 CFR 50.30(c)(1)(ii) and review item A.2.(c)(1)(ii). In addition, this information responds to review item A.2.(d) which specified the information to be contained in applications for reactor operating license as delineated in 10 CFR 50.30 (d).

This letter provides our response to all of the review items in Section A.1 and A.2 in the enclosure to your October 16, 1978 letter. As previously agreed, we will provide our response to the remaining items by January 19, 1978.

Sincerely,

Attachments

cc: B. L. Shriver
J. P. Farrar
A. B. Reynolds

T. G. Williamson, Director
Reactor Facility

Sworn to and subscribed before me this 18th day of December 1978.

Witness my hand and official seal.

Notary Public

Essbossed Hereon Is My Albemarle County, Va., Notary Public Seal
My Commission Expires January 21, 1979
LENA R. THORNE