UNIVERSITY OF MISSOURI

Research Reactor Facility

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October 13, 1982

Region III, Office of Inspection
and Enforcement
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Attention: J. R. Miller, Chief
Technical Inspection Branch

Docket No. 50-186 University of Missouri

Gentlemen:

Referring to your letter of September 15, 1982 reporting the results of an inspection by Messrs. P. C. Lovendale and W. B. Grant, the following response is submitted for each of the items in Appendix Notice of Violation.

Response to Notice of Violation

Item 1.

10CFR20.201(b) requires that surveys be made as necessary to comply with 10CFR20, including 10CFR20.101 which specifies radiation dose limits for individuals.

"Contrary to the above, surveys were not made in the area accessible to personnel around beam port E."

Response to Item 1.

Routine surveys are made in the area accessible to personnel at beam port E. The routine survey has not included measuring radiation in the cross section of the beams due to lack of confidence in the methods available for neutron measurements. On October 23, 1980, measurements were made in beams at beam ports A and E. Evaluation of that data for beam port E gave an exposure rate in the beam of 21.8 Rem/hr. Radiation components of the beam were 0.43 Rem/hr fast neutrons, 3 Rem/hr gamma and 18.34 Rem/hr thermal neutrons. Because measurement of the thermal neutron component was difficult, we utilized a conservatively high value of 5×10^6 n cm^{-2} sec^{-1} supplied by the experimenter based on measurements with his equipment.

We recognize that the evaluation was not adequately communicated to personnel at MURR. It was reviewed with Reactor Health Physics and beam port personnel August 18, 1982 and will be communicated by posting at beam ports and by training meetings for appropriate personnel.

It was decided to develop a much better capability to perform beam measurements by use of a neutron spectrometer. A Ludlum model 42-5 neutron spectrometer was purchased. During the September, 1981 through May, 1982 school term, MURR supported a graduate student for a research project to develop an acceptable method of using the neutron spectrometer to evaluate neutron spectra in narrow beams.

May 1982, James Dwight Sohl, Jr. published his thesis Experimental Benchmarking of the Bonner Sphere Spectrometer Using Filtered Neutron Beams.

Several months were needed for Mr. Sohl to transfer his knowledge to MURR Health Physics Technician, Steve Growcock, who has been performing trial measurements since May, 1982. He successfully completed those trial measurements in August, 1982.

Based on new methods of measurement, an evaluation of the radiation exposure rates for beam port E beams are:

Beam*	Gamma Rem/hr	Neutron Rem/hr
3XE	0.250	13.29 ± .12
2XE	0.730	10.28 ± .10

*Refer to attached drawing.

The radiation surveillance program for open beams at beam ports now includes measurement and evaluation of exposure rates in beam cross sections when an experiment change will affect the radiation levels in the beam. Posting will be maintained at beam ports with open beams to caution experimenters and to meet requirements by 10CFR20.203.

A physical barrier will be maintained at beams accessible to personnel designed to show the location of the beam line and to alert a person moving into a beam. Temporary barriers have been installed pending completion of hardware for permanent barriers.

Item 2.

10 CFR 20.203 states, in part, that each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words: Caution, Radiation Area, and that each area in which licensed materials are stored shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words: Caution, Radioactive Material(s).

Contrary to the above, surveys made by the inspectors and confirmed by the licensee of the Sinclair Farm storage area identified accessible radiation levels of 15 mR/hr. This area was not posted as a radiation area nor was the area posted as a radioactive materials storage area.

Response to Item 2.

The tank referred to in the inspection report was not properly posted at the time of inspection. It had been labeled with adhesive backed signs that were no longer on the tank. The immediate remedy was to enclose the tank with a rope barrier and post signs to comply with 10CFR20.203.

We are determining the cost of replacing the existing fence with an acceptable security fence to enclose the Sinclair Radwaste Disposal site. As reported below under item 3, a decision about disposition of radioactive materials at the site will be made by December 31, 1982.

Item 3.

NRC License No. R-103 authorizes operation of the reactor, including possession of byproduct material produced by operation of the reactor, as described in the application, which includes the Hazards Summary report. 10 CFR 50.59(b) requires a written safety evaluation which provides the basis for the determination that a change in the facility as described in the safety analysis report does not involve an unreviewed safety question.

Contrary to the above, radioactive waste is routinely stored at a location (Sinclair Farm) several miles from the reactor site. Such storage is not described

in the Hazards Summary Report nor has the licensee conducted a safety evaluation of such storage in accordance with 10 CFR 50.59.

Response to Item 3.

We are evaluating alternative radioactive waste disposal procedures for the Research Reactor and all other University of Missouri radwaste generators. By December 31, 1982, a request will be submitted to amend one of the University of Missouri licenses to permit waste generated by operation under license R-103 to be stored and processed at the Sinclair Radwaste Disposal site or we will remove waste generated under R-103 from the site.

It is our understanding that the present arrangement is temporarily acceptable pending resolution of the alternatives discussed in the preceding paragraph.

Sincerely yours,

Orval L. Olson

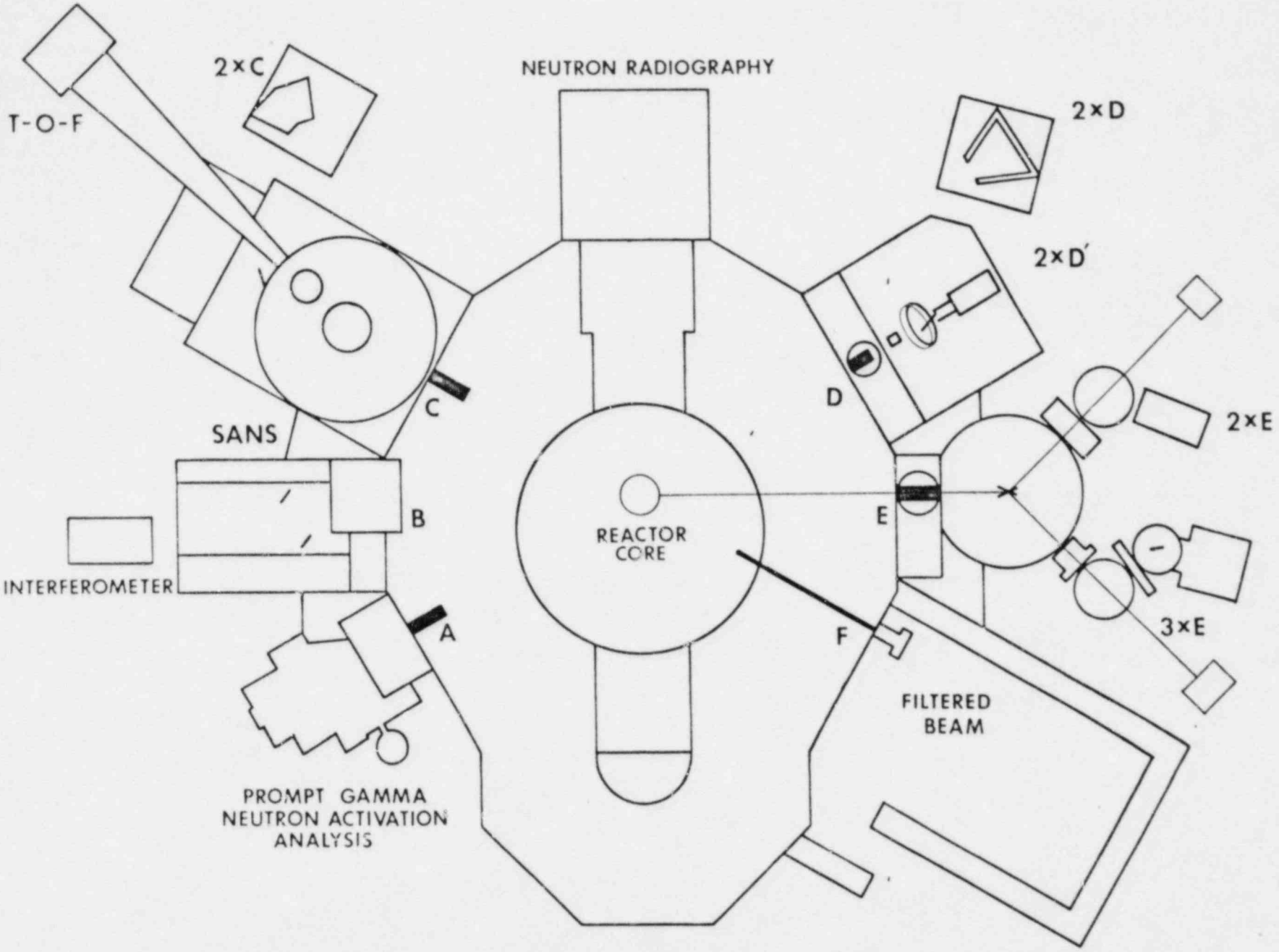
Orval L. Olson, Manager
Reactor Health Physics

Don M. Alger

Don M. Alger
Associate Director

OLO/mbs

Attachment (1)


T-O-F
2×C
NEUTRON RADIOGRAPHY
2×D
2×D′
SANS
C
D
2×E
B
REACTOR
CORE
E
INTERFEROMETER
A
F
3×E
FILTERED
BEAM
PROMPT GAMMA
NEUTRON ACTIVATION
ANALYSIS