# U.S. NUCLEAR REGULATORY COMMISSION OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No.	50-77/79-03				
Docket No.	50-77				
License No	. <u>R-31</u>	Priority		CategoryH	
Licensee:	Catholic Unive	rsity			
	620 Michigan A	venue, N.E.			
	Washington, D.	C. 20064			
Facility Na	ame: <u>Catholic</u>	University of An	erica Resea	arch and Test Reactor, AGN 201	
Inspection	at: Washingto	n, D. C.			
Inspection	conducted: 0	tober 29-30, 197	9		
Inspectors	: - Charles on the	elina		11-1-79	
	C. O. Galin	a, Investigator		date signed	
	K. E. Plumle	e, Radiation Spe	cialist	date signed	
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	11	2010		date signed	
Approved by	y: J. P. Stohr	, Chfef, Radiati	ion Support	Section, <u>11/20/79</u> date signed	
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Inspection Summary:

Inspection on October 29-30, 1979 (Report No. 50-77/79-03)

Areas Inspected: Routine, unannounced inspection by regional based inspectors of the research reactor facility; reactor operations; the radiation protection program for these activities; and, radioactive waste management in this facility. This inspection involved 8 hours onsite by two regional based inspectors. <u>Results</u>: No items of noncompliance were identified involving the research reactor facility, operations and waste management. Two items of noncompliance were identified involving the radiation protection program (Deficiency - failure to post information as specified by 10 CFR 19.11(a) and (b), Paragraph 3.a; and, Deficiency - failure to post Form NRC-3 as specified by 10 CFR 19.11(c), Paragraph 3.b).

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Region I Form 12 (Rev. April 77)

## DETAILS

#### 1. Persons Contacted

\*Dr. D. D. Ebert, Reactor Supervisor \*Dr. E. D. Jordan, Reactor Administrator

\*denotes those present at the exit interview, October 30, 1979, 3:30 p.m.

### 3. Licensee Action on Previously Identified Items

(Closed) Item of Noncompliance (78-02-01): Lack of timely report, required by License No. R-31, of a condition that could have prevented actuation of a safety system. Interviews and reviews of the reactor logbook and surveillance records did not identify any recurrence of this item.

(Closed) Inspector Followup Item (78-02-02): Review of status of the reactor console, and any console maintenance problems. Interviews and reviews of the reactor logbook including maintenance entries and surveillance entries did not identify any recent functional problems or maintenance problems involving the reactor console.

(Closed) Unresolved Item (74-01-02): Radiation dose rate during reactor runs. Shielding requirments were specified in Section 16.3.4, "Shielding," of the Technical Specifications, License Amendment No. 7, March 12, 1979, issued in response to the license renewal application dated October 12, 1977. Review of the licensee's records did not identify any items of noncompliance involving shielding.

(Closed) Unresolved Item (74-01-03): Boric acid content of reactor shield water. The Technical Specifications, Section 16.3.4, "Shielding," do not require the use of boric acid, and the licensee does not use boric acid in the shield water.

(Closed) Circular (77-14): Separation of contaminated and noncontaminated water system. The only potentially contaminated water system is the shield water deionizer loop for this reactor. The entire system is located in and over the reactor pit, which has no drain. There is no connection to noncontaminated systems except at times when the system is sampled and drained, or refilled, using temporary arrangements.

#### 3. Review of Posted Information

a. Part of the inspection effort was to examine licensee compliance with requirements of 10 CFR 19.11, "Posting of Notices to Workers," which requires, in subparts (a) and (b):

- "(a) Each licensee shall post current copies of the following documents:
  (1) The regulations in this part and in Part 20 of this chapter;
  (2) the license, license conditions, or documents incorporated into a license by reference, and amendments thereto; (3) the operating procedures applicable to licensed activities...
- (b) If posting of a document specified in paragraph (a)(1), (2) or (3) of this section is not practicable, the licensee may post a notice which describes the document and states where it may be examined."

The inspector noted that the above posting requirements include, in addition to copies of 10 CFR 19 and 10 CFR 20, a copy of NRC License No. R-31 and Appendix A thereto (Technical Specifications), and amendments to the license, as well as the operating procedures for activities conducted under the license.

During the tour of the facility the inspector observed the above documents were not posted and there was no posted sign describing them.

The inspector identified this as noncompliance with the above requirements (79-03-01).

The licensee representatives stated that the bulletin board bearing the posted documents had been removed and was not yet relocated to the newly designated place. He said the removal occurred when the Nuclear Reactor Lab was subdivided into the two rooms that are now called the Nuclear Reactor Lab and the Thermal Science Laboratory (FSAR Figure 12-1).

The Radiation Safety Officer informed the inspector by telephone on November 5, 1979, that the proper sign has been posted.

#### b. 10 CFR 19.11 requires, in subpart (c):

"(c) Form NRC-3, "Notice to Employees," shall be posted by each licensee wherever individuals work in or frequent any portion of a restricted area...."

The inspector observed, and the licensee representative acknowledged, there was no posted copy of Form NRC-3 in or near the Nuclear Reactor Lab or elsewhere on that level of the Pangborn Building, the reactor room being a restricted area frequented by security, housekeeping, student, and staff personnel on various daily and weekly schedules. The inspector identified this as noncompliance with the above requirements (79-03-02).

The licensee representative requested that copies of Form NRC-3 be mailed to the licensee pursuant to the provisions of 10 CFR 19.11(c) for distributing the form. Copies were mailed on November 1, 1979.

The Radiation Safety Officer informed the inspector by telephone on November 5, 1979, that the Form NRC-3's had been posted by that date and there will be audits to prevent any recurrence of this item of noncompliance.

### 4. Organization and Administration

Part of the inspection effort was to determine compliance with requirements of Technical Specifications Section 16.6.1, "Organization," and Figure 16-1 thereof, "Administrative Organization for Reactor Control and Safety."

Interviews with licensee representatives and further review during the exit interview, showed that the above organization was modified on October 15, 1979. Whereas subsection 16.6.1.2, "Executive Vice President and Provost," other subsections\* and Figure 16-1 of the Technical Specifications apparently referred to one individual the licensee has designated one individual "Executive Vice President," and another individual "Provost." The licensee representative stated that the duties and responsibilities indicated in the Technical Specifications were assigned as of October 15, 1979, to the "Executive Vice President," and timely written notice of the change in title will be submitted to NRC.

Licensee update of this information will be verified on a subsequent routine inspection (79-03-03).

The licensee representative stated that the following personnel occupy the positions required by Technical Specifications Section 16.6.1, "Organization."

<u>President</u> - Dr. E. Pellegrino <u>Executive Vice President</u> - Dr. C. J. Neusse <u>Dean of Engineering and Architecture</u> - Dr. G. McDuffie <u>Chairman, Department of Mechanical Engineering</u> - Dr. M. Caserella (Acting) (Y. Whang is on a leave of

absence.)

\*References to "Executive Vice President and Provost" are made in Technical Specifications 16.6.1.3, 16.6.1.9, and 16.6.1.10.

Reactor Administrator - Dr. E. Jordan

Reactor Supervisor - Dr. D. Ebert

<u>Reactor Operators</u> - Dr. D. Ebert is the only currently licensed reactor operator or Senior Reactor Operator (SRO).

<u>Reactor Safety Committee (RSC)</u> - (Same as following; Radiation Safety Committee Membership.)

Radiation Safety Committee - (Membership October 4, 1979)

Chairman - E. Jordan Members - H. Crannell D. Ebert W. Keene L. May W. Nork E. Smith J. Todhunter

#### Radiation Safety Officer - W. Keene

The inspector was informed by the Reactor Supervisor that in addition to the above, the following four personnel are involved part time with the Nuclear Reactor Lab.

### Health Physics Assistant

Electronic Technician

Housekeeper

Graduate Student

The inspector had no further questions on this area of the inspection at this time.

5. Review of Logbooks and Records

The inspector reviewed selected examples of the following logbooks and records, covering the period May, 1978 to October 30, 1979, to determine compliance with requirements imposed by the license, Technical Specifications, NRC Regulations, licensee procedures, and applicable guides and standards.

- -- 1978 Annual Report of Nuclear Reactor Operations
- -- Reactor Operations Logsheets
- -- Sign-in and Visitors Register Sheets
- -- Radiation and Contamination Survey Sheets
- -- RSC Committee Meeting Minutes

No items of noncompliance were identified involving logbooks and records.

## 6. Review of Design Changes

During the tour of the licensed facility the inspector observed the design changes and made measurements to confirm adherence to accepted standards and practices. No undocumented changes and no discrepancies with documentation were identified except that some interior walls had not been built that are shown in FSAR Figure 12-1 in the area designated as the Thermal Science Laboratory.

The inspector did not identify any differences in the construction of the new wall, dividing the Thermal Science Laboratory from the Nuclear Reactor Lab, and the original dividing walls in the basement of the Pangborn Building. The prints, designated M-3 and M-4, which show the original design, were transmitted by a letter dated September 25, 1959.

The licensee has placed concrete blocks in the windows of the Nuclear Reactor Lab.

The inspector measured the ventilation inflow velocity at 180 linear fpm at the threshholds of doors into the Nuclear Reactor Lab, with all doors closed. This confirmed that the ventilation balance would not spread any airborne radioactivity from the Nuclear Reactor Lab into adjoining areas of the building.

No items of noncompliance with reactor facility design requirements were identified.

## 7. Review of Experiments

Review of reactor experiments indicated that classes are present twice each week, and reactor operation is limited to experiments, surveillance and routine calibration conducted within the scope of the manufacturer's safety documentation, the FSAR, and the Technical Specifications.

No experiments or operation was identified that did not comply with the RSC Committee, license, and regulatory requirements.

## 8. Reactor Operator Training

Review showed that one licensed operator was available for the facility, Dr. D. Ebert, whose Senior Reactor Operator License was issued January 19, 1979. This followed training, and an onsite examination by an NRC examiner, at a similar reactor facility located at Memphis State University, during November, 1978.

Review of reactor records and RSC minutes showed that Dr. Ebert has participated in maintenance, in checkout, and in the resumption of operation of the Catholic University Nuclear Reactor Facility, and has been present during all subsequent reactor operation. He appeared to participate in all maintenance, surveillance activities, operation, conduct of experiments, and review and preparation of procedures.

Dr. Ebert stated the intent to train and qualify candidates for reactor operators licenses.

Licensee implementation of an operator training and requalification program will be followed up on a subsequent routine inspection (79-03-04).

## 9. Procedures

Part of the inspection effort was to review compliance with the requirements of subsections 16.6.1.6, 16.6.1.8, 16.6.1.9, and 16.6.1.10 of the Technical Specifications which specify the Reactor Supervisor's, Reactor Safety Committee's, and Radiation Safety Officer's responsibilities for procedure preparation, authorization, and review. In a letter dated May 8, 1979 to Dr. W. J. Walker, Division of Fuel Cycle and Material Safety, there was a commitment to update the Radiation Safety Manual, which is the responsibility of the Radiation Safety Officer, and is referenced in the Technical Specifications.

Review of the reactor operating procedures showed these were being marked up for revision, review, and eventual reissuance. No improperly authorized procedures were identified. The licensee representative stated the revised Radiation Safety Manual was being typed.

No items of noncompliance were identified in this area of the inspection. The revised Radiation Safety Manual will be examined on a subsequent routine inspection (79-03-05).

# 10. Maintenance

Review of reactor maintenance activities carried out during January to October, 1979, indicated that the waterproofing failed and was repaired in the neutron detector thimbles, which subsequently remained dry inside.

Observation of the exterior of the AGN 201 reactor, and the space beneath the reactor, did not identify any leakage or apparent rust or deterioration. The inspector noted that the 1978 Annual Report, submitted by the licensee, identified a possible problem with the paint inside the shield water tank, which will be reviewed on a subsequent routine inspection (79-03-06). The shield water tank was not opened during this inspection.

The inspector's examination of the reactor console did not identify any deterioration or overdue upkeep. The surveillance records and maintenance records did not indicate any current console problems. Review of recorder charts did not identify any operational problems.

The inspector had no further questions at this time on this area of the inspection.

### 11. Radiation Control

Review of licensee dosimetry information and comparison with survey records did not indicate any items of noncompliance with requirements of 10 CFR 20.101, "Exposure of Individuals to Radiation in Restricted Areas," and 10 CFR 20.202, "Personnel Monitoring."

The inspector noted that the licensee procedures and the FSAR require the assignment of fit badges to those individuals who work with radioactive material. Reco: of each individual's badge exposures are maintained. None indicated at annual accumulated whole body exposure during the calendar year 1978 greater than 100 mrem to any individual, and the 1979 records through August, 1979, did not indicate any greater exposures this year.

The inspector noted that visitors and security personnel typically are assigned self-reader dosimeters, and they record their own reading of the dosimeter exposure, except where two or more individuals are present in

which case only one (typically the escort for the other individuals) may wear a dosimeter, and the other (escorted) individual(s) will be assigned the same dose.

Review of the self-reader dosimeter information did not indicate that any individual exposure records were necessary to comply with the requirements of 10 CFR 20.401, "Records of Surveys, Radiation Monitoring, and Disposal." This information appeared to be consistent with the radiation levels shown on survey records and with radiation exposures indicated by the film badge records for those individuals working with radioactive materials.

The inspector used an NRC calibrated survey instrument to confirm the recent licensee surveys records (Eberline Model No. E-120, Serial No. 3175, NRC #872).

Observation during the survey did not identify any items of noncompliance with requirements of 10 CFR 20.203, "Caution Signs, Labels, Signals, and Controls."

The inspector used an "Alnor Velometer Jr." instrument (NRC #897) to measure the face flow velocities at the radiation hoods and the ventilation flow velocity into doors and openings in the Nuclear Reactor Lab. As found the hood flows exceeded 100 linear fpm, with normal hood opening.

No items of noncompliance were identified involving radiation control.

#### 12. Radwaste Management

The 1978 Annual Report of Nuclear Reactor Operations indicated there were no identified radioactive liquid or gaseous effluents and no solid radioactive waste resulting from activities conducted under the reactor license, the reactor having remained shutdown throughout 1978. The licensee representative stated that the shield water was sampled prior to disposal in the building drains and it contained no detectable radioactivity. No detectable radioactivity appeared to have been released during 1979 to date.

Surveys of the drains, and a tour using a survey meter to search for radioactivity did not identify any radioactive materials other than those present in previously labeled containers. The inspector surveyed outside the building and also in unrestricted areas on the basement level of the Pangborn Building, and no contamination was detected in unrestricted areas.

Disposal of liquid and solid radwaste resulting from activities conducted under other licenses involves the accumulation of drums of radwaste in the Nuclear Reactor Lab that are not the result of reactor experiments or operations. Observation of this accumulation did not identify any nonconformance with the description of waste management given in the FSAR.

The inspector noted that the waste was placed in 55 gallon steel drums and the drum caps were in place but were not secured by the lock rings. There was the odor of toluene when drums were opened. The licensee representative attributed this odor to the discard as radwaste of liquid scintillation cocktail material which is toluene-based.

A licensee representative estimated the quantity of radioactive materials in the radwaste at a millicurie, more or less, most of which was tritium.

The inspector noted that the ventilation appeared adequate to dissipate the odor within the short time.

The inspector noted that toluene is a flammable material and there appeared to be a potential for inadvertent storage of toluene in the Nuclear Reactor Lab.

The licensee representative stated that no significant quantity of toluene would be accumulated in the Nuclear Reactor Lab radioactive waste storage drums, and a new storage location will be found.

The relocation of waste storage will be reviewed on a subsequent routine inspection (79-03-07).

#### 13. Emergency Planning

Review of the Emergency Plan implementation showed that the licensee representatives did not have access, in the absence of the Radiation Safety Officer, to a copy of the letter from Washington Hospital on their capability to receive radioactively contaminated emergency cases.

This item will be reviewed on a subsequent routine inspection (79-03-08).

#### 14. Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection, 3:30 p.m., October 30, 1979.

The inspectors reviewed the scope and the findings of the inspection.

The licensee representative requested copies of Form NRC-3.

The inspector stated he would mail copies of Form NRC-3 to the licensee.

(By telephone contact with the Radiation Safety Officer, the inspector was informed that the items of noncompliance were corrected on November 5, 1979, on receipt of the above forms.)