

May 5, 2000

Dr. John J. Phillips, Director  
Department of Veterans Affairs  
Medical Center  
4101 Woolworth Avenue  
Omaha, NE 68105

SUBJECT: DEPARTMENT OF VETERANS AFFAIRS A. J. BLOTCKY REACTOR  
FACILITY - AMENDMENT RE: FUEL INSPECTION (TAC NO. MA8496)

Dear Dr. Phillips:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 10 to Facility Operating License No. R-57 for the Omaha Department of Veterans Affairs Medical Center A. J. Blotcky Reactor Facility. The amendment consists of changes to the Technical Specifications in response to your application of March 6, 2000.

The amendment changes the frequency of reactor fuel inspection to require that each fuel element be inspected every 5 years with at least 20 percent of the fuel elements inspected each year. The amendment also adds new requirements concerning damaged fuel elements.

A copy of the safety evaluation supporting Amendment No. 10 is also enclosed.

Sincerely,

*/RA/*

Alexander Adams, Jr., Senior Project Manager  
Events Assessment, Generic Communications and  
Non-Power Reactors Branch  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

Docket No. 50-131  
License No. R-57  
Enclosures:  
1. Amendment No. 10  
2. Safety Evaluation

cc w/enclosures:  
Please see next page

cc:

Mayor  
City of Omaha  
Omaha, NE 68102

Mr. John P. Claassen  
Reactor Manager/Supervisor  
Omaha Veterans Administration  
Medical Center  
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Omaha, NE 68105

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OMAHA DEPARTMENT OF VETERANS AFFAIRS MEDICAL CENTER

DOCKET NO. 50-131

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 10  
License No. R-57

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for an amendment to Facility Operating License No. R-57 filed by the Omaha Department of Veterans Affairs Medical Center (the licensee) on March 6, 2000, conforms to the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the regulations of the Commission as stated in Chapter I of Title 10 of the *Code of Federal Regulations* (10 CFR);
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance that (i) the activities authorized by this amendment can be conducted without endangering the health and safety of the public and (ii) such activities will be conducted in compliance with the regulations of the Commission;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public;
  - E. This amendment is issued in accordance with the regulations of the Commission as stated in 10 CFR Part 51, and all applicable requirements have been satisfied; and
  - F. Prior notice of this amendment was not required by 10 CFR 2.105 and publication of a notice for this amendment is not required by 10 CFR 2.106.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the enclosure to this license amendment, and paragraph 2.C.2. of Facility Operating License No. R-57 is hereby amended to read as follows:

2. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 10, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

Alexander Adams, Jr., Senior Project Manager  
Events Assessment, Generic Communications and  
Non-Power Reactors Branch  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

Enclosure:  
Appendix A, Technical Specifications Changes

Date of Issuance:

ENCLOSURE TO LICENSE AMENDMENT NO. 10

FACILITY OPERATING LICENSE NO. R-57

DOCKET NO. 50-131

Replace the following pages of Appendix A, "Technical Specifications," with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

Remove

15

16

Insert

15

16

#### 4.2.4 Ventilation System

Applicability: This specification applies to the building confinement ventilation system.

Objective: The objective is to ensure the proper operation of the ventilation system in controlling releases to radioactive material to the uncontrolled environment.

Specification: It shall be verified monthly, at intervals not to exceed 6 weeks, that the ventilation system is operable.

Bases: Experience accumulated over several years of operation has demonstrated that the tests of the ventilation system on a monthly basis are sufficient to ensure the proper operation of the system.

#### 4.2.5 Experiment and Irradiation Limits

Applicability: This specification applies to the surveillance requirements for experiments installed in the reactor and its experimental facilities and for irradiations performed in the irradiation facilities.

Objective: The objective is to prevent the conduct of experiments or irradiations which may damage the reactor or release excessive amounts of radioactive materials as a result of failure.

Specifications:

- (1) A new experiment shall not be installed in the reactor or its experimental facilities until a hazards analysis has been performed and reviewed for compliance with the Limitations on Experiments, Section 3.6, by the Reactor Safeguards Board. Minor modifications to a reviewed and approved experiment may be made at the discretion of the Senior Reactor Operator (SRO) responsible for the operation, provided that the hazards associated with the modifications have been reviewed and a determination made and documented that the modifications do not create a significantly different, a new, or a greater than the original approved experiment.
- (2) An irradiation of a new type of device or material shall not be performed until an analysis of the irradiation has been performed and reviewed for compliance with the limitations on irradiations, Section 3.7, by a licensed SRO qualified in health physics, or a licensed senior operator and a person qualified in health physics.

Bases: It has been demonstrated over a number of years of experience that experiments and irradiations reviewed by the reactor staff and the Reactor Safeguards Committee as appropriate can be conducted without endangering the safety of the reactor or exceeding the limits in the Technical Specifications.

#### 4.3 Fuel Element Inspection

Applicability: This specification applies to the inspection requirements for the fuel elements.

Objective: The objective is to verify the continuing integrity of the fuel element cladding.

Specifications: The reactor fuel elements shall be examined for physical damage by a visual inspection at least once each five years, with at least 20 percent of the fuel elements examined each year. Observation will include inspection for swelling, cracks, corrosion, and pitting.

The reactor shall not be operated with damaged fuel except to detect and identify damaged fuel for removal. A fuel element shall be removed from the core if a clad defect exists as indicated by the release of fission products. If an annual inspection identifies damaged fuel, then the entire core would be inspected.

Basis: The frequency of examination allows each element to be inspected every 5 years. Previous inspection experience has shown that this frequency of inspection is adequate and thus reduces the risk of accident or damaged fuel to handling.

#### 4.4 Primary Coolant Conditions

Applicability: This specification applies to the surveillance of primary water quality.

Objective: The objective is to ensure that water quality does not deteriorate over extended periods of time if the reactor is not operated.

Specification: The conductivity and pH of the primary coolant water shall be measured at least once every 2 weeks, and shall be as follows, on the average:

- (1) conductivity  $\leq 5 \times 10^{-6}$  mhos/cm
- (2) pH between 5.0 and 7.5

Bases: Section 3.8 ensures that the water quality is adequate during reactor operation. Section 4.6 ensures that water quality is not permitted to deteriorate over extended periods of time even if the reactor does not operate.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 10 TO

FACILITY OPERATING LICENSE NO. R-57

OMAHA DEPARTMENT OF VETERANS AFFAIRS MEDICAL CENTER

DOCKET NO. 50-131

1.0 INTRODUCTION

By letter dated March 6, 2000, the Omaha Department of Veterans Affairs Medical Center (VA or the licensee) submitted a request for an amendment to the technical specifications (TSs) of Facility Operating License No. R-57 for the A. J. Blotcky Reactor Facility (reactor). The requested changes to the TSs would decrease the frequency of fuel element inspections and add limits on operation with damaged fuel.

2.0 EVALUATION

The licensee has requested changes to TS 4.3 for fuel element inspection. TS 4.3 currently reads:

4.3 Reactor Fuel Elements

Applicability: This specification applies to the surveillance requirements of the fuel element.

Objective: The objective is to verify continuing integrity of the fuel element cladding.

Specifications: Quarterly, at intervals not to exceed 4 months, four fuel elements will be inspected visually for swelling, cracks, corrosion, and pitting. At each quarterly inspection, the four elements will be selected from a different quadrant of the core.

Bases: This frequency of examination allows each element to be inspected every 3.5 years. Previous inspection experience has shown that since the operating power of the reactor is low, this frequency of inspection is adequate.

The licensee has proposed changing TS 4.3 to read:

4.3 Fuel Element Inspection

Applicability: This specification applies to the inspection requirements for the fuel elements.

Objective: The objective is to verify the continuing integrity of the fuel element cladding.

Specifications: The reactor fuel elements shall be examined for physical damage by a visual inspection at least once each 5 years, with at least 20 percent of the fuel elements examined each year. Observation will include inspection for swelling, cracks, corrosion, and pitting.

The reactor shall not be operated with damaged fuel except to detect and identify damaged fuel for removal. A fuel element shall be removed from the core if a clad defect exists as indicated by the release of fission products. If an annual inspection identifies damaged fuel, then the entire core would be inspected.

Basis: The frequency of examination allows each element to be inspected every 5 years. Previous inspection experience has shown that this frequency of inspection is adequate and thus reduces the risk of accident or damaged fuel to handling.

The licensee has proposed extending the frequency of fuel inspections so that each element will be inspected once every 5 years. Currently inspections are performed quarterly on four fuel elements so that each fuel element is inspected every 3.5 years. The present core has been used since 1959 (except for a fuel element added in 1994) without any fuel failures. Fuel is usually damaged by poor water chemistry, which causes corrosion of the fuel cladding, or by high power levels and repeated pulsing, which can stress the fuel. The licensee has not had difficulty meeting the TS 4.4 quality requirements for primary water. The VA reactor is not licensed to pulse and, at 20 kW(t), is the lowest power TRIGA reactor licensed by NRC. After over 40 years of operation without fuel failure, there is reasonable assurance of the integrity of the fuel in the VA reactor. Experience with hundreds of fuel elements at other TRIGA reactors with higher power levels has confirmed the continuing integrity of TRIGA fuel operated at steady-state power levels. The inspection frequency proposed by the licensee is consistent with that approved by NRC for other nonpulsing TRIGA reactors and consistent with the guidance in NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors." In addition, the proposed annual inspection as opposed to a quarterly inspection would decrease the likelihood of fuel damage due to fuel handling to carry out the inspections, and could decrease radiation exposure of the VA staff, in accordance with the as low as reasonably achievable (ALARA) principle. Based on the discussion above, the staff has determined that the decrease in inspection frequency is acceptable and that the material condition of the fuel elements will continue to be monitored on a frequency acceptable to identify fuel damage.

The licensee has also proposed to add a requirement to TS 4.3 that if fission products are released from a fuel element, the element shall be removed from the core and that the reactor shall not be operated with damaged fuel except to detect and identify damaged fuel for removal. In addition, if the annual inspection of the fuel identifies damaged fuel, the entire core will be inspected. The requirement to inspect the entire core if the annual inspection identifies a damaged fuel element is consistent with the guidance in NUREG-1537 and has been approved for other NRC -licensed TRIGA reactors. The entire core is inspected to ensure that the cause of a damaged fuel element is not generic. Because damage caused by generic causes will be detected, this proposed TS is acceptable to the staff.

The requirement that a fuel element with a clad defect indicated by the release of fission products be removed from the core helps to ensure that any fuel elements with clad defects will be removed from operation in a timely manner. Experience with fuel that has failed on rare occasions at other TRIGA reactors shows that fission products are normally released only when the reactor is operating. Therefore, to locate a damaged fuel element for removal from the core, it is necessary to operate the reactor. The licensee has proposed an addition to the TS that states that the reactor will not be operated with damaged fuel except to detect and identify damaged fuel for removal. This TS ensures that fission product releases from damaged fuel will be kept to a minimum while allowing damaged fuel elements to be detected and removed which allows normal operation to continue. Because the proposed TS requires removal of damaged fuel from the core and limits operation with damaged fuel to that operation needed to detect and identify damaged fuel, the proposed TS is acceptable to the staff.

The licensee has proposed other changes to the TS commensurate with the proposed changes to the specification. These changes clarify the TS and are acceptable to the staff.

The VA project manager discussed a minor change to the basis of the proposed TS with the Reactor Manager on March 28, 2000. It was agreed to change the word "damage" to "damaged" in the last sentence of the basis. This change is administrative in nature and improves the grammar of the basis and is therefore, acceptable to the staff.

### 3.0 ENVIRONMENTAL CONSIDERATION

This amendment involves changes in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes in inspection and surveillance requirements. The staff has determined that this amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released off site, and no significant increase in individual or cumulative occupational radiation exposure. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

### 4.0 CONCLUSION

The staff has concluded, on the basis of the considerations discussed above, that (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously evaluated, or create the possibility of a new or different kind of accident from any accident previously evaluated, and does not involve a significant reduction in a margin of safety, the amendment does not involve a significant hazards consideration; (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed activities; and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or the health and safety of the public.

Principal Contributor: A. Adams, Jr.

Date: