

FINAL
NRC - TECHNICAL SPECIFICATIONS

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APPENDIX A
TECHNICAL SPECIFICATIONS
FOR
THE UNIVERSITY OF UTAH TRIGA REACTOR
DOCKET NO. 50-407
FACILITY LICENSE NO. R-126
WITH AMENDMENT NO. 1

SEP 30 1975

4. SURVEILLANCE REQUIREMENTS

FUEL

Applicability

This specification applies to the surveillance requirement for the fuel elements.

Objective

The objective is to assure that the dimensions of the fuel elements remain within acceptable limits.

Specification

- a. All fuel elements shall be inspected visually for damage or deterioration every two years. Any fuel element which appears damaged shall be measured for length and bend. A fuel element shall be considered damaged and must be removed from the core if:
 1. In measuring the transverse bend, its sagitta exceeds 0.125 inches over the length of the cladding.
 2. In measuring the elongation, its length exceeds its original length by 0.250 inch (a)
 3. A clad defect exists as indicated by release of fission products.
 - b. Fuel elements in the hottest assumed location as well as representative elements in each of the B and C hexagonal rings shall be measured for possible damage in the event that there is indication that fuel temperatures greater than the limiting safety system setting may have been exceeded.
- (a) Original length shall be deemed to be the length of each respective fuel element as measured before the initial critical startup of the reactor.

Bases

Biannual visual inspection of the TRIGA fuel has been shown adequate to insure fuel element integrity through a long history of standard operation in the steady-state mode. The limit of transverse bend has been shown to result in no difficulty in disassembling the core. Analysis of the removal of heat from touching fuel elements shows that there will be no hot space resulting in damage to the fuel caused by this touching. Experience with TRIGA reactors has shown that even fuel element bowing which results in touching can occur without deleterious effects. The

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insures the same degree of control of release of radioactive materials (SAR Section 8.7.5).

4.3.5 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.

Specifications:

- (1) A new experiment shall not be installed in the reactor or its experimental facilities until a hazards analysis has been performed by the Reactor Supervisor and reviewed by the Reactor Safety Committee. Minor modifications to reviewed and approved experiments may be made at the discretion of the senior operator responsible for the operation, provided that the hazards associated with the modifications have been reviewed and a determination has been made that the modifications do not create a significantly different, a new, or a greater hazard 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 by the Reactor Supervisor.

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

4.4 Reactor Fuel Elements

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

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

Specifications: All fuel elements shall be inspected visually for damage or deterioration every two years. The reactor shall not be operated with damaged fuel. A fuel element shall be considered damaged and must be removed from the core if:

- (1) in measuring the transverse bend, its sagitta exceeds 0.125 inches over the length of the cladding,
- (2) in measuring the elongation, its length exceeds its original length by 0.250 inches,

- (3) a clad defect exists as indicated by release of fission products. However, the reactor may be operated on a short-term basis as needed to assist in determining the source of the leakage.

Bases: The frequency of inspection and measurement schedule is based on the parameters most likely to affect the fuel cladding. The limit of transverse bend has been shown to result in no difficulty in disassembling the core. Analysis of the removal of heat from touching fuel elements shows that there will be no hot spots resulting in damage to the fuel caused by this touching. Experience with TRIGA reactors has shown that fuel element bowing that could result in touching has occurred without deleterious effects. The elongation limit has been specified to ensure that the cladding material will not be subjected to stresses that could cause a loss of integrity in the fuel containment and to ensure adequate coolant flow.

4.5 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 monthly and shall be as follows:

- (1) conductivity $\leq 5 \times 10^{-6}$ mhos/cm,
- (2) pH between 5.0 and 8.0

Bases: Section 3.8 ensures that the water quality is adequate during reactor operation. Section 4.5 ensures that water quality is not permitted to deteriorate over extended periods of time even if the reactor does not operate.