

4.0 SURVEILLANCE REQUIREMENTS

4.1 General

The requirements listed below generally prescribe tests or inspections to verify periodically that the performance of required systems is in accordance with specifications given above in Sections 2 and 3. In all instances where the specified frequency is annual, the interval between tests is not to exceed 14 months; when semiannual, the interval should not exceed 7 months; when monthly, the interval shall not exceed 6 weeks; when weekly, the interval shall not exceed 10 days; and when daily, the interval shall not exceed 3 days.

4.2 Safety Channel Calibration

A channel calibration of each safety channel shall be performed annually (see Sect. 3.2.3).

4.3 Reactivity Surveillance

(1) The reactivity worth of each control rod (including the regulating rod) and the shut-down margin shall be determined whenever operation requires a reevaluation of core physics parameters, or annually, whichever occurs first. The rod worth will be determined using the reactivity-period or rod-drop methods.

(2) The reactivity worth of an experiment shall be estimated, or measured at low power, before conducting the experiment.

- (3) Boron/Carbide rods shall be gauged quarterly and any dimensional changes reported promptly to the Commission. Silver/Indium/Cadmium control rods shall be gauged annually, or, in the case of newly installed rods, at the end of the first six months. If any Ag/In/Cd rod should be found not to meet the acceptance criteria it shall be removed from service. In addition, all other rods manufactured of the same batch shall be inspected.

4.4 Control and Safety System Surveillance

- (1) The scram time shall be measured annually. If a control rod is removed from the core temporarily, or if a new rod is installed, its scram time shall be measured before reactor operation. If the bridge is moved, the scram time will be measured before subsequent reactor operation.
- (2) A channel test of each measuring channel in the reactor safety system shall be performed monthly or prior to each reactor operating period whichever occurs first unless the preceding shut-down period is 8 hours or less. A channel test before startup is, however, required on any channel receiving maintenance during the shut-down period.
- (3) A channel check of each measuring channel (except for the pool level) in the reactor safety system shall be performed daily when the reactor is in operation.

4.5 Radiation Monitoring System

- (1) The excursion, stack, and area monitors shall be calibrated annually.
- (2) The excursion, stack, and area monitors shall receive a channel test monthly.

3. The excursion, stack, and area monitors shall receive a channel check and a setpoint verification daily during reactor operating periods.

4.6 Engineered Safety Features

4.6.1 Excursion Monitor: see above 4.5.

4.6.2 Emergency Generator

- (1) The ability of the emergency generator to start, to run normally, and to generate 440 VAC shall be checked weekly.
- (2) The generator shall be tested for its ability to accept, via the automatic transfer switch, the reactor electrical load once every six months. A commercial power outage and subsequent pickup of load by the emergency generator will count as a successful load test.

4.6.3 Containment

- (1) The efficiency of the charcoal filters and of the absolute filters in the emergency exhaust system shall be measured annually and the flow rate verified.
- (2) The operability of the evacuation alarm and containment isolation system shall be tested, and negative pressure verified, semiannually. A utility power outage may be used to initiate such tests.

4.7 Reactor Fuel

- (1) Upon receipt from the fuel vendor, all fuel elements shall be visually inspected and the accompanying quality control documents checked for compliance with specifications.

- (2) Each new fuel element will be inspected for damage and flow obstructions prior to insertion into the core.

4.8 Sealed Sources

The antimony-beryllium sealed source shall be leak tested in accordance with the procedures described in the application for license amendment dated March 21, 1963, except that the frequency of leak testing will be in accordance with 10 CFR Part 34.25(b). The strontium-90 sealed source shall be tested for leakage and/or contamination semiannually.

4.9 Pool Water

- (1) The pH and specific resistance of the pool water shall be determined each week.
- (2) An analysis of the pool water for radioactive material shall be done at monthly intervals. This analysis is to include Sb-124 as an indicator of Sb-Be neutron source integrity.
- (3) Activity of the pool water will be measured weekly.

4.10 Core Spray

The core spray in the reactor operating position shall be tested for operability semiannually.

6.1.3 Staffing

- a. The minimum staffing when the reactor is not secured shall be:
 1. A licensed Reactor Operator in the control room.
 2. A second licensed reactor operator present at the reactor facility. Unexpected absence for two hours is acceptable provided immediate action is taken to obtain a replacement.
 3. A licensed Senior Reactor Operator shall be readily available on call.
 4. A member of the operating staff shall be designated by Level 2 management as knowledgeable in radiation control.

- b. Events requiring the presence of a Senior Operator:
 1. All fuel-element or control-rod alterations within the reactor core region.
 2. Relocations of any experiments with reactivity worth greater than or equal to one dollar.
 3. Recovery from unplanned or unscheduled shutdowns unless they are of a type excluded by the Level 2 authority. Such exclusions shall be posted in the control room or placed in the appropriate procedures. Furthermore, the presence of a senior operator at the facility shall not be required during recovery from unplanned or unscheduled shutdown or significant reduction in power in instances which result from:
 - (1) Electrical power interruptions from internal or external failures exclusive of power supply failures of the reactor instrumentation, control and safety systems;

- (2) False signals which, in the opinion of the Senior Operator, were properly verified to be false and to have resulted from monitoring, experimental, or control equipment, or from personnel inadvertence; and
- (3) Intentional shutdowns made by the Reactor Operator which are not related to the safety of the reactor.

Provided that prior to the initiation of such recovery, the Senior Operator shall be notified of the shutdown or power reduction, and shall determine that the shutdown was caused by one of the enumerated occurrences, and shall determine that his presence at the facility during recovery is not required.

6.1.4 Selection and Training of Personnel

The selection, training, and requalification of personnel shall meet or exceed the requirements of ANS-15.4/N 380 and Appendix A of 10 CFR Part 55 and be in accordance with the requalification plan approved by the Commission.

6.1.5 Review and Audit

The independent review and audit of reactor facility operations shall be performed by the Nuclear Safeguards Committee.

6.1.5.1 Composition and Qualifications

The Nuclear Safeguards Committee shall be composed of a minimum of 5 members. The members shall collectively provide a broad spectrum of expertise in the appropriate reactor technology. Members and alternates shall be appointed by and report to the Level 1 authority. They may include