(7) Direct communication between personnel in the control room and at the refueling machine shall be available whenever changes in core geometry are taking place.

(8) When irradiated fuel is being handled in the auxiliary building, the exhaust ventilation from the spent fuel pool area will be diverted through the charcoal filter.

(9) Prior to initial core loading and prior to refueling operations, a complete check out, including a load test, shall be conducted on fuel handling cranes that will be required during the refueling operation to handle spent fuel assemblies.

(10) A minimum of 23 feet of water above the top of the core shall be maintained whenever irradiated fuel is being handled.

(11) Storage in Region 1 and Region 2 of the spent fuel racks shall be restricted to fuel assemblies having initial enrichment less than or equal to 4.0 weight percent of U-235.

(12) Storage in Region 2 of the spent fuel racks shall be restricted to those assemblies whose parameters fall within the "acceptable" region of Figure 2-10.

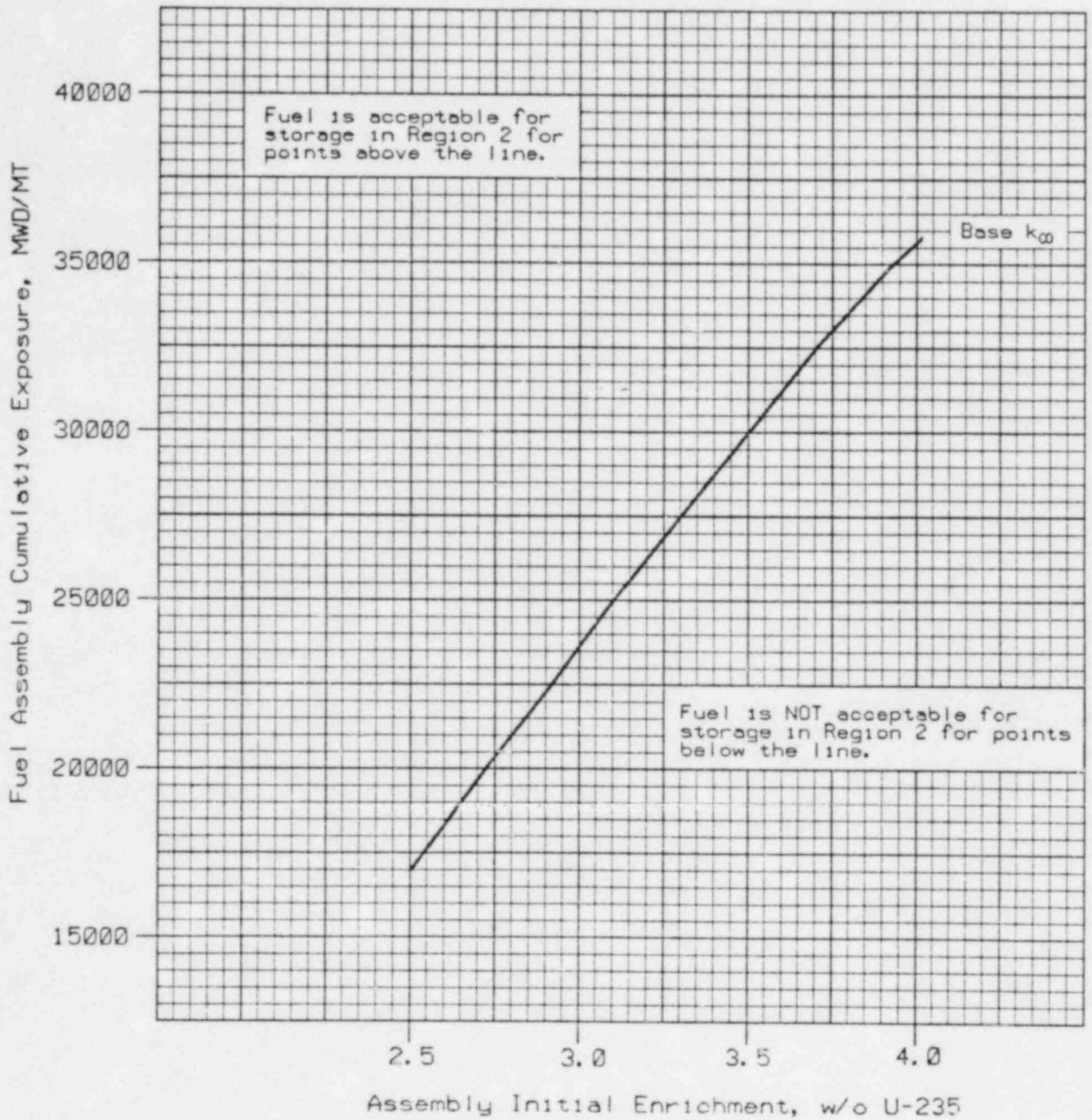
If any of the above conditions are not met, all refueling operations shall cease immediately, work shall be initiated to satisfy the required conditions, and no operations that may change the reactivity of the core shall be made. However, refueling operations may commence and continue with less than 5 containment atmosphere and plant ventilation duct radiation monitors provided that gross, particulate and iodine monitors are monitoring the stack effluent. These three plant ventilation duct radiation monitors will initiate closure of the containment pressure relief, air sample and purge system valves and shall employ a one-out-of-three logic for the initiation of VIAS.

Irradiated fuel movement shall not be initiated before the reactor core has decayed for a minimum of 72 hours if the reactor has been operated at power levels in excess of 2% rated power.

Basis

The equipment and general procedures to be utilized during refueling operations are discussed in the USAR. Detailed instructions, the above specifications, and the design of the fuel handling equipment incorporating built-in interlocks and safety features provide assurance that no

Spent Fuel Pool Region 2 Storage Criteria Minimum Required Fuel Assembly Exposure as a Function of Initial Enrichment to Permit Storage in Region 2



SPENT FUEL POOL REGION 2 STORAGE CRITERIA	OMAHA PUBLIC POWER DISTRICT FORT CALHOUN STATION-UNIT No. 1	FIGURE 2-10

incident could occur during the refueling operations that would result in a hazard to public health and safety.(1) Whenever changes are not being made in core geometry one flux monitor is sufficient. This permits maintenance of the instrumentation. Continuous monitoring of radiation levels and neutron flux provides immediate indication of an unsafe condition. The shutdown cooling pump is used to maintain a uniform boron concentration.

The shutdown margin as indicated will keep the core subcritical even if all CEA's were withdrawn from the core. During refueling operations, the reactor refueling cavity is filled with approximately 250,000 gallons of borated water. The boron concentration of this water (at least 1700 ppm boron) is sufficient to maintain the reactor subcritical by more than 5%, including allowance for uncertainties, in the cold condition with all rods withdrawn.(2) Periodic checks of refueling water boron concentration ensure the proper shutdown margin. Communication requirements allow the control room operator to inform the refueling machine operator of any impending unsafe condition detected from the main control board indicators during fuel movement.

In addition to the above engineered safety features, interlocks are utilized during refueling operations to ensure safe handling. An excess weight interlock is provided on the lifting hoist to prevent movement of more than one fuel assembly at a time. In addition, interlocks on the auxiliary building crane will prevent the trolley from being moved over storage racks containing irradiated fuel, except as necessary for the handling of fuel. The restriction of not moving fuel in the reactor for a period of 72 hours after the power has been removed from the core takes advantage of the decay of the short half-life fission products and allows any failed fuel to purge itself of fission gases, thus reducing the consequences of fuel handling accident.

The ventilation air for both the containment and the spent fuel pool area flows through absolute particulate filters and radiation monitors before discharge at the ventilation discharge duct. In the event the stack discharge should indicate a release in excess of the limits in the technical specifications, the containment ventilation flow paths will be closed automatically and the auxiliary building ventilation flow paths will be closed manually. In addition, the exhaust ventilation ductwork from the spent fuel storage area is equipped with a charcoal filter which will be manually put into operation whenever irradiated fuel is being handled.(1)

References

(1) FSAR, Section 9.5

(2) FSAR, Section 9.5.1.2

TABLE 3-5
(Continued)

		Test	Frequency	FSAR Section Reference
10c.	(Continued)	4. Automatic and/or manual initiation of the system shall be demonstrated.	At least once per plant operating cycle.	
11.	Containment Cooling and Iodine Removal Fuseable Linked Dampers	1. Demonstrate damper action. 2. Test a spare fuseable link.	1 year, 2 years, 5 years, and every 5 years thereafter.	9.10
12.	Fuel Elements	Visually inspect fuel elements removed from the reactor.	During each refueling outage.	3
13.	Diesel Generator Under-Voltage Relays	Calibrate.	During each refueling outage.	8.4.3
14.	Motor Operated Safety Injection Loop Valve Motor Starters (HCV-311, 314, 317, 320, 327, 329, 331, 333, 312, 315, 318, 321)	Verify the contactor pickup value at $\leq$85% of 460 V.	During each refueling outage.	
15.	Pressurizer Heaters	Verify control circuits operation for post-accident heater use.	During each refueling outage.	
16.	Spent Fuel Pool Region 1 Racks	Test neutron poison samples for dimensional change, hardness change, and neutron attenuation change.	Intervals of 1, 2, 4, 7, 11, 15, 20, and 25 years after installation.	

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4.0 DESIGN FEATURES
4.4 Fuel Storage
4.4.1 New Fuel Storage

The new unirradiated fuel bundles will normally be stored in the dry new fuel storage rack with an effective multiplication factor of less than 0.9. The open grating floor below the rack and the covers above the racks, along with generous provision for drainage, precludes flooding of the new fuel storage rack.

New fuel may also be stored in shipping containers or in the spent fuel pool racks which have a maximum effective multiplication factor of 0.95 with Fort Calhoun Type C fuel and unborated water.

The new fuel storage racks are designed as a Class I structure.

4.4.2 Spent Fuel Storage

Irradiated fuel bundles will be stored prior to off-site shipment in the stainless steel lined spent fuel pool. The spent fuel pool is normally filled with borated water with a concentration of at least 1700 ppm.

The spent fuel racks are designed as a Class I structure.

Normally the spent fuel pool cooling system will maintain the bulk water temperature of the pool below 120°F. Under other conditions of fuel discharge, the fuel pool water temperature is maintained below 140°F.

The spent fuel racks are designed and will be maintained such that the calculated effective multiplication factor is no greater than 0.95 (including all known uncertainties) assuming the pool is flooded with unborated water. The racks are divided into 2 regions. Region 1 racks are surrounded by Boraflex; Region 2 racks have no poison. Acceptance criteria for fuel storage in Regions 1 and 2 are delineated in Section 2.8 of these Technical Specifications.

5.8.3 a. The intent of the original procedure is not altered.

b. The change is approved by two members of the plant supervisory staff, at least one of whom holds a Senior Reactor Operator's License on the unit affected.

c. The change is documented, reviewed by the Plant Review Committee and approved by the Manager - Fort Calhoun Station within 14 days of implementation.

5.8.4 Written procedures approved per 5.8.2 above shall be implemented which govern the selection of fuel assemblies to be placed in Region 2 of the spent fuel racks (Technical Specification 2.8(12). These procedures shall require an independent verification of initial enrichment requirements and fuel burnup calculations for a fuel bundle to assure the "acceptance" criteria for placement in Region 2 are met. This independent verification shall be performed by individuals or groups other than those who performed the initial acceptance criteria assessment, but who may be from the same organization.

5.9 Reporting Requirements

In addition to the applicable reporting requirements of Title 10, Code of Federal Regulations, the following identified reports shall be submitted to the Director of the appropriate Regional Office of Inspection and Enforcement unless otherwise noted.

5.9.1 Routine Reports

a. Startup Report. A summary report of plant startup and power escalation testing shall be submitted following (1) receipt of an operating license, (2) amendment to the license involving a planned increase in power level, (3) installation of fuel that has a different design or has been manufactured by a different fuel supplier, and (4) modifications that may have significantly altered the nuclear, thermal, or hydraulic performance of the plant. The report shall address each of the tests identified in the USAR and shall in general include a description of the measured values of the operating conditions or characteristics obtained during the test program and a comparison of these values with design predictions and specifications. Any corrective actions that were required to obtain satisfactory operation shall also be described. Any additional specific details required in license conditions based on other commitments shall be included in this report.

5.9.1 Continued

Startup reports shall be submitted within (1) 90 days following completion of the startup test program, (2) 90 days following resumption or commencement of commercial power operation, or (3) 9 months following initial criticality, whichever is earliest. If the Startup Report does not cover all three events (i.e., initial criticality, completion of startup test program, and resumption or commencement of commercial power operation), supplementary reports shall be submitted at least every three months until all three events have been completed.

b. Annual Occupational Exposure Report. An annual occupational exposure report should be submitted prior to March 1 of each year. The report shall consist of a tabulation on an annual basis of the number of station, utility and other personnel (including contractors) receiving exposures greater than 100 mrem/yr and their associated man rem exposure according to work and job functions,3/ e.g., reactor operations and surveillance, inservice inspection, routine maintenance, special maintenance (describe maintenance), waste processing, and refueling outages. The dose assignment to various duty functions may be estimates based on pocket dosimeter, TLD, or film badge measurements. Small exposures totalling less than 20% of the individual total dose need not be accounted for. In the aggregate, at least 80% of the total whole body dose received from external sources shall be assigned to specific major work functions.

c. Monthly Operating Report. Routine reports of operating statistics and shutdown experience shall be submitted on a monthly basis to the Director, Office of Management Information and Program Control, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555, with a copy to the appropriate Regional Office, to arrive no later than the fifteenth of each month following the calendar month covered by the report.

5.9.2 Reportable Occurrences

Reportable occurrences, including corrective actions and measures to prevent reoccurrence, shall be reported to the NRC. Supplemental reports may be required to fully

3/ This tabulation supplements the requirements of § 20.407 of 10 CFR Part 20.

5.9.2 Continued

describe final resolution of occurrence. In case of corrected or supplemental reports, a licensee event report shall be completed and reference shall be made to the original report date.

a. Prompt Notification With Written Followup. The types of events listed below shall be reported as expeditiously as possible, but within 24 hours by telephone and confirmed by telegraph, mailgram, or facsimile transmission to the Director of the appropriate Region Office, or his designate no later than the first working day following the event, with a written followup report within two weeks. The written followup report shall include, as a minimum, a completed copy of a licensee event report form. Information provided on the licensee event report form shall be supplemented, as needed, by additional narrative material to provide complete explanation of the circumstances surrounding the event.

(1) Failure of the reactor protection system or other systems subject to limiting safety settings to initiate the required protective function by the time a monitored parameter reaches the setpoint specified as the limiting safety system setting in the technical specifications or failure to complete the required protective function.

Note: Instrument drift discovered as a result of testing need not be reported under this item but may be reportable under items 2.a(5), 2.a(6), or 2.b(1) below.

(2) Operation of the unit or affected systems when any parameter or operation subject to a limiting condition is less conservative than the least conservative aspect of the limiting condition for operation established in the technical specifications.

Note: If specified action is taken when a system is found to be operating between the most conservative and the least conservative aspects of a limiting condition for operation listed in the technical specifications, the limiting condition for operation is not considered to have been violated and need not be reported under this item, but it may be reportable under item 2.b(2) below.

5.9.2 Continued

(3) Abnormal degradation discovered in fuel cladding, reactor coolant pressure boundary, or primary containment.

Note: Leakage of valve packing or gaskets within the limits for identified leakage set forth in technical specifications need not be reported under this item.

(4) Reactivity anomalies involving disagreement with the predicted value of reactivity balance under steady state conditions greater than or equal to 1.0% $\Delta k/k$; a calculated reactivity balance indicating a shutdown margin less conservative than specified in the technical specifications; short-term reactivity increases that correspond to a reactor period of less than 5 seconds or, if subcritical, an unplanned reactivity insertion of more than 0.5% $\Delta k/k$; or occurrence of any unplanned criticality.

(5) Failure or malfunction of one or more components which prevents or could prevent, by itself, the fulfillment of the functional requirements of system(s) used to cope with accidents analyzed in the SAR.

(6) Personnel error or procedural inadequacy which prevents or could prevent, by itself, the fulfillment of the functional requirements of systems required to cope with accidents analyzed in the SAR.

Note: For items 2.a(5) and 2.a(6) reduced redundancy that does not result in a loss of system function need not be reported under this section but may be reportable under items 2.b(2) and 2.b(3) below.

(7) Conditions arising from natural or man-made events that, as a direct result of the event require plant shutdown, operation of safety systems, or other protective measures required by technical specifications.

5.9.2 Continued

(8) Errors discovered in the transient or accident analyses or in the methods used for such analyses as described in the safety analysis report or in the bases for the technical specifications that have or could have permitted reactor operation in a manner less conservative than assumed in the analyses.

(9) Performance of structures, systems, or components that requires remedial action or corrective measures to prevent operation in a manner less conservative than assumed in the accident analyses in the safety analysis report or technical specifications bases; or discovery during plant life of conditions not specifically considered in the safety analysis report or technical specifications that require remedial action or corrective measures to prevent the existence or development of an unsafe condition.

Note: This item is intended to provide for reporting of potentially generic problems.

b. Thirty Day Written Reports. The reportable occurrences discussed below shall be the subject of written reports to the Director of the appropriate Regional Office within thirty days of occurrence of the event. The written report shall include, as a minimum, a completed copy of a licensee event report form. Information provided on the licensee event report form shall be supplemented, as needed, by additional narrative material to provide complete explanation of the circumstances surrounding the event.

(1) Reactor protection system or engineered safety feature instrument settings which are found to be less conservative than those established by the technical specifications but which do not prevent the fulfillment of the functional requirements of affected systems.

(2) Conditions leading to operation in a degraded mode permitted by a limiting condition for operation or plant shutdown required by a limiting condition for operation.

5.9.2 Continued

Note: Routine surveillance testing, instrument calibration, or preventative maintenance which require system configurations as described in items 2.b(1) and 2.b(2) need not be reported except where test results themselves reveal a degraded mode as described above.

(3) Observed inadequacies in the implementation of administrative or procedural controls which threaten to cause reduction of degree of redundancy provided in reactor protection systems or engineered safety feature systems.

(4) Abnormal degradation of systems other than those specified in item 2.a(3) above designed to contain radioactive material resulting from the fission process.

Note: Sealed sources or calibration sources are not included under this item. Leakage of valve packing or gaskets within the limits for identified leakage set forth in technical specifications need not be reported under this item.

5.10 Record Retention

5.10.1 The following records shall be retained for at least five years:

a. Records and logs of facility operation covering time interval at each power level.

b. Records and logs of principal maintenance activities, inspections, repair and replacement of principal items of equipment related to nuclear safety.

c. REPORTABLE OCCURRENCE Reports.

d. Records of surveillance activities, inspections and calibrations required by these Technical Specifications.

e. Records of reactor tests and experiments.

f. Records of changes made to Operating Procedures.

g. Records of radioactive shipments.

h. Records of sealed source leak tests and results.

i. Records of annual physical inventory of all source material of record.

5.10.2 A complete record of the analysis employed in the selection of any fuel assembly to be placed in Region 2 of the spent fuel racks will be retained as long as that bundle remains in Region 2 (reference Technical Specifications 2.8(12) and 5.8.4).

DISCUSSION

These Technical Specification changes are being made to administratively support an application by the District dated March 12, 1982, to install high density spent fuel storage racks at the Fort Calhoun Station. These racks will be divided into 2 regions; Region 1, which utilizes poisons, and Region 2, which takes credit for fuel burnup to limit reactivity below a specified value. The intent of these Technical Specification changes is to:

(1) Provide an administrative control over the selection of fuel assemblies to be placed in Region 2 to assure these assemblies meet the necessary criteria for storage in that area. The acceptance criteria will be based on Figure 2-10, "Spent Fuel Pool Region 2 Storage Criteria", which will be added to the Technical Specifications by this change. Justification for this figure was presented in the January 21, 1983 submittal for the spent fuel storage rack application. The statement describing who may perform an independent review in Technical Specification 5.8.4 was based on 10 CFR 50, Appendix B, Part III (Design Control).

(2) Provide assurance that surveillance requirements for periodic testing of neutron poison samples in the Region 1 spent fuel racks are met.

The following hazards considerations have been made in accordance with 10 CFR 50.92:

(1) The changes make the Technical Specifications more conservative and therefore do not involve an increase in the probability or consequences of an accident previously evaluated.

(2) The changes will support a safety analysis which is presently ongoing. It constitutes an administrative change which makes the Technical Specifications more conservative by ensuring adherence to the safety analysis and therefore will not create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) The changes require additional administrative controls involving use of the above mentioned spent fuel storage racks. They will tend to increase the margin of safety rather than reduce it.