TECHNICAL SPECIFICATIONS

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ATTACHMENT A

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DEFINITIONS

Azimuthal Power Tilt - T_q

Azimuthal Power Tilt shall be the maximum difference between the power generated in any core quandrant (upper or lower) and the average power of all quandrants in that axial half (upper or lower) of the core divided by the average power of all quandrants in that axial half (upper or lower) of the core.

Unrodded Planar Radial Peaking Factor - F_{xy}

The unrodded Planar Radial Peaking Factor is the maximum ratio of the peak to average power density of the individual fuel rods in any of the unrodded horizontal planes, excluding azimuthal tilt, T_q.

Unrodded Integrated Radial Peaking Factor - F_R

The unrodded Integrated Radial Peaking Factor is the ratio of the peak pin power to the average pin power in an unrodded core, excluding azimuthal tilt, T_q.

Fire Suppression Water System

The fire suppression water system consists of fire pumps and distribution piping with associated sectionalizing control or isolation valves. Such valves include yard hydrant curb valves, and the first valve ahead of the water flow alarm device on each sprinkler, hose standpipe or spray system riser.

Dose Equivalent I-131

That concentration of I-131 (μCi/gm) which alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134 and I-135 actually present. In other words,

$$\text{Dose Equivalent I-131 } (\mu Ci/gm) = \mu Ci/gm \text{ of I-131} + 0.0361 \times \mu Ci/gm \text{ of I-132} + 0.270 \times \mu Ci/gm \text{ of I-133} + 0.0169 \times \mu Ci/gm \text{ of I-134} + 0.0838 \times \mu Ci/gm \text{ of I-135}$$

$\overline{E}$ - Average Disintegration Energy

$\overline{E}$ is the average (weighted in proportion to the concentration of each radionuclide in the reactor coolant at the time of sampling) of the sum of the average beta and gamma energies per disintegration, in MEV, for isotopes, other than iodines, with half lives greater than 15 minutes making up at least 95% of the total non-iodine radioactivity in the coolant.

References

(1) FSAR, Section 7.2

(2) FSAR, Section 7.3

2.1.3 Reactor Coolant Radioactivity

Applicability

Applies to the radioactivity of the reactor coolant.

Objective

To ensure that the reactor coolant radioactivity is maintained at a level commensurate with the occupational and public safety.

Specification

(1) The radioactivity of the reactor coolant shall be limited to:

a. $\leq$ 2.0 μCi/gm DOSE EQUIVALENT I-131, and

b. $\leq 100/\bar{E}$ μCi/gm

(2) With the radioactivity of the reactor coolant > 2.0 μCi/gm DOSE EQUIVALENT I-131 but $\leq$ 60 μCi/gm, operation may continue for up to 100 hours during one continuous time interval.

(3) With the radioactivity of the reactor coolant > 2.0 μCi/gm DOSE EQUIVALENT I-131 for more than 100 hours during one continuous time interval or exceeding 60 μCi/gm, be in at least HOT SHUTDOWN with $T_{avg} < 536°F$ within 6 hours.

(4) With the radioactivity of the reactor coolant > $100/\bar{E}$ μCi/gm, be in at least HOT SHUTDOWN with $T_{avg} < 536°F$ within 6 hours.

(5) With the radioactivity of the reactor coolant > 2.0 μCi/gm DOSE EQUIVALENT I-131, perform the sampling and analysis requirements of items 1.(a)(2)(ii) and 1.(b)(2)(i) of Table 3-4 until the radioactivity of the reactor coolant is restored to within its limits. A REPORTABLE OCCURRENCE, pursuant to Specification 5.9.2, shall be submitted to the Commission. This report shall contain the results of the radioactivity analyses together with the following information:

a. Reactor power history starting 48 hours prior to the first samples in which the limit was exceeded.

2.0 LIMITING CONDITIONS FOR OPERATION
2.1 Reactor Coolant System (Continued)
2.1.3 Reactor Coolant Radioactivity (Continued)

b. Purification System flow history starting 48 hours prior to the first sample in which the limit was exceeded.

c. The time duration when the radioactivity of the reactor coolant exceeded 2.0 μCi/gm DOSE EQUIVALENT I-131.

Basis

The limitations on the radioactivity of the reactor coolant ensure that the resulting 2-hour doses at the site boundary will be well within the limits of 10 CFR Part 100 following a steam generator tube rupture accident in conjunction with an assumed steady state primary-to-secondary steam generator leakage rate of 1.0 GPM and a concurrent loss of offsite power.

Permitting power operation to continue for limited time periods with the reactor coolant's radioactivity levels > 2.. μCi/gm DOSE EQUIVALENT I-131, but ≤ 60 μCi/gm, accommodates possible iodine spiking phenomenon which may occur following changes in thermal power.

Reducing T_{avg} to < 536°F prevents the release of radioactivity should a steam generator tube rupture, since the saturation pressure of the reactor coolant is below the lift pressure of the atmospheric steam relief valves. The surveillance requirements provide adequate assurance that excessive radioactivity levels in the reactor coolant will be detected in sufficient time to take appropriate corrective action(s).

References

(1) FSAR, Section 11.11.3

(2) FSAR, Section 14.14

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2.0 LIMITING CONDITIONS FOR OPERATION

2.20 Steam Generator Coolant Radioactivity

Applicability

Applies to the radioactivity of the steam generator coolant.

Objective

To ensure that the steam generator coolant radioactivity is maintained at a level commensurate with the occupational and public safety.

Specification

(1) The radioactivity of the steam generator coolant shall be $\leq$ 0.10 μCi/gm DOSE EQUIVALENT I-131.

(2) With the radioactivity of the steam generator coolant > 0.10 μCi/gm DOSE EQUIVALENT I-131, be in at least HOT SHUTDOWN within 6 hours.

Basis

The limitations on the steam generator coolant's radioactivity ensure that the resultant off-site doses will be well within the limits of 10 CFR Part 100 in the event of a steam line break. This dose also includes the effects of a coincident 1.0 GPM primary-to-secondary tube leak in the steam generator of the affected steam line and a concurrent loss of off-site power.

References

(1) FSAR Section 14.12

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests

Applicability

Applies to plant equipment and conditions related to safety.

Objective

To specify the minimum frequency and type of surveillance to be applied to critical plant equipment and conditions.

Specifications

Equipment and sampling tests shall be conducted as specified in Tables 3-4 and 3-5. The specified intervals may be adjusted to accommodate normal test schedules except that the interval shall not exceed 1.25 times the specified interval.

Basis

The equipment testing and system sampling frequencies specified in Tables 3-4 and 3-5 are considered adequate, based upon experience, to maintain the status of the equipment and systems so as to assure safe operation. Thus, those systems where changes might occur relatively rapidly are sampled frequently and those static systems not subject to changes are sampled less frequently.

The control room air treatment system consists of high efficiency particulate air filters (HEPA) and the charcoal adsorbers. HEPA filters are installed before the charcoal adsorbers to prevent clogging of the iodine adsorbers. The charcoal adsorbers are installed to reduce the potential intake of iodine to the control room. The in-place test results will confirm system integrity and performance. The laboratory carbon sample tests results should indicate methyl iodide removal efficiency of at least 90 percent for expected accident conditions.

The spent fuel storage-decontamination areas air treatment system is designed to filter the building atmosphere to the auxiliary building vent during refueling operations. The charcoal adsorbers are installed to reduce the potential release of radioiodine to the environment. In-place testing is performed to confirm the integrity of the filter system. The charcoal adsorbers are periodically sampled to insure capability for the removal of radioactive iodine.

3.0 SURVEILLANCE REQUIREMENTS

3.2 Equipment and Sampling Tests (Continued)

The Safety Injection (SI) pump room air treatment system consists of charcoal adsorbers which are installed in normally bypassed ducts. This system is designed to reduce the potential release of radioiodine in SI pump rooms during the recirculation period following a DBA. The in-place and laboratory testing of charcoal adsorbers will assure system integrity and performance.

Pressure drop across the combined HEPA filters and charcoal adsorbers, for each of the air treatment systems, of less than 6 inches of water will indicate that the filters and adsorbers are not clogged by excessive amounts of foreign matter. Operation of the system for 10 hours every month will demonstrate operability and remove excessive moisture build-up on the adsorbers.

If significant painting, fire or chemical release occurs such that the HEPA filters or charcoal adsorbers could become contaminated from the fumes, chemicals or foreign materials, testing will be performed to confirm system performance.

Demonstration of the automatic and/or manual initiation capability will assure the system's availability.

References

FSAR, Section 9.10

TABLE 3-4

MINIMUM FREQUENCIES FOR SAMPLING TESTS

	Type of Measurement and Analysis	Sample and Analysis Frequency
1. Reactor Coolant		
(a) Power Operation	(1) Gross Radioactivity	1 per 3 days
	(2) Isotopic Analysis for DOSE EQUIVALENT I-131	(i) 1 per 14 days
		(ii) 1 per 8 hours(1) whenever the radioactivity exceeds 2.0 µCi/gm DOSE EQUIVALENT I-131.
		(iii) 1 sample within 24 hours following a thermal power change exceeding 15% of the rated thermal power within a 1-hour period.
	(3) $\overline{E}$ Determination	1 per 6 months(2)
	(4) Dissolved oxygen and chloride	1 per 3 days
(b) Hot Standby	(1) Gross Radioactivity	1 per 3 days
Hot Shutdown	(2) Isotopic Analysis for DOSE EQUIVALENT I-131	(i) 1 per 8 hours(1) whenever the radioactivity exceeds 2.0 µCi/gm DOSE EQUIVALENT I-131.
		(ii) 1 sample within 24 hours following a thermal power change exceeding 15% of the rated thermal power within a 1-hour period.
	(3) Dissolved oxygen and chloride	1 per 3 days

TABLE 3-4 (Continued)

MINIMUM FREQUENCIES FOR SAMPLING TESTS

	Type of Measurement and Analysis	Sample and Analysis Frequency
1. Reactor Coolant (Continued)		
(c) Cold Shutdown	(1) Chloride	1 per 3 days
(d) Refueling Operation	(1) Chloride	1 per 3 days
	(2) Boron Concentration	1 per 3 days
2. Steam Generator Coolant	Isotopic Analysis for DOSE EQUIVALENT I-131	1 per 7 days.
3. SIRW Tank	Boron Concentration	1 per 31 days
4. Concentrated Boric Acid Tanks	Boron Concentration	1 per 31 days
5. SI Tanks	Boron Concentration	1 per 31 days
6. Spent Fuel Pool	Boron Concentration	1 per 31 days

(1) Until the radioactivity of the reactor coolant is restored to $\leq$ 2 µCi/gm DOSE EQUIVALENT I-131

(2) Sample to be taken after a minimum of 2 EFPD and 20 days of power operation have elapsed since reactor was subcritical for 48 hours or longer.

DELETE

ATTACHMENT B

DISCUSSION OF PROPOSED CHANGES TO TECHNICAL SPECIFICATIONS

The proposed revisions to the Fort Calhoun Station Unit No. 1 Technical Specifications are intended to provide the following functions:

1. Responds to the Commission's letter dated July 22, 1980, and

2. Adds Limiting Conditions for Operation during or following a power transient for which Section 2.1.3 of the present Technical Specifications does not have explicit provisions.

The proposed Technical Specifications provide reasonable assurance that following a steam generator tube rupture incident or a main steamline break in conjunction with an assumed steady state primary-to-secondary steam generator leakage rate of 1.0 GPM and a concurrent loss of offsite power, the resulting doses at the site boundary will be well within the exposure guidelines of 10 CFR Part 100. At the same time, these Technical Specifications permit the operating flexibility, compatibility with considerations of health and safety of the public, under unusual conditions of operation, on a temporary basis. Conversely, these Technical Specifications provide compliance with the limit specified in 10 CFR Part 20 under normal reactor operation.

It is concluded that based on the following reasons the proposed Technical Specifications do not involve an unreviewed safety question as per 10 CFR Part 50, Paragraph 50.59 (a)(2):

1. The proposed changes do not increase the probability or consequences of accidents or malfunction of safety-related equipment previously considered,

2. There is a reasonable assurance that the health and safety of the public will not be endangered under the proposed changes,

3. The possibility for an accident or malfunction of a different type than previously evaluated is not created, and

4. The safety of margin as defined in the applicable Technical Specifications is not reduced.

A comparison of standard Technical Specifications and the proposed Technical Specifications attached to the Commission's letter dated July 22, 1980, is presented on the next page.

COMPARISON OF STANDARD TECHNICAL SPECIFICATIONS (STS)
AND THE PROPOSED TECHNICAL SPECIFICATIONS
FOR FORT CALHOUN STATION UNIT NO. 1

Section or Subsection of STS	Section or Subsection of Proposed Tech. Specifications	Remarks
1.0	Definitions	Appropriate/applicable definitions have been incorporated.
I. REACTOR COOLANT SYSTEM		
3.4.9.a	2.1.3(1)a	The radioactivity of the reactor coolant for DOSE EQUIVALENT I-131 is 2.0 μCi/gm instead of 1.0 μCi/gm, as per STS. The 2.0 μCi/gm limit is based on approximately 1% failed fuel as referenced in Table 11.1.5 of the FSAR and is based on the methodology presented in NUREG-0017. Also, the thyroid doses under accident conditions using 2.0 μCi/gm without iodine spiking are less than 1% of 10 CFR Part 100 value. Fort Calhoun Station has operated for approximately 7 years without any undue hazard to the public as per 10 CFR Part 20 and Appendix I to 10 CFR Part 50.
3.4.9.b.	2.1.3(1)b	- - - - -
Action a	2.1.3(2)	1. The proposed Technical Specification is considered conservative since the upper limit for DOSE EQUIVALENT I-131 during power transients (iodine spiking) is not allowed to exceed 60 μCi/gm. Figure 314-1 of STS allows the radioactivity to exceed 60 μCi/gm whenever the reactor thermal power is less than 80%. 2. The specified time limit for reactor operation during iodine spiking is 100 hours instead of 48 hours. This 100-hour time limit has been obtained after reviewing the past 7 years operating history. It was determined that it takes approximately 100 to 150 hours to restore the radioactivity within acceptable values.

Section or Subsection of STS	Section or Subsection of Proposed Tech. Specifications	Remarks
Action b	2.1.3(3)	Incorporated
Action c	2.1.3(4)	Incorporated
Action d	2.1.3(5)	Incorporated
Table 4.4-4		
Item 1	Table 3-4, Items 1(a)(1) and 1(b)(1)	Incorporated
Item 2	Table 3-4, Item 1(a)(2)(i)	Incorporated
Item 3	Table 3-4, Item 1(a)(3)	Incorporated
Item 4(a)	Table 3-4, Items 1(a)(2)(ii) and 1(b)(2)(i)	Based on the operating history of the plant, sampling requirements once per 8 hours are considered appropriate. Based on the operating history of the plant and especially during iodine spiking phenomenon, the sampling requirement of one sample within 24 hours is considered appropriate.
II. SECONDARY COOLANT SYSTEM		
3.7.1.4	Proposed new Specification 2.20(1)	Incorporated
Action	2.20(2)	Incorporated
Table 4.7-1		
Item 1	-	Not considered appropriate due to its implication/interaction with Item 2 of STS. Also, the determination of gross radioactivity does not have any bearing on the safety considerations following a main steam line break.
Item 2	Table 3-4, Item 2	The proposed sampling requirements are considered more limiting.

JUSTIFICATION FOR FEE CLASSIFICATION

The proposed amendment is deemed to be Class III within the meaning of 10 CFR 170.22 because its acceptability has been identified by Commission positions. The Commission identified the need and format for the proposed amendment by letter dated July 22, 1980.

ATTACHMENT C