ATTACHMENT

Technical Specification Changes

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1.19 PURGE - PURGING

PURGE or PURGING is the controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration or other operating conditions in such a manner that replacement air or gas is required to purify the confinement.

1.20 VENTING

VENTING is the controlled process of discharging air as gas from a confinement to maintain temperature, pressure, humidity, concentration or other operating conditions in such a manner that replacement air or gas is not provided. Vent used in system name does not imply a VENTING process.

1.21 REPORTABLE EVENT

A REPORTABLE EVENT shall be any of those conditions specified in Section 50.73 to 10 CFR Part 50.

1.22 MEMBER(S) OF THE PUBLIC

MEMBER(S) OF THE PUBLIC shall include all persons who are not occupationally associated with the plant. This category does not include employees of the GPU System, GPU contractors or vendors. Also excluded from this category are persons who enter the site to service equipment or to make deliveries.

1.23 SUBSTANTIVE CHANGES

SUBSTANTIVE CHANGES are those which affect the activities associated with a document or the document's meaning or intent. Examples of non-substantive changes are: (1) correcting spelling; (2) adding (but not deleting) sign-off spaces; (3) blocking in notes, cautions, etc.; (4) changes in corporate and personnel titles which do not reassign responsibilities and which are not referenced in the Appendix A Technical Specifications; and (5) changes in nomenclature or editorial changes which clearly do not change function, meaning or intent.

1.24 CORE OPERATING LIMITS REPORT

The CORE OPERATING LIMITS REPORT is a TMI-1 specific document that provides core operating limits for the current operating cycle. The cycle-specific core operating limits addressed by the individual Technical Specifications shall be determined for each cycle in accordance with Specification 6.9.5. The report may also contain GPUN design criteria and core operating limits not required by the Technical Specifications.

The specified flow rates for curves 1, 2, and 3 of Figure 2.1-2 correspond to the expected minimum flow rates with four pumps, three pumps, and one pump in each loop, respectively.

The curve of Figure 2.1-1 is the most restrictive of all possible reactor coolant pump-maximum thermal power combinations shown in Figure 2.1-3. The curves of Figure 2.1-3 represent the conditions at which the DNBR limit is predicted at the maximum possible thermal power for the number of reactor coolant pumps in operation or the local quality at the point of minimum DNBR is equal to 22 percent, (B&W-2)(4), or 26 percent (BWC)(2) whichever condition is more restrictive.

The maximum thermal power for three pump operation is 89.3 percent due to a power level trip produced by the flux-flow ratio (74.7 per cent flow x 1.08 = 80.6 percent power) plus the maximum calibration and instrumentation error. The maximum thermal power for other reactor coolant pump conditions is produced in a similar manner.

Using a local quality limit of 22 percent (B&W-2), or 26 percent (BWC) at the point of minimum DNBR as a basis for curves 2 and 3 of Figure 2.1-3 is a conservative criterion even though the quality at the exit is higher than the quality at the point of minimum DNBR.

The DNBR as calculated by the B&W-2 or BWC correlation continually increases from the point of minimum DNBR, so that the exit DNBR is always higher and is a function of the pressure.

For each curve of Figure 2.1-3, a pressure-temperature point above and to the left of the curve would result in a DNBR greater than 1.30 (B&W-2) or 1.18 (BWC) or a local quality at the point of minimum DNBR less than 22 percent (B&W-2), or 26 percent (BWC) for the particular reactor coolant pump situation. Curve 1 is more restrictive than any other reactor coolant pump situation because any pressure/temperature point above and to the left of this curve will be above and to the left of the other curves.

REFERENCES

(1) FSAR, Section 3.2.3.1.1

(2) BWC Correlation of Critical Heat Flux, BAW-10143P-A, Babcock & Wilcox, Lynchburg, Virginia, April 1985

(3) FSAR, Section 3.2.3.1.1.3

(4) FSAR, Section 3.2.3.1.1.10

3.5.2 CONTROL ROD GROUP AND POWER DISTRIBUTION LIMITS

Applicability

This specification applies to power distribution and operation of control rods during power operation.

Objective

To asure an acceptable core power distribution during power operation, to set a limit on potential reactivity insertion from a hypothetical control rod ejection, and to assure core subcriticality after a reactor trip.

Specification

3.5.2.1 The available shutdown margin shall not be less than one percent $\Delta K/K$ with the highest worth control rod fully withdrawn.

3.5.2.2 Operation with inoperable rods:

a. Operation with more than one inoperable road as defined in Specification 4.7.1 and 4.7.2.3 in the safety or regulating rod banks shall not be permitted.

b. If a control rod in the regulating and/or safety rod banks is declared inoperable in the withdrawn position as defined in Specification Paragraph 4.7.1.1 and 4.7.1.3, an evaluation shall be initiated immediately to verify the existence of one percent $\Delta k/k$ hot shutdown margin. Boration may be initiated to increase the available rod worth either to compensate for the worth of the inoperable rod or until the regulating banks are fully withdrawn, whichever occurs first. Simultaneously a program of exercising the remaining regulating and safety rods shall be initiated to verify operability.

c. If within one hour of determination of an inoperable rod as defined in Specification 4.7.1, it is not determined that a one percent $\Delta k/k$ hot shutdown margin exists combining the worth of the inoperable rod with each of the other rods, the reactor shall be brought to the HOT SHUTDOWN condition until this margin is established.

d. Following the determination of an inoperable rod as defined in Specification 4.7.1, all rods shall be exercised within 24 hours and exercised weekly until the rod problem is solved.

e. If a control rod in the regulating or safety rod groups is declared inoperable per 4.7.1.2, power shall be reduced to 60% of the thermal power allowable for the reactor coolant pump combination.

f. If a control rod in the regulating or axial power shaping groups is declared inoperable per Specification 4.7.1.2., operation may continue provided the rods in the group are positioned such that the rod that was declared inoperable is maintained within allowable group average position limits of Specification 4.7.1.2.

g. If the inoperable rod in Paragraph "e" above is in groups 5, 6, 7, or 8, the other rods in the group may be trimmed to the same position. Normal operation of 100 percent of the thermal power allowable for the reactor coolant pump combination may then continue provided that the rod that was declared inoperable is maintained within allowable group average position limits in 3.5.2.5.

3.5.2.3 The worth of single inserted control rods during criticality is limited by the restriction of Specification 3.1.3.5 and the Control Rod Position Limits defined in Specification 3.5.2.5.

3.5.2.4 Quadrant Tilt:

a. Except for physics tests, the quadrant tilt, as determined using the full incore system (FIS), shall not exceed the values in the CORE OPERATING LIMITS REPORT.

The FIS is OPERABLE for monitoring quadrant tilt provided the number of valid symmetric string individual SPND signals in any one quadrant is not less than the limit in the CORE OPERATING LIMITS REPORT.

b. When the full incore system is not OPERABLE and except for physics tests quadrant tilt as determined using the power range channels for each quadrant (out of core detector system)(OCD), shall not exceed the values in CORE OPERATING LIMITS REPORT.

c. When neither detector system above is OPERABLE and, except for physics tests, quadrant tilt as determined using the minimum incore system (MIS), shall not exceed the values in the CORE OPERATING LIMITS REPORT.

d. Except for physics tests, if quadrant tilt exceeds the tilt limit, allowable power shall be reduced 2 percent for each 1 percent tilt in excess of the tilt limit. For less than four pump operation, thermal power shall be reduced 2 percent below the thermal power allowable for the reactor coolant pump combination for each 1 percent tilt in excess of the tilt limit.

e. Within a period of 4 hours, the quadrant power tilt shall be reduced to less than the tilt limit except for physics tests, or the following adjustments in setpoints and limits shall be made:

1. The protection system reactor power/imbalance envelope trip setpoints shall be reduced 2 percent in power for each 1 percent tilt, in excess of the tilt limit, or when thermal power is equal to or less than 50% full power with four reactor coolant pumps running, set the nuclear overpower trip setpoint equal to or less than 60% full power.

2. The control rod group withdrawal limits in the CORE OPERATING LIMITS REPORT shall be reduced 2 percent in power for each 1 percent tilt in excess of the tilt limit.

3. The operational imbalance limits in the CORE OPERATING LIMITS REPORT shall be reduced 2 percent in power for each 1 percent tilt in excess of the tilt limit.

f. Except for physics or diagnostic testing, if quadrant tilt is in excess of the tilt limit defined in the CORE OPERATING LIMITS REPORT and using the applicable detector system defined in 3.5.2.4.a, b, and c above, the reactor will be placed in the HOT SHUTDOWN condition. Diagnostic testing during power operation with a quadrant tilt is permitted provided that the thermal power allowable is restricted as stated in 3.5.2.4.d above.

g. Quadrant tilt shall be monitored on a minimum frequency of once every two hours during power operation above 15 percent of rated power.

3.5.2.5 Control Rod Positions:

a. Operating rod group overlap shall not exceed 25 percent ± 5 percent, between two sequential groups except for physics tests.

b. Position limits are specified for regulating control rods. Except for physics tests or exercising control rods, the regulating control rod insertion/withdrawal limits are specified in the CORE OPERATING LIMITS REPORT. If any of these control rod position limits are exceeded, corrective measures shall be taken immediately to achieve an acceptable control rod position. Acceptable control rod positions shall be attained within four hours.

c. Safety rod limits are given in 3.1.3.5.

3.5.2.6 The control rod drive patch panels shall be locked at all times with limited access to be authorized by the superintendent.

3.5.2.7 Axial Power Imbalance:

a. Except for physics tests the axial power imbalance, as determined using the full incore system (FIS), shall not exceed the envelope defined in the CORE OPERATING LIMITS REPORT.

The FIS is operable for monitoring axial power imbalance provided the number of valid self powered neutron detector (SPND) signals in any one quadrant is not less than the limit in the CORE OPERATING LIMITS REPORT.

b. When the full incore detector system is not OPERABLE and except for physics tests axial power imbalance, as determined using the power range channels (out of core detector system)(OCD), shall not exceed the envelope defined in the CORE OPERATING LIMITS REPORT.

c. When neither detector system above is OPERABLE and, except for physics tests axial power imbalance, as determined using the minimum incore system (MIS), shall not exceed the envelope defined in the CORE OPERATING LIMITS REPORT.

d. Except for physics tests if axial power imbalance exceeds the envelope, corrective measures (reduction of imbalance by APSR movements and/or reduction in reactor power) shall be taken to maintain operation within the envelope.

e. If an acceptable axial power imbalance is not achieved within four hours, reactor power shall be reduced until imbalance limits are met.

f. Axial power imbalance shall be monitored on a minimum frequency of once every two hours during power operation above 40 percent of rated power.

3.5.2.8 A power map shall be taken at intervals not to exceed 30 effective full power days using the incore instrumentation detection system to verify the power distribution is within the limits shown in the CORE OPERATING LIMITS REPORT.

Bases

The axial power imbalance, quadrant power tilt, and control rod position limits are based on LOCA analyses. These limits are developed in a manner that ensures the initial condition LOCA maximum linear heat rate will not cause the maximum clad temperature to exceed the Final Acceptance Criteria (10 CFR 50 Appendix K). Operation outside of any one limit alone does not necessarily constitute a situation that would cause the Final Acceptance Criteria to be exceeded should a LOCA occur. Each limit represents the boundary of operation that will preserve the Final Acceptance Criteria even if all three limits are at their maximum allowable values simultaneously. The effects of the gray APSRs are included in the limit development. Additional conservatism included in the limit development is introduced by application of:

a. Nuclear uncertainty factors

b. Thermal calibration uncertainty

c. Fuel densification effects

d. Hot rod manufacturing tolerance factors

e. Postulated fuel rod bow effects

f. Peaking limits based on initial condition for Loss of Coolant Flow transients.

The incore instrumentation system uncertainties used to develop the axial power imbalance and quadrant tilt limits accounted for various combinations of invalid SPND signals. If the number of valid SPND signals falls below that used in the uncertainty analysis, then another system shall be used for monitoring axial power imbalance and/or quadrant tilt.

The 25$\pm$5 percent overlap between successive control rod groups is allowed since the worth of a rod is lower at the upper and lower part of the stroke. Control rods are arranged in groups or banks defined as follows:

Group	Function
1	Safety
2	Safety
3	Safety
4	Safety
5	Regulating
6	Regulating
7	Regulating
8	APSR (axial power shaping rod bank)

Control rod groups are withdrawn in sequence beginning with group 1. Groups 5,6 and 7 are overlapped 25 percent. The normal position at power is for group 7 to be partially inserted.

The rod position limits are based on the most limiting of the following three criteria: ECCS power peaking, shutdown margin, and potential ejected rod worth. As discussed above, compliance with the ECCS power peaking criterion is ensured by the rod position limits. The minimum available rod worth, consistent with the rod position limits, provides for achieving hot shutdown by reactor trip at any time, assuming the highest worth control rod that is withdrawn remains in the full out position (1). The rod position limits also ensure that inserted rod groups will not contain single rod worths greater than: 0.65% $\Delta k/k$ at rated power. These values have been shown to be safe by the safety analysis (2) of the hypothetical rod ejection accident. A maximum single inserted control rod worth of 1.0% $\Delta k/k$ is allowed by the rod position limits at hot zero power. A single inserted control rod worth 1.0% $\Delta k/k$ at beginning of life, hot, zero power would result in a lower transient peak thermal power and, therefore, less severe environmental consequences than 0.65% $\Delta k/k$ ejected rod worth at rated power.

The plant computer will scan for tilt and imbalance and will satisfy the technical specification requirements. If the computer is out of service, than manual calculation for tilt above 15 percent power and imbalance above 40 percent power must be performed at least every two hours until the computer is returned to service.

Reduction of the nuclear overpower trip setpoint to 60% full power when thermal power is equal to or less than 50% full power maintains both core protection and an operability margin at reduced power similar to that at full power.

During the physics testing program, the high flux trip setpoints are administratively set as follows to assure an additional safety margin is provided:

Test Power	Test Setpoint
0	<5%
15	50%
40	50%
50	60%
75	85%
>75	105.1%

REFERENCES

(1) FSAR, Section 3.2.2.1.2

(2) FSAR, Section 14.2.2.2

3.5.4 INCORE INSTRUMENTATION

Applicability

Applies to the operability of the incore instrumentation system.

Objective

To specify the functional and operational requirements of the incore instrumentation system for the Minimum Incore System (MIS).

Specification

Above 80 percent of operating power determined by the reactor coolant pump combination, reference Table 2.3.1, at least 23 individual incore detectors shall be OPERABLE to check gross core power distribution and to assist in the periodic calibration of the out-of-core detectors in regard to the core imbalance trip limits. The detectors shall be arranged as follows and may be a part of both basic arrangements.

3.5.4.1 Axial Power Imbalance

a. Three detectors in each of three strings shall lie in the same axial plane with one plane in each axial core half.

b. The axial planes in each core half shall be symmetrical about the core mid-plane.

c. The detectors shall not have radial symmetry.

3.5.4.2 Quadrant Tilt

a. Two sets of four detectors shall lie in each core half. Each set of four shall lie in the same axial plane. The two sets in the same core half may lie in the same axial place.

b. Detectors in the same plane shall have quarter core radial symmetry.

Bases

A system of 52 incore flux detector assemblies with seven detectors per assembly has been provided primarily for fuel management purposes. The system includes data display and record functions and is also used for out-of-core nuclear instrumentation calibration and for core power distribution verification.

a. The out-of-core instrumentation calibration includes:

1. Calibration of the split detectors at initial reactor startup, during the power escalation program, and periodically thereafter.

5.3 REACTOR

Applicability

Applies to the design features of the reactor core and reactor coolant system.

Objective

To define the significant design features of the reactor core and reactor coolant system.

Specification

5.3.1 REACTOR CORE

5.3.1.1 The reactor core is composed of slightly enriched uranium dioxide pellets contained in fuel rods. A fuel assembly contains 208 fuel rods arranged in a 15 by 15 lattice. The details of the fuel assembly design are described in TMI-1 FSAR Chapter 3.(1)

5.3.1.2 The reactor core shall approximate a right circular cylinder with an equivalent diameter of 128.9 inches. The active fuel height is defined in TMI-1 FSAR Chapter 3.(3)

5.3.1.3 The core average and individual batch enrichments for the present cycle are described in TMI-1 FSAR Chapter 3.(2)

5.3.1.4 The control rod assemblies (CRA) and axial power shaping rod assemblies (APSRA) are distributed in the reactor core as shown in TMI-1 FSAR Chapter 3.(2) The CRA and APSRA design data are also described in the FSAR.

5.3.1.5 The TMI-1 core may contain burnable poison rod assemblies (BPRA) as described in TMI-1 FSAR Chapter 3.(4)

5.3.1.6 Reload fuel assemblies and rods shall conform to design and evaluation data described in the FSAR and shall not exceed an enrichment of 4.3 weight percent of U^{235}.

5.3.2 REACTOR COOLANT SYSTEM

5.3.2.1 The reactor coolant system shall be designed and constructed in accordance with code requirements.(4)

5.3.2.2 The reactor coolant system and any connected auxiliary systems exposed to the reactor coolant conditions of temperature and pressure, shall be designed for a pressure of 2,500 psig and a temperature of 650 F. The pressurizer and pressurizer surge line shall be designed for a temperature of 670 F.(5)

5.3.2.3 The reactor coolant system volume shall be less than 12,200 cubic feet.

REFERENCES

(1) FSAR, Section 3.2.1

(2) FSAR, Section 3.2.2

(3) FSAR, Section 3.2.3

(4) FSAR, Section 3.2.4

(5) FSAR, Section 4.1.3

(6) FSAR, Section 4.1.2

6.9.4.2.5 The Radioactive Effluent Release Reports shall include the instrumentation not returned to OPERABLE status within 30 days per TS 3.21.1.b and TS 3.22.2.b.

6.9.4.3 The following information shall be included in the Radioactive Effluent Release Report to be submitted 60 days after January 1 of each year.

6.9.4.3.1 The Radioactive Effluent Release Report to be submitted 60 days after January 1 of each year shall include an annual summary of hourly meteorological data collected over the previous year. This annual summary may be either in the form of an hour-by-hour listing of wind speed, wind direction, atmosphere stability, and precipitation (if measured) on magnetic tape, or in the form of joint frequency distribution of wind speed, wind direction, and atmospheric stability.

6.9.4.3.2 The Radioactive Effluent Release Report to be submitted 60 days after January 1 of each year shall include an assessment of the radiation doses due to the radioactive liquid and gaseous effluents released from the unit or station during the previous calendar year.

6.9.4.3.3 The Radioactive Effluent Release Report to be submitted 60 days after January 1 of each year shall include an assessment of the radiation doses from radioactive liquid and gaseous effluents to MEMBERS OF THE PUBLIC due to their activities inside the site boundary (Figures 5-3 and 5-4) during the report period. All assumptions used in making these assessments (i.e., specific activity, exposure time and location) shall be included in these reports. The meteorological conditions concurrent with the time of release of radioactive materials in gaseous effluents (as determined by sampling frequency and measurement) shall be used for determining the gaseous pathway doses. The assessment of radiation doses shall be performed in accordance with the OFFSITE DOSE CALCULATION MANUAL (ODCM).

6.9.4.3.4 The Radioactive Effluent Release Report to be submitted 60 days after January 1 of each year shall also include an assessment of radiation doses to the likely most exposed real individual from reactor releases and other nearby uranium fuel cycle sources including doses from primary effluent pathways and direct radiation for the previous 12 consecutive months to show conformance with 40 CFR 190 "Environmental Radiation Protection Standards for Nuclear Power Operation". Acceptable methods for calculating the dose contributions from Liquid and gaseous effluents are given in Regulatory Guide 1.109, Rev. 1.

6.9.5 <u>CORE OPERATING LIMITS REPORT</u>

6.9.5.1 The core operating limits addressed by the individual Technical Specifications shall be established and documented in the CORE OPERATING LIMITS REPORT prior to each reload cycle or prior to any remaining part of a reload cycle.

6.9.5.2 The analytical methods used to determine the core operating limits addressed by the individual Technical Specifications shall be those previously reviewed and approved by the NRC for use at TMI-1. All NRC-approved reports, letters, and staff safety evaluation reports identifying the analytical methodology used to establish the limits described in the CORE OPERATING LIMITS REPORT shall be documented as references in the report.

6.9.5.3 The core operating limits shall be determined so that all applicable limits (e.g. fuel thermal-mechanical limits, core thermal-hydraulic limits, ECCS limits, nuclear limits such as shutdown margin, and transient/accident analysis limits) of the safety analysis are met.

6.9.5.4 The CORE OPERATING LIMITS REPORT, including any mid-cycle revisions or supplements thereto, shall be provided upon issuance for each reload cycle to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector.

6.10 <u>RECORD RETENTION</u>

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

a. Records of normal station operation including power levels and periods of operation at each power level.

b. Records of principal maintenance activities, including inspection, repairs, substitution, or replacement of principal items of equipment related to nuclear safety.

c. All REPORTABLE EVENTS.

d. Records of periodic checks, tests and calibrations.

e. Records of reactor physics tests and other special tests related to nuclear safety.

f. Changes to procedures required by Specification 6.8.1.

g. Records of solid radioactive shipments.