Byron Station

Technical Requirements Manual

(TRM)

Byron Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

APPENDICES

1.0 USE AND APPLICATION

1.1 Definitions

---------------------------------NOTE---------------------------------
The defined terms of this section appear in capitalized type and are applicable throughout this Technical Requirements Manual.

Term	Definition
ACTIONS	ACTIONS shall be that part of a Requirement that prescribes Required Actions to be taken under designated Conditions within specified Completion Times.
CHANNEL CALIBRATION	A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel so that it responds within the required range and accuracy to known inputs. The CHANNEL CALIBRATION shall encompass the entire channel, including the required sensor, alarm, interlock, display, and trip functions. Calibration of instrument channels with Resistance Temperature Detector (RTD) or thermocouple sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping calibrations or total channel steps so that the entire channel is calibrated.
CHANNEL CHECK	A CHANNEL CHECK shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameter.

1.1 Definitions

CHANNEL OPERATIONAL TEST (COT)	A COT shall be the injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify the OPERABILITY of required alarm, interlock, display, and trip functions. The COT shall include adjustments, as necessary, of the required alarm, interlock, and trip setpoints so that the setpoints are within the required range and accuracy.
CORE ALTERATION	CORE ALTERATION shall be the movement of any fuel, sources, or reactivity control components, within the reactor vessel with the vessel head removed and fuel in the vessel. Suspension of CORE ALTERATIONS shall not preclude completion of movement of a component to a safe position.
CORE OPERATING LIMITS REPORT (COLR)	The COLR is the unit specific document that provides cycle specific parameter limits for the current reload cycle. These cycle specific parameter limits shall be determined for each reload cycle in accordance with Specification 5.6.5. Unit operation within these limits is addressed in individual Specifications.
DOSE EQUIVALENT I-131	DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microcurie/gram) that alone would produce the same dose when inhaled as the combined activities of iodine isotopes I-131, I-132, I-133, I-134, and I-135 actually present. The determination of DOSE EQUIVALENT I-131 shall be performed using the Committed Effective Dos Equivalent (CEDE) dose conversion factors from Table 2.1 of EPA Federal Guidance Report No. 11, 1988, “Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion.”

1.1 Definitions

INSERVICE TESTING PROGRAM	The INSERVICE TESTING PROGRAM is the licensee program that fulfills the requirements of 10 CFR 50.55a(f).
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 licensee, its contractors or vendors and persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational, or other purposes not associated with the plant.
MODE	A MODE shall correspond to any one inclusive combination of core reactivity condition, power level, average reactor coolant temperature, and reactor vessel head closure bolt tensioning specified in Table T1.1-1 with fuel in the reactor vessel.
OFFSITE DOSE CALCULATION MANUAL (ODCM)	The ODCM shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring Alarm/Trip Setpoints, and in the conduct of the Environmental Radiological Monitoring Program. The ODCM shall also contain (1) the Radioactive Effluent Controls and Radiological Environmental Monitoring Programs and (2) descriptions of the information that should be included in the Annual Radiological Environmental Operating and Radioactive Effluent Release Reports.
OPERABLE - OPERABILITY	A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

1.1 Definitions

PROCESS CONTROL PROGRAM (PCP)	The PCP shall contain the current formulas, sampling, analyses, tests, and determinations to be made to ensure that processing and packaging of solid radioactive wastes based on demonstrated processing of actual or simulated wet solid wastes will be accomplished in such a way as to assure compliance with 10 CFR Parts 20, 61, and 71, State regulations, burial ground requirements, and other requirements governing the disposal of solid radioactive waste.
PURGE - PURGING	PURGE or PURGING shall be any controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration or other operating condition, in such a manner that replacement air or gas is required to purify the confinement.
QUADRANT POWER TILT RATIO (QPTR)	QPTR shall be the ratio of the maximum upper excore detector calibrated output to the average of the upper excore detector calibrated outputs, or the ratio of the maximum lower excore detector calibrated output to the average of the lower excore detector calibrated outputs, whichever is greater.
RATED THERMAL POWER (RTP)	RTP shall be a total reactor core heat transfer rate to the reactor coolant of 3645 MWt.
SINGLE-FAILURE PROOF LOAD HANDLING SYSTEM	Cranes meeting requirements of ASME NOG-1-2004, NUREG-0554 and NUREG-0612, as applicable. Special Lifting Devices meeting requirements of NUREG-0612, Section 5.1.6(1)(a). Lifting devices that are not specially designed that meet the requirements of NUREG-0612, Section 5.1.6(1)(b). Interfacing lift points such as lifting lugs or cask trunions meet the requirements of NUREG-0612, Section 5.1.6(3).

1.1 Definitions

SHUTDOWN MARGIN (SDM)	SDM shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming: a. All Rod Cluster Control Assemblies (RCCAs) are fully inserted except for the single RCCA of highest reactivity worth, which is assumed to be fully withdrawn. With any RCCA not capable of being fully inserted, the reactivity worth of the RCCA must be accounted for in the determination of SDM; and b. In MODES 1 and 2, the fuel and moderator temperatures are changed to the hot zero power temperature.
SITE BOUNDARY	The SITE BOUNDARY shall be that line beyond which the land is neither owned, nor leased, nor otherwise controlled by the licensee.
THERMAL POWER	THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.
TRIP ACTUATING DEVICE OPERATIONAL TEST (TADOT)	A TADOT shall consist of operating the trip actuating device and verifying the OPERABILITY of required alarm, interlock, display, and trip functions. The TADOT shall include adjustment, as necessary, of the trip actuating device so that it actuates at the required setpoint within the required accuracy.
UNRESTRICTED AREA	An UNRESTRICTED AREA shall be any area at or beyond the SITE BOUNDARY access to which is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials, or any area within the SITE BOUNDARY used for residential quarters or for industrial, commercial, institutional, and/or recreational purposes.

1.1 Definitions

VENTILATION EXHAUST TREATMENT SYSTEM	A VENTILATION EXHAUST TREATMENT SYSTEM shall be any system designed and installed to reduce gaseous radioiodine or radioactive material in particulate form in effluents by passing ventilation or vent exhaust gases through charcoal adsorbers and/or HEPA filters for the purpose of removing iodines or particulates from the gaseous exhaust stream prior to the release to the environment. Such a system is not considered to have any effect on noble gas effluents. Engineered Safety Features Atmospheric Cleanup Systems are not considered to be VENTILATION EXHAUST TREATMENT SYSTEM components.
WASTE GAS HOLDUP SYSTEM	A WASTE GAS HOLDUP SYSTEM shall be any system designed and installed to reduce radioactive gaseous effluents by collecting Reactor Coolant System off-gases from the Reactor Coolant System and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

Table T1.1-1 (page 1 of 1)
MODES

MODE	TITLE	REACTIVITY CONDITION (k_{eff})	% RATED THERMAL POWER[a]	AVERAGE REACTOR COOLANT TEMPERATURE (°F)
1	Power Operation	≥ 0.99	> 5	NA
2	Startup	≥ 0.99	≤ 5	NA
3	Hot Standby	< 0.99	NA	≥ 350
4	Hot Shutdown[b]	< 0.99	NA	$350 > T_{avg} > 200$
5	Cold Shutdown[b]	< 0.99	NA	≤ 200
6	Refueling[c]	NA	NA	NA

(a) Excluding decay heat.

(b) All required reactor vessel head closure bolts fully tensioned.

(c) One or more required reactor vessel head closure bolts less than fully tensioned.

1.0 USE AND APPLICATION

1.2 Logical Connectors

PURPOSE

The purpose of this section is to explain the meaning of logical connectors.

Logical connectors are used in the Technical Requirements Manual (TRM) to discriminate between, and yet connect, discrete Conditions, Required Actions, Completion Times, Surveillances, and Frequencies. The only logical connectors that appear in the TRM are AND and OR. The physical arrangement of these connectors constitutes logical conventions with specific meanings.

BACKGROUND

Several levels of logic may be used to state Required Actions. These levels are identified by the placement (or nesting) of the logical connectors and by the number assigned to each Required Action. The first level of logic is identified by the first digit of the number assigned to a Required Action and the placement of the logical connector in the first level of nesting (i.e., left justified with the number of the Required Action). The successive levels of logic are identified by additional digits of the Required Action number and by successive indentations of the logical connectors.

When logical connectors are used to state a Condition, Completion Time, Surveillance, or Frequency, only the first level of logic is used, and the logical connector is left justified with the statement of the Condition, Completion Time, Surveillance, or Frequency.

EXAMPLES

The following examples illustrate the use of logical connectors.

1.2 Logical Connectors

EXAMPLES (continued)

EXAMPLE 1.2-1

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. TLCO not met.	A.1 Verify . . . AND A.2 Restore . . .	

In this example the logical connector AND is used to indicate that when in Condition A, both Required Actions A.1 and A.2 must be completed.

1.2 Logical Connectors

EXAMPLES (continued)

EXAMPLE 1.2-2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. TLCO not met.	A.1 Trip . . . OR A.2.1 Verify . . . AND A.2.2.1 Reduce . . . OR A.2.2.2 Perform . . . OR A.3 Align . . .	

This example represents a more complicated use of logical connectors. Required Actions A.1, A.2, and A.3 are alternative choices, only one of which must be performed as indicated by the use of the logical connector OR and the left justified placement. Any one of these three Actions may be chosen. If A.2 is chosen, then both A.2.1 and A.2.2 must be performed as indicated by the logical connector AND. Required Action A.2.2 is met by performing A.2.2.1 or A.2.2.2. The indented position of the logical connector OR indicates that A.2.2.1 and A.2.2.2 are alternative choices, only one of which must be performed.

1.0 USE AND APPLICATION

1.3 Completion Times

PURPOSE

The purpose of this section is to establish the Completion Time convention and to provide guidance for its use.

BACKGROUND

Technical Requirements Manual Limiting Conditions for Operation (TLCOs) specify minimum requirements for ensuring safe operation of the unit. The ACTIONS associated with a TLCO state Conditions that typically describe the ways in which the requirements of the TLCO can fail to be met. Specified with each stated Condition are Required Action(s) and Completion Time(s).

DESCRIPTION

The Completion Time is the amount of time allowed for completing a Required Action. It is referenced to the time of discovery of a situation (e.g., inoperable equipment or variable not within limits) that requires entering an ACTIONS Condition unless otherwise specified, providing the unit is in a MODE or specified condition stated in the Applicability of the TLCO. Unless otherwise specified, the Completion Time begins when a senior licensed operator on the operating shift crew with responsibility for plant operations makes the determination that an LCO is not met and an ACTIONS Condition is entered. The "otherwise specified" exceptions are varied, such as a Required Action Note or Surveillance Requirement Note that provides an alternative time to perform specific tasks, such as testing, without starting the Completion Time. While utilizing the Note, should a Condition be applicable for any reason not addressed by the Note, the Completion Time begins. Should the time allowance in the Note be exceeded, the Completion Time begins at that point. The exceptions may also be incorporated into the Completion Time. Required Actions must be completed prior to the expiration of the specified Completion Time. An ACTIONS Condition remains in effect and the Required Actions apply until the Condition no longer exists or the unit is not within the TLCO Applicability.

If situations are discovered that require entry into more than one Condition at a time within a single TLCO (multiple Conditions), the Required Actions for each Condition must be performed within the associated Completion Time. When in multiple Conditions, separate Completion Times are tracked for each Condition starting from the discovery of the situation that required entry into the Condition, unless otherwise specified.

1.3 Completion Times

DESCRIPTION (continued)

Once a Condition has been entered, subsequent trains, subsystems, components, or variables expressed in the Condition, discovered to be inoperable or not within limits, will not result in separate entry into the Condition, unless specifically stated. The Required Actions of the Condition continue to apply to each additional failure, with Completion Times based on initial entry into the Condition, unless otherwise specified.

However, when a subsequent train, subsystem, component, or variable expressed in the Condition is discovered to be inoperable or not within limits, the Completion Time(s) may be extended. To apply this Completion Time extension, two criteria must first be met. The subsequent inoperability:

a. Must exist concurrent with the first inoperability; and

b. Must remain inoperable or not within limits after the first inoperability is resolved.

The total Completion Time allowed for completing a Required Action to address the subsequent inoperability shall be limited to the more restrictive of either:

a. The stated Completion Time, as measured from the initial entry into the Condition, plus an additional 24 hours; or

b. The stated Completion Time as measured from discovery of the subsequent inoperability.

The above Completion Time extension does not apply to those TLCOs that have exceptions that allow completely separate re-entry into the Condition (for each train, subsystem, component, or variable expressed in the Condition) and separate tracking of Completion Times based on this re-entry. These exceptions are stated in individual TLCOs.

1.3 Completion Times

DESCRIPTION (continued)

The above Completion Time extension does not apply to a Completion Time with a modified "time zero." This modified "time zero" may be expressed as a repetitive time (i.e., "once per 8 hours," where the Completion Time is referenced from a previous completion of the Required Action versus the time of Condition entry) or as a time modified by the phrase "from discovery . . . ." Example 1.3-3 illustrates one use of this type of Completion Time. The 10 day Completion Time specified for Conditions A and B in Example 1.3-3 may not be extended.

EXAMPLES

The following examples illustrate the use of Completion Times with different types of Conditions and changing Conditions.

EXAMPLE 1.3-1

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

Condition B has two Required Actions. Each Required Action has its own separate Completion Time. Each Completion Time is referenced to the time that Condition B is entered.

1.3 Completion Times

EXAMPLES (continued)

The Required Actions of Condition B are to be in MODE 3 within 6 hours AND in MODE 5 within 36 hours. A total of 6 hours is allowed for reaching MODE 3 and a total of 36 hours (not 42 hours) is allowed for reaching MODE 5 from the time that Condition B was entered. If MODE 3 is reached within 3 hours, the time allowed for reaching MODE 5 is the next 33 hours because the total time allowed for reaching MODE 5 is 36 hours.

If Condition B is entered while in MODE 3, the time allowed for reaching MODE 5 is the next 36 hours.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One pump inoperable.	A.1 Restore pump to OPERABLE status.	7 days
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

When a pump is declared inoperable, Condition A is entered. If the pump is not restored to OPERABLE status within 7 days, Condition B is also entered and the Completion Time clocks for Required Actions B.1 and B.2 start. If the inoperable pump is restored to OPERABLE status after Condition B is entered, Condition A and B are exited, and therefore, the Required Actions of Condition B may be terminated.

When a second pump is declared inoperable while the first pump is still inoperable, Condition A is not re-entered for the second pump. TLCO 3.0.c is entered, since the ACTIONS do not include a Condition for more than one inoperable pump. The Completion Time clock for Condition A does not stop after TLCO 3.0.c is entered, but continues to be tracked from the time Condition A was initially entered.

While in TLCO 3.0.c, if one of the inoperable pumps is restored to OPERABLE status and the Completion Time for Condition A has not expired, TLCO 3.0.c may be exited and operation continued in accordance with Condition A.

1.3 Completion Times

EXAMPLES (continued)

While in TLCO 3.0.c, if one of the inoperable pumps is restored to OPERABLE status and the Completion Time for Condition A has expired, TLCO 3.0.c may be exited and operation continued in accordance with Condition B. The Completion Time for Condition B is tracked from the time the Condition A Completion Time expired.

On restoring one of the pumps to OPERABLE status, the Condition A Completion Time is not reset, but continues from the time the first pump was declared inoperable. This Completion Time may be extended if the pump restored to OPERABLE status was the first inoperable pump. A 24 hour extension to the stated 7 days is allowed, provided this does not result in the second pump being inoperable for > 7 days.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-3

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Function X train inoperable.	A.1 Restore Function X train to OPERABLE status.	7 days AND 10 days from discovery of failure to meet the TLCO
B. One Function Y train inoperable.	B.1 Restore Function Y train to OPERABLE status.	72 hours AND 10 days from discovery of failure to meet the TLCO
C. One Function X train inoperable. AND One Function Y train inoperable.	C.1 Restore Function X train to OPERABLE status. OR C.2 Restore Function Y train to OPERABLE status.	72 hours 72 hours

1.3 Completion Times

EXAMPLES (continued)

When one Function X train and one Function Y train are inoperable, Condition A and Condition B are concurrently applicable. The Completion Times for Condition A and Condition B are tracked separately for each train starting from the time each train was declared inoperable and the Condition was entered. A separate Completion Time is established for Condition C and tracked from the time the second train was declared inoperable (i.e., the time the situation described in Condition C was discovered).

If Required Action C.2 is completed within the specified Completion Time, Conditions B and C are exited. If the Completion Time for Required Action A.1 has not expired, operation may continue in accordance with Condition A. The remaining Completion Time in Condition A is measured from the time the affected train was declared inoperable (i.e., initial entry into Condition A).

The Completion Times of Conditions A and B are modified by a logical connector with a separate 10 day Completion Time measured from the time it was discovered the TLCO was not met. In this example, without the separate Completion Time, it would be possible to alternate between Conditions A, B, and C in such a manner that operation could continue indefinitely without ever restoring systems to meet the TLCO. The separate Completion Time modified by the phrase "from discovery of failure to meet the TLCO" is designed to prevent indefinite continued operation while not meeting the TLCO. This Completion Time allows for an exception to the normal "time zero" for beginning the Completion Time "clock". In this instance, the Completion Time "time zero" is specified as commencing at the time the TLCO was initially not met, instead of at the time the associated Condition was entered.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-4

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more valves inoperable.	A.1 Restore valve(s) to OPERABLE status.	4 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours

A single Completion Time is used for any number of valves inoperable at the same time. The Completion Time associated with Condition A is based on the initial entry into Condition A and is not tracked on a per valve basis. Declaring subsequent valves inoperable, while Condition A is still in effect, does not trigger the tracking of separate Completion Times.

Once one of the valves has been restored to OPERABLE status, the Condition A Completion Time is not reset, but continues from the time the first valve was declared inoperable. The Completion Time may be extended if the valve restored to OPERABLE status was the first inoperable valve. The Condition A Completion Time may be extended for up to 4 hours provided this does not result in any subsequent valve being inoperable for > 4 hours.

If the Completion Time of 4 hours (plus the extension) expires while one or more valves are still inoperable, Condition B is entered.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-5

ACTIONS

----------------------------NOTE----------------------------
Separate Condition entry is allowed for each inoperable valve.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more valves inoperable.	A.1 Restore valve to OPERABLE status.	4 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 12 hours

The Note above the ACTIONS Table is a method of modifying how the Completion Time is tracked. If this method of modifying how the Completion Time is tracked was applicable only to a specific Condition, the Note would appear in that Condition rather than at the top of the ACTIONS Table.

The Note allows Condition A to be entered separately for each inoperable valve, and Completion Times tracked on a per valve basis. When a valve is declared inoperable, Condition A is entered and its Completion Time starts. If subsequent valves are declared inoperable, Condition A is entered for each valve and separate Completion Times start and are tracked for each valve.

1.3 Completion Times

EXAMPLES (continued)

If the Completion Time associated with a valve in Condition A expires, Condition B is entered for that valve. If the Completion Times associated with subsequent valves in Condition A expire, Condition B is entered separately for each valve and separate Completion Times start and are tracked for each valve. If a valve that caused entry into Condition B is restored to OPERABLE status, Condition B is exited for that valve.

Since the Note in this example allows multiple Condition entry and tracking of separate Completion Times, Completion Time extensions do not apply.

EXAMPLE 1.3-6

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel inoperable.	A.1 Perform TSR 3.x.x.x. OR A.2 Reduce THERMAL POWER to ≤ 50% RTP.	Once per 8 hours 8 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours

1.3 Completion Times

EXAMPLES (continued)

Entry into Condition A offers a choice between Required Action A.1 or A.2. Required Action A.1 has a "once per" Completion Time, which qualifies for the 25% extension, per TSR 3.0.b, to each performance after the initial performance. The initial 8 hour interval of Required Action A.1 begins when Condition A is entered and the initial performance of Required Action A.1 must be complete within the first 8 hour interval. If Required Action A.1 is followed, and the Required Action is not met within the Completion Time (plus the extension allowed by TSR 3.0.b), Condition B is entered. If Required Action A.2 is followed and the Completion Time of 8 hours is not met, Condition B is entered.

If after entry into Condition B, Required Action A.1 or A.2 is met, Condition B is exited and operation may then continue in Condition A.

1.3 Completion Times

EXAMPLES (continued)

EXAMPLE 1.3-7

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One subsystem inoperable.	A.1 Verify affected subsystem isolated.	1 hour AND Once per 8 hours thereafter
	AND	
	A.2 Restore subsystem to OPERABLE status.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Be in MODE 5.	36 hours

Required Action A.1 has two Completion Times. The 1 hour Completion Time begins at the time the Condition is entered and each "Once per 8 hours thereafter" interval begins upon performance of Required Action A.1.

1.3 Completion Times

EXAMPLES (continued)

If after Condition A is entered, Required Action A.1 is not met within either the initial 1 hour or any subsequent 8 hour interval from the previous performance (plus the extension allowed by TSR 3.0.b), Condition B is entered. The Completion Time clock for Condition A does not stop after Condition B is entered, but continues from the time Condition A was initially entered. If Required Action A.1 is met after Condition B is entered, Condition B is exited and operation may continue in accordance with Condition A, provided the Completion Time for Required Action A.2 has not expired.

IMMEDIATE COMPLETION TIME

When "Immediately" is used as a Completion Time, the Required Action should be pursued without delay and in a controlled manner.

1.0 USE AND APPLICATION

1.4 Frequency

PURPOSE	The purpose of this section is to define the proper use and application of Frequency requirements.

DESCRIPTION

Each Technical Requirements Manual Surveillance Requirement (TSR) has a specified Frequency in which the Surveillance must be met in order to meet the associated Limiting Condition for Operation (TLCO). An understanding of the correct application of the specified Frequency is necessary for compliance with the TSR.

The "specified Frequency" is referred to throughout this section and Section 3.0, Surveillance Requirement (TSR) Applicability. The "specified Frequency" consists of the requirements of the Frequency column of each TSR as well as certain Notes in the Surveillance column that modify performance requirements.

Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated TLCO is within its Applicability, represent potential TSR 3.0.d conflicts. To avoid these conflicts, the TSR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With a TSR satisfied, TSR 3.0.d imposes no restriction.

Sometimes special situations dictate when the requirements of a Surveillance are to be met. They are "otherwise stated" conditions allowed by TSR 3.0.a. They may be stated as clarifying Notes in the Surveillance, as part of the Surveillance, or both. Example 1.4-5 discusses these special situations.

1.4 Frequency

DESCRIPTION (continued)

The use of "met" or "performed" in these instances conveys specific meaning. A surveillance is "met" only when the acceptance criteria are satisfied. Known failure of the requirements of a Surveillance, even without a Surveillance specifically being "performed," constitutes a Surveillance not "met." "Performance" refers only to the requirement to specifically determine the ability to meet the acceptance criteria. TSR 3.0.d restrictions would not apply if both the following conditions are satisfied:

a. The Surveillance is not required to be performed; and

b. The Surveillance is not required to be met or, even if required to be met, is not known to be failed.

EXAMPLES

The following examples illustrate the various ways that Frequencies are specified. In these examples, the Applicability of the TLCO (TLCO not shown) is MODES 1, 2, and 3.

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Perform CHANNEL CHECK.	12 hours

Example 1.4-1 contains the type of TSR most often encountered in the Technical Requirements Manual (TRM). The Frequency specifies an interval (12 hours) during which the associated Surveillance must be performed at least one time. Performance of the Surveillance initiates the subsequent interval. Although the Frequency is stated as 12 hours, an extension of the time interval to 1.25 times the stated Frequency is allowed by TSR 3.0.b for operational flexibility. The measurement of this interval continues at all times, even when the TSR is not required to be met per TSR 3.0.a (such as when the equipment is inoperable, a variable is outside specified limits, or the unit is outside the Applicability of the TLCO). If the interval specified by TSR 3.0.b is exceeded while the unit is in a MODE or other specified condition in the Applicability of the TLCO, and the performance of the Surveillance is not otherwise modified (refer to Example 1.4-3), then TSR 3.0.c becomes applicable.

If the interval as specified by TSR 3.0.b is exceeded while the unit is not in a MODE or other specified condition in the Applicability of the TLCO for which performance of the TSR is required, the Surveillance must be performed within the Frequency requirements of TSR 3.0.b prior to entry into the MODE or other specified condition. Failure to do so would result in a violation of TSR 3.0.d.

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Verify flow is within limits.	Once within 12 hours after ≥ 25% RTP AND 24 hours thereafter

Example 1.4-2 has two Frequencies. The first is a one time performance Frequency, and the second is of the type shown in Example 1.4-1. The logical connector "AND" indicates that both Frequency requirements must be met. Each time reactor power is increased from a power level < 25% RTP to ≥ 25% RTP, the Surveillance must be performed within 12 hours.

The use of "once" indicates a single performance will satisfy the specified Frequency (assuming no other Frequencies are connected by "AND"). This type of Frequency does not qualify for the extension allowed by TSR 3.0.b.

"Thereafter" indicates future performances must be established per TSR 3.0.b, but only after a specified condition is first met (i.e., the "once" performance in this example). If reactor power decreases to < 25% RTP, the measurement of both intervals stops. New intervals start upon reactor power reaching 25% RTP.

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-3

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
-------------------NOTE------------------ Not required to be performed until 12 hours after ≥ 25% RTP. ------------------- ------------------ Perform channel adjustment.	7 days

The interval continues, whether or not the unit operation is < 25% RTP between performances.

As the Note modifies the required performance of the Surveillance, it is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is < 25% RTP, this Note allows 12 hours after power reaches ≥ 25% RTP to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency." Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by TSR 3.0.b) interval, but operation was < 25% RTP, it would not constitute a failure of the TSR or failure to meet the TLCO. Also, no violation of TSR 3.0.d occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not exceed 12 hours with power ≥ 25% RTP.

Once the unit reaches 25% RTP, 12 hours would be allowed for completing the Surveillance. If the Surveillance were not performed within this 12 hour interval, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of TSR 3.0.c would apply.

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-4

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
------------------NOTE----------------- Only required to be performed in MODE 1. ------------------- -----------------	
Perform complete cycle of the valve.	7 days

The interval continues, whether or not the unit operation is in MODE 1, 2, or 3 (the assumed Applicability of the associated TLCO) between performances.

As the Note modifies the required performance of the Surveillance, the note is construed to be part of the "specified Frequency." Should the 7 day interval be exceeded while operation is not in MODE 1, this Note allows entry into and operation in MODES 2 and 3 to perform the Surveillance. The Surveillance is still considered to be performed within the "specified Frequency" if completed prior to MODE 1. Therefore, if the Surveillance were not performed within the 7 day (plus the extension allowed by TSR 3.0.b) interval, but operation was not in MODE 1, it would not constitute a failure of the TSR or failure to meet the TLCO. Also, no violation of TSR 3.0.d occurs when changing MODES, even with the 7 day Frequency not met, provided operation does not result in entry into MODE 1.

Once the unit reaches MODE 1, the requirement for the Surveillance to be performed within its specified Frequency applies and would require that the Surveillance had been performed. If the Surveillance were not performed prior to MODE 1, there would then be a failure to perform a Surveillance within the specified Frequency, and the provisions of TSR 3.0.c would apply.

1.4 Frequency

EXAMPLES (continued)

EXAMPLE 1.4-5

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
-------------------NOTE------------------ Only required to be met in MODE 1. -------------------- ------------------ Verify leakage rates are within limits.	24 hours

Example 1.4-5 specifies that the requirements of this Surveillance do not have to be met until the unit is in MODE 1. The interval measurement for the Frequency of this Surveillance continues at all times, as described in Example 1.4-1. However, the Note constitutes an "otherwise stated" exception to the Applicability of this Surveillance. Therefore, if the Surveillance were not performed within the 24 hour interval (plus the extension allowed by TSR 3.0.b), but the unit was not in MODE 1, there would be no failure of the TSR nor failure to meet the TLCO. Therefore, no violation of TSR 3.0.d occurs when changing MODES, even with the 24 hour Frequency exceeded, provided the MODE change was not made into MODE 1. Prior to entering MODE 1 (assuming again that the 24 hour Frequency were not met), TSR 3.0.d would require satisfying the TSR.

1.0 USE AND APPLICATION

1.5 TLCO and TSR Implementation

The Technical Requirements Manual (TRM) provides those limitations upon plant operations which are part of the licensing basis for the station but do not meet the criteria for continued inclusion in the Technical Specifications.

It also provides information which supplements the Technical Specifications such as specific plant setpoints for Technical Specification equipment. Nothing in the TRM shall supersede any Technical Specification requirement.

TLCOs and TSRs are implemented the same as Technical Specifications (see TRM 3.0). However, TLCOs and TSRs are treated as plant procedures and are not part of the Technical Specifications. Therefore the following exceptions apply:

a. Violations of the Action or Surveillance requirements in a TLCO are not reportable as conditions prohibited by, or deviations from, the Technical Specifications per 10 CFR 50.72 or 10 CFR 50.73, unless specifically required by the TRM.

b. Power reduction or plant shutdowns required to comply with the Actions of a TLCO or as a result of the application of TLCO 3.0.c are not reportable per 10 CFR 50.72 or 10 CFR 50.73.

c. Violations of TLCO or TSR requirements, except as provided for in TLCO 3.0 of this manual, shall be treated the same as plant procedure violations.

1.0 USE AND APPLICATION

1.6 Technical Requirements Manual Revisions

Changes to this manual shall be made under the following provisions:

a. Changes to the TRM shall be made under appropriate administrative controls and reviews.

b. Licensees may make changes to TRM without prior NRC approval provided the change does not require prior NRC approval pursuant to 10 CFR 50.59.

c. The TRM revision process shall contain provisions to ensure that the TRM is maintained consistent with the UFSAR.

d. Proposed changes that require NRC approval pursuant to 10 CFR 50.59 shall be reviewed and approved by the NRC prior to implementation. Changes to the TRM implemented without prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e) as modified by approved exemptions.

Table T2.0.a-1 (page 1 of 3)
Reactor Trip System Instrumentation Trip Setpoints

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
1.	Manual Reactor Trip	1,2,	NA
		3[(a)], 4[(a)], 5[(a)]	
2.	Power Range Neutron Flux		
	a. High	1,2	≤ 109% RTP[(h)]
	b. Low	1[(b)],2	≤ 25% RTP
3.	Power Range Neutron Flux - High Positive Rate	1,2	≤ 5% RTP with time constant ≥ 2 sec
4.	Intermediate Range Neutron Flux	1[(b)], 2[(c)]	≤ 25% RTP
5.	Source Range Neutron Flux	2[(d)]	≤ 1.0 E5 cps
		3[(a)], 4[(a)], 5[(a)]	≤ 1.0 E5 cps
6.	Overtemperature ΔT	1,2	See LCO 3.3.1
7.	Overpower ΔT	1,2	See LCO 3.3.1

(continued)

(a) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

(b) Below the P-10 (Power Range Neutron Flux) interlock.

(c) Above the P-6 (Source Range Block Permissive) interlock.

(d) Below the P-6 (Source Range Block Permissive) interlock.

Table T2.0.a-1 (page 2 of 3)
Reactor Trip System Instrumentation Trip Setpoints

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
8. Pressurizer Pressure		
a. Low	1(e)	≥ 1885 psig
b. High	1,2	≥ 2385 psig
9. Pressurizer Water Level - High	1(e)	≤ 92% of instrument span
10. Reactor Coolant Flow - Low (per loop)	1(e)	≥ 90% of loop minimum measured flow
11. Reactor Coolant Pump (RCP) Breaker Position (per train)	1(e)	NA
12. Undervoltage RCPs (per train)	1(e)	≥ 5268 V
13. Underfrequency RCPs (per train)	1(e)	≥ 57.0 Hz
14. Steam Generator (SG) Water Level-Low Low (per SG)		
a. Unit 1	1,2	≥ 18.0% of narrow range instrument span
b. Unit 2	1,2	≥ 36.3% of narrow range instrument span
15. Turbine Trip		
a. Emergency Trip Header Pressure (per train)	1(f)	≥ 1000 psig
b. Turbine Throttle Valve Closure (per train)	1(f)	≥ 1% open

(continued)

(e) Above the P-7 (Low Power Reactor Trips Block) interlock.

(f) Above the P-8 (Power Range Neutron Flux) interlock.

Table T2.0.a-1 (page 3 of 3)
Reactor Trip System Instrumentation Trip Setpoints

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
16. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS)	1,2	NA
17. Reactor Trip System Interlocks		
a. Source Range Block Permissive, P-6	2[(d)]	≥ 1E-5% RTP
b. Low Power Reactor Trips Block, P-7		
(1) P-10 Input	1	NA
(2) P-13 Input	1	NA
c. Power Range Neutron Flux, P-8	1	≤ 30% RTP
d. Power Range Neutron Flux, P-10	1,2	≤ 10% RTP
e. Turbine Impulse Pressure, P-13	1	≤ 10% turbine power
18. Reactor Trip Breakers (RTBs)[(g)]	1,2	NA
	3[(a)], 4[(a)], 5[(a)]	NA
19. Reactor Trip Breaker Undervoltage and Shunt Trip Mechanisms	1,2	NA
	3[(a)], 4[(a)], 5[(a)]	NA
20. Automatic Trip Logic	1,2	NA
	3[(a)], 4[(a)], 5[(a)]	NA

(a) With Rod Control System capable of rod withdrawal or one or more rods not fully inserted.

(d) Below the P-6 (Source Range Block Permissive) interlock.

(g) Including any reactor trip bypass breakers that are racked in and closed for bypassing an RTB.

Table T2.0.b-1 (page 1 of 4)
Engineered Safety Feature Actuation System Instrumentation Trip Setpoints

FUNCTION			APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
1.	Safety Injection			
	a.	Manual Initiation	1,2,3,4	NA
	b.	Automatic Actuation Logic and Actuation Relays	1,2,3,4	NA
	c.	Containment Pressure-High 1	1,2,3	≤ 3.4 psig
	d.	Pressurizer Pressure-Low	1,2,3[(a)]	≥ 1829 psig
	e.	Steam Line Pressure-Low	1,2,3[(a)]	≥ 640 psig[(b)]
2.	Containment Spray			
	a.	Manual Initiation	1,2,3,4	NA
	b.	Automatic Actuation Logic and Actuation Relays	1,2,3,4	NA
	c.	Containment Pressure High-3	1,2,3	≤ 20.0 psig

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

Table T2.0.b-1 (page 2 of 4)
Engineered Safety Feature Actuation System Instrumentation Trip Setpoints

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
3. Containment Isolation		
a. Phase A Isolation		
(1) Manual Initiation	1,2,3,4	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.	
b. Phase B Isolation		
(1) Manual Initiation	1,2,3,4	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	NA
(3) Containment Pressure High-3	1,2,3	≤ 20.0 psig
4. Steam Line Isolation		
a. Manual Initiation	1,2[c],3[c]	NA
b. Automatic Actuation Logic and Actuation Relays	1,2[g],3[g]	NA
c. Containment Pressure-High 2	1,2[g],3[g]	≤ 8.2 psig
d. Steam Line Pressure		
(1) Low	1,2[g],3[a][f][g]	≥ 640 psig[b]
(2) Negative Rate-High	3[d][g]	≤ 100.0 psi[e]

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) Time constants used in the lead/lag controller are $t_1 \geq 50$ seconds and $t_2 \leq 5$ seconds.

(c) Except when all Main Steam Isolation Valves (MSIVs) are closed.

(d) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.1 blocked.

(e) Time constant utilized in the rate/lag controller is ≥ 50 seconds.

(f) Below the P-11 (Pressurizer Pressure) interlock with Function 4.d.2 not enabled.

(g) Except when all Main Steam Isolation Valves (MSIVs) and MSIV bypass valves are closed.

Table T2.0.b-1 (page 3 of 4)
Engineered Safety Feature Actuation System Instrumentation Trip Setpoints

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
5. Turbine Trip and Feedwater Isolation		
a. Automatic Actuation Logic and Actuation Relays	1,2(h),3(h)	NA
b. Steam Generator (SG) Water Level-High High (P-14)		
1) Unit 1	1,2(h),3(h)	≤ 88.0% of narrow range instrument span
2) Unit 2	1,2(h),3(h)	≤ 80.8% of narrow range instrument span
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.	
6. Auxiliary Feedwater		
a. Automatic Actuation Logic and Actuation Relays	1,2,3	NA
b. SG Water Level-Low Low		
1) Unit 1	1,2,3	≥ 18.0% of narrow range instrument span
2) Unit 2	1,2,3	≤ 36.3% of narrow range instrument span
c. Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.	
d. Loss of Offsite Power (Undervoltage on Bus 141(241))	1,2,3	≥ 2870 V
e. Undervoltage Reactor Coolant Pump (per train)	1,2	≥ 5268 V
f. Auxiliary Feedwater Pump Suction Transfer on Suction Pressure-Low	1,2,3	
Pressure Transmitter		≥ 18.1 psia
Pressure Switch		≥ 20.5 psia

(continued)

(h) Except when all Feedwater Isolation Valves are closed or isolated by a closed manual valve.

Table T2.0.b-1 (page 4 of 4)
Engineered Safety Feature Actuation System Instrumentation Trip Setpoints

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	NOMINAL TRIP SETPOINT
7. Switchover to Containment Sump		
a. Automatic Actuation Logic and Actuation Relays	1,2,3,4	NA
b. Refueling Water Storage Tank (RWST) Level-Low Low	1,2,3,4	≥ 46.7% of instrument span
Coincident with Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.	
8. ESFAS Interlocks		
a. Reactor Trip, P-4	1,2,3	NA
b. Pressurizer Pressure, P-11	1,2,3	≤ 1930 psig
c. T_{avg} - Low Low, P-12	1,2,3	≥ 550°F
9. Loss of Power		
a. Loss of Voltage	1,2,3,4,5[(i)],6[(i)]	≥ 2870 V with a time delay of ≤ 1.8 sec
b. Degraded Voltage	1,2,3,4,5[(i)],6[(i)]	≥ 3847 V with a time delay of 310 sec
c. Low Degraded Voltage	1,2,3,4,5[(i)],6[(i)]	≥ 3160.15 V with a time delay of 3.0 sec

(i) When associated DG is required to be OPERABLE by LCO 3.8.2, "AC Sources-Shutdown."

2.1.a MISCELLANEOUS TEST REQUIREMENTS

------------------------------------NOTES------------------------------------

1. Each of the following Surveillances shall be completed within its specified frequency.

2. Failure to meet the surveillance requirement require immediate actions to determine OPERABILITY of the associated equipment. LCOs potentially impacted are identified in the TSR with ().

APPLICABILITY: Defined in the TSR

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 2.4.a.1	------------------NOTES------------------ 1. Only applicable in MODE 1. 2. TSR 3.0.d is not applicable. -- Perform CHANNEL CALIBRATION on Reactor Coolant System total flow rate indicators. (LCO 3.4.1)	18 months
TSR 2.4.b.1	------------------NOTE------------------- Required to be met in MODES 1, 2, and 3. -- Perform CHANNEL CALIBRATION on the Pressurizer PORV actuation instrumentation. (LCO 3.4.11)	18 months
TSR 2.5.a.1	------------------NOTE------------------- Required to be met in MODES 1, 2; and MODE 3 with the RCS pressure > 1000 psig. -- Perform CHANNEL CALIBRATION on accumulator water level channels. (LCO 3.5.1)	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.a.2	------------------NOTE------------------ Required to be met in MODES 1, 2; and MODE 3 with the RCS pressure > 1000 psig. -- Perform CHANNEL CALIBRATION on accumulator pressure channels. (LCO 3.5.1)	18 months
TSR 2.5.b.1	------------------NOTE------------------ Required to be met in MODES 1, 2, 3, and 4. -- Verify, through a visual inspection of all accessible areas of the containment, loose debris which could be transported to the containment sump during LOCA conditions has been removed. (LCO 3.6.8)	Prior to entering MODE 4

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.b.2	-------------------NOTES------------------- 1. Required to be met in MODES 1, 2, 3, and 4. 2. Only required to be performed once TSR 2.5.b.1 has been completed. 3. TSR 3.0.d is not applicable. --- Verify, through a visual inspection of the areas affected within containment, loose debris which could be transported to the containment sump during LOCA conditions has been removed. (LCO 3.6.8)	Following each containment entry

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.c.1	-------------------NOTES------------------ 1. Only applicable to the following ECCS throttle valves: a. High Head SI System - SI8810A,B,C,D b. SI System - SI8822A,B,C,D and SI8816A,B,C,D 2. Required to be met in MODES 1, 2, 3; and MODE 4 when the associated ECCS subsystems are required to be OPERABLE. 3. Only required to be performed for affected valves following valve stroking operation or maintenance on the valve. -- Verify the correct position of each position stop for the ECCS throttle valves. (LCO 3.5.2)	Once within 4 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.c.2	-------------------NOTES------------------ 1. A flow balance that introduces flow to the loops shall not be performed in MODE 1, 2, 3, or 4. 2. Only required to be performed following alterations to the CV pump and/or piping system that alter the ECCS flow characteristics. 3. Required to be met in MODES 1, 2, 3; and MODE 4 when the associated ECCS subsystems are required to be OPERABLE. --- Verify through analytical means or a flow balance test that the CV pump performance curve and/or the following CV ECCS cold leg injection flow characteristics are met with a single pump running: a. The sum of the injection line flow rates, excluding the highest flow rate, is ≥ 330 gpm; and b. The total pump flow rate is ≤ 550 gpm, including a simulated seal injection flow of 80 gpm. <u>OR</u>	Prior to associated subsystems being declared OPERABLE (continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
Verify the CV pump performance curve and/or CV ECCS cold leg injection flow characteristics are acceptable by a technical evaluation that concludes the evaluation results are: 1. within the acceptance criteria of the accident analyses of record; and 2. acceptable for continued equipment operation (i.e., pump NPSH, pump runout, etc.). Flow rates specified in a. and b. above shall be returned to within limits prior to the associated subsystems being declared OPERABLE if in a refueling outage or no later than the end of the next refueling outage if in MODES 1, 2, 3, 4, or 5. (LCO 3.5.2)	

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.c.3	----------NOTES---------- 1. A flow balance test that introduces flow to the loops shall not be performed in MODE 1, 2, 3, or 4. 2. Only required to be performed following alterations to the SI pump and/or piping system that alter the ECCS flow characteristics. 3. Required to be met in MODES 1, 2, 3; and MODE 4 when the associated ECCS subsystems are required to be OPERABLE. ------------------------------	
	Verify through analytical means or a flow balance test that the SI pump performance curve and/or the following SI ECCS cold leg injection flow characteristics are met with a single pump running: a. The sum of the injection line flow rates, excluding the highest flow rate, is ≥ 439 gpm; and b. The total pump flow rate is ≤ 655 gpm. (LCO 3.5.2) <u>OR</u>	Prior to associated subsystems being declared OPERABLE

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.c.3	Verify the SI pump performance curve and/or SI ECCS cold leg injection flow characteristics are acceptable by a technical evaluation that concludes the evaluation results are: 1. within the acceptance criteria of the accident analysis of record; and 2. acceptable for continued equipment operation (e.g., pump NPSH, pump runout, etc.). Flow rates specified in a. and b. above shall be returned to within limits prior to the associated subsystems being declared OPERABLE if in a refueling outage or no later than the end of the next refueling if in MODES 1, 2, 3, 4, or 5.	

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.5.c.4 3;	--------------------NOTES-------------------- 1. Only required to be performed following completion of modifications to the RHR system that alter the ECCS subsystem flow characteristics. 2. Required to be met in MODES 1, 2, and MODE 4 when the associated ECCS subsystems are required to be OPERABLE. --- Verify the RHR pump performance curve and/or RHR ECCS cold leg injection flow characteristics are consistent with the assumptions used in the safety analysis. (LCO 3.5.2/LCO 3.5.3)	Prior to associated ECCS subsystems required to be OPERABLE.
	TSR 2.6.a.1 DELETED	

(continued)

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
TSR 2.7.a.1	------------------NOTES------------------ 1. This surveillance shall not be performed in MODE 1, 2, or 3. 2. Required to be met in MODES 1, 2, and 3. -- Perform an inspection of the B Train Auxiliary Feedwater Pump diesel engine in accordance with manufacturer's recommendation for this class of service. (LCO 3.7.5)	18 months
TSR 2.7.a.2	------------------NOTE------------------ Required to be met in MODES 1, 2, 3, and 4. -- Verify that each deep well pump starts and operates for ≥ 15 minutes and that each manual, power operated, or automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, is in the correct position. (LCO 3.7.9)	31 days
TSR 2.7.a.3	------------------NOTE------------------ Required to be met in MODES 1, 2, 3 and 4. -- Verify a UHS deep well pump flow rate of ≥ 550 gpm. (LCO 3.7.9)	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 2.7.a.4	--------------------NOTE------------------- Required to be met in MODES 1, 2, 3, and 4. --- Perform CHANNEL CALIBRATION on each UHS cooling tower basin level switch. (LCO 3.7.9)	18 months
TSR 2.7.a.5	--------------------NOTE------------------- Required to be met in MODES 1, 2, 3, and 4. --- Visually inspect and verify no abnormal breakage or degradation of the fill materials in the UHS cooling tower. (LCO 3.7.9)	18 months
TSR 2.7.a.6	--------------------NOTE------------------- Required to be met in MODES 1, 2, 3, and 4. --- Perform an inspection of each diesel that powers an essential service water makeup pump in accordance with procedures prepared in conjunction with it's manufacturer's recommendations for the class of service. (LCO 3.7.9)	18 months

3.0 TECHNICAL REQUIREMENTS MANUAL (TRM) LIMITING CONDITION FOR OPERATION (TLCO) APPLICABILITY

TLCO 3.0.a — TLCOs shall be met during the MODES or other specified conditions in the Applicability, except as provided in TLCO 3.0.b and TLCO 3.0.f.

TLCO 3.0.b — Upon discovery of a failure to meet a TLCO, the Required Actions of the associated Conditions shall be met, except as provided in TLCO 3.0.e.

If the TLCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required unless otherwise stated.

TLCO 3.0.c — When a TLCO is not met and the associated ACTIONS are not met, an associated ACTION is not provided, or if directed by the associated ACTIONS, action shall be initiated within 1 hour to:

1. Implement appropriate compensatory actions as needed,

2. Verify that the plant is not in an unanalyzed condition or that a required safety function is not compromised by the inoperabilities, and

3. Within 12 hours, obtain Station Duty Officer approval of the compensatory actions and plan for exiting TLCO 3.0.c.

Exceptions to this TLCO are stated in the individual TLCOs.

Where corrective measures are completed that permit operation in accordance with the TLCO or ACTIONS, completion of the actions required by TLCO 3.0.c is not required.

TLCO 3.0.c is only applicable in MODES 1, 2, 3, and 4.

3.0 TECHNICAL REQUIREMENTS MANUAL (TRM) LIMITING CONDITION FOR OPERATION (TLCO) APPLICABILITY

TLCO 3.0.d When a TLCO is not met, entry into a MODE or other specified condition in the Applicability shall only be made:

1. When the associated ACTIONS to be entered permit continued operation in the MODE or other specified condition in the Applicability for an unlimited period of time;

2. After performance of a risk assessment addressing inoperable systems and components, consideration of the results, determination of the acceptability of entering the MODE or other specified condition in the Applicability, and establishment of risk management actions, if appropriate (exceptions to this Specification are stated in the individual Specifications); or

3. When an allowance is stated in the individual value, parameter, or other TLCO

This TLCO shall not prevent changes in MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.

TLCO 3.0.e Equipment removed from service or declared inoperable to comply with ACTIONS may be returned to service under administrative control solely to perform testing required to demonstrate its OPERABILITY or the OPERABILITY of other equipment. This is an exception to TLCO 3.0.b for the system returned to service under administrative control to perform the required testing to demonstrate OPERABILITY.

3.0 TECHNICAL REQUIREMENTS MANUAL (TRM) LIMITING CONDITION FOR OPERATION (TLCO) APPLICABILITY

TLCO 3.0.f Exception TLCOs allow specified TRM requirements to be changed to permit performance of special tests and operations. Unless otherwise specified, all other TRM requirements remain unchanged. Compliance with Exception TLCOs is optional. When an Exception TLCO is desired to be met but is not met, the ACTIONS of the Exception TLCO shall be met. When an Exception TLCO is not desired to be met, entry into a MODE or other specified condition in the Applicability shall be made in accordance with the other applicable TLCOs.

TLCO 3.0.g TLCOs, including associated ACTIONs, shall apply to each unit individually, unless otherwise indicated. Whenever the TLCO refers to a system or component that is shared by both units, the ACTIONs will apply to both units simultaneously.

3.0 TECHNICAL REQUIREMENTS MANUAL (TRM) SURVEILLANCE REQUIREMENT (TSR) APPLICABILITY

TSR 3.0.a	TSRs shall be met during the MODES or other specified conditions in the Applicability for individual TLCOs, unless otherwise stated in the TSR. Failure to meet a TSR, whether such failure is experienced during the performance of the TSR or between performances of the TSR, shall be failure to meet the TLCO. Failure to perform a TSR within the specified Frequency shall be failure to meet the TLCO except as provided in TSR 3.0.c. TSRs do not have to be performed on inoperable equipment or variables outside specified limits.
TSR 3.0.b	The specified Frequency for each TSR is met if the TSR is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met. For Frequencies specified as "once," the above interval extension does not apply. If a Completion Time requires periodic performance on a "once per . . ." basis, the above Frequency extension applies to each performance after the initial performance. Exceptions to this TSR are stated in the individual TSRs.
TSR 3.0.c	If it is discovered that a TSR was not performed within its specified Frequency, then compliance with the requirement to declare the TLCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is greater. This delay period is permitted to allow performance of the TSR. The delay period is only applicable when there is a reasonable expectation the surveillance will be met when performed. A risk evaluation shall be performed for any TSR delayed greater than 24 hours and the risk impact shall be managed. If the TSR is not performed within the delay period, the TLCO must immediately be declared not met, and the applicable Condition(s) must be entered. When the TSR is performed within the delay period and the TSR is not met, the TLCO must immediately be declared not met, and the applicable Condition(s) must be entered.

3.0 TECHNICAL REQUIREMENTS MANUAL (TRM) SURVEILLANCE REQUIREMENT (TSR) APPLICABILITY

TSR 3.0.d	Entry into a MODE or other specified condition in the Applicability of a TLCO shall only be made when the TCLO's TSRs have been met within their specified Frequency, except as provided by TSR 3.0.c. When a TLCO is not met due to TSRs not having been met, entry into a MODE or other specified condition in the Applicability shall only be made in accordance with TLCO 3.0.d. This provision shall not prevent entry into MODES or other specified conditions in the Applicability that are required to comply with ACTIONS or that are part of a shutdown of the unit.
TSR 3.0.e	TSRs shall apply to each unit individually, unless otherwise indicated.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.a Boration Flow Path - Shutdown

TLCO 3.1.a One of the following boron injection flow paths via the Chemical & Volume Control (CV) System shall be OPERABLE and capable of being powered from an OPERABLE emergency power source:

1. A flow path via a boric acid transfer pump from the Boric Acid Storage System, which is OPERABLE as specified in TLCO 3.1.e for MODE 5 or as specified in TLCO 3.1.f for MODE 4; or

2. A flow path from the Refueling Water Storage Tank (RWST) which is OPERABLE as specified in TLCO 3.1.e for MODE 5 or as specified in LCO 3.5.4 for MODE 4.

APPLICABILITY: MODES 4 and 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required flow path inoperable. <u>OR</u> Required flow path not capable of being powered from an OPERABLE emergency power source.	A.1 ---------NOTE-------- Not applicable if positive reactivity addition is the direct result of a RCS cooldown required by Technical Specifications. --------------------- Suspend positive reactivity additions.	 Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.1.a.1	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.a.1. --- Verify Boric Acid Storage System solution temperature is ≥ 65°F.	7 days
TSR 3.1.a.2	Verify each manual, power operated, or automatic valve in the required flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.	31 days

3.1 REACTIVITY CONTROL SYSTEMS

3.1.b Boration Flow Paths - Operating

TLCO 3.1.b One boron injection flow path via the Chemical & Volume (CV) Control System from the Refueling Water Storage Tank (RWST) shall be OPERABLE, and either:

1. One additional OPERABLE flow path from the RWST, or
2. An OPERABLE flow path via a boric acid transfer pump from the Boric Acid Storage System.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required flow path inoperable.	A.1	Restore required flow path to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Borate to the SHUTDOWN MARGIN specified in the COLR at 200°F.	6 hours
	AND	
	B.3.1 Restore required flow path to OPERABLE status.	174 hours
	OR	
	B.3.2 Be in MODE 4.	180 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.1.b.1	--------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.b.2. ---	
	Verify Boric Acid Storage System solution temperature is ≥ 65°F.	7 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.1.b.2	Verify each manual, power operated, or automatic valve in the required flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.	31 days
TSR 3.1.b.3	-------------------NOTE-------------------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. --- Verify each automatic valve in the required flow path actuates to its correct position on an actual or simulated safety injection actuation signal.	36 months
TSR 3.1.b.4	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.b.2. --- Verify required flow path from the Boric Acid Storage System delivers ≥ 30 gpm to the RCS.	18 months

3.1 REACTIVITY CONTROL SYSTEMS

3.1.c Charging Pump - Shutdown

TLCO 3.1.c One centrifugal charging pump in the boron injection flow path required by TLCO 3.1.a shall be OPERABLE and capable of being powered from an OPERABLE emergency power source.

APPLICABILITY: MODES 4 and 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required charging pump inoperable. OR Required charging pump not capable of being powered from an OPERABLE emergency power source.	A.1 ---------NOTE-------- Not applicable if positive reactivity addition is the direct result of a RCS cooldown required by Technical Specifications. --------------------- Suspend positive reactivity additions.	 Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.1.c.1 Verify the required centrifugal charging pump's developed head at the test flow point is greater than or equal to the required developed head.	In accordance with the INSERVICE TESTING PROGRAM

3.1 REACTIVITY CONTROL SYSTEMS

3.1.d Charging Pumps - Operating

TLCO 3.1.d Two centrifugal charging pumps shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One charging pump inoperable.	A.1 Restore charging pump to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Borate to the SHUTDOWN MARGIN specified in the COLR at 200°F.	6 hours
	AND	
	B.3 Be in MODE 4.	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.1.d.1 Verify each centrifugal charging pump's developed head at the test flow point is greater than or equal to the required developed head.	In accordance with the INSERVICE TESTING PROGRAM

3.1 REACTIVITY CONTROL SYSTEMS

3.1.e Borated Water Source - Shutdown

TLCO 3.1.e One of the following borated water sources shall be OPERABLE:

1. A Boric Acid Storage System, or
2. The Refueling Water Storage Tank (RWST).

APPLICABILITY: MODE 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required borated water source inoperable.	A.1 Suspend positive reactivity additions.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.1.e.1	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.e.2 and the outside air temperature < 35°F. --- Verify RWST solution temperature ≥ 35°F.	24 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.1.e.2	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.e.2. --- Verify RWST boron concentration ≥ 2300 ppm and ≤ 2500 ppm.	7 days
TSR 3.1.e.3	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.e.2. --- Verify RWST borated water level is ≥ 9.0%.	7 days
TSR 3.1.e.4	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.e.1. --- Verify Boric Acid Storage System solution temperature is ≥ 65°F.	7 days
TSR 3.1.e.5	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.e.1. --- Verify Boric Acid Storage System boron concentration is ≥ 7000 ppm.	7 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.1.e.6	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.1.e.1. --- Verify Boric Acid Storage System borated water level is ≥ 12.0%.	7 days

3.1 REACTIVITY CONTROL SYSTEMS

3.1.f Borated Water Sources - Operating

TLCO 3.1.f The Boric Acid Storage System shall be OPERABLE when required as a borated water source by TLCO 3.1.b for MODES 1, 2, and 3 or TLCO 3.1.a for MODE 4.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Required Boric Acid Storage System inoperable in MODE 1, 2, or 3.	A.1	Restore the Boric Acid Storage System to OPERABLE status.	72 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	6 hours
	AND		
	B.2	Borate to the SHUTDOWN MARGIN specified in the COLR at 200°F.	6 hours
	AND		
	B.3.1	Restore the required Boric Acid Storage System to OPERABLE status.	174 hours
	OR		
	B.3.2	Be in MODE 4.	180 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Boric Acid Storage System inoperable in MODE 4.	C.1 Restore the required Boric Acid Storage System to OPERABLE status. OR C.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.1.f.1 Verify Boric Acid Storage System solution temperature is ≥ 65°F.	7 days
TSR 3.1.f.2 Verify Boric Acid Storage System boron concentration is ≥ 7000 ppm.	7 days
TSR 3.1.f.3 Verify Boric Acid Storage System borated water level is ≥ 40%.	7 days

3.1 REACTIVITY CONTROL SYSTEMS

3.1.g Position Indication System - Shutdown

TLCO 3.1.g One Digital Rod Position Indication (DRPI), excluding bank demand position indication, shall be OPERABLE and capable of determining the control rod position within 12 steps for each shutdown or control rod not fully inserted.

APPLICABILITY: MODES 3, 4, and 5 with the Rod Control System capable of rod withdrawal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more shutdown or control rods with required DRPI inoperable.	A.1 Restore required OPERABLE DRPI.	15 minutes
B. Required Action and associated Completion Time of Condition A not met.	B.1 Initiate action to fully insert all rods.	Immediately
	<u>OR</u>	
	B.2 Initiate boration to restore RCS boron concentration to within the limits specified in the COLR.	Immediately
	<u>OR</u>	
	B.3 Open Reactor Trip Breakers (RTBs) and Reactor Trip Bypass Breakers (RTBBs).	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.1.g.1	Verify each DRPI agrees within 12 steps of the group demand position for the full indicated range of rod travel.	18 months

3.1 REACTIVITY CONTROL SYSTEM

3.1.h Shutdown Margin (SDM) - MODE 1 and MODE 2 with $k_{eff} \geq 1.0$

TLCO 3.1.h SDM shall be within the limits specified in the COLR.

APPLICABILITY: MODE 1, and
MODE 2 with $k_{eff} \geq 1.0$.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Initiate and continue boration.	1 hour
	<u>AND</u>	
	A.2 Restore required SDM to within limits specified in the COLR.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.1.h.1 Verify SDM is within limit with control banks at the maximum insertion limit specified in LCO 3.1.6 and considering the following factors: a. Reactor Coolant System boron concentration, b. Control rod position, c. Reactor Coolant System average temperature, d. Fuel burnup based on gross thermal energy generation, e. Xenon concentration, and f. Samarium concentration.	Prior to operation above 5% RATED THERMAL POWER after each fuel loading

3.1 REACTIVITY CONTROL SYSTEMS

3.1.i Shutdown Margin (SDM) - MODE 5

TLCO 3.1.i SDM shall be within the limits specified in the COLR.

APPLICABILITY: MODE 5.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SDM not within limit.	A.1 Declare both Boron Dilution Protection System subsystems inoperable and enter Condition C of LCO 3.3.9, "Boron Dilution Protection System (BDPS)," for "Two Boron Dilution Alert channels inoperable or no reactor coolant pump in operation or one or more RCS loop isolation valve(s) not open."	Immediately
	AND	
	A.2 Initiate and continue boration to restore SDM to within limits specified in the COLR.	15 minutes

ACTIONS

SURVIELLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
NONE	

3.1 REACTIVITY CONTROL SYSTEM

3.1.j Shutdown and Control Rods

TLCO 3.1.j All shutdown and control rods not fully inserted shall be OPERABLE.

APPLICABILITY: MODES 3, 4, and 5.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more rods inoperable.	A.1	Verify SDM is within the limits specified in the COLR.	1 hour <u>AND</u> Once per 12 hours thereafter
B. Required Action and associated Completion Time of Condition A not met. <u>OR</u> SDM not within the limits specified in the COLR for Required Action A.1.	B.1	Initiate and continue boration to restore the required SDM to within limits specified in the COLR.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
NONE	

3.1 REACTIVITY CONTROL SYSTEMS

3.1.k Position Indication System - Shutdown (Special Test Exception)

TLCO 3.1.k The requirements of TLCO 3.1.g may be suspended provided either:

1. Only one shutdown or control bank is withdrawn from the fully inserted position at a time, or

2. The Reactor Coolant System (RCS) boron concentration is within the limits specified in the COLR for maintaining $k_{eff} \leq 0.987$ with all shutdown and control rods fully withdrawn.

APPLICABILITY: MODES 3, 4, and 5 during performance of rod drop time measurements and during the surveillance of Digital Rod Position Indication (DRPI) for OPERABILITY.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE-------- Only applicable when invoking TLCO 3.1.k.1. --------------------- More than one bank of rods withdrawn. <u>OR</u> ---------NOTE-------- Only applicable when invoking TLCO 3.1.k.2. --------------------- RCS boron concentration not within limit.	A.1 Restore required OPERABLE DRPI.	15 minutes

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Actions and associated Completion Times of Condition A not met.	B.1 Initiate action to fully insert all rods.	Immediately
	<u>OR</u>	
	B.2 Initiate boration to restore RCS boron concentration to within the limits specified in the COLR.	Immediately
	<u>OR</u>	
	B.3 Open Reactor Trip Breakers (RTBs) and Reactor Trip Bypass Breakers (RTBBs).	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.1.k.1	-------------------NOTE-------------------- Only required to be performed when invoking TLCO 3.1.k.1. --- Verify each DRPI agrees within 12 steps of the group demand position when the rods are stationary and within 24 steps of the group demand position during rod motion.	Once within 24 hours prior to the start of rod drop time measurements <u>AND</u> 24 hours thereafter
TSR 3.1.k.2	-------------------NOTE-------------------- Only required to be performed when invoking TLCO 3.1.k.2. --- Verify the RCS boron concentration is within the limits specified in the COLR for maintaining $k_{eff} \leq 0.987$ with all shutdown and control rods fully withdrawn.	Once within 2 hours prior to the start of either rod drop time measurements or the surveillance of DRPI for OPERABILITY <u>AND</u> 2 hours thereafter

3.3 INSTRUMENTATION

3.3.a Movable Incore Detectors

TLCO 3.3.a The Movable Incore Detection System shall be OPERABLE with:

1. ≥ 75% of the detector thimbles,
2. ≥ 2 detector thimbles per core quadrant, and
3. Sufficient movable detectors, drive, and readout equipment to map these thimbles.

-------------------------NOTES-------------------------
Only ≥ 50% of the detector thimbles are required for Power Distribution Monitoring System (PDMS) calibrations after the initial PDMS calibration following each refueling.

APPLICABILITY: When the Movable Incore Detection System is used for:

1. Recalibration of the Excore Neutron Flux Detection System,
2. Calibration of the PDMS,
3. Monitoring normalized symmetric power distribution, or
4. Measurement of $F^N_{\Delta H}$, $F^C_Q(Z)$, and $F^W_Q(Z)$.

ACTIONS

--------------------------------NOTE--------------------------------
TLCO 3.0.c is not applicable

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Movable Incore Detection System inoperable.	A.1 Suspend use of the Movable Incore Detection System data for applicable recalibration, measurement, or monitoring.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.3.a.1	Normalize each detector output when required for: a. Recalibration of the Excore Neutron Flux Detection System, b. Calibration of the PDMS, c. Monitoring normalized symmetric power distribution, or d. Measurement of $F^N_{\Delta H}$, $F^C_Q(Z)$, and $F^W_Q(Z)$.	24 hours

3.3 INSTRUMENTATION

3.3.b Seismic Monitoring Instrumentation

TLCO 3.3.b The seismic monitoring instrumentation in Table T3.3.b-1 shall be OPERABLE.

APPLICABILITY: At all times.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each instrument.

2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more seismic monitoring instruments inoperable.	A.1	Restore required instrument to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1	Prepare and submit a report to the Plant Operating Review Committee outlining the cause of the malfunction and the plans for restoring the instrument to OPERABLE status.	10 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ---------NOTE--------- Required Actions C.2 and C.3 shall be completed whenever Condition C is entered. --------------------- One or more required seismic instruments actuated during a confirmed seismic event.	C.1 Restore required instrument to OPERABLE status.	24 hours
	AND	
	C.2 Analyze data retrieved from instrument to determine the magnitude of the vibratory ground motion.	14 days
	AND	
	C.3 Prepare and submit a report to the Plant Operating Review Committee describing the magnitude, frequency spectrum, and resultant effect upon facility features important to safety.	14 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.b.1 Verify OPERABLE status indications of the seismic monitoring instrumentation.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.3.b.2	Verify the triaxial acceleration sensors and the time-history accelerographs properly process the equipment internal test signals.	92 days
TSR 3.3.b.3	Verify the response spectrum analyzer properly executes its diagnostic routine.	92 days
TSR 3.3.b.4	-------------------NOTE-------------------- TSR 3.3.b.4 may be performed in lieu of the test required by TSR 3.3.b.2. --- Verify the triaxial acceleration sensors and the time-history accelerographs properly record the equipment internal test signals.	184 days
TSR 3.3.b.5	Verify the electronic calibration of the time-history accelerographs.	18 months
TSR 3.3.b.6	Install fresh magnetic recording plates in the triaxial peak accelerographs.	18 months

Table T3.3.b-1 (page 1 of 1)
Seismic Monitoring Instrumentation

INSTRUMENTS AND SENSOR LOCATIONS	MEASUREMENT RANGE	REQUIRED INSTRUMENTS
1. Time – History Accelerographs		
a. Auxiliary Electrical Equipment Room, OPA02J (Central Recorder)	NA	4
b. Byron River Screen House	NA	2
c. Free Field	NA	1
d. Auxiliary Building – 426 ft	NA	1
2. Triaxial Peak Accelerographs		
a. Containment/Reactor Equipment Accumulators	-2 g to +2 g	1
b. Containment/Reactor Piping	-2 g to +2 g	1
c. Auxiliary Building/Category I Piping	-2 g to +2 g	1
3. Response-Spectrum Analyzer (Computer)		
a. Auxiliary Electrical Equipment Room, OPA02J	None	1
4. Triaxial Acceleration Sensors		
a. Containment/10W - 377 ft	-2 g to +2 g	1
b. Containment/10W - 502 ft	-2 g to +2 g	1
c. Containment/10X - 426 ft	-2 g to +2 g	1
d. Free Field/41 + 00E, 27 + 00N	-2 g to +2 g	1
e. Auxiliary Building/18N - 426 ft	-2 g to +2 g	1
f. Byron River Screen House – 669 ft	-2 g to +2 g	1
g. Byron River Screen House – 702 ft	-2 g to +2 g	1

3.3 INSTRUMENTATION

3.3.c Meteorological Monitoring Instrumentation

TLCO 3.3.c The meteorological monitoring instrumentation channels in Table T3.3.c-1 shall be OPERABLE.

APPLICABILITY: At all times.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each channel.

2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more meteorological monitoring instrument channels inoperable.	A.1	Restore channel to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met.	B.1	Prepare and submit a report to the Plant Operating Review Committee outlining the cause of the malfunction and the plans for restoring the channel to OPERABLE status.	10 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.c.1 Perform CHANNEL CHECK.	24 hours
TSR 3.3.c.2 Perform CHANNEL CALIBRATION.	184 days

Table T3.3.c-1 (page 1 of 1)
Meteorological Monitoring Instrumentation

	INSTRUMENT AND LOCATION	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
1.	Wind Speed		
	a. Nominal Elevation 30 ft	1	TSR 3.3.c.1 TSR 3.3.c.2
	b. Nominal Elevation 250 ft	1	TSR 3.3.c.1 TSR 3.3.c.2
2.	Wind Direction		
	a. Nominal Elevation 30 ft	1	TSR 3.3.c.1 TSR 3.3.c.2
	b. Nominal Elevation 250 ft	1	TSR 3.3.c.1 TSR 3.3.c.2
3.	Air Temperature - ΔT (Nominal Elevation 30 ft/250 ft)	1	TSR 3.3.c.1 TSR 3.3.c.2

3.3 INSTRUMENTATION

3.3.d Loose-Part Detection System

TLCO 3.3.d The Loose-Part Detection instrumentation in Table T3.3.d-1 shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each instrument.
2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required Loose-Part Detection System instruments inoperable.	A.1	Restore required instrument to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met.	B.1	Prepare and submit a report to the Plant Operating Review Committee outlining the cause of the malfunction and the plans for restoring the instrument to OPERABLE status.	10 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.3.d.1	Perform CHANNEL CHECK.	24 hours
TSR 3.3.d.2	--------------------NOTE-------------------- Verification of setpoint not required. -- Perform CHANNEL OPERATIONAL TEST.	31 days
TSR 3.3.d.3	Perform CHANNEL CALIBRATION.	18 months

Table T3.3.d-1 (page 1 of 1)
Loose-Part Detection Instrumentation

NOTE
The Loose-Part Detection Instrumentation is considered OPERABLE if one of the two sensor channels for each instrument in Table T3.3.d-1 and the associated amplifier are OPERABLE.

INSTRUMENT AND LOCATION	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
1. Reactor Head a. _VE-LM001 (270°) OR b. _VE-LM002 (0°)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3
2. Reactor Bottom a. _VE-LM003 (G-9) OR b. _VE-LM004 (H-13)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3
3. "A" Steam Generator Channel Head a. _VE-LM005 (Hot Side) OR b. _VE-LM006 (Cold Side)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3
4. "B" Steam Generator Channel Head a. _VE-LM007 (Hot Side) OR b. _VE-LM008 (Cold Side)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3
5. "C" Steam Generator Channel Head a. _VE-LM009 (Hot Side) OR b. _VE-LM010 (Cold Side)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3
6. "D" Steam Generator Channel Head a. _VE-LM011 (Hot Side) OR b. _VE-LM012 (Cold Side)	1	TSR 3.3.d.1 TSR 3.3.d.2 TSR 3.3.d.3

3.3 INSTRUMENTATION

3.3.e Explosive Gas Monitoring Instrumentation

TLCO 3.3.e The explosive gas monitoring instrumentation channels in Table T3.3.e-1 shall be OPERABLE with their Alarm/Trip setpoints set to ensure that the limits of the Explosive Gas and Storage Tank Radioactivity Monitoring Program are not exceeded.

APPLICABILITY: According to Table T3.3.e-1.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each channel.

2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required channels inoperable.	A.1.1 Suspend affected system operation. <u>OR</u>	Immediately (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.1.2.1 ---------NOTE-------- Only applicable during degassing operation. --------------------- Take and analyze grab samples.	 Once per 4 hours
	AND	
	A.1.2.2 ---------NOTE-------- Only applicable during non-degassing operations. --------------------- Take and analyze grab samples.	 Once per 24 hours
	AND	
	A.2.1 Restore channel to OPERABLE status.	30 days
	OR	
	A.2.2 Prepare and submit a report to the Plant Operating Review Committee explaining the reason for not correcting the inoperability in a timely manner.	60 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.3.e.1	Perform CHANNEL CHECK.	24 hours
TSR 3.3.e.2	Perform CHANNEL OPERATIONAL TEST.	31 days
TSR 3.3.e.3	-------------------NOTES------------------- 1. For the Hydrogen Analyzer, the CHANNEL CALIBRATION shall include the use of standard gas samples containing hydrogen and nitrogen. 2. For the Oxygen Analyzer and the Waste Gas Compressor Discharge Oxygen Analyzer, the CHANNEL CALIBRATION shall include the use of standard gas samples containing oxygen and nitrogen. --- Perform CHANNEL CALIBRATION.	92 days

Table T3.3.e-1 (page 1 of 1)
Explosive Gas Monitoring Instrumentation

	INSTRUMENT	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
1.	Hydrogen Analyzer (OAT-GW8000)	(a)	1	TSR 3.3.e.1 TSR 3.3.e.2 TSR 3.3.e.3
2.	Oxygen Analyzer (OAT-GW8003)	(a)	1	TSR 3.3.e.1 TSR 3.3.e.2 TSR 3.3.e.3
3.	Waste Gas Compressor Discharge Oxygen Analyzer (OAIT-GW004)	(b)	1	TSR 3.3.e.1 TSR 3.3.e.2 TSR 3.3.e.3

(a) During WASTE GAS HOLDUP SYSTEM operation.

(b) During Waste Gas Compressor operation.

3.3 INSTRUMENTATION

3.3.f High Energy Line Break (HELB) Isolation Sensors

TLCO 3.3.f The HELB instrumentation channels shown in Table T3.3.f-1 shall be OPERABLE.

APPLICABILITY: According to Table T3.3.f-1.

ACTIONS

------------------------------------ NOTES ------------------------------------

1. Separate Condition entry is allowed for each channel.
2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required auxiliary steam isolation instrumentation channels inoperable.	A.1	Restore the required channel to OPERABLE status.	7 days
	<u>OR</u>		
	A.2	Suspend the supply of auxiliary steam to the Auxiliary Building.	7 days
	<u>OR</u>		
	A.3	Establish a continuous watch in the affected area.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One or more required steam generator blowdown line isolation instrumentation channels inoperable.	B.1	Restore the required channel to OPERABLE status.	7 days
	<u>OR</u>		
	B.2	Limit the total steam generator blowdown flow rate to ≤ 60 gpm on the affected unit.	7 days
	<u>OR</u>		
	B.3	Establish a continuous watch in the affected area.	7 days

SURVEILLANCE REQUIREMENTS

-------------------------------------NOTE-------------------------------------
TSR 3.3.f.1 and TSR 3.3.f.2 apply to each HELB instrument in Table T3.3.f-1.

SURVEILLANCE	FREQUENCY
TSR 3.3.f.1 Perform CHANNEL OPERATIONAL TEST.	18 months
TSR 3.3.f.2 Perform CHANNEL CALIBRATION.	18 months

Table T3.3.f-1 (page 1 of 1)
High Energy Line Break Instrumentation

INSTRUMENT AND LOCATION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS
1. Auxiliary Steam Isolation		
a. 0TS-AS031A 0TS-AS032A	(a)	1
b. 0TS-AS031B 0TS-AS032B	(a)	1
2. Steam Generator Blowdown Line Isolation		
a. TS-SD045A TS-SD045B	1,2,3,4	1
b. TS-SD046A TS-SD046B	1,2,3,4	1
c. TS-SD045C TS-SD045D	1,2,3,4	1
d. TS-SD046C TS-SD046D	1,2,3,4	1

(a) When auxiliary steam is supplied from any source to the Auxiliary Building.

3.3 INSTRUMENTATION

3.3.g Turbine Overspeed Protection

TLCO 3.3.g At least one Turbine Overspeed Protection System, as shown in Table T3.3.g-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each valve.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One throttle valve or one governor valve per high pressure turbine steam line inoperable.	A.1 Restore the valve to OPERABLE status.	72 hours
B. One reheat stop valve or one reheat intercept valve per low pressure turbine steam line inoperable.	B.1 Restore the valve to OPERABLE status.	72 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Close at least one valve in the affected steam line. OR C.2 Isolate the turbine from the steam supply.	6 hours 6 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Turbine Overspeed Protection System inoperable for reasons other than Condition A or B.	D.1 ---------NOTE-------- For additional guidance, reference Tables T3.3.g-1, T3.3.g-2. --------------------- Isolate the turbine from the steam supply.	6 hours

SURVEILLANCE REQUIREMENTS

-------------------------------------NOTE-------------------------------------
TSR 3.0.d is not applicable.

SURVEILLANCE		FREQUENCY
TSR 3.3.g.1	Cycle each of the 12 extraction steam nonreturn check valves from the closed position.	Once within 7 days prior to entering MODE 3 from MODE 4.
TSR 3.3.g.2	-------------------NOTE-------------------- Only required to be performed during turbine operation. --- Verify, by direct observation, freedom of movement of each of the 12 extraction steam nonreturn check valve weight arms.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.3.g.3	-------------------NOTE-------------------- Only required to be performed during turbine operation. --- Verify, by direct observation, closure of each of the following valves from the running position. a. Six turbine reheat stop valves; and b. Six turbine reheat intercept valves.	184 days
TSR 3.3.g.4	-------------------NOTE-------------------- Only required to be performed during turbine operation. --- Verify, by direct observation, closure of each of the following valves from the running position. a. Four high pressure turbine throttle valves; and b. Four high pressure turbine governor valves.	184 days
TSR 3.3.g.5	Perform CHANNEL CALIBRATION.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.3.g.6	Disassemble at least one of each type of the following valves and perform a visual and surface inspection of valve seats, disks, and stems to verify no unacceptable flaws or corrosion: a. Four high pressure turbine throttle valves, b. Four high pressure turbine governor valves, c. Six turbine reheat stop valves, d. Six turbine reheat intercept valves; and e. Twelve extraction steam nonreturn check valves.	40 months

TABLE T3.3.g-1 (page 1 of 1)
Turbine Overspeed Protection (Unit 1)

---NOTE---
TLCO 3.3.g requires at least one Turbine Overspeed Protection System to be OPERABLE. This TLCO is satisfied by the operability of one overspeed trip network along with the turbine throttle, governor, reheat stop, reheat intercept, and nonreturn check valves.

OVERSPEED TRIP NETWORK #1	OVERSPEED TRIP NETWORK #2	OVERSPEED TRIP NETWORK #3
Speed Probes(1SE-TS013_) Turbine Emergency Trip Cabinet 1/2PA38J OST-2 Turbine Overspeed Trip System Panel 1/2TG09J High Pressure Trip Manifold Solenoids 1/2FSV-EH5021A, B, C and D and 1/2FSV-EH5022A, B, C and D[(a)]	Speed Probes (1/2SE-TS011_) DEH Control Cabinet 1/2PA22J High Pressure Trip Manifold Solenoids 1/2FSV-EH5022A, B, C and D[(b)]	Speed Probes (1/2SE-TS014_) DEH Control Cabinet 1/2PA22J High Pressure Trip Manifold Solenoids 1/2FSV-EH5021A, B, C and D[(c)]

(a) The high pressure trip manifold solenoid portion of Overspeed Trip Network #1 is OPERABLE provided any one of the following combinations of solenoids are OPERABLE: 1/2FSV-EH5021A and 1/2FSV-EH5021B; 1/2FSV-EH5021A and 1/2FSV-EH5021D; 1/2FSV-EH5021B and 1/2FSV-EH5021C; 1/2FSV-EH5021C and 1/2FSV-EH5021D; 1/2FSV-EH5022A and 1/2FSV-EH5022B; 1/2FSV-EH5022A and 1/2FSV-EH5022D; 1/2FSV-EH5022B and 1/2FSV-EH5022C; or 1/2FSV-EH5022C and 1/2FSV-EH5022D.

(b) The high pressure trip manifold solenoid portion of Overspeed Trip Network #2 is OPERABLE provided any one of the following combinations of solenoids are OPERABLE: 1/2FSV-EH5022A and 1/2FSV-EH5022B; 1/2FSV-EH5022A and 1/2FSV-EH5022D; 1/2FSV-EH5022B and 1/2FSV-EH5022C; or 1/2FSV-EH5022C and 1/2FSV-EH5022D.

(c) The high pressure trip manifold solenoid portion of Overspeed Trip Network #3 is OPERABLE provided any one of the following combinations of solenoids are OPERABLE: 1/2FSV-EH5021A and 1/2FSV-EH5021B; 1/2FSV-EH5021A and 1/2FSV-EH5021D; 1/2FSV-EH5021B and 1/2FSV-EH5021C; or 1/2FSV-EH5021C and 1/2FSV-EH5021D.

Entry into TLCO 3.3.g, CONDITIONS A or B is only required when a problem exists with one of the specified valves prohibiting it from closing. The inability of the valve to close requires it to be declared inoperable.

Entry into TLCO 3.3.g, CONDITION D requires isolation of the turbine from the steam supply within 6 hours for the Turbine Overspeed Protection System being inoperable for reasons other than those identified in CONDITIONS A and B.

Examples could include:

1. <u>NO OVERSPEED TRIP NETWORK</u>

   The main turbine has three separate electrical overspeed trip networks. Overspeed Trip Network #1 is comprised of speed probes 1/2SE-TS013_, 1/2PA38J, OST-2, 1/2TG09J and High Pressure Trip Manifold Solenoids 1/2FSV-EH5021A, B, C and D and 1/2FSV-EH5022A, B, C and D. Overspeed Trip Network #2 is comprised of speed probes 1/2SE-TS011_, 1/2PA22J and High Pressure Trip Manifold Solenoids 1/2FSV-EH5022A, B, C and D. Overspeed Trip Network #3 is comprised of speed probes 1/2SE-TS014_, 1/2PA22J and High Pressure Trip Manifold Solenoids 1/2FSV-EH5021A, B, C and D. With no overspeed trip network, the turbine must be isolated from the steam supply.

2. <u>FAILURE ON A NONRETURN CHECK VALVE</u>

   Failure of a nonreturn check valve to move freely would require the valve to be declared inoperable and entry in to CONDITION D. Isolation of the steam flow path is accomplished by closing the MOV and/or manual isolation valve. Closing the MOV and/or manual isolation valve prohibits the reflux of extraction steam from the isolated steam line and satisfies Required Action of CONDITION D. Reference Table T3.3.g-2 for determining the correct valve (MOV or manual) to isolate the flow path.

Page Deleted

TABLE T3.3.g-3 (page 1 of 1)
Extraction Steam Nonreturn Check Valves and the Associated MOV or Manual Isolation Valve

HEATER	FAILED EXTRACTION STEAM NONRETURN CHECK VALVE	MOTOR-OPERATED ISOLATION VALVE	MANUAL ISOLATION VALVES
_2A	_ES011A	_ES010A	NA
_2B	_ES011B	_ES010B	NA
_2C	_ES011C	_ES010C	NA
_3A	_ES015A	_ES013A	NA
_3B	_ES015B	_ES013B	NA
_3C	_ES015C	_ES013C	NA
_4A	_ES017A	_ES016A	NA
_4B	_ES017B	_ES016B	NA
_4C	_ES017C	_ES016C	NA
_5A	_ES008	_ES007	_ES009A
_5B	_ES008	_ES007	_ES009B
_6A	_ES002	_ES001	_ES003A
_6B	_ES002	_ES001	_ES003B
_7A	_ES005	_ES004	_ES006A
_7B	_ES005	_ES004	_ES006B

3.3 INSTRUMENTATION

3.3.h Power Distribution Monitoring System (PDMS)

TLCO 3.3.h The PDMS shall be OPERABLE with required PDMS instrumentation in Table T3.3.h-1 OPERABLE.

APPLICABILITY: MODE 1 with THERMAL POWER > 25% RTP.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Separate Condition entry is allowed for each Function. ---------------------- One or more Functions with one or more required channels inoperable.	A.1 Restore required channel to OPERABLE status.	4 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. PDMS inoperable for reasons other than Condition A. OR Required Action and associated Completion Time of Condition A not met.	B.1	Apply LCO 3.1.4, "Rod Group Alignment Limits," as applicable, with PDMS inoperable.	Immediately
	AND		
	B.2	Apply LCO 3.2.1, "Heat Flux Hot Channel Factor ($F_Q(Z)$)," as applicable, with PDMS inoperable.	Immediately
	AND		
	B.3	Apply LCO 3.2.2, "Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$)," as applicable, with PDMS inoperable.	Immediately
	AND		
	B.4	Apply LCO 3.2.4, "Quadrant Power Tilt Ratio (QPTR)," as applicable, with PDMS inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.3.h.1	Perform CHANNEL CHECK for each required instrumentation channel.	7 days
TSR 3.3.h.2	-------------------NOTE-------------------- Neutron detectors are excluded from CHANNEL CALIBRATION. ---	
	Perform CHANNEL CALIBRATION for each required instrumentation channel, except Detector Plateau Curves.	18 months
	Perform Detector Plateau Curves of the CHANNEL CALIBRATION for Power Range Channels only	36 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
TSR 3.3.h.3 Perform PDMS calibration.	Prior to declaring PDMS OPERABLE after each refueling AND -----NOTE------ Not required to be performed until 31 Effective Full Power Days (EFPD) after the Core Exit Thermocouple (CETC) chess knight move pattern not satisfied --------------- 31 EFPD thereafter with the CETC chess knight move pattern not satisfied AND 180 EFPD thereafter with the CETC chess knight move pattern satisfied

Table T3.3.h-1 (Page 1 of 1)
Power Distribution Monitoring System Instrumentation

FUNCTION	REQUIRED CHANNELS
1. Power Range Neutron Flux Monitors	3
2. Reactor Coolant System (RCS) Cold Leg Temperature	2
3. Reactor Power	1[a]
4. Control Bank Position (per bank)	1[b]
5. Core Exit Temperature	17 with $\geq$ 2 per core quadrant

(a) Either calorimetric power, the average power of the power range neutron flux monitors, or the average power of the ΔT channels.

(b) Either the Demand Position Indication System or the Digital Rod Position Indication (DRPI) System.

3.3 INSTRUMENTATION

3.3.i Post Accident Monitoring (PAM) Instrumentation

TLCO 3.3.i The PAM instrumentation for each Function shown in Table T3.3.i-1 shall be OPERABLE.

APPLICABILITY: According to Table T3.3.i-1.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each Function.

2. TLCO 3.0.d.3 is applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more Functions with one or more required channel inoperable.	A.1	Enter the Condition referenced in Table T3.3.i-1 for the channel.	Immediately
B. As required by Required Action A.1 and referenced in Table T3.3.i-1.	B.1	Restore required channel to OPERABLE status.	30 days
C. As required by Required Action A.1 and referenced in Table T3.3.i-1.	C.1	Restore one required channel to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. ---------NOTE--------- Required Action D.2.2 shall be completed whenever Required Action D.2.1 is not met. --------------------- As required by Required Action A.1 and referenced in Table T3.3.i-1.	D.1	Initiate alternate method of monitoring the appropriate parameters.	72 hours
	AND		
	D.2.1	Restore one required channel to OPERABLE status.	7 days
	OR		
	D.2.2	Submit a report to the Plant Operating Review Committee outlining the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.	14 days
E. One or more Functions with two required channels inoperable.	E.1	Restore one required channel to OPERABLE status.	7 days
F. Required Action and associated Completion Time of Condition B, C, D or E not met.	F.1	Enter TLCO 3.0.c.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.i.1 Perform CHANNEL CHECK.	31 days
TSR 3.3.i.2 Perform CHANNEL CALIBRATION.	18 months

Table T3.3.i-1 (page 1 of 1)
Post Accident Monitoring Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS
1.	Auxiliary Feedwater Flow Rate (per SG)	1,2,3	2	B	TSR 3.3.i.1 TSR 3.3.i.2
2.	PORV Position Indicator[a] (open/closed) (per valve)	1,2,3	1	C	TSR 3.3.i.1
3.	PORV Block Valve Position Indicator[b] (open/closed) (per valve)	1,2,3	1	C	TSR 3.3.i.1
4.	Safety Valve Position Indicator (open/closed) (per valve)	1,2,3	1	C	TSR 3.3.i.1
5.	Containment Floor Drain Sump Water Level (Narrow Range)	1,2,3	2	B	TSR 3.3.i.1 TSR 3.3.i.2
6.	Auxiliary Building Vent Stack (Wide Range Noble Gas) (per stack)	1,2,3	1	D	TSR 3.3.i.1 TSR 3.3.i.2
7.	Reactor Coolant Subcooling Margin Monitor[c]	1,2,3	2	B	None

(a) Not applicable if the associated block valve is in the closed position.

(b) Not applicable if the block valve is verified in the closed position and power is removed.

(c) Use monitoring channels (10 highest average core exit temperatures) in conjunction with RCS pressure to determine the subcooling margin.

3.3 INSTRUMENTATION

3.3.j Hydrogen Monitor

TLCO 3.3.j One containment hydrogen monitor channel shall be OPERABLE.

APPLICABILITY: MODES 1 and 2.

ACTIONS

------------------------------------- NOTE -------------------------------------
TLCO 3.0.d.3 is applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTES-------- 1. The monitor must be in standby mode to meet the requirement in NUREG-0737, Item II.F.1.6. 2. Not applicable if hydrogen monitor is in operation. ---------------------- Required hydrogen monitor not in the standby mode.	A.1 Place the hydrogen monitor in the standby mode. OR A.2 Declare the hydrogen monitor inoperable.	Immediately Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required hydrogen monitor channel inoperable.	B.1 Confirm readiness for utilizing alternate method of monitoring.	Immediately
	<u>AND</u>	
	B.2 Restore required hydrogen monitor channel to OPERABLE status.	72 hours
C. Required Action and associated Completion Time of Condition B not met.	C.1 Submit a report to the Plant Operating Review Committee outlining the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the hydrogen monitor channel to OPERABLE status.	14 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.j.1 Verify hydrogen monitor is in standby mode.	12 hours
TSR 3.3.j.2 Perform CHANNEL CHECK.	31 days
TSR 3.3.j.3 Perform CHANNEL OPERATIONAL TEST.	92 days
TSR 3.3.j.4 Perform CHANNEL CALIBRATION.	18 months

3.3 INSTRUMENTATION

3.3.k Feedwater Flow

TLCO 3.3.k The Leading Edge Flow Meter system shall be OPERABLE.

APPLICABILITY: MODE 1, with THERMAL POWER > 98.3% RTP.

ACTIONS

------------------------------------ NOTE ------------------------------------
TLCO 3.0.d.2 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LEFM system inoperable.	A.1 Restore LEFM system to OPERABLE status.	72 hours
B. REQUIRED ACTION and associated COMPLETION TIME OF CONDITION A not met.	B.1 Reduce power to ≤ 98.3% RTP.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.k.1 Perform CHANNEL CHECK.	Prior to exceeding 98.3% RTP AND Once per 24 hours thereafter
TSR 3.3.k.2 Perform CHANNEL CALIBRATION.	Once per 24 months

3.3 INSTRUMENTATION

3.3.o Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System Actuation Instrumentation

TLCO 3.3.o The FHB Ventilation System actuation instrumentation in Table T3.3.o-1 shall be OPERABLE.

APPLICABILITY: According to Table T3.3.o-1.

ACTIONS

------------------------------------NOTE------------------------------------
TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One channel inoperable.	A.1 Restore channel to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Action and associated Completion Time for Condition A not met. OR Two channels inoperable.	B.1.1	Place in emergency mode one FHB Ventilation System train capable of being powered by an OPERABLE emergency power source.	Immediately
	AND		
	B.1.2	Take actions to provide an appropriate portable continuous monitor with the same alarm setpoint in the fuel pool area.	Immediately
	OR		
	B.2	Suspend crane operations with loads, including new fuel assemblies, over or within the spent fuel storage pool.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.o.1 Perform CHANNEL CHECK.	12 hours

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
TSR 3.3.o.2 Perform CHANNEL OPERATIONAL TEST.	18 months
TSR 3.3.o.3 Perform CHANNEL CALIBRATION.	18 months

TABLE T3.3.o-1 (page 1 of 1)
FHB Ventilation System Actuation Instrumentation

FUNCTIONAL UNIT	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	ALARM/TRIP SETPOINT	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
Fuel Building Isolation Radioactivity-High and Criticality (ORE-AR055/56)	(a)	≤ 5 mR/h	2	TSR 3.3.o.1 TSR 3.3.o.2 TSR 3.3.o.3

(a) During crane operations with loads, including new fuel assemblies, over or within the spent fuel storage pool.

3.3 INSTRUMENTATION

3.3.p Radiation Monitoring Instrumentation

TLCO 3.3.p The Radiation Monitoring instrumentation Alarm/Trip Setpoints for each Function in Table T3.3.p-1 shall be OPERABLE.

APPLICABILITY: According to Table T3.3.p-1.

ACTIONS

-------------------------------------NOTE-------------------------------------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more required channels Alarm/Trip Setpoint(s) not within limits specified in Table T3.3.p-1.	A.1 Adjust the Setpoint to within limit.	4 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met.	B.1	Declare the channel inoperable and enter applicable Condition and Required Actions of LCO 3.3.6, "Containment Ventilation Isolation Instrumentation," LCO 3.3.7, "VC Filtration System Actuation Instrumentation," LCO 3.3.8, "FHB Ventilation System Actuation Instrumentation," TLCO 3.3.o, "FHB Ventilation System Actuation Instrumentation," and TLCO 3.7.i, "FHB Ventilation Systems," for one or more radiation monitors inoperable, as applicable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.3.p.1	Perform CHANNEL CHECK.	12 hours
TSR 3.3.p.2	Perform CHANNEL OPERATIONAL TEST.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
TSR 3.3.p.3 Perform CHANNEL CALIBRATION.	18 months

TABLE T3.3.p-1 (page 1 of 1)
Radiation Monitoring Instrumentation for Plant Operations

	FUNCTIONAL UNIT	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	ALARM/TRIP SETPOINT	REQUIRED CHANNELS	CHANNELS TO TRIP/ALARM	SURVEILLANCE REQUIREMENTS
1.	Fuel Building Isolation Radioactivity-High and Criticality (ORE-AR055/56)	(a)	≤ 5 mR/hr	2	1	TSR 3.3.p.1 TSR 3.3.p.2 TSR 3.3.p.3
2.	Containment Isolation Containment Radioactivity-High					
	a) U-1 (1RE-AR011/12)	All	(b)	2	1	TSR 3.3.p.1 TSR 3.3.p.2 TSR 3.3.p.3
	b) U-2 (2RE-AR011/12)	All	(b)	2	1	TSR 3.3.p.1 TSR 3.3.p.2 TSR 3.3.p.3
3.	Main Control Room Isolation-Outside Air Intake-Gaseous Radioactivity-High					
	a) Train A (ORE-PR031B/32B)	All	≤ 2 mR/hr	2	1	TSR 3.3.p.1 TSR 3.3.p.2 TSR 3.3.p.3
	b) Train B (ORE-PR033B/34B)	All	≤ 2 mR/hr	2	1	TSR 3.3.p.1 TSR 3.3.p.2 TSR 3.3.p.3

(a) During crane operations with loads, including new fuel assemblies, over or within the spent fuel storage pool.

(b) Trip Setpoint shall be established at ≤ 2 x background in the Containment Building at RTP .

3.3 INSTRUMENTATION

3.3.y Engineered Safety Feature Actuation System (ESFAS) Instrumentation

TLCO 3.3.y The ESFAS Instrumentation for each Function in Table T3.3.y-1 shall be OPERABLE,

APPLICABILITY: According to Table T3.3.y-1.

ACTIONS

-----------------------------------NOTE-----------------------------------
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more Functions with one or more required channel(s) inoperable.	A.1	Enter the Condition referenced in Table T3.3.y-1 for the channel.	Immediately
B. One Auxiliary Feedwater - Manual Initiation channel inoperable.	B.1	Restore channel to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action and associated Completion Time of Condition B not met. <u>OR</u> Two Auxiliary Feedwater - Manual Initiation channels inoperable.	C.1 Enter TLCO 3.0.c.	Immediately
D. ---------NOTE--------- Separate Condition entry is allowed for each channel. ---------------------- One or more Individual Steam Line Isolation - Manual Initiation channels inoperable.	D.1 Restore channel to OPERABLE status. <u>OR</u> D.2 Declare the associated valve inoperable and enter the applicable Conditions and Required Actions of LCO 3.7.2, "Main Steam Isolation Valves (MSIVs)."	48 hours 48 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.3.y.1 Perform TRIP ACTUATING DEVICE OPERATIONAL TEST.	18 months

Table T3.3.y-1 (page 1 of 1)
Engineered Safety Feature Actuation System Instrumentation

	FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
1.	Individual Steam Line Isolation - Manual Initiation	1,2,3	D	1 per steam line	TSR 3.3.y.1
2.	Auxiliary Feedwater - Manual Initiation	1,2,3	B, C	2	TSR 3.3.y.1

TLCO 3.4.a was deleted via plant review 00-60.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.b RCS Chemistry

TLCO 3.4.b RCS Chemistry shall be maintained within the limits of Table T3.4.b-1.

APPLICABILITY: According to Table T3.4.b-1.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more chemistry parameters in excess of its Steady-State Limit but within its Transient Limit.	A.1 Restore parameter to within its Steady-State Limit.	24 hours
B. Dissolved Oxygen concentration in excess of its Steady-State Limit for > 24 hours. <u>OR</u> Dissolved Oxygen concentration in excess of its Transient Limit.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 4 with $T_{avg} \leq 250°F$.	6 hours 36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Chloride or Fluoride concentration in excess of its Steady-State Limit for > 24 hours. OR Chloride or Fluoride concentration in excess of its Transient Limit.	C.1	Initiate action to reduce pressurizer pressure ≤ 500 psig.	Immediately
	AND		
	C.2	Be in MODE 3.	6 hours
	AND		
	C.3	Be in MODE 5.	36 hours
	AND		
	C.4	Perform an engineering evaluation to determine the effects of the out-of-limit condition on the structural integrity of the RCS and to determine that the RCS remains acceptable for continued operation.	Prior to increasing pressurizer pressure above 500 psig OR Prior to proceeding to MODE 4 from MODE 5

SURVEILLANCE REQUIREMENTS

-----------------------------------NOTE-----------------------------------
TSR 3.4.b.1 applies to each RCS Chemistry parameter in Table T3.4.b-1.

SURVEILLANCE		FREQUENCY
TSR 3.4.b.1	------------------NOTES------------------- 1. Not required to be performed for Dissolved Oxygen if RCS $T_{avg} \leq 250°F$. 2. Not required to be performed for Dissolved Oxygen in Mode 1 if Dissolved Hydrogen concentration is $\geq$ 15 cc/kg and is sampled at the same frequency as Dissolved Oxygen. -- Verify RCS chemistry parameters within limits specified in Table T3.4.b-1.	In accordance with EPRI PWR Primary Water Chemistry Guidelines

Table T3.4.b-1
RCS Chemistry Limits

PARAMETER	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	STEADY STATE LIMIT	TRANSIENT LIMIT
1. Dissolved Oxygen	MODES 1,2,3, and MODE 4 with T_{avg} > 250°F	≤ 100 ppb	≤ 1000 ppb
2. Chloride	At All Times	≤ 150 ppb	≤ 1500 ppb
3. Fluoride	At All Times	≤ 150 ppb	≤ 1500 ppb

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.c Pressurizer Temperature Limits

TLCO 3.4.c The pressurizer temperature shall be limited to:

1. ≤ 100°F heatup in any 1 hour period;
2. ≤ 200°F cooldown in any 1 hour period; and
3. ≤ 320°F spray water temperature differential.

APPLICABILITY: At all times.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Required Actions A.2 and A.3 shall be completed whenever this Condition is entered. ---------------------- Pressurizer temperature not within limits.	A.1 Restore pressurizer temperature to within limits.	30 minutes
	AND	
	A.2 Perform an engineering evaluation to determine the effects of the out-of-limit condition on the structural integrity of the pressurizer.	72 hours
	AND	
	A.3 Determine that the pressurizer remains acceptable for continued operation.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Actions and associated Completion Times of Condition A not met.	B.1	---------NOTE-------- Required Action B.1 is only applicable when in MODES 1 and 2. ---------------------	
		Be in MODE 3.	6 hours
	AND		
	B.2	Reduce pressurizer pressure to < 500 psig.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.4.c.1	-------------------NOTE-------------------- Only required to be performed during system heatup and cooldown. ---	
	Verify pressurizer heatup or cooldown rates are within limits.	30 minutes
TSR 3.4.c.2	-------------------NOTE-------------------- Only required to be performed during auxiliary spray operation. ---	
	Verify auxiliary spray water temperature differential is within limit.	12 hours

TLCO 3.4.d was deleted via plant review 18-013.

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.e Reactor Vessel Head Vents

TLCO 3.4.e Two reactor vessel head vent paths, each consisting of two valves in series powered from emergency buses, shall be OPERABLE and closed.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One reactor vessel head vent path inoperable.	A.1 Initiate action to maintain the inoperable vent path closed. AND A.2 Initiate action to remove power from the valve actuators of the valves in the inoperable vent path.	Immediately Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ---------NOTE--------- TLCO 3.0.d.3 is applicable in MODES 1 and 2 provided Required Actions B.1 and B.2 are complete. --------------------- Both reactor vessel head vent paths inoperable.	B.1 Initiate action to maintain the inoperable vent paths closed.	Immediately
	AND	
	B.2 Initiate action to remove power from the valve actuators of the valves in the inoperable vent paths.	Immediately
	AND	
	B.3 Restore one vent path to OPERABLE status.	30 days
C. Required Actions and associated Completion Times of Condition B not met.	C.1 Be in MODE 3.	6 hours
	AND	
	C.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.4.e.1 Verify all manual isolation valves in each vent path are locked in the open position.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.4.e.2	--------------------NOTE-------------------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. -- Perform a complete cycle of each valve in the vent path from the control room.	18 months
TSR 3.4.e.3	------------------ NOTE-------------------- This Surveillance shall not be performed in MODE 1, 2, 3, or 4. -- Verify flow through the reactor vessel head vent paths during venting operation.	18 months

3.4 Reactor Coolant System (RCS)

3.4.f Structural Integrity

TLCO 3.4.f The structural integrity of all ASME Code Class 1, 2, and 3 plant components shall be maintained in accordance with the Inservice Inspection and Testing Programs.

APPLICABILITY: MODES 1, 2, 3, 4, 5, and 6.

ACTIONS

-----------------------------------NOTES -----------------------------------

1. Separate Condition entry is allowed for each component.

2. TLCO 3.0.d.3 is applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Only applicable to ASME Code Class 1 and 2 components. ----------------------	A.1 Restore the structural integrity of the affected component to within its limits.	Prior to increasing the RCS temperature to > 200°F
Structural integrity of one or more ASME component(s) not in conformance.	<u>OR</u>	
	A.2 Isolate the affected component.	Prior to increasing the RCS temperature to > 200°F

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ---------NOTE--------- Only applicable to ASME Code Class 3 components. ----------------------	B.1 Restore the structural integrity of the affected component to within its limits.	Immediately
Structural integrity of one or more ASME component(s) not in conformance.	OR	
	B.2 Isolate the affected component.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.4.f.1	Perform an inspection of each RCP flywheel.	In accordance with the RCP Flywheel Inspection Program.
TSR 3.4.f.2	Verify the structural integrity of ASME Code Class 1, 2, and 3 components.	In accordance with the Inservice Inspection and Testing Programs.

3.5 EMERGENCY CORE COOLING SYSTEM (ECCS)

3.5.a ECCS Subsystems - $T_{avg} \leq 200°F$ and Pressurizer Level ≤ 5%

TLCO 3.5.a One of the following means of decay heat removal shall be available:

1. One Safety Injection (SI) pump and flow path, or
2. A flow path to permit gravity feed from the RWST to the Reactor Coolant System (RCS) with the reactor vessel head removed.

APPLICABILITY: MODES 5 and 6 with pressurizer level ≤ 5%.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. No means of decay heat removal available.	A.1 Initiate action to restore an available means of decay heat removal. OR A.2 Initiate action to establish pressurizer level > 5%.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.5.a.1	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.5.a.1. --- Verify the required SI pump motor circuit breaker is racked in.	12 hours
TSR 3.5.a.2	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.5.a.1. --- Verify an OPERABLE flow path available from the RWST to the RCS.	12 hours
TSR 3.5.a.3	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.5.a.2. --- Verify the reactor vessel head is removed.	12 hours
TSR 3.5.a.4	-------------------NOTE-------------------- Only required to be performed when complying with TLCO 3.5.a.2. --- Verify an OPERABLE flow path available to permit gravity feed from the RWST to the RCS.	12 hours

This section
Left blank
intentionally

3.7 PLANT SYSTEMS

3.7.a Steam Generator Pressure/Temperature Limitations

TLCO 3.7.a Reactor and Secondary coolant pressure shall be ≤ 200 psig.

APPLICABILITY: When either Reactor or Secondary coolant temperature in the steam generator is ≤ 70°F.

ACTIONS

-----------------------------------NOTE-----------------------------------
Separate Condition entry is allowed for each side (Primary or Secondary) of each steam generator.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Required Actions A.2 and A.3 shall be completed whenever this Condition is entered. ---------------------- Reactor coolant pressure > 200 psig. <u>OR</u> Secondary coolant pressure > 200 psig.	A.1 Reduce the steam generator pressure of the applicable side to ≤ 200 psig.	30 minutes
	<u>AND</u>	
	A.2 Perform an engineering evaluation to determine the effect of the overpressurization on the structural integrity of the steam generator.	Prior to increasing temperature to > 200°F
	<u>AND</u>	
	A.3 Determine that the steam generator remains acceptable for continued operation.	Prior to increasing temperature to > 200°F

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.7.a.1	-------------------NOTE-------------------- Only required to be performed when the temperature of either Reactor or Secondary coolant ≤ 70°F. --- Verify pressure in each side of the steam generator is ≤ 200 psig.	1 hour

3.7 PLANT SYSTEMS

3.7.b Snubbers

TLCO 3.7.b All required snubbers shall be OPERABLE.

-------------------------NOTES---------------------------

1. Not applicable to snubbers installed on nonsafety related systems unless their failure, or failure of the associated system(s), would adversely affect any safety related system.
2. Required snubber(s) are those installed in a system, subsystem, or train required to be OPERABLE.
3. (Byron Unit-2 Only) verification of Steam Generator snubber fluid levels shall be through local examination of reservoirs and snubbers, not based on remote panel lighting indication.

APPLICABILITY: MODES 1, 2, 3, 4, and
MODES 5, and 6 for snubbers located on systems required OPERABLE in those MODES.

ACTIONS

---NOTE---
Separate Condition entry is allowed for each snubber.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required Snubber(s) associated with a TRM system inoperable.	A.1.1 Initiate an OPERABILITY Determination on the attached component.	Immediately
	AND	
	A.1.2 Perform engineering evaluation on the attached component	72 hours
	OR	
	A.2 Declare the attached system inoperable and enter appropriate TRM action.	Immediately
B. One or more required Snubber(s) associated with a Technical Specification Structure, System, or Component inoperable.	B.1 Evaluate entry into Technical Specification LCO 3.0.9.	Immediately
	AND	
	B.2 Evaluate the risk associated with the inoperable snubber and ability to properly manage the risk.	Immediately
	AND	

CONDITION	REQUIRED ACTION	COMPLETION TIME
	B.3 Evaluate Auxiliary Feedwater OPERABILITY and/or alternative core cooling capability.	Immediately
	AND	
	B.4 Evaluate non-seismic capability associated with the inoperable snubber.	Immediately
	AND	
	B.5.1 Perform an engineering evaluation on attached component to determine potential system degradation.	72 hours
	OR	
	B.5.2 Declare the affected plant system(s) inoperable	Immediately

SURVEILLANCE REQUIREMENTS

-----------------------------------NOTE-----------------------------------
The provisions of TSR 3.0.b are applicable for all inspection intervals up to and including 48 months.

SURVEILLANCE		FREQUENCY
TSR 3.7.b.1	Perform required augmented or inservice inspection.	Examination and testing of snubbers shall be in accordance with the 10CFR 50.55a approved edition / addenda of the ASME OM Code, subsection ISTD, as referenced in the applicable Program Plan.

A. Transient Event Inspection

An inspection shall be performed of all snubbers attached to sections of systems that have experienced unexpected, potentially damaging transients as determined from a review of operational data and a visual inspection of the systems within 6 months following such an event. In addition to satisfying the visual inspection acceptance criteria, freedom of motion of mechanical snubbers shall be verified using at least one of the following: (1) manually induced snubber movement; or (2) evaluation of in-place snubber piston setting; or (3) stroking the mechanical snubber through it's full range of travel.

B. Locations with Two Snubbers

Configurations that utilize two snubbers at the same location shall be considered as one required snubber.

3.7 PLANT SYSTEMS

3.7.c Sealed Source Contamination

TLCO 3.7.c Each sealed source containing radioactive material either in excess of 100 μCi of beta and/or gamma emitting material or 5 μCi of alpha emitting material shall be free of ≥ 0.005 μCi of removable contamination.

APPLICABILITY: At all times.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each source.

2. TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. ---------NOTE--------- Required Actions A.2 and A.3 shall be completed whenever Condition A is entered. ---------------------- One or more sealed sources with removable contamination not within limits.	A.1	Withdraw the sealed source from use.	Immediately
	AND		
	A.2.1	Decontaminate and repair the sealed source.	Prior to use or transfer to another licensee
	OR		
	A.2.2	Dispose of the sealed source in accordance with Commission Regulations.	Immediately
	AND		
	A.3	Submit report to the Plant Operating Review Committee.	12 months

SURVEILLANCE REQUIREMENTS

-------------------------------------NOTES-------------------------------------

1. Each sealed source shall be tested for leakage and/or contamination by the licensee, or other persons specifically authorized by the Commission or Agreement State.

2. The test method shall have a detection sensitivity of at least 0.005 μCi per test sample.

3. Startup sources and fission detectors previously subjected to core flux are exempted from the TSRs. Startup sources do not include "secondary startup sources" which do not contain radioactive material.

4. Sealed sources which are continuously enclosed within a shielded mechanism (i.e., sealed sources within radiation monitoring or boron measuring devices) are considered to be stored and need not be tested unless they are removed from the shielded mechanism.

SURVEILLANCE		FREQUENCY
TSR 3.7.c.1	--------------------NOTE-------------------- Only required to be performed on sources in use. -- Perform leakage testing for all sealed sources containing radioactive materials with a half-life > 30 days (excluding Hydrogen 3) and in any form other than gas.	6 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.7.c.2	------------------NOTES------------------ 1. Only required to be performed on stored sources not in use. 2. Only required to be performed if not tested within the previous 6 months. -- Perform leakage testing for each sealed source and fission detector.	Prior to use or transfer to another licensee
TSR 3.7.c.3	------------------NOTE------------------ Only required to be performed on stored sources not in use. -- Perform leakage testing on sealed sources and fission detectors transferred without a certificate indicating the last test date.	Prior to use or transfer to another licensee
TSR 3.7.c.4	------------------NOTE------------------ Only required to be performed on sealed startup sources and fission detectors not previously subjected to core flux. -- Perform leakage testing for each sealed startup source and fission detector.	Once within 31 days prior to being subjected to core flux or installed in the core or following repair or maintenance to sources

3.7 PLANT SYSTEMS

3.7.d Area Temperature Monitoring

TLCO 3.7.d The temperature limit of each area in Table T3.7.d-1 shall not be exceeded for > 8 hours, or by > 30° F.

APPLICABILITY: Whenever the equipment in the affected area is required to be OPERABLE.

ACTIONS

------------------------------------NOTE------------------------------------
Separate Condition entry is allowed for each area.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Required Actions A.2 and A.3 shall be completed whenever Condition A is entered. ----------------------	A.1.1 Restore area temperature to within limit.	4 hours
	<u>OR</u>	
One or more area temperatures exceeding the temperature limit by > 30°F.	A.1.2 Declare the equipment in the affected area inoperable.	4 hours
	<u>AND</u>	
	A.2 Submit a report to the Plant Operating Review Committee outlining the cumulative time and the amount by which the temperature in the affected area exceeded the limit.	30 days
	<u>AND</u>	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.3	Perform an analysis to demonstrate the continued OPERABILITY of the affected equipment.	30 days
B. One or more area temperatures exceeding the temperature limit for > 8 hours.	B.1	Submit a report to the Plant Operating Review Committee outlining the cumulative time and the amount by which the temperature in the affected area exceeded the limit.	30 days
	AND		
	B.2	Perform an analysis to demonstrate the continued OPERABILITY of the affected equipment.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.7.d.1	Verify each area temperature is within limits in accordance with Table T3.7.d-1.	12 hours

Table T3.7.d-1 (page 1 of 1)
Area Temperature Monitoring

	AREA	TEMPERATURE LIMIT (°F)
1.	Miscellaneous Electrical Equipment and Battery Rooms	108
2.	ESF Switchgear Rooms	108
3.	Division 12 (Division 22) Cable Spreading Room	108
4.	Upper Cable Spreading Rooms	90
5.	Diesel Generator Rooms	132
6.	Diesel Oil Storage Rooms	132
7.	Auxiliary Building Vent Exhaust Filter Cubicle	105
8.	Centrifugal Charging Pump Rooms	122
9.	Containment Spray Pump Rooms	130
10.	RHR Pump Rooms	130
11.	Safety Injection Pump Rooms	130
12.	Control Room	90
13.	Lower Cable Spreading Rooms	108

3.7 PLANT SYSTEMS

3.7.e Tornado Design Basis Essential Service Water Cooling Tower (SXCT) Fans - Operating

TLCO 3.7.e The required SXCT fans shall be OPERABLE as specified in Table T3.7.e-1.

APPLICABILITY: MODES 1, 2, 3, and 4

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required SXCT fan inoperable when outside air wet bulb temperature is ≤ 65°F. OR One or two required SXCT fans inoperable when outside air wet bulb temperature is > 65°F and ≤ 78°F.	A.1 Verify OPERABLE SXCT fans are capable of being powered by an OPERABLE emergency power source. AND A.2 Restore required SXCT fan(s) to OPERABLE status.	1 hour 72 hours
B. Outside air wet bulb temperature is > 78°F and ≤ 87°F	B.1 Verify 7 SXCT fans are OPERABLE AND B.2 Verify outside air wet bulb temperature is ≤ 87°F. AND B.3 Verify outside air wet bulb temperature is ≤ 78°F.	Immediately 4 hours AND Once per 4 hours thereafter. 7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. SX trains on either Unit in split train operation.	C.1 Restore Unit SX trains to crosstied train operation.	72 hours
D. Two or more required SXCT fans inoperable when outside air wet bulb temperature is ≤ 65°F. <u>OR</u> Three or more required SXCT fans inoperable when outside air wet bulb temperature is > 65°F and ≤ 78°F. <u>OR</u> Outside air wet bulb temperature > 87°F.	D.1 Enter TLCO 3.0.c	Immediately
E. Required Action and associated Completion Time of Condition A, B or C not met.	E.1 Enter TLCO 3.0.c	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.e.1 Verify SXCT fan requirements in Table T3.7.e-1 are met.	12 hours

Table T3.7.e-1 (page 1 of 1)
SXCT Fan Requirements for Tornado Design Basis Event
With SX Trains on Both Units Crosstied

OUTSIDE AIR WET BULB TEMPERATURE	REQUIREMENTS
$\leq$ 65°F	6 required OPERABLE SXCT fans
> 65°F and $\leq$ 78°F	7 required OPERABLE SXCT fans

3.7 PLANT SYSTEMS

3.7.f Tornado Design Basis Essential Service Water Cooling Tower (SXCT) Fans - Shutdown

TLCO 3.7.f The required SXCT fans shall be OPERABLE as specified in Table T3.7.f-1.

APPLICABILITY: Unit 1 (Unit 2) in MODES 1, 2, 3, and 4, with Unit 2 (Unit 1) in MODES 5, 6 or defueled.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required SXCT fan inoperable when outside air wet bulb temperature is ≤ 76°F. OR One or two required SXCT fans inoperable when outside air wet bulb temperature is > 76°F and ≤ 78°F.	A.1 Verify OPERABLE SXCT fans are capable of being powered by an OPERABLE emergency power source.	1 hour
	AND	
	A.2 Restore required SXCT fan(s) to OPERABLE status.	72 hours
B. Outside air wet bulb temperature is > 78°F and ≤ 87°F	B.1 Verify 7 SXCT fans are OPERABLE	Immediately
	AND	
	B.2 Verify outside air wet bulb temperature is ≤ 87°F.	4 hours AND Once per 4 hours thereafter.
	AND	
	B.3 Verify outside air wet bulb temperature is ≤ 78°F.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. SX trains on either Unit in split train operation.	C.1	Restore Unit SX trains to crosstied train operation.	72 hours
D. Two or more required SXCT fans inoperable when outside air wet bulb temperature is ≤ 76°F. OR Three or more required SXCT fans inoperable when outside air wet bulb temperature > 76°F and ≤ 78°F. OR Outside air wet bulb temperature > 87°F.	D.1	Enter TLCO 3.0.c	Immediately
E. Required Action and associated Completion Time of Condition A, B or C not met.	E.1	Enter TLCO 3.0.c	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.f.1	Verify SXCT fan requirements in Table T3.7.f-1 are met.	12 hours

Table T3.7.f-1 (page 1 of 1)
SXCT Fan Requirements for Tornado Design Basis Event
With SX Trains on Both Units Crosstied

OUTSIDE AIR WET BULB TEMPERATURE	REQUIREMENTS
≤ 76°F	6 required OPERABLE SXCT fans
> 76°F and ≤ 78°F	7 required OPERABLE SXCT fans

3.7 PLANT SYSTEMS

3.7.g Auxiliary Feedwater (AF) Flow Control Valves

TLCO 3.7.g The AF Flow Control Valves shall be OPERABLE.

APPLICABILITY: Modes 1, 2 and 3

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ---------NOTE--------- Separate Condition entry is allowed for each accumulator. ---------------------- One or more AF Flow Control Valve Air Accumulator(s) inoperable.	A.1 Restore AF Flow Control Valve Air accumulator(s) to OPERABLE status.	30 days
B. One or more AF Flow Control Valve(s) not capable of closing on demand from the main control room.	B.1 Restore AF Flow Control Valve(s) to OPERABLE status.	30 days
C. ---------NOTE--------- Not applicable to Unit 2. ---------------------- One or more AF Flow Control Valve(s) not capable of throttling flow as assumed in the safety analysis for the Steam Generator Tube Rupture Margin to Overfill event.	C.1 Restore AF Flow Control Valve(s) to OPERABLE status.	30 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Actions and associated Completion Times of Conditions A, B or C not met.	D.1 Enter TLCO 3.0.c	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.7.g.1 Perform leakage test for each AF Flow Control Valve Air Accumulator.	In accordance with the INSERVICE TESTING PROGRAM

3.7 PLANT SYSTEMS

3.7.i Fuel Handling Building (FHB) Ventilation Systems

TLCO 3.7.i Two FHB Ventilation System trains shall be OPERABLE.

APPLICABILITY: During crane operation with loads, including new fuel assemblies, over or within the spent fuel storage pool.

ACTIONS

-----NOTE-----
TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One FHB Ventilation System train inoperable.	A.1 Restore FHB Ventilation System train to OPERABLE status.	7 days
B. Required Action and associated Completion Time of Condition A not met.	B.1 Place in emergency mode one OPERABLE FHB Ventilation System train capable of being powered by an OPERABLE emergency power source.	Immediately
	<u>OR</u>	
	B.2 Suspend crane operation with loads, including new fuel assemblies, over or within the spent fuel storage pool.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. Two FHB Ventilation System trains inoperable.	C.1	Suspend crane operation with loads, including new fuel assemblies, over or within the spent fuel storage pool.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.7.i.1	For FHB Ventilation Systems required to be OPERABLE, the following SRs are applicable: SR 3.7.13.1 SR 3.7.13.4 SR 3.7.13.2 SR 3.7.13.5	In accordance with applicable SRs

3.7 PLANT SYSTEMS

3.7.j Spent Fuel Pool Water Level

TLCO 3.7.j The spent fuel pool water level shall be ≥ 23 ft over the top of irradiated fuel assemblies seated in the storage racks.

APPLICABILITY: During movement of loads, including new fuel assemblies, over or within the spent fuel pool.

ACTIONS

------------------------------------NOTE------------------------------------
TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Spent fuel pool water level not within limit.	A.1 Suspend movement of loads, including new fuel assemblies, over or within the spent fuel pool.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
TSR 3.7.j.1 Verify spent fuel pool water level is ≥ 23 ft above the top of the irradiated fuel assemblies seated in the storage racks.	7 days

3.7 PLANT SYSTEMS

3.7.k Spent Fuel Pool Boron Concentration

TLCO 3.7.k The spent fuel pool boron concentration shall be as applicable:

a. ≥ 300 ppm for Holtec spent fuel pool storage racks; and ≥ 2000 ppm for Joseph Oat spent fuel pool storage racks.

APPLICABILITY: Whenever fuel assemblies are stored in the spent fuel pool.

ACTIONS

------------------------------------NOTE------------------------------------
TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Spent fuel pool boron concentration not within limit.	A.1 Suspend movement of loads, including new fuel assemblies, over or within the spent fuel pool.	Immediately
	AND	
	A.2 Initiate action to restore spent fuel pool boron concentration to within limit.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.7.k.1	Verify the spent fuel pool boron concentration is within limit.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.a Containment Penetration Conductor Overcurrent Protective Devices

TLCO 3.8.a The containment penetration conductor overcurrent protective devices in Table T3.8.a-1 for Unit 1 (Table T3.8.a-2 for Unit 2) shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each device.

2. TLCO 3.0.d.3 is applicable to overcurrent devices in circuits which have the circuit breakers tripped, inoperable circuit breakers racked out or removed.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more containment penetration conductor overcurrent protective devices inoperable.	A.1 Restore the protective device to OPERABLE status. OR	72 hours

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.1 Verify the circuit is de-energized with the associated circuit breaker tripped.	72 hours AND 7 days thereafter
	AND	
	A.2.2 Determine operability status of the affected system or component.	Immediately following initial performance of Required Action A.2.1
	OR	
	A.3.1 Verify the circuit is de-energized with the associated circuit breaker racked out or removed.	72 hours AND 7 days thereafter
	AND	
	A.3.2 Determine operability status of the affected system or component.	Immediately following initial performance of Required Action A.3.1
B. Required Actions and associated Completion Times of Condition A not met.	B.1 Be in MODE 3.	6 hours
	AND	
	B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.8.a.1	--------------------NOTES------------------- 1. A representative sample shall consist of ≥ 10% of the circuit breakers selected, on a rotating basis, from 6.9 kV and 4.16 kV circuit breakers. 2. For each circuit breaker found inoperable during these functional tests, an additional representative sample of ≥ 10% of all circuit breakers of the inoperable type shall be functionally tested until no more failures are found or all circuit breakers of the inoperable type have been functionally tested. --- Perform CHANNEL CALIBRATION on the associated protective relays of the sampled circuit breakers.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.8.a.2	--------------------NOTES-------------------- 1. A representative sample shall consist of ≥ 10% of the circuit breakers selected, on a rotating basis, from 6.9 kV and 4.16 kV circuit breakers. 2. For each circuit breaker found inoperable during these functional tests, an additional representative sample of ≥ 10% of all circuit breakers of the inoperable type shall be functionally tested until no more failures are found or all circuit breakers of the inoperable type have been functionally tested. --- Perform an integrated system functional test on a representative sample of each circuit breaker type, which includes simulated automatic actuation of the system to demonstrate that the overall penetration design remains within operable limits.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.8.a.3	-------------------NOTES------------------- 1. A representative sample shall consist of ≥ 10% of the circuit breakers selected, on a rotating basis, from each type of 480 V circuit breakers. 2. Testing of these circuit breakers shall consist of injecting a current in excess of the breakers nominal setpoint and measuring the response time. The measured response time will be compared to the manufacturers data to ensure that it is ≤ a value specified by the manufacturer. 3. Circuit breakers found inoperable during functional tests shall be restored to OPERABLE or replaced with OPERABLE circuit breakers prior to resuming operation. 4. For each circuit breaker found inoperable during these functional tests, an additional representative sample of ≥ 10% of all circuit breakers of the inoperable type shall be functionally tested until no more failures are found or all circuit breakers of the inoperable type have been functionally tested. --- Functionally test a representative sample of each 480 V circuit breaker type.	 18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.8.a.4	-------------------NOTES------------------- 1. A representative sample shall consist of ≥ 10% of the fuses selected, on a rotating basis, from each type of fuse. 2. Testing of these fuses shall consist of a nondestructive resistance measurement test which demonstrates that the fuse meets the manufacturer's design criteria. 3. Fuses found inoperable during functional tests shall be replaced with OPERABLE fuses prior to resuming operation. 4. For each fuse found inoperable during these functional tests, an additional representative sample of ≥ 10% of all fuses of the inoperable type shall be functionally tested until no more failures are found or all fuses of the inoperable type have been functionally tested. --- Functionally test a representative sample of each fuse type.	18 months
TSR 3.8.a.5	-------------------NOTE-------------------- Only applicable to 6.9 kV and 4.16 kV circuit breakers. --- Perform an inspection and preventative maintenance for each breaker in accordance with the manufacturer's recommendation.	60 months

Table T3.8.a-1 (page 1 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
1. 6.9 kV Switchgear	
1RC01PA - RCP A Bus 157 Cub 1	Primary
Bus 157 Normal Feed ACB 1571	Backup
Bus 157 Emergency Feed ACB 1572	Backup
1RC01PB - RCP B Bus 156 Cub 2	Primary
Bus 156 Normal Feed ACB 1561	Backup
Bus 156 Emergency Feed ACB 1562	Backup
1RC01PC - RCP C Bus 158 Cub 5	Primary
Bus 158 Normal Feed ACB 1582	Backup
Bus 158 Emergency Feed ACB 1581	Backup
1RC01PD - RCP D Bus 159 Cub 5	Primary
Bus 159 Normal Feed ACB 1592	Backup
Bus 159 Emergency Feed ACB 1591	Backup
2. 480 V Switchgear	
1RY03EA - Pressurizer Heater Backup Group A Compt. A1-A6. B1	Primary Backup
1RY03EB - Pressurizer Heater Backup Group B Compt. B1-B6	Primary Backup
1RY03EC - Pressurizer Heater Backup Group C Compt. A1-A6. A1	Primary Backup
1RY03ED - Pressurizer Heater Backup Group D Compt. B1-B6	Primary Backup

(continued)

Table T3.8.a-1 (page 2 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
3. 480 V A.C. Switchgear Circuit Breakers	
1VP01CA - RCFC Fan 1A	
1A Low Speed Feed Breaker Switchgear 131X Cub 4C	Primary
1A Hi Speed Feed Breaker Switchgear 131X Cub 5C	Primary
1VP01CC - RCFC Fan 1C	
1C Low Speed Feed Breaker Switchgear 131X Cub 2C	Primary
1C Hi Speed Feed Breaker Switchgear 131X Cub 3C	Primary
Bus 131X Normal Feed 141 Switchgear Cub 19 ACB 1415X	Backup
1VP01CB - RCFC Fan 1B	
1B Low Speed Feed Breaker Switchgear 132X Cub 4C	Primary
1B Hi Speed Feed Breaker Switchgear 132X Cub 5C	Primary
1VP01CD - RCFC Fan 1D	
1D Low Speed Feed Breaker Switchgear 132X Cub 2C	Primary
1D Hi Speed Feed Breaker Switchgear 132X Cub 3C	Primary
Bus 132X Normal Feed 142 Switchgear Cub 14 ACB 1425X	Backup

(continued)

Table T3.8.a-1 (page 3 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
4. 480 V Molded Case Circuit Breakers (MCCB)	MCC 133X4
1RC01PA-A Cub B1	Primary Backup
1RC01PA-B Cub B2	Primary Backup
1HC22G Cub B3	Primary Backup
1FH03G Cub B4	Primary Backup
1VP05CA Cub C1	Primary Backup
1RF03P Cub C2	Primary Backup
1RC01PD-A Cub D1	Primary Backup
1RC01PD-B Cub D2	Primary Backup
1RF02PB Cub D4	Primary Backup
1RF01P Cub D5	Primary Backup
1RE01PA Cub D6	Primary Backup
1VP02CA Cub E1	Primary Backup
1VP04CA Cub E2	Primary Backup
1VP04CC Cub F1	Primary Backup
1EW11EA,B,C Cub F3	Primary Backup
1IC02EA Cub F5	Primary Backup
1IC02EB Cub G1	Primary Backup
1IC02EC Cub G2	Primary Backup

(continued)

Table T3.8.a-1 (page 4 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
5. 480 V Molded Case Circuit Breakers (MCCB)	MCC 134X5
1IC02EF Cub A1	Primary Backup
1IC02EE Cub A2	Primary Backup
1IC02ED Cub A3	Primary Backup
1FH02J Cub G1	Primary Backup
1FH03J Cub G2	Primary Backup
1RC01PB-B Cub B1	Primary Backup
1RE01PB Cub B3	Primary Backup
1RC01PC-A Cub C1	Primary Backup
1RC01PC-B Cub C2	Primary Backup
1VP05CB Cub J1	Primary Backup
1RC01PB-A Cub C3	Primary Backup
1HC65G-A Cub D3	Primary Backup
1VP02CB Cub F1	Primary Backup
1RC01R-A Cub F2 A&B	Primary Backup
1RF02PA Cub G3	Primary Backup
1EW12EA,B,C Cub F3 A&B	Primary Backup
1VP04CB Cub F4	Primary Backup
1VP04CD Cub F5	Primary Backup

(continued)

Table T3.8.a-1 (page 5 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
6. 480 V Molded Case Circuit Breakers (MCCB)	MCC 132X2A
1SI8808C Cub A2	Primary
MCC 132X2 Cub B2	Backup
1SI8808B Cub A3	Primary
MCC 132X2 Cub B2	Backup
7. 480 V Molded Case Circuit Breakers (MCCB)	MCC 132X2
1RH8702B Cub B1	Primary Backup
1RH8701B Cub B3	Primary Backup
1CV8112 Cub B4	Primary Backup
1OG079 Cub C1	Primary Backup
1WO056A Cub C2	Primary Backup
1OG080 Cub C3	Primary Backup
1RY8000B Cub C4	Primary Backup
1RC8003C Cub D5	Primary Backup
1RC8003B Cub D4	Primary Backup
1RC8002A Cub G1	Primary Backup
1RC8002B Cub G2	Primary Backup
1RC8002C Cub G3	Primary Backup
1RC8002D Cub G4	Primary Backup

(continued)

Table T3.8.a-1 (page 6 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

	PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
8.	480 V Molded Case Circuit Breakers (MCCB)	MCC 131X2A
	1SI8808D Cub A2	Primary
	MCC 131x2 Cub B2	Backup
	1SI8808A Cub A3	Primary
	MCC 131x2 Cub B2	Backup
9.	480 V Molded Case Circuit Breakers (MCCB)	MCC 131X2
	1RC8001A Cub G1	Primary Backup
	1RC8001B Cub G2	Primary Backup
	1RC8001C Cub G3	Primary Backup
	1RC8001D Cub G4	Primary Backup
	1RH8701A Cub B1	Primary Backup
	1RH8702A Cub B4	Primary Backup
	1LL42J Cub C1	Primary Backup
	1VQ001A Cub C3	Primary Backup
	1VQ002A Cub F1	Primary Backup
	1RC8003D Cub C4	Primary Backup
	1RC8003A Cub C5	Primary Backup
	1OG057A Cub D1	Primary Backup
	1CC9416 Cub D3	Primary Backup
	1CC9438 Cub D4	Primary Backup
	1OG081 Cub E2	Primary Backup

(continued)

Table T3.8.a-1 (page 7 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 1)

10.	480 V Molded Case Circuit Breakers (MCCB)	MCC 133X6
	1HC01G - Cub B2 Cub B1	Primary Backup
	1LL04E - Cub C2 Cub C1	Primary Backup
	1VP03CA Cub A3	Primary Backup
	1VP03CD Cub C4	Primary Backup
11.	480 V Molded Case Circuit Breakers (MCCB)	MCC 134X7
	1LL05E - Cub B2 Cub B1	Primary Backup
	1VP03CB Cub A3	Primary Backup
	1VP03CC Cub B4	Primary Backup
12.	480 V Molded Case Circuit Breakers (MCCB)	MCC 131X2B
	1WO056B Cub A4	Primary Backup
	1RY8000A Cub A5	Primary Backup
13.	260 VAC RCD Power (53 rods, 5 panels)	
	Stationary Gripper Coils (all panels)	Primary Backup
	Lift Coils (all panels)	Primary Backup
	Movable Gripper Coils (all panels)	Primary Backup

Table T3.8.a-2 (page 1 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
1. 6.9 kV Switchgear	
2RC01PA - RCP A Bus 257 Cub 7	Primary
Bus 257 Normal Feed ACB 2571	Backup
Bus 257 Emergency Feed ACB 2572	Backup
2RC01PB - RCP B Bus 256 Cub 5	Primary
Bus 256 Normal Feed ACB 2561	Backup
Bus 256 Emergency Feed ACB 2562	Backup
2RC01PC - RCP C Bus 258 Cub 3	Primary
Bus 258 Normal Feed ACB 2582	Backup
Bus 258 Emergency Feed ACB 2581	Backup
2RC01PD - RCP D Bus 259 Cub 3	Primary
Bus 259 Normal Feed ACB 2592	Backup
Bus 259 Emergency Feed ACB 2591	Backup
2. 480 V Pressurizer Heater Switchgear	
2RY03EA - Pressurizer Heater Backup Group A	Primary
Compt. B1-B6. A1	Backup
2RY03EB - Pressurizer Heater Backup Group B	Primary
Compt. A1-A6. B1	Backup
2RY03EC - Pressurizer Heater Backup Group C	Primary
Compt. B1-B6	Backup
2RY03ED - Pressurizer Heater Backup Group D	Primary
Compt. A1-A6	Backup

(continued)

Table T3.8.a-2 (page 2 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
3. 480 V A.C. Switchgear Circuit Breakers	
2VP01CA - RCFC Fan 2A	
2A Low Speed Feed Breaker Switchgear 231X Cub 4C	Primary
2A Hi Speed Feed Breaker Switchgear 231X Cub 5C	Primary
2VP01CC - RCFC Fan 2C	
2C Low Speed Feed Breaker Switchgear 231X Cub 2C	Primary
2C Hi Speed Feed Breaker Switchgear 231X Cub 3C	Primary
Bus 231X Normal Feed 241 Switchgear Cub 4 ACB 2415X	Backup
2VP01CB - RCFC Fan 2B	
2B Low Speed Feed Breaker Switchgear 232X Cub 4C	Primary
2B Hi Speed Feed Breaker Switchgear 232X Cub 5C	Primary
2VP01CD - RCFC Fan 2D	
2D Low Speed Feed Breaker Switchgear 232X Cub 2C	Primary
2D Hi Speed Feed Breaker Switchgear 232X Cub 3C	Primary
Bus 232X Normal Feed 242 Switchgear Cub 8 ACB 2425X	Backup

(continued)

Table T3.8.a-2 (page 3 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
4. 480 V Molded Case Circuit Breakers (MCCB)	MCC 233X4
2RC01PA-A Cub B1	Primary Backup
2RC01PA-B Cub B2	Primary Backup
2HC22G Cub B3	Primary Backup
2FH03G Cub B4	Primary Backup
2VP05CA Cub C1	Primary Backup
2RF03P Cub C2	Primary Backup
2RC01PD-A Cub D1	Primary Backup
2RC01PD-B Cub D2	Primary Backup
2RF02PB Cub D4	Primary Backup
2RF01P Cub D5	Primary Backup
2RE01PA Cub D6	Primary Backup
2VP02CA Cub E1	Primary Backup
2VP04CA Cub E2	Primary Backup
2VP04CC Cub F1	Primary Backup
2EW11EA,B,C Cub F3	Primary Backup
2IC02EA Cub F5	Primary Backup
2IC02EB Cub G1	Primary Backup
2IC02EC Cub G2	Primary Backup

(continued)

Table T3.8.a-2 (page 4 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

	PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
5.	480 V Molded Case Circuit Breakers (MCCB)	MCC 234X5
	2IC02EF Cub A1	Primary Backup
	2IC02EE Cub A2	Primary Backup
	2IC02ED Cub A3	Primary Backup
	2FH02J Cub G1	Primary Backup
	2FH03J Cub G2	Primary Backup
	2RC01PB-B Cub B1	Primary Backup
	2RE01PB Cub B3	Primary Backup
	2RC01PC-A Cub C1	Primary Backup
	2RC01PC-B Cub C2	Primary Backup
	2VP05CB Cub J1	Primary Backup
	2RC01PB-A Cub C3	Primary Backup
	2HC65G-A Cub D3	Primary Backup
	2VP02CB Cub F1	Primary Backup
	2RC01R-A Cub F2 A&B	Primary Backup
	2RF02PA Cub G3	Primary Backup
	2EW12EA,B,C Cub F3 A&B	Primary Backup
	2VP04CB Cub F4	Primary Backup
	2VP04CD Cub F5	Primary Backup

(continued)

Table T3.8.a-2 (page 5 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

	PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
6.	480 V Molded Case Circuit Breakers (MCCB)	MCC 232X2A
	2SI8808C Cub A2	Primary
	MCC 232X2 Cub B2	Backup
	2SI8808B Cub A3	Primary
	MCC 232X2 Cub B2	Backup
7.	480 V Molded Case Circuit Breakers (MCCB)	MCC 232X2
	2RH8702B Cub B1	Primary Backup
	2RH8701B Cub B3	Primary Backup
	2CV8112 Cub B4	Primary Backup
	2OG079 Cub C1	Primary Backup
	2WO056A Cub C2	Primary Backup
	2OG080 Cub C3	Primary Backup
	2RY8000B Cub C4	Primary Backup
	2RC8003C Cub D5	Primary Backup
	2RC8003B Cub D4	Primary Backup
	2RC8002A Cub G1	Primary Backup
	2RC8002B Cub G2	Primary Backup
	2RC8002C Cub G3	Primary Backup
	2RC8002D Cub G4	Primary Backup

(continued)

Table T3.8.a-2 (page 6 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

	PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
8.	480 V Molded Case Circuit Breakers (MCCB)	MCC 231X2A
	2SI8808D Cub A2	Primary
	MCC 231X2 Cub B2	Backup
	2SI8808A Cub A3	Primary
	MCC 231X2 Cub B2	Backup
9.	480 V Molded Case Circuit Breakers (MCCB)	MCC 231X2
	2RC8001A Cub G1	Primary Backup
	2RC8001B Cub G2	Primary Backup
	2RC8001C Cub G3	Primary Backup
	2RC8001D Cub G4	Primary Backup
	2RH8701A Cub B1	Primary Backup
	2RH8702A Cub B4	Primary Backup
	2LL42J Cub C1	Primary Backup
	2VQ001A Cub C3	Primary Backup
	2VQ002A Cub F1	Primary Backup
	2RC8003D Cub C4	Primary Backup
	2RC8003A Cub C5	Primary Backup
	2OG057A Cub D1	Primary Backup
	2CC9416 Cub D3	Primary Backup
	2CC9438 Cub D4	Primary Backup
	2OG081 Cub E2	Primary Backup

PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
	(continued)

Table T3.8.a-2 (page 7 of 7)
Containment Penetration Conductor Overcurrent Protective Devices (Unit 2)

	PROTECTIVE DEVICE NUMBER AND LOCATION	DEVICE
10.	480 V Molded Case Circuit Breakers (MCCB)	MCC 233X6
	2HC01G - Cub B2	Primary
	Cub B1	Backup
	2LL04E - Cub C2	Primary
	Cub C1	Backup
	2VP03CA	Primary
	Cub A3	Backup
	2VP03CD	Primary
	Cub C4	Backup
11.	480 V Molded Case Circuit Breakers (MCCB)	MCC 234X7
	2LL05E - Cub B2	Primary
	Cub B1	Backup
	2VP03CB	Primary
	Cub A3	Backup
	2VP03CC	Primary
	Cub B4	Backup
12.	480 V Molded Case Circuit Breakers (MCCB)	MCC 231X2B
	2WO056B	Primary
	Cub A4	Backup
	2RY8000A	Primary
	Cub A5	Backup
13.	260 VAC RCD Power (53 rods, 5 panels)	
	Stationary Gripper Coils (all panels)	Primary Backup
	Lift Coils (all panels)	Primary Backup
	Movable Gripper Coils (all panels)	Primary Backup

3.8 ELECTRICAL POWER SYSTEMS

3.8.b Motor Operated Valves Thermal Overload Protection Devices

TLCO 3.8.b The thermal overload protection devices integral with the motor starter of each valve listed in Table T3.8.b-1 for Unit 1 (Table T3.8.b-2 for Unit 2) shall be OPERABLE.

APPLICABILITY: Whenever the motor operated valve is required to be OPERABLE.

ACTIONS

------------------------------------NOTE------------------------------------
Separate Condition entry is allowed for each thermal overload protection device.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more thermal overload protection devices inoperable.	A.1 Declare the affected valve inoperable.	Immediately
	<u>AND</u>	
	A.2 Enter the applicable Conditions and Required Actions for the affected valve.	Immediately

SURVEILLANCE REQUIREMENTS

------------------------------------NOTE------------------------------------
TSR 3.8.b.1 applies to each thermal overload protection device in Table T3.8.b-1 (Table T3.8.b-2).

SURVEILLANCE		FREQUENCY
TSR 3.8.b.1	------------------NOTE------------------ Each thermal overload is calibrated and each valve is cycled through at least one complete cycle of full travel with the motor operator when the thermal overload is OPERABLE. -- Perform CHANNEL CALIBRATION of each thermal overload device listed in Tables T3.8.b-1 and T3.8.b-2.	6 years

Table T3.8.b-1 (page 1 of 3)
Thermal Overload Protection Devices - Unit 1

VALVE NUMBER	FUNCTION
0OG059	Unit 1 Suction Isolation Valve H_2 Recombiner
0OG060	Unit 1 Discharge Isolation Valve H_2 Recombiner
0OG061	Unit Discharge Xtie for H_2 Recombiner
0OG062	Unit Xtie on Discharge of H_2 Recombiner
0OG063	Unit Suction Xtie for H_2 Recombiner
0OG064	Unit Suction Xtie for H_2 Recombiner
0OG065	OB H_2 Analyzer Inlet Isolation Valve
0OG066	OB H_2 Recombiner Discharge Isolation Valve
1OG057A	OA H_2 Recombiner Discharge Isolation Valve
1OG079	H_2 Recombiner Discharge Containment Isolation Valve
1OG080	H_2 Recombiner Suction Containment Isolation Valve
1OG081	H_2 Recombiner Suction Containment Isolation Valve
1OG082	OA H_2 Recombiner Discharge Containment Isolation Valve
1OG083	OA H_2 Recombiner Discharge Containment Isolation Valve
1OG084	OA H_2 Recombiner Containment Outlet Isolation Valve
1OG085	H_2 Recombiner Containment Outlet Isolation Valve
1AF006A	1A AF Pump SX Suction Isolation Valve
1AF006B	1B AF Pump SX Suction Downstream Isolation Valve
1AF013A	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
1AF013B	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
1AF013C	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
1AF013D	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
1AF013E	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
1AF013F	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
1AF013G	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
1AF013H	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
1AF017A	1A AF Pump SX Suction Upstream Isolation Valve
1AF017B	1B AF Pump SX Suction Upstream Isolation Valve
1CC201A	MOV 1A SX to CC Makeup Isolation Valve
1CC201B	MOV 1B SX to CC Makeup Isolation Valve
1CC202A	MOV 1A SX to CC Makeup Isolation Valve
1CC202B	MOV 1B SX to CC Makeup Isolation Valve
1CC685	RCP Thermal Barrier Outlet Header Containment Isolation Valve
1CC9412A	CC to RHR HX 1A Isolation Valve
1CC9412B	CC to RHR HX 1B Isolation Valve
1CC9413A	RCPs CC Supply Downstream Containment Isolation Valve
1CC9413B	RCPs CC Supply Upstream Containment Isolation Valve
1CC9414	CC Water from RCPs Isolation Valve
1CC9415	Unit 1 Service Loop Isolation Valve
1CC9416	CC Water from RCPs Isolation Valve
1CC9438	CC Water from RCPs Thermal Barrier Isolation Valve
1CC9473A	Discharge Header X-tie Isolation Valve
1CC9473B	Discharge Header X-tie Isolation Valve
1CS001A	1A CS Pump Suction from RWST
1CS001B	1B CS Pump Suction from RWST
1CS007A	CS Pump 1A Discharge Line Downstream Isolation Valve
1CS007B	CS Pump 1B Discharge Line Downstream Isolation Valve
1CS009A	1A Pump Suction from 1A Recirculation Sump
1CS009B	1B CS Containment Recirculation Sump B Suction Isolation Valve to CS
1CS019A	CS Eductor 1A Suction Conn Isolation Valve
1CS019B	CS Eductor 1B Suction Conn Isolation Valve

(continued)

Table T3.8.b-1 (page 2 of 3)
Thermal Overload Protection Devices - Unit 1

VALVE NUMBER	FUNCTION
1CV112B	MOV VCT Outlet Upstream Isolation VCT Valve
1CV112C	MOV VCT Outlet Downstream Isolation VCT Valve
1CV112D	MOV RWST to Charging Pump Suction Header
1CV112E	MOV RWST to Charging Pump Suction Header
1CV8100	MOV RCP Seal Leakoff Header Isolation
1CV8104	MOV Emergency Boration Valve
1CV8105	MOV Charging Pumps Discharge Header Isolation Valve
1CV8106	MOV Charging Pumps Discharge Header Isolation Valve
1CV8110	MOV A & B Charging Pump Recirculation Downstream Isolation
1CV8111	MOV A & B Charging Pump Recirculation Upstream Isolation
1CV8112	RCP Seal Water Return Isolation Valve
1CV8355A	MOV RCP 1A Seal Injection Inlet to Containment Isolation
1CV8355B	MOV RCP 1B Seal Injection Inlet Isolation
1CV8355C	MOV RCP 1C Seal Injection Isolation
1CV8355D	MOV RCP 1D Seal Injection Isolation
1CV8804A	MOV RHR System X-Tie Valve to Charging Pump Suction Header A/B
1RH610	RH PP 1RH01PA Recirculation Line Isolation
1RH611	RH PP 1RH01PB Recirculation Line Isolation
1RH8701A	RC Loop 1A to RHR Pump Isolation Valve
1RH8702A	RC Loop 1C to RHR Pump Isolation Valve
1RH8701B	RC Loop 1A to RHR Pump Isolation Valve
1RH8702B	RC Loop 1C to RHR Pump Isolation Valve
1RH8716A	RHR HX 1RH02AA Downstream Isolation Valve
1RH8716B	RHR HX 1RH02AB Downstream Isolation Valve
1RY8000A	Pressurizer Relief Isolation Valve 1A
1RY8000B	Pressurizer Relief Isolation Valve 1B
1SI8801A	SI Charging Pump Discharge Isolation Valve
1SI8801B	SI Charging Pump Discharge Isolation Valve
1SI8802A	SI PP 1A Discharge Line Downstream Containment Isolation Valve
1SI8802B	SI PP 1B Discharge Line Downstream Isolation Valve
1SI8804B	SI Pump 1B Suction X-tie from RHR HX
1SI8806	SI Pumps Upstream Suction Isolation
1SI8807A	SI to Charging Pump Suction Crosstie Isolation Valve
1SI8807B	SI to Charging Pump Suction Crosstie Isolation Valve
1SI8808A	Accumulator 1A Discharge Isolation Valve
1SI8808B	Accumulator 1B Discharge Isolation Valve
1SI8808C	Accumulator 1C Discharge Isolation Valve
1SI8808D	Accumulator 1D Discharge Isolation Valve
1SI8809A	SI RHR HX 1A Discharge Line Downstream Isolation Valve
1SI8809B	SI RHR HX 1B Discharge Line Downstream Isolation Valve
1SI8811A	SI Containment Sump A Outlet Isolation Valve
1SI8811B	SI Containment Sump B Outlet Isolation Valve
1SI8812A	SI RWST to RH Pump 1A Outlet Isolation Valve
1SI8812B	SI RWST to RH Pump 1B Outlet Isolation Valve
1SI8813	SI Pumps 1A-1B Recirculation Line Downstream Isolation
1SI8814	SI Pump 1A Recirculation Line Isolation Valve
1SI8835	SI Pumps X-tie Discharge Isolation Valve
1SI8840	SI RHR HX Discharge Line Upstream Containment Penetration Isolation Valve
1SI8821A	SI Pump 1A Discharge Line X-tie Isolation Valve
1SI8821B	SI Pump 1B Discharge Line X-tie Isolation Valve
1SI8920	SI Pump 1B Recirculation Line Isolation Valve
1SI8923A	SI Pump 1A Suction Isolation Valve
1SI8923B	SI Pump 1B Suction Isolation Valve
1SI8924	SI Pump 1A Suction X-tie Downstream Isolation Valve

(continued)

Table T3.8.b-1 (page 3 of 3)
Thermal Overload Protection Devices - Unit 1

VALVE NUMBER	FUNCTION
1SX016B	RCFC B&D SX Supply MOV
1SX016A	RCFC A&C SX Supply MOV
1SX027A	RCFC A&C SX Return MOV
1SX027B	RCFC B&D SX Return MOV
0SX007	CC HX Outlet Valve
0SX146	CC HX "0" Return Valve to Unit 1 MDCT
0SX157A	SX M/U Pump 0A Supply Fill to MDCT
0SX157B	SX M/U Pump 0B Supply to MDCT 0B MOV
0SX158A	SX M/U Pump 0A Supply Fill to MDCT MOV
0SX158B	SX M/U Pump 0B Supply to MDCT 0B MOV
0SX162A	MDCT 0A Bypass to Basin MOV
0SX162B	MDCT 0B Bypass to Basin MOV
0SX163A	MDCT 0A Riser Isolation Valve MOV
0SX163B	MDCT 0A Riser Isolation Valve MOV
0SX163E	MDCT 0B Riser Isolation Valve MOV
0SX163F	MDCT 0B Riser Isolation Valve MOV
1SX001A	1A SX Pump Suction Valve MOV
1SX001B	1B SX Pump Suction Valve MOV
1SX004	Unit 1 SX Supply to Unit 1 CCW HX MOV
1SX005	1B SX Pump Supply to CCW HX MOV
1SX007	CC HX Outlet Valve
1SX010	Unit 1 Train A Return Valve AB
1SX011	Train A Train B Unit 1 Return X-tie Valve AB
1SX033	1A SX Pump Discharge X-tie MOV
1SX034	1B SX Pump Discharge X-tie MOV
1SX136	Unit 1 Train B Return Valve AB
1WO006A	Chilled Water Coils 1A & 1C Supply Isolation Valve
1WO006B	Chilled Water Coils 1B & 1D Supply Isolation Valve
1WO020A	Chilled Water Coils 1A & 1C Return Isolation Valve
1WO020B	Chilled Water Coils 1B & 1D Return Isolation Valve
1WO056A	Chilled Water Containment Isolation Valve
1WO056B	Chilled Water Containment Isolation Valve

Table T3.8.b-2 (page 1 of 3)
Thermal Overload Protection Devices - Unit 2

VALVE NUMBER	FUNCTION
0OG059	Unit 1 Suction Isolation Valve H_2 Recombiner
0OG060	Unit 1 Discharge Isolation Valve H_2 Recombiner
0OG061	Unit Discharge Xtie for H_2 Recombiner
0OG062	Unit Xtie on Discharge of H_2 Recombiner
0OG063	Unit Suction Xtie for H_2 Recombiner
0OG064	Unit Suction Xtie for H_2 Recombiner
0OG065	OB H_2 Analyzer Inlet Isolation Valve
0OG066	OB H_2 Recombiner Discharge Isolation Valve
2OG057A	OB H_2 Recombiner Discharge Isolation Valve
2OG079	H_2 Recombiner Discharge Containment Isolation Valve
2OG080	H_2 Recombiner Suction Containment Isolation Valve
2OG081	H_2 Recombiner Suction Containment Isolation Valve
2OG082	OB H_2 Recombiner Discharge Containment Isolation Valve
2OG083	OB H_2 Recombiner Discharge Containment Isolation Valve
2OG084	OB H_2 Recombiner Containment Outlet Isolation Valve
2OG085	H_2 Recombiner Containment Outlet Isolation Valve
2AF006A	2A AF Pump SX Suction Isolation Valve
2AF006B	2B AF Pump SX Suction Downstream Isolation Valve
2AF013A	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
2AF013B	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
2AF013C	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
2AF013D	AF Motor Driven Pump Discharge Header Downstream Isolation Valve
2AF013E	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
2AF013F	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
2AF013G	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
2AF013H	AF Diesel Driven Pump Discharge Header Downstream Isolation Valve
2AF017A	2A AF Pump SX Suction Upstream Isolation Valve
2AF017B	2B AF Pump SX Suction Upstream Isolation Valve
2CC201A	MOV 2A SX to CC Makeup Isolation Valve
2CC201B	MOV 2B SX to CC Makeup Isolation Valve
2CC202A	MOV 2A SX to CC Makeup Isolation Valve
2CC202B	MOV 2B SX to CC Makeup Isolation Valve
2CC685	RCP Thermal Barrier Outlet Header Containment Isolation Valve
2CC9412A	CC to RHR HX 2A Isolation Valve
2CC9412B	CC to RHR HX 2B Isolation Valve
2CC9413A	RCP CC Supply Downstream Containment Isolation
2CC9413B	RCPs CC Supply Upstream Containment Isolation
2CC9414	CC Water from RCPs Isolation Valve
2CC9415	Unit 2 Service Loop Isolation Valve
2CC9416	CC Water from RCPs Isolation Valve
2CC9438	CC Water from RCPs Thermal Barrier Isolation Valve
2CC9473A	Discharge Header X-tie Isolation Valve
2CC9473B	Discharge Header X-tie Isolation Valve
2CS001A	2A CS Pump Suction from RWST
2CS001B	2B CS Pump Suction from RWST
2CS007A	CS Pump 2A Discharge Line Downstream Isolation Valve
2CS007B	CS Pump 2B Discharge Line Downstream Isolation Valve
2CS009A	2A Pump Suction from 1A Recirculation Sump
2CS009B	2B CS Containment Recirculation Sump B Suction Isolation Valve to CS
2CS019A	CS Eductor 2A Suction Conn Isolation Valve
2CS019B	CS Eductor 2B Suction Conn Isolation Valve

(continued)

Table T3.8.b-2 (page 2 of 3)
Thermal Overload Protection Devices - Unit 2

VALVE NUMBER	FUNCTION
2CV112B	MOV VCT Outlet Upstream Isolation VCT Valve
2CV112C	MOV VCT Outlet Downstream Isolation VCT Valve
2CV112D	MOV RWST to Charging Pump Suction Header
2CV112E	MOV RWST to Charging Pump Suction Header
2CV8100	MOV RCP Seal Leakoff Header Isolation
2CV8104	MOV Emergency Boration Valve
2CV8105	MOV Charging Pumps Discharge Header Isolation Valve
2CV8106	MOV Charging Pumps Discharge Header Isolation Valve
2CV8110	MOV A & B Charging Pump Recirculation Downstream Isolation
2CV8111	MOV A & B Charging Pump Recirculation Upstream Isolation
2CV8112	RC Pump Seal Water Return Isolation Valve
2CV8355A	MOV RCP 2A Seal Injection Inlet to Containment Isolation
2CV8355B	MOV RCP 2B Seal Injection Inlet Isolation
2CV8355C	MOV RCP 2C Seal Injection Isolation
2CV8355D	MOV RCP 2D Seal Injection Isolation
2CV8804A	MOV RHR System X-Tie Valve to Charging Pump Suction Header A/B
2RH610	RH Pump 2RH01PA Recirculation Line Isolation
2RH611	RH Pump 2RH01PB Recirculation Line Isolation
2RH8701A	RC Loop 2A to RHR Pump Isolation Valve
2RH8702A	RC Loop 2C to RHR Pump Isolation Valve
2RH8701B	RC Loop 2A to RHR Pump Isolation Valve
2RH8702B	RC Loop 2C to RHR Pump Isolation Valve
2RH8716A	RH HX 2RH02AA Downstream Isolation Valve
2RH8716B	RH HX 2RH02AB Downstream Isolation Valve
2RY8000A	Pressurizer Relief Isolation Valve 2A
2RY8000B	Pressurizer Relief Isolation Valve 2B
2SI8801A	SI Charging Pump Discharge Isolation Valve
2SI8801B	SI Charging Pump Discharge Isolation Valve
2SI8802A	SI Pump 2A Discharge Line Downstream Containment Isolation Valve
2SI8802B	SI Pump 2B Discharge Line Downstream Isolation Valve
2SI8804B	SI Pump 2B Suction X-tie from RHR HX
2SI8806	SI Pumps Upstream Suction Isolation
2SI8807A	SI to Charging Pump Suction X-tie Isolation Valve
2SI8807B	SI to Charging Pump Suction X-tie Isolation Valve
2SI8808A	Accumulator 2A Discharge Isolation Valve
2SI8808B	Accumulator 2B Discharge Isolation Valve
2SI8808C	Accumulator 2C Discharge Isolation Valve
2SI8808D	Accumulator 2D Discharge Isolation Valve
2SI8809A	SI RHR HX 2A Discharge Line Downstream Isolation Valve
2SI8809B	SI RHR HX 2B Discharge Line Downstream Isolation Valve
2SI8811A	SI Containment Sump A Outlet Isolation Valve
2SI8811B	SI Containment Sump B Outlet Isolation Valve
2SI8812A	SI RWST to RHR Pump 2A Outlet Isolation Valve
2SI8812B	SI RWST to RHR Pump 2B Outlet Isolation Valve
2SI8813	SI Pumps 2A-2B Recirculation Line Downstream Isolation
2SI8814	SI Pump 2A Recirculation Line Isolation Valve
2SI8835	SI Pumps X-tie Discharge Isolation Valve
2SI8840	SI RHR HX Discharge Line Upstream Containment Penetration Isolation Valve
2SI8821A	SI Pump 2A Discharge Line X-tie Isolation Valve
2SI8821B	SI Pump 2B Discharge Line X-tie Isolation Valve
2SI8920	SI Pump 2B Recirculation Line Isolation Valve
2SI8923A	SI Pump 2A Suction Isolation Valve
2SI8923B	SI Pump 2B Suction Isolation Valve
2SI8924	SI Pump 2A Suction X-tie Downstream Isolation Valve

(continued)

Table T3.8.b-2 (page 3 of 3)
Thermal Overload Protection Devices - Unit 2

VALVE NUMBER	FUNCTION
2SX016B	RCFC B&D SX Supply MOV
2SX016A	RCFC A&C SX Supply MOV
2SX027A	RCFC A&C SX Return MOV
2SX027B	RCFC B&D SX Return MOV
0SX007	CC HX Outlet Valve
0SX147	CC HX "2A" Return Valve to Unit 2 MDCT
0SX157A	SX M/U Pump 0A Supply Fill to MDCT
0SX157B	SX M/U Pump 0B Supply to MDCT 0B MOV
0SX158A	SX M/U Pump 0A Supply Fill to MDCT 0B MOV
0SX158B	SX M/U Pump 0B Supply to MDCT 0B MOV
0SX162C	MDCT 0A Bypass to Basin MOV
0SX162D	MDCT 0B Bypass to Basin MOV
0SX163C	MDCT 0A Riser Isolation Valve MOV
0SX163D	MDCT 0A Riser Isolation Valve MOV
0SX163G	MDCT 0B Riser Isolation Valve MOV
0SX163H	MDCT 0B Riser Isolation Valve MOV
2SX001A	2A SX Pump Suction Valve MOV
2SX001B	2B SX Pump Suction Valve MOV
2SX004	Unit 2 SX Supply to Unit 2 CCW HX MOV
2SX005	2B SX Pump Supply to 0 CCW HX MOV
2SX007	CC HX Outlet Valve
2SX010	Unit 2 Train A Return Valve AB
2SX011	Train A Train B Unit 2 Return X-tie Valve AB
2SX033	2A SX Pump Discharge X-tie MOV
2SX034	2B SX Pump Discharge X-tie MOV
2SX136	Unit 2 Train B Return Valve AB
2WO006A	Chilled Water Coils 2A & 2C Supply Isolation Valve
2WO006B	Chilled Water Coils 2B & 2D Supply Isolation Valve
2WO020A	Chilled Water Coils 2A & 2C Return Isolation Valve
2WO020B	Chilled Water Coils 2B & 2D Return Isolation Valve
2WO056A	Chilled Water Containment Isolation Valve
2WO056B	Chilled Water Containment Isolation Valve

3.8 ELECTRICAL POWER SYSTEMS

3.8.c Battery Monitoring and Maintenance

TLCO 3.8.c Battery cell parameters for Division 11(21) and Division 12(22) batteries shall be within limits of Table T3.8.c-1.

APPLICABILITY: When associated DC electrical power subsystems are required to be OPERABLE.

ACTIONS

-------------------------------------NOTE-------------------------------------
Separate Condition entry is allowed for each battery.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One battery with one or more battery cell parameters not within Category A or B limits.	A.1	Verify pilot cell electrolyte level and float voltage meet Table T3.8.c-1 Category C limits.	1 hour
	<u>AND</u>		
	A.2	Verify battery cell parameters meet Table T3.8.c-1 Category C limits.	24 hours <u>AND</u> Once per 7 days thereafter
	<u>AND</u>		
	A.3	Restore battery cell parameters to Category A and B limits of Table T3.8.c-1.	31 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ---------NOTE--------- Required Actions B.1 and B.2 must be completed after LCO 3.8.6, "Battery Parameters," Required Action C.3 is completed. ---------------------- One battery with one or more cells with electrolyte level less than the minimum established design limit.	B.1 Conduct an equalizing charge of the affected battery cell(s). AND B.2 Verify successful completion of appropriate testing for the affected cell(s).	31 days 31 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.8.c.1	Verify battery cell parameters meet Table T3.8.c-1 Category A limits.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.8.c.2	Verify battery cell parameters meet Table T3.8.c-1 Category B limits.	92 days AND Once within 7 days after a battery discharge < 110 V AND Once within 7 days after a battery overcharge > 145 V
TSR 3.8.c.3	Verify no visible corrosion at battery terminals and connectors. OR Verify battery connection resistance is ≤ 150 micro- ohms for inter-cell connections, ≤ 150 micro- ohms for inter-rack connections, ≤ 150 micro- ohms for inter-tier connections, and ≤ 150 micro- ohms for terminal connections. AND Verify total battery connection resistance is ≤ 3245 micro-ohms.	92 days
TSR 3.8.c.4	Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration that could degrade battery performance.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.8.c.5	Remove visible terminal corrosion, verify battery cell to cell and terminal connections are clean and tight, and are coated with anti-corrosion material.	18 months
TSR 3.8.c.6	Verify battery connection resistance is ≤ 150 micro- ohms for inter-cell connections, ≤ 150 micro- ohms for inter-rack connections, ≤ 150 micro- ohms for inter-tier connections, and ≤ 150 micro- ohms for terminal connections. <u>AND</u> Verify total battery connection resistance is ≤ 3245 micro-ohms.	18 months

Table T3.8.c-1 (page 1 of 1)
Battery Cell Parameters Requirements

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: ALLOWABLE LIMITS FOR EACH CONNECTED CELL
Electrolyte Level	≥ Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	≥ Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 V	≥ 2.13 V[b]	> 2.07 V
Specific Gravity[c][d]	≥ 1.200	≥ 1.195 <u>AND</u> Average of all connected cells > 1.205	Not more than 0.020 below average of all connected cells <u>AND</u> Average of all connected cells ≥ 1.195

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum during equalizing charges provided it is not overflowing.
(b) Corrected for average electrolyte temperature.
(c) Corrected for electrolyte temperature.
(d) A battery charging current of < 3 amps when on float charge is acceptable for meeting specific gravity limits following a battery recharge, for a maximum of 7 days. When charging current is used to satisfy specific gravity requirements, specific gravity of each connected cell shall be measured prior to expiration of the 7 day allowance.

3.9 REFUELING OPERATIONS

3.9.a Decay Time

TLCO 3.9.a The reactor shall be subcritical for ≥ the last 113 hours; OR the reactor shall be subcritical for ≥ the last 50.33 hours AND the point described by the number of assemblies offloaded and the time after shutdown shall be within the Acceptable Regions of the appropriate figure (Figure 3.9.a-1 through 3.9.a-9, as applicable), based on cycle-specific SFP Background Heat Load Margin.

APPLICABILITY: During movement of irradiated fuel in the reactor vessel.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Reactor subcritical for < 50.33 hours; OR Reactor subcritical <113 hours AND the point described by the number of assemblies offloaded and the time after shutdown not within the Acceptable Regions of the appropriate figure (Figure 3.9.a-1 through 3.9.a-9).	A.1 Suspend movement of irradiated fuel in the reactor vessel.	Immediately

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
TSR 3.9.a.1	-------------------------------------- NOTE Surveillance no longer required to be performed once Acceptable Region II is entered. -------------------------------------- Verify the reactor subcritical ≥ 113 hours by confirming the date and time of subcriticality; OR Verify the reactor subcritical ≥ 50.33 hours by confirming the date and time of subcriticality AND verify the point described by the number of assemblies offloaded and the time after shutdown is within the Acceptable Regions of the appropriate figure (Figure 3.9.a-1 through 3.9.a-9, as applicable), based on cycle-specific SFP Background Heat Load Margin determined by TSR 3.9.a.2.	Prior to initial movement of irradiated fuel in the reactor vessel each outage. If cycle-specific SFP Background Heat Load Margin is used, verify subcriticality prior to initial movement of irradiated fuel in the reactor vessel AND verify the point described by the number of assemblies offloaded and the time after shutdown is within the Acceptable Regions of the appropriate figure (Figure 3.9.a-1 through 3.9.a-9, as applicable), based on cycle-specific SFP Background Heat Load Margin prior to transporting each fuel assembly through the transfer tube out of containment.
TSR 3.9.a.2	-------------------------------------- NOTE Surveillance only required to be performed if cycle-specific SFP Background Heat Load figures are used in TSR 3.9.a.1 -------------------------------------- Determine the Spent Fuel Pool Background Heat Load Margin for the specific cycle for use in TSR 3.9.a.1. Round the margin down to the next MBTU/hr value to determine the applicable SFP Background Heat Load Margin Figure (Figure 3.9.a-1 through 3.9.a-9).	Prior to movement of irradiated fuel in the reactor vessel each outage.

Figure 3.9.a-1

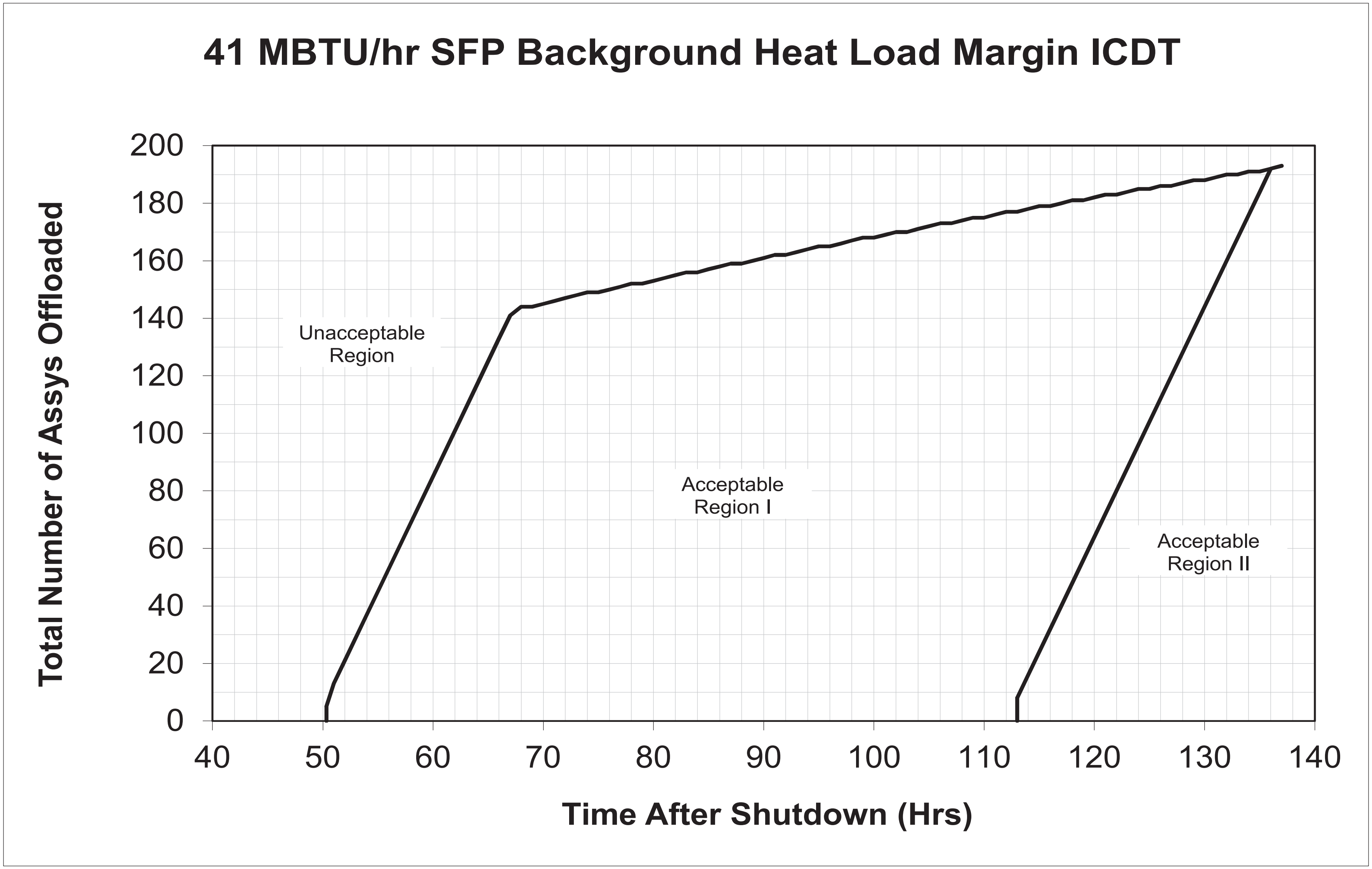

41 MBTU/hr SFP Background Heat Load Margin ICDT
Total Number of Assys Offloaded
200
180
160
140
120
100
80
60
40
20
0
40
50
60
70
80
90
100
110
120
130
140
Time After Shutdown (Hrs)
Unacceptable Region
Acceptable Region I
Acceptable Region II

Figure 3.9.a-2

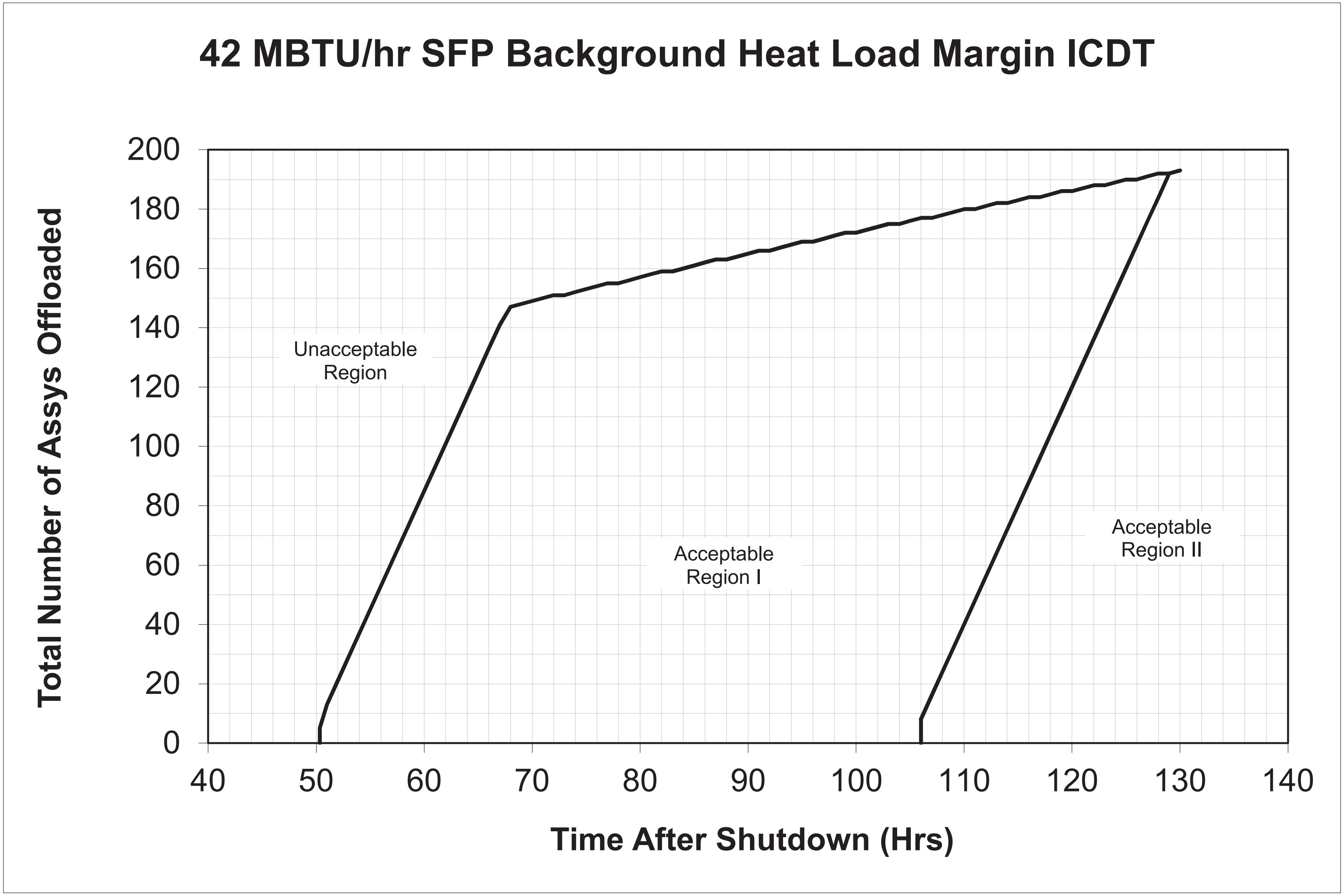

42 MBTU/hr SFP Background Heat Load Margin ICDT
Total Number of Assys Offloaded
200
180
160
140
120
100
80
60
40
20
0
40
50
60
70
80
90
100
110
120
130
140
Time After Shutdown (Hrs)
Unacceptable Region
Acceptable Region I
Acceptable Region II

Figure 3.9.a-3

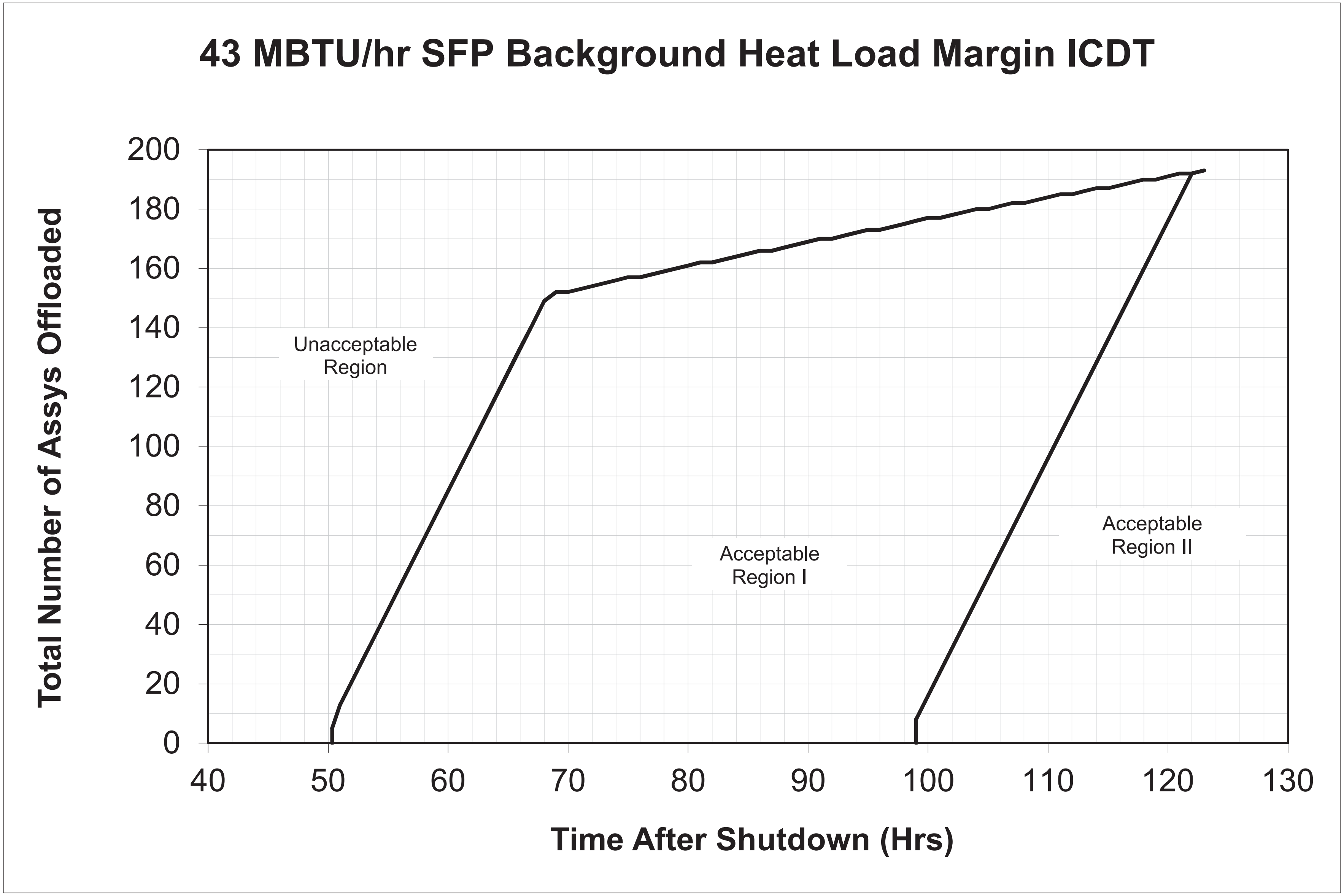

43 MBTU/hr SFP Background Heat Load Margin ICDT
Total Number of Assys Offloaded
200
180
160
140
120
100
80
60
40
20
0
40
50
60
70
80
90
100
110
120
130
Time After Shutdown (Hrs)
Unacceptable Region
Acceptable Region I
Acceptable Region II

Figure 3.9.a-4

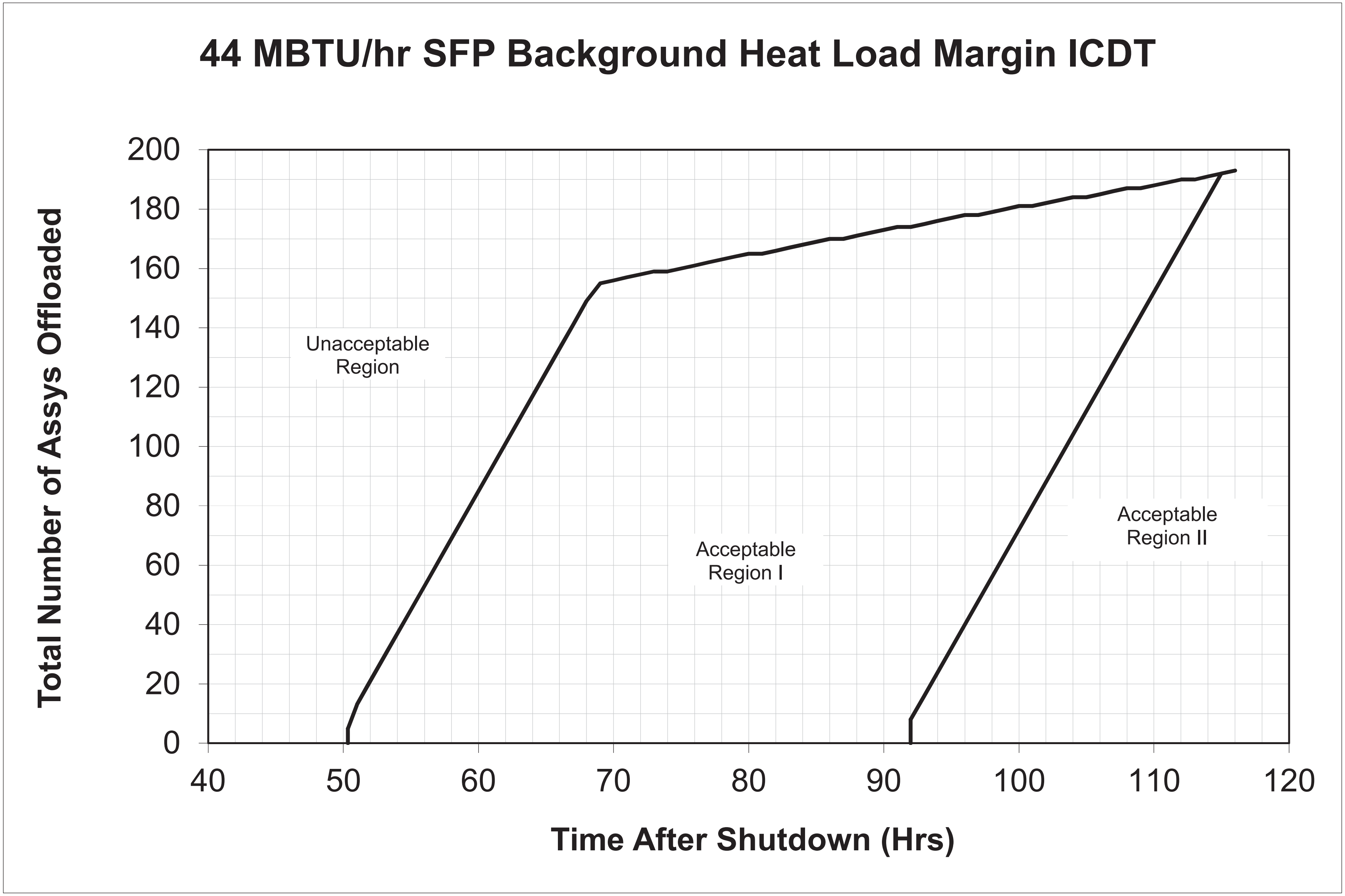

44 MBTU/hr SFP Background Heat Load Margin ICDT
Total Number of Assys Offloaded
200
180
160
140
120
100
80
60
40
20
0
40
50
60
70
80
90
100
110
120
Time After Shutdown (Hrs)
Unacceptable Region
Acceptable Region I
Acceptable Region II

Figure 3.9.a-5

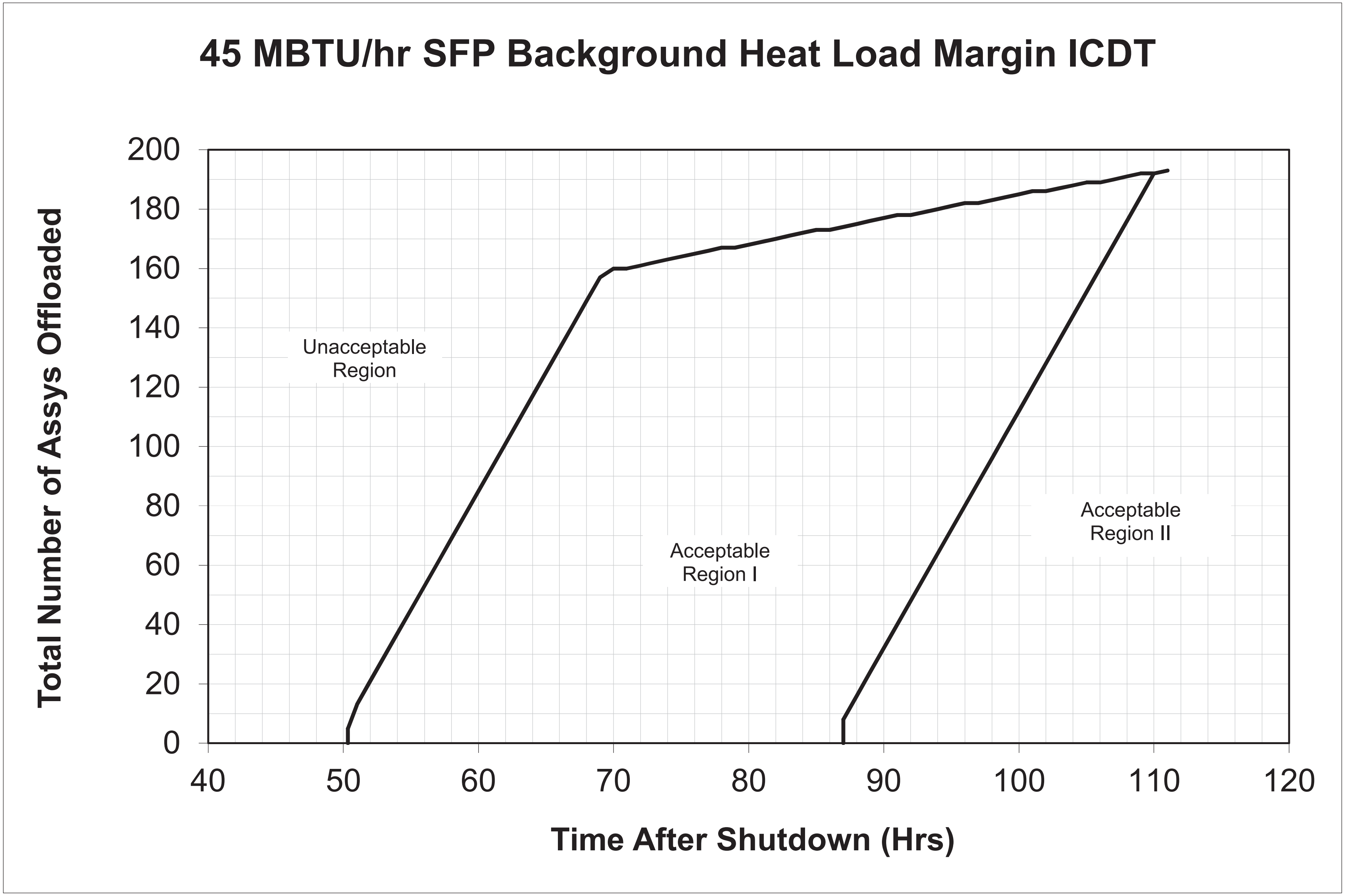

45 MBTU/hr SFP Background Heat Load Margin ICDT
Total Number of Assys Offloaded
200
180
160
140
120
100
80
60
40
20
0
40
50
60
70
80
90
100
110
120
Time After Shutdown (Hrs)
Unacceptable Region
Acceptable Region I
Acceptable Region II

Figure 3.9.a-6

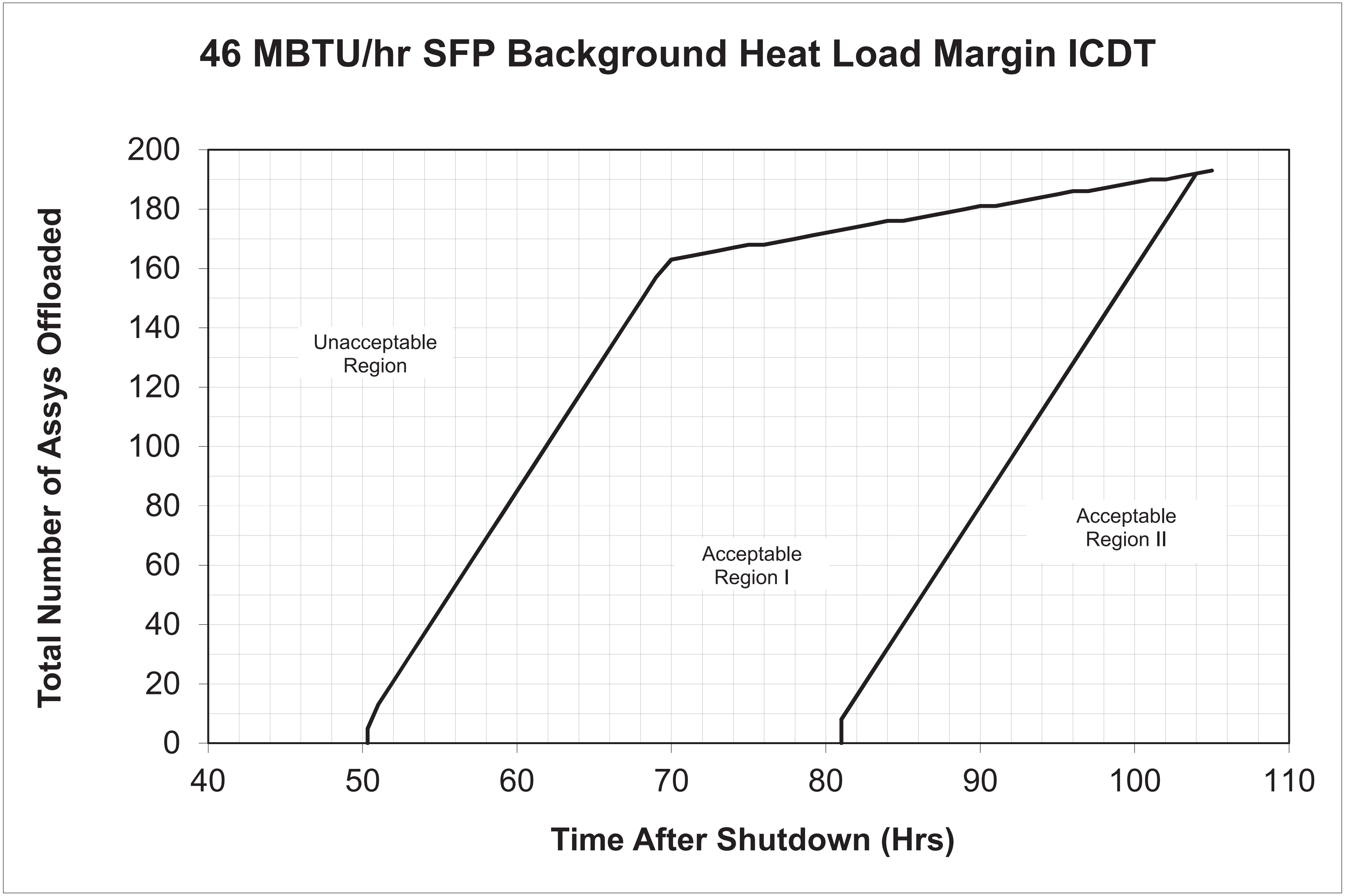

46 MBTU/hr SFP Background Heat Load Margin ICDT
Total Number of Assys Offloaded
Time After Shutdown (Hrs)
200
180
160
140
120
100
80
60
40
20
0
40
50
60
70
80
90
100
110
Unacceptable Region
Acceptable Region I
Acceptable Region II

Figure 3.9.a-7

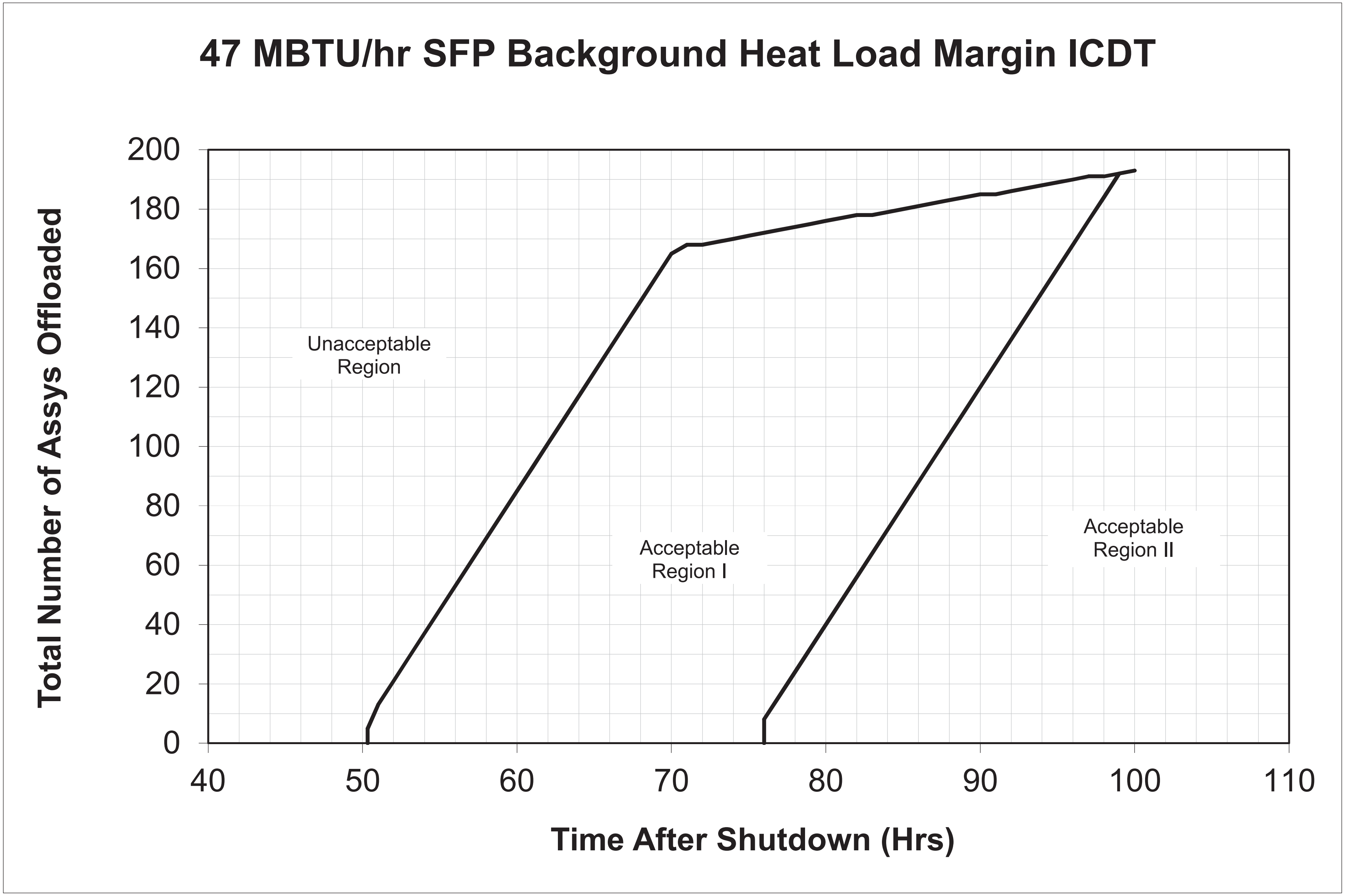

47 MBTU/hr SFP Background Heat Load Margin ICDT
Total Number of Assys Offloaded
Time After Shutdown (Hrs)
0
20
40
60
80
100
120
140
160
180
200
40
50
60
70
80
90
100
110
Unacceptable Region
Acceptable Region I
Acceptable Region II

Figure 3.9.a-8

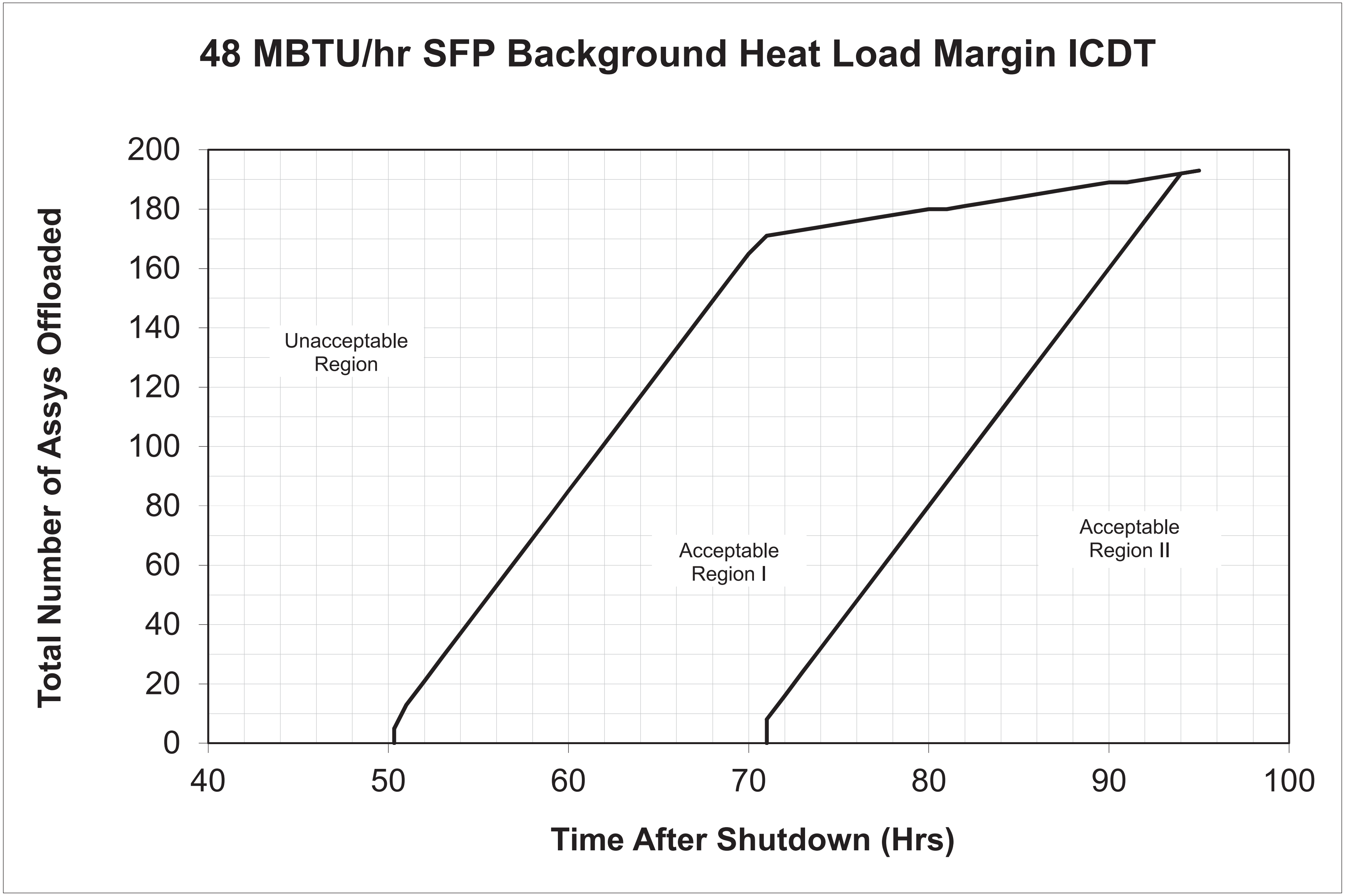
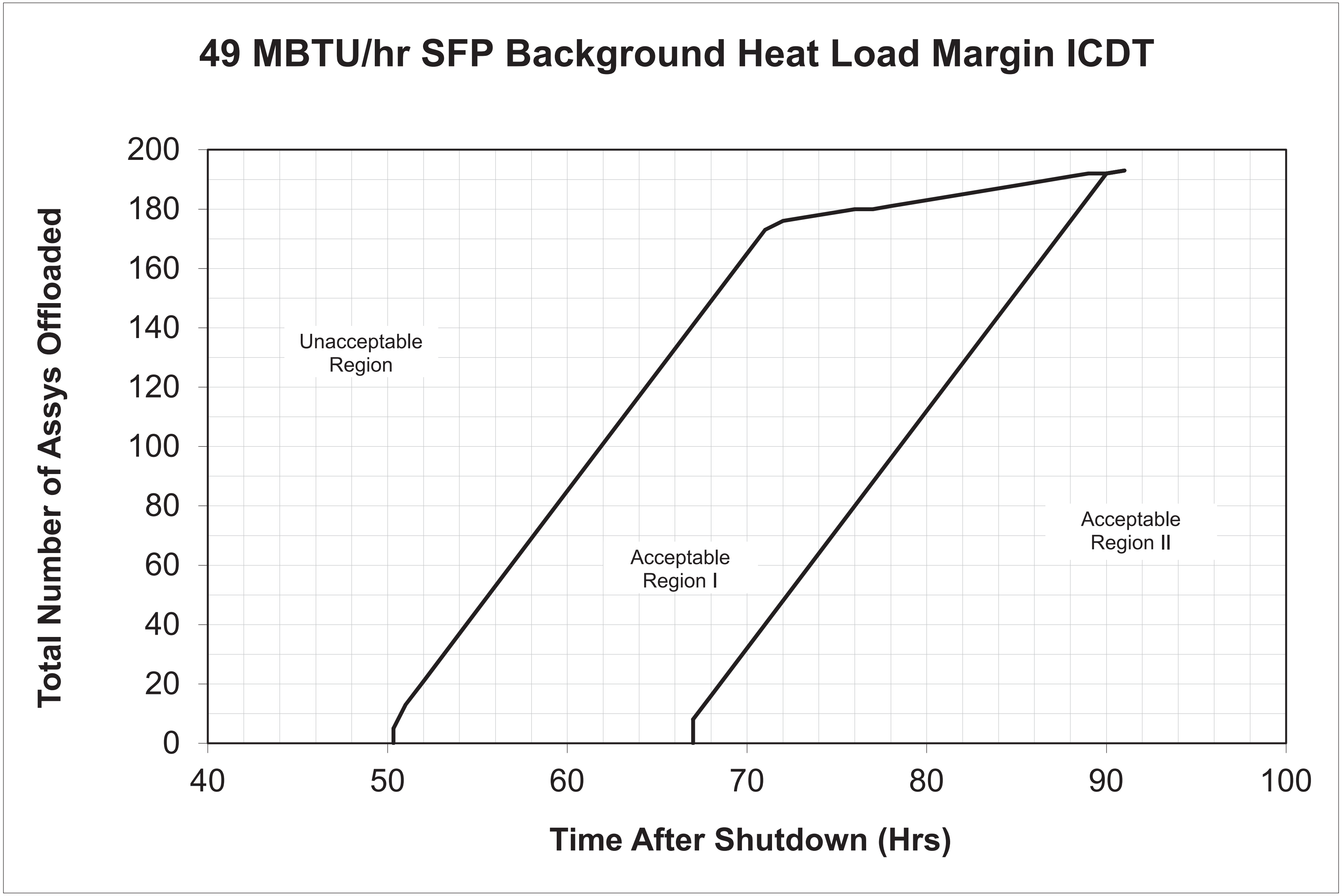

48 MBTU/hr SFP Background Heat Load Margin ICDT
Total Number of Assys Offloaded
200
180
160
140
120
100
80
60
40
20
0
40
50
60
70
80
90
100
Time After Shutdown (Hrs)
Unacceptable Region
Acceptable Region I
Acceptable Region II

Figure 3.9.a-9


49 MBTU/hr SFP Background Heat Load Margin ICDT
Total Number of Assys Offloaded
Time After Shutdown (Hrs)
0
20
40
60
80
100
120
140
160
180
200
40
50
60
70
80
90
100
Unacceptable Region
Acceptable Region I
Acceptable Region II

3.9 REFUELING OPERATIONS

3.9.b Communications

TLCO 3.9.b Direct communications shall be maintained between the control room and personnel at the containment refueling station.

APPLICABILITY: During CORE ALTERATIONS.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Direct communications not maintained.	A.1 Suspend CORE ALTERATIONS.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.9.b.1	Demonstrate direct communications between the control room and personnel at the containment refueling station.	Once within 1 hour prior to the start of CORE ALTERATIONS <u>AND</u> Once per 12 hours thereafter

3.9 REFUELING OPERATIONS

3.9.c Refueling Machine/Auxiliary Hoist/Cavity Maintenance Crane

TLCO 3.9.c The refueling machine used for movement of fuel assemblies and the auxiliary hoist or cavity maintenance crane used for movement of drive rods shall be OPERABLE with:

1. The refueling machine used for movement of fuel assemblies having:

   a) A capacity ≥ 2850 pounds; and
   b) An overload cutoff limit ≤ 2850 pounds.

2. The auxiliary hoist or cavity maintenance crane used for latching and unlatching drive rods having:

   a) A capacity ≥ 2000 pounds; and
   b) A load indicator which shall be used to prevent lifting loads > 1000 pounds.

APPLICABILITY: During movement of drive rods or fuel assemblies within the reactor vessel.

ACTIONS

-------------------------------NOTE-------------------------------

Separate Condition entry is allowed for the refueling machine, auxiliary hoist, or cavity maintenance crane.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Refueling machine inoperable. <u>OR</u> Auxiliary hoist inoperable. <u>OR</u> Cavity maintenance crane inoperable.	A.1 Suspend use of the inoperable refueling machine, inoperable auxiliary hoist, or inoperable cavity maintenance crane from operations involving the movement of drive rods or fuel assemblies within the reactor vessel.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.9.c.1	Verify refueling machine operability by: a. Performing a load test of $\geq$ 3563 pounds; and b. Demonstrating an automatic load cutoff when the crane load > 2850 pounds.	Once within 100 hours prior to the start of movement of fuel assemblies within the reactor vessel

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.9.c.2	Verify auxiliary hoist or cavity maintenance crane and associated load indicator operability by performing a load test ≥ 2500 pounds.	Once within 100 hours prior to the start of movement of drive rods within the reactor vessel

3.9 REFUELING OPERATIONS

3.9.d Crane Travel – Spent Fuel Pool

TLCO 3.9.d Loads shall be limited to ≤ 2000 pounds when traveling over fuel assemblies in the spent fuel pool, unless such loads are carried by a SINGLE-FAILURE PROOF LOAD HANDLING SYSTEM.

APPLICABILITY: With fuel assemblies in the spent fuel pool.

ACTIONS

-----------------------------------NOTE-----------------------------------
TLCO 3.0.c is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Load not within limit and load not carried by a SINGLE-FAILURE PROOF LOAD HANDLING SYSTEM.	A.1 Place the crane load in a safe condition.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.9.d.1	For loads >2000 pounds that are not carried by a SINGLE-FAILURE PROOF LOAD HANDLING SYSTEM, verify crane interlocks or physical stops prevent crane travel with such loadsover fuel assemblies in the spent fuel pool.	Once within 7 days prior to crane use <u>AND</u> Once per 7 days thereafter during crane operation

3.9 REFUELING OPERATIONS

3.9.e Refueling Cavity Water Level

TLCO 3.9.e Refueling cavity water level shall be maintained ≥ 23 ft above the top of the reactor vessel flange.

APPLICABILITY: During movement of new fuel assemblies within containment.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Refueling cavity water level not within limit.	A.1	Suspend movement of new fuel assemblies within containment.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.9.e.1	Verify refueling cavity water level is ≥ 23 ft above the top of reactor vessel flange.	24 hours

3.10 FIRE PROTECTION

3.10.a Fire Detection Instrumentation

TLCO 3.10.a As a minimum, the fire detection instrumentation for each fire detection zone shown in Table T3.10.a-1 for Unit 1 (Table T3.10.a-2 for Unit 2) shall be OPERABLE.

APPLICABILITY: Whenever equipment protected by the fire detection instrument is required to be OPERABLE.

ACTIONS

-----------------------------------NOTE-----------------------------------

1. Separate Condition entry is allowed for each channel.
2. TLCO 3.0.c is not applicable.
3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. With any, but not more than one-half the total in any fire zone, fire detection instrument(s) inoperable.	A.1	Restore instrument to OPERABLE status.	14 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR More than one-half the required fire detection instruments in any fire zone inoperable. OR Any required fire suppression instruments inoperable. OR Any two or more adjacent required fire detection instruments inoperable.	B.1	-------NOTE-------- Only applicable to instrument(s) located outside containment. ------------------- Establish a hourly fire watch patrol to inspect the inoperable instrument zone.	1 hour
	AND		
	B.2.1	-------NOTE-------- Only applicable to instrument(s) located inside containment. ------------------- Establish a fire watch patrol to inspect the inoperable instrument zone.	1 hour AND Every 8 hours thereafter
	OR		
	B.2.2	Monitor the containment air temperature at the return air risers for the running Reactor Containment Fan Coolers (RCFCs).	Once per 1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.10.a.1.1	Perform a TRIP ACTUATING DEVICE OPERATIONAL TEST (TADOT) for the following zones within Tables T3.10.a-1 and T3.10.a-2: All Containment Zones (Unit 1 and Unit 2)	18 months
TSR 3.10.a.1.2	Perform a TRIP ACTUATING DEVICE OPERATIONAL TEST (TADOT) for all other zones specified in Tables T3.10.a-1 and T3.10.a-2.	3 years
TSR 3.10.a.2.1	The NFPA Standard 72D supervised circuits supervision associated with the detector alarms of each required fire detection instrument shall be demonstrated OPERABLE for the following zones within Tables T3.10.a-1 and T3.10.a-2: All Containment Zones (Unit 1 and Unit 2)	18 months
TSR 3.10.a.2.2	The NFPA Standard 72D supervised circuits supervision associated with the detector alarms of each required fire detection instrument shall be demonstrated OPERABLE for all other zones specified in Tables T3.10.a-1 and T3.10.a-2.	3 years
TSR 3.10.a.3	----------------NOTE------------------ 1. Only required to be performed for fire detection instruments not accessible during unit operation. 2. Only required to be performed following MODE 5 > 24 hours unless performed in the previous 18 months. -------------------------------------- Perform a TRIP ACTUATING DEVICE OPERATIONAL TEST (TADOT)	Prior to entering MODE 4

Table T3.10.a-1 (Page 1 of 3)
Fire Detection Instruments
(Unit 1)

INSTRUMENT LOCATION	INSTRUMENT TYPE (a)	Total Number of Instruments HEAT	FLAME	SMOKE
1. Containment (c)				
Zone 2 Elev 401	Detection	2		
Zone 3 Elev 401	Detection	2		
Zone 4 Elev 401	Detection	2		
Zone 5 Elev 401	Detection	3		
Zone 6 Elev 426	Detection			6
Zone 7 Elev 414	Detection			7
2. Control Room				
Zone 29 Elev 383	Detection			4
Zone 68 Elev 451	Detection			3
Zone 69 Elev 451	Detection			12
Zone 75 Elev 451	Detection			20
Zone 68 Elev 451 (Unit 2)	Detection			3
3. Switchgear Rooms				
Zone 66 Elev 451	Detection			10
Zone 77 Elev 426	Detection			21
Zone 78 Elev 426	Detection			19

(continued)

(a) A single detector in a zone marked “Detection” will alarm in the Main Control Room. A single detector in a zone marked “Suppression” will initiate suppression and alarm in the Main Control Room.

(b) Not Used

(c) The fire detection instruments located within the containment are not required to be OPERABLE during the performance of Type A containment leakage rate tests.

Table T3.10.a-1 (Page 2 of 3)
Fire Detection Instruments
(Unit 1)

	INSTRUMENT LOCATION	INSTRUMENT TYPE (a)	Total Number of Instruments HEAT	FLAME	SMOKE
4.	Upper Cable Spreading Room				
	Zone 41 Elev 463	Detection			4
	Zone 42 Elev 463	Detection	4		
	Zone 43 Elev 463	Detection			8
	Zone 44 Elev 463	Detection	8		
	Zone 45 Elev 463	Detection			10
	Zone 46 Elev 463	Detection	10		
	Zone 47 Elev 463	Detection			5
	Zone 48 Elev 463	Detection	5		
	Lower Cable Spreading Room				
	Zone 49 Elev 439	Detection			23
	Zone 50 Elev 439	Detection	23		
	Zone 51 Elev 439	Detection			13
	Zone 52 Elev 439	Detection	13		
	Zone 53 Elev 439	Detection			9
	Zone 54 Elev 439	Detection	9		
	Zone 55 Elev 439	Detection			6
	Zone 56 Elev 439	Detection	6		
5.	Remote Shutdown Panel				
	Zone 13 Elev 383	Detection			8
6.	Station Battery Room Zone 67 Elev 451	Detection			13
7.	Diesel Generator Room				
	Zone 37 Elev 401	Suppression	6		
	Zone 38 Elev 401	Suppression	6		
	Zone 71 Elev 401	Detection		1	
	Zone 72 Elev 401	Detection		1	
8.	Diesel Fuel Storage				
	Zone 39 Elev 401	Suppression	1		
	Zone 40 Elev 401	Suppression	1		
	Zone 27 Elev 383	Suppression	3		
	Zone 28 Elev 383	Suppression	3		
	Zone 10 Elev 383	Detection			6

(continued)

(a) A single detector in a zone marked “Detection” will alarm in the Main Control Room. A single detector in a zone marked “Suppression” will initiate suppression and alarm in the Main Control Room.

Table T3.10.a-1 (Page 3 of 3)
Fire Detection Instruments
(Unit 1)

INSTRUMENT LOCATION	INSTRUMENT TYPE (a)	Total Number of Instruments HEAT	FLAME	SMOKE
9. Safety Related Pumps				
Zone 41 Elev 383	Suppression	2		
Zone 42 Elev 383	Suppression	1		
Zone 12 Elev 383	Detection			7
Zone 16 Elev 364	Detection			2
Zone 18 Elev 364	Detection			10
Zone 19 Elev 364	Detection			3
Zone 20 Elev 346	Detection			3
Zone 21 Elev 346	Detection			3
Zone 52 RSH	Suppression	8		
Zone 11 Elev 330 (Unit 2)	Detection			23
10. Fuel Storage				
Zone 39 Elev 401	Detection			32
11. Auxiliary Building				
Zone 70 Elev 451	Detection			11
Zone 17 Elev 364	Detection			37
Zone 40 Elev 364	Detection			7
Zone 11 Elev 383	Detection			37
Zone 8 Elev 401	Detection			36
Zone 9 Elev 401	Detection			8
Zone 23 Elev 426	Detection			6
Zone 25 Elev 467	Detection			7
Zone 64 Elev 414	Detection			5
Zone 65 Elev 414	Detection	5		
Zone 14 Elev 377	Detection			4
Zone 15 Elev 377	Detection			4
Zone 17 Elev 346 (Unit 2)	Detection			40
Zone 40 Elev 346 (Unit 2)	Detection			12
Zone 12 Elev 459 (Unit 2)	Detection			11
Zone 22 Elev 467 (Unit 2)	Detection			18
Zone 62 Elev 451 (Unit 2)	Detection			11
Zone 61 Elev 439 (Unit 2)	Detection			7
Zone 75 Elev 426 (Unit 2)	Detection			36
Zone 76 Elev 426	Detection			13
Zone 24 Elev 414	Detection			16
12. Miscellaneous				
Zone 26 Elev 864	Detection			12
Zone 79 Elev 685	Detection			20

(a) A single detector in a zone marked "Detection" will alarm in the Main Control Room. A single detector in a zone marked "Suppression" will initiate suppression and alarm in the Main Control Room.

Table T3.10.a-2 (Page 1 of 3)
Fire Detection Instruments
(Unit 2)

INSTRUMENT LOCATION	INSTRUMENT TYPE [(a)]	Total Number of Instruments HEAT	FLAME	SMOKE
1. Containment [(c)]				
Zone 2 Elev 401	Detection	2		
Zone 3 Elev 401	Detection	2		
Zone 4 Elev 401	Detection	2		
Zone 5 Elev 401	Detection	3		
Zone 6 Elev 426	Detection			6
Zone 7 Elev 414	Detection			7
2. Control Room				
Zone 29 Elev 383 (Unit 1)	Detection			4
Zone 68 Elev 451	Detection			3
Zone 69 Elev 451	Detection			14
Zone 75 Elev 451 (Unit 1)	Detection			20
Zone 68 Elev 451 (Unit 1)	Detection			3
3. Switchgear Rooms				
Zone 66 Elev 451	Detection			11
Zone 77 Elev 426	Detection			22
Zone 78 Elev 426	Detection			20

(continued)

(a) A single detector in a zone marked “Detection” will alarm in the Main Control Room. A single detector in a zone marked “Suppression” will initiate suppression and alarm in the Main Control Room.

(b) Not used.

(c) The fire detection instruments located within the containment are not required to be OPERABLE during the performance of Type A containment leakage rate tests.

Table T3.10.a-2 (Page 2 of 3)
Fire Detection Instruments
(Unit 2)

INSTRUMENT LOCATION	INSTRUMENT TYPE [a]	Total Number of Instruments HEAT	FLAME	SMOKE
4. Upper Cable Spreading Room				
Zone 41 Elev 463	Detection			4
Zone 42 Elev 463	Detection	4		
Zone 43 Elev 463	Detection			8
Zone 44 Elev 463	Detection	8		
Zone 45 Elev 463	Detection			9
Zone 46 Elev 463	Detection	9		
Zone 47 Elev 463	Detection			5
Zone 48 Elev 463	Detection	5		
Lower Cable Spreading Room				
Zone 49 Elev 439	Detection			23
Zone 50 Elev 439	Detection	23		
Zone 51 Elev 439	Detection			19
Zone 52 Elev 439	Detection	19		
Zone 53 Elev 439	Detection			9
Zone 54 Elev 439	Detection	9		
Zone 55 Elev 439	Detection			6
Zone 56 Elev 439	Detection	6		
5. Remote Shutdown Panel				
Zone 13 Elev 383 (Unit 1)	Detection			8
6. Station Battery Room				
Zone 67 Elev 451	Detection			15
7. Diesel Generator Room				
Zone 37 Elev 401	Suppression	4		
Zone 38 Elev 401	Suppression	4		
Zone 71 Elev 401	Detection		1	
Zone 72 Elev 401	Detection		1	
8. Diesel Fuel Storage				
Zone 39 Elev 401	Suppression	1		
Zone 40 Elev 401	Suppression	1		
Zone 27 Elev 383	Suppression	3		
Zone 28 Elev 383	Suppression	3		
Zone 10 Elev 383	Detection			6

(continued)

(a) A single detector in a zone marked “Detection” will alarm in the Main Control Room. A single detector in a zone marked “Suppression” will initiate suppression and alarm in the Main Control Room.

Table T3.10.a-2 (Page 3 of 3)
Fire Detection Instruments
(Unit 2)

	INSTRUMENT LOCATION	INSTRUMENT TYPE (a)	Total Number of Instruments HEAT	FLAME	SMOKE
9.	Safety Related Pumps				
	Zone 41 Elev 383	Suppression	2		
	Zone 42 Elev 383	Suppression	1		
	Zone 12 Elev 383 (Unit 1)	Detection			7
	Zone 16 Elev 364	Detection			2
	Zone 18 Elev 364	Detection			10
	Zone 19 Elev 364	Detection			3
	Zone 20 Elev 346	Detection			3
	Zone 21 Elev 346	Detection			3
	Zone 52 RSH (Unit 1)	Suppression	8		
	Zone 11 Elev 330	Detection			23
10.	Fuel Storage				
	Zone 39 Elev 401 (Unit 1)	Detection			32
11.	Auxiliary Building				
	Zone 17 Elev 346	Detection			40
	Zone 40 Elev 346	Detection			12
	Zone 22 Elev 467	Detection			18
	Zone 62 Elev 451	Detection			11
	Zone 9 Elev 401	Detection			11
	Zone 14 Elev 401	Detection			4
	Zone 15 Elev 401	Detection			4
	Zone 64 Elev 401	Detection	6		
	Zone 65 Elev 401	Detection			6
	Zone 61 Elev 439	Detection			7
	Zone 70 Elev 451	Detection			11
	Zone 75 Elev 426	Detection			37
	Zone 25 Elev 467	Detection			7
	Zone 17 Elev 364 (Unit 1)	Detection			37
	Zone 40 Elev 364 (Unit 1)	Detection			7
	Zone 11 Elev 383 (Unit 1)	Detection			37
	Zone 8 Elev 401 (Unit 1)	Detection			36
	Zone 23 Elev 426 (Unit 1)	Detection			6
	Zone 12 Elev 459	Detection			11
	Zone 76 Elev 426	Detection			13
	Zone 24 Elev 414	Detection			17
12.	Miscellaneous				
	Zone 26 Elev 864 (Unit 1)	Detection			12

(a) A single detector in a zone marked “Detection” will alarm in the Main Control Room. A single detector in a zone marked “Suppression” will initiate suppression and alarm in the Main Control Room.

3.10 FIRE PROTECTION

3.10.b Fire Protection Water Supply System

TLCO 3.10.b The Fire Suppression Water Supply System shall be OPERABLE with:

1. Two fire suppression pumps with their discharge aligned to the fire suppression header, and
2. An OPERABLE flow path capable of transferring the water through distribution piping to:
   a) The yard hydrant isolation valves for: OFP06S, OFP07S, OFP08S, OFP14S, OFP15S, OFP16S, OFP21S, and OFP27S;
   b) The last valve ahead of each hose standpipe as required by TLCO 3.10.f;
   c) The last valve ahead of the deluge valves on systems required by TLCO 3.10.c; and
   d) The last valve ahead of the flow alarm valves in sprinkler systems required by TLCO 3.10.c.

APPLICABILITY: At all times.

ACTIONS

-------------------------------------NOTE-------------------------------------

1. Separate Condition entry is allowed for each water supply system.
2. TLCO 3.0.c is not applicable.
3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One Fire Suppression pump inoperable.	A.1	Verify an alternate backup pump or water supply.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Two Fire Suppression pumps inoperable	B.1	Establish a backup Fire Suppression Water Supply System.	24 hours
C. One or more required yard hydrant(s) inoperable or isolation valve(s) closed.	C.1	Provide backup by staging a 4 inch hoseline of sufficient length from an alternate OPERABLE yard hydrant to reach the inoperable yard hydrant.	24 hours
D. One or more required hose standpipe isolation valve(s) inoperable and closed.	D.1	Declare the fire hose standpipe inoperable and enter the Conditions and associated Required Actions of TLCO 3.10.f.	Immediately
E. One or more required deluge system isolation valve(s) inoperable and closed.	E.1	Declare the deluge system inoperable and enter the Conditions and Required Actions of TLCO 3.10.c.	Immediately
F. One or more required sprinkler system isolation valve(s) inoperable and closed.	F.1	Declare the sprinkler system inoperable and enter the Conditions and Required Actions of TLCO 3.10.c.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. Required Actions and associated Completion Times of Condition C, D, E, or F not met.	G.1	Establish an hourly fire watch patrol for the affected area.	1 hour
H. Water Supply Flow Test not within limits. (TSR 3.10.b.18)	H.1	Engineering evaluate condition for failure of TSR 3.10.b.18.	7 Days
	<u>AND</u>		
	H.1	Establish compensatory actions, as required.	

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.10.b.1	Verify the contained water supply volume.	7 days
TSR 3.10.b.2	Verify the electrolyte level of each batter for the fire pump diesel starting 24 volt battery bank is above the plates.	31 days
TSR 3.10.b.3	Verify the overall battery voltage for the fire pump diesel starting 24 volt battery bank is ≥ 24 volts.	31 days
TSR 3.10.b.4	Start and operate the electric motor-driven pump for ≥ 15 minutes on recirculation flow.	31 days
TSR 3.10.b.5	Verify each normally open valve in the pump train or header flow path is in the correct position.	92 days
TSR 3.10.b.6	Verify the fuel storage tank contains ≥ 325 gallons of fuel for fire pump diesel engine.	31 days
TSR 3.10.b.7	Verify the fire pump diesel engine starts from ambient conditions and operates for ≥ 30 minutes on recirculation flow.	31 days
TSR 3.10.b.8	Verify the specific gravity for the fire pump diesel starting 24 volt battery bank is appropriate for continued service.	92 days
TSR 3.10.b.9	Verify that a drain sample of diesel driven fire pump fuel oil stored in the day tank, obtained in accordance with ASTM-D4057, is within the acceptable limits specified in Table 1 of ASTM-D975 for viscosity, water and sediment.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
TSR 3.10.b.10 Flush the system ring header.	24 months
TSR 3.10.b.11 SURVEILLANCE DELETED	
TSR 3.10.b.12 Perform a system functional test which includes simulated automatic actuation of the system throughout its operating sequence and verify each fire pump develops a discharge of 150% of rated capacity (+/- 10%) at 65% of rated pressure (+/- 10%), and recording measured performance at minimum and rated loads.	18 months
TSR 3.10.b.13 Perform a system functional test which includes simulated automatic actuation of the system throughout its operating sequence and verify the fire suppression pump starts (sequentially) to maintain the fire suppression water supply system pressure $\geq$ 125 psig.	18 months
TSR 3.10.b.14 Subject the diesel driven fire pump to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for the class of service.	18 months
TSR 3.10.b.15 ------------NOTE------------ Only required to be performed for valves not testable during plant operation. -------------------------------- Perform a system functional test which includes simulated automatic actuation of the system throughout its operating sequence and cycle each valve in the pump train or header flow path through at least one complete cycle of full travel.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
TSR 3.10.b.16 Visually inspect the battery-to-battery and terminal connections for the fire pump diesel starting 24 volt battery bank for cleanliness, tightness, freedom of corrosion and a coating of anticorrosion material.	18 months
TSR 3.10.b.17 Visually inspect the batteries, cell plates, and battery racks for the fire pump diesel starting 24 volt battery bank for physical damage or abnormal deterioration.	18 months
TSR 3.10.b.18 Perform a flow test of the system in accordance with Chapter 8, Section 16 of the Fire Protection Handbook,15th Edition, published by the National Fire Protection Association.	3 years

3.10 FIRE PROTECTION

3.10.c Water Systems

TLCO 3.10.c The Water System, including the Foam Systems in the diesel generator fuel oil storage tank room, the Sprinkler Systems in the Auxiliary Building, and Auxiliary Building Manual Deluge Systems shall be OPERABLE.

APPLICABILITY: Whenever equipment protected by the above systems is required to be OPERABLE.

ACTIONS

-----------------------------------NOTE-----------------------------------

1. Separate Condition entry is allowed for each water system.
2. TLCO 3.0.c is not applicable.
3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more of the required water systems inoperable.	A.1	Enter the Condition referenced in Table T3.10.c-1 for the inoperable water system.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. As required by Required Action A.1 and referenced in Table T3.10.c-1.	B.1	Establish a continuous fire watch.	1 hour
	AND		
	B.2	Verify backup fire suppression equipment.	1 hour
C. As required by Required Action A.1 and referenced in Table T3.10.c-1.	C.1.1	Establish a continuous fire watch.	1 hour
	AND		
	C.1.2	Verify backup fire suppression equipment.	1 hour
	OR		
	C.2.1	Verify automatic fire detection instrumentation OPERABLE.	1 hour
	AND		
	C.2.2.	Establish a hourly fire watch.	1 hour

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. As required by Required Action A.1 and referenced in Table T3.10.c-1.	D.1 Establish a hourly fire watch. OR D.2 Verify automatic fire detection instrumentation OPERABLE.	1 hour 1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.10.c.1	Verify each normally open valve in the flow path is in the correct position.	92 days
TSR 3.10.c.2	Perform a test on the Sprinkler System by discharging water out of the inspectors test connections and verifying a “Fire” alarm.	92 days
TSR 3.10.c.3	Visually verify the Sprinkler header for integrity and head spray pattern not obstructed.	12 months
TSR 3.10.c.4	Verify the Sprinkler water flow through the 2 inch test drain at the riser.	12 months
TSR 3.10.c.6	Visually verify the deluge header for integrity and spray heads not obstructed.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.10.c.7	Visually inspect dry pipe deluge headers for integrity.	18 months
TSR 3.10.c.8	Visually verify each nozzle's spray pattern not obstructed.	18 months
TSR 3.10.c.9	Perform a Foam System functional test and verify it actuates to its correct position on an actual or simulated actuation signal and verify a "Fire Trouble" alarm is received when the isolation valve is closed and verify a "Fire" alarm is received on actuation of the alarm switch.	18 months
TSR 3.10.c.10	Verify the Manual Deluge System by cycling the isolation valve and verifying the "Fire Trouble" alarm.	18 months
TSR 3.10.c.11	Verify the Manual Deluge System by cycling the deluge valve.	18 months
TSR 3.10.c.12	Perform an air flow test through each open deluge nozzle in the Foam System and verify each nozzle is unobstructed.	3 years

Table T3.10.c-1 (page 1 of 3)
Water Systems

SPRINKLER SYSTEMS

SYSTEM #	FIRE ZONE	AREA PROTECTED	CONDITION
1S-57	11.5-0	Auxiliary Building, El. 401'0"	D
1S-59	11.3-0	Auxiliary Building, General Area, El. 364'0"	B
1S-60	11.3-1	Unit 1 Auxiliary Building Pipe Penetration Area, EL. 364' 0"	C
2S-53	11.3-2	Unit 2 Auxiliary Building Pipe Penetration Area, El. 364'0"	C
2S-54	11.2-0 11.3-0 11.4-0 11.5-0 11.6-0	Auxiliary Building General Area, El., 346' 0", El. 364' 0" El. 383' 0" El.401' 0", El. 426' 0"	C
2S-55	11.6-0	Auxiliary Building, El 426' 0"	D

FOAM SYSTEMS

SYSTEM #	FIRE ZONE	AREA PROTECTED	CONDITION
1S-27	10.1-1	Diesel Fuel Oil Storage Room 1B	D
1S-28	10.2-1	Diesel Fuel Oil Storage Room 1A	D
2S-27	10.1-2	Diesel Fuel Oil Storage Room 2B	D
2S-28	10.2-2	Diesel Fuel Oil Storage Room 2A	D

(continued)

Table T3.10.c-1 (page 2 of 3)
Water Systems

DELUGE SYSTEMS

SYSTEM #	FIRE ZONE	AREA PROTECTED	CONDITION
1S-1	11.7-0	Aux Bldg HVAC Exhaust Filter (0VA05FA)	C
1S-2	11.7-0	Aux Bldg HVAC Exhaust Filter (0VA05FB)	C
1S-3	11.7-0	Aux Bldg HVAC Exhaust Filter (0VA05FC)	C
1S-4	18.4-1	Control Room Recirc Absorber (0VC02FA)	D
1S-5	3.3A-1	Control Room Makeup Filter (0VC05FA)	D
1S-6	3.3A-1	Control Room Makeup Filter (0VC06FA)	D
1S-7	11.7-1	Containment Post LOCA Exhaust Filter (0VQ01S)	D
1S-10	11.7-0	Aux Bldg Tank Vent Filter (0VF01S)	C
2S-1	11.7-0	Aux Bldg HVAC Exhaust Filter (0VA05FD)	C
2S-2	11.7-0	Aux Bldg HVAC Exhaust Filter (0VA05FE)	C
2S-3	11.7-0	Aux Bldg HVAC Exhaust Filter (0VA05FF)	C
2S-4	18.4-2	Control Room Recirc Absorber (0VC02FB)	D
2S-5	3.3A-2	Control Room Makeup Filter (0VC05FB)	D

(continued)

Table T3.10.c-1 (page 3 of 3)
Water Systems

DELUGE SYSTEMS

SYSTEM #	FIRE ZONE	AREA PROTECTED	CONDITION
2S-6	3.3A-2	Control Room Makeup Filter (0VC06FB)	D
2S-7	11.7-2	Containment Post LOCA Exhaust Filter (2VQ01S)	D
2S-8	11.7-0	Aux Bldg HVAC Exhaust Filter (0VA05FG)	C
2S-9	11.7-0	Aux Bldg HVAC Exhaust Filter (0VA05FH)	C
2S-10	11.7-0	Aux Bldg HVAC Exhaust Filter (0VA05FI)	C
2S-25	11.7-0	Fuel Handling HVAC Exhaust Filter (0VA09FA)	C
2S-26	11.7-0	Fuel Handling HVAC Exhaust Filter (0VA09FB)	C

3.10 FIRE PROTECTION

3.10.d CO_2 Systems

TLCO 3.10.d The CO_2 Systems, including the diesel generator rooms and day tank rooms, lower cable spreading room, auxiliary feedwater diesel room and day tank room, diesel-driven essential service water (ESW) makeup pumps and day tank rooms, and the cable tunnel room shall be OPERABLE.

APPLICABILITY: Whenever equipment protected by the above systems is required to be OPERABLE.

ACTIONS

------------------------------------NOTE------------------------------------

1. Separate Condition entry is allowed for each CO_2 system.
2. TLCO 3.0.c is not applicable.
3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more of the required CO_2 systems inoperable.	A.1 Enter the Condition referenced in Table T3.10.d-1 for the inoperable CO_2 systems.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. As required by Required Action A.1 and referenced in Table T3.10.d-1.	B.1.1 Establish a continuous fire watch.	1 hour
	<u>AND</u>	
	B.1.2 Verify backup fire suppression equipment.	1 hour
	<u>OR</u>	
	B.2.1 Verify automatic fire detection instrumentation OPERABLE.	1 hour
	<u>AND</u>	
	B.2.2 Verify fire wrap in the zone is OPERABLE.	1 hour
	<u>AND</u>	
	B.2.3 Establish an hourly fire watch.	1 hour
C. As required by Required Action A.1 and referenced in Table T3.10.d-1	C.1 Establish an hourly fire watch.	1 hour
	<u>OR</u>	
	C.2 Verify automatic fire detection instrumentation OPERABLE.	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.10.d.1	Verify river screen house CO_2 storage tank level $\geq$ 50% (1.0 ton) and river screen house CO_2 storage tank pressure < 357 psig and >275 psig.	7 days
TSR 3.10.d.2	Verify plant CO_2 storage tank level > 69% (6.9 tons) and plant CO_2 storage tank pressure <357 psig and > 275 psig.	7 days
TSR 3.10.d.3	Verify each normally open valve in the flow path is in its correct position.	92 days
TSR 3.10.d.4	Perform a CO_2 System functional test for all applicable CO_2 systems within Table T3.10.d-1. Verify the system, including interlocks associated with ventilation system fire dampers, actuates to its correct position on both a manual signal and an actual or simulated actuation signal.	3 years
TSR 3.10.d.5	Visually verify each nozzle for integrity and discharge path unobstructed for all applicable CO_2 systems within Table T3.10.d-1.	3 years

Table T3.10.d-1 (page 1 of 1)
CO_2 Systems

SYSTEM #	FIRE ZONE	AREA PROTECTED	CONDITION
1S-37	9.1-1	1B Diesel Generator Room	C
1S-38	9.2-1	1A Diesel Generator Room	C
1S-39	9.4-1	1B Diesel Generator Day Tank Room	C
1S-40	9.3-1	1A Diesel Generator Day Tank Room	C
1S-41	11.4A-1	1B AF Pump Room	C
1S-42	11.4A-1	1B AF Pump Day Tank Room	C
1S-43	3.2A-1	Lower Cable Spreading Room	B
1S-44	3.2B-1	Lower Cable Spreading Room	C
1S-45	3.2C-1	Lowe Cable Spreading Room	C
1S-46	3.2D-1/E-1	Lower Cable Spreading Room	C
1S-47	3.1-1	Unit 1 Cable Tunnel	B
1S-52	18.11-0.1.2	River Screen House SX Makeup Pumps and Day Tank Rooms	C
2S-37	9.1-2	2B Diesel Generator Room	C
2S-38	9.2-2	2A Diesel Generator Room	C
2S-39	9.4-2	2B Diesel Generator Day Tank Room	C
2S-40	9.3-2	2A Diesel Generator Day Tank Room	C
2S-41	11.4A-2	2B AF Pump Room	C
2S-42	11.4A-2	2B AF Pump Day Tank Room	C
2S-43	3.2A-2	Lower Cable Spreading Room	B
2S-44	3.2B-2	Lower Cable Spreading Room	C
2S-45	3.2C-2	Lower Cable Spreading Room	C
2S-46	3.2D-2/E-2	Lower Cable Spreading Room	C
2S-47	3.1-2	Unit 2 Cable Tunnel	C

3.10 FIRE PROTECTION

3.10.e Halon Systems

TLCO 3.10.e The Halon Systems in the upper cable spreading room shall be OPERABLE.

APPLICABILITY: Whenever equipment protected by the Halon systems is required to be OPERABLE.

ACTIONS

------------------------------------NOTE------------------------------------

1. Separate Condition entry is allowed for each halon system.
2. TLCO 3.0.c is not applicable.
3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more of the required Halon Systems inoperable.	A.1 Establish an hourly fire watch. <u>OR</u> A.2 Verify automatic fire detection instrumentation OPERABLE.	1 hour 1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.10.e.1	Verify each normally open valve in the flow path is in the correct position.	92 days
TSR 3.10.e.2	Verify the Halon Storage cylinders weight to be ≥ 95% of full charge weight and pressure to be ≥ 90% of full charge pressure.	6 months
TSR 3.10.e.3	Perform a Halon System Functional Test including interlocks associated with ventilation dampers, to verify the system actuates to its correct position on an actual or simulated actuation signal.	3 years
TSR 3.10.e.4	Visually verify each nozzle for integrity and discharge path obstructed.	3 years

3.10 FIRE PROTECTION

3.10.f Fire Hose Stations

TLCO 3.10.f The fire hose stations in Table T3.10.f-1 shall be OPERABLE.

APPLICABILITY: Whenever equipment protected by the fire hose stations is required to be OPERABLE.

ACTIONS

-----------------------------------NOTE-----------------------------------

1. Separate Condition entry is allowed for each fire hose station.

2. If required to provide a gated wye, one outlet of the wye shall be connected to the standard length of hose provided for the hose station. The second outlet of the wye shall be connected to a length of hose sufficient to provide coverage for the area left unprotected by the inoperable hose station. Where it can be demonstrated that the physical routing of the fire hose would result in a recognizable hazard to operating personnel, plant equipment, or the hose itself, the fire hose shall be stored in a roll at the outlet of the operable hose station Signs shall be mounted above the gated wye(s) to identify the proper hose to use.

3. TLCO 3.0.c is not applicable.

4. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more of the required fire hose stations inoperable.	A.1	Enter the Condition referenced in Table T3.10.f-1 for the inoperable fire hose station.	Immediately
B. As required by Required Action A.1 and referenced in Table T3.10.f-1	B.1	Provide gated wye on the nearest OPERABLE hose station.	1 hour

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. As required by Action A.1 and referenced in Table T3.10.f-1.	C.1 Provide gated wye on the nearest OPERABLE hose station.	1 hour
	OR	
	C.2.1 Verify primary means of fire suppression OPERABLE	1 hour
	AND	
	C.2.2 Provide gated wye on the nearest OPERABLE hose station.	7 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.10.f.1	---------------NOTE----------------------- Only required to be performed on fire stations accessible during plant operation. ---	
	Perform visual inspection of each fire hose station to assure all required equipment is at the station.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.10.f.2	-------------NOTE--------------------- Only required on fire stations that are not accessible during plant operations. Perform visual inspection of each fire hose station to assure all required equipment is at the station.	18 months
TSR 3.10.f.3	Remove each fire hose for inspection, inspect all gaskets, replace any degraded gaskets and rerack.	18 months
TSR 3.10.f.4	Partially open each fire hose station to verify valve operability and no flow blockage.	3 years
TSR 3.10.f.5	Hydrostatically test each fire hose at a pressure $\geq$ 150 psig or $\geq$ 50 psig above maximum fire main operating pressure, whichever is greater.	5 years after new hose installation AND 3 years thereafter

Table T3.10.f-1 (page 1 of 5)

FIRE HOSE STATIONS

LOCATION		CONDITION	ELEVATION	HOSE RACK REEL	ANGLE VALVE
Auxiliary Bldg					
S-18:	By dumb waiter	B	480	233	FP458
S-15:	By U-1 prefilters (near stairs)	B	471	176	FP329
S-21:	By U-2 prefilters (near stairs)	B	471	177	FP334
Q-17:	Wall by elevator in upper cable room	C	469	244[(a)]	FP469
Q-19:	Wall by stairs in upper cable room	C	469	252[(a)]	FP477
L-11:	Outside southeast corner of upper cable spreading room A-1	B	467	240	FP465
L-14:	By the southeast door of UCSR C-1	C	467	241[(a)]	FP466
M-13:	By the northwest corner of UCSR A-1	C	467	242[(a)]	FP467
P-18:	Northwest corner of UCSR C-1	C	467	245[(a)]	FP470
M-18:	North wall of UCSR C-1	C	467	246[(a)]	FP471
M-18:	South wall of UCSR C-2	C	467	247[(a)]	FP472
L-25:	Outside northeast corner of UCSR A-2	B	467	248	FP473
L-22:	In the northeast corner of UCSR C-2	C	467	249[(a)]	FP474
M-23:	In the southwest corner of UCSR A-2	C	467	250[(a)]	FP475
P-20:	West wall of UCSR C-2	C	467	251[(a)]	FP476
S-21:	By U-2 VA filters (U-2 side)	B	467	232	FP457
S-15:	By U-1 VA filters (U-1 side)	B	467	234	FP459
S-21:	By VA filters (U-2 side)	B	456	231	FP456
S-15:	By VA filters (U-1 side)	B	456	235	FP460
Q-24:	Radwaste drumming station	B	387	110	FP375
L-10:	By control room refrig. Units	B	387	106	FP385
L-12:	By blowdown after filters	B	387	107	FP384
S-19:	By 2A RHR Heat exchanger room	B	387	112	FP378
M-26:	Radwaste control panel	B	387	109	FP377
M-18:	By Aux, Feedwater motor driven pump 1A	B	387	108	FP383
N-23:	By remote shutdown panel U-1	B	387	111	FP376
Q-15:	By 480 V MCC 132X3	B	387	113	FP382
V-18:	By letdown heat exchanger	B	387	114	FP379
P-29:	West wall 6.9 kV switchgear room U-2	B	455	29	FP339
P-7:	West wall 6.9 kV switchgear room	B	455	20	FP324
L-11:	In UC HVAC Rm OA o LCSR C-1	B	455	22	FP332
L-25:	By OBVC HVAC room	B	455	27	FP335

(continued)

(a) Fire hose stations that do not supply the primary means of suppression.

Table T3.10.f-1 (page 2 of 5)

FIRE HOSE STATIONS

	LOCATION	CONDITION	ELEVATION	HOSE RACK REEL	ANGLE VALVE
Auxiliary Bldg. (continued)					
M-8:	South wall of battery room	B	451	279	FP638
M-26:	South wall of battery room	B	451	280	FP639
M-18:	North wall U-1 AB by door	C	444	238[(a)]	FP463
L-7:	East wall LCSR A-1	C	443	207[(a)]	FP330
M-10:	In the southeast corner of LCSR B-1	C	443	208[(a)]	FP327
P-10:	In the southwest corner of LCSR B-1	C	443	209[(a)]	FP325
M-13:	South wall of LCSR C-1	C	443	210[(a)]	FP326
P-13:	West wall of LCSR D-1	C	443	211[(a)]	FP328
M-18:	South wall of LCSR U-2 by door	C	443	239[(a)]	FP464
L-29:	East wall LCSR A-2	C	443	212[(a)]	FP336
M-26:	In northeast corner of LCSR B-2	C	443	213[(a)]	FP337
P-26:	In northwest corner of LCSR B-2	C	443	214[(a)]	FP340
M-23:	North wall of LCSR C-2	C	443	215[(a)]	FP341
P-21:	East wall of LCSR D-2	C	433	216[(a)]	FP333
S-21:	By cabinet 2RY01EC (elec.pen. area)	B	431	229	FP454
S-24:	By U-2 cnmt. Shield wall (elec. Pen. area)	B	431	230	FP455
S-15:	By Pzr htr. transformer (elec. Pen. area)	B	431	236	FP461
S-12:	By U-1 cnmt. shield wall (elec. Pen. area)	B	431	237	FP462
M-18:	Rad Chem offices	B	430	57	FP323
Q-10:	Back of Div. 11 swgr room	C	430	283[(a)]	FP640
Q-26:	Back of Div. 21 swgr room	C	430	284[(a)]	FP641
P-11:	Outside laundry room	B	430	52	FP313
Q-19:	By U-2 VCT valve aisle	B	430	54	FP342
P-24:	By radwaste evaporator	B	430	55	FP343
U-17:	By east door to decon/change area	B	430	58	FP319
S-15:	By U-1 Pzr. Htr. Transformer (elec. pen. area)	B	419	174	FP322
S-21:	By U-2 Pzr. Htr. Transformer (elec. pen. area)	B	419	175	FP347
Q-10:	By U-1 electrical penetration area	B	419	205	FP321
Q-26:	By U-2 electrical penetration area	B	419	206	FP346

continued

(a) (Fire hose stations that do not supply the primary means of suppression.

Table T3.10.f-1 (page 3 of 5)

FIRE HOSE STATIONS

LOCATION		CONDITION	ELEVATION	HOSE RACK REEL	ANGLE VALVE
Auxiliary Bldg. (continued)					
L-11:	By waste oil tank room	B	405	90	FP315
P-18:	By elevator	B	405	91	FP318
P-23:	By spent resin pumps	B	405	92	FP349
Q-11:	By laundry tanks	B	405	93	FP314
S-21:	East of U-2 hydrogen recombiner	B	405	94	FP348
V-21:	West of U-2 hydrogen recombiner	B	405	95	FP345
V-15:	West of U-1 hydrogen recombiner control panel	B	405	96	FP316
S-15:	East of U-1 hydrogen recombiner	B	405	97	FP317
N-11:	By the recycle holdup tanks	B	368	130	FP373
M-13:	By the U-1 stairs	B	368	131	FP374
P-13:	By panel 1PL84JB	B	368	132	FP369
L-20:	By the U-2 stairs	B	368	133	FP355
P-21:	By the blowdown condenser	B	368	134	FP356
L-25:	By the PW M/U pumps	B	368	135	FP361
N-25:	By chemical drain tank	B	368	136	FP357
Q-25	By spent resin flushing pump	B	368	137	FP360
S-18:	By panel 1PL86J	B	368	138	FP362
Q-11:	By Aux. Bldg. Floor drain tanks	B	368	139	FP368
U-15:	By U-1 spray add tank	B	368	140	FP372
U-21:	By U-2 spray add tank	B	368	142	FP358
V-18:	By U-2 cent. chg. pump room	B	368	141	FP366
P-11:	By recycle evaporator feed pumps	B	350	151	FP381
M-13:	By U-1 stairs	B	350	152	FP370
N-23:	By gas decay tanks	B	350	154	FP352
Q-19:	By “B” Aux. Bldg. Equip. drain tank	B	350	155	FP365
Q-17:	By “A” Aux. Bldg. Equip. drain tank	B	350	155	FP371
Q-13:	By U-1 collection sump pumps	B	350	157	FP380
Q-21:	By U-2 collection sump pumps	B	350	159	FP364
S-18:	Between moderating heat exchangers	B	350	158	FP354
V-18:	Between BR chiller units	B	350	161	FP353
W-15:	By CS pump 1A	B	350	163	FP367
V-21	By CS pump 2A	B	350	164	FP359
L-19:	By OB recycle evap room	B	350	153	FP363
M-13:	By leak detection sump	B	334	165	FP448
P-18:	By elevator pit	B	334	166	FP449
P-18:	By 1B SX pump room	B	334	167	FP351
M-23:	By 1B SX pump room	B	334	168	FP350

(continued)

Table T3.10.f-1 (page 4 of 5)

FIRE HOSE STATIONS

LOCATION		CONDITION	ELEVATION	HOSE RACK REEL	ANGLE VALVE
Fuel Handling Bldg.					
V-17:	By west door to decon/change room	B	430	61	FP320
V-19:	On V wall	B	430	59	FP344
Z-15:	South of decon. area	B	430	170	FP389
X-21:	North of spent fuel pool	B	430	171	FP386
Z-15:	By 480V MCC 134X6	B	405	172	FP388
AA-19:	Outside FC pump room	B	405	173	FP387
Unit 1 Containment					
R-17:	By reactor head assembly area	B	430	62	FP163
R-2:	By accumulator tank 1C	B	430	63	FP154
R-7:	By equipment hatch	B	430	64	FP160
R-12:	By charcoal filter 1A	B	430	65	FP157
R-17	By south stairs	B	403	98	FP164
R-2:	By RCFC 1C	B	403	99	FP155
R-7:	By pressurizer (outside missile shield)	B	403	100	FP161
R-12:	By panel PL69J	B	403	101	FP158
R-12:	By RPT	B	381	143	FP159
R-17:	By south stairs	B	381	144	FP162
R-2:	By RCFC 1C	B	381	145	FP156
R-7:	By panel 1PL52J	B	381	146	FP165
Unit 1 Turbine Bldg.					
K-14:	By the control room	B	451	16	FP194
L-6:	Outside 1B D/G room	B	405	87	FP183
K-10:	Outside 1A D/G room	B	405	281	FP275
L-7:	Basement of turbine bldg.	B	361	129	FP184
L-7:	Outside Div. 12 swgr	B	430	47	FP181
L-10:	Outside Div. 11 swgr	B	430	51	FP182
L-5:	Outside non-ESF swgr	B	455	18	FP180
L-10:	Outside battery room	B	455	21	FP179

(continued

Table T3.10.f-1 (page 5 of 5)

FIRE HOSE STATIONS

LOCATION		CONDITION	ELEVATION	HOSE RACK REEL	ANGLE VALVE
Unit 2 Containment					
R-26:	By personnel hatch	B	430	66	FP163
R-31:	By west stairs	B	430	67	FP154
R-37:	By reactor head assembly area	B	430	68	FP160
R-42:	By charcoal filter 2A	B	430	69	FP157
R-26:	By pressurizer (outside missile shield)	B	403	102	FP164
R-31:	By west stairs	B	403	103	FP155
R-37:	By north stairs	B	403	104	FP161
R-42:	Outside missile barrier by Loop D MS pipe	B	403	105	FP158
R-26:	By panel 2PL52J	B	381	147	FP165
R-31:	By west stairs	B	381	148	FP156
R-37:	By north stairs	B	381	149	FP162
R-42:	By PRT	B	381	150	FP159
Unit 2 Turbine Bldg.					
L-30:	Outside Unit 2 non-ESF swgr	B	455	14	FP232
L-24:	Outside West Turbine Building office	B	455	15	FP237
L-26:	Outside Unit 2 battery room	B	455	28	FP233
L-29:	Outside Div. 22 swgr	B	430	42	FP231
L-26:	Outside Div. 21 swgr	B	430	56	FP230
L-29:	Outside 2B D/G room	B	405	82	FP229
K-28:	Outside 2A D/G room	B	405	282	FP275
L-29:	By 2C cond /cond booster pump	B	364	124	FP228

3.10 FIRE PROTECTION

3.10.g Fire Assemblies

TLCO 3.10.g All fire assemblies (walls, floor/ceilings, cable tray enclosures and other fire barriers) separating safety related fire areas or separating portions of redundant systems important to safe shutdown within a fire area, and all fire rated sealing devices in fire assembly penetrations (fire doors, fire windows, fire dampers, and penetration seals for cables, pipes, and ventilation ducts) shall be OPERABLE.

APPLICABILITY: At all times.

------------------------------------NOTE------------------------------------

1. The fire assembly (barrier wall separating the Emergency Diesel Generator (EDG) from the Turbine Building) and its associated sealing devices are not required to be OPERABLE when the associated EDG is Out-of-Service for maintenance or repair.

2. The fire assemblies (i.e., walls only) enclosing the Train B Auxiliary Feedwater (AF) Pump Rooms and their associated sealing devices are not required to be OPERABLE when the associated AF pump is not required to be OPERABLE.

ACTIONS

------------------------------------NOTE------------------------------------

1. Separate Condition entry is allowed for each fire assembly and sealing device.

2. Alternate Compensatory Measures: NRC RIS 2005-07 provides the flexibility for the site to evaluate and justify compensatory measures on a case-by-case basis. Alternate compensatory measures may be a practical tool for minimizing the safety significance and/or reducing the burden of long-term impairments, or for addressing situations not directly addressed by the TRM, such as deficiencies in the safe shutdown analysis itself. The requirements for alternate compensatory measures are outlined in station procedures. (Note that station procedures use the terms “alternate compensatory measures” and “alternative compensatory measures” interchangeably.)
Each entry into Alternate Compensatory Measures requires an approved technical evaluation. If an approved technical evaluation is not available, then the TLCO will require establishment of either a continuous fire watch or an hourly fire watch if fire detection is available. If a technical evaluation for Alternate Compensatory Measures is approved after a fire watch has been established, then the fire watch can be suspended after the Alternate Compensatory Measures have been implemented.

3. TLCO 3.0.c is not applicable.

4. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more of the required fire assemblies inoperable.	A.1	Establish a continuous fire watch on at least one side of the inoperable assembly.	1 hour
	<u>OR</u>		
	A.2.1	Verify the OPERABILITY of fire detectors on at least one side of the inoperable assembly.	1 hour
	<u>AND</u>		
	A.2.2	Establish an hourly fire watch patrol.	1 hour
	<u>OR</u>		
	A.3	Establish Alternate Compensatory Measures	1 hour
B. One or more required fire rated sealing devices inoperable.	B.1	Establish a continuous fire watch on at least one side of the inoperable fire rated sealing device.	1 hour
	<u>OR</u>		
	B.2.1	Verify the OPERBILITY of fire detectors on at least one side of the inoperable fire rated sealing device.	1 hour
	<u>AND</u>		
	B.2.2	Establish an hourly fire watch patrol.	1 hour
	<u>OR</u>		
	B.3	Establish Alternate Compensatory Measures	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.10.g.1	Verify each unlocked fire door without electrical supervision is closed.	7 days
TSR 3.10.g.2	Verify each locked closed fire door is closed.	31 days
TSR 3.10.g.3	Perform TADOT for each electrically supervised fire door.	92 days
TSR 3.10.g.4	Inspect each required fire door release and closing mechanism and latch.	6 months
TSR 3.10.g.5	SURVEILLANCE DELETED	

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
TSR 3.10.g.6	-------------------NOTE------------------ 1. If apparent changes in appearance or abnormal degradations are found, a visual inspection of an additional 10% of each type of fire rated sealed penetration shall be made. This inspection process shall continue until a 10% sample with no apparent changes in appearance or abnormal degradation is found. 2. Samples shall be selected such that each fire rated penetration seal will be inspected every 15 years. -- Perform a visual inspection of 10% of each type of fire rated sealed penetration.	18 months
TSR 3.10.g.7	Perform a visual inspection of each fire window/fire damper and associated hardware.	18 months
TSR 3.10.g.8	Perform a visual inspection of the exposed surfaces of each fire assembly.	18 months

3.10 FIRE PROTECTION

3.10.h Fire Brigade Staff

TLCO 3.10.h A site Fire Brigade of at least 5 members shall be maintained onsite.

APPLICABILITY: At all times.

ACTIONS

-----NOTE-----

1. The Fire Brigade shall not include the Shift Manager and the two other members of the minimum shift crew necessary for safe shutdown of the unit and any personnel required for other essential functions during a fire emergency.

2. The Fire Brigade composition may be less than the minimum requirements for a period of time not to exceed 2 hours in order to accommodate unexpected absence provided immediate action is taken to fill the required positions.

3. TLCO 3.0.c is not applicable.

4. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Fire Brigade composition less than minimum requirements.	A.1 Initiate action to restore Fire Brigade to required composition.	Immediately

3.10 FIRE PROTECTION

3.10.i DC Emergency Lights

TLCO 3.10.i All DC Emergency Lights installed to satisfy Section III.J of 10 CFR 50 Appendix R (Drawing 6E-0-3779B) shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, 4 and 5.

ACTIONS

-------------------------------------NOTE-------------------------------------

1. Separate Condition entry is allowed for each emergency light.

2. TLCO 3.0.c is not applicable.

3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required emergency light(s) inoperable.	A.1 Establish backup emergency lighting in the affected area. <u>OR</u>	1 hour
	A.2 Provide portable lighting	1 hour

SURVEILLANCE REQUIREMENTS

---------------------------------NOTE------------------------------------

TSR 3.10.i.1 and 3.10.i.2 apply to each required emergency light.

SURVEILLANCE		FREQUENCY
TSR 3.10.i.1	Perform an operational check using local test pushbutton.	92 days
TSR 3.10.i.2	Perform 8 hour discharge test, or battery conductance test.	18 months

3.11 RADIOLOGICAL EFFLUENTS (RE)

3.11.a Radioactive Liquid Effluent Monitoring Instrumentation

TLCO 3.11.a All radioactive liquid effluent monitoring instrumentation channels shown in Table T3.11.a-1 shall be OPERABLE.

APPLICABILITY: At all times.

ACTIONS

------------------------------------NOTES------------------------------------

1. Separate Condition entry is allowed for each channel.
2. All samples are to be analyzed for radioactivity at a lower limit of detection as specified in Table T3.11.c-1.
3. TLCO 3.0.c is not applicable.
4. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more radioactive liquid effluent monitoring instrumentation channel Alarm/Trip Setpoint less conservative than required.	A.1 Suspend the release of radioactive liquid effluent monitored by the affected channel.	Immediately
	<u>OR</u>	
	A.2 Declare the channel inoperable.	Immediately
B. Less than the required radioactive liquid effluent monitoring instrumentation channels OPERABLE.	B.1 Enter the Condition referenced in Table T3.11.a-1 for the affected channel(s).	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. As required by Required Action B.1 and referenced by Table T3.11.a-1.	C.1 Verify at least two independent samples are analyzed.	Prior to initiating a release
	AND	
	C.2 Verify at least two technically qualified members of the facility staff independently verify the release rate calculations.	Prior to initiating a release
	AND	
	C.3 Verify at least two technically qualified members of the facility staff independently verify the discharge line valving.	Prior to initiating a release
	AND	
	C.4.1 Restore the required number of channels to OPERABLE.	14 days
	OR	
	C.4.2 Supplement the Radioactive Effluent Release Report pursuant to Technical Specification 5.6.3 with the cause for failure to correct inoperability.	In accordance with Technical Specification 5.6.3

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. As required by Required Action B.1 and referenced by Table T3.11.a-1.	D.1 Verify grab samples are collected and analyzed.	Every 12 hours
	AND	
	D.2.1 Restore the required number of channels to OPERABLE.	30 days
	OR	
	D.2.2 Supplement the Radioactive Effluent Release Report pursuant to Technical Specification 5.6.3 with the cause for failure to correct inoperability.	In accordance with Technical Specification 5.6.3

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. As required by Required Action B.1 and referenced by Table T3.11.a-1.	E.1	------NOTES--------- 1. Pump performance curves generated in place may be used to estimate flow. 2. Only required to be performed during actual releases. -------------------- Estimate flow rate.	Every 4 hours
	AND		
	E.2.1	Restore the required number of channels to OPERABLE.	30 days
	OR		
	E.2.2	Supplement the Radioactive Effluent Release Report pursuant to Technical Specification 5.6.3 with the cause for failure to correct inoperability.	In accordance with Technical Specification 5.6.3

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. As required by Required Action B.1 and referenced by Table T3.11.a-1.	F.1.1 -------NOTE--------- Only required to be performed when the specific activity of the secondary coolant is > 0.01 μCi/gm DOSE EQUIVALENT I-131. --------------------	
	Verify grab samples are collected and analyzed.	Every 12 hours
	OR	
	F.1.2 -------NOTE--------- Only required to be performed when the specific activity of the secondary coolant is ≤ 0.01 μCi/gm DOSE EQUIVALENT I-131. --------------------	
	Verify grab samples are collected and analyzed.	Every 24 hours
	AND	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. (continued)	F.2.1 Restore the required number of channels to OPERABLE.	30 days
	OR	
	F.2.2 Supplement the Radioactive Effluent Release Report Pursuant to Technical Specification 5.6.3 with the cause for failure to correct inoperability.	In accordance with Technical Specification 5.6.3
G. As required by Required Action B.1 and referenced by Table T3.11.a-1.	G.1 Verify liquid grab samples are collected and analyzed.	Every 12 hours
	AND	
	G.2.1 Restore the required number of channels to OPERABLE.	30 days
	OR	
	G.2.2. Supplement the Radioactive Effluent Release Report pursuant to Technical Specification 5.6.3 with the cause for failure to correct inoperability.	In accordance with Technical Specification 5.6.3

(continued)

ACTIONS (continued)

CONDITION		REQUIRED ACTION		COMPLETION TIME
H.	Required Action and associated Completion Time for Conditions C,D,E, F, or G not met.	H.1	Suspend the release of radioactive liquid effluent monitored by the affected channel.	Immediately

SURVEILLANCE REQUIREMENTS

--------------------------------NOTES--------------------------------

1. Refer to Table T3.11.a-1 to determine which TSRs apply to each instrument.

2. Alarm/Trip Setpoints shall be set to ensure that the limits of Technical Requirements 3.11.c are not exceeded. The Alarm/Trip Setpoints of these channels shall be determined and adjusted in accordance with the methodology and parameters in the OFFSITE DOSE CALCULATION MANUAL (ODCM).

SURVEILLANCE		FREQUENCY
TSR 3.11.a.1	Perform a CHANNEL CHECK.	24 hours
TSR 3.11.a.2	Perform a SOURCE CHECK.	31 days
TSR 3.11.a.3	Perform a CHANNEL OPERATIONAL TEST.	92 days
TSR 3.11.a.4	Perform a CHANNEL OPERATIONAL TEST.	184 days
TSR 3.11.a.5	Perform a CHANNEL CALIBRATION.	18 months
TSR 3.11.a.6	Perform a SOURCE CHECK.	Prior to each release

Table T3.11.a-1 (page 1 of 3)

Radioactive Liquid Effluent Monitoring Instrumentation

INSTRUMENT	REQUIRED CHANNELS	CONDITION	SURVEILLANCE REQUIREMENTS
1. Radioactivity Monitors Providing Alarm and Automatic Termination of Release			
a. Liquid Radwaste Effluent Line (ORE-PR001)	1	C	TSR 3.11.a.1 TSR 3.11.a.4 [(a)] TSR 3.11.a.5 [(c)] TSR 3.11.a.6
b. Fire and Oil Sump (ORE-PR005)	1	F	TSR 3.11.a.1 TSR 3.11.a.2 TSR 3.11.a.4 [(a)] TSR 3.11.a.5 [(c)]
c. Condensate Polisher Sump Discharge (ORE-PR041)	1	F	TSR 3.11.a.1 TSR 3.11.a.2 TSR 3.11.a.4 [(a)] TSR 3.11.a.5 [(c)]

(continued)

(a) The CHANNEL OPERATIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occur if any of the following conditions exists:

1. Instrument indicates measured levels above the ALARM/TRIP Setpoint, or
2. Circuit failure (monitor loss of communications - alarm only, detector loss of counts, or monitor loss of power), or
3. Detector check source test failure, or
4. Detector channel out-of-service, or
5. Monitor loss of sample flow.

(c) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Institute of Standards and Technology (NIST) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.

Table T3.11.a-1 (page 2 of 3)

Radioactive Liquid Effluent Monitoring Instrumentation

INSTRUMENT	REQUIRED CHANNELS	CONDITION	SURVEILLANCE REQUIREMENTS
2. Radioactivity Monitors Providing Alarm But Not Providing Automatic Termination of Release			
a. Essential Service Water			
1) Unit 1			
a) RCFC 1A and 1C Outlet (1RE-PR002)	1	D	TSR 3.11.a.1 TSR 3.11.a.2 TTSR 3.11.a.4 (b) TSR 3.11.a.5 (c)
b) RCFC 1B and 1D Outlet (1RE-PR003)	1	D	SR 3.11.a.1 TSR 3.11.a.2 TSR 3.11.a.4 (b) TSR 3.11.a.5 (c)
2) Unit 2			
a) RCFC 2A and 2C Outlet (2RE-PR002)	1	D	TSR 3.11.a.1 TSR 3.11.a.2 TSR 3.11.a.4 (b) TSR 3.11.a.5 (c)
b) RCFC 2B and 2D Outlet (2RE-PR003)	1	D	TSR 3.11.a.1 TSR 3.11.a.2 TSR 3.11.a.4 (b) TSR 3.11.a.5 (c)
b. Station Blowdown Line (0RE-PR010)	1	D	TSR 3.11.a.1 TSR 3.11.a.2 TSR 3.11.a.4 (a) TSR 3.11.a.5 (c)

(continued)

(b) The CHANNEL OPERATIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:

1. Instrument indicates measured levels above the ALARM Setpoint, or
2. Circuit failure (monitor loss of communications - alarm only, detector loss of counts, or monitor loss of power),
3. Detector check source test failure, or
4. Detector channel out-of-service, or
5. Monitor loss of sample flow.

(c) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Institute of Standards and Technology (NIST) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.

Table T3.11.a-1 (page 3 of 3)

Radioactive Liquid Effluent Monitoring Instrumentation

INSTRUMENT	REQUIRED CHANNELS	CONDITION	SURVEILLANCE REQUIREMENTS
3. Flow Rate Measurement Devices			
a. Liquid Radwaste Effluent Line (Loop-WX001)	1	E	TSR 3.11.a.1 [d] TSR 3.11.a.3 TSR 3.11.a.5
b. Liquid Radwaste Effluent Line (Loop-WX630)	1	E	TSR 3.11.a.1 [d] TSR 3.11.a.3 TSR 3.11.a.5
c. Station Blowdown Line (Loop-CW032)	1	E	TSR 3.11.a.1 [d] TSR 3.11.a.3 TSR 3.11.a.5
4. Radioactivity Monitors Providing Alarm and Automatic Closure of Surge Tank Vent Component Cooling Water Line a. (0RE-PR009 and 1/2RE-PR009)	2	G	TSR 3.11.a.1 TSR 3.11.a.2 TSR 3.11.a.4 [a] TSR 3.11.a.5 [c]

(a) The CHANNEL OPERATIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occur if any of the following conditions exist:

1. Instrument indicates measured levels above the ALARM/TRIP Setpoint, or
2. Circuit failure (monitor loss of communications - alarm only, detector loss of counts, or monitor loss of power),
3. Detector check source test failure, or
4. Detector channel out-of-service, or
5. Monitor loss of sample flow.

(d) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Institute of Standards and Technology (NIST) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.

(d) CHANNEL CHECK shall consist of verifying indication of flow during periods of release. CHANNEL CHECK shall be made at least once per 24 hours on days on which continuous, periodic, or batch releases are made.

3.11 RADIOLOGICAL EFFLUENTS(RE)

3.11.b Radioactive Gaseous Effluent Monitoring Instrumentation

TLCO 3.11.b All radioactive gaseous effluent monitoring instrumentation channels shown in Table T3.11.b-1 shall be OPERABLE.

APPLICABILITY: At all times.

ACTIONS

-------------------------------------NOTE-------------------------------------

1. Separate Condition entry is allowed for each channel.

2. TLCO 3.0.c is not applicable.

3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more gaseous effluent monitoring instrumentation channel Alarm/Trip Setpoint(s) less conservative than required.	A.1 Suspend the release of radioactive gaseous effluent monitored by the affected channel.	Immediately
	<u>OR</u>	
	A.2 Declare the channel inoperable.	Immediately
B. Less than the required radioactive gaseous effluent monitoring instrumentation channels OPERABLE.	B.1 Enter the Condition referenced in Table T3.11.b-1 for the affected channel(s).	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. As required by Required Action B.1 and referenced by Table T3.11.b-1.	C.1	Verify at least two independent samples of the tank's contents are analyzed.	Prior to initiating a release
	<u>AND</u>		
	C.2	Verify at least two technically qualified members of the facility staff independently verify the release rate calculations.	Prior to initiating a release
	<u>AND</u>		
	C.3	Verify at least two technically qualified members of the facility staff independently verify the discharge valve lineup.	Prior to initiating a release
	<u>AND</u>		
	C.4.1	Restore the required number of channels to OPERABLE.	14 days
	<u>OR</u>		
	C.4.2	Supplement the Radioactive Effluent Release Report pursuant to Technical Specification 5.6.3 with the cause for failure to correct the inoperability.	In accordance with Technical Specification 5.6.3

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. As required by Required Action B.1 and referenced by Table T3.11.b-1.	D.1.1	Suspend PURGING via this pathway.	Immediately
	<u>OR</u>		
	D.1.2	Verify real time monitoring of radioactive effluents released via this pathway.	During release
	<u>AND</u>		
	D.2.1	Restore the required number of channels to OPERABLE.	7 days
	<u>OR</u>		
	D.2.2	Supplement the Radioactive Effluent Release Report pursuant to Technical Specification 5.6.3 with the cause for failure to correct the inoperability.	In accordance with Technical Specification 5.6.3.

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
E. As required by Required Action B.1 and referenced by Table T3.11.b-1.	E.1	Estimate flow rate	Every 4 hours
	<u>AND</u>		
	E.2.1	Restore the required number of channels to OPERABLE.	30 days
	<u>OR</u>		
	E.2.2	Supplement the Radioactive Effluent Release Report pursuant to Technical Specification 5.6.3 with the cause for failure to correct inoperability.	In accordance with Technical Specification 5.6.3

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
F. As required by Required Action B.1 and referenced by Table T3.11.b-1.	F.1	Verify samples are continuously collected with auxiliary sampling equipment as required by Table T3.11.f-1.	During release
	<u>AND</u>		
	F.1.2	Restore the required number of channels to OPERABLE.	30 days
	<u>OR</u>		
	F.2.2	Supplement the Radioactive Effluent Release Report pursuant to Technical Specification 5.6.3 with the cause for failure to correct the inoperability.	In accordance with Technical Specification 5.6.3

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
G. As required by Required Action B.1 and referenced by Table T3.11.b-1.	G.1	Verify gaseous grab samples are collected and analyzed for principle gamma emitters at a Lower Limit of Detection (LLD) as specified in TRM 3.11 Table T3.11.f-1.n	Every 12 hours
	<u>AND</u>		
	G.2.1	Restore the required number of channels to OPERABLE.	30 days
	<u>OR</u>		
	G.2.2	Supplement the Radioactive Effluent Release Report pursuant to Technical Specification 5.6.3 with the cause for failure to correct the inoperability.	In accordance with Technical Specification 5.6.3
H. Required Action and associated Completed Time for Conditions C, D, E, F, or G not met.	H.1	Suspend the release of radioactive gaseous effluent monitored by the affected channel.	Immediately

SURVEILLANCE REQUIREMENTS

-------------------------------NOTES-------------------------------

1. Refer to Table T3.11.b-1 to determine which TSRs apply to each instrument.
2. Alarm/Trip Setpoints shall be set to ensure that the limits of Technical Requirements 3.11.f and Technical Specification 5.5.12 are not exceeded. The Alarm/Trip Setpoints of these channels meeting TLCO 3.11.f shall be determined and adjusted in accordance with the methodology and parameters in the OFFSITE DOSE CALCULATION MANUAL (ODCM).

SURVEILLANCE		FREQUENCY
TSR 3.11.b.1	Perform a CHANNEL CHECK.	24 hours
TSR 3.11.b.2	Perform a SOURCE CHECK.	31 days
TSR 3.11.b.3	Perform a CHANNEL OPERATIONAL TEST.	92 days
TSR 3.11.b.4	Perform a CHANNEL OPERATIONAL TEST.	184 days
TSR 3.11.b.5	Perform a CHANNEL CALIBRATION.	18months
TSR 3.11.b.6	Perform a CHANNEL CHECK.	Prior to each release
TSR 3.11.b.7	Perform a SOURCE CHECK.	Prior to each release

Table T3.11.b-1 (page 1 of 3)

Radioactive Gaseous Effluent Monitoring Instrumentation

INSTRUMENT	REQUIRED CHANNELS	CONDITION	SURVEILLANCE REQUIREMENTS
U-1 Plant Vent Monitoring			
1. Noble Gas Activity Monitor - Providing Alarm			
a. High Range (1RE-PR028D)	1	G	TSR 3.11.b.1
			TSR 3.11.b.2
			TSR 3.11.a.4(b)
			TSR 3.11.a.5(c)
b. Low Range (1RE-PR028B)	1	G	TSR 3.11.b.1
			TSR 3.11.b.2
			TSR 3.11.b.4 (b)
			TSR 3.11.b.5 (c)
c. Iodine Sampler (1RE-PR028C)	1	F	TSR 3.11.b.1
			TSR 3.11.b.2
			TSR 3.11.b.4 (b)
			TSR 3.11.b.5 (c)
d. Particulate Sampler (1RE-PR028A)	1	F	TSR 3.11.b.1
			TSR 3.11.b.2
			TSR 3.11.b.4 (b)
			TSR 3.11.b.5 (c)
e. Effluent System Flow Rate Measuring Device (LOOP-VA019)	1	E	TSR 3.11.b.1
			TSR 3.11.b.3
			TSR 3.11.b.5
f. Sampler Flow Rate Measuring Devices (1FT-PR165)	1	E	TSR 3.11.b.1
			TSR 3.11.b.4
			TSR 3.11.b.5

(continued)

(b) The CHANNEL OPERATIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:

1. Instrument indicates measured levels above the ALARM Setpoint, or
2. Circuit failure (monitor loss of communications - alarm only, detector loss of counts, or monitor loss of power), or
3. Detector check source test failure, or
4. Detector channel out-of-service, or
5. Monitor loss of sample flow.

(c) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Institute of Standards and Technology (NIST) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.

Table T3.11.b-1 (page 2 of 3)

Radioactive Gaseous Effluent Monitoring Instrumentation

INSTRUMENT	REQUIRED CHANNELS	CONDITION	SURVEILLANCE REQUIREMENTS
U-2 Plant Vent Monitoring System			
2. Noble Gas Activity Monitor -Providing Alarm			TSR 3.11.b.1
a. High Range (2RE-PR028D)	1	G	TSR 3.11.b.2
			TSR 3.11.b.4 (b)
			TSR 3.11.b.5 (c)
b. Low Range (2RE-PR028B)	1	G	TSR 3.11.b.1
			TSR 3.11.b.2
			TSR 3.11.b.4 (b)
			TSR 3.11.b.5 (c)
c. Iodine Sampler (2RE-PR028C)	1	F	TSR 3.11.b.1
			TSR 3.11.b.2
			TSR 3.11.b.4 (b)
			TSR 3.11.b.5 (c)
d. Particulate Sampler (2RE-PR028A)	1	F	TSR 3.11.b.1
			TSR 3.11.b.2
			TSR 3.11.b.4 (b)
			TSR 3.11.b.5 (c)
e. Effluent System Flow Rate Measuring Device (LOOP-VA020)	1	E	TSR 3.11.b.1
			TSR 3.11.b.3
			TSR 3.11.b.5
f. Sampler Flow Rate Measuring Device (2FT-PR165)	1	E	TSR 3.11.b.1
			TSR 3.11.b.4
			TSR 3.11.b.5
3. Refer to Technical Requirements Manual 3.3.e for Gaseous Waste Management Explosive Gas Monitoring Instrumentation			

(continued)

(b) The CHANNEL OPERATIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:

1. Instrument indicates measured levels above the ALARM Setpoint, or
2. Circuit failure (monitor loss of communications - alarm only, detector loss of counts, or monitor loss of power), or
3. Detector check source test failure, or
4. Detector channel out-of-service, or
5. Monitor loss of sample flow.

(c) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Institute of Standards and Technology (NIST) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.

Table T3.11.b-1 (page 3 of 3)

Radioactive Gaseous Effluent Monitoring Instrumentation

INSTRUMENT	REQUIRED CHANNELS	CONDITION	SURVEILLANCE REQUIREMENTS
4. Gas Decay Tank System			
Noble Gas Activity Monitor - Providing Alarm and Automatic Termination of Release (ORE-PR002A and 2B)	2	C	TSR 3.11.b.4 [d] TSR 3.11.b.5 [c] TSR 3.11.b.6 TSR 3.11.b.7
5. Containment Purge System			TSR 3.11.b.1
a. Noble Gas Activity Monitor - Providing Alarm (1/2RE-PR001B)	1	D	TSR 3.11.b.4 [a] TSR 3.11.b.5 [c] TSR 3.11.b.7
b. Iodine Sampler (1/2RE-PR001C)	1	F	TSR 3.11.b.5 [c] TSR 3.11.b.6 TSR 3.11.b.7
c. Particulate Sampler (1/2RE-PR001A)	1	F	TSR 3.11.b.5 [c] TSR 3.11.b.6 TSR 3.11.b.7

(a) The CHANNEL OPERATIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occur if any of the following conditions exists:

1. Instrument indicates measured levels above the Alarm/Trip Setpoint, or
2. Circuit failure (monitor loss of communications - alarm only, detector loss of counts, or monitor loss of power), or
3. Detector check source test failure, or
4. Detector channel out-of-service, or
5. Monitor loss of sample flow.

(b) The CHANNEL OPERATIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:

1. Instrument indicates measured levels above the Alarm Setpoint, or
2. Circuit failure (monitor loss of communications - alarm only, detector loss of counts, or monitor loss of power), or
3. Detector check source test failure, or
4. Detector channel out-of-service, or
5. Monitor loss of sample flow.

(c) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Institute of Standards and Technology (NIST) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.

3.11 RADIOLOGICAL EFFLUENTS(RE)

3.11.c Concentration Limits for Effluents

TLCO 3.11.c The concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS (see Byron Station OFFSITE DOSE CALCULATION MANUAL (ODCM)) shall be limited to 10 times the concentrations specified in 10 CFR Part 20, Appendix B, Table 2, Column 2, for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to $2x10^{-4}$ μCi/ml total activity.

APPLICABILITY: At all times.

ACTIONS

------------------------------------NOTE------------------------------------

1. Separate Condition entry is allowed for each release.

2. TLCO 3.0.c is not applicable.

3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Concentration of radioactive material released exceeding limit.	A.1 Restore the concentration within the limit. OR	Immediately
	A.2 Terminate the release.	Immediately

(continued)

SURVEILLANCE REQUIREMENTS

-----NOTES-----

1. All TSRs to be performed at frequency defined by Table T3.11.c-1.

2. The results of the radioactivity analysis shall be used in accordance with the methodology and parameters in the ODCM to assure that the concentrations at this point of release are maintained with the limits of TLCO 3.11.c.

SURVEILLANCE		FREQUENCY
TSR 3.11.c.1	Sample and analyze liquid wastes.	Per Table T3.11.c-1

Table T3.11.c-1 (page 1 of 4)

Radioactive Liquid Waste Sampling and Analysis Program

LIQUID RELEASE TYPE	SAMPLING FREQUENCY(g)	MINIMUM ANALYSIS FREQUENCY(g)	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD) (μCi/ml) (Refer to Note 1. Page 3.11.c-6)
1. Batch Release Tanks [(a)]	P Each Batch	P Each Batch	Principal Gamma Emitters [(b)]	5×10^{-7}
			I-131	1×10^{-6}
	P One Batch/M	M	Dissolved and Entrained Gases (Gamma Emitters)	1×10^{-5}
	P Each Batch	M Composite [(c)]	H-3	1×10^{-5}
	P Each Batch	Q Composite [(c)]	Gross Alpha	1×10^{-7}
			Sr-89, Sr-90	5×10^{-8}
			Fe-55	1×10^{-6}

(continued)

Table T3.11.c-1 (page 2 of 4)

Radioactive Liquid Waste Sampling and Analysis Program

LIQUID RELEASE TYPE	SAMPLING FREQUENCY(g)	MINIMUM ANALYSIS FREQUENCY(g)	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD) (μCi/ml) (Refer to Note 1. Page 3.11.c-6)
2. Continuous Releases (d)	Continuous (e)	W Continuous (e)	Principal Gamma Emitters (b)	5×10^{-7}
			I-131	1×10^{-6}
a. Circulating Water Blowdown	M Grab Sample	M	Dissolved and Entrained Gases (Gamma Emitters)	1×10^{-5}
b. Waste Water Treatment System Discharge to Flume	Continuous (e)	M Continuous (e)	H-3	1×10^{-5}
c. Condensate Polisher Sump Discharge	Continuous (e)	Q Continuous (e)	Gross Alpha	1×10^{-7}
			Sr-89, Sr-90	5×10^{-8}
			Fe-55	1×10^{-6}

(continued)

Table T3.11.c-1 (page 3 of 4)

Radioactive Liquid Waste Sampling and Analysis Program

LIQUID RELEASE TYPE	SAMPLING FREQUENCY(g)	MINIMUM ANALYSIS FREQUENCY(g)	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD) (μCi/ml) (Refer to Note 1. Page 3.11.c-6)
3. Continuous Releases (d) Essential Service Water Reactor Containment Fan Cooler (RCFC) Outlet Line	W (f) Grab Sample	W (f)	Principal Gamma Emitters (b)	5×10^{-7}
			I-131	1×10^{-6}
			Dissolved and Entrained Gases (Gamma Emitters)	1×10^{-5}
			H-3	1×10^{-5}

(a) A batch release is the discharge of liquid wastes of a discrete volume. Prior to sampling for analyses, each batch shall be isolated and then thoroughly mixed.

(b) The principal gamma emitters for which the LLD specification applies include the following radionuclides Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, and Ce-141. Ce-144 shall also be measured, but at the LLD of 5E-06. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Radioactive Effluent Release Report pursuant to Specifications 5.6.3 in the format outlined in Regulatory Guide 1.21, Appendix B, Revision 1, June 1974.

(c) A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged and in which the method of sampling employed results in a specimen that is representative of the liquids released.

(d) A continuous release is the discharge of liquid wastes of a nondiscrete volume, e.g., from a volume of a system that has an input flow during the continuous release.

(e) To be representative of the quantities and concentrations of radioactive materials in liquid effluents, samples shall be collected continuously in proportion to the rate of flow of the effluent stream. Prior to analyses, all samples taken for the composite shall be thoroughly mixed in order for the composite sample to be representative of the effluent release.

(f) Not required unless the Essential Service Water RCFC Outlet Radiation Monitors 1/2RE-PR002 and 1/2RE-PR003 indicate levels greater than 1×10^{-6} μCi/ml above background at any time during the week.

(g) Frequency Notation:

P = Prior to each release

M = At least once per 31 days

Q = At least once per 92 days

W = at least once per 7 days

Table T3.11.c-1 (page 4 of 4)

Radioactive Liquid Waste Sampling and Analysis Program

Note 1: Lower Limit of Detection (LLD)

The LLD is defined, for purposes of these Technical Requirements, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a “real” signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66\ s_b}{E * V * 2.22 \times 106 * Y * \exp} \ (-\lambda \Delta T)$$

Where:

LLD = the lower limit of detection (microCuries per unit mass or volume).

S_b = the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute).

E = the counting efficiency (counts per disintegration).

V = the sample size (units of mass or volume).

2.22×10^6 = the number of disintegrations per minute per microCurie.

Y = the fractional radiochemical yield, when applicable.

λ = the radioactive decay constant for the particular radionuclide (sec^{-1}), and

ΔT = the elapsed time between the midpoint of sample collection and the time of counting (sec).

Typical values of E, V, Y and ΔT should be used in the calculation.

It should be recognized that the LLD is defined as a before the fact limit representing the capability of a measurement system and not as an after the fact limit for a particular measurement.

3.11 RADIOLOGICAL EFFLUENTS(RE)

3.11.d Dose from Liquid Effluents

TLCO 3.11.d The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents, from each unit, to UNRESTRICTED AREAS (see Byron Station OFFSITE DOSE CALCULATION MANUAL (ODCM)) shall be limited:

1. During any calendar quarter to ≤ 1.5 mrem to the whole body and to ≤ 5 mrem to any organ, and
2. During any calendar year to ≤ 3 mrem to the whole body and to ≤ 10 mrem to any organ.

APPLICABILITY: At all times.

ACTIONS

-------------------------------NOTES-------------------------------

1. Separate Condition entry is allowed for each dose.
2. TLCO 3.0.c is not applicable.
3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Calculated dose exceeding above limits.	A.1 Submit Special Report to the Commission that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.11.d.1	Determine cumulative dose contributions from liquid effluents for the current calendar quarter and the current calendar year.	31 days

3.11 RADIOLOGICAL EFFLUENTS(RE)

3.11.e Liquid Radwaste Treatment System

TLCO 3.11.e The Liquid Radwaste Treatment System shall be OPERABLE and shall be used to reduce releases from each unit to UNRESTRICTED AREAS (see Byron Station OFFSITE DOSE CALCULATION MANUAL (ODCM)) when the projected dose would exceed 0.06 mrem to the whole body or 0.2 mrem to any organ in a 31 day period.

APPLICABILITY: At all times.

ACTIONS

-------------------------------NOTES-------------------------------

1. Separate Condition entry is allowed for each dose.

2. TLCO 3.0.c is not applicable.

3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Radioactive liquid waste being discharged without treatment. <u>AND</u> In excess of above limits. <u>AND</u> Any portion of the Liquid Radwaste Treatment System not in operation.	A.1 Submit Special Report to the Commission that includes an explanation of why liquid radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems, and the reason for the inoperability; action(s) taken to restore the inoperable equipment to OPERABLE status; and a summary description of action(s) taken to prevent recurrence.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.11.e.1	----------------NOTE--------------------- Only required to be performed when the Liquid Radwaste Treatment System is not fully utilized. --- Project doses due to liquid releases from each unit to UNRESTRICTED AREAS.	31 days
TSR 3.11.e.2	Verify the installed Liquid Radwaste Treatment System is OPERBLE by meeting the requirements of TLCO 3.11.c and TLCO 3.11.d.	Per the applicable TSRs

3.11 RADIOLOGICAL EFFLUENTS(RE)

3.11.f Dose Rate for Gaseous Effluent

TLCO 3.11.f The dose rate in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY (See Byron Station OFFSITE DOSE CALCULATION MANUAL (ODCM)) shall be limited to:

1. For noble gases: ≤ 500 mrem/yr to the whole body and ≤ 3000 mrem/yr to the skin, and
2. For Iodine-131 and 133, for tritium, and for all radionuclides in particulate form with half-lives > 8 days; ≤ 1500 mrem/yr to any organ.

APPLICABILITY: At all times.

ACTIONS

-------------------------------NOTES-------------------------------

1. Separate Condition entry is allowed for each dose.
2. TLCO 3.0.c is not applicable.
3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Dose rate exceeding above limits.	A.1 Restore the release rate to within limits.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.11.f.1	Determine dose rate due to noble gases within limits.	Per Table T3.11.f-1
TSR 3.11.f.2	Determine dose rate due to I-131, I-133 tritium and all other radionuclides in particulate from with half-lives > 8 days within limits.	Per Table T3.11.f-1

Table T3.11.f-1 (page 1 of 3)

Radioactive Gaseous Waste Sampling and Analysis Program

GASEOUS RELEASE TYPE	SAMPLING FREQUENCY(g)	MINIMUM ANALYSIS FREQUENCY(g)	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD) (μCi/ml) (Refer to Note 1. Page 3.11.F-5)
1. Waste Gas Decay Tank	P Each Tank Grab Sample	P Each Tank	Principal Gamma Emitters [(a)]	1×10^{-4}
2. Containment Purge	P Each PURGE [(b)] Grab Sample	Each PURGE [(b)] Grab Sample	Principal Gamma Emitters[(a)]	1×10^{-4}
			H-3	1×10^{-7}

(continued)

Table T3.11.f-1 (page 2 of 3)

Radioactive Gaseous Waste Sampling and Analysis Program

GASEOUS RELEASE TYPE	SAMPLING FREQUENCY(g)	MINIMUM ANALYSIS FREQUENCY(g)	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD) (μCi/ml) (Refer to Note 1. Page 3.11.F-5)
3. Auxiliary Building Vent Stack (Units 1 and 2)	M (c) (d) Grab Sample	M	Principal Gamma Emitters (a)	1×10^{-4}
			H-3	1×10^{-7}
	Continuous (e)	W (f) Charcoal Sample	I-131	1×10^{-12}
			I-133	1×10^{-10}
	Continuous (e)	W (f) Particulate Sample	Principal Gamma Emitters(a)	1×10^{-11}
	Continuous (e)	Q Composite Particulate Sample	Gross Alpha	1×10^{-11}
	Continuous (e)	Q Composite Particulate Sample	Sr-89, Sr-90	1×10^{-11}
	Continuous	N.A. Noble Gas Monitor	Noble Gases; Gross Beta or Gamma	1×10^{-6}

(continued)

(a) The principal gamma emitters for which the LLD specification applies include the following radionuclides; Kr-87, Kr-88, Xe133m, Xe-135, and Xe-138 in noble gas releases and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, I-131, Cs-134, Cs-137, Ce-141, and Ce-144 in iodine and particulate releases. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Radioactive Effluent Release Report pursuant to Specification 5.6.3, in the format outlined in Regulatory Guide 1.21, Appendix B, Revision 1, June 1974.

(b) Sampling and analysis shall also be performed following shutdown, startup or a THERMAL POWER change exceeding 15% of RATED THERMAL POWER within a 1-hour period.

(c) Tritium grab samples shall be taken at least once per 24 hours when the refueling canal is flooded.

(d) Tritium grab samples shall be taken at least once per 7 days from the spent fuel pool area, whenever spent fuel is in the spent fuel pool.

(e) The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with Technical Requirements 3.11.f, 3.11.g, and 3.11.h.

(f) Samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after changing, or after removal from sampler. Sampling shall also be performed at least once per 24 hours for at least 7 days following each shutdown, startup or THERMAL POWER change exceeding 15% of RATED THERMAL POWER within a 1-hour period and analyses shall be completed with 48 hours of changing. When samples collected for 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10. This requirement does not apply if: (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the reactor coolant has not increased more than a factor of 3, and (2) the noble gas monitor shows that effluent activity has not increased more than a factor of 3.

(g) Frequency Notation:

P = Prior to each release, M = At least once per 31 days, Q = At least once per 92 days, W = at least once per 7 days.

Table T3.11.f-1 (page 3 of 3)

Radioactive Gaseous Waste Sampling and Analysis Program

Note 1: Lower Limit of Detection (LLD)

The LLD is defined, for purposes of these Technical Requirements, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66\ S_b}{E * V * 2.22 \times 10^6 * Y * \exp(-\lambda \Delta T)}$$

Where:

LLD =	the lower limit of detection (microCuries per unit mass or volume).
S_b =	the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute).
E =	the counting efficiency (counts per disintegration).
V =	the sample size (units of mass or volume).
2.22×10^6 =	the number of disintegrations per minute per microCurie.
Y =	the fractional radiochemical yield, when applicable.
λ =	the radioactive decay constant for the particular radionuclide (sec-1), and
ΔT =	the elapsed time between the midpoint of sample collection and the time of counting (sec).

Typical values of E, V, Y, and ΔT should be used in the calculation.

It should be recognized that the LLD is defined as a before the fact limit representing the capability of a measurement system and not as an after the fact limit for a particular measurement.

3.11 RADIOLOGICAL EFFLUENTS(RE)

3.11.g Dose - Noble Gases

TLCO 3.11.g The air dose due to noble gases released in gaseous effluents, from each unit, to areas at and beyond the SITE BOUNDARY/UNRESTRICTED AREA boundary (see Byron Station OFFSITE DOSE CALCULATION MANUAL (ODCM)) shall be limited to:

1. During any calendar quarter: $\leq$ 5 mrad for gamma radiation and $\leq$ 10 mrad for beta radiation, and

2. During any calendar year: $\leq$ 10 mrad for gamma radiation and $\leq$ 20 mrad for beta radiation.

APPLICABILITY: At all times.

ACTIONS

------------------------------NOTES------------------------------

1. Separate Condition entry is allowed for each dose.

2. TLCO 3.0.c is not applicable.

3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Calculated air dose exceeding limit.	A.1	Submit a Special Report to the Commission that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.11.g.1	Determine cumulative dose contributions for noble gases for the current calendar quarter and current calendar year.	31 days

3.11 RADIOLOGICAL EFFLUENTS(RE)

3.11.h Dose – I-131, I-133, Tritium, and Radioactive Material in Particulate Form

TLCO 3.11.h The dose to a MEMBER OF THE PUBLIC from I-131, I-133, tritium, and all radionuclides in particulate form with half-lives > 8 days in gaseous effluents released, from each unit, to areas at and beyond the SITE BOUNDARY/UNRESTRICTED AREA boundary (see BYRON Station OFFSITE DOSE CALCULATION MANUAL (ODCM)) shall be limited to:

1. During any calendar quarter: ≤ 7. mrem to any organ, and
2. During any calendar year: ≤ 15 mrem to any organ.

APPLICABILITY: At all times.

ACTIONS

-------------------------------NOTES-------------------------------

1. Separate Condition entry is allowed for each calculated dose.
2. TLCO 3.0.c is not applicable.
3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Calculated dose exceeding limit.	A.1	Submit a Special Report to the Commission that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.11.h.1	Determine cumulative dose contributions for Iodine-131 and 133, tritium, and radionuclides in particulate form with half-lives > 8 days for the current calendar quarter and current calendar year.	31 days

3.11 RADIOLOGICAL EFFLUENTS(RE)

3.11.i Gaseous Radwaste Treatment System

TLCO 3.11.i The VENTILATION EXHAUST TREATMENT SYSTEM and the WASTE GAS HOLDUP SYSTEM shall be OPERABLE and shall be used to reduce activity in releases, from each unit, of gaseous effluents when the projected doses at and beyond the SITE BOUNDARY/UNRESTRICTED AREA boundary (see Byron Station OFFSITE DOSE CALCULATION MANUAL (ODCM)) in 31 days would exceed:

1. 0.2 mrad to air from gamma radiation
2. 0.4 mrad to air from beta radiation, or
3. 0.3 mrem to any organ of a MEMBER OF THE PUBLIC.

APPLICABILITY: At all times.

ACTIONS

-------------------------------NOTES-------------------------------

1. Separate Condition entry is allowed for each gaseous release.

2. TLCO 3.0.c is not applicable.

3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. -----NOTE------- Only applicable if radioactive gaseous waste being discharged without treatment. ------------------ Gaseous releases in excess of limit.	A.1 Submit a Special Report to the Commission that includes the following information: a. Identification of any inoperable equipment or subsystems, and the reason for the inoperability. b. Action(s) taken to restore the inoperable equipment to OPERABLE status, and c. Summary description of action(s) taken to prevent recurrence.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.11.i.1	-----NOTE----- Only required to be performed when the Gaseous Radwaste Treatment Systems are not being fully utilized. ---------- Project doses due to gaseous releases from each unit to areas at or beyond the SITE BOUNDARY/UNRESTRICTED AREA boundary.	31 days
TSR 3.11.i.2	Verify the installed VENTILATION EXHAUST TREATMENT SYSTEM and WASTE GAS HOLDUP SYSTEM are OPERABLE by meeting TSR 3.11.f, and TSR 3.11.g or TSR 3.11.h.	Per the applicable TSRs

3.11 RADIOLOGICAL EFFLUENTS(RE)

3.11.j Solid Radioactive Wastes

TLCO 3.11.j Radioactive wastes shall be solidified or dewatered in accordance with the PROCESS CONTROL PROGRAM.

APPLICABILITY: At all times.

ACTIONS

-------------------------------NOTES-------------------------------

1. TLCO 3.0.c is not applicable.

2. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A.1 Solidification or dewatering not meeting either the disposal site, shipping or transportation requirements.	A.1 Suspend shipment of inadequately processed wastes.	Immediately
	AND	
	A.2 Determine root cause and correct to preclude recurrence.	Prior to resuming shipments
B.1 Solidification or dewatering not performed in accordance with the PROCESS CONTROL PROGRAM.	B.1 Test the improperly processed waste in each container to ensure it meets burial ground and shipping requirements.	Prior to resuming shipments
	AND	
	B.2 Take appropriate administrative action to prevent recurrence.	Prior to resuming shipments

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.11.j.1	The PROCESS CONTROL PROGRAM shall be used to collect and test representative specimens to verify the solidification of each type of wet radioactive waste. (Refer to Note 1, Page 3.11.j-3)	At least one representative test specimen from at least every tenth batch of each type of wet radioactive waste

NOTE 1

Solidification of at least one representative test specimen from at least every tenth batch of each type of wet radioactive wastes (e.g., filter sludges, spent resins, evaporator bottoms, boric acid solutions and sodium sulfate solutions) shall be verified in accordance with the PROCESS CONTROL PROGRAM:

a. If any test specimen fails to verify solidification, the solidification of the batch under test shall be suspended until such time as additional test specimens can be obtained, alternative solidification parameters can be determined in accordance with the PROCESS CONTROL PROGRAM, and a subsequent test verifies solidification. Solidification of the batch may then be resumed using the alternative solidification parameters determined by the PROCESS CONTROL PROGRAM;

b. If the initial test specimen from a batch of waste fails to verify solidification, the PROCESS CONTROL PROGAM, shall provide for me the collection and testing of representative test specimens from each consecutive batch of the same type of wet waste until at least 3 consecutive initial test specimens demonstrate solidification. The PROCESS CONTROL PROGRAM shall be modified as required, as provided in TLCO 5.2.5, to assure solidification of subsequent batches of waste; and

c. With the installed equipment incapable of meeting TLCO 3.11.j or declared out-of-service, restore the equipment to operable status or provide for contract capability to process wastes as necessary to satisfy all applicable transportation and disposal requirements.

3.11 RADIOLOGICAL EFFLUENTS(RE)

3.11.k Total Dose

TLCO 3.11.k The annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and to radiation from the uranium fuel cycle sources shall be limited to ≤ 25 mrem to the whole body or any organ (except the thyroid) and ≤ 75 mrem to the thyroid.

APPLICABILITY: At all times.

ACTIONS

-------------------------------NOTES-------------------------------

1. Separate Condition entry is allowed for each calculated dose.
2. TLCO 3.0.c is not applicable.
3. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Calculated doses exceeding twice the TLCO limits for: 3.11.D.1 3.11.D.2 3.11.G.1 3.11.G.2 3.11.H.1, or 3.11.H,2	A.1	-------NOTE--------- Calculations to include direct radiation contributions from the Unit and from outside storage tanks. -------------------- Determine if the TLCO 3.11.k limits have been exceeded.	15 days
B. Required Action of Condition A determines the TLCO 3.11.k limits have been exceeded.	B.1	Submit a Special Report to the Commission (Refer to Note 1, Page 3.11.k-3).	15 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.11.k.1	---------------NOTE--------------------- Only applicable if Condition A is entered --- Determine cumulative dose contributions from direct radiation from the units and from radwaste storage tanks.	In accordance with the OFFSITE DOSE CALCULATION MANUAL (ODCM)
TSR 3.11.k.2	Determine cumulative dose contributions from liquid and gaseous effluents in accordance with TSR 3.11.d.1, TSR 3.11.g.1, and TSR 3.11.h.1 and in accordance with the methodology and parameters in the OFFSITE DOSE CALCULATION MANUAL (ODCM).	Per the applicable TSRs
TSR 3.11.k.3	Inspect the Old Steam Generator Storage Facility (OSGSF) sump for the presence of liquid and the appearance that seepage has occurred.	92 days
TSR 3.11.k.4	---------------NOTE--------------------- Only required to be performed if TSR 3.11.k.3 identifies both the presence of liquid and indications of seepage. --- Sample and analyze the liquid from the OSGSF sump.	 92 days

NOTE 1

The Special Report shall define the corrective actions to be taken to reduce subsequent releases to prevent recurrence of exceeding the TLCO 3.11.k limits and includes the schedule for achieving conformance with the TLCO 3.11.k limits. The Special Report, as defined by 10 CFR 20.405c, shall include an analysis that estimates the radiation exposure to a MEMBER OF THE PUBLIC from the uranium, cycle sources, including all effluent pathways and direct radiation, for the calendar year that includes the release(s) covered by this report. It shall also describe levels of radiation and concentration of radioactive material involved, and the cause of the exposure levels or concentrations. If the estimated dose(s) exceeds the TLCO 3.11.k limits, and if the release condition resulting in violation of 40 CFR Part 190 has not already been corrected, the Special Report shall include a request for a variance in accordance with the provisions of 40 CFR Part 190. Submittal of the report is considered a timely response and a variance is granted until staff action on the request is complete.

3.12 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

3.12.a Radiological Environmental Monitoring Program

TLCO 3.12.a The Radiological Environmental Monitoring Program (REMP) shall be conducted as specified in Table T3.12.a-1.

APPLICABILITY: At all times.

ACTIONS

-------------------------------NOTES-------------------------------

1. TLCO 3.0.c is not applicable.

2. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. REMP not being conducted as specified in Table T3.12.a-1.	A.1	Submit in the Annual Radiological Environmental Operating Report, as required by Specification 5.6.2, a description of the reasons for not conducting the program as required and the plans for preventing recurrence.	In accordance with Technical Specification 5.6.2.

(continued)

Actions (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Level of radioactivity as a result of plant effluents in an environmental sampling medium at a specified location exceeding the reporting limits of Table T3.12.a-2 when averaged over any calendar quarter.	B.1 ------NOTE-------- The methodology and parameters used to estimate the potential annual dose to a MEMBER OF THE PUBLIC shall be indicated in this report. -------------------- Submit a Special Report to the Commission that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to a MEMBER OF THE PUBLIC is less than the calendar year limits of Technical Requirements 3.11.d, 3.11.g and 3.11.h	30 days

(continued)

Actions (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. More than one of the radionuclides in Table T3.12.a-2 are detected in the sampling medium. <u>AND</u> $\frac{C_1}{RL_1} + \frac{C_2}{RL_2} + \ldots \geq 1.0$ Where; C = concentration RL = reporting level.	C.1 ------NOTE-------- The methodology and parameters used to estimate the potential annual dose to a MEMBER OF THE PUBLIC shall be indicated in this report. -------------------- Submit a Special Report to the Commission that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to a MEMBER OF THE PUBLIC is less than the calendar year limits of Technical Requirements 3.11.d, 3.11.g and 3.11.h	30 days

(continued)

Actions (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
D. Radionuclides other than those in Table T3.12.a-2 are detected. <u>AND</u> Are the results of plant effluents. <u>AND</u> The potential annual dose to a MEMBER OF THE PUBLIC from radionuclides is equal to or greater than the calendar limits of Technical Requirements 3.11.d, 3.11.g and 3.11.h.	D.1	------NOTE-------- The methodology and parameters used to estimate the potential annual dose to a MEMBER OF THE PUBLIC shall be indicated in this report. -------------------- Submit a Special Report to the Commission that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to a MEMBER OF THE PUBLIC is less than the calendar year limits of Technical Requirements 3.11.d, 3.11.g and 3.11.h	 30 days
E. Measured levels of radioactivity not the result of plant effluents.	E.1	Report and describe the condition in the Annual Radiological Environmental Operating Report required by Specification 5.6.2	In accordance with Technical Specification 5.6.2

(continued)

Actions (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
F. Milk or fresh leafy vegetable samples unavailable from one or more of the sample locations required by Table T3.12.a-1.	F.1	Identify specific locations for obtaining replacement samples and add them to the REMP given the OFFSITE DOSE CALCULATION MANUAL (ODCM).	30 days
	AND		
	F.2	Submit controlled version of the ODCM to the NRC including a revised figure(s) and table reflecting the new location(s) with supporting information identifying the cause of the unavailability of samples, deleting the specific locations from which samples were unavailable and justifying the selection of the new location(s) for obtaining samples.	In accordance with Technical Specification 5.6.3

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.12.a.1	The radiological environmental monitoring samples shall be collected pursuant to Table T3.12.a-1 from the specific locations given in the table and figure(s) in the ODCM and shall be analyzed pursuant to the requirements of Table T3.12.a-1 and the detection capabilities required by the Table T3.12.a-3.	Per the applicable Table(s)

Table T3.12.a-1 (Page 1 of 5)
Radiological Environmental Monitoring Program

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[(a)]	SAMPLING AND COLLECTION FREQUENCY	TYPE/FREQUENCY OF ANALYSIS
1. Airborne Radioiodine and Particulates	Samples from a total of eight locations: a. Indicator - Near Field Four samples from locations within 4 km (2.5 mi) in different sectors.	Continuous sampler operation with sample collection weekly (or more frequently if required due to dust loading).	Radioiodine Canister: I-131 analysis bi-weekly on near field samples and control. [(b)] Particulate Sampler: Gross beta analysis following weekly filter change [(c)] and gamma isotopic analysis [(d)] quarterly on composite filters by location on near field samples and control. [(b)]
	b. Indicator - Far Field Three additional locations within 4 to 10 km (2.5 to 6.2 mi) in different sectors.		
	c. Control One sample from a control location within 10 to 30 km (6.2 to 18.6 mi).		

(continued)

(a) Specific parameters of distance and direction from the centerline of the midpoint of the two units and additional description where pertinent, shall be provided for each and every sample location in the ODCM. Refer to NUREG-0133, “Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants,” October 1978, and to Radiological Assessment Branch Technical Position, Revision 1, November 1979.

Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of sampling equipment, if a person/business who participates in the program goes out of business or no longer can provide samples, or due to a contractor omission which is corrected as soon as discovered. If the equipment malfunctions, corrective actions shall be completed as soon as practical. If a person/business supplying samples goes out of business, a replacement supplier should be found as soon as possible. All deviations from the sampling schedule will be described in the Annual Radiological Environmental Operating Report.

(b) Far field samples are analyzed when the respective near field sample results are inconsistent with previous measurements and radioactivity is confirmed as having its origin in airborne effluents from the station, or at the discretion of the Health Physics Support Director.

(c) Airborne particulate sample filters shall be analyzed for gross beta radioactivity 24 hours or more after sampling to allow for radon and daughter decay. If gross beta activity in air particulate samples is greater than 10 times the yearly mean of control samples, gamma isotopic analysis shall be performed on the individual samples.

(d) Gamma isotopic analysis means the identification and quantification of gamma emitting radionuclides that may be attributable to the effluents from the station.

Table T3.12.a-1 (Page 2 of 5)
Radiological Environmental Monitoring Program

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[(a)]	SAMPLING AND COLLECTION FREQUENCY	TYPE/FREQUENCY OF ANALYSIS
2. Direct Radiation [(e)]	Forty routine monitoring stations either with a Dosimeter of Legal Record (DLR) or with one instrument for measuring dose rate continuously, placed as follows: a. Indicator - Inner Ring (100 Series DLR) One in each meteorological sector, in the general area of the SITE BOUNDARY; b. Indicator - Outer Ring (200 Series DLR) One in each meteorological sector, within 6 to 8 km (3.7 to 5.0 mi); and c. Other One at each Airborne location given in part 1.a. and 1.b. The balance of the DLRs to be placed at special interest locations beyond the restricted locations beyond the Restricted Area where either a MEMBER OF THE PUBLIC or Exelon Nuclear employees have routine access (300 Series DLR). d. Control One at each Airborne control location given in part 1.c.	Quarterly	Gamma dose on each DLR quarterly.

(continued)

(a) Specific parameters of distance and direction from the centerline of the midpoint of the two units and additional description where pertinent, shall be provided for each and every sample location in the ODCM. Refer to NUREG-0133, “Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants,” October 1978, and to Radiological Assessment Branch Technical Position, Revision 1, November 1979.

Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of sampling equipment, if a person/business who participates in the program goes out of business or no longer can provide samples, or due to a contractor omission which is corrected as soon discovered. If the equipment malfunctions, corrective actions shall be completed as soon as practical. If a person/business supplying samples goes out of business, a replacement supplier should be found as soon as possible. All deviations from the sampling schedule will be described in the Annual Radiological Environmental Operating Report.

(e) One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition, to, integrating dosimeters. Film badges shall not be used as dosimeters for measuring direct radiation. The 40 locations is not an absolute number. The number of direct radiation monitoring stations may be reduced according to geographical limitations, etc., if a station is adjacent to a lake, some sectors may be over water thereby reducing the number of dosimeters, which could be placed at the indicated distances. The frequency of analysis or readout for DLR systems will depend upon the characteristics of the specific system used and should be selected to obtained optimum dose information with minimal fading.

Table T3.12.a-1 (Page 3 of 5)
Radiological Environmental Monitoring Program

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[(a)]	SAMPLING AND COLLECTION FREQUENCY	TYPE/FREQUENCY OF ANALYSIS
3. Waterborne			
a. Ground/Well	a. Indicator Samples from three sources only if likely to be affected. [(f)]	Quarterly	Gamma isotopic [(d)] and tritium analysis quarterly.
b. Drinking [(g)]	a. Indicator Some sample from each community drinking water supply that could be affected by the station discharge within 10 km (6.2 mi) downstream of discharge.	Weekly grab samples	Gross beta and gamma isotopic analyses (d) on monthly composite; tritium analysis on quarterly composite.
c. Surface Water [(g)]	If no community water supply (Drinking Water) exists within 10 km downstream of discharge then surface water sampling shall be performed. a. Indicator One sample downstream.	Weekly grab samples	Gross beta and gamma isotopic analyses [(d)] on monthly composite; tritium analysis on quarterly composite.
d. Control Sample [(g)]	a. Control One surface sample upstream of discharge.	Weekly grab samples	Gross beta and gamma isotopic analyses (d) on monthly composite; tritium analysis on quarterly composite.
e. Sediment	a. Indicator At least one sample from downstream [(g)] area within 10 km (6.2 mi) distance.	Semi-annually	Gamma isotopic analysis [(d)] semiannually.

(continued)

(a) Specific parameters of distance and direction from the centerline of the midpoint of the two units and additional description where pertinent, shall be provided for each and every sample location in the ODCM. Refer to NUREG-0133, “Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants,” October 1978, and to Radiological Assessment Branch Technical Position, Revision 1, November 1979.

Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of sampling equipment, if a person/business who participates in the program goes out of business or no longer can provide samples, or due to a contractor omission which is corrected as soon discovered. If the equipment malfunctions, corrective actions shall be completed as soon as practical. If a person/business supplying samples goes out of business, a replacement supplier should be found as soon as possible. All deviations from the sampling schedule will be described in the Annual Radiological Environmental Operating Report.

(d) Gamma isotopic analysis means the identification and quantification of gamma emitting radionuclides that may be attributable to the effluents from the station.

(f) Groundwater samples shall be taken when this source is tapped for drinking or irrigation purposes in areas where the hydraulic gradient or recharge properties are suitable for contamination.

(g) The ‘downstream’ sample shall be taken in an area beyond but near the mixing zone. The ‘upstream sample’ shall be taken at a distance beyond significant influence of the discharge. Upstream samples in an estuary must be taken far enough up stream beyond the station influence.

Table T3.12.a-1 (Page 4 of 5)
Radiological Environmental Monitoring Program

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[(a)]	SAMPLING AND COLLECTION FREQUENCY	TYPE/FREQUENCY OF ANALYSIS
4. Ingestion			
a. Milk [(h)]	a. Indicator Samples from milking animals from a maximum of three locations within 10 km (6.2 mi) distance.	Bi-weekly (i) when animals are on pasture (May through October), monthly at other times (November through April).	Gamma isotopic [(d)] and I-131 [(j)] analysis on each sample.
	b. Control One sample from milking animals at a control location within 15 to 30 km (9.3 to 18.6 mi).		
b. Fish	a. Indicator Representative samples of commercially and recreationally important species in discharge area.	Two times annually.	Gamma isotopic analysis [(d)] on edible portions.
	b. Control Representative samples of commercially and recreationally important species in the control location upstream of discharge.		

(continued)

(a) Specific parameters of distance and direction from the centerline of the midpoint of the two units and additional description where pertinent, shall be provided for each and every sample location in the ODCM. Refer to NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," October 1978, and to Radiological Assessment Branch Technical Position, Revision 1, November 1979.

Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of sampling equipment, if a person/business who participates in the program goes out of business or no longer can provide samples, or due to a contractor omission which is corrected as soon discovered. If the equipment malfunctions, corrective actions shall be completed as soon as practical. If a person/business supplying samples goes out of business, a replacement supplier should be found as soon as possible. All deviations from the sampling schedule will be described in the Annual Radiological Environmental Operating Report.

(d) Gamma isotopic analysis means the identification and quantification of gamma emitting radionuclides that may be attributable to the effluents from the station.

(h) If milking animals are not found in the designated indicator locations, or if the owners decline to participate in the REMP, all milk sampling shall be discontinued.

(i) Bi-weekly refers to every two weeks.

(j) I-131 analysis means the analytical separation and counting procedure are specific for this radionuclide.

Table T3.12.a-1 (Page 5 of 5)
Radiological Environmental Monitoring Program

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[(a)]	SAMPLING AND COLLECTION FREQUENCY	TYPE/FREQUENCY OF ANALYSIS
4. Ingestion (continued)			
c. Food Products	a. Indicator Two representative samples from the principal food pathways grown in each of four major quadrants within 10 km (6.2 mi): At least one root vegetable sample.[(k)] At least one broad leaf vegetable (or vegetation).[(k)] b. Control Two representative samples similar to indicator samples grown within 15 to 30km (9.3 to 18.6 mi).	Annually	Gamma isotopic[(d)] analysis on each sample.

(a) Specific parameters of distance and direction from the centerline of the midpoint of the two units and additional description where pertinent, shall be provided for each and every sample location in the ODCM. Refer to NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," October 1978, and to Radiological Assessment Branch Technical Position, Revision 1, November 1979.

Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of sampling equipment, if a person/business who participates in the program goes out of business or no longer can provide samples, or due to a contractor omission which is corrected as soon discovered. If the equipment malfunctions, corrective actions shall be completed as soon as practical. If a person/business supplying samples goes out of business, a replacement supplier should be found as soon as possible. All deviations from the sampling schedule will be described in the Annual Radiological Environmental Operating Report.

(d) Gamma isotopic analysis means the identification and quantification of gamma emitting radionuclides that may be attributable to the effluents from the station.

(k) One sample shall consist of a volume/weight of sample large enough to fill contractor specified container.

Table T3.12.a-2 (Page 1 of 1)
Reporting Levels for Radioactivity Concentration in Environmental Samples Reporting Levels

ANALYSIS	WATER (pCi/l)	AIRBORNE PARTICULATE OR GASES (pCi/m^3)	Fish (pCi/kg, wet)	MILK (pCi/l)	FOOD PRODUCTS (pCi/kg, wet)
H-3	20,000[(a)]				
Mn-54	1,000		30,000		
Fe-59	400		10,000		
Co-58	1,000		30,000		
Co-60	300		10,000		
Zn-65	300		20,000		
Zr-95	400				
Nb-95	400				
I-131	2[(b)]	0.9		3	100
Cs-134	30	10	1,000	60	1,000
CS-137	50	20	2,000	70	2,000
Ba-140	200			300	
La-140	200			300	

(a) For drinking water samples. This is 40 CFR Part 141 value. If no drinking water pathway exists, a value of 30,000 pCi/l may be used.

(b) If no drinking water pathway exists, a value of 20 pCi/l may be used.

Table T3.12.a-3 (Page 1 of 2)
Detection Capabilities for Environmental Sample Analysis [(a)]
Lower Limit of Detection (LLD)[(b)] (Refer to Note 1, page 3.12.a-14)

ANALYSIS	WATER (pCi/l)	AIRBORNE PARTICULATE OR GASES (pCi/m^3)	Fish (pCi/kg, wet)	MILK (pCi/l)	FOOD PRODUCTS (pCi/kg, wet)	SEDIMENT (pCi/kg, dry)
Gross Beta	4	0.01	1000			
H-3	2000 [(c) (d)]					
Mn-54	15		130			
Fe-59	30		260			
Co-58, 60	15		130			
Zn-65	30		260			
Zr-95	30					
Nb-95	15					
I-131	1[(e)]	0.07		1	60	
Cs-134	15	0.05	130	15	60	150
Cs-137	18	0.06	150	18	80	180
Ba-140	60			60		
La-140	15			15		

(a) This list does not mean that only these nuclides are to be considered. Other peaks at are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Annual Radiological Environmental Operating Report pursuant to Technical Specification 5.6.2.

(b) Required detection capabilities for Dosimeters of Legal Record (DLR) used for environmental measurements shall be in accordance with the recommendations of Regulatory Guide 4.13.

(c) This LLD is the minimum allowable, however, vendors performing environmental sample analysis offsite will be required to meet an LLD of 200 pCi/l.

(d) If no drinking water pathway exists, a valve of 3000 pCi/l may be used.

(e) If no drinking water pathway exists, a valve of 15 pCi/l may be used.

Table T3.12.a-3 (Page 2 of 2)
Detection Capabilities for Environmental Sample Analysis [(a)]
Lower Limit of Detection (LLD)[(b)] (Refer to Note 1, page 3.12.a-14)

Note 1: Lower Limit of Detection (LLD)

The LLD is defined, for purposes of these Technical Requirements, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a “real” signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66\ S_b}{E * V * 2.22 * Y * \exp(-\lambda \Delta t)}$$

Where:

LLD = the “a priori” lower limit of detection (picoCuries per unit mass or volume),

S_b = the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute),

E = the counting efficiency (counts per disintegration),

V = the sample size (units of mass or volume),

2.22 = the number of disintegrations per minute per picocurie,

Y = the fractional radiochemical yield, when applicable,

λ = the radioactive decay constant for the particular radionuclide (sec^{-1}), and

Δt = the elapsed time between the midpoint of sample collection and the time of counting (sec).

Typical values of E, V, Y, and Δt should be used in the calculation.

It should be recognized that the LLD is defined as a before the fact limit representing the capability of a measurement system and not as an after the fact limit for a particular measurement. Analyses shall be performed in such a manner that the stated LLDs will be achieved under routine conditions. Occasionally, background fluctuations, unavoidable small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unachievable. In such cases, the contributing factors shall be identified and described in the Annual Radiological Environmental Operating Reporting pursuant to Technical Specification 5.6.2.

3.12 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

3.12.b Land Use Census

TLCO 3.12.b The Land Use Census shall be conducted and shall identify within a distance of 10 km (6.2 miles) the location in each of the 16 meteorological sectors (Refer to Note 1, Page 3.12.b-2) of the nearest milk animal, the nearest residence (Refer to Note 2, Page 3.12.b-2), and a enumeration of livestock. For dose calculation, a garden will be assumed at the nearest residence.

APPLICABILITY: At all times.

ACTIONS

-------------------------------NOTES-------------------------------

1. TLCO 3.0.c is not applicable.

2. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Calculated dose or dose commitment greater than the value currently calculated in Technical Requirement 3.11.h.1.	A.1 Identify the new location(s) in the next Annual Radiological Environmental Operating Report pursuant to Technical Specification 5.6.2	12 months
B. Identification of a location that yields a calculated dose or dose commitment (via the same exposure pathway) 20% greater than at a location from which samples are currently being obtained, in accordance with Technical Requirement 3.12.a.	B.1 Add the new location(s) to the Radiological Environmental Monitoring Program (REMP) given in the OFFSITE DOSE CALCULATION MANUAL (ODCM) (Refer to Note 3.) Page 3.12.b-2)	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.12.b.1	The Land Use Census (Refer to Note 4, Page 3.12.b-2) shall be conducted during the growing season (01 JUN - 01 OCT).	12 months

Note 1: This requirement may be reduced according to geographical limitations: e.g., at a lake site where some sectors will be over water.

Note 2: The nearest industrial facility shall also be documented if closer than the nearest residence.

Note 3: The sampling location(s), excluding the control station location, having the lowest calculated dose or dose commitment(s), via the same exposure pathway, may be deleted from this monitoring program after October 31 of the year in which this Land Use Census was conducted. Pursuant to Technical Specification 5.5.1.c, submit in the next Annual Radiological Environmental Operating Report documentation for a change in the ODCM including a revised figure(s) and table(s) for the ODCM reflecting the new location(s) with information supporting the change in sampling locations.

Note 4: The Land Use Census shall use information that will provide the best results, such as by a door-to-door survey, aerial survey, or by consulting local agriculture authorities. The results of the Land Use Census shall be included in the Annual Radiological Environmental Operating Report.

3.12 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

3.12.c Interlaboratory Comparison Program

TLCO 3.12.c Analyses shall be performed on radioactive materials, supplied as part of an Interlaboratory Comparison Program that corresponds to samples required by Table 3.12.a-1.

APPLICABILITY: At all times.

ACTIONS

-------------------------------NOTES-------------------------------

1. TLCO 3.0.c is not applicable.

2. TLCO 3.0.d is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Analyses NOT being performed per Table T3.12.a-1.	A.1	Report the corrective actions to preclude recurrence in the Annual Radiological Operating Report to the Commission pursuant to Technical Specification 5.6.2.	In accordance with Technical Specification 5.6.2.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
TSR 3.12.c.1	Summarize the results obtained as pat of the Interlaboratory Comparison Program in the Annual Radiological Environmental Operating Report to the Commission pursuant to Technical Specifications 5.6.2.	In accordance with Technical Specification 5.6.2

5.0 ADMINISTRATIVE CONTROLS

5.1 Safety Limit Violation

5.1 The following actions shall be taken in the event a Safety Limit (Technical Specification 2.1.1 or 2.1.2) is violated:

a. The NRC Operations Center shall be notified by telephone as soon as possible and in all cases within 1 hour,

b. The Site Vice President and the Offsite Review and Investigative Function shall be notified within 24 hours,

c. A Safety Limit Violation Report shall be prepared. The report shall be reviewed by the Onsite Review and Investigative Function. This report shall describe: (1) applicable circumstances preceding the violation, (2) effects of the violation upon facility components, systems or structures, and (3) corrective action to prevent recurrence,

d. The Safety Limit Violation Report shall be submitted to the Commission, the Offsite Review and Investigative Function and the Site Vice President within 14 days of the violation, and

e. Critical operation of the Unit shall not be resumed until authorized by the Commission.

5.0 ADMINISTRATIVE CONTROLS

5.2 Procedures and Programs

5.2.a Process Control Program (PCP)

Written procedures shall be established, implemented, and maintained covering the activities of the PCP implementation.

The PCP shall contain the current formulas, sampling, analyses, tests, and determinations to be made to ensure that processing and packaging of solid radioactive wastes based on demonstrated processing of actual or simulated wet solid wastes will be accomplished in such a way as to assure compliance with 10 CFR Parts 20, 61, and 71, State regulations, burial ground requirements, and other requirements governing the disposal of solid radioactive waste.

Changes to the PCP:

1. Shall be documented and records of reviews performed shall be retained for the duration of the unit Operating License. This documentation shall contain:

    a. Sufficient information to support the change together with the appropriate analyses or evaluations justifying the change(s) and,

    b. A determination that the change will maintain the overall conformance of the solidified waste product to existing requirements of Federal, State, and other applicable regulations.

2. Shall become effective after review and acceptance by the Onsite Review and Investigative Function (Onsite Review) and the approval of the Station Manager.

5.2 Procedures and Programs

5.2.b In-Plant Radiation Monitoring

A program shall be established, implemented and maintained which will ensure the capability to accurately determine the airborne iodine concentration in vital areas under accident conditions. This program shall include the following:

1. Training of personnel,

2. Procedures for monitoring, and

3. Provisions for maintenance of sampling and analysis equipment.

5.2.c Radiological Environmental Monitoring Program

A program shall be established, implemented and maintained which will monitor the radiation and radionuclides in the environs of the plant. The program shall provide (1) representative measurements of radioactivity in the highest potential exposure pathways, and (2) verification of the accuracy of the effluent monitoring program and modeling of environmental exposure pathways. The program shall (1) be contained in the Offsite Dose Calculation Manual (ODCM), (2) conform to the guidance of Appendix I to 10 CFR Part 50, and (3) include the following:

1. Monitoring, sampling, analysis, and reporting of radiation and radionuclides in the environment in accordance with the methodology and parameters in the ODCM,

2. A Land Use Census to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the monitoring program are made if required by the results of this census, and

3. Participation in an Interlaboratory Comparison Program to ensure that independent checks on the precision and accuracy of the measurements of radioactive materials in environmental sample matrices are performed as part of the Quality Assurance Program for environmental monitoring.

5.2 Procedures and Programs

5.2.d Radiation Protection Program

Procedures for personnel radiation protection shall be prepared consistent with the requirements of 10 CFR Part 20 and shall be approved, maintained and adhered to for all operations involving personnel radiation exposure.

5.2.e Offsite Dose Calculation Manual (ODCM)

The requirement for an ODCM program is contained in Technical Specification 5.5.1.

Changes to the ODCM shall become effective after review and acceptance by the Onsite Review and Investigative Function and the approval of the Station Manager on the date specified by the Onsite Review and Investigative Function.

5.0 ADMINISTRATIVE CONTROLS

5.3 Reporting Requirements

The following reports shall be submitted in accordance with 10 CFR 50.4.

5.3.a Startup Report

1. A summary report of plant startup and power escalation testing shall be submitted to the Commission 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.

2. The Startup Report shall address each of the tests identified in the Updated Final Safety Analysis Report (UFSAR) and shall 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.

3. 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 operation) supplementary reports shall be submitted at least every 3 months until all three events have been completed.

5.3 Reporting Requirements

5.3.b Annual Specific Activity Report

An Annual Report covering the activity of the facility for the previous calendar year shall be submitted to the Commission prior to March 1 of each year.

The results of specific activity analysis in which the primary coolant exceeded the limits of Specification 3.4.16. The following information shall be included: (1) Reactor power history starting 48 hours prior to the first sample in which the limit was exceeded; (2) Results of the last isotopic analysis for radioiodine performed prior to exceeding the limit, results of analysis while limit was exceeded and results of one analysis after radioiodine activity was reduced to less than limit. Each result should include date and time of sampling and the radioiodine concentrations; (3) Clean-up system flow history starting 48 hours prior to the first sample in which the limit was exceeded; (4) Graph of the I-131 concentration and one other radioiodine isotope concentration in microcuries per gram as a function of time for the duration of the specific activity above the steady-state level; and (5) The time duration when the specific activity of the primary coolant exceeded the radioiodine limit.

5.3.c Special Reports

1. In the event the unit is in MODE 1 or 2 with $K_{eff} \geq 1$ and with the Moderator Temperature Coefficient (MTC) more positive than the beginning of life limit specified in the COLR, a Special Report shall be prepared and submitted to the Commission within 10 days. The Special Report shall describe the value of the measured MTC, the interim control rod withdrawal limits, and the predicted average core burnup necessary for restoring the positive MTC to within its limit for the all rods withdrawn condition.

2. In the event an inoperable Main Control Room Radiation Outside Air Intake Monitor (ORE-PR031B/32B or ORE-PR033B/34B) is not restored to OPERABLE within 30 days, a Special Report shall be prepared and submitted to the Commission within the following 30 days. The Special Report shall describe the cause of the inoperability and the plans for restoration.

5.3 Reporting Requirements

5.3.c Special Reports (continued)

3. In the event the unit is in MODE 4, 5, or 6 with the reactor head on and either the PORVs, RHR suction relief valves, or the RCS vents are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission within 30 days. The Special Report shall describe the circumstances initiating the transient, the effect of the PORVs, RHR suction relief valves, or RCS vents on the transient, and any corrective action necessary to prevent recurrence.

4. In the event the unit is in MODE 1, 2, 3, or 4 and the ECCS is actuated and injects water into the RCS, a Special Report shall be prepared and submitted to the Commission within 90 days. The Special Report shall describe the circumstances of the actuation and the total accumulated actuation cycles to date. The current value of the usage factor for each affected Safety Injection nozzle shall be provided in this Special Report whenever its value exceeds 0.70.

   (NOTE: If a Licensee Event Report (LER) has been provided to the NRC documenting the event and that report includes all of the requirements of the Special Report, no additional actions are required.)

5. In the event the unit is in MODE 1, 2, 3, or 4 with an UHS cooling water basin level switch inoperable for more than 30 days, a Special Report shall be prepared and submitted to the Commission, within the next 10 days. The Special Report shall provide the cause of the inoperability and the plans for restoring the switch(es) to OPERABLE status.

ODCM AND RADIOLOGICAL CONTROLS REPORTS AND PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

This Program provides guidance for the implementation of Technical Specification (TS) 5.5.1, "Offsite Dose Calculation Manual (ODCM)", 5.6.2, "Annual Radiological Environmental Operating Report", and 5.6.3, "Radioactive Effluent Release Report."

The ODCM contains the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, the calculation of gaseous and liquid effluent monitoring alarm and trip setpoints, and the conduct of the Radiological Environmental Monitoring Program. In addition, the ODCM contains the radioactive effluent controls, radiological environmental monitoring activities, and descriptions of the information that is included in the Annual Radiological Environmental Operating, and Radioactive Effluent Release Reports.

1.2 REFERENCES

1. Technical Specifications:
    a. 5.5.1, "Offsite Dose Calculation Manual (ODCM)"
    b. 5.6.2, "Annual Radiological Environmental Operating Report"
    c. 5.6.3, "Radioactive Effluent Release Report"
2. US NRC 10CFR20.1302
3. US NRC 40CFR190
4. US NRC 10CFR50, Appendix I

1.3 DEFINITIONS AND/OR ACRONYMS

Offsite Dose Calculation Manual - ODCM

1.4 PROGRAM DESCRIPTION

The purpose of this Program is to ensure that methodologies, parameters, effluent controls, radiological monitoring, and reporting requirements are properly implemented by the ODCM or other approved plant procedures.

1.5 PROGRAM IMPLEMENTATION

1. The ODCM shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring alarm and trip setpoints, and in the conduct of the Radiological Environmental Monitoring Program.

2. The ODCM shall also contain the radioactive effluent controls and radiological environmental monitoring activities, and descriptions of the information that should be included in the Annual Radiological Environmental Operating, and Radioactive Effluent Release Reports required in Reference 1.

The Chemistry Department shall have responsibility for the implementation, performance, completion and reporting of this Program.

1.6 ACCEPTANCE CRITERIA

Acceptance criteria is contained in the ODCM, plant implementing or surveillance procedures.

1.7 LCOARS/COMPENSATORY MEASURES

No LCOARs will be entered as a result of exceeding any acceptance criteria. Any corrective measures are contained in the ODCM or plant procedures. In addition, an Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

1. Annual Radiological Environmental Operating Report covering the operation of the facility during the previous calendar year shall be submitted by May 15 of each year. The report shall include summaries, interpretations, and analyses of trends of the results of the Radiological Environmental Monitoring Program for the reporting period. The material provided shall be consistent with the objectives outlined in the ODCM, and Reference 4.

2. The Radioactive Effluent Release Report covering the operation of the facility during the previous year shall be submitted prior to May 1 of each year in accordance with 10CFR50.36a. The report shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the facility. The material provided shall be consistent with the objectives outlined in the ODCM and Process Control Program and in conformance with 10CFR50.36a and Reference 4.

A single submittal may be made for the facility. The submittal should combine sections common to both units.

The Chemistry Department is responsible for preparing and submitting the subject reports.

1.9 CHANGE CONTROL

Changes to the ODCM shall be documented and records of reviews performed shall be retained. As a minimum, the documentation shall contain:

1. Sufficient information to support the change(s) together with the appropriate analyses or evaluations justifying the change(s); and

2. A determination that the change(s) maintain the levels of radioactive effluent control required by References 2, 3, 4, and 10CFR50.36a and do not adversely impact the accuracy or reliability of effluent, dose, or setpoint calculations.

Changes to the ODCM are effective upon approval of the Plant Manager or designee.

Changes to the ODCM shall be submitted to the NRC in the form of a complete, legible copy of the entire ODCM as a part of or concurrent with the Radioactive Effluent Release Report for the period of the report in which any change in the ODCM was made. Each change shall be identified by markings in the margin of the affected pages, clearly indicating the area of the page that was changed, and shall indicate the date (i.e., month and year) the change was implemented.

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Byron has been reviewed and was determined not to be applicable to Braidwood.

PRIMARY COOLANT SOURCES OUTSIDE CONTAINMENT

Byron

TABLE OF CONTENTS

1.1 PURPOSE

The purpose of this Program is to verify leakage tests are performed on each system or portion of systems outside containment that could potentially contain highly radioactive fluids or gases, pursuant to Technical Specification (TS) 5.5.2, "Primary Coolant Sources Outside Containment". This Program provides controls to minimize leakage from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient or accident to level as low as practicable.

1.2 References

1. Technical Specifications 5.5.2, "Primary Coolant Sources Outside Containment"

2. UFSAR Appendix E.77 (UFSAR), "Primary Coolant Sources Outside Containment (III.D.1.1)"

3. NUREG 0737.III.D.1.1, "Integrity of Systems Outside Containment Likely to Contain Radioactive Material for Pressurized-Water Reactors and Boiling-Water Reactors"

4. NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants"

1.3 DEFINITIONS AND ACRONYMS

1. INDICATION - The response from the application of a visual examination (VT-2).

2. VT-2 (Visual Examination) - An inspection of an ASME/NUREG System component at normal system operating pressure.

1.4 PROGRAM DESCRIPTION

This Program provides controls to minimize leakage from those portions of systems outside containment that could contain highly radioactive fluids during a serious transient or accident to levels as low as practicable. The systems include the recirculation portions of the Containment Spray, Safety Injection, Chemical and Volume Control, and Residual Heat Removal.

1.5 PROGRAM IMPLEMENTATION

This Program determines, through the associated implementing procedures, that leakage sources outside containment will be accounted for to insure the total amount will not exceed the UFSAR acceptable limits for Byron Station. The bases for this Program were established per References 2 and 3 that provide for the following:

1. Monitor the leak testing of piping so that the appropriate lines are examined at least once per 18 months on each System or portions of Systems;

2. Direct leak test examinations such that systems are tested at approximate operating pressure or higher;

3. Align systems such that all piping tested is properly pressurized;

4. Identify lines that contain gases that require pressure decay and/or metered makeup testing;

5. Quantify results of leakage examinations;

6. Initiate corrective action; and

7. Preventive maintenance in accordance with approved plant procedures consistent with the Byron Maintenance Rule.

The Engineering Programs Group shall have responsibility for the completion of this Program.

1.6 ACCEPTANCE CRITERIA

1. All examinations required by this Program are completed at least once per 18 months. The provisions of SR 3.0.2 are applicable.

2. Cumulative leakage shall be within the acceptable range specified per UFSAR Table 15.6-13.

1.7 LCOARS/COMPENSATORY MEASURES

Any examinations exceeding acceptance criteria shall be immediately conveyed to the Shift Manager. The Shift Manager shall determine the OPERABILITY status and implement a LCOAR if applicable. In addition, an Issue Report may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

Any examinations exceeding acceptance criteria will be coordinated/reported in accordance with the requirements of the Maintenance Rule Program.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include the Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Byron has been reviewed and determined not to be applicable to Braidwood.

Appendix C is not used in the TRM

RADIOACTIVE EFFLUENT CONTROLS PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

This Program is in compliance with Technical Specification (TS) 5.5.4, "Radioactive Effluent Controls Program." This Program provides controls for radioactive effluents and for maintaining the doses to members of the public from radioactive effluents as low as reasonably achievable. The Program shall be contained in the Offsite Dose Calculation Manual (ODCM) which is implemented by plant procedures which also include remedial actions taken whenever the acceptance criteria is exceeded.

1.2 REFERENCES

1. Technical Specifications 5.5.4, "Radioactive Effluent Controls Program"
2. Offsite Dose Calculation Manual (ODCM)
3. US NRC 10CFR20, Appendix B, Table 2, Column 2
4. US NRC 10CFR20.1302
5. US NRC 10CFR50, Appendix I
6. US NRC 40CFR190

1.3 DEFINITIONS AND/OR ACRONYMS

Offsite Dose Calculation Manual - ODCM

1.4 PROGRAM DESCRIPTION

This Program ensures that appropriate plant procedures, along with the ODCM are implemented for radioactive effluent controls. These controls are to be maintained in accordance with the guidance provided by referenced NRC requirements. This Program provides the general guidance for surveillance testing, monitoring, setpoint determination, exposure limits, and reporting requirements.

1.5 PROGRAM IMPLEMENTATION

This Program shall be implemented by plant procedures or the ODCM which will include at least the following:

1. Limitations on the functional capability of radioactive liquid and gaseous monitoring instrumentation including surveillance tests and setpoint determination in accordance with the methodology in Reference 2;

2. Limitations on the concentrations of radioactive material released in liquid effluents to unrestricted areas, conforming to 10 times the concentrations stated in Reference 3;

3. Monitoring, sampling, and analysis of radioactive liquid and gaseous effluents in accordance with Reference 4 and with the methodology and parameters per Reference 2;

4. Limitations on the quarterly and annual doses or dose commitment to a member of the public from radioactive materials in liquid effluents released from each unit to unrestricted areas, conforming to Reference 5;

5. Determination of cumulative and projected dose contributions from radioactive effluents for the current calendar quarter and current calendar year in accordance with the methodology and parameters in Reference 2, Section 12 at least every 31 days;

6. Limitations on the functional capability and use of the liquid and gaseous effluent treatment systems to ensure that appropriate portions of these systems are used to reduce releases of radioactivity when the projected doses in a period of 31 days would exceed 2% of the guidelines for the annual dose or dose commitment, conforming to Reference 5;

7. Limitations on the dose rate resulting from radioactive material released in gaseous effluents to areas beyond the site boundary conforming to the acceptance criteria.

8. Limitations on the quarterly and annual air doses resulting from noble gases released in gaseous effluents from each unit to areas beyond the site boundary, conforming to Reference 5;

9. Limitations on the quarterly and annual doses to a member of the public from Iodine-131, Iodine-133, Tritium, and all radionuclides in particulate form with half lives > 8 days in gaseous effluents released from each unit to areas beyond the site boundary, conforming to Reference 5; and

10. Limitations on the annual dose or dose commitment to any member of the public due to releases of radioactivity and to radiation from uranium fuel cycle sources, conforming to Reference 6.

The Chemistry Department shall have responsibility for the implementation, performance, completion, and reporting of this Program.

1.6 ACCEPTANCE CRITERIA

All acceptance criteria pertaining to this Program is located in the ODCM, implementing, or surveillance procedures.

1.7 LCOARS/COMPENSATORY MEASURES

An Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

Any reporting requirements are listed in the ODCM and implementing procedures.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Byron has been reviewed and was determined not to be applicable to Braidwood.

TRANSIENT MONITORING PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

The purpose of this Program is to provide guidance for tracking the number of cycles of specific transients and to ensure operation within the Byron Plant Design Basis is in accordance with Technical Specifications (TS) 5.5.5, "Component Cyclic or Transient Limit."

The minimum requirements for cyclic or transient tracking are those transients listed in Attachment 1 of this Program. These items, in addition to various other monitored parameters or transients, will be tracked periodically in accordance with appropriate Plant Procedures.

Components affected by the transients monitored are typically ASME Section III Code Class 1 vessels. The design of such components includes cyclic/fatigue assumptions which must be tracked to ensure that the unit is operating within its design basis. Piping and components designed to ANSI B31.1, Power piping does not generally require fatigue monitoring as those considerations are inherent to the safety margins applied by that Code.

1.2 REFERENCES

1. TS Specification 5.5.5, "Component Cyclic or Transient Limit"

2. Updated Final Safety Analysis Report, (UFSAR), Section 3.9 and 5.2

3. 10CFR50, Appendix A

4. "WCAP-12235, General Guidelines for Nuclear Power Plant Transient and Fatigue Monitoring", March, 1989

1.3 DEFINITION AND/OR ACRONYMS

Not applicable.

1.4 PROGRAM DESCRIPTION

This Program ensures that appropriate plant procedures are implemented to monitor transients that may have an affect on ASME Section III Code Class 1 vessels/components as specified in Reference 2.

Attachment 1 provides component cyclic or transient limits as well as design cycle or transient parameters for specific plant components. Monitoring of additional equipment/parameters not listed in Attachment 1 may be performed as a good practice on an as needed basis, and are not considered within the scope of this Program though they may be tracked using appropriate Plant Procedures, Implementing procedures shall have adequate measures to identify cumulative cyclic/transient conditions requiring further analysis prior to the design basis limits being reached. In the event any of the limits are approached or exceeded, required actions or reporting requirements are specified in this Program or appropriate Plant Procedures.

1.5 PROGRAM IMPLEMENTATION

Specific plant procedures have been developed and implemented in order to perform the following:

1. Provide a tracking program for the relevant transient cycles/trips for those ASME Section III Code Class 1 components specified in Reference 2.

2. Periodically monitor components identified in Attachment 1 for code compliance relative to parameters such as, transient limits and usage factors.

System Engineering Department shall have responsibility for the implementation, performance, completion, and reporting of this Program.

1.6 ACCEPTANCE CRITERIA

1. Attachment 1 provides cyclic or transient limit acceptance criteria for each component within the scope of this Program.

2. Should the design basis limits be approached or exceeded, an evaluation and recommended operating restrictions (if any) will be provided by Site Engineering - Mechanical. Any recommendations to modify design limits shall be accompanied by a safety evaluation.

1.7 LCOARS/COMPENSATORY MEASURES

In the event that a component has reached its administrative cyclic or transient limit, the Shift Manager shall be notified immediately. The Shift Manager shall determine OPERABILITY status and implement a LCOAR if applicable. In addition, a Problem Identification Form (PIF) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

1. A special report will be generated whenever cyclic or transient limits are being approached or exceeded. This report shall be generated and distributed, as a minimum to the following:

   PORC (Plant Operations Review Committee)
   Site V.P.
   Plant Manager
   Operations Manager
   Engineering Manager

2. Any violations of the cyclic or transient limits shall be reported to the NRC in accordance with 10CFR50.71 and 10CFR50.72.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial, shall include a 10CFR50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include Regulatory Assurance Department in all cases. As a part of the ITR, for a change to this Program. Braidwood and Byron Plant Operations Review committee (PORC) approval is required. The PORC approval shall ensure Braidwood is implementing the same change or that the change has been reviewed and determined not to be applicable to Braidwood.

ATTACHMENT 1

COMPONENT CYCLIC OR TRANSIENT LIMITS

COMPONENT	CYCLIC OR TRANSIENT LIMIT	DESIGN CYCLE OR TRANSIENT
Reactor Coolant System	200 heatup cycles at ≤ 100°F/h and	Heatup cycle - T_{avg} from ≤ 200°F to ≥ 550°F.
	200 cooldown cycles at < 100 °F/h.	Cooldown cycle - T_{avg} from ≥ 550°F to ≤ 200°F.
	200 pressurizer cooldown cycles at ≤ 200°F/h.	Pressurizer cooldown cycle temperature from ≥ 650°F to ≤ 100°F.
	80 loss of load cycles, without immediate Turbine or Reactor Trip.	≥ 15% of RATED THERMAL POWER to 0% of RATED THERMAL POWER.
	40 cycles of loss-of-offsite A.C. electrical power.	Loss-of-Offsite A.C. electrical ESF Electrical System.
	80 cycles of loss of flow in one reactor coolant loop.	Loss of only one reactor coolant pump.
	400 Reactor trip cycles.	100% to 0% of RATED THERMAL POWER.
	10 auxiliary spray actuation cycles.	Spray water temperature differential > 320°F.
	200 leak tests.	Pressurized to ≥ 2485 psig.
	10 hydrostatic pressure tests.	Pressurized to ≥ 3107 psig.
Secondary Coolant System	1 large steam line break.	Break in a > 6 inch steam line.
	10 hydrostatic pressure tests.	Pressurized to ≥ 1481 psig.

PRE-STRESSED CONCRETE CONTAINMENT TENDON SURVEILLANCE PROGRAM BYRON

TABLE OF CONTENTS

1.1 PURPOSE

This Program provides controls for monitoring any tendon degradation in the pre-stressed concrete containments and is pursuant to Technical Specifications (TS) 5.5.6 and 5.6.8.

1.2 REFERENCES

1. Technical Specifications:

   a. 5.5.6, " Pre-Stressed Concrete Containment Tendon Surveillance Program”

   b. 5.6.8, " Tendon Surveillance Report "

2. USFAR Section 3.8.1.7.3.2, "Inservice Tendon Surveillance Program"

3. U.S. NRC 10CFR50.55a

4. U.S. NRC Regulatory Guide 1.35.1, "Determining Pre-Stressing Forces For Inspection of Pre-Stressed Concrete Containments, dated July 1990"

5. ASME Boiler and Pressure Vessel Code, Section XI, Sub Section IWL.

6. Drawings:

   a. S884: Containment Building Tendon Location Plans and Sections

   b. Inland Ryerson Company Drawings 781 / 782 through 781 / 782-23

   c. Byron Station In Service Inspection Drawings for Containment Tendons

7. Byron SER Section 3.8.1

8. Maintenance Rule 10CFR50.6

9. Byron Containment In Service Inspection (CISI) Program Plan

1.3 DEFINITIONS AND/OR ACRONYMS

1. TENDON - The bundle of wire assemblies and anchorages that maintain pre-stressed forces within the containment structure.

2. ANCHORAGE - The components at each end of the wire bundle that are used to maintain the required pre-stressed forces and distribute the forces within the tendon.

3. LIFT OFF FORCE - The force required to lift the containment tendon anchorage from the shim stack or structure.

4. SHEATHING FILLER GREASE - The corrosion protection medium that encases the tendon and anchorage.

1.4 PROGRAM DESCRIPTION

The Pre-Stressed Concrete Containment Tendon Surveillance Program provides a standardized methodology to ensure that aging and degradation issues are identified early and monitored through the following activities:

1. Measuring, recording, and evaluating the lift off force for tendons included in the test sample population;

2. Ensuring the containment vessel, tendon anchorages, and tendon wires do not exhibit signs of abnormal degradation;

3. Ensuring the tendon wires continue to maintain the required integrity through physical testing; and

4. Ensuring the sheathing filler grease continues to protect the tendon components from corrosion by identification of free water and chemical analysis of the sheathing filler grease.

1.5 PROGRAM IMPLEMENTATION

1. Inspection schedules, examination and testing methods, personnel qualification requirements, and reporting requirements shall be established, implemented, and maintained in accordance with Section XI, Subsection IWL of the ASME Boiler and Pressure Vessel Code and applicable addenda as required by 10CFR50.55(a) except where alternative exemption or relief has been authorized by NRC. The Engineering Programs Group shall have the responsibility for

all aspects of the Program.

2. The detection of degredation of the containment structure or trending shall be coordinated with the requirements of the Maintenance Rule Program.

1.6 ACCEPTANCE CRITERIA

Acceptance criteria for the Byron Pre-Stressed Concrete Containment Tendon Surveillance Program is contained in appropriate Plant Procedures as described in Byron Containment In Service Inspection (CISI) Program Plan.

1.7 LCOARS / COMPENSATORY MEASURES

In the event the acceptance criteria is exceeded, immediately notify the Shift Manager. In addition, station Corrective Action Program shall be entered to provide proper tracking and resolution of noted problems associated with the implementation of this Program. Engineering shall determine if the condition that exceeded the acceptance criteria renders the containment inoperable. In the event the containment is found to be inoperable, the Shift Manager shall be immediately notified and the Shift Manager shall implement the applicable LCOAR.

1.8 REPORTING REQUIREMENTS

1. Items which do not meet the acceptance criteria shall be evaluated by Engineering and an Engineering Evaluation Report shall be prepared. The Engineering Evaluation Report(s) shall be maintained at the site and are subject to review by the regulatory and enforcement authorities.:

   a. The Engineering Evaluation Report shall be in accordance with the ASME Code Section XI, IWL Subsection.

2. The following conditions shall also be reported in the ISI Summary Report required by ASME Section XI, 1WA6000. When:

   1. The elongation corresponding to a specific load (adjusted for effective wires or strands) during re-tensioning of the tendons differs by more than 10 percent from that recorded during the last measurement;

   2. The Sheathing Filler Grease Analysis contains chemically combined water exceeding 10 percent by weight;

3. The presence of free water is identified in the sheathing filler grease;

4. The absolute difference between the amount of sheathing filler grease removed during inspection and testing and the amount replaced thereafter exceeds 10 percent of the tendon duct volume; or

5. Grease leakage is detected during general visual examination of the containment surface.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include the Regulatory Assurance Department in all cases. As part of the ITR, for a change to this Program, Braidwood and Byron Plant Operations Review Committee (PORC) approval is required. The PORC approval shall ensure Braidwood is implementing the same change or that the change has been reviewed and determined not to be applicable to Braidwood.

REACTOR COOLANT PUMP FLYWHEEL INSPECTION PROGRAM BYRON

TABLE OF CONTENTS

1.1 PURPOSE

The purpose of this Program is to verify the structural integrity of each Reactor Coolant Pump Flywheel pursuant to Technical Specification (TS) 5.5.7, "Reactor Coolant Pump Flywheel Inspection Program." This Program provides for the inspection of each reactor coolant pump flywheel in general conformance with Reference 5 as modified by References 12 and 13.

1.2 REFERENCES

1. Technical Specification 5.5.7, "Reactor Coolant Pump Flywheel Inspection Program"
2. UFSAR:
   a. Section 5.4.1.5.2
   b. Appendix A
3. 10CFR50 Appendix A and B
4. NUREG-0800, Section 5.4.1.1, "Pump Flywheel Integrity"
5. Regulatory Guide 1.14, "Reactor Coolant Pump Flywheel Integrity"
6. Byron Unit 1 and 2 Inservice Inspection Program Plan
7. Westinghouse WCAP-8163, "Topical Report on Reactor Coolant Pump Integrity in LOCA"
8. Westinghouse Vendor Manual F-198, "Reactor Coolant Pump"
9. Byron SER Sections:
   a. 2.2.4
   b. 3.5.1.2
   c. 5.4.1
10. Byron Station Maintenance Rule Program

11. Westinghouse WCAP-14535A, "Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination"

12. Mahesh Chawla to O.D. Kingsley, "Issuance of Amendments - Byron Station, Units 1 and 2 and Braidwood Station, Units 1 and 2 - Request for Technical Specifications Change - Revision to the Reactor Coolant Pump Flywheel Inspection Program," dated September 21, 2001.

13. Marshall David to M.J. Pacilio, "Braidwood Station, Units 1 and 2, and Byron Station, Unit Nos. 1 and 2 – Issuance of Amendments RE: Extension of Inspection Interval for Reactor Coolant Flywheels (TAC Nos. ME3640, ME3641, ME3642, and ME3643), dated September 16, 2001.

1.3 DEFINITIONS AND/OR ACRONYMS

1. UT – Ultrasonic Testing

2. SURFACE EXAMINATION – Examination method using liquid penetrant (PT) or magnetic particle (MT) techniques.

3. INDICATION - The response from the application of a nondestructive examination (NDE).

4. RELEVANT INDICATION OR FLAW - An imperfection or unintentional discontinuity that is detectable by NDE.

5. DEFECT - A flaw of such size, shape, orientation, location, or properties as to be rejectable.

1.4 PROGRAM DESCRIPTIONS

One of the following examinations shall be performed on each reactor coolant pump flywheel at the specified frequency:

1. A qualified in-place UT examination over the volume from the inner bore of the flywheel to the circle of half the outer radius or
2. A surface examination (MT or PT) of the bore and keyway area whenever the flywheels are removed for maintenance purposes.

Since the exposed surfaces, other than the bore and keyway areas, of the flywheels are coated with corrosion preventative primer paint, a surface examination of these surfaces is not practicable.

This program shall provide for the inspection of each reactor coolant pump flywheel in general conformance with the recommendations of Regulatory Position c.4.b of Regulatory Guide 1.14, Revision 1, August 1975.

For reactor coolant pump motor serial numbers 4S88P961 and 1S88P961, in lieu of Regulatory Position c.4.b(1) and c.4.b(2), a qualified in-place UT examination over the volume from the inner bore of the flywheel to the circle of one-half the outer radius or a surface examination (MT and/or PT) of exposed surfaces of the removed flywheel may be conducted at approximately 10 year intervals coinciding with the Inservice Inspection schedule as required by ASME Section XI.

For all other reactor coolant pump motors, in lieu of Regulatory Position c.4.b(1) and c.4.b(2), a qualified in-place UT examination over the volume from the inner bore of the flywheel to the circle of one-half the outer radius or a surface examination (MT and/or PT) of exposed surfaces of the removed flywheel may be conducted at an interval not to exceed 20 years.

1.5 PROGRAM IMPLEMENTATION

Inspection schedules, personnel, equipment and material certifications, applicable examination methods, and examination reports shall be initiated and maintained in accordance with Byron Unit 1 and 2 Inservice Inspection Program Plan and associated procedures.

The Engineering Programs Group shall have responsibility for the implementation, performance, completion, and reporting of this Program.

1.6 ACCEPTANCE CRITERIA

1. All relevant indications shall be recorded on the appropriate examination form.

2. Final disposition of flaws shall be based on engineering analysis.

1.7 LCOARS/COMPENSATORY MEASURES

In the event indication(s) exceed allowable length, the Shift Manager shall be notified immediately. The Shift Manager shall determine OPERABILITY status and implement a LCOAR if applicable. In addition, an Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

1. If the examination and evaluation indicate an increase in flaw size or growth rate greater than predicted for the service life of the flywheel, the results of the examination and evaluation should be submitted to the NRC for evaluation.

2. The detection of flaws that exceed the acceptance criteria standards shall be coordinated with the requirements of the Maintenance Rule Program.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 evaluation and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, for a change to the Program, concurrence from Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. The concurrence shall be that Braidwood is implementing the same change or that the change has been reviewed and determined not to be applicable to Braidwood.

Appendix H - Revision 111 deleted this Appendix H – see Plant Review 17-002

STEAM GENERATOR PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

This Program verifies the tube integrity of the Steam Generators (SGs) by performing inspections and tube plugging in accordance with Technical Specification (TS) 3.4.19, "Steam Generator (SG) Tube Integrity," and the Steam Generator Program. The Steam Generator Program is defined by TS 5.5.9, NEI 97-06 and it's associated EPRI Steam Generator Management Program Guidelines. TS 5.6.9, "Steam Generator (SG) Tube Inspection Reports," provides the SG reporting requirements.

1.2 REFERENCES

1. Technical Specifications:
   a. 5.5.9, "Steam Generator (SG) Program"
   b. 5.6.9, "Steam Generator (SG) Tube Inspection Reports"
   c. 3.4.13, "RCS Operational LEAKAGE"
   d. 3.4.19, "Steam Generator (SG) Tube Integrity"
2. Updated Final Safety Analysis Report Sections:
   a. 5.4.2, "Steam Generators"
   b. 15.1.5, "Steam System Piping Failure"
   c. 15.6.3, "Steam Generator Tube Rupture"
3. Exelon Generation Company, LLC, Quality Assurance Topical Report
4. ASME Boiler and Pressure Vessel Code:
   a. Section V, Nondestructive Examination, latest approved Edition and Addenda.
   b. Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, latest approved Edition and Addenda.
5. American Society for Nondestructive Testing (ASNT): Standard for Qualification and Certification of Nondestructive Testing Personnel, CP-189, 1995 Edition"

6. General Design Criteria (GDC) of Appendix A to 10CFR50:

   a. GDC-14

   b. GDC-15

   c. GDC-30

   d. GDC-31

   e. GDC-32

7. Nuclear Energy Institute (NEI) Technical Specification Task Force (TSTF) Standard Technical Specification Change Traveler,

   a. TSTF-449, Revision 4

   b. TSTF-510, Revision 2

8. Draft Regulatory Guide 1.121, "Bases for Plugging Degraded PWR Steam Generator Tubes"

9. Maintenance Rule Performance Criteria RC-2, “Remove Heat from Reactor to Steam Generators Including Steam Generator Integrity”

10. NEI 97-06, Steam Generator Program Guidelines

11. EPRI PWR Steam Generator Examination Guidelines

12. EPRI Primary to Secondary Leak Guidelines

13. EPRI Steam Generator Integrity Guidelines

14. EPRI Steam Generator In Situ Pressure Test Guidelines

15. EPRI Steam Generator Secondary Water Chemistry Guidelines

16. EPRI Steam Generator Primary Water Chemistry Guidelines

1.3 <u>DEFINITIONS AND/OR ACRONYMS</u>

1. IMPERFECTION - An exception to the dimensions, finish or contour of a tube from that required by fabrication drawings or specifications. Eddy current testing indications <20% of the nominal wall thickness, if detectable, may be considered as imperfections.

2. DEGRADATION - A service induced cracking, wastage, wear or general corrosion occurring on either inside or outside of a tube.

3. DEGRADED TUBE - A tube containing imperfections ≥20% of the nominal tube wall thickness caused by degradation.

4. DEFECT - An imperfection of such severity that it exceeds the plugging limit. A tube containing defect is defective.

5. PLUGGING LIMIT - The imperfection depth at or beyond which the tube shall be removed from service by plugging. The plugging limit imperfection depth for the tubing is equal to 40% of the nominal wall thickness.

   For Unit 2 only, this definition does not apply to service-induced flaws identified in the portion of the tube below 14.01 inches from the top of the tubesheet. Service-induced flaws found in the portion of the tube below 14.01 inches from the top of the tubesheet do not require plugging.

   For Unit 2 only, service-induced flaws identified in the portion of the tube from the top of the tubesheet to 14.01 inches below the top of the tubesheet shall be plugged upon detection.

6. DEGRADATION ASSESSMENT – An assessment of degradation performed prior to an upcoming outage to determine the type and location of flaws to which the tubes may be susceptible and to determine which inspection methods need to be employed and at what locations. The assessment includes appropriate inspection plans, inspection methods and inspection intervals for the applicable degradation mechanisms identified.

7. CONDITION MONITORING – An evaluation of the “as found” condition of the tubing during and SG inspection outage with respect to the performance criteria for structural integrity and accident induced leakage prior to the plugging of tubes.

8. OPERATIONAL ASSESSMENT - An evaluation that projects the condition of the tubes from the "as-left" condition exiting a SG inspection outage to the next SG inspection with respect to the performance criteria for structural integrity and accident induced leakage following plugging of tubes.

1.4 PROGRAM DESCRIPTION

This Program verifies the tube integrity of the SGs through periodic eddy current inspections. The Bases for this Program and TS Section were established by NEI TSTF-449 & TSTF-510 (References 7.a & 7.b) and NEI 97-06 (Reference 10) and it's referenced EPRI Guidelines (References 11 through 16). The SG Program provides a means to detect and plug degradation of SG tubes in order to maintain the steam generator performance criteria for tube structural integrity, accident induced leakage, and operational leakage as delineated in TS 5.5.9 and NEI-97-06.

1.5 PROGRAM IMPLEMENTATION

A SG Program has been established and implemented to ensure that SG tube integrity is maintained. The SG Program is implemented through Exelon SG Program administrative and surveillance procedures to ensure compliance with the requirements of TS 3.4.19, TS 5.5.9, NEI 97-06 and it's associated EPRI Guidelines. The SG Program includes the following provisions:

1. Condition monitoring assessments are performed during each SG inspection to evaluate the "as-found" condition of the tubes with respect to the SG performance criteria for structural integrity and accident induced leakage as determined from the inservice inspection results.

2. SG Integrity is maintained by meeting the performance criteria or tube structural integrity, accident induced leakage and operational leakage. The SG Program procedures implement the performance criteria that are delineated in TS 5.5.9.b and NEI 97-06. Meeting the SG performance criteria provides reasonable assurance of maintaining tube integrity at normal and accident conditions.

3. Tubes found by inservice inspection that contain flaws that are equal to or greater than 40% of the nominal tube wall thickness are plugged. For Unit 2 only, service-induced flaws identified in the portion of the tube from the top of the tubesheet to 14.01 inches below the top of the tubesheet are plugged upon detection. For Unit 2 only, service-induced flaws found in the portion of the tube below 14.01 inches from the top of the tubesheet do not require plugging.

4. Periodic SG tube inspections are performed with the objective of detecting flaws of any type (e.g., volumetric flaws, axial and circumferential cracks) that may be present along the length of the tube, from the tube-to-tubesheet weld at the tube inlet to the tube-to-tubesheet weld at the tube outlet, and that may satisfy the applicable tube plugging criteria. For Unit 2 only, the portion of the tube below 14.01 inches from the top of the tubesheet is excluded. The tube-to-tubesheet weld is not part of the tube. The inspection scope, inspection methods and inspection intervals are determined by a degradation assessment that is performed in accordance with TS 5.5.9.d and NEI 97-06 to ensure that SG integrity is maintained until the next SG inspection.

5. Operational primary-to-secondary leakage monitoring is performed in accordance with TS 3.4.13, NEI 97-06 and EPRI Primary to Secondary Leak Guidelines (Reference 12).

6. There are no approved tube repair methods for the Units 1 & 2 SGs.

The Engineering Programs Department is the owner of the SG Program. The site Chemistry and Operations Departments are responsible for monitoring and responding to operational primary to secondary leakage. The site Chemistry Department is responsible for implementing the primary water and secondary water chemistry programs as described in References 15 and 16.

1.6 ACCEPTANCE CRITERIA

1. A tube with an imperfection depth greater than or equal to 40% of the nominal tube wall thickness shall be plugged.

For Unit 2 only, service-induced flaws found in the portion of the tube below 14.01 inches from the top of the tubesheet do not require plugging.

For Unit 2 only, service-induced flaws identified in the portion of the tube from the top of the tubesheet to 14.01 inches below the top of the tubesheet shall be plugged upon detection.

2. SG tube integrity shall be maintained by meeting the performance criteria for tube structural integrity, accident induced leakage and operational leakage as delineated in TS 5.5.9.b.

3. For Unit 1, the maximum equivalent plugging level is 5% per SG.

4. For Unit 2, the maximum equivalent plugging level is 5% per SG.

1.7 LCOARS/COMPENSATORY MEASURES

1. If a SG performance criterion is exceeded, reports shall be submitted to the NRC as required by 10CFR50.72 and 50.73, including a root cause evaluation identifying the performance criterion exceeded and an Operational Assessment establishing the basis for the next operating cycle.

2. The Shift Manager shall be notified immediately for any of the conditions identified below. The Shift Manager shall determine OPERABILITY status and implement a LCOAR as applicable. In addition, an Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

   a. Primary-to-secondary leakage not within limit.

   b. One or more SG tubes satisfying the tube plugging criteria and not plugged in accordance with the SG Program.

c. A SG performance criterion is exceeded.

d. SG tube integrity is not maintained.

1.8 REPORTING REQUIREMENTS

1. Following each inservice inspection of SG tubes performed in accordance with TS 5.5.9, a report of inspection results shall be submitted to the NRC within 180 days after initial entry into MODE 4 in accordance with TS 5.6.9.

2. An inservice summary report shall be submitted to the NRC and IEMA within 90 days of the completion of each refueling outage when SG inspections are performed, as required by ASME Section XI IWA-6000.

3. The Steam Generator Surveillance Program effectiveness is monitored by Maintenance Rule Criteria RC-2.

The Engineering Programs Department is responsible for preparing and submitting the above reports.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Byron has been reviewed and was determined not to be applicable to Braidwood.

SECONDARY WATER CHEMISTRY PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

In accordance with Technical Specification (TS) 5.5.10, "Secondary Water Chemistry Program." This Program provides controls for monitoring secondary water chemistry in order to inhibit steam generator tube degradation.

1.2 REFERENCES

1. Technical Specification 5.5.10, "Secondary Water Chemistry Program"
2. UFSAR Section 5.4.2.1.3, and 10.3.3
3. Electric Power Research Institute, PWR Secondary Water Chemistry Guidelines
4. Westinghouse Guidelines for Secondary Water Chemistry, February, 1985

1.3 DEFINITIONS AND/OR ACRONYMS

1. SECONDARY SYSTEM CHEMISTRY PARAMETERS - Chemical impurities in the secondary system have the potential to create conditions harmful to steam generator materials. Carefully controlling steam generator chemistry parameters minimizes material degradation.

   Parameters that cause rapid corrosion cannot be exceeded for more than brief periods at power. Power reductions or shutdown is required within set times of exceeding limits on these critical parameters.

2. Pressurized Water Reactor - PWR

3, Electric Power Research Institute - EPRI

4. Institute of Nuclear Power Operations - INPO

1.4 PROGRAM DESCRIPTION

The Secondary Chemistry Monitoring Program states chemical parameters which can indicate corrosive conditions and provides concentration limits for each parameter. These secondary chemistry guidelines were derived from Reference 3. Station procedures outline who is responsible for what actions and describes how other documents interact with this Program.

This Program provides controls for monitoring secondary water chemistry to inhibit Steam Generator tube degradation. The Program includes:

1. Identification of a sampling schedule for critical variables and control points for these variables;
2. Identification of the procedures used to measure the values of the critical variables;
3. Identification of process sampling points which shall include monitoring the discharge of the condensate pumps for evidence of condenser inleakage;
4. Procedures for the recording and management of data;
5. Procedures defining corrective actions for all out of specification chemistry conditions; and
6. Procedures identifying the authority responsible for the interpretation of the data and the sequence and timing of corrective actions.

1.5 PROGRAM IMPLEMENTATION

The requirements of the Program apply at all times.

1. The sampling schedule for the critical variables and control points for these variables is located in appropriate station procedures. The department responsible for this action is the Chemistry Department.

2. A means to measure the values of the critical variables will be located in appropriate station procedures. The Chemistry Department is responsible for revising and implementing these procedures.

3. Process sampling points are identified in appropriate station procedures and include the condensate pump discharge for evidence of a condenser leak. The Chemistry Department maintains a sample point book which contains additional sampling points. The Chemistry Department is responsible for this action.

4. The recording and management of the data is controlled by appropriate station procedures and is the responsibility of the Chemistry Department.

5. The definitions for corrective actions for all out of specification chemistry conditions are in appropriate station procedures and are the responsibility of the Chemistry Department with support from the Operations and Radiation Protection Departments.

6. The Chemistry Department shall be responsible for the interpretation of the data and the sequence and timing of corrective actions. This shall be performed with required support from the Operating, Radiation Protection, and System Engineering Departments.

1.6 ACCEPTANCE CRITERIA

This Program is based on Reference 3 and acceptance criteria are incorporated into appropriate station procedures.

1.7 LCOARS/COMPENSATORY MEASURES

The compensatory measures for exceeding secondary water chemistry parameters can be identified in appropriate station procedures. In addition, a Problem Identification Form (PIF) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

To assure corporate and station steam generator chemistry objectives are met, an ongoing review of secondary water chemistry will be conducted by the Chemistry Department. The Chemistry Supervisor and/or their designee is responsible for a monthly review of key program parameters, chosen by the Chemistry Supervisor and /or their designee. The Program's effectiveness will be measured against recognized industry standards, such as INPO standards (or other comparable standards).

The Chemistry Department is additionally responsible for reporting and reviewing programmatic failures through an approved station problem identification process.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall require a 10CFR50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include Regulatory Assurance in all cases. As a part of the ITR, for a change to this Program, Braidwood and Byron Plant Operations Review Committee (PORC) approval is required. The PORC approval shall ensure Braidwood is implementing the same change or that the change has been reviewed and determined not to be applicable to Braidwood.

VENTILATION FILTER TESTING PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

The purpose of this Program is to provide guidelines for performing surveillance testing of Technical Specification (TS) 5.5.11, "Ventilation Filter Testing Program (VFTP)" HVAC System Filters at Byron Station.

1.2 REFERENCES

1. Technical Specification Section 5.5.11, "Ventilation Filter Testing Program (VFTP)"
2. USNRC Regulatory Guide 1.52, Rev. 2, March 1978
3. ANSI N510 1980
4. ASTM D 3803-1989, "Standard Test Method for Nuclear Grade Activated Carbon"
5. UFSAR Appendix A

1.3 DEFINITIONS AND/OR ACRONYMS

1. Ventilation Filter Testing Program - VFTP
2. High Efficiency Particulate Air - HEPA

1.4 PROGRAM DESCRIPTION

This Program implements the following required testing of Engineered Safety Feature (ESF) ventilation filter systems at the frequencies specified in accordance with References 2 and 3.

1. Demonstrate for each of the ESF filter systems that an in-place test of the High Efficiency Particulate Air (HEPA) filters shows a penetration when tested in accordance with References 2 and 3 at the system flow rate, specified in Table 1, Part 1.

2. Demonstrate for each of the ESF filter systems that an in place test of the charcoal absorber shows a bypass leakage within limits when tested in accordance with References 2 and 3 at the system flow rated specified in Table 1, Part 2.

3. Demonstrate for each of the ESF filter systems that a laboratory test of a sample of the charcoal absorber, when obtained as described in Reference 2, shows the methyl iodide penetration less than the value specified in Table 1, Part 3, when tested in accordance with References 2, 3 and 4 at a temperature of 30°C and Relative Humidity (RH) specified in Table 1, Part 3.

4. Demonstrate for each of the ESF filter systems that the pressure drop across the combined HEPA filters and the charcoal adsorbers is < 6 inches of water gauge when tested in accordance with References 2 and 3 at the system flow rate, specified in Table 1, Part 4.

5. Demonstrate for each of the ESF filter systems that a bypass leakage test of the 1) combined HEPA filters and damper or 2) combined charcoal filter and damper leakage shows a total bypass leakage within acceptable limits at the system flow rate specified in Table 1, Part 5.

6. Demonstrate that the heaters for each of the ESF filter systems dissipate the value specified in Table 1, Part 6, when tested in accordance with References 3 and 5.

1.5 PROGRAM IMPLEMENTATION

Technical Section Filter Testing, Inspection and Repair

1. Control Room Ventilation (VC) System:

   a. At least once per 18 months (+ 25% tolerance) or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housing, or (2) following painting, fire or chemical release in any ventilation zone communicating with the Emergency Makeup System filter plenum shall meet the following requirements:

1. Verify that each HEPA and charcoal bank satisfies the inplace penetration testing acceptance criteria of less than 0.05% and 1%, respectively, and that the system flow rate is 6000 cfm ± 10% for the Emergency Makeup System using the test procedure guidance in accordance with References 2 and 3;

2. Verify, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample from the Emergency Makeup System obtained in accordance with Reference 2 meets the laboratory testing criteria for a methyl iodide penetration of less than 2% when tested according to Reference 4 at a temperature of 30 °C and a RH of 70%; and

3. Verify a system flow rate 6000 cfm ± 10% for the Emergency Makeup System and 49,5000 cfm ± 10% for the Recirculation System when tested in accordance with Reference 3.

b. After every 720 hours (+ 25% tolerance) of Emergency Makeup System operation, verify, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample from the Emergency Makeup System obtained in accordance with for methyl iodide penetration of less than 2% when tested according to Reference 4 at a temperature of 30°C and a RH of 70%.

c. At least once per 18 months (+ 25% tolerance) by:

1. Verifying the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6.0 inches Water Gauge while operating the Emergency Makeup System at a flow rate of 6000 cfm ± 10% when tested in accordance with References 2 and 3.

2. Verifying that the heaters dissipate ≥ 24.0 kW when tested in accordance with Reference 3 and any exceptions noted in Reference 5.

d. After each complete or partial replacement of a HEPA filter bank in the Emergency Makeup System, verify that the affected HEPA filter bank satisfies the inplace penetration testing acceptance criteria of less than 0.05% in accordance with Reference 3 while operating the Emergency Makeup System at a flow rate of 6600 cfm ± 10%.

e. After each complete or partial replacement of a charcoal adsorber bank in the Emergency Makeup System, verify that the affected charcoal adsorber bank satisfies the inplace penetration testing acceptance criteria of less than 0.01% in accordance with Reference 3 while operating the system at a flow rate of 6000 cfm ± 10%.

f. At least once per 18 months (+ 25% tolerance) or (1) after any structural maintenance on the charcoal adsorber housings, or (2) following painting, fire or chemical release in any ventilation zone communicating with the recirculation charcoal adsorber by:

   1. Verifying that the recirculation charcoal adsorber plenum satisfies the inplace penetration testing acceptance criteria of less than 2% total bypass, using the test procedure guidance in accordance with References 2 and 3 and the system flow rate is 49,500 cfm ± 10% for the recirculation charcoal adsorber;

   2. Verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample from the recirculation charcoal adsorber obtained in accordance with Reference 2 meets the laboratory testing criteria for a methyl iodide penetration of less than 4% when tested according to Reference 4 at a temperature of 30 °C and a RH of 70%; and

   3. Verifying a system flow rate of 49,500 cfm ± 10% for the Recirculation Charcoal Adsorber when tested in accordance with Reference 3.

g. After each complete or partial replacement of a charcoal adsorber bank in the Recirculation Charcoal Absorber System by verifying that the charcoal adsorber bank satisfies the inplace penetration testing acceptance criteria of less than 0.1% in accordance with Reference 3 while operating at a system flow rate of 49,500 cfm ± 10%.

h. After every 720 hours (+ 25% tolerance) of Recirculation Charcoal Adsorber System operation by verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Reference 2, meets the laboratory testing criteria for a methyl iodide penetration of less than 4% when tested according to Reference 4 at a temperature of 30°C and a RH of 70%.

2. Non-Accessible Area Exhaust Filter Plenum Ventilation System:

a. At least once per 18 months (+ 25% tolerance) or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housing, or (2) following painting, fire or chemical release in any ventilation zone communicating with the exhaust filter plenum by:

1. Verifying that each HEPA and charcoal bank satisfies the inplace penetration and bypass leakage testing acceptance criteria of less than 1%, using the test procedure guidance in accordance with References 2 and 3, while the flow rate is between 55,669 cfm and 68,200 cfm for the train;

2. Verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample from each bank of adsorbers of the train obtained in accordance with Reference 2 meets the laboratory testing criteria for a methyl iodide penetration of less than 4.5% when tested according to Reference 4 at a temperature of 30 °C and a RH of 70%; and

3. Verifying a system flow rate of between 55,669 cfm and 68,200 cfm through the train through the exhaust filter plenum when tested in accordance with Reference 3.

4. Verifying that with the system operating at a flow rate of between 55,669 cfm and 68,200 cfm through the train and exhausting through the HEPA filter and charcoal adsorbers, with the main supply and exhaust fans operating, the total bypass flow of the system and the damper leakage, when determined by direct measurement at a test pressure of 2 inches of water, is less than or equal to 1%.

5. Verifying, with a system flow of between 55,669 cfm and 68,200 cfm through the train and exhaust filter plenum, that the flow rate in each filter bank is 18,556 cfm and 23,100 cfm.

b. After every 720 hours (+25% tolerance) of charcoal adsorber operation by verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample obtained from each bank of adsorbers of the train in accordance with Reference 2, meets the laboratory testing criteria for a methyl iodide penetration of less than 4.5% when tested according to Reference 4 at a temperature of 30°C and a RH 70%.

c. At least once per 18 months (+25% tolerance) by verifying for each filter bank of the train that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6.0 inches Water Gauge while operating the exhaust filter plenum at a flow rate of between 55,669 cfm and 68,200 cfm when tested in accordance with References 2 and 3.

d. After each complete or partial replacement of a HEPA filter bank by verifying that the exhaust filter plenum satisfies the inplace penetration testing acceptance criteria of less than 1% in accordance with Reference 3 while operating at a flow rate of between 55,669 cfm and 68,200 cfm through the train.

e. After each complete or partial replacement of a charcoal adsorber bank by verifying that the exhaust filter plenum satisfies the inplace penetration testing acceptance criteria of less than 1% in accordance with Reference 3 while operating at a system flow rate of between 55,669 cfm and 68,200 cfm through the train.

3. Fuel Handling Building Exhaust Filter Plenums:

a. At least once per 18 months (+ 25% tolerance) or (1) after any structural maintenance on the HEPA filter or charcoal adsorber housing, or (2) following painting, fire or chemical release in any ventilation zone communicating with the system by:

1. Verifying that the Fuel Handling Building Exhaust Filter Plenum satisfies the inplace penetration testing acceptance criteria of less than 1% when using the test procedure guidance in accordance with References 2 and 3 while the system flow rate is 21,000 cfm ± 10%.

2. Verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Reference 2 meets the laboratory testing criteria for a methyl iodide penetration of less than 10% when tested according to Reference 4 at a temperature of 30 °C and a RH of 95%;

3. Verifying a flow rate of 21,000 cfm ± 10% through the Fuel Handling Building Exhaust Filter Plenum during operation when tested in accordance with Reference 3; and

4. Verifying that with the system operating at a flow rate of 21,000 cfm ± 10% and exhausting through the HEPA filters and charcoal adsorbers, with the main supply and exhaust fans operating, the total bypass flow and damper leakage, when determined by direct measurement at a test pressure of 2 inches pf water, is less than or equal to 1%.

b. After every 720 hours (+25% tolerance) of charcoal adsorber operation by verifying, within 31 days (+ 25% tolerance) after removal, that a laboratory analysis of a representative carbon sample obtained in accordance with Reference 2, meets the laboratory testing criteria for a methyl iodide penetration of less than 10% when tested according to Reference 4 at a temperature of 30°C and a RH of 95%.

c. At least once per 18 months (+25% tolerance) by verifying that the pressure drop across the combined HEPA filters and charcoal adsorber banks is less than 6.0 inches Water Gauge while operating the exhaust filter plenum at a flow rate of 21,000 cfm and ± 10% when tested in accordance with References 2 and 3.

d. After each complete or partial replacement of a HEPA filter bank by verifying that the Fuel Handling Building Exhaust Filter Plenum satisfies the inplace penetration testing acceptance criteria of less than 1% in accordance with Reference 3 while operating at a system flow rate of 21,000 cfm ± 10%; and

e. After each complete or partial replacement of a charcoal adsorber bank by verifying that the Fuel Handling Building Exhaust Filter Plenum satisfies the inplace penetration testing acceptance criteria of less than 1% in accordance with Reference 3 while operating at a system flow rate of 21,0900 cfm ± 10%.

1.6 ACCEPTANCE CRITERIA

Acceptance criteria is listed in Table 1.

1.7 LCOARS/COMPENSATORY MEASURES

In the event any of the acceptance criteria is not met, the Shift Manager will immediately be notified. The Shift Manger shall determine OPERABILITY status and implement a LCOAR as applicable. In addition, a Problem Identification Form (PIF) may be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

Not applicable.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall require a 10 CFR 50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include the Regulatory Assurance Department in all cases. As Part of the ITR, for a change to this Program, Braidwood and Byron Plant Operations Review Committee (PORC) approval is required. The PORC approval shall ensure Braidwood is implementing the same change or that the change has been reviewed and determined not to be applicable to Braidwood.

TABLE 1

VENTILATION FILTER TESTING PROGRAM (VFTP)

Part 1

ESF Ventilation System	Flow Rate	Penetration
Control Room Ventilation (VC) Filtration System (makeup)	≥ 5400 cfm and ≤ 6600 cfm	<0.05%
Nonaccessable Area Exhaust Filter Plenum Ventilation System (after structural maintenance of the HEPA filter housings)	≥ 55,669 cfm and ≤ 68,200 cfm per train, and ≥ 18,556 cfm and ≤ 22,733 cfm per bank	< 1%
Nonaccessible Area Exhaust Filter Plenum Ventilation System (for reasons other than structural maintenance of the EPA filter housings)	≥ 55,669 cfm and ≤ 68,200 cfm per train	< 1%
Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System	≥ 18,900 cfm and ≤ 23,100 cfm	< 1%

Table 1 (page 2 of 4)

Part 2

ESF Ventilation System	Flow Rate	Bypass
VC Filtration System (makeup)	≥ 5400 cfm and ≤ 6600 cfm	< 1%
VC Filtration System (recirculation, charcoal bed after complete or partial replacement)	≥ 44,550 cfm and ≤ 54,450 cfm	< 0.1%
VC Filtration System (recirculation for reasons other than complete or partial charcoal bed replacement)	≥ 44,550 cfm and ≤ 54,450 cfm	< 1%
Nonaccessible Area Exhaust Filter Plenum Ventilation System (after structural maintenance on the charcoal adsorber housings)	≥ 55,669 cfm/train and ≤ 68,200 cfm/train and ≥ 18,556 cfm/bank and ≤ 22,733 cfm/bank	< 1%
Nonaccessible Area Exhaust Filter Plenum Ventilation System (For reasons other than structural maintenance of the charcoal adsorber housings)	≥ 55,669 cfm/train and ≤ 68,200 cfm/train	< 1%
FHB Ventilation System	≥ 18,900 cfm/train and ≤ 23,100 cfm/train	< 1%

Table 1 (page 3 of 4)

Part 3

ESF Ventilation System	Penetration	RH
VC Filtration System (makeup)	2.0%	70%
VC Filtration System (recirculation)	4%	70%
Nonaccessible Area Exhaust Filter Plenum Ventilation System	4.5%	70%
FHB Ventilation System	10%	95%

Part 4

EFS Ventilation System	Flow Rate
VC Filtration System (makeup)	≥ 5400 cfm and ≤ 6600 cfm
Nonaccessible Area Exhaust Filter Plenum Ventilation System	≥ 55,669 cfm/train and ≤ 68,200 cfm/train
FHB Ventilation System	≥ 18,900 cfm and ≤ 23,100 cfm

Part 5

ESF Ventilation System	Flow Rate	Bypass
Nonaccessible Area Exhaust Filter Plenum Ventilation System	≥ 55,669 cfm/train and ≤ 68,200 cfm/train	≤ 1%
FHB Ventilation System	≥ 18,900 cfm and ≤ 23,100 cfm	≤ 1%

Table 1 (page 4 of 4)

Part 6

ESF Ventilation System	Wattage
VC Filtration System	≥ 24.05 kW

EXPLOSIVE GAS AND STORAGE TANK RADIOACTIVITY MONITORING PROGRAM
BYRON

TABLE OF CONTENTS

1.1. PURPOSE

In accordance with Technical Specification (TS) Specification 5.5.12, "Explosive Gas and Storage Tank Radioactive Monitoring Program". This Program provides controls for:

1. Potentially explosive gas mixtures contained in the Waste Gas System;
2. The quantity of radioactivity contained in gas decay tanks; and
3. The quantity of radioactivity contained in unprotected outdoor liquid radwaste storage tanks.

The requirements of this Program dictate the contents of the implementing procedures.

1.2 REFERENCES

1. TS Specification 5.5.12, "Explosive Gas and Storage Tank Radioactivity Monitoring Program"
2. UFSAR Section 11.3.2.5
3. ODCM
4. Standard Review Plan 11.3, Branch Technical Position (BTP) ETSB 11-5, "Postulated Radioactive Release due to Waste Gas System Leak or Failure," in NUREG-0800, July 1981
5. 10CFR20, Appendix B, Table 2, Column 2
6. General Design Criterion 60 of Appendix A to 10CFR50

1.3 DEFINITIONS AND/OR ACRONYMS

A WASTE GAS HOLDUP SYSTEM - Any system designed and installed to reduce radioactive gaseous effluents by collecting Reactor Coolant System off-gases from the Reactor Coolant System and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

PRIMARY COOLANT DEGASSING OPERATION - When preparing the plant for MODE 5 prior to MODE 6, the Reactor Coolant is degassed to reduce the hydrogen concentrations. At the start of the degassing operation, the Volume Control Tank (VCT) gas space contains hydrogen and traces of fission gases. The operation involves opening the VCT water level to force gasses out of the tank, and closing the VCT vent.

MEMBER(S) OF THE PUBLIC - Include all persons who are not occupationally associated with the plant. This category does not include employees of the licensee, its contractors or vendors and persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational, or other purposes not associated with the plant.

The SITE BOUNDARY - Be that line beyond which the land is neither owned, nor leased, nor otherwise controlled by the licensee.

IMMEDIATELY - That the Required Actions should be pursued without delay and in a controlled manner.

1.4 PROGRAM DESCRIPTION

This Program ensures that the concentration of potentially explosive gas mixtures contained in the WASTE GAS HOLDUP SYSTEM is maintained below the flammability limits for hydrogen and oxygen. Sample instruments with alarms are provided to alert operators to take compensatory measures to prevent the hydrogen and oxygen concentrations from reaching flammability limits. Maintaining the concentration of hydrogen and oxygen below their flammability limits provides assurance that the releases of radioactive materials will be controlled in conformance with the requirements of Reference 6.

Restricting the quantity of radioactivity contained in each gas decay tank provides assurance that in the event of an uncontrolled release of the tank's contents, the resulting whole body exposure to a MEMBER OF THE PUBLIC at the nearest SITE BOUNDARY will not exceed 0.5 rem. This is consistent with Reference 4.

The quantity of radioactivity contained in all outdoor liquid radwaste tanks that are not surrounded by liners, dikes, or walls, capable of holding the tank's contents and that do not have tank overflows and surrounding area drains connected to the liquid radwaste treatment system is an amount that would result in concentrations less than the limits of Reference 5, at the nearest potable water supply and the nearest surface water supply in an unrestricted area, in the event of an uncontrolled release of the tank's contents.

The Radiation Protection Department shall be the Program owner with required support from the Operating, Chemistry, and System Engineering Departments.

1.5 PROGRAM IMPLEMENTATION

The requirements of this Program apply at all times.

1. The concentration of hydrogen and oxygen in the WASTE GAS HOLDUP SYSTEM shall be determined to be within the acceptance criteria by continuously monitoring the waste gases in the WASTE GAS HOLDUP SYSTEM with the hydrogen and oxygen monitors required by TRM LCO 3.3.e.

2. The quantity of radioactivity contained in each gas decay tank shall be determined, in accordance with the guidance provided in Reference 4, to be within the acceptance criteria at least once per 7 days when radioactive materials are being added to the tank, and at least once per 24 hours during PRIMARY COOLANT DEGASSING OPERATION.

3. The quantity of radioactive material contained in the Primary Water Storage Tank and any Outside Temporary Tanks shall be determined to be within the acceptance criteria by analyzing a representative sample of the tank's contents at least once per 7 days when radioactive materials are being added to the tank.

1.6 ACCEPTANCE CRITERIA

1. Explosive Gas Mixtures

   The concentration of oxygen in the WASTE GAS HOLDUP SYSTEM shall be ≤ 2% by volume whenever the hydrogen concentration is > 4% by volume.

2. Radioactivity Contained in Gas Decay Tanks

   The quantity of radioactivity contained in each gas decay tank shall be limited to ≤ 5 E+04 Curies of noble gases (considered as Xe-133 equivalent).

3. Radioactivity Contained in Unprotected Outdoor Liquid Radwaste Storage Tanks.

   The quantity of radioactive material, excluding tritium and dissolved or entrained noble gases, shall be limited to the following:

   a. Primary Water Storage Tank ≤ 2000 Curies
   b. Outside Temporary Tank ≤ 10 Curies

1.7 LCOARS/COMPENSATORY MEASURES

1. Explosive Gas Mixtures

   a. With the concentration of oxygen in the WASTE GAS HOLDUP SYSTEM > 2% by volume but ≤ 4% by volume, when hydrogen is > 4% by volume, restore the oxygen concentration to ≤ 2% within 48 hours.

   b. With the concentration of oxygen in the WASTE GAS HOLDUP SYSTEM > 4% by volume and the hydrogen concentration > 4% by volume, IMMEDIATELY suspend all additions of waste gases to the system and reduce the concentration of oxygen to ≤ 4% by volume, then restore the oxygen concentration to ≤ 2% within the following 48 hours.

   The department responsible for the above Actions is the Operating Department.

2. Radioactivity Contained in Gas Decay Tanks

   With the quantity of radioactive material in any gas decay tank exceeding the acceptance criteria:

   a. IMMEDIATELY suspend all additions of radioactive material to the tank, and within 48 hours, reduce the tank contents to within the limit; and

   b. Describe the events leading to this condition in the next Radioactive Effluent Release Report.

   The department responsible for action a is the Operating Department, Action b is the responsibility of the Radiation Protection Department.

3. Radioactivity Contained in Unprotected Outdoor Liquid Radwaste Storage Tanks

   With the quantity of radioactive material in the Primary Water Storage Tank or any Outside Temporary Tank exceeding the acceptance criteria:

   a. IMMEDIATELY suspend all additions of radioactive material to the tank;

   b. Within 48 hours reduce the tank contents to within the acceptance criteria; and

   c. Describe the events leading to this condition in the next Radioactive Effluent Release Report

   The Operations Department is responsible for Actions a and b, and the Radiation Protection Department is responsible for Action c.

   The Shift Manager shall determine OPERABILITY status and implement a LCOAR as applicable. A Problem Identification Form (PIF) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

This Program shall be reviewed every two years for technical accuracy and revision. The review shall be done by the Radiation Protection Department with input from the Operations, Chemistry, and System Engineering Departments.

Program failures shall be reported through an approved station problem identification process. The Operations Department will be responsible for ensuring that Program failures have been reported.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include Regulatory Assurance Department in all cases. As a part of the ITR, for a change to this Program, Braidwood and Byron Plant Operations Review Committee (PORC) approval is required. The PORC approval shall ensure Braidwood is implementing the same change or that the change has been reviewed and determined not to be applicable to Braidwood.

DIESEL FUEL OIL TESTING PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

The purpose of this Program is to provide guidance for implementation of Diesel Fuel Oil Testing at Byron Station as required by Technical Specification (TS) 5.5.13. This Program, through approved Exelon Nuclear, Byron Station, or Vendor procedures, ensures that DELIVERED, NEW, and STORED diesel fuel oil meet the appropriate standards.

1.2 REFERENCES

1. Technical Specification 5.5.13, "Diesel Fuel Oil Testing Program"

2. ASTM Standards

   a. D5452-98, "Particulate Contamination in Aviation Fuels by Laboratory Filtration,"
   b. D1552-95, "Standard Test Method for Sulfur in Petroleum Products (High Temperature Method)"
   c. D975-06b, "Standard Specifications for Diesel Fuel Oils"
   d. D2622-98, "Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescent Spectrometry"
   e. D4176-93, "Standard Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)"
   f. D4057-95, "Standard Practice for Manual Sampling of Petroleum and Petroleum Products"
   g. D1298-99, "Standard Practice for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method"
   h. D4294-98, "Standard Test Method for Sulfur in Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectroscopy"
   i. D2709-96e, "Test Method for Water and Sediment in Distillate Fuels by Centrifuge"
   j. D1500-98, “Standard Test Method for ASTM Color of Petroleum Products (ASTM Color Scale)”
   k. D3120-06, “Standard Test Method for Trace Quantities of Sulfur in Light Liquid Petroleum Hydrocarbons by Oxidative Microcoulometry”
   l. D5453-06, “Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence”
   m. D6079-04e, “Standard Test Method for Evaluating Lubricity of Diesel Fuels by the High Frequency Reciprocating Rig (HFRR)”

3. Commitments

   a. CM-1, Action Tracking Item 1367499-18-40, License Renewal Fuel Oil Chemistry Aging Management Program (1.5.5, 1.5.6, and Attachment A)

1.3 DEFINITIONS AND/OR ACRONYMS

1. DELIVERED DIESEL FUEL OIL - Any diesel fuel being delivered to Byron Station which is intended to be used by INSTALLED PLANT EQUIPMENT. Fuel is typically delivered by truck and is either blended at approximately 25% #1 grade and 75% #2 grade, or purchased such that the resultant fuel has an approximate 25% #1 to 75% #2 ratio (i.e. one truck load #1 to three truck loads #2). This blend can be used year-around, but is intended to prevent winter gelling concerns. Byron Station may also specify straight #2 fuel if desired, with optional anti-gel additives utilized for winter considerations. Delivered diesel fuel oil receives a cursory analysis of properties to give confidence that the truck indeed contains diesel fuel oil prior to adding it to any OUTDOOR BULK DIESEL FUEL OIL TANK. If fuel is being delivered using the one truck load #1 to three truck loads #2 method to achieve the blend, it is recognized that the straight #1 fuel parameters may not meet the blend's specification. In this case, the fuel is still accepted since it is known that it will eventually be blended with #2 and the resultant further analyzed before use as described in the definition of UNCERTIFIED DIESEL FUEL OIL.

2. UNCERTIFIED DIESEL FUEL OIL - Any diesel fuel oil that has not been tested and found to meet the applicable acceptance criteria for grade #2 diesel fuel oil and is to be added, or already is in, the INSTALLED PLANT EQUIPMENT's tanks or the OUTDOOR BULK DIESEL FUEL OIL TANKS. Fuel in the INSTALLED PLANT EQUIPMENT's tanks or the OUTDOOR BULK DIESEL FUEL OIL TANKS can become UNCERTIFIED when samples are not found to meet fuel specification (following analysis of an optional confirmatory sample) or by adding DELIVERED or UNCERTIFIED fuel to the tanks. In the event fuel is UNCERTIFIED, actions are taken to either bring the fuel back into specifications and/or prevent the fuel from being used until it is deemed CERTIFIED.

3. CERTIFIED DIESEL FUEL OIL - Diesel fuel oil in any station diesel fuel oil tank which has previously been sampled, analyzed, and found to meet the applicable acceptance criteria for grade #2 diesel fuel oil, except that the acceptance criteria values for sulfur and lubricity will be as required per paragraphs 1.5.3.c and 1.5.3.h below. This fuel can be stored in either the OUTDOOR BULK DIESEL FUEL OIL TANKS or tanks associated with the INSTALLED PLANT EQUIPMENT. This fuel is periodically sampled and analyzed. See Attachment A for test and test frequency.

4. NEW FUEL OIL – Diesel fuel oil that has been sampled and tested in accordance with the requirements of TS 5.5.13 for NEW FUEL OIL. TS 5.5.13 requires specific tests of fuel oil prior to addition to storage tanks, e.g., 1) an API gravity or an absolute specific gravity, 2) a flash point and kinematic viscosity, and 3) a clear and bright appearance with proper color or a water and sediment content. Additional tests are required to verify other properties of NEW FUEL OIL within 30 days following sampling and addition to storage tanks.

   For the Emergency Diesel Generators (EDGs), the OUTDOOR BULK DIESEL FUEL OIL TANKS (one 50,000 gal. and one 125,000 gal.) are normally the source of NEW FUEL OIL.

5. STORED FUEL OIL- Diesel fuel oil that has been sampled and tested in accordance with the requirements of TS 5.5.13 for STORED FUEL OIL. Fuel oil degradation during long term storage shows up as an increase in particulate, due mostly to oxidation. Consequently, TS 5.5.13 requires STORED FUEL OIL to be tested for total particulate concentration every 31 days.

   For the EDGs, the inside storage tanks (each Unit 1 EDG is provided with two 25,000 gal. inside storage tanks and each Unit 2 EDG is provided with one 50,000 gal. inside storage tank) are the source of the required STORED FUEL OIL.

6. INSTALLED PLANT EQUIPMENT - EDGs, Diesel-driven fire pump, Security diesel generator, Diesel-driven Auxiliary Feedwater pump, Essential Service Water Makeup pumps, Auxiliary boilers (note: Auxiliary boilers burn CERTIFIED or UNCERTIFIED fuel directly from the OUTDOOR BULK DIESEL FUEL OIL TANKS).

7. OUTDOOR BULK DIESEL FUEL OIL TANKS - Typically called 125K and 50K tanks (0D003T and 0D012T respectively). These tanks receive the delivered fuel and store it UNCERTIFIED until being CERTIFIED through analysis. Once CERTIFIED the fuel stored in these tanks is normally used to fill the tanks of the INSTALLED PLANT EQUIPMENT.

1.4 PROGRAM DESCRIPTION

The Diesel Fuel Oil Testing Program provides guidance for testing DELIVERED, NEW, and STORED DIESEL FUEL OIL. This Program includes sampling and testing requirements as outlined in Attachment A which also may be contained in appropriate procedures, as well as acceptance criteria in accordance with the applicable standards. This Program also describes preventative maintenance activities that are performed to ensure good fuel quality and tank condition for certain INSTALLED PLANT EQUIPMENT tanks.

1.5 PROGRAM IMPLEMENTATION

This Diesel Fuel Oil Testing Program implements required sampling and analysis of DELIVERED, NEW, and STORED DIESEL FUEL OIL. The Program includes sampling and testing requirements as outlined in Attachment A which also may be contained in appropriate procedures, as well as acceptance criteria, in accordance with applicable standards. This Program also describes preventative maintenance activities that are performed to ensure good fuel quality and tank condition for certain INSTALLED PLANT EQUIPMENT'S tanks. This Program establishes the following:

1. Other properties of NEW FUEL OIL are within limits within 30 days following sampling in accordance with ASTM D4057-95 and addition to storage tanks;

2. Total particulate concentration of the fuel oil is ≤ 10 mg/l when tested every 31 days in accordance with ASTM D5452-98.

3. Acceptability (certification) of UNCERTIFIED fuel oil and continued certification on a periodic basis in the fuel oil storage tanks by determining that the fuel oil:

   a. meets ASTM D975-06b specifications;

   b. meets ASTM D5452-98 specification for particulate contamination;

   c. meets Illinois EPA sulfur requirements and may be tested in accordance with ASTM D1552-95, ASTM D2622-98, ASTM D4294-98; ASTM D3120-06, or D5453-06;

   d. a flash point and kinematic viscosity is within limits;

   e. API specific gravity or an absolute specific gravity within limits when tested in accordance with ASTM D1298-99;

   f. water and sediment when tested in accordance with ASTM D2709-96e is within limits;

   g. a clear and bright appearance when tested in accordance with ASTM D4176-93, and proper color when tested in accordance with ASTM D1500-98; and

   h. lubricity is less than 600 microns when tested in accordance with ASTM D6079-04e.

Actual testing for each individual tank may vary. The minimum testing schedule is shown in Attachment A. Actual fuel analysis performed is determined within specific Exelon Nuclear, Byron

Station, or approved Vendor procedures.

4. 10 year OUTDOOR BULK DIESEL FUEL OIL TANK (0DO03T - 125K gallon tank and 0DO12T - 50K gallon tank) cleaning using a Sodium Hypochlorite (household bleach) solution or an evaluated equivalent solution; and

5. 10 year EDG tank cleaning using a Sodium Hypochlorite (household bleach) solution or an evaluated equivalent solution (Unit 1 has four 25,000 gallon (1DO01TA/B/C/D) and Unit 2 has two 50,000 gallon (2DO01TA/B) tanks) **(CM-1)**; and

6. Periodic check for and removal of accumulated water from the EDG day tanks. **(CM-1)**

The provisions of SR 3.0.2 and SR 3.0.3 are applicable to the Diesel Fuel Oil Testing Program frequencies.

The Byron Operating Department, Chemistry Department, and Vendors are responsible for the implementation, performance, completion, and reporting of this Program.

1.6 ACCEPTANCE CRITERIA

Acceptance criteria for the fuel used in the INSTALLED PLANT EQUIPMENT at Byron is specified in the applicable Exelon Nuclear, Byron Station, and Vendor procedures implemented by this Program.

1.7 LCOARS/COMPENSATORY MEASURES

In the event the diesel fuel oil does not meet the acceptance criteria, the Shift Manager or designee shall be immediately notified. The Shift Manager or designee shall determine OPERABILITY status and implement a LCOAR(s) as applicable.

Typically, fuel stored in the 125K and 50K OUTDOOR BULK DIESEL FUEL OIL TANKS which does not meet acceptance criteria is declared UNCERTIFIED since there is not any LCOAR(s) associated with these tanks. Actions are taken to prevent UNCERTIFIED fuel from being used. A confirmatory sample should be analyzed in the event a sample is found to not meet the acceptance criteria. In addition, an Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

Failure to perform a preventative maintenance activity to ensure good tank condition for a specified tank (items 4, 5, and 6 under Section 1.5 Program Implementation) within the specified Frequency does not constitute an automatic failure to meet the acceptance criteria for the associated fuel and does not require the associated fuel to be declared UNCERTIFIED. If acceptance criteria for the associated diesel fuel oil continue to be met, there is not any LCOAR(s) associated with completion of this preventative maintenance activity. If the preventative maintenance activity cannot be performed within the specified frequency, action shall be initiated prior to exceeding the specified frequency to prepare and submit a report to the Plant Operating Review Committee outlining the cause of the inability to perform the required activity within the specified frequency and the plans for completion of the required activity. If this action cannot be completed prior to the specified frequency being exceeded due to late discovery, the provisions of TLCO 3.0.c are applicable.

1.8 REPORTING REQUIREMENTS

Analysis results are reported to Byron by Vendor.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include the Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Byron has been reviewed and was determined not to be applicable to Braidwood.

	Outdoor Bulk Diesel Fuel Oil Tanks: ØDOØ3T (125k gal.) ØDO12T (5Øk gal.)	EDG Storage Tanks: 1DOØ1TA/B/C/D (25k gal.) 2DOØ1TA/B (5Øk gal.)		EDG Day Tanks: 1DOØ2TA/B (5ØØ gal.) 2DOØ2TA/B (5ØØ gal.)		_B AF Pump Diesel Day Tanks: 1DO1ØT (5ØØ gal.) 2DO1ØT (5ØØ gal.)	Diesel-Driven Fire Pump Diesel Fuel Oil Day Tank: ØDOØ5T (65Ø gal.)	Security Diesel Generator Day Tank: ØDOØ6T (5ØØ gal.)	ØA/ØB SX Makeup Pump Diesel Day Tanks: ØDOØ8TA (2ØØØ gal.) ØDOØ8TB (2ØØØ gal.)
Frequency →	Monthly	31 Days	92 Days	31 Days	92 Days	92 Days	92 Days	92 Days	92 Days
Parameter:									
Flash Point	XX(2)								
Cloud Point	XX(3)								
Water and Sediment	XX(1)(2)(5)		X(5)		X(5)	X(5)	X(5)	X	X(5)
Ramsbottom Carbon Residue	XX(3)								
Ash	XX(3)								
Kinetic Viscosity	XX(2)		X		X	X	X	X	X
Copper Strip Corrosion	XX(3)								
Cetane Index	XX(3)								
Sulfur	XX(3)								
API Gravity	XX(2)		X		X	X	X	X	X
Distillation Temperature	XX(3)								
Bacteria	X(5)		X(5)		X(5)	X(5)	X(5)		X(5)
Clear and Bright	XX(1)(2)	X			X	X	X	X	X
Color	XX(1)(2)	X			X	X	X	X	X
Heat Value	X								
Total Particulate Contamination	XX(4)(5)	XX(5)			X(5)	X(5)	X(5)		X(5)
Removal of Accumulated Water	X	XX(5)		XX(5)		X(5)	X(5)		X(5)
Lubricity	X								

XX = Technical Specification required testing performed
X = Testing performed

NOTES:

(1) Water and Sediment or Clear and Bright with Proper Color is required.
(2) Technical Specifications require verifying within limits within 3Ø days prior to adding new fuel oil to storage tanks.
(3) Technical Specifications require verifying within 3Ø days following sampling and addition to storage tanks.
(4) Required since the Outdoor Bulk Diesel Fuel Oil Tanks are considered the source of stored fuel for the _B AF Pump Diesel Day Tanks and the ØA/ØB SX Makeup Pump Diesel Day Tanks
(5) Testing required per the License Renewal Fuel Oil Chemistry Aging Management Program (CM-1)

TECHNICAL SPECIFICATIONS BASES CONTROL PROGRAM

TABLE OF CONTENTS

1.1 PURPOSE

The purpose of this Program is to provide guidance for identifying, processing, and implementing changes to the Technical Specifications (TS) Bases. This Program implements and satisfies the requirements of TS 5.5.14, "Technical Specifications (TS) Bases Control Program."

This Program is applicable to the preparation, review, implementation, and distribution of changes to the TS Bases. This Program also provides guidance for preparing TS Bases Change Packages for distribution.

1.2 REFERENCES

1. TS 5.5.14, "Technical Specifications (TS) Bases Control Program"
2. 10 CFR 50.4, "Written Communications"
3. 10 CFR 50.59, "Changes, Tests and Experiments"
4. 10 CFR 50.71, "Maintenance of Records, Making of Reports"
5. 10 CFR 50.90, "Application for Amendment of License or Construction Permit"

1.3 DEFINITIONS AND/OR ACRONYMS

1. 10 CFR 50.59 REVIEW - A written regulatory evaluation which provides the basis for the determination that a change does, or does not, require NRC approval pursuant to 10 CFR 50.59. The scope of the evaluation should be commensurate with the potential safety significance of the change, but must address the relevant safety concerns included in the Safety Analysis Report and other owner controlled documents. The depth of the evaluation must be sufficient to determine whether or not NRC approval is required prior to implementation. Depending upon the significance of the change, the evaluation may be brief; however, a simple statement of conclusion is not sufficient.

2. EDITORIAL CHANGE - Editorial changes include correction of punctuation, insignificant word or title changes, style or format changes, typographical errors, or correction of reference errors that do not change the intent, outcome, results, functions, processes, responsibilities, or performance requirements of the item being changed. Changes in numerical values shall <u>not</u> be considered as editorial changes. Editorial changes do not constitute a change to the TS Bases and therefore do not require further 10 CFR 50.59 reviews. If the full scope of this proposed change is encompassed by one or more of the below, then the change is considered editorial.

   - Rewording or format changes that do not result in changing actions to be accomplished.
   - Deletion of cycle-specific information that is no longer applicable.
   - Addition of clarifying information, such as:
     - Spelling, grammar, or punctuation changes
     - Changes to references
     - Name or title references

1.4 PROGRAM DESCRIPTION

1. A Licensee may make changes to the TS Bases without prior NRC approval provided the changes do not require either of the following:

   a. A change in the TS as currently incorporated in the license; or

   b. A change to the Updated Final Safety Analysis Report (UFSAR) or TS Bases that requires NRC approval pursuant to 10 CFR 50.59.

2. Changes that meet the above criteria (i.e., 1.4.1.a or 1.4.1.b) shall be submitted to the NRC pursuant to 10 CFR 50.90 and reviewed and approved by the NRC prior to implementation.

3. The TS Bases shall be maintained consistent with the UFSAR.

4. If a change to the TS Bases is not consistent with the UFSAR, then the cognizant Engineer shall prepare and submit a UFSAR Change Package when the TS Bases Change Request is submitted to Regulatory Assurance (RA) for processing.

5. Changes to the TS Bases that do not require prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e), as modified by approved exemptions.

6. TS Bases changes associated with a TS Amendment shall be implemented consistent with the implementation requirements of the TS Amendment.

7. Cantera Licensing (CL) is responsible for the control and distribution of the TS Bases. In order to prevent distribution errors (i.e., omissions or duplications), CL shall maintain the master TS Bases distribution list.

1.5 PROGRAM IMPLEMENTATION

1. TS Bases Change Requestor identifies the need for a revision to the TS Bases and notifies the RA Licensing Engineer (i.e., hereafter referred to as RA LE). A TS Bases change can be initiated through any Stations' RA. TS Bases Change Requestor notifies their counterparts on the need for a change.

2. RA LE notifies their counterparts of identified need for revision to the TS Bases.

3. RA LE obtains concurrence from CL on the need for a change.

4. RA LE drafts TS Bases changes considering format, rules of usage, and technical adequacy, and notifies RAMs at each of the other Stations by transmitting Attachment D, "Technical Specifications Bases Change Applicability Review Form."

5. CL Engineer (i.e., hereafter referred to as CLE reviews the agreed upon TS Bases wording changes for consistency with format, rules of usage, and technical adequacy and provides final concurrence.

6. After concurrence of the TS Bases wording changes is obtained, CLE makes an electronic version available in a working directory for use in the preparation of the 10 CFR 50.59 REVIEW and Station Qualified Review (SQR) process. The CLE shall ensure that the master electronic TS Bases files are revised per step 14 below upon receiving SQR approval. The Revision number in the footer should be a sequential number (i.e., 1, 2, etc.).

```
************************************************************
*                           NOTE                           *
*                                                          *
* If the TS Bases changes are applicable to more than one  *
* Station, the following steps should be performed         *
* concurrently for each Station.                           *
************************************************************
```

7. TS Bases Change Requestor provides a 10 CFR 50.59 REVIEW for the TS Bases changes in accordance with appropriate plant procedures. An exception to this requirement applies when the changes are being requested in order to reflect an approved NRC Safety Evaluation (SE) associated with a site specific Operating License or TS change. The NRC SE is sufficient to support the changes provided it has been determined that the changes are consistent with and entirely bounded by the NRC SE. A 10 CFR 50.59 REVIEW shall be performed for TS Bases changes that reflect generic industry approval by an NRC SE to determine site specific applicability. A 10 CFR 50.59 REVIEW is not required for an EDITORIAL CHANGE. |

8. TS Bases Change Requestor completes Attachment A, "Technical Specifications Bases Change Request Form," as follows: |
   a. Identifies the affected sections, and includes a copy of the proposed TS Bases changes;

   b. Briefly summarizes the changes including the LCO, Action, or Surveillance Requirement to which the changes apply;

   c. Briefly summarizes the reason for the changes and attaches all supporting documentation;

   d. Identifies any schedule requirements and proposed implementation date that apply (i.e., describe any time limitations that might apply which would require expedited processing). If the changes are outage related, then checks "yes" and lists the applicable outage identifier;

   e. Identifies any known implementation requirements such as procedure changes, UFSAR changes, Passport changes, Reportability Manual revisions, pre-implementation training requirements, etc.;

   f. If a 10 CFR 50.59 REVIEW was prepared to support the TS Bases changes, the Requestor then checks the appropriate box, lists the associated 10 CFR 50.59 REVIEW Number, and attaches the original;

g. If the changes to the TS Bases are the result of an approved NRC SE associated with a site specific Operating License or TS change and the scope of the changes determined to be consistent with and entirely bounded by the NRC SE, then the Requestor checks the appropriate box and attaches a copy;

h. If the changes to the TS Bases are EDITORIAL CHANGES, then the Requestor checks the appropriate box and no 10 CFR 50.59 REVIEW is required;

i. Signs and dates as Requestor and identifies the originating department;

j. Obtains approval to proceed from Department Supervisor (or designee); and

k. Returns Attachment A to the RA LE.

9. RA LE reviews the TS Bases Change Request Form, including supporting documentation, and documents the review by signing Attachment A. The review verifies that the following information or documentation is included:

a. Completed 10 CFR 50.59 REVIEW. If the changes are related to an approved NRC SE associated with a site specific Operating License or TS change and determined to be entirely bounded by the NRC SE, then only a copy of the SE is required to be attached and no 10 CFR 50.59 REVIEW is required. A 10 CFR 50.59 REVIEW is not required for an EDITORIAL CHANGE;

b. Identification of known documents requiring revisions; and

c. Completed UFSAR Change Request with supporting documentation, in accordance with appropriate plant procedures, if applicable.

10. If the TS Bases change is not an EDITORIAL CHANGE, the RA LE/TS Bases Change Requestor obtains SQR approval of the TS Bases changes by performing the following:

a. RA LE prepares the TS Bases Change SQR package. The SQR package shall include Attachment A (including completed 10 CFR 50.59 REVIEW or NRC SE) and the revised TS Bases pages. Attachment A is provided for the purpose of reviewing and finalizing the implementation requirements and ensuring the necessary actions have been initiated. RA LE shall assign Action Tracking (AT) items, as necessary, to track implementation requirements;

b. TS Bases Change Requestor submits the TS Bases Change SQR package to the SQR Committee members for a preliminary review. The SQR composition shall include RA and Operating Departments in all cases; and

c. TS Bases Change Requestor resolves preliminary review comments and finalizes the TS Bases Change SQR package.

11. The RAM shall determine the need for Plant Operations Review Committee (PORC) approval. The need for PORC approval shall be documented on Attachment A.

12. RA LE/TS Bases Change Requestor obtains PORC approval, if necessary.

13. RA LE notifies CLE of approval of the TS Bases changes by forwarding a copy of the approved SQR/PORC Change package to CLE.

14. After approval of the TS Bases changes by SQR/PORC, CLE ensures that the controlled master electronic files are updated.

15. CL/RA completes Attachment B, "Technical Specifications Bases Change Instruction Form," as follows:

a. CLE indicates the effective date of the TS Bases changes consistent with the SQR/PORC approval or TS amendment required implementation date. If the TS Bases change is a result of a TS Amendment, the update shall be implemented coincident with implementation requirements of the TS Amendment. Otherwise, the update must be implemented by the date indicated on Attachment B;

b. CLE lists each page to be removed and inserted, including the Affected Page List; and

c. RA LE provides the updated master file directory for updating Electronic Document Management System (EDMS), if applicable.

16. CLE creates a TS Bases Change Package. The TS Bases Change Package shall consist of:

a. TS Bases Change Instruction Form (Attachment B);

b. Revised Affected Page List; and

c. Revised TS Bases pages.

One CLE shall assemble and approve the TS Bases Change Package for distribution and a second CLE shall perform a peer check to verify completeness of the TS Bases Change Package.

17. After the RA LE notifies the CLE that SQR/PORC approval of the TS Bases changes has been obtained and that all AT items assigned to track implementation requirements have been completed, CLE forwards the TS Bases Change Package to the RA LE as notification of the need to update the onsite TS Bases controlled copies and EDMS, if applicable. CLE also forwards the TS Bases Change Package to CL Records Management as notification of the need to update the offsite (CL) TS Bases controlled copies and to transmit updates to the offsite (non-CL) TS Bases controlled copies.

18. RA LE forwards the TS Bases Change Package to Station Records Management as notification of the need to update the onsite TS Bases controlled copies and EDMS, if applicable.

19. Upon completion of updating the onsite TS Bases controlled copies and EDMS (if applicable), Station Records Management Supervisor signs and dates Attachment C and returns Attachment C to the appropriate CLE.

20. Upon completion of updating the offsite (CL) TS Bases controlled copies and transmitting updates to the offsite (non-CL) TS Bases controlled copies, CL Records Management signs and dates Attachment C and returns Attachment C to the appropriate CLE.

21. RA LE ensures that the documentation required to be maintained as a quality record is provided to Station Records Management for the purpose of record retention.

1.6 ACCEPTANCE CRITERIA

Not applicable.

1.7 LCOARS/COMPENSATORY MEASURES

An Issue Report may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

The RAM will be responsible for ensuring that Program failures have been resolved.

1.8 REPORTING REQUIREMENTS

```
************************************************************
*                          NOTE                            *
*                                                          *
* TS Bases changes requiring prior NRC approval shall be   *
* submitted in accordance with Reference 5.                *
*                                                          *
************************************************************
```

TS Bases changes not requiring prior NRC approval, as described in Section 1.4 of this Program, shall be submitted to the NRC in accordance with 10 CFR 50.71(e).

1.9 CHANGE CONTROL

Changes to this Program, other than EDITORIAL CHANGES, shall include a 10 CFR 50.59 REVIEW and a SQR. The SQR composition shall | include RA Department in all cases. For a change to this Program, PORC approval from all Stations is required. The concurrence shall be that the other Stations are implementing the same changes or that the changes have been reviewed and determined not to be applicable to the other Stations.

ATTACHMENT A
TECHNICAL SPECIFICATIONS BASES CHANGE REQUEST FORM

1. Change Request #: ____________ Affected Bases Section(s): ______________________

2. Description of changes: ____
____
____

3. Reason for changes (attach all supporting documentation): ____________________
____
____
____

4. Schedule Requirements:
Outage Related (check one) ☐ No ☐ Yes, Outage # __________
Other (explain) ____

5. Implementation Requirements (attach additional pages, as necessary):
Identify the impact of the changes on the following:

Affected	N/A	
☐	☐	UFSAR ______________________
☐	☐	TS ______________________
☐	☐	Technical Requirements Manual ______________________
☐	☐	NRC Safety Evaluation ______________________
☐	☐	Fire Protection Report ______________________
☐	☐	NRC Commitments ______________________
☐	☐	Vendor Documentation ______________________
☐	☐	Special Permits/Licenses ______________________
☐	☐	Procedures ______________________
☐	☐	Environmental Qualification ______________________
☐	☐	Design Basis Documentation ______________________
☐	☐	Engineering Calculations ______________________
☐	☐	Drawings/Prints ______________________
☐	☐	PRA Information ______________________
☐	☐	Programs ______________________
☐	☐	Reportability Manual ______________________
☐	☐	QA Topical Report ______________________
☐	☐	Passport______________________
☐	☐	Pre-Implementation Training Required ______________________
☐	☐	Maintenance Rule ______________________
☐	☐	Offsite Dose Calculation Manual ______________________
☐	☐	Other ______________________

6. Check one:
☐ 10 CFR 50.59 REVIEW Attached, 10 CFR 50.59 REVIEW #:____________________
☐ NRC SE Attached, Changes consistent with and entirely bounded by NRC SE
☐ EDITORIAL CHANGE, No 10 CFR 50.59 REVIEW required

7. Requestor: ____________________/____________________/____________________
(Signature) (Date) (Department)

8. Requesting Supervisor Approval: ____________________/____________________
(Signature) (Date)

9. PORC Approval Required: ☐ Yes ☐ No

10. Licensing Engineer Review: ____________________/____________________
(Signature) (Date)

ATTACHMENT B
TECHNICAL SPECIFICATIONS BASES CHANGE INSTRUCTION FORM
FOR ONSITE/OFFSITE DISTRIBUTION AND FOR UPDATING EDMS

Braidwood/Byron/Dresden/LaSalle/QC (circle one) TS Bases Revision # ______

NOTE: This change is effective as of ____________________________ and shall be implemented by __________ . (SQR/PORC or Amendment Implementation Date)
(Date)

Approved for distribution: _________________________________/____________
(CLE Signature) (Date)

Verified: _________________________________/____________
(CLE Signature) (Date)

REMOVE Section	REMOVE Page	INSERT Section	INSERT Page	UPDATE EDMS Section	UPDATE EDMS Page
Affected Page List	All	Affected Page List	All	N/A	N/A

ATTACHMENT B
TECHNICAL SPECIFICATIONS BASES CHANGE INSTRUCTION FORM
FOR ONSITE/OFFSITE DISTRIBUTION AND FOR UPDATING EDMS

Braidwood/Byron/Dresden/LaSalle/QC (circle one) TS Bases Revision # ______

Station Records Management:

Onsite Distribution Completed: ______________________________/____________________
(Station Records Mgmt. Supr.) (Date)

EDMS Update Completed: ______________________________/____________________
(Station Records Mgmt. Supr.) (Date)

** Return this sheet to: Cantera Licensing
Braidwood/Byron/Dresden/LaSalle/QC (circle one) CLE
CANTERA

CL Records Management:

Offsite (CL) Distribution Completed: ___________________________/____________________
(CL Records Mgmt.) (Date)

Offsite (non-CL) Distribution Transmitted: ___________________________/____________________
(CL Records Mgmt.) (Date)

** Return this sheet to Braidwood/Byron/Dresden/LaSalle/QC (circle one) CL

Offsite (non-CL) Controlled Copy Holders:

Offsite (non-CL) Distribution Completed: ___________________________/____________________
(Signature) (Date)

** Return this sheet to: EXELON GENERATION COMPANY, LLC
LICENSING AND REGULATORY AFFAIRS DEPARTMENT
4300 WINFIELD ROAD
WARRENVILLE, IL 60555

SAFETY FUNCTION DETERMINATION PROGRAM (SFDP)
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

The purpose of the SFDP is to ensure that the proper Actions are taken upon failure to concurrently meet two or more Technical Specifications (TS) Limiting Conditions for Operation (LCOs) such that multiple inoperabilities of Systems, Structures, or Components (SSCs) do not result in an undetected LOSS OF SAFETY FUNCTION (LOSF).

1.2 REFERENCES

1. BAP 300-1, “Conduct of Operation”
2. BAP 1400-6, “Technical Specifications Limiting Conditions for Operations Action Requirements (LCOARs)
3. Technical Specification LCO 3.0.6
4. TS Specification 5.5.15, “Safety Function Determination Program (SFDP)”
5. Maintenance Rule Scoping Manual

1.3 DEFINITIONS AND/OR ACRONYMS

1. ACTIONS - In the LCO Actions section, it describes the Required Actions to be taken under designated Conditions within specified COMPLETION.TIMES
2. LOSS OF SAFETY FUNCTION (LOSF) - A LOSF exists when, assuming no concurrent single failure, a safety function assumed in the accident analysis cannot be performed. In other words, a system, train, or component inoperability results in the plant being in an unanalyzed condition, without consideration of a single failure or loss of offsite power, in which a design basis event could not be mitigated.
3. COMPLETION TIME - In the LCO Actions section, it states the amount of time allowed to complete a Required Action.
4. COMPLETION TIME EXTENSION - The additional amount of time a SUPPORTED SYSTEM may be inoperable due to its associated SUPPORT SYSTEM being inoperable. NOTE - the inoperability of the SUPPORTED SYSTEM must only be directly attributed to its associated SUPPORT SYSTEM being inoperable and the SUPPORT SYSTEM Required Actions not specifically requiring entry into the SUPPORTED SYSTEMS Required Actions and associated COMPLETION TIMES.
5. CONDITION - In the LCO Actions section, it describes the ways in which the requirements of an LCO can fail to be met.

6. OPERABLE/OPERABILITY - A system, subsystem, train, component, or device shall be OPERABLE when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication, and other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

7. SAFETY FUNCTION - An accident mitigation feature required by NRC regulation, plant design or Technical Specifications normally composed of two trains of SUPPORTED and SUPPORT equipment.

8. SUPPORTED SYSTEM - A SSC, required by the TS, which requires a SUPPORT SYSTEM to ensure its safety function can be performed. Process parameters or operating limits do not comprise SUPPORTED SYSTEMS for the purposes of implementing LCO 3.0.6.

9. SUPPORT SYSTEM - A SSC which is needed by another TS LCO required SSC to perform a safety function.

   An example would be the Component Cooling Water (CC) System (SUPPORT SYSTEM) which is required by the Residual Heat Removal System (SUPPORTED SYSTEM) to fulfill the RH safety function. A SUPPORT SYSTEM may also be a SUPPORTED SYSTEM. An example is the Component Cooling Water (CC) System which needs the Essential Service Water (SX) System to fulfill its safety function.

   NOTE

   A SSC which monitors or maintains a process parameter or operating limit is not a SUPPORT SYSTEM for the purposes of implementing LCO 3.0.6. An example is Rod Position Indication which is used to monitor control rod insertion limits. Inoperability of the Rod Position Indication System does not automatically suggest that the control rods are no longer within insertion limits. Control rod insertion limits are monitored separately and Actions are taken as appropriate when insertion limits are not met or if Surveillance Requirements can not be performed when required.
   Likewise, parameter limits that could affect other parameter limits if exceeded are also not considered SUPPORT SYSTEM for the purposes of implementing LCO 3.0.6. An example is that exceeding control rod insertion limits could affect hot channel factors.

1.4 PROGRAM DESCRIPTION

1. TS LCO 3.0.2 states that upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met, except as provided in LCO 3.0.5 and LCO 3.0.6. LCO 3.0.6 provides an exception to LCO 3.0.2 for SUPPORTED SYSTEMS by not requiring the Required Actions for the SUPPORTED SYSTEMS to be performed when the failure to meet an LCO is solely due to a SUPPORT SYSTEM LCO not being met. In this situation, although the SUPPORTED SYSTEM is declared inoperable, LCO 3.0.6 requires only the Conditions and Required Actions of the SUPPORT SYSTEM to be performed. The Conditions and Required Actions for the SUPPORTED SYSTEM are not required to be performed (i.e., cascading to the SUPPORTED SYSTEM) per LCO 3.0.6.

   There are two types of SUPPORT SYSTEMS which must be considered when implementing LCO 3.0.6: (1) those addressed in Technical Specifications, and (2) those which are not. If the required SUPPORT SYSTEM is not addressed in the Technical Specifications, the impact of the SUPPORT SYSTEM inoperability must be evaluated with respect to any SUPPORTED SYSTEM which is addressed in Technical Specifications. An example of this is the loss of a ventilation system for which there is no LCO. If the equipment supported by the ventilation system were subsequently exposed to freezing conditions, then all affected systems which have an LCO must be evaluated to ensure that they remain OPERABLE and that there is no LOSS OF SAFETY FUNCTION.

   If the SUPPORT SYSTEM is addressed in the Technical Specifications, only the SUPPORT SYSTEM LCO must be entered per LCO 3.0.6 (i.e., "cascading" to the SUPPORTED SYSTEM is not required). However, the SUPPORT SYSTEM inoperability must still be evaluated with respect to the existing plant conditions to ensure that a LOSS OF SAFETY FUNCTION does not exist. An example of this is the loss of component cooling water to one residual heat removal (RHR) heat exchanger. If the electrical bus supplying the second RHR pump were also removed from service, a LOSS OF SAFETY FUNCTION may exist following a loss-of-coolant-accident and this plant configuration must be evaluated. It should be noted that for cases in which the inoperable SUPPORT SYSTEM is addressed in Technical Specifications, "cascading" can still be performed. LCO 3.0.6 only provides an option for not cascading at the discretion of operations.

2. If the exception of 3.0.6 is utilized, additional evaluations and limitations may be required in accordance with Specification 5.5.15, "Safety Function Determination Program (SFDP)" (Reference Figure 1).

   If a LOSF is determined to exist by this Program, the appropriate Conditions and Required Actions of the LCO in which the LOSF exists are required to be entered. When a SUPPORT SYSTEM'S Required Action directs a SUPPORTED SYSTEM to be declared inoperable or directs entry into Conditions and Required Actions for a SUPPORTED SYSTEM, the applicable Conditions and Required Actions shall be entered in accordance with LCO 3.0.2.

3. Since "cascading" is not required when applying 3.0.6, a possibility exists that unrelated concurrent failures of more than one system could result in the complete loss of both trains of a SUPPORTED SYSTEM. Therefore, upon a failure to meet two or more LCOs during the same time period, an evaluation shall be conducted to determine if a LOSF exists. Generally, this is done by confirming that the remaining required redundant SSCs are OPERABLE. If a LOSF does exist, the SFDP directs that the appropriate actions be taken.

```
************************************************************
*                           NOTE                           *
* If the failure of a TS required SUPPORT SYSTEM results   *
* in the inoperability of a system outside of the TS, and  *
* that system is subsequently relied upon by a SUPPORTED   *
* SYSTEM to remain OPERABLE, then LCO 3.0.6 could apply and *
* only the SUPPORT SYSTEM'S Required Actions would be      *
* entered.                                                 *
*                                                          *
************************************************************
```

4. A single component inoperability may result in multiple inoperabilities within a single train and affect multiple TS LCOs. LCO 3.0.6 limits the amount of "cascading" Actions that are required when an inoperable SSC renders a SUPPORT SYSTEM inoperable.

   A LOSF evaluation must only be performed when equipment is inoperable in more than one train. For multiple inoperabilities within a single train, whether separate inoperabilities or inoperabilities of SUPPORTED SYSTEM(S) due to the inoperability of a SUPPORT SYSTEM, compliance with the Required Actions within the LCOs as directed by LCO 3.0.2 and LCO 3.0.6 is sufficient to ensure safe operation.

   If the inoperable system is a SUPPORT SYSTEM and its Required Actions have not been pre-evaluated in combination with other inoperabilities as noted in Table 1, then perform a LOSF evaluation in accordance with Section 1.5. LCO's which are not SUPPORT SYSTEMS may also result in a LOSF when taken in combination with additional inoperabilities. Therefore, a LOSF evaluation is required and the Required Actions of the applicable LCOs shall be met in accordance with LCO 3.0.2.

If more than one LCO's Required Actions have been entered, then determine if all the LCOs have been entered for the same train.

a. If the LCOs have been entered for the same train, then no LOSF exists provided the redundant equipment on the opposite train is not inoperable for other reasons. No further evaluation is required.

b. If the LCOs have been entered for different trains, then a LOSF evaluation shall be performed to determine if the initial inoperability(s), in conjunction with subsequent inoperability(s) in the required redundant train, results in the loss of a safety function. This evaluation shall address the following examples:

    1) A required system redundant to the system(s) supported by the inoperable SUPPORT SYSTEM is also inoperable (see Figure 2, Example 1); or

    2) A required system redundant to the system(s)in turn supported by the inoperable SUPPORTED SYSTEM is also inoperable (see Figure 2, Example 2); or

    3) A required system redundant to the SUPPORT SYSTEM(s) for the SUPPORTED SYSTEMs (a) and (b) above is also inoperable (see Figure 2, Example 3).

    For a TS related SUPPORT SYSTEM, Table 1 may be used as a guide for evaluating SUPPORT/SUPPORTED SYSTEM(s) relationships between TS systems.

    Inoperable SSC(s) should be evaluated if the inoperability impacts the ability of the SSC(s) to perform its required safety function.

1.5 PROGRAM IMPLEMENTATION - LOSS OF SAFETY FUNCTION (LOSF) EVALUATION

NOTE

1. If an LCO is not met for a SUPPORT SYSTEM, and the SUPPORT SYSTEM Actions direct the Actions for the SUPPORTED SYSTEMS be entered, enter the appropriat Actions for the SUPPORTED SYSTEMS.

2. If a SUPPORTED SYSTEM LCO is not met solely due to a SUPPORT SYSTEM inoperability, and the SUPPORT SYSTEM Actions do not direct that Actions for the SUPPORTED SYSTEMS be entered, then do not enter the Actions for the SUPPORTED SYSTEMS per LCO 3.0.6.

1. Identify if the degraded SSC renders a TS required SSC inoperable. If NO, then no further evaluation is necessary.

2. If YES, then enter the LCOAR for the inoperable SSC.

3. Determine if the inoperable SSC is also a SUPPORT SYSTEM SSC.

4. If YES, then identify all TS required SUPPORTED SYSTEM SSC's that are rendered inoperable as a result of this LCOAR entry.

5. If the SUPPORT SYSTEM SSC Required Actions direct performance of any SUPPORTED SYSTEM SSC Required Action(s), then enter the LCOAR for the SUPPORTED SYSTEM SSC as directed and perform the Required Actions.

6. For ALL inoperable SUPPORT and SUPPORTED SYSTEM SSC's, perform an evaluation to ensure a LOSS OF SAFETY FUNCTION (LOSF) does not exist for current plant conditions. Perform cross-train checks to ensure redundant trains are fully operational.

7. If any redundant train SSC is NOT fully Operational, then one of the following conditions will apply:

   a. The SSC is part of a single LCO with multiple subsystems and the LCO specified function is intact. NO LOSF exists for this specific SSC, or

   b. The SSC will still perform it's required Safety Function as defined in the Safety Analysis Report (SAR). NO LOSF exists for this specific SSC, or

c. A LOSS OF SAETY FUNCTION exists. Enter the LCOAR and perform the Required Actions of the SSC in which the LOSF exists for the specific Condition(s) that apply.

8. If no LOSF exists, for all SUPPORTED SSC's which are rendered inoperable, perform one of the following actions:

   a. Enter the LCOAR(s) for each inoperable SSC and perform the Conditions and Required Actions as directed (Cascading), or

   b. Declare the SUPPORTED SYSTEM SSC(s) inoperable and apply LCO 3.0.6 to preclude entry into the Conditions and Required Actions associated with the inoperable SUPPORTED SYSTEM SSC(s). Track the inoperable SSC(s) on the Delayed LCOAR Entry Table of the inoperable SUPPORT SYSTEM SSC LCOAR.

NOTE: Examples of LOSF evaluations may be found in Figure 2, Examples 1, 2, and 3, and in Attachment 2.

1.6 ACCEPTANCE CRITERIA

Not Applicable.

1.7 LCOARS/COMPENSATORY MEASURES

The Shift Manager is responsible for initiating any LCOARs or Compensatory Measures resulting from the LOSF evaluation. In addition, a Problem Identification Form (PIF) may be generated to provide proper tracking and resolution.

1.8 REPORTING REQUIREMENTS

This will be evaluated on a case-by-case situation.

1.9 CHANGE CONTROL

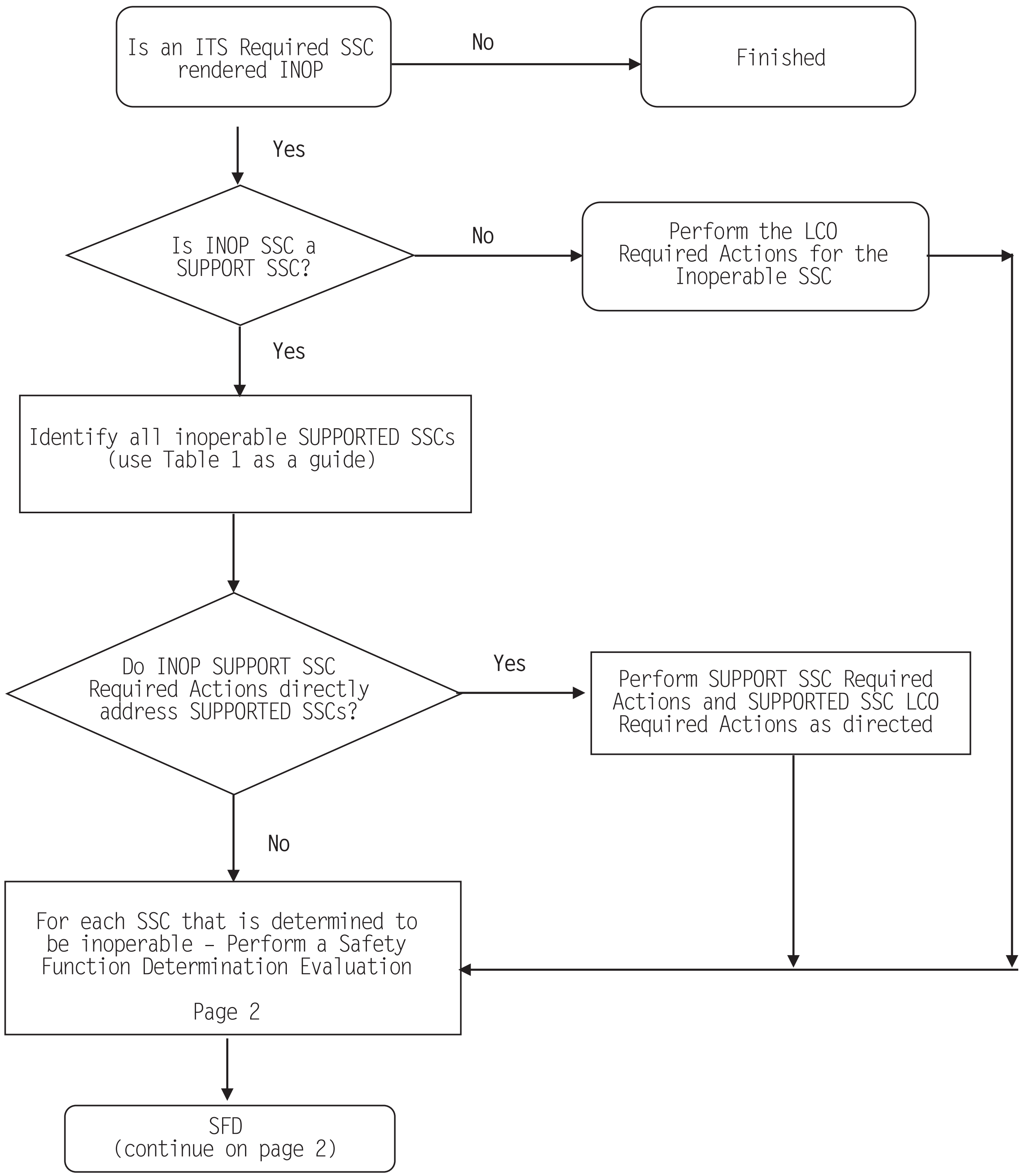
Changes to this Program, other than editorial changes, shall include a 10CFR50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include the Regulatory Assurance Department in all cases. As part of the ITR, for a change to this Program. Braidwood and Byron Plant Operations Review Committee (PORC) approval is required. The PORC approval shall ensure Braidwood is implementing the same change or that the change has been reviewed and determined not to be applicable to Braidwood.

FIGURES 1 and 2

SFDP FLOWCHART

SUPPORT/SUPPORTED SYSTEM DIAGRAM

FIGURE 1 - SFDP FLOWCHART



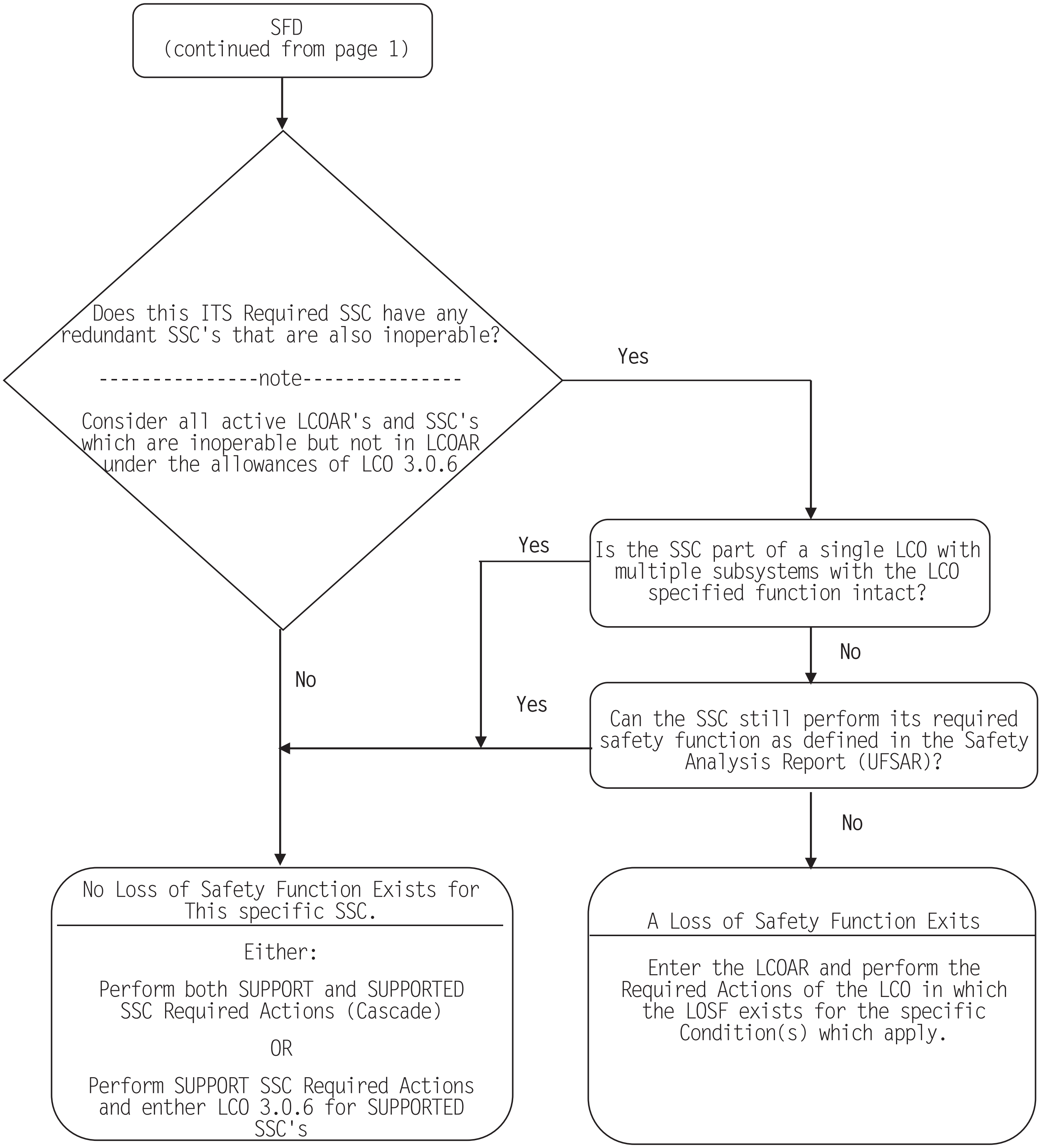

SFD
(continued from page 1)
Does this ITS Required SSC have any redundant SSC's that are also inoperable?
---------------note---------------
Consider all active LCOAR's and SSC's which are inoperable but not in LCOAR under the allowances of LCO 3.0.6
Yes
Is the SSC part of a single LCO with multiple subsystems with the LCO specified function intact?
Yes
No
No
Yes
Can the SSC still perform its required safety function as defined in the Safety Analysis Report (UFSAR)?
No
No Loss of Safety Function Exists for This specific SSC.
Either:
Perform both SUPPORT and SUPPORTED SSC Required Actions (Cascade)
OR
Perform SUPPORT SSC Required Actions and enther LCO 3.0.6 for SUPPORTED SSC's
A Loss of Safety Function Exits
Enter the LCOAR and perform the Required Actions of the LCO in which the LOSF exists for the specific Condition(s) which apply.

FIGURE 2
SUPPORT/SUPPORTED SYSTEM DIAGRAM

EXAMPLE 1

A LOSF may exist when a SUPPORT SYSTEM is inoperable, and:

A required system redundant to the system(s) supported by the inoperable SUPPORT SYSTEM is also inoperable.

If System 2 of Train A is inoperable, and System 5 of Train B is inoperable, a LOSF exists in SUPPORTED SYSTEM 5, 10, 11.

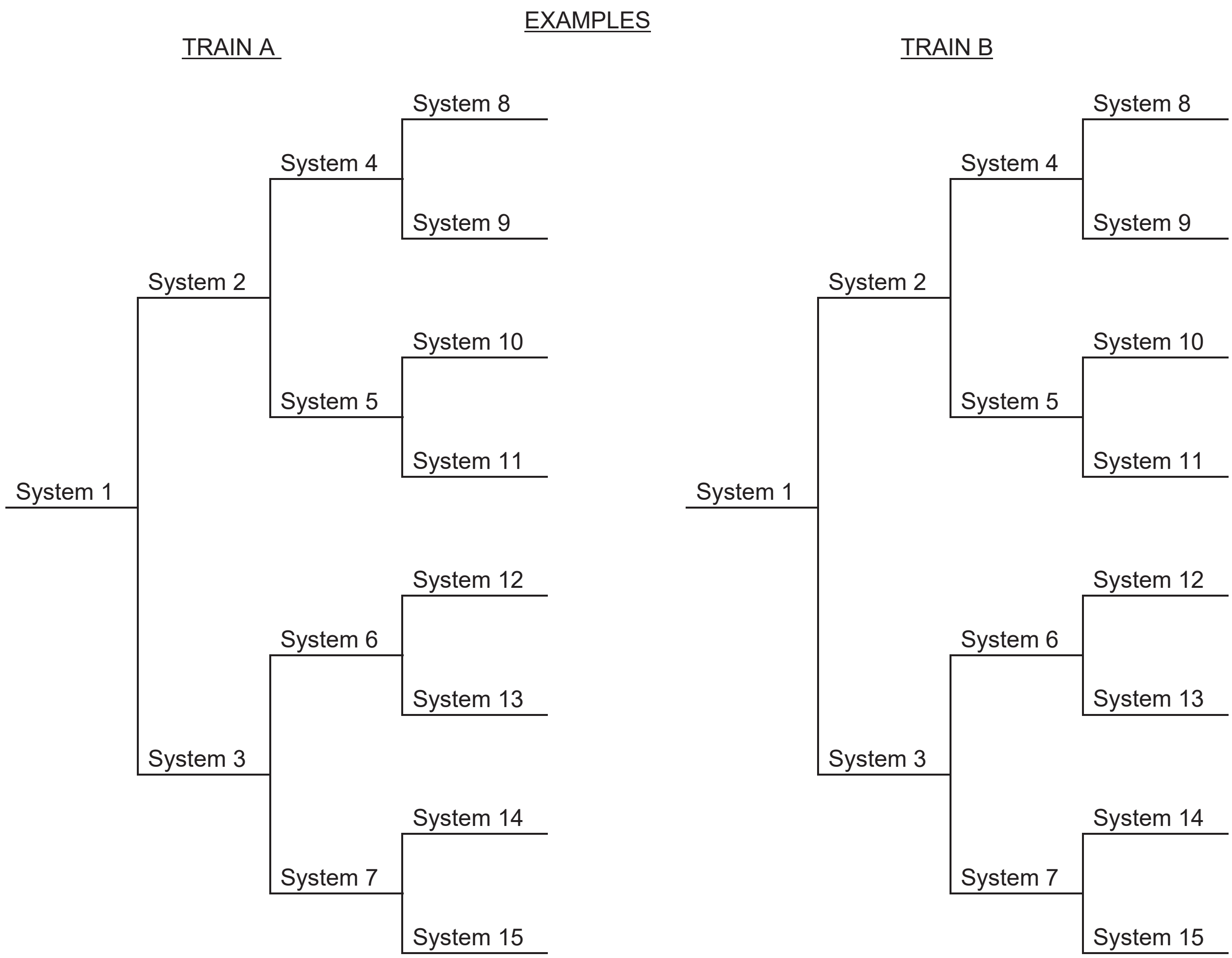


FIGURE 2
SUPPORT/SUPPORTED SYSTEM DIAGRAM
EXAMPLE 2

A LOSF may exist when a SUPPORT SYSTEM is inoperable, and:

A required system redundant to the system(s) in turn supported by the inoperable SUPPORTED SYSTEM is also inoperable.

If System 2 of Train A is inoperable, and System 11 of Train B is inoperable, a LOSF exists in System 11 which is in turn supported by System 5.

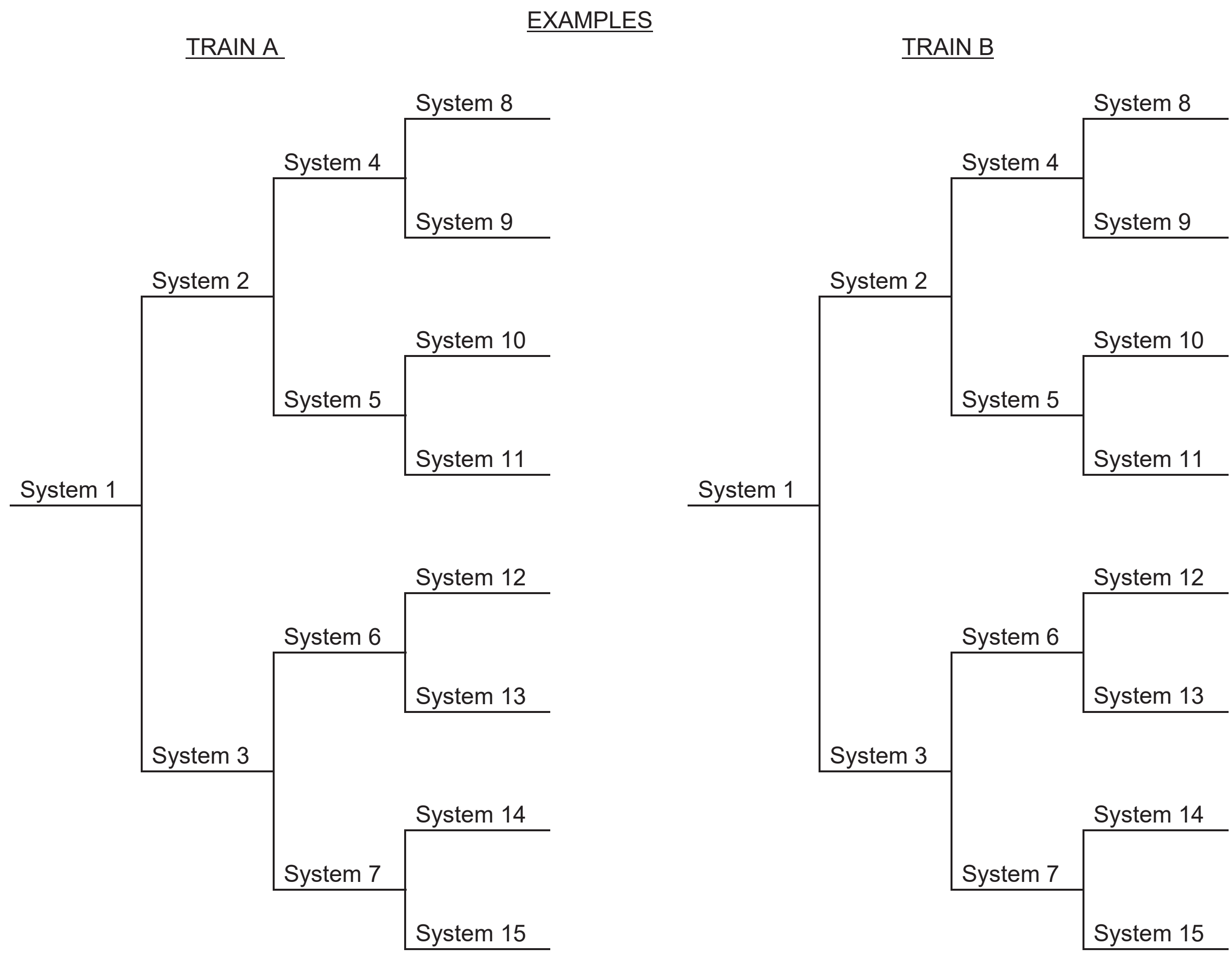


FIGURE 2
SUPPORT/SUPPORTED SYSTEM DIAGRAM
EXAMPLE 3

A LOSF may exist when a SUPPORT SYSTEM is inoperable, and:

A required system redundant to the SUPPORT SYSTEM(S) for the SUPPORTED SYSTEMS (a) and (b) above is also inoperable.

If System 2 of Train A is inoperable, and System 1 of Train B is inoperable, a LOSF Exists in Systems 2, 4, 5, 8, 9, 10 and 11.

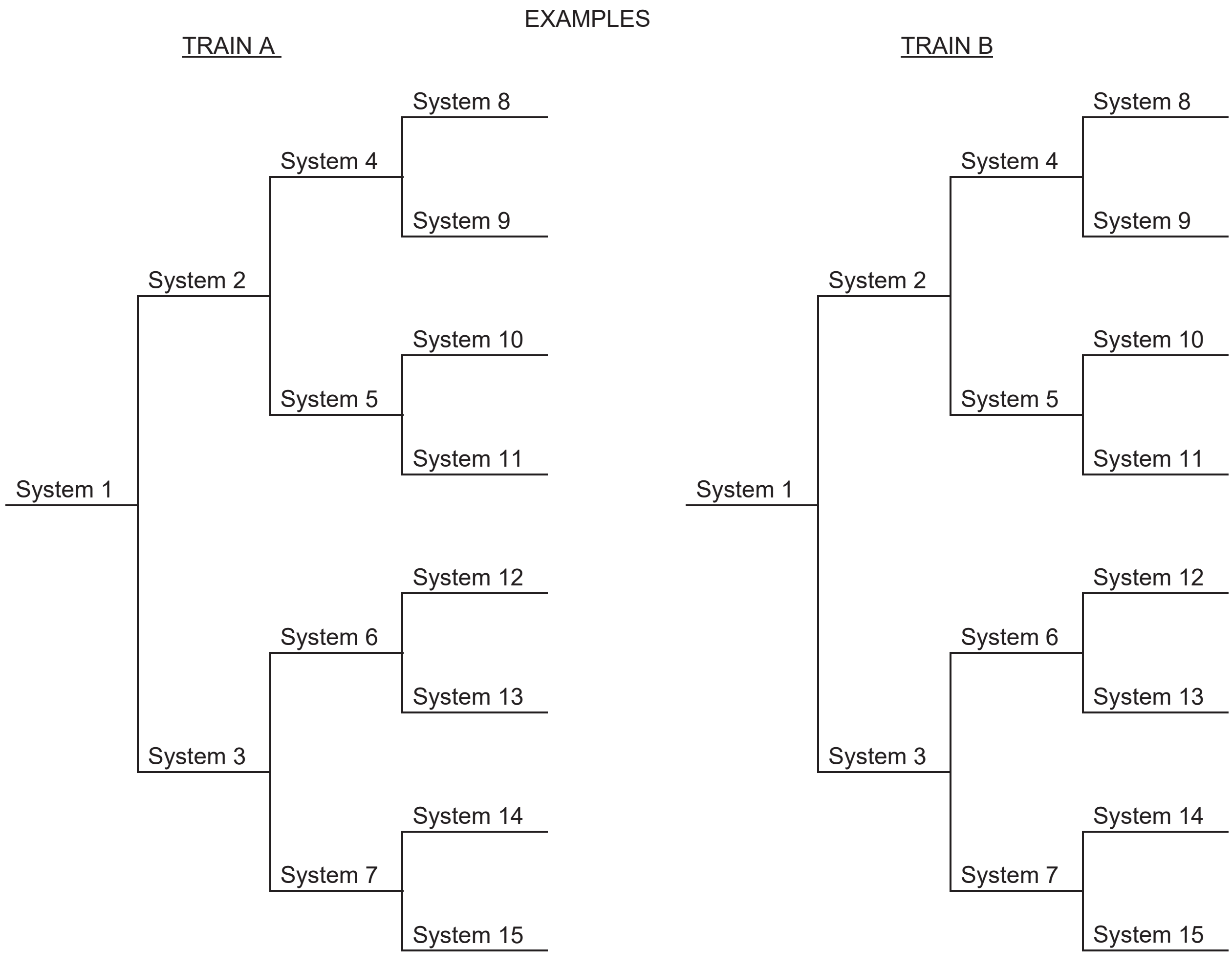


TABLE 1
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.3.2	Engineered Safety Feature Actuation System (ESFAS) Instrumentation	3.3.1	Reactor Trip System (RTS) Instrumentation
		3.3.6	Containment Ventilation isolation Instrumentation
		3.3.7	Control Room Ventilation (VC) Filtration System Actuation Instrumentation
		3.3.8	Fuel Handling Building Exhaust Filter Plenum (FHB)System Actuation Instrumentation
		3.5.2	ECCS - Operating
		3.5.3	ECCS - Shutdown
		3.6.3	Containment Isolation Valves
		3.6.6	Containment Spray and Cooling Systems
		3.6.7	Spray Additive System
		3.7.2	Main Steam Isolation Valves (MSIVs)
		3.7.5	Auxiliary Feedwater (AF) System
		3.7.7	Component Cooling Water (CC)
		3.7.8	Essential Service Water (SX) System
		3.7.10	Control Room Ventilation (VC) Filtration System
		3.7.11	Control Room Ventilation (VC) Temp Control System
		3.7.12	Nonaccessible Area Exhaust Filter Plenum Ventilation System
		3.7.13	Fuel Handling Exhaust Filter Plenum (FHB) Ventilation System
		3.8.1	AC Sources - Operating
3.3.5	Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation	3.8.1	AC Sources - Operating
		3.8.2	AC Sources - Shutdown
3.3.6	Containment Ventilation Isolation Instrumentation	3.6.3	Containment Isolation Valves

TABLE 1
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.3.7	Control Room Ventilation (VC) Filtration System Actuation Instrumentation	3.7.10	Control Room Ventilation (VC) Filtration System
3.3.8	Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System Actuation Instrumentation	3.7.13	FHB Ventilation System
3.4.14	RCS Pressure Isolation Valve (PIV) Leakage	3.4.6 3.4.13 3.5.1 3.5.2 3.5.3	RCS Loops - Mode 4 RCS Operational Leakage Accumulators ECCS - Operating ECCS - Shutdown
3.4.17	RCS Loop Isolation Valves	3.3.9 3.4.4 3.4.5 3.4.6 3.4.12	BDPS RCS Loops - MODES 1 and 2 RCS Loops - MODE 3 RCS Loops - MODE 4 LTOP System
3.5.4	Refueling Water Storage Tank (RWST)	3.3.9 3.5.2 3.5.3 3.6.6	BDPS ECCS - Operating ECCS - Shutdown Containment Spray and Cooling Systems
3.5.5	Seal Injection Flow	3.5.2	ECCS - Operating
3.6.2	Containment Airlocks	3.6.1	Containment
3.6.3	Containment Isolation Valves	3.5.2 3.5.3 3.6.1 3.6.6 3.7.7 3.7.8	ECCS – Operating ECCS – Shutdown Containment Containment Spray and Cooling Systems Component Cooling System Essential Service Water (SX)
3.6.6	Containment Spray	3.6.7	Spray Additive System
3.6.8	Containment Sump	3.5.2 3.5.3 3.6.6	ECCS – Operating ECCS – Shutdown Containment Spray and Cooling Systems

TABLE 1
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.7.6	Condensate Storage Tank	3.7.5	Auxiliary Feedwater (AF) System
3.7.7	Component Cooling Water (CC) System	3.4.4 3.4.5 3.4.6 3.4.7 3.4.8 3.5.2 3.5.3 3.9.5 3.9.6	RCS Loops - Modes 1 and 2 RCS Loops - Mode 3 RCS Loops - Mode 4 RCS Loops - Mode 5, Loops Filled RCS Loops - Mode 5, Loops not Filled ECCS - Operating ECCS - Shutdown Residual Heat Removal (RHR) Coolant Circulation-High Water Level Residual Heat Removal (RHR) Coolant Circulation-Low Water Level
3.7.8	Essential Service Water (SX) System	3.5.2 3.5.3 3.6.6 3.7.5 3.7.7 3.7.11 3.8.1 3.8.2	ECCS - Operating ECCS - Shutdown Containment Spray and Cooling System Auxiliary Feedwater System Component Cooling Water (CC) System Control Room Ventilation (VC) Temperature Control System AC Sources - Operating (DG only) AC Sources - Shutdown (DG only)
3.7.9	Ultimate Heat Sink	3.7.5 3.7.8	"B" AFW System Essential Service Water (SX)
3.7.10	Control Room Ventilation (VC) Filtration Systm	3.7.11	Control Room Ventilation (VC) Temperature Control System
3.8.1	AC Sources - Operating	3.3.9 3.4.5 3.8.9 3.8.1	BDPS RCS Loops – Mode 3 Distribution Systems – Operating Opposite unit AC Sources

TABLE 1
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.8.2	AC Sources – Shutdown	3.7.10 3.7.11 3.7.13 3.8.10 3.8.1	Control Room Ventilation (VC) Filtration System Control Room Ventilation (VC) Temperature Control System Fuel Handling Building Ventilation System Opposite unit AC Sources
3.8.3	Diesel Fuel Oil	3.8.1 3.8.2	AC Sources - Operating AC Sources - Shutdown
3.8.4	DC Sources - Operating	3.8.7 3.8.9	Inverters - Operating Distribution Systems - Operating
3.8.5	DC Sources - Shutdown	3.8.8 3.8.10	Inverters - Shutdown Distribution Systems - Shutdown
3.8.6	Battery Parameters	3.8.4 3.8.5	DC Sources - Operating DC Sources - Shutdown
3.8.7	Inverters - Operating	3.8.9	Distribution Systems - Operating
3.8.8	Inverters - Shutdown	3.8.10	Distribution Systems - Shutdown

TABLE 1
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.8.9	Distribution Systems - Operating	3.3.1	Reactor Trip System (RTS) Instrumentation
		3.3.2	Engineered Safety Feature Actuation System (ESFAS) Instrumentation
		3.3.3	Post Accident Monitoring (PAM) Instrumentation
		3.3.4	Remote Shutdown System
		3.3.5	Loss of Power (LOP) Diesel Generator (DG) Start Inst.
		3.3.6	Containment Ventilation Isolation Instrumentation
		3.3.7	Control Room Ventilation (VC) Filtration System Actuation Instrumentation
		3.3.8	Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System Actuation Instrumentation
		3.4.5	RCS Loops - Mode 3
		3.4.6	RCS Loops - Mode 4
		3.4.9	Pressurizer
		3.4.11	Pressurizer Power Operated Relief Valves (PORVs)
		3.4.12	LTOP System
		3.4.15	RCS Leakage Detection Instrumentation
		3.5.2	ECCS - Operating
		3.5.3	ECCS - Shutdown
		3.6.3	Containment Isolation Valves
		3.6.6	Containment Spray and Cooling Systems
		3.6.7	Spray Additive Tank
		3.7.2	Main Steam Isolation Valves (MSIVs)
		3.7.4	Steam Generator Power Operated Relief Valves
		3.7.5	Auxiliary Feedwater (AF) System
		3.7.7	Component Cooling Water (CC) System
		3.7.8	Essential Service Water (SX) System
		3.7.9	Ultimate Heat Sink
		3.7.10	Control Room Ventilation (VC) Filtration System
		3.7.11	Control Room Ventilation (VC) Temperature Control System
		3.7.12	Nonessential Area Exhaust Filter Plenum Ventilation System
		3.7.13	Fuel Handling Building (FHB) Ventilation System
		3.8.1	AC Sources - Operating
		3.8.4	DC Sources - Operating
		3.8.7	Inverters - Operating

TABLE 1
SUPPORT SYSTEM TO SUPPORTED SYSTEM TS CROSS REFERENCE

Support System TS Number	Support System	Supported System TS Number	Supported System
3.8.10	Distribution Systems - Shutdown	3.3.1	Reactor Trip System (RTS)
		3.3.6	Containment Ventilation Isolation Instrumentation
		3.3.7	Control Room Ventilation (VC) Filtration System Actuation Instrumentation
		3.3.8	Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System Actuation Instrumentation
		3.3.9	BDPS
		3.4.7	RCS Loops - Mode 5, Loops Filled
		3.4.8	RCS Loops – Mode 5, Loops Not Filled
		3.4.12	LTOP System
		3.7.10	Control Room Ventilation (VC) Filtration System
		3.7.11	Control Room Ventilation (VC) Temperature Control System
		3.7.13	Fuel Handling Building Exhaust Filter Plenum (FHB) Ventilation System
		3.8.2	AC Sources - Shutdown
		3.8.5	DC Sources - Shutdown
		3.9.3	Nuclear Instrumentation
		3.9.4	Containment Penetrations
		3.9.5	Residual Heat Removal (RHR) and Coolant Circulation - High Water Level
		3.9.6	Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level

ATTACHMENT 1

LCOAR FORMAT

A. SAFETY FUNCTION DETERMINATION PROGRAM REQUIREMENTS

Loss of Safety Function (LOSF) Evaluation

Is there any inoperable or degraded SUPPORT SYSTEM or SUPPORTED SYSTEM equipment on the opposite/redundant train that, when coupled with this inoperable equipment, might result in a complete loss of a Tech Spec required safety function.

1. NO - No LOSF exists. No further evaluation is necessary.

2. YES - A LOSF may exist. Using the SFDP and BAP 1400-6, evaluate which of the following conditions apply:

   a. The SSC is part of an LCO with multiple subsystems and the LCO specified function is intact. No LOSF exists.

   b. The SCC is credited in the Safety Analysis Report (SAR) and the SAR operability criteria are met. No LOSF exists.

   c. A LOSF exists. Perform the Required Actions of the SSC LCO in which the LOSF exists for the specific Condition(s) that apply.

LCO 3.0.6 - DELAYED LCOAR ENTRY CALCULATION.

Perform this step only if NO LOSF exists and it is desired to preclude entry into SUPPORTED SYSTEM LCOAR as allowed by LCO 3.0.6. A LOSF does not exist if the redundant train of the inoperable SUPPORTED SYSTEM(S) equipment is OPERABLE.

1. Rules of Usage:

   a. With a single SUPPORT SYSTEM inoperable, the affected SUPPORTED SYSTEM(s) LCOAR entry(s) is not required to be entered unless directed by the SUPPORT SYSTEM Required Actions.

   b. In the event additional SUPPORT SYSTEM(s) become inoperable during the Completion Time for restoration of the first SUPPORT SYSTEM, the LCOAR entry(s) of the SUPPORTED SYSTEM may be delayed by either the maximum allowed Completion Time of the SUPPORT SYSTEMs, OR 2 times the Completion Time for restoration of the SUPPORTED SYSTEM (applied at the time the second SUPPORT SYSTEM becomes inoperable), whichever is less.

2. When tracking delayed LCOAR entry times, it is imperative that the INOPERABLE TIME/DATE and required LCOAR entry TIME/DATE reflect the total time the SUPPORTED SYSTEM has been inoperable. A review of all active LCOARS must be performed to ensure SUPPORTED SYSTEM(s) do not remain inoperable for longer than allowed in 1.b. above.

B. SUPPORT SYSTEM to SUPPORTED SYSTEM Tech Spec cross reference is found in the SFDP. Complete the following table(s) for all inoperable SUPPORTED SYSTEMS for which LCOAR entry will not be made per the allowances of LCO 3.0.6.

Table 1: Supported System delayed LCOAR entry Table: (example)

SUPPORT SYSTEM: LCO 3.7.7 Component Cooling Water

SUPPORTED SYSTEM TS NUMBER	SUPPORTED SYSTEM	INOPERABLE TIME / DATE	Enter LCOAR TIME / DATE
3.4.4	RCS Loops - Modes 1 & 2	________	________
3.4.5	RCS Loops - Mode 3	________	________
3.4.6	RCS Loops - Mode 4	________	________
3.4.7	RCS Loops - Mode 5, Loops filled	________	________
3.4.8	RCS Loops - Mode 5, Loops not filled	________	________
3.5.2	ECCS - Operating	________	________
3.5.3	ECCS - Shutdown	________	________
3.9.5	RHR Coolant Circulation - High Water Level	________	________
3.9.6	RHR Coolant Circulation - Low Water Level	________	________
________	________	________	________
________	________	________	________
________	________	________	________

Table 2: ANY/All other SUPPORTED SYSTEMS which are inoperable as a result of the SUPPORTED SYSTEM(S) identified in table 1 above.

SUPPORTED SYSTEM TS NUMBER	2nd / 3rd LEVEL SUPPORTED SYSTEM	INOPERABLE TIME / DATE	Enter LCOAR TIME / DATE
	(none pre-identified)		
________	________	________	________
________	________	________	________
________	________	________	________
________	________	________	________
________	________	________	________
________	________	________	________
________	________	________	________
________	________	________	________
________	________	________	________

ATTACHMENT 2

SFDP EVALUATION EXAMPLES

ITEMS CLEARLY INOPERABLE

A. A SSC that is unable to perform its specified function(s) because of obvious failure, damage, or malfunction, or because it is disabled for testing or maintenance is inoperable.

B. A SSC that trips (where tripped is not the safety function condition) is inoperable unless it can be restarted promptly, without performing maintenance. If the attempt at restart is unsuccessful, the SSC is inoperable. The time frame for compensatory action begins at the time of the initial trip.

C A SUPPORTED SSC is inoperable when a SUPPORT SYSTEM is not capable of performing its related support function. However, if it is determined that the SSC is capable of performing its intended function, even with an inoperable SUPPORT SYSTEM, then the TS SUPPORTED SYSTEM may be considered OPERABLE.

D. Failure of a SSC to meet quantitative acceptance criteria specified in Surveillance Procedures is inoperable unless the Surveillance Procedure acceptance criteria is more conservative than the existing TS SR acceptance criteria and the results of the surveillance is clearly within the acceptance criteria of the TS SR.

E. A SSC is inoperable if it fails to meet a safety function requirement identified in a docketed letter to the NRC that specifically describes its functional capability/requirement is.

F. A SSC is inoperable if its configuration results in the LOSF or a loss of capability to withstand a single failure, if required.

G. If calculation indicates that a SSC will not be able to perform as needed to mitigate the affects of a design basis accident, then the SSC is inoperable.

ITEMS POTENTIALLY INOPERABLE

A. A suspected error in any analysis that could affect the functional status of a SSC.

B. A lack of documentation that could affect the functional status of a SSC.

C. A minor deviation (incorrect bolt size, tolerance/clearance, etc.) found in a SSC. Also included in this category are items such as unevaluated installation of lead shielding on a system or removal of a component from a system without using temporary restraints and without a prior Engineering evaluation.

D. An unfulfilled EQ installation or maintenance requirement for a component or device where the impact is not obvious.

EXAMPLE: The EQ Program may require O-rings be replaced with new O-rings every time a cover is removed from a device and at least once every five years. The consequences of failure to replace the O-ring at the end of the five year interval may not be clear, and may or may not cause the device to be inoperable.

EXAMPLE: An unidentified wire is found in an EQ valve operator and there is not sufficient information available to determine whether the wire is suitable for the application.

E. An item found in nonconformance with electrical separation criteria specified in the UFSAR.

F. An item found in noncompliance with physical separation or mechanical isolation requirements specified by Plant Drawings,Operating Procedures, Fire Hazards Analysis, etc.

G. Equipment found out-of-tolerance in the nonconservative direction.

H. When a SSC is found to be outside its design basis, it may be considered operable when it is judged that the SSC is capable of performing its specified functions(s). Further testing calculations, etc. may be required to support this position.

I. Discovery of an unanalyzed condition associated with the current design basis (i.e., an unanalyzed condition which should have been analyzed).

SFDP EVALUATION - EXAMPLE 1

EXAMPLE 1: At 0500, with Unit 2 in MODE 1, both channels of the Containment Radiation-High monitor are determined to be inoperable.

This instrumentation supports the Containment Ventilation Isolation instrumentation by providing input to the Automatic Actuation Logic and Actuation relays and Containment Radiation-High. Since these supported functions require at least 2 channels, for the monitors, entry must be made into the Required Actions for LCO 3.3.6.

These Actions directly specify to enter applicable Conditions and Required Actions of LCO 3.6.3 for containment valves made inoperable by isolation instrumentation (Required Action B.1) As stated in LCO 3.0.6 when the SUPPORT SYSTEM SSC Required Actions provide direction for SUPPORTED SYSTEM SSCs, the applicable SUPPORTED SYSTEM SSC Conditions and Required Actions shall be entered. This effectively precludes the use of LCO 3.0.6.

Conclusion: The LCO 3.3.6 Required Actions should be performed, as well as those for all the inoperable SUPPORTED SYSTEMS. The SFDP will not be entered since LCO 3.0.6 cannot be used.

SFDP EVALUATION - EXAMPLE 2

EXAMPLE 2: At 0130, with both Units at 100% power, the Spray Additive Tank is determined to be inoperable.

Per LCO Bases 3.6.7, the Spray Additive Tank provides sodium hydroxide through the suction of the Containment Spray Pumps and into the containment. The purpose of the sodium hydroxide is to provide iodine scrubbing in the case of a LOCA.

In the event the Spray Additive Tank is inoperable, it will not disable the Containment Spray Pump to perform is intended safety function, which is to spray borated water from the RWST into containment in order to reduce pressure and temperature. Since this function will still be performed, even with the Spray Additive Tank inoperable, it is not considered to be a SUPPORT SYSTEM for the Containment Spray Pump.

The same is not true in the case where the Containment Spray Pump is inoperable. In this case the Containment Spray Pump is a SUPPORT SYSTEM for the Spray Additive Tank. If the Containment Spray Pump is inoperable, the sodium hydroxide, function of the Spray Additive Tank, will not be sprayed into containment. In this case the Spray Additive Tank is a SUPPORTED SYSTEM to the Containment Spray Pump.

<u>Conclusion</u>: Since the Spray Additive Tank is not a SUPPORT SYSTEM for the Containment Spray Pumps, both trains of Containment Spray are OPERABLE, and no LOSF exists.

SFDP EVALUATION - EXAMPLE 3

EXAMPLE 3: At 1300, Unit 1 was at 100% power and Train B Essential Service Water (SX) System became inoperable with the associated LCOAR implemented. At 1400, the Condensate Storage Tank (CST) becomes inoperable.

Train B SX is a SUPPORT SYSTEM to the Auxiliary Feedwater (AF) Pumps (SUPPORTED SYSTEM). No LOSF exists at this time (1300 to 1359 hours) since Train A SX is intact and, being a cross-tied system, can supply all the SX needs to both trains of AF, etc, and since no redundant systems are inoperable. The Actions for SX (LCO 3.7.8, Action A.1) are entered. The Actions for AF (LCO 3.7.5) are not entered since AF is operable.

At 1400 hours, the CST becomes inoperable. The CST (LCO 3.7.6) is considered to be a SUPPORT SYSTEM to the AF. However, the CST is not the safety related water supply to the AF, it is only the preferred supply. At this point the plant is in 2 LCOs and a SFDP evaluation is warranted. In this case, the evaluation should show that no LOSF exists for the following reasons:

The CST does support the AF, however, the CST is not the safety related water supply to the AF, it is only the preferred supply. Therefore, the AF is not inoperable due to the CST being inoperable. Furthermore, SX remains available to AF.

<u>Conclusion:</u> A LOSF does not exist and only Technical Specification 3.7.6 is entered for the CST inoperability.

COMPLETION TIME EXTENSIONS APPLICABLE TO THE SFDP

RULES OF USAGE FOR COMPLETION TIME EXTENSIONS

1. Single SUPPORT SYSTEM inoperable affecting SUPPORTED SYSTEM(s)

   With a single SUPPORT SYSTEM inoperable, the affected SUPPORTED SYSTEM(s) LCOARs entry(s) is not required to be entered unless directed by the SUPPORT SYSTEM Required Actions. (Reference Case A.)

2. Multiple SUPPORT SYSTEMS become inoperable affecting the same SUPPORTED SYSTEM(s)

   When a SUPPORT SYSTEM becomes inoperable, the SUPPORTED SYSTEM(S) LCOAR entry is not required to be entered unless directed by the SUPPORT SYSTEM Required Actions. In the event additional SUPPORT SYSTEM(s) become inoperable during the Completion Time of the first SUPPORT SYSTEM, the LCOAR entry(s) of the SUPPORTED SYSTEM(s) may be delayed by either:

   a) The maximum allowed Completion Time of the SUPPORT SYSTEMS,

   OR

   b) 2 times the Completion Time for restoration of the SUPPORTED SYSTEM (applied at the time the second SUPPORT SYSTEM becomes inoperable),

whichever is the shorter duration. Reference Cases B and C.

The SFDP requires declaring SUPPORTED SYSTEM(S) inoperable if a SUPPORT SYSTEM inoperability renders the SUPPORTED SYSTEM incapable of performing its required function. However, the Conditions and Required Actions of the SUPPORTED SYSTEM do not have to be entered (i.e., the LCO Required Actions are not entered) except as directed by the SUPPORT SYSTEM Required Actions.

Consequently, it is possible to have SUPPORTED SYSTEM(S) inoperable for longer periods of time than their respective Completion Time would allow on their own. Per Technical Specifications 5.5.15, the SFDP must include measures to ensure that the SUPPORTED SYSTEM's Completion Times are not inappropriately extended.

The Required Action may be delayed only if the inoperability is due solely to an inoperability of a SUPPORT SYSTEM. If a SUPPORTED SYSTEM is made directly inoperable, then the LCO and Required Actions are entered at the time of direct inoperability per LCO 3.0.2.

The following criteria apply to Completion Time extension:

CASE A:

If only one SUPPORT SYSTEM is inoperable, General Rule 1 applies and the SUPPORTED SYSTEM LCOAR entry need not be entered unless directed by the SUPPORT SYSTEM Required Actions.

Example:

System A (SUPPORTED SYSTEM)	Action Completion Time - 3 days
System B (SUPPORT SYSTEM)	Action Completion Time - 7 days

LCOAR entry on SUPPORTED SYSTEM A is not required to be entered.

<u>Case B:</u>

The SUPPORT SYSTEMS become inoperable at different times. The LCOAR entry for the SUPPORTED SYSTEM may be delayed as follows:

Example:

System A (SUPPORTED SYSTEM)	Action Completion Time - 7 days
System B (SUPPORT SYSTEM)	Action Completion Time - 3 days
System C (SUPPORT SYSTEM)	Action Completion Time - 3 days

System B and C support System A

System B (SUPPORT SYSTEM) is inoperable at T = 0 days

Therefore: System A (SUPPORTED SYSTEM) Conditions and Required Action(s) need not be entered unless directed by the System B (SUPPORT SYSTEM) Required Actions.

System C (SUPPORT SYSTEM) becomes inoperable 2 days after System B (SUPPORT SYSTEM) became inoperable. System B is still not OPERABLE.

Therefore: At T = 0 days until the second SUPPORT SYSTEM becomes inoperable, General Rule 1 is applied. At this point, System B (SUPPORT SYSTEM) Completion Time is 3 days. System A (SUPPORTED SYSTEM) LCOAR is not entered unless directed by the System B (SUPPORT SYSTEM) Required Actions.

At T = 2 days, System C (SUPPORT SYSTEM) becomes inoperable. System C (SUPPORT SYSTEM) also supports System A (SUPPORTED SYSTEM) initiating General Rule 2 at T = 2 days. System C (SUPPORT SYSTEM) has a Completion Time of 3 days. Therefore, the maximum Completion Time for this scenario is from T = 0 days to T = 3 days for System B (SUPPORT SYSTEM), and from T = 2 days to T = 5 days for System C (SUPPORT SYSTEM). The maximum delay time for System A (SUPPORTED SYSTEM) LCOAR entry is 5 days because:

System B (SUPPORT SYSTEM) Completion Time is T = 3 days

System C (SUPPORT SYSTEM) Completion Time is T = 5 days

T = 5 days is the longer of the two completion times and is compared with the two times the SUPPORTED SYSTEMS's completion time for restoration. System C (SUPPORT SYSTEM) completion time is at T = 5 days. System A (SUPPORTED SYSTEM) completion time limit is 2 X 7 = 14 days after T = 2 days. T = 2 + 14 or a total of 16 days. Since T = 5 days is less than T = 16 days, the maximum allowed delay time to enter the System A (SUPPORTED SYSTEM) LCOAR is the shorter of the two, 5 days.

CASE C:

Two SUPPORT SYSTEMS become inoperable at different times. The LCOAR entry for the SUPPORTED SYSTEM may be delayed as follows:

Example:

System A (SUPPORTED SYSTEM)	Action Completion Time - 3 days
System B (SUPPORT SYSTEM)	Action Completion Time - 3 days
System C (SUPPORT SYSTEM)	Action Completion Time - 7 days

System B and C support System A

Case C1 - System B (SUPPORT SYSTEM) B becomes inoperable at T = 0 days.

System B (SUPPORT SYSTEM) with a Completion Time of 3 days, renders System A (SUPPORTED SYSTEM) inoperable. General Rule 1 is applied, which allows an overall Completion Time of 3 days for the System B (SUPPORT SYSTEM). The LCOAR for System A (SUPPORTED SYSTEM) is not required to be entered unless directed by the System B (SUPPORT SYSTEM) Required Actions.

At T = 1 day, System C (SUPPORT SYSTEM) becomes inoperable and has a Completion Time of 7 days. System C (SUPPORT SYSTEM) also supports System A (SUPPORTED SYSTEM). System B (SUPPORT SYSTEM) continues to remain inoperable through its Completion Time T = 3 days.

Once System C (SUPPORT SYSTEM) becomes inoperable concurrent with System B, General Rule 2 is applied at T=1, the Completion Times are:

T = 0 days to T = 3 days for System B (SUPPORT SYSTEM), and

T = 1 day to T = 8 days for System C (SUPPORT SYSTEM).

At T = 3 days System B (SUPPORT SYSTEM) is not declared OPERABLE, and the appropriate subsequent Required Actions of System B (SUPPORT SYSTEM) are entered. The Required Actions of System A (SUPPORTED SYSTEM) A are not entered (unless SUPPORT SYSTEM B or C Required Actions specifically direct them to be entered) until T = 7 days (2 times System A's Completion Time after T = 1 day).

T = 7 days is less than System C's T = 8 days Completion Time. Not entering the Required Actions for System A (SUPPORTED SYSTEM) is allowed under LCO 3.0.6 provided the inoperability of System A (SUPPORTED SYSTEM) is solely due to the inoperability of System B (SUPPORT SYSTEM) and subsequently System C (SUPPORT SYSTEM).

Case C2 - At T = 0 day, System B (SUPPORT SYSTEM) becomes inoperable, with a Completion Time of 3 days, and renders System A (SUPPORTED SYSTEM) inoperable. General Rule 1 is applied, which allows an overall Completion Time of 3 days for System B (SUPPORT SYSTEM).

At T = 1 days, System C (SUPPORT SYSTEM) becomes inoperable and has a Completion Time of 7 days. System C (SUPPORT SYSTEM) also supports System A (SUPPORTED SYSTEM). When System C (SUPPORT SYSTEM) becomes inoperable, General Rule 2 is triggered requiring System A (SUPPORTED SYSTEM) LCOAR entry no later than day 7 (2 x 3 days after T=1). The Completion Times are:

From T = 0 day to T = 3 days for System B (SUPPORT SYSTEM), and
From T = 1 day to T = 8 days for System C (SUPPORT SYSTEM).

System B (SUPPORT SYSTEM) is declared OPERABLE at T = 2 days.

System C (SUPPORT SYSTEM) remains inoperable and consequently, System A (SUPPORTED SYSTEM) is <u>still</u> inoperable solely due to its SUPPORT SYSTEM (System C) being inoperable. At this point, General Rule 2 remains in effect to eliminate continuous alternating inoperabilities. This would allow the Required Action entry for System A (SUPPORTED SYSTEM) to still be delayed only until day 7 (T = 1 + 6 days).

CONTAINMENT LEAKAGE RATE
TESTING PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

This Program provides controls to implement the leakage rate testing of the containment as required by 10 CFR 50.54(o) and 10 CFR 50, Appendix J, Option B, as modified by approved exemptions including routine inspections, tests, and reporting requirements pursuant to Technical Specification 5.5.16, "Containment Leakage Rate Testing Program." The Program inspection and test frequencies and associated acceptance criteria shall be in accordance with the guidelines contained in NEI 94-01, Revision 3-A, and ANSI/ANS-56.8-2002.

1.2 REFERENCES

1. Technical Specifications:
   a. 3.6.1, "Containment"
   b. 3.6.2, "Containment Air Locks"
   c. 3.6.3, "Containment Isolation Valves"
   d. 5.5.16, “Containment Leakage Rate Testing Program”
2. UFSAR:
   a. Section 6.2, "Containment Systems"
   b. Section 6.2.6.1, "Containment Integrated Leakage Rate Test"
   c. Section 6.2.6.2, "Containment Penetration Leakage Rate Test"
3. NRC/Industry Documents:
   a. NEI 94-01 Rev. 3-A, "Industry Guideline for Implementing Performance-Based Option of 10 CFR 50, Appendix J"
   b. ANSI/ANS-56.8-2002, "Containment System Leakage Testing Requirements"

c. 10 CFR 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water Cooled Power Reactors"

d. NUREG 1493, "Performance-Based Containment Leak-Test Program"

4. Byron Maintenance Rule 10 CFR 50.65

1.3 DEFINITIONS AND/OR ACRONYMS

1. PERFORMANCE CRITERIA - The performance standards against which test results are to be compared for establishing the acceptability of the containment system as a leakage-limiting boundary.

2. CONTAINMENT SYSTEM - The principal barrier, after the reactor coolant pressure boundary, to prevent the release of quantities of radioactive material that would have a significant radiological effect on the health of the public.

3. OVERALL INTEGRATED LEAKAGE RATE - The total leakage rate through all tested leakage paths, including containment welds, valves, fittings, and components that penetrate the primary containment, expressed in units of weight percent of contained air mass at test pressure per 24 hours.

4. L_a - The maximum allowable primary containment leakage rate, L_a, shall be 0.20% of the primary containment air weight per day at the calculated peak containment pressure (P_a).

5. P_a - The maximum calculated primary pressure, P_a, (Unit 1 = 42.8 psig) (Unit 2 = 38.4 psig) for the design basis loss of coolant accident.

6. TYPE A TEST - A test to measure the containment system overall integrated leakage rate under conditions representing DBA containment pressure and systems alignments.

7. TYPE B TEST - A pneumatic test intended to detect or measure leakage across pressure-retaining or leakage-limiting boundaries other than valves, such as:

   a. containment penetrations whose design incorporates resilient seals, gaskets, sealant compounds, expansion bellows, or flexible seal assemblies;

   b. seals, including door operating mechanism penetrations, which are part of the primary containment; or

   c. doors and hatches with resilient seals or gaskets except for seal-welded doors.

8. TYPE C TESTS - A pneumatic test to measure leakage rates from containment isolation valves, which are potential gaseous leakage pathways from containment during a design-basis LOCA.

9. UPPER CONFIDENCE LIMIT (UCL) - A calculated value constructed from test data that places a statistical upper bound on the true leakage rate (%/24h).

10. MINIMUM PATHWAY LEAKAGE RATE (MNPLR) - The minimum leakage rate that can be attributed to a penetration leakage path (e.g., the smaller of either the inboard or outboard barrier's individual leakage rates).

11. MAXIMUM PATHWAY LEAKAGE RATE (MXPLR) - The maximum leakage rate attributed to a penetration leakage path. The MXPLR is the larger, not the total, leakage of two barriers in series.

1.4 PROGRAM DESCRIPTION

This Program provides administrative guidelines for the Byron Containment Leakage Rate Testing Program, guidelines for the coordination of inspection, trending, reporting, performance evaluation, repair, establishing surveillance intervals, and regulatory compliance for Type A, B, and C leakage testing.

10 CFR 50 Appendix J Option B allows the use of a performance-based program to perform the Type A, B, and C containment leakage testing. Program requirements are further defined in References 3.a, 3.b, and 3.c. These documents require that periodic testing be conducted to verify the leakage integrity of the containment and those systems and components which penetrate the

containment. The objective for monitoring performance of TYPE A TESTS focuses on verifying the leakage integrity of a passive containment structure.

TYPE B and C TESTS focus on assuring that containment penetrations are essentially leak tight. The results of these tests are evaluated against performance criteria and the required testing intervals are adjusted based on the performance of the component/system.

Option B allows licensees with good ILRT performance history to reduce the TYPE A TEST frequency from three tests in 10 years to one test in 15 years. For TYPE B and TYPE C TESTS, Option B allows Byron Station to reduce testing frequency based on the experience history of each component, and establish controls to ensure continued performance during the extended testing interval. Type B and C LLRT intervals utilize the requirements and guidance as stipulated in Reference 3.a.

1.5 PROGRAM IMPLEMENTATION

Inspection, trending, reporting, performance evaluation, repair, surveillance intervals, and regulatory compliance for Type A, B, and C leakage testing shall be initiated and maintained in accordance with the Byron Containment Leakage Rate Testing Program.

1.6 ACCEPTANCE CRITERIA

Acceptance criteria for TYPE A TESTS are contained in applicable Station Procedures. Acceptance criteria for TYPE B and C TESTS are contained in applicable Station Procedures. The acceptance criteria specified in the individual leak rate test procedures are administrative guidelines that are used to help maintain low containment leakage rates. The acceptance criteria associated with the individual leak rate test procedures are not Technical Specification requirements with the exception of the personnel/emergency airlock door seals and overall air lock leakage. The acceptance criteria associated with the personnel/emergency airlock door seals and overall air lock leakage are as specified in TS 5.5.16.

1.7 LCOARS/COMPENSATORY MEASURES

If any abnormalities in containment leakage exceed the acceptance criteria, the Shift Manager will be immediately notified. The Shift Manager shall determine OPERABILITY status and implement a LCOAR as applicable. In addition, an Issue Report (IR) may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

1.8 REPORTING REQUIREMENTS

Any reporting requirements associated with acceptance criteria of this Program not being met shall be reported in accordance with the requirements specified in the implementing procedures.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include the Regulatory Assurance Department in all cases. As part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Byron has been reviewed and was determined not to be applicable to Braidwood.

Appendix Q was deleted with Revision 46 – see plant review 06-008.

HIGH RADIATION AREAS

BYRON

TABLE OF CONTENTS

1.1 PURPOSE

The purpose of this Program is to provide guidance and direction for the proper methodology for controlling high radiation areas. This Program is developed in accordance with Technical Specification (ITS) 5.7, “High Radiation Area.”

1.2 REFERENCES

1. Technical Specifications 5.7 “High Radiation Area”
2. 10 Code of Federal Regulations Part 20 “Standards for Protection Against Radiation”
3. Regulatory Guide 8.38, “Control of Access to High and Very High Radiation Areas in Nuclear Power Plants”
4. INPO Report 91-014, “Guidelines for Radiological Protection at Nuclear Power Stations”, December, 1991

1.3 DEFINITIONS AND/OR ACRONYMS

1. BARRICADE - A rope, ribbon, or other firmly secured, conspicuous obstacle that (by itself or used with physical barriers such as existing walls or hand railings) completely surrounds the area and obstructs inadvertent entry.
2. HIGH RADIATION AREA (HRA) - Any area accessible to individuals, in which radiation levels could result in an individual receiving a deep dose equivalent in excess of 100 mrem in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates.

1.4 PROGRAM DESCRIPTION

The High Radiation Area Program is intended to describe the proper methodology for controlling HRAs.

1.5 PROGRAM IMPLEMENTATION

1. Pursuant to 10CFR20, paragraph 20.1601(c), in lieu of the requirements of 10CFR20, 1601, each high radiation area, as defined in 10CFR20, in which the intensity of radiation is > 100 mrem/hr but ≤ 1000 mrem/hr at 30 cm (12 inches) from the radiation source or from any surface which the radiation penetrates, shall be BARRICADED and conspicuously posted as a HRA and entrance thereto shall be controlled by requiring issuance of a Radiation Work Permit (RWP) or equivalent document that includes specification of radiation dose rates in the immediate work area(s) and other appropriate radiation protection equipment and measures. Individuals qualified in radiation protection procedures or personnel continuously escorted by such individuals may be exempt from the RWP issuance requirement during the performance of their assigned duties in high radiation areas with exposure rates ≤ 1000 mrem/hr, provided they are otherwise following plant radiation protection procedures for entry into such HRAs.

   Any individual or group of individuals permitted to enter such areas shall be provided with or accompanied by one or more of the following:

   a. A radiation monitoring device that continuously indicates the radiation dose rate in the area;

   b. A radiation monitoring device that continuously integrates the radiation dose rate in the area and alarms when a preset integrated dose is received. Entry into such areas with this monitoring device may be made after the dose rate levels in the area have been established and personnel are aware of them; or

c. An individual qualified in radiation protection procedures with a radiation dose rate monitoring device, who is responsible for providing positive control over the activities within the area, shall perform periodic radiation surveillance at the frequency specified in the RWP or equivalent document.

2. In addition to the requirements of ITS 5.7.1, areas accessible to personnel with radiation levels > 1000 mrem/hr at 30 cm (12 inches) from the radiation source or from any surface which the radiation penetrates shall require the following:

   a. Doors shall be locked to prevent unauthorized entry and shall not prevent individuals from leaving the area. In place of locking the door, direct or continuous electronic surveillance that is capable of detecting unauthorized entry may be used. The keys shall be maintained under the administrative control of the Shift Manager on duty or health physics supervision;

   b. Personnel access and exposure control requirements of activities being performed within these areas shall be specified by an approved RWP or equivalent document that includes specification of radiation dose rates in the immediate work area(s) and other appropriate radiation protection equipment and measures;

   c. Each person entering the area shall be provided with an alarming radiation monitoring device that continuously integrates the radiation dose rate (such as an electronic dosimeter). Surveillance and radiation monitoring by health physics personnel may be substituted for an alarming dosimeter;

d. For individuals HRAs accessible to personnel with radiation levels of > 1000 mrem/hr at 30 cm (12 inches) that are located within large areas such as reactor containment, where no enclosure exists for purposes of locking, and where no enclosure can be reasonably constructed around the individual area, that individual area shall be BARRICADED, conspicuously posted, and a flashing light shall be activitated as a warning device; and

e. Except for individuals qualified in radiation protection procedures, or personnel escorted by such individuals, entry into such areas shall be made after dose rates in the area have been determined and entry personnel are knowledgeable of them. Individuals escorted will receive a pre-job briefing prior to entry into such areas.

The Radiation Protection Department is responsible for the implementation, completion and reporting of this Program.

1.6 ACCEPTANCE CRITERIA

Not applicable.

1.7 LCOARS/COMPENSATORY

Not applicable.

1.8 LCOARS/COMPENSATORY MEASURES OF EFFECTIVENESS

Not applicable.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10CFR50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include the Regulatory Assurance Department in all cases. As part of the ITR, for a change to this Program, Braidwood and Byron Plant Operations Review Committee (PORC) approval is required. The PORC approval shall ensure Braidwood is implementing the same change or that the change has been reviewed and determined not to be applicable to Braidwood.

TECHNICAL REQUIREMENTS MANUAL
CONTROL PROGRAM

TABLE OF CONTENTS

1.1 PURPOSE

The purpose of this Program is to provide guidance for identifying, processing, and implementing changes to the Technical Requirements Manual (TRM). This Program implements and satisfies the requirements of TRM Section 1.6, "Technical Requirements Manual Revisions."

This Program is applicable to the preparation, review, implementation, and distribution of changes to the TRM. This Program also provides guidance for preparing TRM Change Packages for distribution.

1.2 REFERENCES

1. TRM Section 1.6, "Technical Requirements Manual Revisions"
2. 10 CFR 50.4, "Written Communications"
3. 10 CFR 50.59, "Changes, Tests and Experiments"
4. 10 CFR 50.71, "Maintenance of Records, Making of Reports"
5. 10 CFR 50.90, "Application for Amendment of License, Construction Permit, or Early Site Permit"

1.3 DEFINITIONS AND/OR ACRONYMS

10 CFR 50.59 REVIEW - A written regulatory evaluation which provides the basis for the determination that a change does, or does not, require NRC approval pursuant to 10 CFR 50.59. The scope of the evaluation should be commensurate with the potential safety significance of the change, but must address the relevant safety concerns included in the Safety Analysis Report and other owner controlled documents. The depth of the evaluation must be sufficient to determine whether or not NRC approval is required prior to implementation. Depending upon the significance of the change, the evaluation may be brief; however, a simple statement of conclusion is not sufficient.

EDITORIAL CHANGE - Editorial changes include correction of punctuation, insignificant word or title changes, style or format changes, typographical errors, or correction of reference errors that do not change the intent, outcome, results, functions, processes, responsibilities, or performance requirements of the item being changed. Changes in numerical values shall not be considered as editorial changes. Editorial changes do not constitute a change to the TRM and therefore do not require further 10 CFR 50.59 Reviews. If the full scope of this proposed change is encompassed by one or more of the below, then the change is considered editorial.

- Rewording or format changes that do not result in changing actions to be accomplished.
- Deletion of cycle-specific information that is no longer applicable.
- Addition of clarifying information, such as:
    - Spelling, grammar, or punctuation changes
    - Changes to references
    - Name or title references

1.4 PROGRAM DESCRIPTION

1. A Licensee may make changes to the TRM without prior NRC approval provided the changes do not require NRC approval pursuant to 10 CFR 50.59.

2. Changes that require NRC approval pursuant to 10 CFR 50.59 shall be submitted to the NRC pursuant to 10 CFR 50.90 and reviewed and approved by the NRC prior to implementation.

3. The TRM is part of the Updated Final Safety Analysis Report (UFSAR) by reference and shall be maintained consistent with the remainder of the UFSAR.

4. If a change to the TRM is not consistent with the remainder of the UFSAR, then the cognizant Engineer shall prepare and submit a UFSAR Change Package when the TRM Change Request is submitted to Regulatory Assurance (RA) for processing.

5. Changes to the TRM that do not require prior NRC approval shall be provided to the NRC on a frequency consistent with 10 CFR 50.71(e), as modified by approved exemptions.

6. TRM changes associated with a Technical Specifications (TS) Amendment shall be implemented consistent with the implementation requirements of the TS Amendment.

7. RA is responsible for the control and distribution of the TRM. In order to prevent distribution errors (i.e., omissions or duplications), RA shall maintain the master TRM distribution list.

1.5 PROGRAM IMPLEMENTATION

1. TRM Change Requestor identifies the need for a revision to the TRM and notifies the RA Licensing Engineer (i.e., hereafter referred to as RA LE). A TRM change can be initiated through any Stations' RA. TRM Change Requestor notifies their counterparts on the need for a change.

2. RA LE notifies their counterparts of identified need for revision to the TRM.

3. RA LE assigns a TRM Change Request Number (CR #)

4. RA LE drafts TRM changes considering format, rules of usage, and technical adequacy.

5. RA LE makes an electronic version of the proposed TRM changes available in a working directory for use in the preparation of the 10 CFR 50.59 REVIEW and Station Qualified Review (SQR) process. The RA LE shall ensure that the master electronic TRM files are revised per step 12 below upon receiving SQR approval. The Revision number in the footer should be a sequential number (i.e., 1, 2, etc.).

NOTE

If the TRM changes are applicable to more than one Station, the following steps should be performed concurrently for each Station.

6. TRM Change Requestor provides a 10 CFR 50.59 REVIEW for the TRM changes in accordance with appropriate plant procedures. An exception to this requirement applies when the changes are being requested in order to reflect an approved NRC Safety Evaluation (SE) associated with a site specific Operating License or TS change. The NRC SE is sufficient to support the changes provided it has been determined that the changes are consistent with and entirely bounded by the NRC SE. A 10 CFR 50.59 REVIEW shall be performed for TRM changes that reflect generic industry approval by an NRC SE to determine site specific applicability. A 10 CFR 50.59 REVIEW is not required for an EDITORIAL CHANGE.

7. TRM Change Requestor completes Attachment A, "Technical Requirements Manual Change Request Form," as follows:

    a. Identifies the affected sections, and includes a copy of the proposed TRM changes;

    b. Briefly summarizes the changes including the TLCO, Action, Surveillance Requirement, or Bases (if applicable) to which the changes apply;

    c. Briefly summarizes the reason for the changes and attaches all supporting documentation;

    d. Identifies any schedule requirements and proposed implementation date that apply (i.e., describe any time limitations that might apply which would require expedited processing). If the changes are outage related, then checks "yes" and lists the applicable outage identifier;

    e. Identifies any known implementation requirements such as procedure changes, UFSAR changes, Passport changes, Reportability Manual revisions, pre-implementation training requirements, etc.;

    f. If a 10 CFR 50.59 REVIEW was prepared to support the TRM changes, the Requestor then checks the appropriate box, lists the associated 10 CFR 50.59 REVIEW Number, and attaches the original;

    g. If the changes to the TRM are the result of an approved NRC SE associated with a site specific Operating License or TS change and the scope of the changes determined to be consistent with and entirely bounded by the NRC SE, then the Requestor checks the appropriate box and attaches a copy;

h. If the changes to the TRM are EDITORIAL CHANGES, then the Requestor checks the appropriate box and no 10 CFR 50.59 REVIEW is required;

i. Signs and dates as Requestor and identifies the originating department;

j. Obtains approval to proceed from Department Supervisor (or designee); and

k. Returns Attachment A to the RA LE.

8. RA LE reviews the TRM Change Request Form, including supporting documentation, and documents the review by signing Attachment A. The review verifies that the following information or documentation is included:

   a. Completed 10 CFR 50.59 REVIEW. If the changes are related to an approved NRC SE associated with a site specific Operating License or TS change and determined to be entirely bounded by the NRC SE, then only a copy of the SE is required to be attached and no 10 CFR 50.59 REVIEW is required. A 10 CFR 50.59 REVIEW is not required for an EDITORIAL CHANGE;

   b. Identification of known documents requiring revisions; and

   c. Completed UFSAR Change Request with supporting documentation, in accordance with appropriate plant procedures, if applicable.

9. If the TRM change is not an EDITORIAL CHANGE, the RA LE/TRM Change Requestor obtains SQR approval of the TRM change by performing the following:

   a. RA LE prepares the TRM Change SQR package. The SQR package shall include Attachment A (including completed 10 CFR 50.59 REVIEW or NRC SE) and the revised TRM pages. Attachment A is provided for the purpose of reviewing and finalizing the implementation requirements and ensuring the necessary actions have been initiated. RA LE shall assign Action Tracking (AT) items, as necessary, to track implementation requirements;

   b. TRM Change Requestor submits the TRM Change SQR package to the SQR Committee members for a preliminary review. The SQR composition shall include RA and Operating Departments in all cases; and

c. TRM Change Requestor resolves preliminary review comments and finalizes the TRM Change SQR package.

10. The RAM shall determine the need for Plant Operations Review Committee (PORC) approval. The need for PORC approval shall be documented on Attachment A.

11. RA LE/TRM Change Requestor obtains PORC approval, if necessary.

12. After approval of the TRM changes by SQR/PORC, RA LE ensures that the controlled master electronic files are updated.

13. RA LE completes Attachment B, "Technical Requirements Manual Change Instruction Form," as follows:

    a. Indicates the effective date of the TRM changes consistent with the SQR/PORC approval or TS amendment required implementation date. If the TRM change is a result of a TS Amendment, the update shall be implemented consistent with the implementation requirements of the TS Amendment. Otherwise, the update must be implemented by the date indicated on Attachment B;

    b. Lists each page to be removed and inserted, including the Affected Page List; and

    c. Provides the updated master file directory for updating Electronic Document Management System (EDMS), if applicable.

14. RA LE creates a TRM Change Package. The TRM Change Package shall consist of:

    1. TRM Change Instruction Form (Attachment B);

    2. Revised Affected Page List; and

    3. Revised TRM pages.

    One RA LE shall assemble and approve the TRM Change Package for distribution and a second RA LE shall perform a peer check to verify completeness of the TRM Change Package.

15. After verifying that SQR/PORC approval of the TRM changes has been obtained and that all AT items assigned to track implementation requirements have been completed, RA LE forwards the TRM Change Package to Station Records Management as notification of the need to update the onsite TRM controlled copies and EDMS, if applicable.

16. RA LE also forwards the TRM Change Package to Cantera Licensing (CL) Records Management as notification of the need to update the offsite (CL) TRM controlled copies and to transmit updates to the offsite (non-CL) TRM controlled copies.

17. Upon completion of updating the onsite TRM controlled copies and EDMS (if applicable), Station Records Management Supervisor signs and dates Attachment B and returns Attachment B to the RA LE.

18. Upon completion of updating the offsite (CL) TRM controlled copies and transmitting updates to the offsite (non-CL) TRM controlled copies, CL Records Management signs and dates Attachment B and returns Attachment B to the RA LE.

19. RA LE ensures that the documentation required to be maintained as a quality record is provided to Station Records Management for the purpose of record retention.

1.6 ACCEPTANCE CRITERIA

Not applicable.

1.7 LCOARS/COMPENSATORY MEASURES

An Issue Report may need to be generated to provide proper tracking and resolution of noted problems associated with the implementation of this Program.

The RAM will be responsible for ensuring that Program failures have been resolved.

1.8 REPORTING REQUIREMENTS

NOTE

TRM changes requiring prior NRC approval shall be submitted in accordance with Reference 5.

TRM changes not requiring prior NRC approval, as described in Section 1.4 of this Program, shall be submitted to the NRC in accordance with 10 CFR 50.71(e).

1.9 CHANGE CONTROL

Changes to this Program, other than EDITORIAL CHANGES, shall include a 10 CFR 50.59 REVIEW and a SQR. The SQR composition shall include RA Department in all cases. For a change to this Program, PORC approval from all Stations is required. The concurrence shall be that the other Stations are implementing the same changes or that the changes have been reviewed and determined not to be applicable to the other Stations.

ATTACHMENT A
TECHNICAL REQUIREMENTS MANUAL CHANGE REQUEST FORM

1. Change Request #: _____________ Affected TRM Section(s): __________________________

2. Description of changes: ____
____
____

3. Reason for changes (attach all supporting documentation): ____________________
____
____
____

4. Schedule Requirements:
Outage Related (check one) ☐ No ☐ Yes, Outage # ___________
Other (explain) ____

5. Implementation Requirements (attach additional pages, as necessary):
Identify the impact of the changes on the following:

Affected	N/A	
☐	☐	UFSAR ______
☐	☐	TS ______
☐	☐	TS Bases ______
☐	☐	NRC Safety Evaluation ______
☐	☐	Fire Protection Report ______
☐	☐	NRC Commitments ______
☐	☐	Vendor Documentation ______
☐	☐	Special Permits/Licenses ______
☐	☐	Procedures ______
☐	☐	Environmental Qualification ______
☐	☐	Design Basis Documentation ______
☐	☐	Engineering Calculations ______
☐	☐	Drawings/Prints ______
☐	☐	PRA Information ______
☐	☐	Programs ______
☐	☐	Reportability Manual ______
☐	☐	QA Topical Report ______
☐	☐	Passport______
☐	☐	Pre-Implementation Training Required ______
☐	☐	Maintenance Rule ______
☐	☐	Offsite Dose Calculation Manual ______
☐	☐	Other ______

6. Check one:
☐ 10 CFR 50.59 REVIEW Attached, 10 CFR 50.59 REVIEW #:______________________
☐ NRC SE Attached, Changes consistent with and entirely bounded by NRC SE
☐ EDITORIAL CHANGE, No 10 CFR 50.59 REVIEW required

7. Requestor: ______________________/______________________/______________________
(Signature) (Date) (Department)

8. Requesting Supervisor Approval: ______________________/______________________
(Signature) (Date)

9. PORC Approval Required: ☐ Yes ☐ No

10. Licensing Engineer Review: ______________________/______________________
(Signature) (Date)

ATTACHMENT B
TECHNICAL REQUIREMENTS MANUAL CHANGE INSTRUCTION FORM
FOR ONSITE/OFFSITE DISTRIBUTION AND FOR UPDATING EDMS

Braidwood/Byron/Dresden/LaSalle/QC (circle one) TRM Revision # ______

NOTE: This change is effective as of ____________________________ and shall be implemented by __________ .
(SQR/PORC or Amendment Implementation Date)
(Date)

Approved for distribution: __________________________________/_____________
(RA LE Signature) (Date)

Verified: __________________________________/_____________
(RA LE Signature) (Date)

REMOVE Section	REMOVE Page	INSERT Section	INSERT Page	UPDATE EDMS Section	UPDATE EDMS Page
Affected Page List	All	Affected Page List	All	N/A	N/A

ATTACHMENT B
TECHNICAL REQUIREMENTS MANUAL CHANGE INSTRUCTION FORM
FOR ONSITE/OFFSITE DISTRIBUTION AND FOR UPDATING EDMS

Braidwood/Byron/Dresden/LaSalle/QC (circle one) TRM Revision # ______

Station Records Management:

Onsite Distribution Completed: ____________________/____________
(Station Records Mgmt. Supr.) (Date)

EDMS Update Completed: ____________________/____________
(Station Records Mgmt. Supr.) (Date)

** Return this sheet to: Regulatory Assurance
Braidwood/Byron/Dresden/LaSalle/QC (circle one) Station

CL Records Management:

Offsite (CL) Distribution Completed: ____________________/____________
(CL Records Mgmt. Dept.) (Date)

Offsite (non-CL) Distribution Transmitted: ____________________/____________
(CL Records Mgmt. Dept.) (Date)

** Return this sheet to: Regulatory Assurance
Braidwood/Byron/Dresden/LaSalle/QC (circle one) Station

Offsite (non-CL) Controlled Copy Holders:

Offsite (non-CL) Distribution Completed: ____________________/____________
(Signature) (Date)

** Return this sheet to: EXELON GENERATION COMPANY, LLC
LICENSING AND REGULATORY AFFAIRS DEPARTMENT
4300 WINFIELD ROAD
WARRENVILLE, IL 60555

CONFIGURATION RISK MANAGEMENT PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

This Configuration Risk Management Program provides a proceduralized process to ensure that a configuration risk assessment is conducted prior to and during performance of maintenance activities that remove SSCs from service.

1.2 REFERENCES

1. Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants"
2. Regulatory Guide 1.174, "An Approach for using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis"
3. Regulatory Guide 1.177, "An Approach for Plant-Specific-Risk-Informed Decisionmaking: Technical Specifications"
4. NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants"

1.3 DEFINITIONS AND/OR ACRONYMS

1. Configuration Risk Management Program - CRMP
2. Probabilistic Risk Assessment - PRA
3. Structure, System, or Component - SSC

1.4 PROGRAM DESCRIPTION

The CRMP is a subset of the work management process. The CRMP ensures that configuration risk is assessed (probabilistic and/or deterministic), and managed, prior to initiating any maintenance activity consistent with the requirements of 10 CFR 50.65. The CRMP also ensures that risk is reassessed if an emergent condition results in a plant configuration that has not been previously assessed.

Probabilistic risk assessments of online configurations are performed using the level 1 PRA model. Deterministic defense-in-depth evaluations of key safety functions are performed for online and shutdown configurations using a safety function assessment module. Deterministic evaluations of plant configurations that result in a change to initiating event frequency and/or decrease in mitigation capability are performed using a plant transient assessment module.

The CRMP establishes risk thresholds and administrative limits for risk significant configuration out of service times to ensure that average baseline risk is maintained within an acceptable band.

Overall risk is managed to the most restrictive risk threshold specified within the CRMP. Risk significant configurations are generally avoided. If a risk significant configuration occurs, immediate actions are taken to protect redundant/diverse SSCs that are relied upon to mitigate events.

The CRMP requires that the PRA model meet industry certification standards to ensure the scope and quality of the PRA is adequate. The CRMP requires that the PRA model the current design configuration of the plant, and that plant modification and procedure changes are monitored and evaluated as to the impact on the PRA model. The CRMP establishes compensatory measures in the event a plant configuration is outside the scope of the PRA, or PRA results are unavailable.

1.5 PROGRAM IMPLEMENTATION

The CRMP is implemented through a company-wide standard procedure. The Work Control and Risk Management Engineering Departments are responsible for the CRMP and associated procedure implementation at the stations.

1.6 ACCEPTANCE CRITERIA

The configuration risk management acceptance criteria are contained within the implementing procedures.

1.7 LCOARS/COMPENSATORY MEASURES

The CRMP provides administrative limits for Technical Specification Limiting Condition of Operation Allowed Outage Time and Maintenance Rule unavailability time. When the administrative limit will be exceeded, compensatory measures are established to reduce risk, limit unavailability time, and implement a contingency plan to restore and/or mitigate the loss of a key safety function.

1.8 REPORTING REQUIREMENTS

The normal work management process and control room logs provide adequate documentation of configuration risk.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 evaluation and an Independent Technical Review (ITR). The ITR composition shall include Regulatory Assurance Department in all cases. As a part of the ITR, for a change to this Program, concurrence from Byron and the Braidwood Plant Operations Review Committee (PORC) approval is required. The concurrence shall be that Byron is implementing the same change or that the change has been reviewed and determined not to be applicable to Byron.

BATTERY MONITORING AND MAINTENANCE PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

This Program provides guidance and clarifying information related to the Battery Monitoring and Maintenance Program. This Program complies with the requirements of Technical Specification (TS) 5.5.17, "Battery Monitoring and Maintenance Program." This program provides for the restoration and maintenance of batteries based on the recommendations given in Reference 2.

1.2 REFERENCES

1. TS 5.5.17, "Battery Monitoring and Maintenance Program"
2. IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications"
3. UFSAR Chapter 8, "Electric Power"
4. NRC Regulatory Guide 1.129, "Maintenance, Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants"

1.3 DEFINITIONS AND/OR ACRONYMS

1. ELECTROLYTE LEVEL - The battery cell fluid level found by visual observation.
2. BATTERY CELL PARAMETERS - Voltage, specific gravity, and resistance/impedance.
3. INTER-CELL/INTER-TIER or INTER-RACK CONNECTIONS - Connections made between rows/steps or racks of individual battery cells.
4. FLOAT VOLTAGE - The voltage applied to a battery to maintain it in a fully charged condition during normal operation.
5. SPECIFIC GRAVITY - A measurement of an individual battery cell electrolyte to determine the state of charge.
6. ELECTROLYTE LEVEL MINIMUM ESTABLISHED DESIGN LIMIT - 1/2 inch below the minimum level indication mark.
7. ELECTROLYTE TEMPERATURE MINIMUM ESTABLISHED DESIGN LIMIT - 60°F.

1.4 PROGRAM DESCRIPTION

This Program ensures the methodologies, parameters, and corrective actions comply with the reference requirements. This Program addresses the station 125 VDC Engineered Safety Features (ESF) Batteries (Division 11(21) and Division 12(22)).

The OPERABILITY requirements for the 125 VDC ESF Batteries are defined in TS Limiting Conditions for Operation (LCOs) 3.8.4, "DC Sources - Operating," 3.8.5, "DC Sources - Shutdown," and 3.8.6, "Battery Parameters." LCO 3.8.6 delineates the limits on battery float current as well as electrolyte temperature, level, and float voltage.

This Program which complies with the requirements of TS 5.5.17 provides for monitoring various battery parameters based on the recommendations of Reference 2.

1.5 PROGRAM IMPLEMENTATION

The Battery Monitoring and Maintenance Program contains the methodology and parameters used to ensure the station batteries are capable of meeting design and operating requirements.

As required by TS 5.5.17, this Program provides for the restoration and maintenance, based on the recommendations of Reference 2 or of the battery manufacturer of the following:

1. Actions to restore battery cells with float voltage < 2.13 V, and

2. Actions to equalize and test battery cells that had been discovered with electrolyte level below the minimum established design limit.

This Program is implemented by Technical Requirements Manual Limiting Condition for Operation (TLCO) 3.8.c, "Battery Monitoring and Maintenance." The Bases for TLCO 3.8.c is provided in Attachment A to this Program.

1.6 ACCEPTANCE CRITERIA

The acceptance criteria are contained in station operating or surveillance procedures. TLCO 3.8.c contains the Conditions, Required Actions and associated Completion Times, and Surveillance Requirements required to comply with TS 5.5.17.

1.7 LCOARS/COMPENSATORY MEASURES

TLCO 3.8.c provides the Conditions, Required Actions and associated Completion Times, and Surveillance Requirements required to comply with TS 5.5.17. The requirements of TLCO 3.8.c are proceduralized via the associated LCOAR.

1.8 REPORTING REQUIREMENTS

There are no reporting requirements for the Battery Monitoring and Maintenance Program.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include the Regulatory Assurance Department in all cases. As part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change has been reviewed and determined not to be applicable to Braidwood.

Attachment A

Bases for TLCO 3.8.c, “Battery Monitoring and Maintenance”

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.c Battery Monitoring and Maintenance

BASES

BACKGROUND	This TLCO delineates the requirements of the Battery Monitoring and Maintenance Program in accordance with Technical Specification (TS) 5.5.17. A discussion of the batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources-Operating," LCO 3.8.5, "DC Sources-Shutdown," and LCO 3.8.6, "Battery Parameters."
APPLICABLE SAFETY ANALYSES	The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 6 (Ref. 1) and Chapter 15 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators, emergency auxiliaries, and control and switching during all MODES of operation. The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the plant. This includes maintaining at least one division of DC sources OPERABLE during accident conditions, in the event of: a. An assumed loss of all offsite AC power or all onsite AC power; and b. A worst case single failure.
LCO	Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. Electrolyte limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met. OPERABILITY of the batteries is defined by LCO 3.8.6, "Battery Parameters."

BASES

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC electrical power subsystems. Therefore, battery electrolyte is only required when the DC power source is required to be OPERABLE. Refer to the Applicability discussion in Bases for LCO 3.8.4 and LCO 3.8.5.

ACTIONS

The ACTIONS Table is modified by a Note which indicates that separate Condition entry is allowed for each battery. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each affected battery. Complying with the Required Actions for one battery may allow for continued operation, and subsequent battery parameters out of limits are governed by separate Condition entry and application of associated Required Actions.

A.1, A.2, and A.3

With one or more cells in one battery not within limits (i.e., Category A limits not met, Category B limits not met, or Category A and B limits not met) but within the Category C limits specified in Table T3.8.c-1 in the accompanying TLCO, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met and operation is permitted for a limited period.

The pilot cell electrolyte level and float voltage are required to be verified to meet the Category C limits within 1 hour (Required Action A.1). This check will provide a quick indication of the status of the remainder of the battery cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cell. One hour is considered a reasonable amount of time to perform the required verification.

BASES

ACTIONS (continued)

Verification that the Category C limits are met (Required Action A.2) provides assurance that during the time needed to restore the parameters to the Category A and B limits, the battery is still capable of performing its intended function. A period of 24 hours is allowed to complete the initial verification because specific gravity measurements must be obtained for each connected cell. Taking into consideration both the time required to perform the required verification and the assurance that the battery cell parameters are not severely degraded, this time is considered reasonable. The verification is repeated at 7 day intervals until the parameters are restored to Category A or B limits. This periodic verification is consistent with the normal Frequency of pilot cell surveillances.

Continued operation is only permitted for 31 days before battery cell parameters must be restored to within Category A and B limits. With the consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable.

BASES

ACTIONS (continued)

B.1 and B.2

With one battery with one or more battery cells with electrolyte level less than the minimum established design limit (i.e., 1/2” below the minimum level indication mark), TS 5.5.17 requires that the Battery Monitoring and Maintenance Program provide actions to equalize and test the affected battery cell(s). The Specification 5.5.17 item b to initiate action to equalize and test in accordance with manufacturer’s recommendation is taken from Annex D of IEEE Standard 450-1995, “IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications.” 31 days is allowed to equalize and test the affected battery cell(s). However, Condition B is modified by a Note which indicates that Required Actions B.1 and B.2 must be completed after restoring the affected cell electrolyte level to greater than or equal to the minimum established design limits, i.e., after LCO 3.8.6, “Battery Parameters,” Required Action C.3 is completed. With the consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable. Based on the results of the manufacturer’s recommended testing the battery may have to be declared inoperable and the affected cell(s) replaced.

SURVEILLANCE REQUIREMENTS

TSR 3.8.c.1

This TSR verifies that Category A battery cell parameters are consistent with IEEE-450 (Ref. 3), which recommends regular battery inspections (at least one per month) including voltage, specific gravity, and electrolyte level of pilot cells.

BASES

SURVEILLANCE REQUIREMENTS (continued)

TSR 3.8.c.2

The quarterly inspection of specific gravity and voltage is consistent with IEEE-450 (Ref. 3). In addition, within 7 days of a battery discharge < 110 V or a battery overcharge > 145 V, the battery must be demonstrated to meet Category B limits. Transients, such as motor starting transients, which may momentarily cause battery voltage to drop to < 110 V, do not constitute a battery discharge provided the battery terminal voltage and float current return to pre-transient values. This inspection is also consistent with IEEE-450 (Ref. 3), which recommends special inspections following a severe discharge or overcharge, to ensure that no significant degradation of the battery occurs as a consequence of such discharge or overcharge.

TSR 3.8.c.3

Visual inspection to detect corrosion of the battery cells and connections, or measurement of the resistance of each intercell, interrack, intertier, and terminal connection, provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.

The limits established for this TSR must not be above the ceiling value established by the manufacturer.

Connection resistance is obtained by subtracting the normal resistance of the interrack (cross room rack) connector or the intertier (bi-level rack) connector from the measured intercell (cell-to-cell) connection resistance.

The Surveillance Frequency for these inspections, which can detect conditions that can cause power losses due to resistance heating, is 92 days. This Frequency is considered acceptable based on operating experience related to detecting corrosion trends.

BASES

SURVEILLANCE REQUIREMENTS (continued)

TSR 3.8.c.4

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. The presence of physical damage or deterioration does not necessarily represent a failure of this TSR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

TSR 3.8.c.5 and TSR 3.8.c.6

Visual inspection and resistance measurements of intercell, interrack, intertier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anti-corrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance TSR. The presence of visible corrosion does not necessarily represent a failure of this TSR provided visible corrosion is removed during performance of TSR 3.8.c.5.

The connection resistance limits for TSR 3.8.c.6 shall not be above the ceiling value established by the manufacturer.

Connection resistance is obtained by subtracting the normal resistance of the interrack (cross room rack) connector or the intertier (bi-level rack) connector from the measured intercell (cell-to-cell) connection resistance.

Table T3.8.c-1

This table delineates the limits on electrolyte level, float voltage, and specific gravity for three different categories. The meaning of each category is discussed below.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Category A defines the normal parameter limit for each designated pilot cell in each battery. The cells selected as pilot cells are those whose temperature, voltage, and electrolyte specific gravity approximate the state of charge of the entire battery.

The Category A limits specified for electrolyte level are based on manufacturer recommendations and are consistent with the guidance in IEEE-450 (Ref. 3), with the extra ¼ inch allowance above the high water level indication for operating margin to account for temperatures and charge effects. In addition to this allowance, footnote (a) to Table T3.8.c-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

The Category A limit specified for float voltage is ≥ 2.13 V per cell. This value is based on the recommendations of IEEE-450 (Ref. 3), which states that prolonged operation of cells < 2.13 V can reduce the life expectancy of cells.

The Category A limit specified for specific gravity for each pilot cell is ≥ 1.200 (0.015 below the manufacturer fully charged nominal specific gravity or a battery charging current that had stabilized at a low value). This value is characteristic of a charged cell with adequate capacity. According to IEEE-450 (Ref. 3), the specific gravity readings are based on a temperature of 77°F (25°C).

The specific gravity readings are corrected for actual electrolyte temperature. For each 3°F (1.67°C) above 77°F (25°C), 1 point (0.001) is added to the reading; 1 point is subtracted for each 3°F below 77°F.

Category B defines the normal parameter limits for each connected cell. The term "connected cell" excludes any battery cell that may be jumpered out.

BASES

SURVEILLANCE REQUIREMENTS (continued)

The Category B limits specified for electrolyte level and float voltage are the same as those specified for Category A and have been discussed above. Footnote (b) to Table T3.8.c-1 requires the float voltage correction for average electrolyte temperature. The Category B limit specified for specific gravity for each connected cell is ≥ 1.195 (0.020 below the manufacturer fully charged, nominal specific gravity) with the average of all connected cells > 1.205 (0.010 below the manufacturer fully charged, nominal specific gravity). These values are based on manufacturer's recommendations. The minimum specific gravity value required for each cell ensures that the effects of a highly charged or newly installed cell will not mask overall degradation of the battery.

Category C defines the limits for each connected cell. These values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety.

The Category C limits specified for electrolyte level (above the top of the plates and not overflowing) ensure that the plates suffer no physical damage and maintain adequate electron transfer capability. The Category C limits for float voltage is based on IEEE-450 (Ref. 3), which states that a cell voltage of 2.07 V or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

The Category C limit of average specific gravity ≥ 1.195 is based on manufacturer recommendations (0.020 below the manufacturer recommended fully charged, nominal specific gravity). In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery.

BASES

SURVEILLANCE REQUIREMENTS (continued)

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge. This phenomenon is discussed in IEEE-450 (Ref. 3). Footnote (d) to Table T3.8.c-1 allows the float charge current to be used as an alternate to specific gravity for up to 7 days following a battery recharge. Within 7 days, each connected cell's specific gravity must be measured to confirm the state of charge. Following a minor battery recharge (such as equalizing charge that does not follow a deep discharge) specific gravity gradients are not significant, and confirming measurements may be made in less than 7 days.

REFERENCES

1. UFSAR, Chapter 6.
2. UFSAR, Chapter 15.
3. IEEE-450-1995.

CONTROL ROOM ENVELOPE HABITABILITY PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

This Program ensures that Control Room Envelope (CRE) Habitability is maintained such that, with an OPERABLE Control Room Ventilation (VC) Filtration System, the CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge by assessing and performing testing in accordance with Technical Specification (TS) 3.7.10, “Control Room Ventilation (VC) Filtration System” and the CRE Habitability Program. The CRE Habitability Program is defined by TS 5.5.18.

1.2 REFERENCES

1. Technical Specifications:
   a. 3.7.10, "Control Room Ventilation (VC) Filtration System"
   b. 5.5.18, "Control Room Envelope Habitability Program"
2. Update Final Safety Analysis Report Sections:
   a. 6.4, "Habitability Systems"
   b. 9.4.1, "Control Room HVAC System"
3. Regulatory Guide 1.196, “Control Room Habitability at Light-Water Nuclear Power Reactors,” Revision 0
4. NEI 99-03, “Control Room Habitability Assessment Guidance,” Revision 0
5. Design Basis Accident (DBA) Control Room Dose Calculations:
   a. BYR04-051, “RE-ANALYSIS OF LOSS OF COOLANT ACCIDENT (LOCA) USING ALTERNATIVE SOURCE TERMS”
   b. BYR04-045, “RE-ANALYSIS OF CONTROL ROD EJECTION ACCIDENT (CREA) USING ALTERNATE SOURCE TERMS”
   c. BYR04-046, “RE-ANALYSIS OF MAIN STEAM LINE BREAK (MSLB) ACCIDENT USING ALTERNATE SOURCE TERMS”
   d. BYR04-047, “RE-ANALYSIS OF FUEL HANDLING ACCIDENT (FHA) USING ALTERNATE SOURCE TERMS”

e. CN-CRA-10-33, “BYRON AND BRAIDWOOD UNIT 2 STEAM GENERATOR TUBE RUPTURE RADIOLOGICAL DOSE ANALYSIS”

f. CN-CRA-10-42, “BYRON AND BRAIDWOOD UNIT 1 STEAM GENERATOR TUBE RUPTURE RADIOLOGICAL DOSE ANALYSIS”

g. BYR04-049, “RE-ANALYSIS OF LOCKED ROTOR ACCIDENT (LRA) USING ALTERNATE SOURCE TERMS”

1.3 DEFINITIONS AND/OR ACRONYMS

1. BREACH: Any work activity or testing that creates or enlarges an opening through a barrier, which would allow the propagation of a hazard through the barrier. Following are some examples:
   - Modification (addition, removal or degradation) of a penetration seal or structural component
   - Core boring
   - Blocking open a door/hatch or damper
   - Modification (addition, removal, or degradation) of a door/hatch or damper

2. CONTROL ROOM ENVELOPE (CRE): The area within the confines of the CRE Boundary that contains the spaces occupants inhabit to control the plant for normal and accident conditions. This area encompasses the control room and other non-critical areas to which frequent personnel access or continuous occupancy is not necessary in the event of an accident. The CRE is protected during normal operation, natural events, and accident conditions. The Byron CRE is shown in drawing M-1033-13.

3. CONTROL ROOM HABITABILITY SYSTEMS (CRHS): The plant systems that help ensure CRE Habitability. This includes the VC system and the VC Temperature Control system. The CRE Boundary is considered an integral part of the CRHS, since it is critical to maintaining CRE Habitability.

4. CRE BOUNDARY: A combination of walls, floor, roof, ducting, doors, penetrations and equipment that physically form the CRE.

5. CRE INTEGRITY: The condition whereby the CRHS are functioning to ensure the protection of the occupants in the CRE during normal and accident conditions.

6. FILTERED INLEAKAGE: This inleakage occurs at a location in the CRHS that allows the inleakage air contamination to be filtered prior to entering the habitability zone. An example is duct inleakage on the suction side of a recirculation air carbon filter where the duct is outside the CRE. Radionuclides are removed from this air prior to it entering the CRE. There is no filtering assumed for hazardous chemical events.

7. TRACER GAS TEST: A test to determine total inleakage into the CRE. Tracer Gas (from ASTM E741) is a gas that can be mixed with air in very small concentrations in order to study air movement. The tracer gas test is actually measuring the total amount of outside air entering the CRE, and the inleakage air is determined by subtracting the filtered outside air supply value from the total amount. This particular test may not locate leaks; it does, however, provide a value for total inleakage.

8. UNFILTERED AIR INLEAKAGE: This is inleakage that occurs at a location in the CRHS that allows inleakage air to enter the control room envelope without any contaminants being filtered prior to entry. Examples would be penetrations and dampers that are at a negative pressure with respect to potentially contaminated surroundings and located such that radionuclides are not removed prior to the inleakage air entering the CRE.

1.4 PROGRAM DESCRIPTION

This Program ensures that CRE Habitability is maintained in accordance with NRC regulations and plant-specific commitments. Specifically, the CRE Habitability Program ensures compliance with 10 CFR 50, Appendix A, General Design Criterion 19 - Control Room (GDC 19). CRE Habitability must be maintained during normal operations as well as during radiological, hazardous chemical, or smoke event emergencies. Administration of this Program, through periodic TRACER GAS TEST, periodic assessments, configuration control, and preventive maintenance, will ensure that CRE Habitability and CRE Integrity are maintained. The CRE Habitability Program is the result of an NRC commitment to Generic Letter 2003-01 for all Exelon Nuclear / AmerGen plant Technical Specifications to have an administrative program for

CRE Habitability.

1.5 PROGRAM IMPLEMENTATION

A CRE Habitability Program shall be established and implemented to ensure that CRE Habitability is maintained such that, with an OPERABLE VC Filtration System, CRE occupants can control the reactor safely under normal conditions and maintain it in a safe condition following a radiological event, hazardous chemical release, or a smoke challenge. This program shall ensure that adequate radiation protection is provided to permit access and occupancy of the CRE under design basis accident (DBA) conditions without personnel receiving radiation exposures in excess of 5 rem total effective dose equivalent (TEDE) for the duration of the accident. The program shall include the following elements:

a. The definition of the CRE and CRE Boundary.

b. Requirements for maintaining the CRE Boundary in its design condition including configuration control and preventive maintenance.

c. Requirements for determining the unfiltered air inleakage past the CRE Boundary into the CRE in accordance with the testing methods and at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, "Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors," Revision 0, May 2003, and assessing CRE habitability at the Frequencies specified in Sections C.1 and C.2 of Regulatory Guide 1.197, Revision 0.

d. Measurement of the CRE pressure relative to all external areas adjacent to the CRE Boundary during the pressurization mode of operation by one train of the VC Filtration System, operating at the flow rate required by the Ventilation Filter Testing Program, at a Frequency of 18 months on a STAGGERED TEST BASIS. The results shall be trended and used as part of the 18 month~~s~~ assessment of the CRE Boundary.

e. The quantitative limits on unfiltered air inleakage into the CRE. These limits shall be stated in a manner to allow direct comparison to the unfiltered air inleakage measured by the testing described in paragraph c. The unfiltered air inleakage limit for radiological challenges is the inleakage flow rate assumed in the licensing basis analyses of DBA consequences. Unfiltered air inleakage limits for hazardous chemicals must ensure that exposure of CRE occupants to these hazards will be within the assumptions in the licensing basis.

f. The provisions of SR 3.0.2 are applicable to the Frequencies for assessing CRE Habitability, determining CRE unfiltered air inleakage, and measuring CRE pressure and assessing the CRE Boundary as required by paragraphs c and d, respectively.

1.6 ACCEPTANCE CRITERIA

1. The quantitative limits on unfiltered air inleakage do not exceed the values assumed in the dose analysis for DBAs.

2. Periodic Assessments do not identify any degraded conditions or programs that could result in exceeding the licensing basis analysis of DBA consequences to the CRE occupants.

1.7 LCOARS/COMPENSATORY MEASURES

In the event any of the acceptance criteria are not met, the Shift Manager will immediately be notified. The Shift Manager shall determine OPERABILITY status and implement a LCOAR as applicable. In addition, an Issue Report may be generated to provide proper tracking and resolution of the noted problems associated with the implementation of this program.

1.8 REPORTING REQUIREMENTS

Any reporting requirements associated with acceptance criteria of this Program not being met shall be reported in accordance with the requirements specified in the implementing procedures or determined through the Corrective Action Process.

1.9 CHANGE CONTROL

Changes to this Program, other than editorial changes, shall include a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include Regulatory Assurance Department in all cases. As a part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same change unless the change being implemented at Byron has been reviewed and was determined not to be applicable to Braidwood.

SURVEILLANCE FREQUENCY CONTROL PROGRAM
BYRON

TABLE OF CONTENTS

1.1 PURPOSE

The purpose of this Program is to provide the administrative controls for modifying surveillance frequencies in accordance with Technical Specification (TS) 5.5.19, “Surveillance Frequency Control Program.” The Surveillance Frequency Control Program (SFCP) ensures that Surveillance Requirements specified in the TSs are performed at intervals sufficient to assure the associated Limiting Conditions for Operation are met.

1.2 REFERENCES

1. Technical Specification 5.5.19, "Surveillance Frequency Control Program"
2. NEI 04-10, “Risk-Informed Method for Control of Surveillances Frequencies,” Revision 1
3. Letter from N.J. DiFrancesco (U. S. NRC) to M.J. Pacilio (Exelon Generation Company, LLC), "Byron Station, Units 1 and 2 - Issuance of Amendments Regarding Technical Specification Change for the Relocation of Specific Surveillance Frequency Requirements Based on Technical Specification Task Force-425," dated February 24, 2011.

1.3 DEFINITIONS AND/OR ACRONYMS

Definitions and/or acronyms are consistent with definitions provided in Technical Specification Section 1.0, "Use and Application."

1.4 PROGRAM DESCRIPTIONS

The list of periodic surveillances and associated TS Bases information that were relocated to the SFCP as part of License Amendment No. 171 for Byron Station, Units 1 and Unit 2 are provided in a separate tab in the TS book for ease of locating.

Table 1 under this tab includes a reference to the TS SR number, a surveillance description, the frequency, and current revision. The description is a summary description of the referenced TS SR which is provided for information purposes only and not intended to be a substitute for the actual TS SR requirement. Refer to the TS for specific action required by each respective TS SR identified in the list.

Table 2 under this tab provides the associated Bases description for each TS SR Frequency and current revision.

Changes to the type or scope of testing (e.g., Channel Check, Channel Functional Test, or Channel Calibration) are not allowed without prior NRC approval. The specified frequencies ensure TS SRs are performed at intervals sufficient to assure associated Limiting Conditions for Operation (LCOs) are met.

Changes to the information in Tables 1 and 2 may occur for one of two reasons:

1. Addition, deletion, or modification of the associated TS SR through a license amendment request, or

2. A change to a surveillance frequency in accordance with the SFCP and associated implementing procedures. Changes to individual surveillance frequencies are evaluated using the methodology provided in NEI 04-10, "Risk-Informed Method for Control of Surveillance Frequencies," Revision 1.

As noted in Tables 1 and 2, Surveillance Frequencies beyond Revision 0 have been evaluated in accordance with TS Section 5.5.19, “Surveillance Frequency Control Program.” Surveillance frequencies at Revision 0 reflect the approved licensing basis upon initial SFCP implementation.

The provisions of TS SR 3.0.2 and 3.0.3 are applicable to the frequencies established in the SFCP.

1.5 PROGRAM IMPLEMENTATION

Changes to the Frequencies listed in the Surveillance Frequency Control Program shall be made in accordance with NEI 04-10, "Risk-Informed Method for control of Surveillance Frequencies," Revision 1.

1.6 ACCEPTANCE CRITERIA

Not applicable.

1.7 LCOARS/COMPENSATORY MEASURES

Noncompliance with the frequencies specified in the SFCP (e.g., a missed surveillance) requires generation of an Issue Report in accordance with PI-AA-125.

1.8 REPORTING REQUIREMENTS

Based on the guidance provided in NUREG-1022, "Event Reporting Guidelines, 10 CFR 50.72 and 50.73," Revision 2, missed surveillances are not reportable as a condition prohibited by TS unless the surveillance, once performed, indicates that the equipment was not capable of performing its specified safety function(s) for a period of time longer than allowed by TS.

1.9 CHANGE CONTROL

The change control process associated with revisions to Surveillance Frequencies is defined in NEI 04-10, “Risk-Informed Method for Control of Surveillances Frequencies,” Revision 1.

Changes to this program, other than editorial changes, shall include a 10 CFR 50.59 Review and a Station Qualified Review (SQR). The SQR composition shall include the Regulatory Assurance Department in all cases. As part of the SQR, Byron and Braidwood Plant Operations Review Committee (PORC) approval is required as determined by the Regulatory Assurance Manager. Byron and Braidwood shall implement the same changes unless the change being implemented at Byron has been reviewed and was determined to be not applicable to Braidwood.

CORE OPERATING LIMITS REPORT (COLR)

FOR

BYRON UNIT 1 CYCLE 24

EXELON TRACKING ID:

COLR BYRON UNIT 1 REVISION 15

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for Byron Station Unit 1 Cycle 24 has been prepared in accordance with the requirements of Technical Specification 5.6.5 (ITS).

The Technical Specification Safety Limits and Limiting Conditions for Operation (LCOs) affected by this report are listed below:

SL	2.1.1	Reactor Core Safety Limits (SLs)
LCO	3.1.1	SHUTDOWN MARGIN (SDM)
LCO	3.1.3	Moderator Temperature Coefficient (MTC)
LCO	3.1.4	Rod Group Alignment Limits
LCO	3.1.5	Shutdown Bank Insertion Limits
LCO	3.1.6	Control Bank Insertion Limits
LCO	3.1.8	PHYSICS TESTS Exceptions – MODE 2
LCO	3.2.1	Heat Flux Hot Channel Factor ($F_Q(Z)$)
LCO	3.2.2	Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$)
LCO	3.2.3	AXIAL FLUX DIFFERENCE (AFD)
LCO	3.2.5	Departure from Nucleate Boiling Ratio (DNBR)
LCO	3.3.1	Reactor Trip System (RTS) Instrumentation
LCO	3.3.9	Boron Dilution Protection System (BDPS)
LCO	3.4.1	Reactor Coolant System (RCS) Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
LCO	3.9.1	Boron Concentration

The portions of the Technical Requirements Manual (TRM) affected by this report are listed below:

TRM TLCO 3.1.b	Boration Flow Paths – Operating
TRM TLCO 3.1.d	Charging Pumps – Operating
TRM TLCO 3.1.f	Borated Water Sources – Operating
TRM TLCO 3.1.g	Position Indication System – Shutdown
TRM TLCO 3.1.h	Shutdown Margin (SDM) – MODE 1 and MODE 2 with keff ≥ 1.0
TRM TLCO 3.1.i	Shutdown Margin (SDM) – MODE 5
TRM TLCO 3.1.j	Shutdown and Control Rods
TRM TLCO 3.1.k	Position Indication System – Shutdown (Special Test Exception)

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

2.0 OPERATING LIMITS

The cycle-specific parameter limits for the specifications listed in Section 1.0 are presented in the following subsections. These limits are applicable for the entire cycle unless otherwise identified. These limits have been developed using the NRC-approved methodologies specified in Technical Specification 5.6.5.

2.1 Reactor Core Safety Limits (SLs) (SL 2.1.1)

2.1.1 In MODES 1 and 2, the combination of Thermal Power, Reactor Coolant System (RCS) highest loop average temperature, and pressurizer pressure shall not exceed the limits specified in Figure 2.1.1.

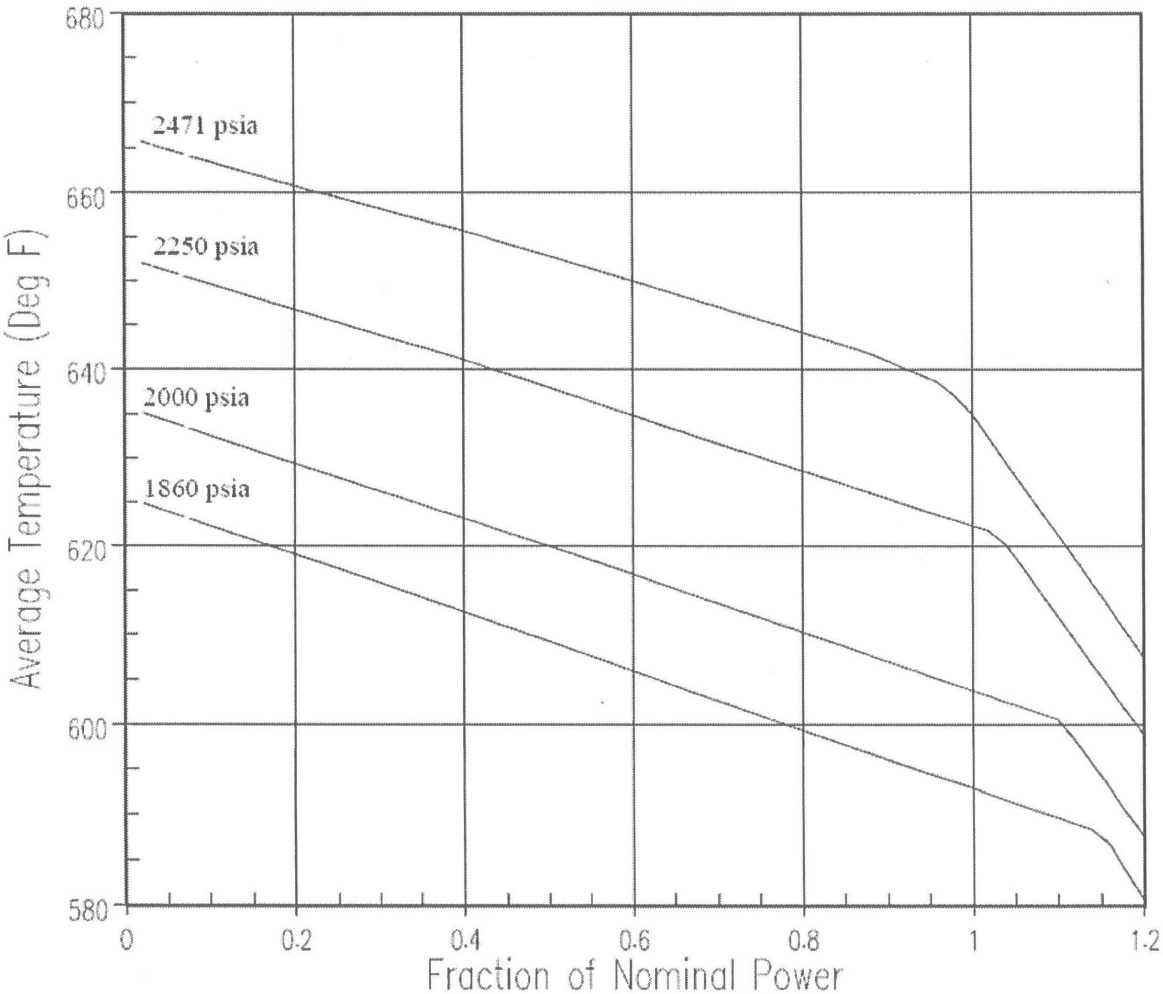


Figure 2.1.1: Reactor Core Limits

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

2.2 SHUTDOWN MARGIN (SDM)

The SDM limit for MODES 1, 2, 3, and 4 is:

2.2.1 The SDM shall be greater than or equal to 1.3% $\Delta k/k$ (LCOs 3.1.1, 3.1.4, 3.1.5, 3.1.6, 3.1.8, 3.3.9; TRM TLCOs 3.1.b, 3.1.d, 3.1.f, 3.1.h, and 3.1.j).

The SDM limit for MODE 5 is:

2.2.2 SDM shall be greater than or equal to 1.3% $\Delta k/k$ (LCO 3.1.1, LCO 3.3.9; TRM TLCOs 3.1.i and 3.1.j).

2.3 Moderator Temperature Coefficient (MTC) (LCO 3.1.3)

The Moderator Temperature Coefficient (MTC) limits are:

2.3.1 The BOL/ARO/HZP-MTC upper limit shall be $+2.097 \times 10^{-5}$ $\Delta k/k/°F$.

2.3.2 The EOL/ARO/HFP-MTC lower limit shall be -4.6×10^{-4} $\Delta k/k/°F$.

2.3.3 The EOL/ARO/HFP-MTC Surveillance limit at 300 ppm shall be -3.7×10^{-4} $\Delta k/k/°F$.

2.3.4 The EOL/ARO/HFP-MTC Surveillance limit at 60 ppm shall be -4.3×10^{-4} $\Delta k/k/°F$.

where: BOL stands for Beginning of Cycle Life
ARO stands for All Rods Out
HZP stands for Hot Zero Thermal Power
EOL stands for End of Cycle Life
HFP stands for Hot Full Thermal Power

2.4 Shutdown Bank Insertion Limits (LCO 3.1.5)

2.4.1 All shutdown banks shall be fully withdrawn to at least 224 steps.

2.5 Control Bank Insertion Limits (LCO 3.1.6)

2.5.1 The control banks, with Bank A greater than or equal to 224 steps, shall be limited in physical insertion as shown in Figure 2.5.1.

2.5.2 Each control bank shall be considered fully withdrawn from the core at greater than or equal to 224 steps.

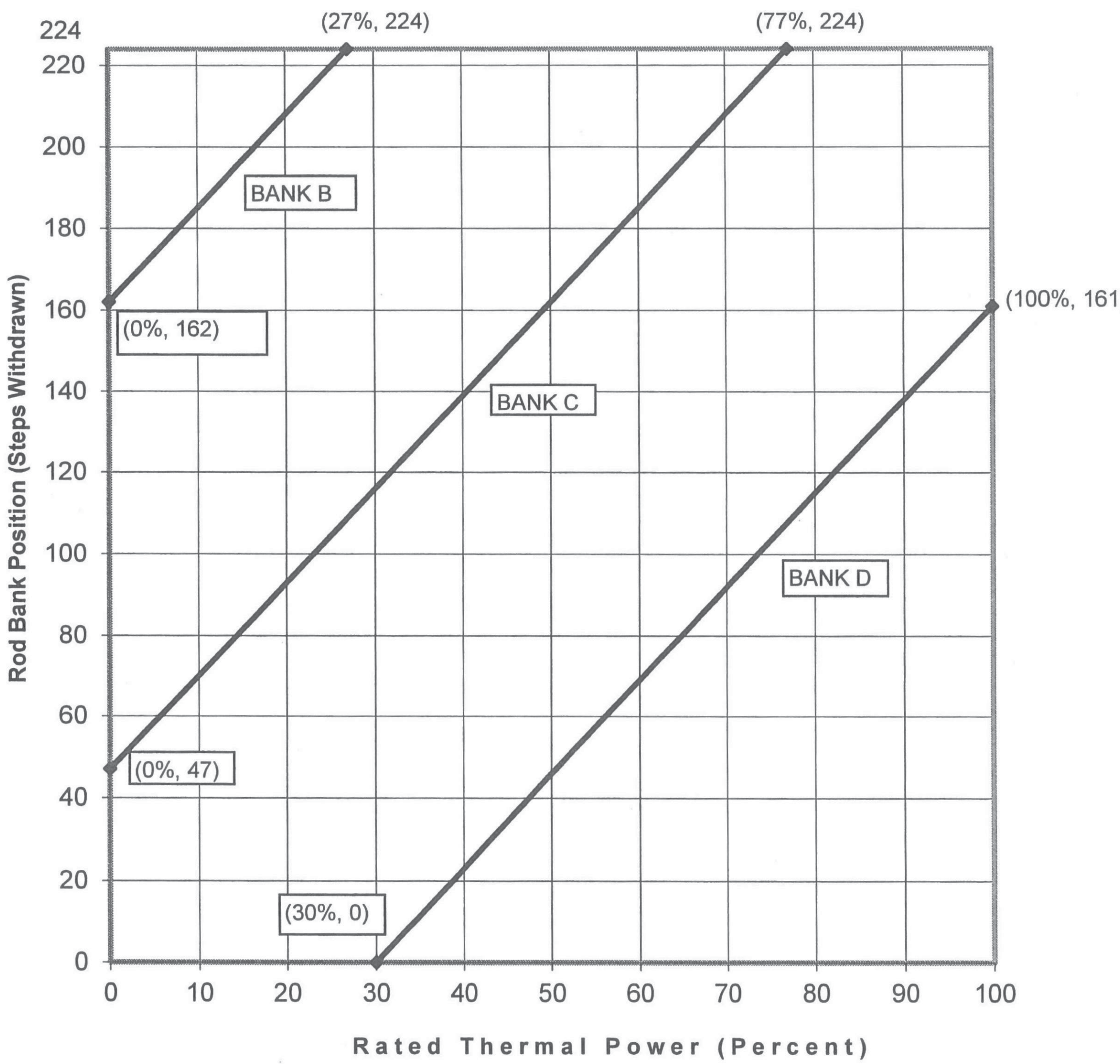
2.5.3 The control banks shall be operated in sequence by withdrawal of Bank A, Bank B, Bank C and Bank D. The control banks shall be sequenced in reverse order upon insertion.

2.5.4 Each control bank not fully withdrawn from the core shall be operated with the following overlap limits as a function of park position:

Park Position (step)	Overlap Limit (step)
228	113

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

Figure 2.5.1:
Control Bank Insertion Limits Versus Percent Rated Thermal Power



The bank position is given as follows:

Control Bank D: (161/70) * (P-100) + 161 (for 30 ≤ P ≤ 100)

Where P is defined as the core power (in percent).

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

2.6 Heat Flux Hot Channel Factor ($F_Q(Z)$) (LCO 3.2.1)

2.6.1 Total Peaking Factor:

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5} x K(Z) \quad \text{for } P \leq 0.5$$

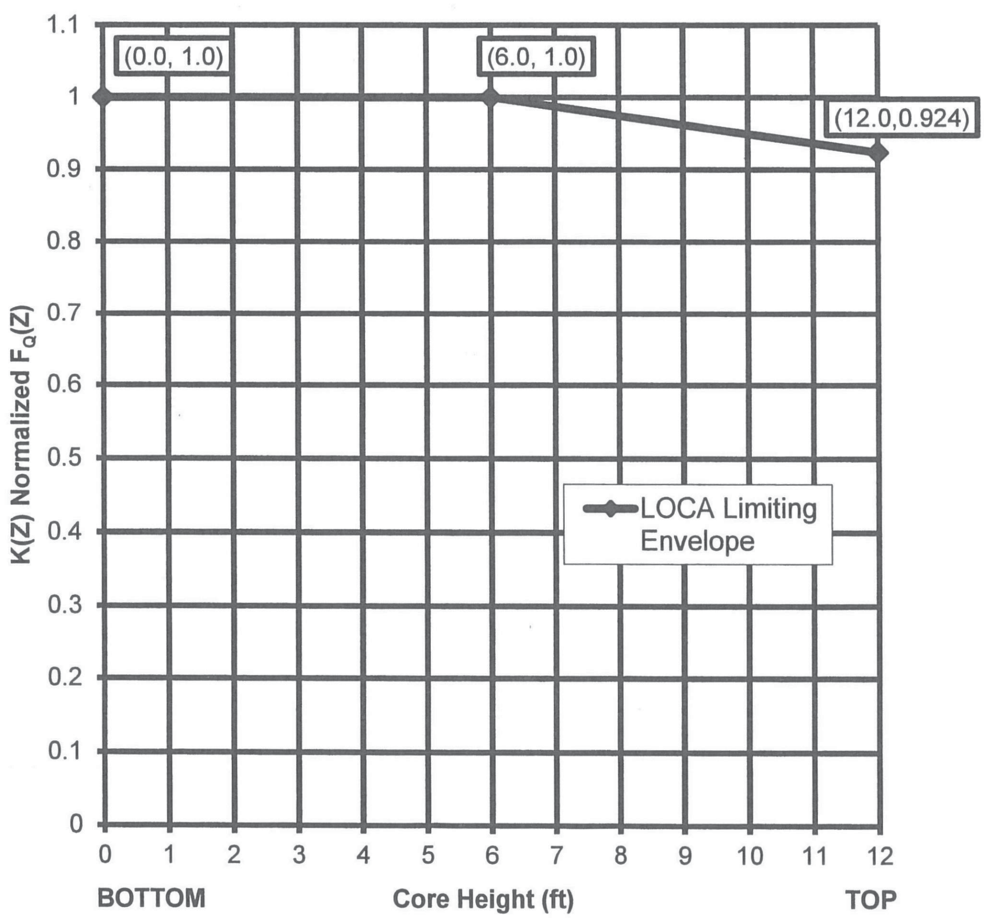
$$F_Q(Z) \leq \frac{F_Q^{RTP}}{P} x K(Z) \quad \text{for } P > 0.5$$

where: P = the ratio of THERMAL POWER to RATED THERMAL POWER

F_Q^{RTP} = 2.60

K(Z) is provided in Figure 2.6.1.

Figure 2.6.1
K(Z) - Normalized $F_Q(Z)$ as a Function of Core Height



CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

2.6.2 W(Z) Values:

a) When the Power Distribution Monitoring System (PDMS) is OPERABLE, W(Z) = 1.00000 for all axial points.

b) When PDMS is inoperable, W(Z) is provided as:

1) Table 2.6.2.a are the normal operation W(Z) values that correspond to the NORMAL AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits provided in Figure 2.8.1.a. The Normal AFD Acceptable Operation Limits may be invoked at any time and must be used with the corresponding W(Z) values.

2) Table 2.6.2.b are the Expanded normal operation W(Z) values that correspond to the EXPANDED AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits provided in Figure 2.8.1.b. The Expanded AFD Acceptable Operation Limits may be invoked at any time and must be used with the corresponding W(Z) values.

Table 2.6.2.c shows the $F^C_Q(z)$ penalty factors that are greater than 2% per 31 Effective Full Power Days (EFPD). These values shall be used to increase the $F^W_Q(z)$ as per Surveillance Requirement 3.2.1.2. A 2% penalty factor shall be used at all cycle burnups that are outside the range of Table 2.6.2.c.

2.6.3 Uncertainty:

The uncertainty, U_{FQ}, to be applied to the Heat Flux Hot Channel Factor $F_Q(Z)$ shall be calculated by the following formula

$$U_{FQ} = U_{qu} \bullet U_e$$

where:

U_{qu} = Base F_Q measurement uncertainty = 1.05 when PDMS is inoperable
(U_{qu} is defined by PDMS when OPERABLE.)
U_e = Engineering uncertainty factor = 1.03

2.6.4 PDMS Alarms:

$F_Q(Z)$ Warning Setpoint = 2% $F_Q(Z)$ Margin
$F_Q(Z)$ Alarm Setpoint = 0% $F_Q(Z)$ Margin

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

Table 2.6.2.a

W(Z) versus Core Height for Normal AFD Acceptable Operation Limits in Figure 2.8.1.a
(Top and Bottom 8% Excluded per Byron SR 3.2.1.2 Bases)

Height (feet)	150 MWD/MTU	4000 MWD/MTU	14000 MWD/MTU	20000 MWD/MTU
0.00 (core bottom)	1.2785	1.3690	1.2443	1.1921
0.20	1.2621	1.3361	1.2220	1.1704
0.40	1.2515	1.3235	1.2118	1.1619
0.60	1.2403	1.3093	1.1991	1.1593
0.80	1.2055	1.2593	1.1768	1.1653
1.00	1.1943	1.2425	1.1695	1.1627
1.20	1.1810	1.2232	1.1656	1.1532
1.40	1.1853	1.2056	1.1615	1.1496
1.60	1.1745	1.1857	1.1556	1.1418
1.80	1.1690	1.1750	1.1515	1.1350
2.00	1.1640	1.1690	1.1464	1.1278
2.20	1.1570	1.1610	1.1390	1.1182
2.40	1.1510	1.1530	1.1331	1.1093
2.60	1.1440	1.1440	1.1257	1.0975
2.80	1.1370	1.1370	1.1224	1.0898
3.00	1.1311	1.1330	1.1202	1.0930
3.20	1.1298	1.1280	1.1171	1.1021
3.40	1.1285	1.1225	1.1139	1.1112
3.60	1.1261	1.1207	1.1109	1.1194
3.80	1.1236	1.1188	1.1149	1.1316
4.00	1.1200	1.1169	1.1232	1.1454
4.20	1.1159	1.1137	1.1319	1.1596
4.40	1.1144	1.1104	1.1389	1.1702
4.60	1.1120	1.1060	1.1448	1.1812
4.80	1.1096	1.1020	1.1491	1.1895
5.00	1.1080	1.0970	1.1532	1.1957
5.20	1.1046	1.0933	1.1540	1.2012
5.40	1.1020	1.0915	1.1556	1.2056
5.60	1.0978	1.0983	1.1643	1.2243
5.80	1.1056	1.1061	1.1799	1.2418
6.00	1.1124	1.1139	1.1925	1.2555
6.20	1.1173	1.1207	1.2031	1.2680
6.40	1.1222	1.1256	1.2109	1.2757
6.60	1.1290	1.1305	1.2156	1.2784
6.80	1.1377	1.1338	1.2184	1.2792
7.00	1.1436	1.1380	1.2182	1.2780
7.20	1.1484	1.1433	1.2151	1.2708
7.40	1.1550	1.1480	1.2091	1.2628
7.60	1.1618	1.1508	1.2001	1.2488
7.80	1.1681	1.1582	1.1903	1.2368
8.00	1.1734	1.1646	1.1842	1.2220
8.20	1.1767	1.1690	1.1733	1.2022
8.40	1.1796	1.1684	1.1654	1.1942
8.60	1.1871	1.1730	1.1601	1.1861
8.80	1.1934	1.1786	1.1631	1.1788
9.00	1.1991	1.1870	1.1653	1.1829
9.20	1.2025	1.1963	1.1661	1.1860
9.40	1.2069	1.2121	1.1738	1.2179
9.60	1.2256	1.2327	1.2020	1.2635
9.80	1.2439	1.2525	1.2360	1.3051
10.00	1.2610	1.2707	1.2660	1.3447
10.20	1.2680	1.2871	1.2940	1.3794
10.40	1.2620	1.3029	1.3120	1.4121
10.60	1.2287	1.3165	1.3270	1.4338
10.80	1.2267	1.3312	1.3320	1.4556
11.00	1.2545	1.3437	1.3310	1.4654
11.20	1.2827	1.3555	1.3390	1.4583
11.40	1.2873	1.3516	1.3235	1.4582
11.60	1.2895	1.3568	1.2985	1.4282
11.80	1.2943	1.3637	1.2864	1.4142
12.00 (core top)	1.3052	1.3794	1.2781	1.4049

Note: W(Z) values at 20000 MWD/MTU may be applied to cycle burnups greater than 20000 MWD/MTU to prevent W(Z) function extrapolation

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

Table 2.6.2.b

W(Z) versus Core Height for Expanded AFD Acceptable Operation Limits in Figure 2.8.1.b
(Top and Bottom 8% Excluded per Byron SR 3.2.1.2 Bases)

Height (feet)	150 MWD/MTU	4000 MWD/MTU	14000 MWD/MTU	20000 MWD/MTU
0.00 (core bottom)	1.4130	1.5187	1.3922	1.3093
0.20	1.3930	1.4792	1.3647	1.2921
0.40	1.3800	1.4639	1.3523	1.2885
0.60	1.3660	1.4470	1.3362	1.2840
0.80	1.3260	1.3892	1.3094	1.2885
1.00	1.3120	1.3691	1.2953	1.2840
1.20	1.2950	1.3455	1.2695	1.2710
1.40	1.2990	1.3250	1.2572	1.2656
1.60	1.2850	1.3006	1.2411	1.2553
1.80	1.2740	1.2795	1.2279	1.2461
2.00	1.2630	1.2609	1.2206	1.2367
2.20	1.2460	1.2407	1.2120	1.2237
2.40	1.2320	1.2212	1.2042	1.2116
2.60	1.2140	1.2052	1.1941	1.1958
2.80	1.1990	1.2016	1.1883	1.1818
3.00	1.1834	1.1973	1.1820	1.1668
3.20	1.1753	1.1912	1.1728	1.1500
3.40	1.1689	1.1859	1.1646	1.1536
3.60	1.1613	1.1778	1.1574	1.1583
3.80	1.1538	1.1707	1.1569	1.1617
4.00	1.1462	1.1634	1.1556	1.1646
4.20	1.1369	1.1535	1.1528	1.1663
4.40	1.1288	1.1444	1.1492	1.1718
4.60	1.1177	1.1335	1.1448	1.1828
4.80	1.1096	1.1234	1.1491	1.1911
5.00	1.1080	1.1133	1.1532	1.1972
5.20	1.1046	1.1007	1.1540	1.2018
5.40	1.1020	1.0915	1.1556	1.2056
5.60	1.0978	1.0983	1.1643	1.2243
5.80	1.1056	1.1061	1.1799	1.2418
6.00	1.1124	1.1139	1.1925	1.2555
6.20	1.1173	1.1207	1.2031	1.2680
6.40	1.1222	1.1256	1.2109	1.2757
6.60	1.1290	1.1305	1.2156	1.2784
6.80	1.1377	1.1338	1.2184	1.2792
7.00	1.1436	1.1380	1.2182	1.2780
7.20	1.1484	1.1433	1.2151	1.2708
7.40	1.1550	1.1480	1.2091	1.2628
7.60	1.1618	1.1508	1.2001	1.2488
7.80	1.1681	1.1582	1.1903	1.2368
8.00	1.1734	1.1646	1.1842	1.2220
8.20	1.1767	1.1690	1.1733	1.2022
8.40	1.1796	1.1684	1.1654	1.1942
8.60	1.1871	1.1730	1.1601	1.1861
8.80	1.1934	1.1786	1.1631	1.1788
9.00	1.1991	1.1870	1.1653	1.1829
9.20	1.2025	1.1963	1.1661	1.1860
9.40	1.2069	1.2121	1.1738	1.2179
9.60	1.2256	1.2327	1.2020	1.2635
9.80	1.2439	1.2525	1.2360	1.3051
10.00	1.2610	1.2707	1.2660	1.3447
10.20	1.2680	1.2871	1.2940	1.3794
10.40	1.2620	1.3029	1.3120	1.4121
10.60	1.2287	1.3165	1.3270	1.4338
10.80	1.2267	1.3312	1.3320	1.4556
11.00	1.2545	1.3437	1.3310	1.4654
11.20	1.2827	1.3555	1.3390	1.4583
11.40	1.2873	1.3516	1.3235	1.4582
11.60	1.2895	1.3568	1.2985	1.4282
11.80	1.2943	1.3637	1.2864	1.4142
12.00 (core top)	1.3052	1.3794	1.2781	1.4049

Note: W(Z) values at 20000 MWD/MTU may be applied to cycle burnups greater than 20000 MWD/MTU to prevent W(Z) function extrapolation

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

Table 2.6.2.c
Penalty Factors in Excess of 2% per 31 EFPD

Cycle Burnup (MWD/MTU)	Penalty Factor $F^C_Q(z)$
0	1.0200
150	1.0500
500	1.0620
750	1.0640
1000	1.0630
1500	1.0500
2000	1.0350
2500	1.0210
3000	1.0200
9900	1.0200
10250	1.0242
10680	1.0236
12000	1.0255
14000	1.0222
15000	1.0200
17500	1.0200
17750	1.0211
18000	1.0210
18500	1.0205
19000	1.0200

Notes:

Linear interpolation is adequate for intermediate cycle burnups.

All cycle burnups outside the range of Table 2.6.2.c shall use a 2% penalty factor for compliance with the 3.2.1.2 Surveillance Requirements.

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

2.7 Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$) (LCO 3.2.2)

2.7.1 $F^N_{\Delta H} \leq F^{RTP}_{\Delta H}[1.0 + PF_{\Delta H}(1.0 - P)]$

where: P = the ratio of THERMAL POWER to RATED THERMAL POWER (RTP)
$F^{RTP}_{\Delta H} = 1.70$
$PF_{\Delta H} = 0.3$

2.7.2 Uncertainty:

The uncertainty, $U_{F\Delta H}$, to be applied to the Nuclear Enthalpy Rise Hot Channel Factor $F^N_{\Delta H}$ shall be calculated by the following formula:

$U_{F\Delta H} = U_{F\Delta Hm}$

where:

$U_{F\Delta Hm}$ = Base $F^N_{\Delta H}$ measurement uncertainty = 1.04 when PDMS is inoperable
($U_{F\Delta Hm}$ is defined by PDMS when OPERABLE.)

2.7.3 PDMS Alarms:

$F^N_{\Delta H}$ Warning Setpoint = 2% $F^N_{\Delta H}$ Margin
$F^N_{\Delta H}$ Alarm Setpoint = 0% $F^N_{\Delta H}$ Margin

2.8 AXIAL FLUX DIFFERENCE (AFD) (LCO 3.2.3)

2.8.1 The AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits are provided in the Figures described below.

a) Figure 2.8.1.a is the Normal AFD Acceptable Operation Limits associated with the W(Z) values in Table 2.6.2.a. Prior to changing to Figure 2.8.1.a, confirm that the plant is within the specified AFD envelope.

b) Figure 2.8.1.b is the Expanded AFD Acceptable Operation Limits associated with the W(Z) values in Table 2.6.2.b.

2.9 Departure from Nucleate Boiling Ratio (DNBR) (LCO 3.2.5)

2.9.1 $DNBR_{APSL} \geq 1.563$

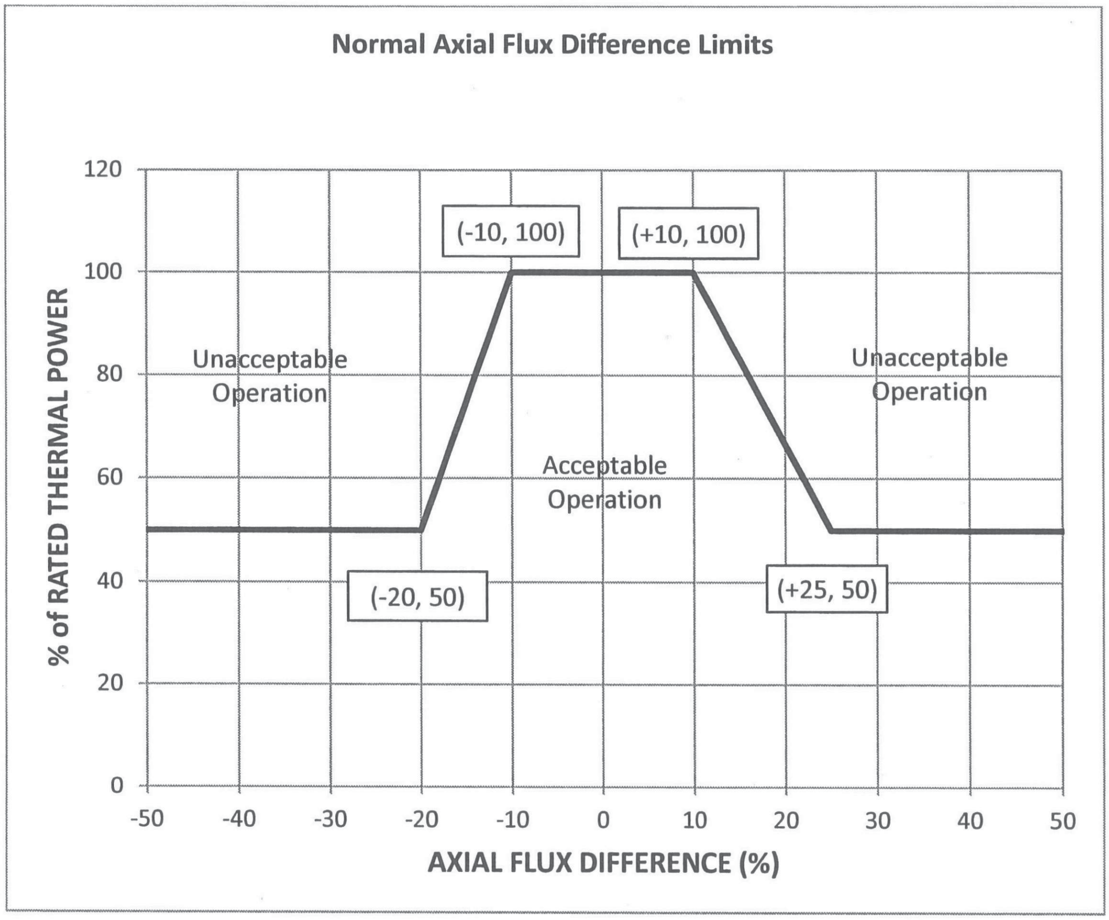
The Axial Power Shape Limiting DNBR ($DNBR_{APSL}$) is applicable with THERMAL POWER $\geq$ 50% RTP when PDMS is OPERABLE.

2.9.2 PDMS Alarms:

DNBR Warning Setpoint = 2% DNBR Margin
DNBR Alarm Setpoint = 0% DNBR Margin

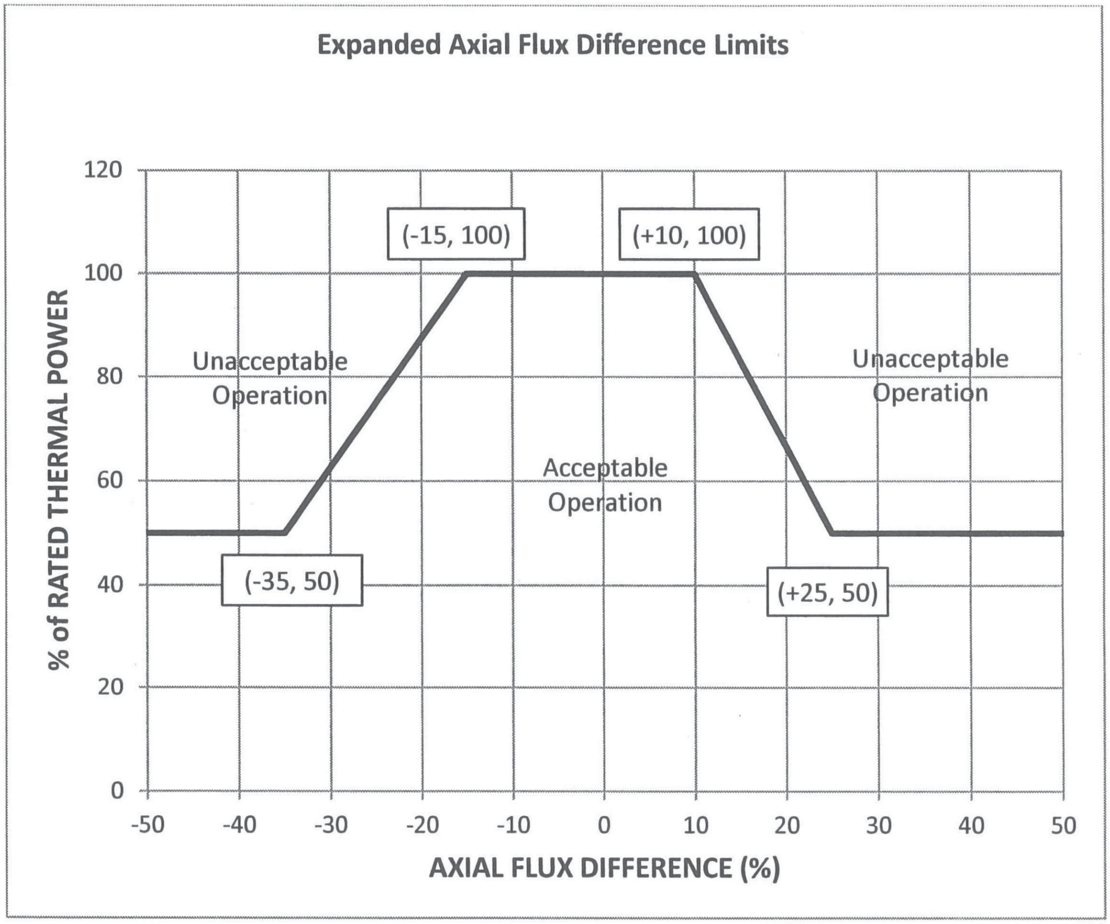
CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

Figure 2.8.1.a:
Normal Axial Flux Difference Limits
as a Function of Rated Thermal Power



CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

Figure 2.8.1.b:
Expanded Axial Flux Difference Limits
as a Function of Rated Thermal Power



CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

2.10 Reactor Trip System (RTS) Instrumentation (LCO 3.3.1) - Overtemperature ΔT Setpoint Parameter Values

2.10.1 The Overtemperature ΔT reactor trip setpoint K_1 shall be equal to 1.325.

2.10.2 The Overtemperature ΔT reactor trip setpoint T_{avg} coefficient K_2 shall be equal to 0.0297 / °F.

2.10.3 The Overtemperature ΔT reactor trip setpoint pressure coefficient K_3 shall be equal to 0.00135 / psi.

2.10.4 The nominal T_{avg} at RTP (indicated) T' shall be less than or equal to 588.0 °F.

2.10.5 The nominal RCS operating pressure (indicated) P' shall be equal to 2235 psig.

2.10.6 The measured reactor vessel ΔT lead/lag time constant τ_1 shall be equal to 8 sec.

2.10.7 The measured reactor vessel ΔT lead/lag time constant τ_2 shall be equal to 3 sec.

2.10.8 The measured reactor vessel ΔT lag time constant τ_3 shall be less than or equal to 2 sec.

2.10.9 The measured reactor vessel average temperature lead/lag time constant τ_4 shall be equal to 33 sec.

2.10.10 The measured reactor vessel average temperature lead/lag time constant τ_5 shall be equal to 4 sec.

2.10.11 The measured reactor vessel average temperature lag time constant τ_6 shall be less than or equal to 2 sec.

2.10.12 The f_1 (ΔI) “positive” breakpoint shall be +10% ΔI.

2.10.13 The f_1 (ΔI) “negative” breakpoint shall be -18% ΔI.

2.10.14 The f_1 (ΔI) “positive” slope shall be +3.47% / % ΔI.

2.10.15 The f_1 (ΔI) “negative” slope shall be -2.61% / % ΔI.

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

2.11 Reactor Trip System (RTS) Instrumentation (LCO 3.3.1) - Overpower ΔT Setpoint Parameter Values

2.11.1 The Overpower ΔT reactor trip setpoint K_4 shall be equal to 1.072.

2.11.2 The Overpower ΔT reactor trip setpoint T_{avg} rate/lag coefficient K_5 shall be equal to 0.02 / °F for increasing T_{avg}.

2.11.3 The Overpower ΔT reactor trip setpoint T_{avg} rate/lag coefficient K_5 shall be equal to 0 / °F for decreasing T_{avg}.

2.11.4 The Overpower ΔT reactor trip setpoint T_{avg} heatup coefficient K_6 shall be equal to 0.00245 / °F when $T > T''$.

2.11.5 The Overpower ΔT reactor trip setpoint T_{avg} heatup coefficient K_6 shall be equal to 0 / °F when $T \leq T''$.

2.11.6 The nominal T_{avg} at RTP (indicated) T'' shall be less than or equal to 588.0 °F.

2.11.7 The measured reactor vessel ΔT lead/lag time constant τ_1 shall be equal to 8 sec.

2.11.8 The measured reactor vessel ΔT lead/lag time constant τ_2 shall be equal to 3 sec.

2.11.9 The measured reactor vessel ΔT lag time constant τ_3 shall be less than or equal to 2 sec.

2.11.10 The measured reactor vessel average temperature lag time constant τ_6 shall be less than or equal to 2 sec.

2.11.11 The measured reactor vessel average temperature rate/lag time constant τ_7 shall be equal to 10 sec.

2.11.12 The f_2 (ΔI) “positive” breakpoint shall be 0 for all ΔI.

2.11.13 The f_2 (ΔI) “negative” breakpoint shall be 0 for all ΔI.

2.11.14 The f_2 (ΔI) “positive” slope shall be 0 for all ΔI.

2.11.15 The f_2 (ΔI) “negative” slope shall be 0 for all ΔI.

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 1 CYCLE 24

2.12 Reactor Coolant System (RCS) Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits (LCO 3.4.1)

2.12.1 The pressurizer pressure shall be greater than or equal to 2209 psig.

2.12.2 The RCS average temperature (T_{avg}) shall be less than or equal to 593.1 °F.

2.12.3 The RCS total flow rate shall be greater than or equal to 386,000 gpm.

2.13 Boron Concentration

2.13.1 The refueling boron concentration shall be greater than or equal to the applicable value given in the Table below (LCO 3.9.1). The reported "prior to initial criticality" value also bounds the end-of-cycle requirements for the previous cycle.

2.13.2 To maintain keff ≤ 0.987 with all shutdown and control rods fully withdrawn in MODES 3, 4, or 5 (TRM TLCO 3.1.g Required Action B.2 and TRM TLCO 3.1.k.2), the Reactor Coolant System boron concentration shall be greater than or equal to the applicable value given in the Table below.

COLR Section	Conditions	Boron Concentration (ppm)
2.13.1	a) prior to initial criticality	1734
	b) for cycle burnups ≥ 0 MWD/MTU and < 16000 MWD/MTU	1850
	c) for cycle burnups ≥ 16000 MWD/MTU	1447
2.13.2	a) prior to initial criticality	1837
	b) for cycle burnups ≥ 0 MWD/MTU and < 16000 MWD/MTU	2081
	c) for cycle burnups ≥ 16000 MWD/MTU	1583

CORE OPERATING LIMITS REPORT (COLR)

FOR

BYRON UNIT 2 CYCLE 23

EXELON TRACKING ID:

COLR BYRON 2 REVISION 12

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

1.0 CORE OPERATING LIMITS REPORT

This Core Operating Limits Report (COLR) for Byron Station Unit 2 Cycle 23 has been prepared in accordance with the requirements of Technical Specification Safety Limits and Limiting Conditions for Operation (LCOs) 5.6.5 (ITS).

The Technical Specification Safety Limits and Limiting Conditions for Operation (LCOs) affected by this report are listed below:

SL	2.1.1	Reactor Core Safety Limits (SLs)
LCO	3.1.1	SHUTDOWN MARGIN (SDM)
LCO	3.1.3	Moderator Temperature Coefficient (MTC)
LCO	3.1.4	Rod Group Alignment Limits
LCO	3.1.5	Shutdown Bank Insertion Limits
LCO	3.1.6	Control Bank Insertion Limits
LCO	3.1.8	PHYSICS TESTS Exceptions – MODE 2
LCO	3.2.1	Heat Flux Hot Channel Factor ($F_Q(Z)$)
LCO	3.2.2	Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$)
LCO	3.2.3	AXIAL FLUX DIFFERENCE (AFD)
LCO	3.2.5	Departure from Nucleate Boiling Ratio (DNBR)
LCO	3.3.1	Reactor Trip System (RTS) Instrumentation
LCO	3.3.9	Boron Dilution Protection System (BDPS)
LCO	3.4.1	Reactor Coolant System (RCS) Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits
LCO	3.9.1	Boron Concentration

The portions of the Technical Requirements Manual (TRM) affected by this report are listed below:

TRM TLCO 3.1.b	Boration Flow Paths – Operating
TRM TLCO 3.1.d	Charging Pumps – Operating
TRM TLCO 3.1.f	Borated Water Sources – Operating
TRM TLCO 3.1.g	Position Indication System – Shutdown
TRM TLCO 3.1.h	Shutdown Margin (SDM) – MODE 1 and MODE 2 with keff ≥ 1.0
TRM TLCO 3.1.i	Shutdown Margin (SDM) – MODE 5
TRM TLCO 3.1.j	Shutdown and Control Rods
TRM TLCO 3.1.k	Position Indication System – Shutdown (Special Test Exception)

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

2.0 OPERATING LIMITS

The cycle-specific parameter limits for the specifications listed in Section 1.0 are presented in the following subsections. These limits are applicable for the entire cycle unless otherwise identified. These limits have been developed using the NRC-approved methodologies specified in Technical Specification 5.6.5.

2.1 Reactor Core Safety Limits (SLs) (SL 2.1.1)

2.1.1 In MODES 1 and 2, the combination of Thermal Power, Reactor Coolant System (RCS) highest loop average temperature, and pressurizer pressure shall not exceed the limits specified in Figure 2.1.1.

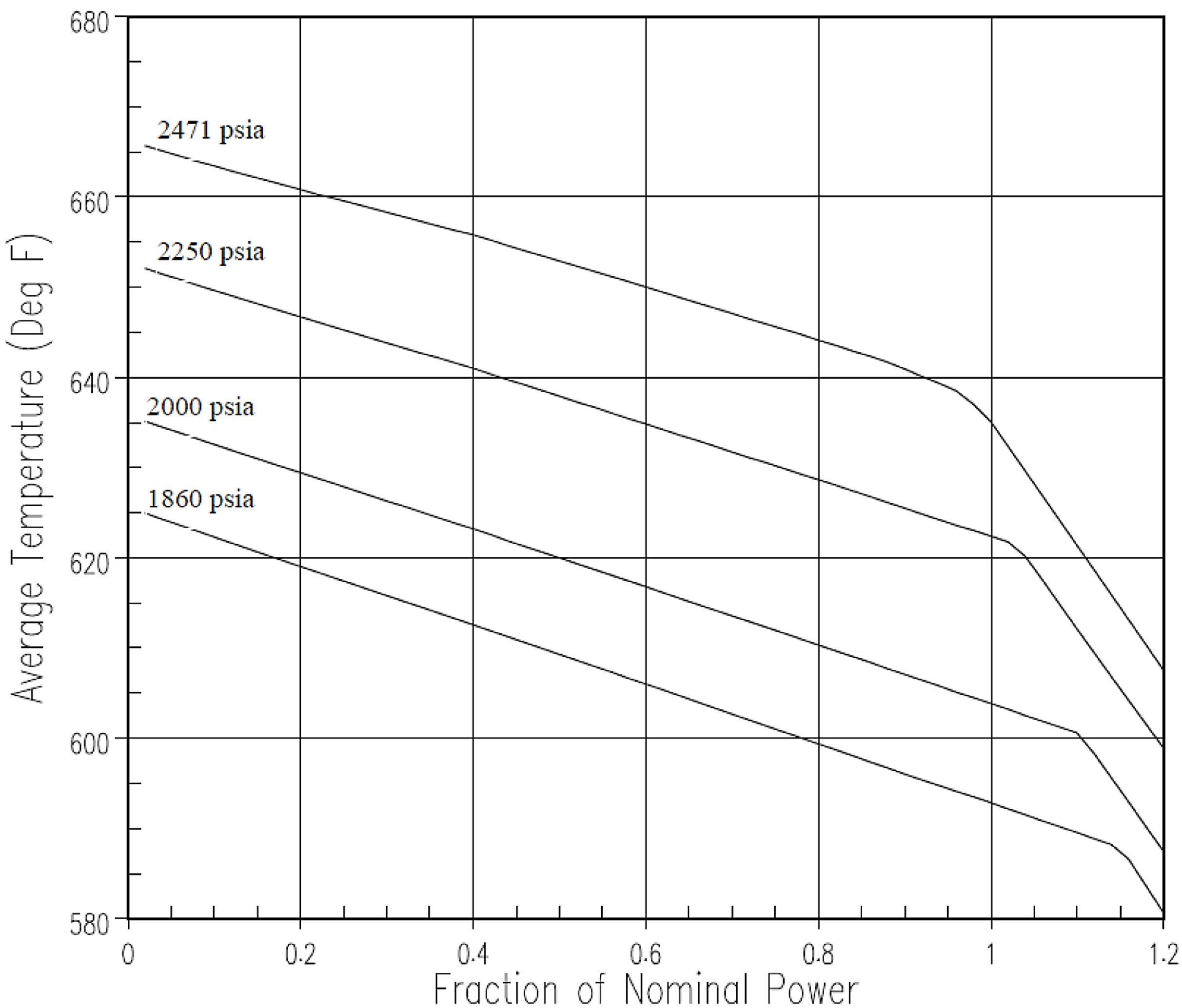


Figure 2.1.1: Reactor Core Limits

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

2.2 SHUTDOWN MARGIN (SDM)

The SDM limit for MODES 1, 2, 3, and 4 is:

2.2.1 The SDM shall be greater than or equal to 1.3% Δk/k (LCOs 3.1.1, 3.1.4, 3.1.5, 3.1.6, 3.1.8, 3.3.9; TRM TLCOs 3.1.b, 3.1.d, 3.1.f, 3.1.h, and 3.1.j).

The SDM limit for MODE 5 is:

2.2.2 SDM shall be greater than or equal to 1.3% Δk/k (LCO 3.1.1, LCO 3.3.9; TRM TLCOs 3.1.i and 3.1.j).

2.3 Moderator Temperature Coefficient (MTC) (LCO 3.1.3)

The Moderator Temperature Coefficient (MTC) limits are:

2.3.1 The BOL/ARO/HZP-MTC upper limit shall be +1.884 x 10^{-5} Δk/k/°F.

2.3.2 The EOL/ARO/HFP-MTC lower limit shall be -4.6 x 10^{-4} Δk/k/°F.

2.3.3 The EOL/ARO/HFP-MTC Surveillance limit at 300 ppm shall be -3.7 x 10^{-4} Δk/k/°F.

2.3.4 The EOL/ARO/HFP-MTC Surveillance limit at 60 ppm shall be -4.3 x 10^{-4} Δk/k/°F.

where: BOL stands for Beginning of Cycle Life
ARO stands for All Rods Out
HZP stands for Hot Zero Thermal Power
EOL stands for End of Cycle Life
HFP stands for Hot Full Thermal Power

2.4 Shutdown Bank Insertion Limits (LCO 3.1.5)

2.4.1 All shutdown banks shall be fully withdrawn to at least 224 steps.

2.5 Control Bank Insertion Limits (LCO 3.1.6)

2.5.1 The control banks, with Bank A greater than or equal to 224 steps, shall be limited in physical insertion as shown in Figure 2.5.1.

2.5.2 Each control bank shall be considered fully withdrawn from the core at greater than or equal to 224 steps.

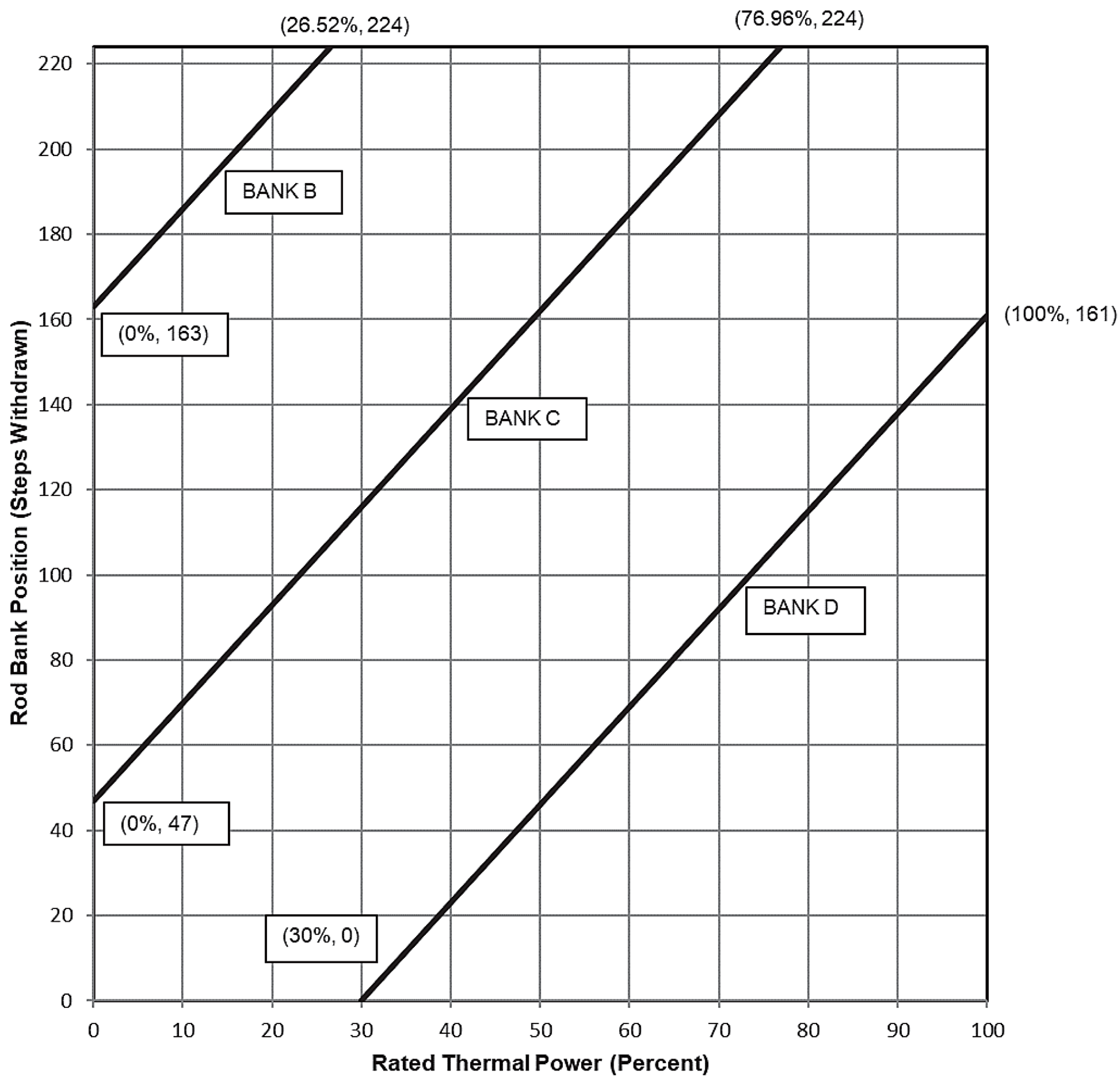
2.5.3 The control banks shall be operated in sequence by withdrawal of Bank A, Bank B, Bank C and Bank D. The control banks shall be sequenced in reverse order upon insertion.

2.5.4 Each control bank not fully withdrawn from the core shall be operated with the following overlap limits as a function of park position:

Park Position (step)	Overlap Limit (step)
231	115

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

Figure 2.5.1:
Control Bank Insertion Limits Versus Percent Rated Thermal Power



The bank position is given as follows:

Control Bank D: (161/70) * (P-100) + 161 (for 30 ≤ P ≤ 100)

Where P is defined as the core power (in percent).

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

2.6 Heat Flux Hot Channel Factor ($F_Q(Z)$) (LCO 3.2.1)

2.6.1 Total Peaking Factor:

$$F_Q(Z) \leq \frac{F_Q^{RTP}}{0.5} x K(Z) \quad \text{for } P \leq 0.5$$

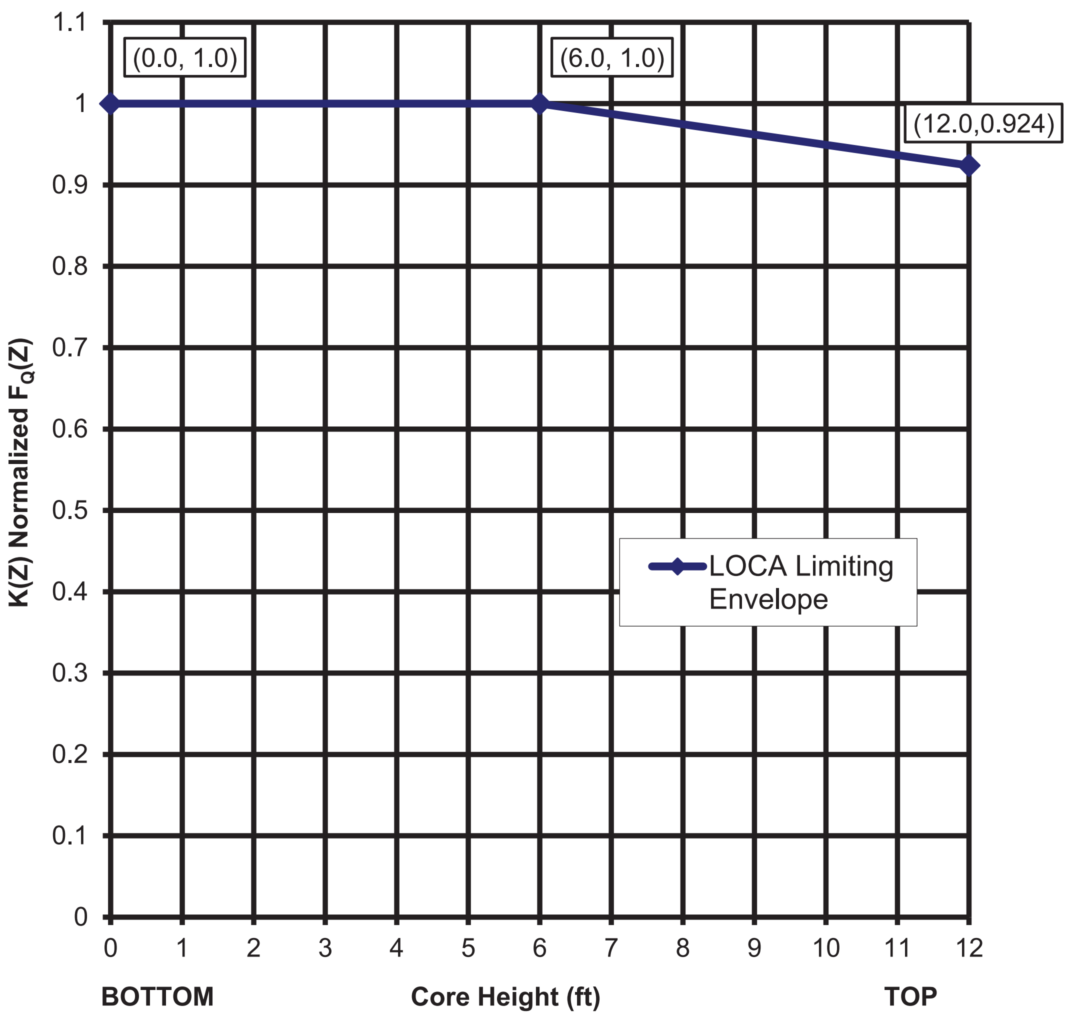
$$F_Q(Z) \leq \frac{F_Q^{RTP}}{P} x K(Z) \quad \text{for } P > 0.5$$

where: P = the ratio of THERMAL POWER to RATED THERMAL POWER

F_Q^{RTP} = 2.60

K(Z) is provided in Figure 2.6.1.

Figure 2.6.1
K(Z) - Normalized F_Q(Z) as a Function of Core Height



CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

2.6.2 W(Z) Values:

a) When the Power Distribution Monitoring System (PDMS) is OPERABLE, W(Z) = 1.00000 for all axial points.

b) When PDMS is inoperable, W(Z) is provided as:

1) Table 2.6.2.a are the normal operation W(Z) values that correspond to the NORMAL AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits provided in Figure 2.8.1.a. The Normal AFD Acceptable Operation Limits may be invoked at any time and must be used with the corresponding W(Z) values.

2) Table 2.6.2.b are the Expanded normal operation W(Z) values that correspond to the EXPANDED AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits provided in Figure 2.8.1.b. The Expanded AFD Acceptable Operation Limits may be invoked at any time and must be used with the corresponding W(Z) values.

Table 2.6.2.c shows the $F^C_Q(z)$ penalty factors that are greater than 2% per the allowable surveillance frequency. These values shall be used to increase the $F^W_Q(z)$ as per Surveillance Requirement 3.2.1.2. A 2% penalty factor shall be used at all cycle burnups that are outside the range of Table 2.6.2.c.

2.6.3 Uncertainty:

The uncertainty, U_{FQ}, to be applied to the Heat Flux Hot Channel Factor $F_Q(Z)$ shall be calculated by the following formula

$$U_{FQ} = U_{qu} \bullet U_e$$

where:

U_{qu} = Base F_Q measurement uncertainty = 1.05 when PDMS is inoperable
(U_{qu} is defined by PDMS when OPERABLE.)
U_e = Engineering uncertainty factor = 1.03

2.6.4 PDMS Alarms:

$F_Q(Z)$ Warning Setpoint = 2% $F_Q(Z)$ Margin
$F_Q(Z)$ Alarm Setpoint = 0% $F_Q(Z)$ Margin

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

Table 2.6.2.a

W(Z) versus Core Height for Normal AFD Acceptable Operation Limits in Figure 2.8.1.a
(Top and Bottom 8% Excluded per Byron SR 3.2.1.2 Bases)

Height (feet)	150 MWD/MTU	6000 MWD/MTU	14000 MWD/MTU	20000 MWD/MTU
0.00 (core bottom)	1.2231	1.3525	1.2371	1.2402
0.20	1.2062	1.3194	1.2149	1.2152
0.40	1.2005	1.3043	1.2071	1.2054
0.60	1.1786	1.2587	1.2020	1.1960
0.80	1.1633	1.2366	1.2029	1.1738
1.00	1.1536	1.2207	1.1988	1.1595
1.20	1.1498	1.2041	1.1929	1.1584
1.40	1.1465	1.2001	1.1878	1.1505
1.60	1.1423	1.1882	1.1801	1.1438
1.80	1.1380	1.1736	1.1740	1.1378
2.00	1.1330	1.1587	1.1669	1.1308
2.20	1.1267	1.1423	1.1575	1.1210
2.40	1.1206	1.1284	1.1488	1.1152
2.60	1.1163	1.1263	1.1366	1.1104
2.80	1.1172	1.1236	1.1268	1.1056
3.00	1.1171	1.1209	1.1218	1.1007
3.20	1.1170	1.1185	1.1164	1.1051
3.40	1.1160	1.1158	1.1151	1.1148
3.60	1.1139	1.1125	1.1139	1.1244
3.80	1.1126	1.1119	1.1162	1.1343
4.00	1.1132	1.1114	1.1202	1.1467
4.20	1.1157	1.1103	1.1271	1.1602
4.40	1.1163	1.1081	1.1353	1.1738
4.60	1.1179	1.1061	1.1416	1.1834
4.80	1.1175	1.1027	1.1467	1.1929
5.00	1.1172	1.0992	1.1505	1.2005
5.20	1.1149	1.0955	1.1524	1.2050
5.40	1.1126	1.0915	1.1547	1.2076
5.60	1.1096	1.0879	1.1543	1.2264
5.80	1.1156	1.0933	1.1579	1.2430
6.00	1.1225	1.1019	1.1716	1.2566
6.20	1.1274	1.1085	1.1852	1.2683
6.40	1.1323	1.1151	1.1949	1.2759
6.60	1.1353	1.1198	1.2015	1.2797
6.80	1.1373	1.1251	1.2043	1.2824
7.00	1.1400	1.1303	1.2052	1.2812
7.20	1.1469	1.1363	1.2031	1.2751
7.40	1.1552	1.1421	1.1991	1.2670
7.60	1.1621	1.1464	1.1921	1.2549
7.80	1.1680	1.1497	1.1881	1.2419
8.00	1.1709	1.1514	1.1830	1.2280
8.20	1.1738	1.1530	1.1731	1.2101
8.40	1.1814	1.1591	1.1662	1.2036
8.60	1.1898	1.1711	1.1573	1.1979
8.80	1.1977	1.1869	1.1555	1.1931
9.00	1.2040	1.2053	1.1606	1.1870
9.20	1.2154	1.2222	1.1652	1.1857
9.40	1.2306	1.2335	1.1723	1.2167
9.60	1.2454	1.2484	1.1780	1.2583
9.80	1.2594	1.2624	1.2100	1.2979
10.00	1.2730	1.2728	1.2390	1.3355
10.20	1.2848	1.2816	1.2650	1.3661
10.40	1.2968	1.2898	1.2810	1.3928
10.60	1.2903	1.3001	1.2910	1.4126
10.80	1.2757	1.3052	1.2970	1.4284
11.00	1.2723	1.3125	1.2990	1.4382
11.20	1.2980	1.3144	1.3020	1.4381
11.40	1.2848	1.3300	1.2924	1.4379
11.60	1.3004	1.3379	1.2723	1.4108
11.80	1.3025	1.3413	1.2602	1.3988
12.00 (core top)	1.3083	1.3576	1.2509	1.3915

Note: W(Z) values at 20000 MWD/MTU may be applied to cycle burnups greater than 20000 MWD/MTU to prevent W(Z) function extrapolation

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

Table 2.6.2.b
W(Z) versus Core Height for Expanded AFD Acceptable Operation Limits in Figure 2.8.1.b
(Top and Bottom 8% Excluded per Byron SR 3.2.1.2 Bases)

Height (feet)	**150 MWD/MTU**	**6000 MWD/MTU**	**14000 MWD/MTU**	**20000 MWD/MTU**
0.00 (core bottom)	1.3892	1.4948	1.3866	1.3265
0.20	1.3676	1.4563	1.3586	1.3045
0.40	1.3598	1.4385	1.3451	1.2950
0.60	1.3333	1.3851	1.3316	1.2871
0.80	1.3128	1.3603	1.3309	1.2876
1.00	1.2991	1.3416	1.3156	1.2833
1.20	1.2816	1.3219	1.2942	1.2757
1.40	1.2669	1.3180	1.2836	1.2695
1.60	1.2503	1.3023	1.2702	1.2602
1.80	1.2366	1.2835	1.2586	1.2518
2.00	1.2259	1.2638	1.2460	1.2424
2.20	1.2113	1.2438	1.2297	1.2293
2.40	1.1976	1.2269	1.2177	1.2179
2.60	1.1850	1.2059	1.2048	1.2028
2.80	1.1762	1.1921	1.1977	1.1886
3.00	1.1669	1.1876	1.1914	1.1745
3.20	1.1607	1.1805	1.1829	1.1605
3.40	1.1555	1.1750	1.1753	1.1604
3.60	1.1493	1.1694	1.1658	1.1648
3.80	1.1431	1.1643	1.1570	1.1682
4.00	1.1368	1.1578	1.1509	1.1713
4.20	1.1287	1.1497	1.1476	1.1733
4.40	1.1215	1.1411	1.1437	1.1799
4.60	1.1217	1.1330	1.1416	1.1883
4.80	1.1202	1.1224	1.1467	1.1963
5.00	1.1186	1.1129	1.1505	1.2021
5.20	1.1155	1.1028	1.1524	1.2052
5.40	1.1128	1.0915	1.1547	1.2076
5.60	1.1096	1.0879	1.1543	1.2264
5.80	1.1156	1.0933	1.1579	1.2430
6.00	1.1225	1.1019	1.1716	1.2566
6.20	1.1274	1.1085	1.1852	1.2683
6.40	1.1323	1.1151	1.1949	1.2759
6.60	1.1353	1.1198	1.2015	1.2797
6.80	1.1373	1.1251	1.2043	1.2824
7.00	1.1400	1.1303	1.2052	1.2812
7.20	1.1469	1.1363	1.2031	1.2751
7.40	1.1552	1.1421	1.1991	1.2670
7.60	1.1621	1.1464	1.1921	1.2549
7.80	1.1680	1.1497	1.1881	1.2419
8.00	1.1709	1.1514	1.1830	1.2280
8.20	1.1738	1.1530	1.1731	1.2101
8.40	1.1814	1.1591	1.1662	1.2036
8.60	1.1898	1.1711	1.1573	1.1979
8.80	1.1977	1.1869	1.1555	1.1931
9.00	1.2040	1.2053	1.1606	1.1870
9.20	1.2154	1.2222	1.1652	1.1857
9.40	1.2306	1.2335	1.1723	1.2167
9.60	1.2454	1.2484	1.1780	1.2583
9.80	1.2594	1.2624	1.2100	1.2979
10.00	1.2730	1.2728	1.2390	1.3355
10.20	1.2848	1.2816	1.2650	1.3661
10.40	1.2968	1.2898	1.2810	1.3928
10.60	1.2903	1.3001	1.2910	1.4126
10.80	1.2757	1.3052	1.2970	1.4284
11.00	1.2723	1.3125	1.2990	1.4382
11.20	1.2980	1.3144	1.3020	1.4381
11.40	1.2848	1.3300	1.2924	1.4379
11.60	1.3004	1.3379	1.2723	1.4108
11.80	1.3025	1.3413	1.2602	1.3988
12.00 (core top)	1.3083	1.3576	1.2509	1.3915

Note: W(Z) values at 20000 MWD/MTU may be applied to cycle burnups greater than 20000 MWD/MTU to prevent W(Z) function extrapolation

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

Table 2.6.2.c
Penalty Factors in Excess of 2%

Cycle Burnup (MWD/MTU)	Penalty Factor $F^C_Q(z)$
0	1.0200
150	1.0650
371	1.0735
592	1.0750
813	1.0740
1034	1.0700
1696	1.0500
2579	1.0225
3242	1.0200
10530	1.0200
10971	1.0270
11413	1.0320
13183	1.0335
13624	1.0315
14508	1.0270
16051	1.0232
18259	1.0310
18484	1.0307
18926	1.0290
19809	1.0200

Notes:

Linear interpolation is adequate for intermediate cycle burnups.

All cycle burnups outside the range of Table 2.6.2.c shall use a 2% penalty factor for compliance with the 3.2.1.2 Surveillance Requirements.

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

2.7 Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$) (LCO 3.2.2)

2.7.1 $F^N_{\Delta H} \leq F^{RTP}_{\Delta H}[1.0 + PF_{\Delta H}(1.0 - P)]$

where: P = the ratio of THERMAL POWER to RATED THERMAL POWER (RTP)
$F^{RTP}_{\Delta H} = 1.70$
$PF_{\Delta H} = 0.3$

2.7.2 Uncertainty:

The uncertainty, $U_{F\Delta H}$, to be applied to the Nuclear Enthalpy Rise Hot Channel Factor $F^N_{\Delta H}$ shall be calculated by the following formula:

$U_{F\Delta H} = U_{F\Delta Hm}$

where:

$U_{F\Delta Hm}$ = Base $F^N_{\Delta H}$ measurement uncertainty = 1.04 when PDMS is inoperable
($U_{F\Delta Hm}$ is defined by PDMS when OPERABLE.)

2.7.3 PDMS Alarms:

$F^N_{\Delta H}$ Warning Setpoint = 2% $F^N_{\Delta H}$ Margin
$F^N_{\Delta H}$ Alarm Setpoint = 0% $F^N_{\Delta H}$ Margin

2.8 AXIAL FLUX DIFFERENCE (AFD) (LCO 3.2.3)

2.8.1 The AXIAL FLUX DIFFERENCE (AFD) Acceptable Operation Limits are provided in the Figures described below.

a) Figure 2.8.1.a is the Normal AFD Acceptable Operation Limits associated with the W(Z) values in Table 2.6.2.a. Prior to changing to Figure 2.8.1.a, confirm that the plant is within the specified AFD envelope.

b) Figure 2.8.1.b is the Expanded AFD Acceptable Operation Limits associated with the W(Z) values in Table 2.6.2.b.

2.9 Departure from Nucleate Boiling Ratio (DNBR) (LCO 3.2.5)

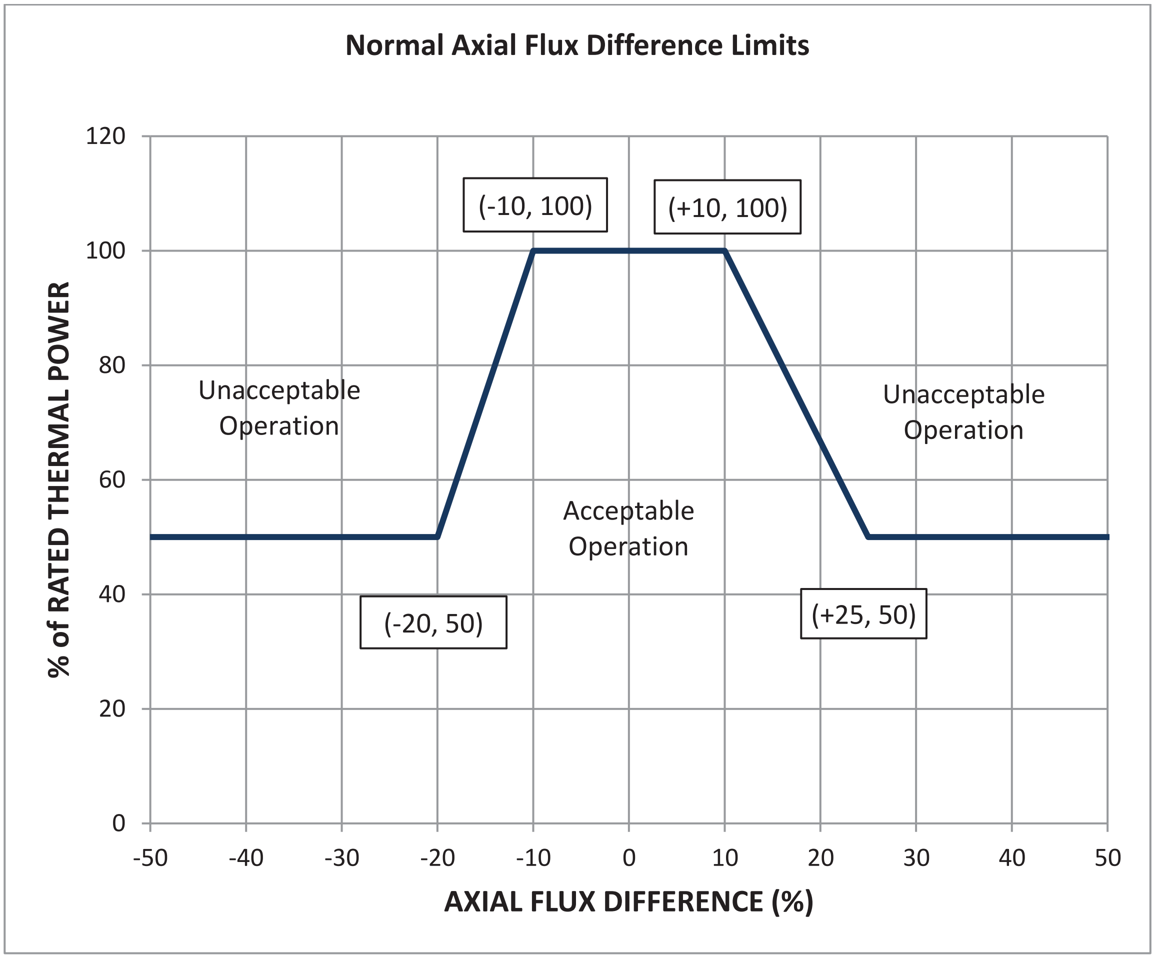
2.9.1 $DNBR_{APSL} \geq 1.563$

The Axial Power Shape Limiting DNBR ($DNBR_{APSL}$) is applicable with THERMAL POWER ≥ 50% RTP when PDMS is OPERABLE.

2.9.2 PDMS Alarms:

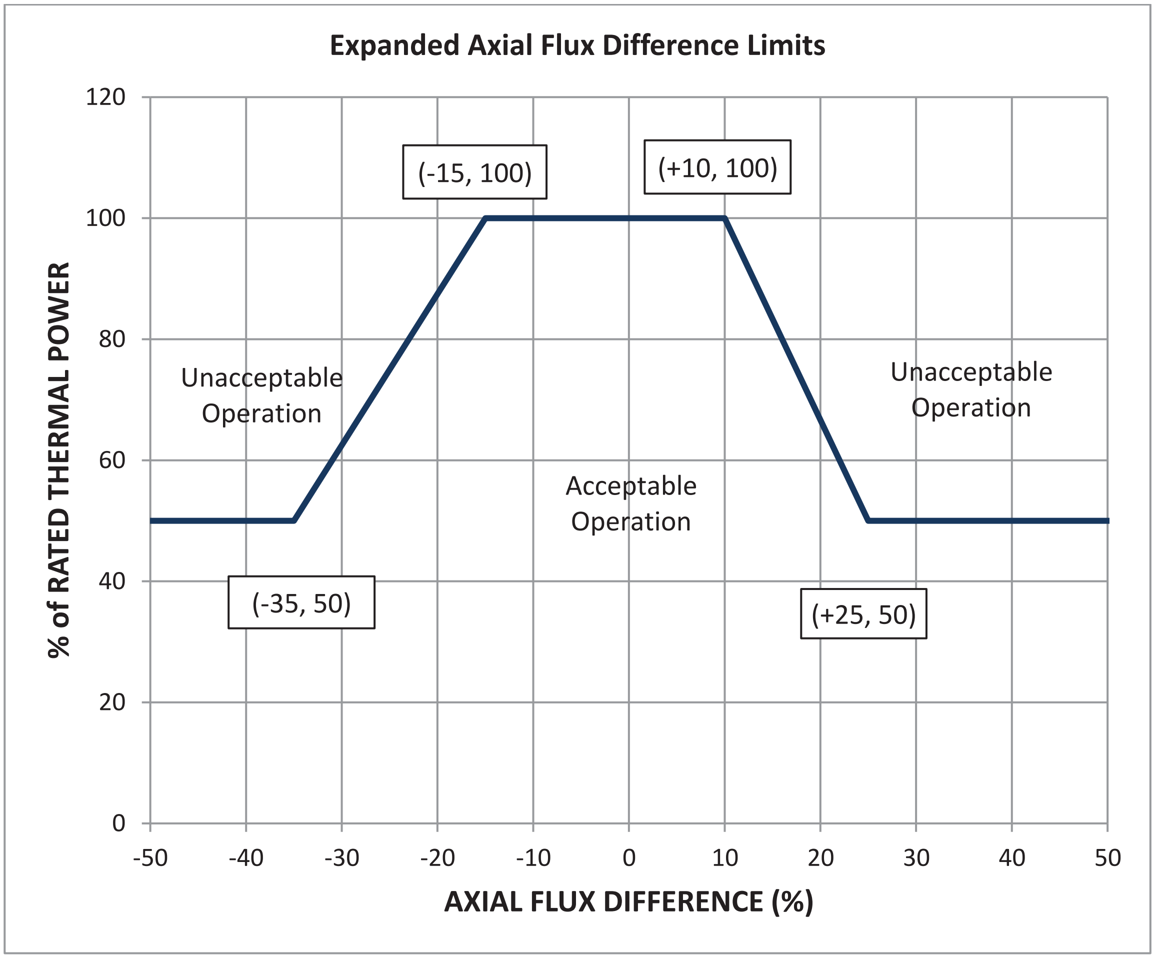
DNBR Warning Setpoint = 2% DNBR Margin
DNBR Alarm Setpoint = 0% DNBR Margin

**Figure 2.8.1.a:
Normal Axial Flux Difference Limits
as a Function of Rated Thermal Power**



CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

Figure 2.8.1.b:
Expanded Axial Flux Difference Limits
as a Function of Rated Thermal Power



CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

2.10 Reactor Trip System (RTS) Instrumentation (LCO 3.3.1) - Overtemperature ΔT Setpoint Parameter Values

2.10.1 The Overtemperature ΔT reactor trip setpoint K_1 shall be equal to 1.325.

2.10.2 The Overtemperature ΔT reactor trip setpoint T_{avg} coefficient K_2 shall be equal to 0.0297 / °F.

2.10.3 The Overtemperature ΔT reactor trip setpoint pressure coefficient K_3 shall be equal to 0.00135 / psi.

2.10.4 The nominal T_{avg} at RTP (indicated) T′ shall be less than or equal to 583.5 °F.

2.10.5 The nominal RCS operating pressure (indicated) P′ shall be equal to 2235 psig.

2.10.6 The measured reactor vessel ΔT lead/lag time constant τ_1 shall be equal to 8 sec.

2.10.7 The measured reactor vessel ΔT lead/lag time constant τ_2 shall be equal to 3 sec.

2.10.8 The measured reactor vessel ΔT lag time constant τ_3 shall be less than or equal to 2 sec.

2.10.9 The measured reactor vessel average temperature lead/lag time constant τ_4 shall be equal to 33 sec.

2.10.10 The measured reactor vessel average temperature lead/lag time constant τ_5 shall be equal to 4 sec.

2.10.11 The measured reactor vessel average temperature lag time constant τ_6 shall be less than or equal to 2 sec.

2.10.12 The f_1 (ΔI) “positive” breakpoint shall be +10% ΔI.

2.10.13 The f_1 (ΔI) “negative” breakpoint shall be -18% ΔI.

2.10.14 The f_1 (ΔI) “positive” slope shall be +3.47% / % ΔI.

2.10.15 The f_1 (ΔI) “negative” slope shall be -2.61% / % ΔI.

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

2.11 Reactor Trip System (RTS) Instrumentation (LCO 3.3.1) - Overpower ΔT Setpoint Parameter Values

2.11.1 The Overpower ΔT reactor trip setpoint K_4 shall be equal to 1.072.

2.11.2 The Overpower ΔT reactor trip setpoint T_{avg} rate/lag coefficient K_5 shall be equal to 0.02 / °F for increasing $T_{avg.}$

2.11.3 The Overpower ΔT reactor trip setpoint T_{avg} rate/lag coefficient K_5 shall be equal to 0 / °F for decreasing $T_{avg.}$

2.11.4 The Overpower ΔT reactor trip setpoint T_{avg} heatup coefficient K_6 shall be equal to 0.00245 / °F when $T > T''$.

2.11.5 The Overpower ΔT reactor trip setpoint T_{avg} heatup coefficient K_6 shall be equal to 0 / °F when $T \leq T''$.

2.11.6 The nominal T_{avg} at RTP (indicated) T'' shall be less than or equal to 583.5 °F.

2.11.7 The measured reactor vessel ΔT lead/lag time constant τ_1 shall be equal to 8 sec.

2.11.8 The measured reactor vessel ΔT lead/lag time constant τ_2 shall be equal to 3 sec.

2.11.9 The measured reactor vessel ΔT lag time constant τ_3 shall be less than or equal to 2 sec.

2.11.10 The measured reactor vessel average temperature lag time constant τ_6 shall be less than or equal to 2 sec.

2.11.11 The measured reactor vessel average temperature rate/lag time constant τ_7 shall be equal to 10 sec.

2.11.12 The f_2 (ΔI) “positive” breakpoint shall be 0 for all ΔI.

2.11.13 The f_2 (ΔI) “negative” breakpoint shall be 0 for all ΔI.

2.11.14 The f_2 (ΔI) “positive” slope shall be 0 for all ΔI.

2.11.15 The f_2 (ΔI) “negative” slope shall be 0 for all ΔI.

CORE OPERATING LIMITS REPORT (COLR) for BYRON UNIT 2 CYCLE 23

2.12 Reactor Coolant System (RCS) Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) Limits (LCO 3.4.1)

2.12.1 The pressurizer pressure shall be greater than or equal to 2209 psig.

2.12.2 The RCS average temperature (T_{avg}) shall be less than or equal to 588.6 °F.

2.12.3 The RCS total flow rate shall be greater than or equal to 386,000 gpm.

2.13 Boron Concentration

2.13.1 The refueling boron concentration shall be greater than or equal to the applicable value given in the Table below (LCO 3.9.1). The reported “prior to initial criticality” value also bounds the end-of-cycle requirements for the previous cycle.

2.13.2 To maintain keff ≤ 0.987 with all shutdown and control rods fully withdrawn in MODES 3, 4, or 5 (TRM TLCO 3.1.g Required Action B.2 and TRM TLCO 3.1.k.2), the Reactor Coolant System boron concentration shall be greater than or equal to the applicable values given in the Table below.

COLR Section	**Conditions**	**Boron Concentration (ppm)**
2.13.1	a) prior to initial criticality	1726
	b) for cycle burnups ≥ 0 MWD/MTU and < 16000 MWD/MTU	1870
	c) for cycle burnups ≥ 16,000 MWD/MTU	1493
2.13.2	a) prior to initial criticality	1818
	b) for cycle burnups ≥ 0 MWD/MTU and < 16000 MWD/MTU	2110
	c) for cycle burnups ≥ 16000 MWD/MTU	1636

BYRON UNIT 1

PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

(November 2015)

BYRON - UNIT 1
PRESSURE AND TEMPERATURE LIMITS REPORT

Table of Contents

List of Figures

List of Tables

BYRON - UNIT 1
PRESSURE AND TEMPERATURE LIMITS REPORT

1.0 Reactor Coolant System (RCS) Pressure and Temperature Limits Report (PTLR)

This Pressure and Temperature Limits Report (PTLR) for Byron Unit 1 has been prepared in accordance with the requirements of Byron TS 5.6.6 (RCS Pressure and Temperature Limits Report). Revisions to the PTLR shall be provided to the NRC after issuance.

The Technical Specifications addressed in this report are listed below:

TS-LCO 3.4.3 RCS Pressure and Temperature (P/T) Limits; and
TS-LCO 3.4.12 Low Temperature Overpressure Protection (LTOP) System.

2.0 RCS Pressure and Temperature Limits

This section provides the Byron Unit 1 Heatup and Cooldown Limitations.

The PTLR limits for Byron Unit 1 were developed using a methodology specified in the Technical Specifications. The methodology listed in WCAP-14040-NP-A, Revision 2 (Reference 1) was used with the following exceptions:

a) Optional use of ASME Code Section XI, Appendix G, Article G-2000, 1996 Addenda,
b) Use of ASME Code Case N-640, “Alternative Reference Fracture Toughness for Development of P-T Limit Curves, Section XI, Division 1”,
c) Use of ASME Code Case N-588, “Alternative to Reference Flaw Orientation of Appendix G for Circumferential Welds in Reactor Vessel, Section XI, Division 1”, and
d) Elimination of the flange requirements documented in WCAP-16143-P.

These exceptions to the methodology in WCAP-14040-NP-A, Revision 2 have been reviewed and accepted by the NRC in References 6, 10, 11 and 12.

WCAP-15391, Revision 1, Reference 7, provides the basis for the Byron Unit 1 P/T curves, along with the best estimate chemical compositions, fluence projections, and adjusted reference temperatures used to determine these limits. The weld metal data integration for Byron and Braidwood Units 1 and 2 is documented in Reference 2. WCAP-16143-P, Reference 11, documents the technical basis for the elimination of the flange requirements.

2.1 RCS Pressure and Temperature (P/T) Limits (LCO 3.4.3)

2.1.1 The RCS temperature rate-of-change limits defined in Reference 7 are:

a) A maximum heatup of 100°F in any 1-hour period.

b) A maximum cooldown of 100°F in any 1-hour period, and

c) A maximum temperature change of less than or equal to 10°F in any 1-hour period during inservice hydrostatic and leak testing operations above the heatup and cooldown limit curves.

2.1.2 The RCS P/T limits for heatup, inservice hydrostatic and leak testing, and criticality are specified by Figure 2.1 and Table 2.1a. The RCS P/T limits for cooldown are shown in Figure 2.2 and Table 2.1b. These limits are defined in WCAP-15391, Rev. 1 (Reference 7). Consistent with the methodology described in Reference 1, the RCS P/T limits for heatup and cooldown shown in Figures 2.1 and 2.2 are provided without margins for instrument error. These limits were developed using ASME Boiler and Pressure Vessel Code Section XI, Appendix G, Article G-2000, 1996 Addenda. The criticality limit curve specifies pressure-temperature limits for core operation to provide additional margin during actual power production as specified in 10 CFR 50, Appendix G.

The P/T limits for core operation (except for low power physics testing) are that the reactor vessel must be at a temperature equal to or higher than the minimum temperature required for the inservice hydrostatic test, and at least 40°F higher than the minimum permissible temperature in the corresponding P/T curve for heatup and cooldown.

MATERIAL PROPERTY BASIS

LIMITING MATERIAL: INTERMEDIATE SHELL FORGING
LIMITING ART VALUES AT 32 EFPY: 1/4T, 106°F
3/4T, 97°F

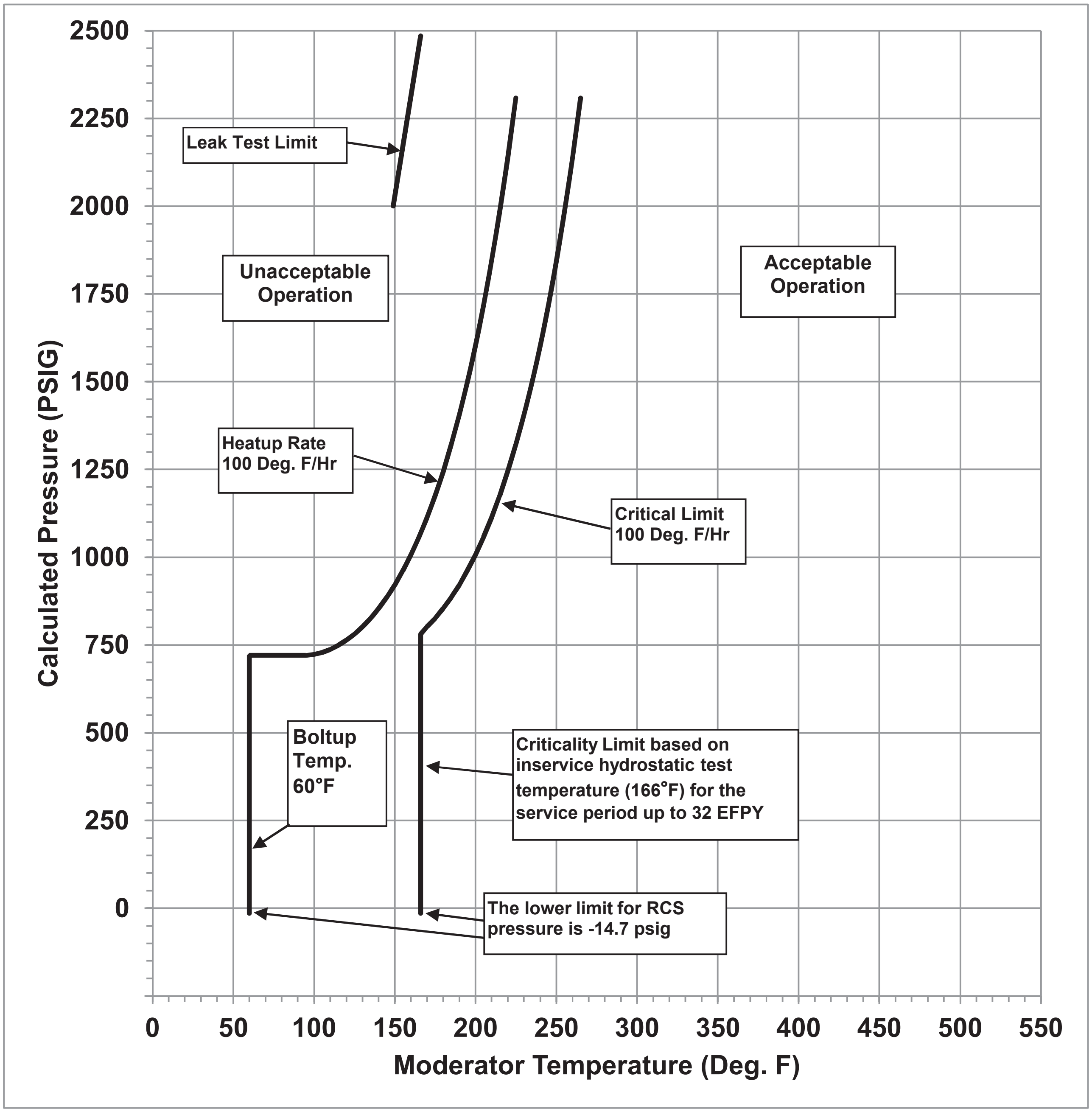


Figure 2.1
Byron Unit 1 Reactor Coolant System Heatup Limitations (Heatup rates of 100°F/hr) Applicable for 32 EFPY (Without Margins for Instrumentation Errors)

MATERIAL PROPERTY BASIS

LIMITING MATERIAL: INTERMEDIATE SHELL FORGING
LIMITING ART VALUES AT 32 EFPY: 1/4T, 106°F
3/4T, 97°F

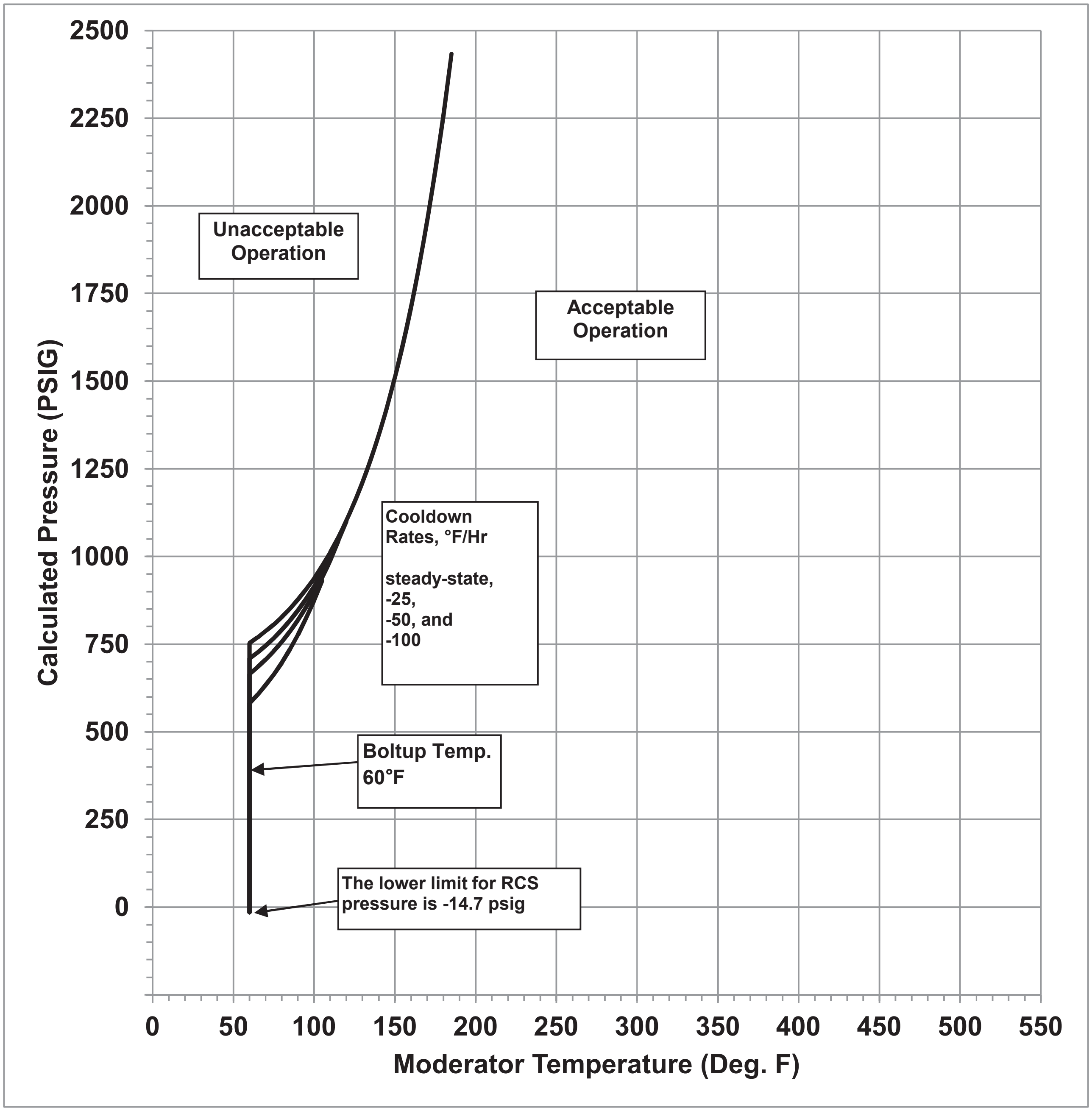


Figure 2.2
Byron Unit 1 Reactor Coolant System Cooldown Limitations (Cooldown rates of 0, 25, 50 and 100°F/hr) Applicable for 32 EFPY (Without Margins for Instrumentation Errors)

Table 2.1a
Byron Unit 1 Heatup Data Points at 32 EFPY
(Without Margins for Instrumentation Errors)

Heatup Curve					
100 F Heatup		Criticality Limit		Leak Test Limit	
T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)
60	-14.7	166	-14.7	149	2000
60	720	166	720	166	2485
65	720	166	720		
70	720	166	720		
75	720	166	720		
80	720	166	720		
85	720	166	720		
90	720	166	720		
95	720	166	723		
100	723	166	729		
105	729	166	737		
110	737	166	749		
115	749	166	764		
120	764	166	781		
125	781	170	802		
130	802	175	826		
135	826	180	854		
140	854	185	886		
145	886	190	921		
150	921	195	962		
155	962	200	1007		
160	1007	205	1057		
165	1057	210	1113		
170	1113	215	1175		
175	1175	220	1244		
180	1244	225	1321		
185	1321	230	1406		
190	1406	235	1499		
195	1499	240	1603		
200	1603	245	1718		
205	1718	250	1844		
210	1844	255	1984		
215	1984	260	2138		
220	2138	265	2308		
225	2308				

Table 2.1b
Byron Unit 1 Cooldown Data Points at 32 EFPY
(Without Margins for Instrumentation Errors)

Cooldown Curves							
Steady State		25 °F Cooldown		50 °F Cooldown		100 °F Cooldown	
T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)
60	-14.7	60	-14.7	60	-14.7	60	-14.7
60	753	60	709	60	665	60	581
65	769	65	726	65	685	65	606
70	787	70	746	70	706	70	633
75	806	75	767	75	730	75	663
80	827	80	791	80	757	80	697
85	851	85	817	85	786	85	735
90	877	90	846	90	819	90	777
95	906	95	879	95	855	95	823
100	937	100	914	100	895	100	874
105	973	105	954	105	940	105	931
110	1011	110	997	110	989		
115	1054	115	1045	115	1043		
120	1102	120	1099				
125	1154						
130	1212						
135	1276						
140	1347						
145	1425						
150	1512						
155	1607						
160	1713						
165	1829						
170	1958						
175	2101						
180	2258						
185	2433						

Note: For each cooldown rate, the steady-state pressure values shall govern the temperature where no allowable pressure values are provided.

3.0 Low Temperature Overpressure Protection and Boltup

This section provides the Byron Unit 1 power operated relief valve lift settings, low temperature overpressure protection (LTOP) system arming temperature, and minimum reactor vessel boltup temperature.

3.1 LTOP System Setpoints (LCO 3.4.12)

The power operated relief valves (PORVs) shall each have maximum lift settings in accordance with Figure 3.1 and Table 3.1. These limits are based on References 3 and 5.

The LTOP setpoints are based on P/T limits that were established in accordance with 10 CFR 50, Appendix G without allowance for instrumentation error. The LTOP setpoints were developed using the methodology described in Reference 1. The LTOP PORV nominal lift settings shown in Figure 3.1 and Table 3.1 account for appropriate instrument error.

3.2 LTOP Enable Temperature

The required enable temperature for the PORVs shall be ≤ 350°F RCS temperature. (Byron Unit 1 procedures governing the heatup and cooldown of the RCS require the arming of the LTOP System for RCS temperature of 350°F and below and disarming of LTOP for RCS temperature above 350°F).

Note that the last LTOP PORV segment in Table 3.1 extends to 400°F where the pressure setpoint is 2335 psig. This is intended to prohibit PORV lift for an inadvertent LTOP system arming at power.

3.3 Reactor Vessel Boltup Temperature (Non-Technical Specification)

The minimum boltup temperature for the Reactor Vessel Flange shall be ≥ 60°F. Boltup is a condition in which the Reactor Vessel head is installed with tension applied to any stud, and with the RCS vented to atmosphere (Reference 7).

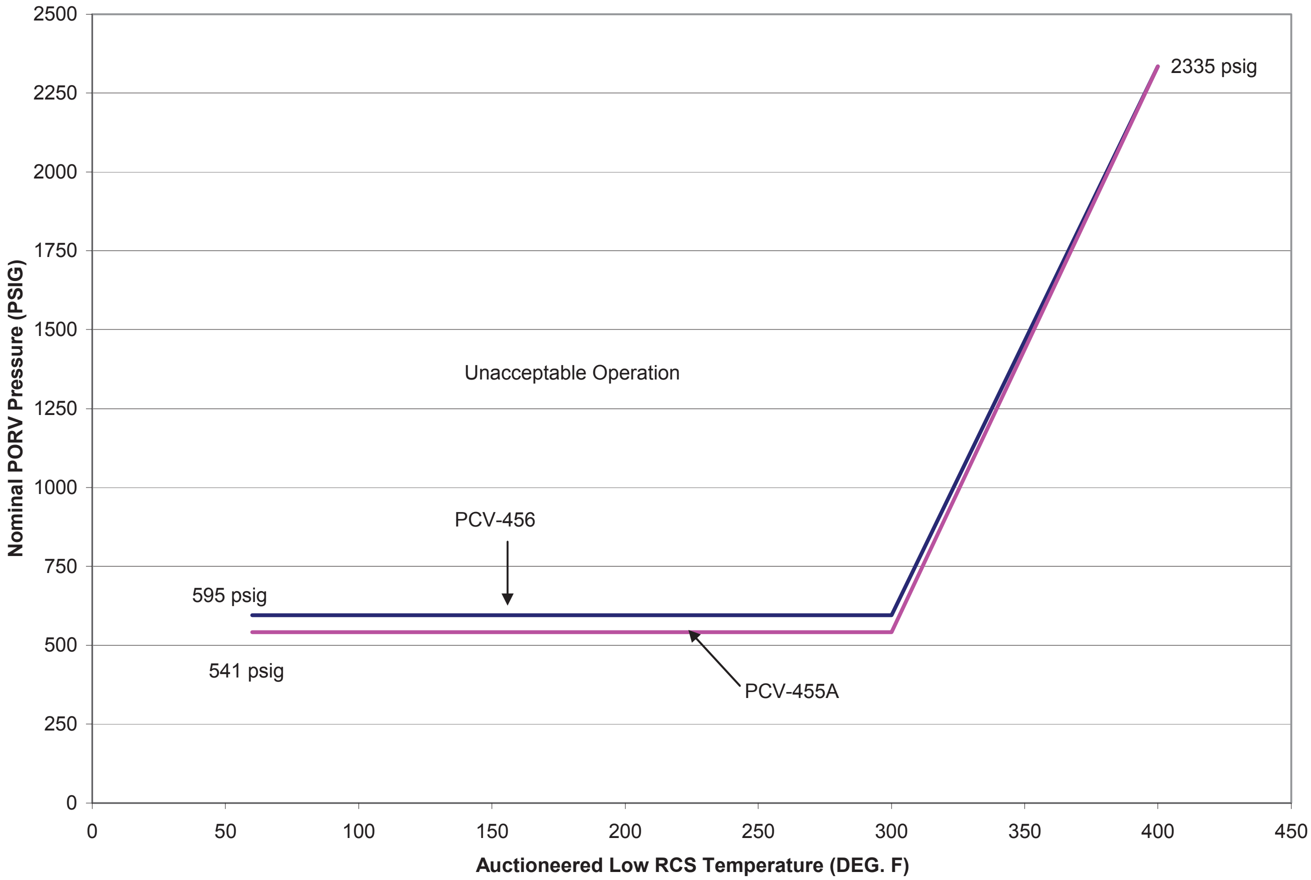


Figure 3.1
Byron Unit 1 Nominal PORV Setpoints for the Low Temperature Overpressure Protection (LTOP) System Applicable for 32 EFPY (Includes Instrumentation Uncertainty)

Table 3.1
Data Points for Byron Unit 1 Nominal PORV Setpoints for the LTOP System Applicable for 32 EFPY (Includes Instrumentation Uncertainty)

PCV-455A

(1TY-0413M)

AUCTIONEERED LOW RCS TEMP. (DEG. F)	RCS PRESSURE (PSIG)
60	541
300	541
400	2335

PCV-456

(1TY-0413P)

AUCTIONEERED LOW RCS TEMP. (DEG. F)	RCS PRESSURE (PSIG)
60	595
300	595
400	2335

Note: To determine nominal lift setpoints for RCS Pressure and RCS Temperatures greater than 300°F, linearly interpolate between the 300°F and 400°F data points shown above. (Setpoints extend to 400°F to prevent PORV liftoff from an inadvertent LTOP system arming while at power.)

4.0 Reactor Vessel Material Surveillance Program

The pressure vessel material surveillance program (Reference 12) is in compliance with Appendix H to 10 CFR 50, "Reactor Vessel Radiation Surveillance Program." The material test requirements and the acceptance standards utilize the reference nil-ductility temperature, RT_{NDT}, which is determined in accordance with ASME Boiler and Pressure Vessel Code, Section III, NB-2331. The empirical relationship between RT_{NDT} and the fracture toughness of the reactor vessel steel is developed in accordance with Appendix G, "Protection Against Non-Ductile Failure," to Section XI of the ASME Boiler and Pressure Vessel Code. The surveillance capsule removal schedule meets the requirements of ASTM E185-82.

The third and final reactor vessel material irradiation surveillance specimens (Capsule W) have been removed and analyzed to determine changes in the reactor vessel material properties. The surveillance capsule testing has been completed for the original operating period. The remaining three capsules, V, Y, and Z, were removed and placed in the spent fuel pool to avoid excessive fluence accumulation should they be needed to support life extension. The removal summary is provided in Table 4.1.

Table 4.1

Byron Unit 1 Surveillance Capsule Withdrawal Summary[a]

Capsule	Capsule Location	Lead Factor	Withdrawal EFPY[b]	Fluence (n/cm^2, E > 1.0 MeV)
U	58.5°	4.05	1.18	0.409×10^{19}
X	238.5°	4.09	5.67	1.49×10^{19}
W	121.5°	4.08	9.27	2.26×10^{19}
Z[c]	301.5°	4.11	14.59 (EOC 12)	3.34×10^{19}
V[c]	61.0°	3.89	14.59 (EOC 12)	3.16×10^{19}
Y[c]	241.0°	3.85	18.81 (EOC 15)	3.97×10^{19}

Notes:

(a) Source document is CN-AMLRS-10-8 (Reference 4), Table 5.7-3.
(b) Effective Full Power Years (EFPY) from plant startup.
(c) Standby Capsules Z, V, and Y were removed and placed in the spent fuel pool. No testing or analysis has been performed on these capsules. If license renewal is sought, one of these standby capsules may need to be tested to determine the effect of neutron irradiation on the reactor vessel surveillance materials during the period of extended operation.

5.0 Supplemental Data Tables

The following tables provide supplemental information on reactor vessel material properties and are provided to be consistent with Generic Letter 96-03. Some of the material property values shown were used as inputs to the P/T limits.

Table 5.1 shows the calculation of the surveillance material chemistry factors using surveillance capsule data.

Table 5.2 provides the reactor vessel material properties table.

Table 5.3 provides a summary of the Byron Unit 1 adjusted reference temperature (ART) values at the 1/4T and 3/4T locations for 32 EFPY.

Table 5.4 provides the RT_{PTS} values for Byron Unit 1 for 32 EFPY obtained from Reference 4.

Table 5.1

Byron Unit 1 Calculation of Chemistry Factors Using Surveillance Capsule Data [(a)]

Material	Capsule	Capsule f [(b)] (n/cm^2, E > 1.0 MeV)	FF[(c)]	ΔRT_{NDT} [(b)] (°F)	FF*ΔRT_{NDT} (°F)	FF^2
Intermediate Shell Forging (Tangential)	U	4.09 x 10^{19}	0.752	28.55	21.47	0.57
	X	1.49 x 10^{19}	1.110	9.82	10.90	1.23
	W	2.26 x 10^{19}	1.221	49.20	60.06	1.49
Intermediate Shell Forging (Axial)	U	0.409 x 10^{19}	0.752	18.52	13.93	0.57
	X	1.49 x 10^{19}	1.110	53.03	58.89	1.23
	W	2.26 x 10^{19}	1.221	29.34	35.82	1.49
				Sum:	201.06	6.58
	CF $_{\text{IS Forging}}$ = $\sum$(FF * ΔRT_{NDT}) ÷ $\sum$(FF^2) = (201.06) ÷ (6.58) = **30.6°F**					
Byron Unit 1 Surveillance Weld Material (Heat #442002)	U	4.09 x 10^{19}	0.752	11.22 (5.61)	8.44	0.57
	X	1.49 x 10^{19}	1.110	80.22 (40.11)	89.08	1.23
	W	2.26 x 10^{19}	1.221	102.68 (51.34)	125.34	1.49
Byron Unit 2 Surveillance Weld Material (Heat #442002)	U	0.406 x 10^{19}	0.750	16.88 (8.44)	12.66	0.56
	W	1.20 x 10^{19}	1.051	57.76 (28.88)	60.70	1.10
	X	2.18 x 10^{19}	1.211	108.02 (54.01)	130.86	1.47
				SUM:	427.08	6.42
	CF $_{\text{Weld Metal}}$ = $\sum$(FF * ΔRT_{NDT}) ÷ $\sum$(FF^2) = (427.08) ÷ (6.42) = **66.5°F**					

Notes:

a) Source document is CN-AMLRS-10-8 (Reference 4), Table 5.2-1.

b) f = fluence; ΔRT_{NDT} values are the measured 30 ft-lb shift values taken from Reference 13. ΔRT_{NDT} values for the surveillance weld data are adjusted by a ratio of 2.0 (pre-adjusted values are listed in parentheses).

c) FF = fluence factor = $f^{(0.28 - 0.10*\log f)}$.

Table 5.2

Byron Unit 1 Reactor Vessel Material Properties [a]

Material Description	Cu (%)	Ni (%)	Initial RT_{NDT} (ºF)[b]
Closure Head Flange 124K358VA1	--	0.74	60
Vessel Flange 123J219VA1	--	0.73	10
Nozzle Shell Forging 123J218	0.05	0.72	30
Intermediate Shell Forging 5P-5933	0.04	0.74	40
Lower Shell Forging 5P-5951	0.04	0.64	10
Intermediate to Lower Shell Forging Circ. Weld Seam WF-336 (Heat # 442002)	0.04	0.63	-30
Nozzle Shell to Intermediate Shell Forging Circ. Weld Seam WF-501 (Heat # 442011)	0.03	0.67	10
Byron Unit 1 Surveillance Program Weld Metal (Heat # 442002)	0.02	0.69	--
Byron Unit 2 Surveillance Program Weld Metal (Heat # 442002)	0.02	0.71	--
Braidwood Units 1 & 2 Surveillance Program Weld Metals (Heat # 442011)	0.03	0.67, 0.71	--

a) Reference 7.
b) The initial RT_{NDT} values for the plates and welds are based on measured data.

Table 5.3			
Summary of Byron Unit 1 Adjusted Reference Temperature (ART) Values at 1/4T and 3/4T Locations for 32 EFPY [(a)]			
Reactor Vessel Material	**Surface Fluence (n/cm^2, E > 1.0 MeV)**	**32 EFPY**	
		1/4T ART (ºF)	**3/4T ART (ºF)**
Nozzle Shell Forging	0.598×10^{19}	74	59
Intermediate Shell Forging	1.77×10^{19}	93	78
→ Using non-credible surveillance data	1.77×10^{19}	**102**	**85**
Lower Shell Forging	1.77×10^{19}	63	48
Nozzle to Intermediate Shell Forging Circ. Weld Seam (Heat # 442011)	0.598×10^{19}	69	49
→ Using credible Braidwood Units 1 and 2 surveillance data	0.598×10^{19}	47	35
Intermediate to Lower Shell Forging Circ. Weld Seam (Heat # 442002)	1.72×10^{19}	79	49
→ Using credible surveillance data	1.72×10^{19}	**65**	**46**

Note:

(a) The source document containing detailed calculations is CN-AMLRS-10-8 (Reference 4), Tables 5.3.1-1 and 5.3.1-2. The ART values summarized in this table utilize the most recent fluence projections and materials data, but were not used in development of the P/T limit curves. See Figures 2.1 and 2.2 of this PTLR for the ART values used in development of the P/T limit curves.

Table 5.4

RT_{PTS} Calculation for Byron Unit 1 Beltline Region Materials at EOL (32 EFPY) [a,b]

Reactor Vessel Material	R.G. 1.99, Rev. 2 Position	CF (°F)	Fluence (n/cm^2, E > 1.0 MeV)	FF	IRT_{NTD} [C] (°F)	ΔRT_{NTD} (°F)	σ_u [c] (°F)	σ_Δ [d] (°F)	Margin	RT_{PTS} (°F)
Nozzle Shell Forging	1.1	31	0.598×10^{19}	0.8560	30	26.5	0	13.3	26.5	83
Intermediate Shell Forging	1.1	26	1.77×10^{19}	1.1569	40	30.1	0	15.0	30.1	100
→ Using non-credible surveillance data	2.1	30.6	1.77×10^{19}	1.1569	40	35.4	0	17	34	**109**
Lower Shell Forging	1.1	26	1.77×10^{19}	1.1569	10	30.1	0	15.0	30.1	70
Nozzle to Intermediate Shell Forging Circ. Weld Seam (Heat # 442011)	1.1	41	0.598×10^{19}	0.8560	10	35.1	0	17.5	35.1	80
→ Using credible Braidwood Units 1 and 2 surveillance data	2.1	26.1	0.598×10^{19}	0.8560	10	22.3	0	11.2	22.3	55
Intermediate to Lower shell Forging Circ Weld Seam (Heat # 442002)	1.1	54	1.72×10^{19}	1.1492	-30	62.1	0	28	56	88
→ Using credible surveillance data	2.1	66.5	1.72×10^{19}	1.1492	-30	76.4	0	14	28	74

<u>Notes:</u>

(a) The 10 CFR 50.61 methodology was utilized in the calculation of the RT_{PTS} values.
(b) The source document containing detailed calculations is CN-AMLRS-10-8 (Reference 4), Table 5.5-1.
(c) Initial RT_{NDT} values are based on measured data. Hence $\sigma_{u} = 0$°F.
(d) Per the guidance of 10 CFR 50.61, the base metal $\sigma_{\Delta} = 17$°F for Position 1.1 and for Position 2.1 with non-credible surveillance data; the weld metal $\sigma_{\Delta} = 28$°F for Position 1.1 (without surveillance data) and with credible surveillance data $\sigma_{\Delta} = 14$°F for Position 2.1. However, σ_{Δ} need not to exceed $0.5 * \Delta RT_{NTD}$

6.0 References

1. WCAP-14040-NP-A, Revision 2, “Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves”, J.D. Andrachek, et al., January 1996.

2. WCAP-14824, Revision 2, “Byron Unit 1 Heatup and Cooldown Limit Curves for Normal Operation and Surveillance Weld Metal Integration for Byron & Braidwood”, November 1997 with Westinghouse errata letters CAE-97-220, dated November 26, 1997 and CAE-97-231/CCE-97-314 and CAE-97-233/CCE-97-316, dated January 6, 1998.

3. Westinghouse Letter to Exelon Nuclear, CAE-10-MUR-197, Revision 0, “Low Temperature Overpressure Protection (LTOP) System Evaluation Final Letter Report,” M. P. Rudakewiz, September 8, 2010.

4. Westinghouse Calculation Note CN-AMLRS-10-8, Revision 0, “Byron Units 1 and 2 Measurement Uncertainty Recapture (MUR) Uprate: Reactor Vessel Integrity Evaluations,” A. E. Leicht, September 2010.

5. Byron Station Design Information Transmittal DIT-BYR-06-046, “Transmittal of Byron Unit 1 and Unit 2 Temperature and Pressure Uncertainties for Low Temperature Overpressure System (LTOPS) Power Operated Relief Valves (PORVS),” David Neidich, August 15, 2006.

6. NRC Letter from R. A. Capra, NRR, to O. D. Kingsley, Commonwealth Edison Co., “Byron Station, Units 1 and 2, and Braidwood Station, Units 1 and 2, Acceptance for Referencing of Pressure Temperature Limits Report (TAC Numbers M98799, M98800, M98801, and M98802),” January 21, 1998.

7. WCAP- 15391, Revision 1, “Byron Unit 1 Heatup and Cooldown Limit Curves for Normal Operation,” T. J. Laubham, et al., November 2003.

8. NRC Letter from G. F. Dick, Jr., NRR, to C. Crane, Exelon Generation Company, LLC, “Issuance of Amendments: Revised Pressure-Temperature Limits Methodology; Byron Station, Units 1 and 2, and Braidwood Station, Units 1 and 2,” dated October 4, 2004.

9. NRC Letter from M. Chawla to O.D. Kingsley, Exelon Generation Company, LLC, “Issuance of exemption from the Requirements of 10 CFR 50 Part 60 and Appendix G for Byron Station, Units 1 and 2, and Braidwood Stations, Units 1 and 2,” dated August 8, 2001.

10. NRC Letter from R. F. Kuntz, NRR, to C. M. Crane, Exelon Generation Company, LLC, "Byron Station, Unit Nos. 1 and 2, and Braidwood Station, Unit Nos. 1 and 2 - Issuance of Amendments Re: Reactor Coolant System Pressure and Temperature Limits Report (TAC Nos. MC8693, MC8694, MC8695, and MC8696)," November 27, 2006.

11. WCAP-16143-P, Revision 1, "Reactor Vessel Closure Head/Vessel Flange Requirements Evaluation for Byron/Braidwood Units 1 and 2," W. Bamford, et al., October 2014.

12. WCAP-9517, "Commonwealth Edison Company, Byron Station Unit 1 Reactor Vessel Surveillance Program", J.A. Davidson, July 1979.

13. WCAP-15123, Revision 1, "Analysis of Capsule W from Commonwealth Edison Company Byron Unit 1 Reactor Vessel Radiation Surveillance Program," T.J. Laubham, et al, January 1999.

BYRON UNIT 2

PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

(October 2020)

BYRON - UNIT 2
PRESSURE AND TEMPERATURE LIMITS REPORT

Table of Contents

List of Figures

List of Tables

BYRON - UNIT 2
PRESSURE AND TEMPERATURE LIMITS REPORT

1.0 Introduction

This Pressure and Temperature Limits Report (PTLR) for Byron Unit 2 has been prepared in accordance with the requirements of Byron TS-5.6.6 (RCS Pressure and Temperature Limits Report). Revisions to the PTLR shall be provided to the NRC after issuance.

The Technical Specifications addressed in this report are listed below:

TS-LCO 3.4.3 RCS Pressure and Temperature (P/T) Limits; and
TS-LCO 3.4.12 Low Temperature Overpressure Protection (LTOP) System.

2.0 RCS Pressure and Temperature Limits

This section provides the Byron Unit 2 Heatup and Cooldown Limitations.

The PTLR limits for Byron Unit 2 were developed using a methodology specified in the Technical Specifications. The methodology listed in WCAP-14040-A, Revision 4 (Reference 1) was used with the following exceptions:

a) Elimination of the flange requirements documented in WCAP-16143-P.
b) The initial reference temperatures of the inlet/outlet nozzle forging to shell welds are determined using BAW-2308 in lieu of the ASME NB-2300 requirements.

WCAP-18371-NP, Revision 0 (Reference 5), provides the basis for the Byron Unit 2 P/T curves, along with the best estimate chemical compositions, fluence projections, and adjusted reference temperatures used to determine these limits. The "Master Curve" fracture toughness properties from BAW-2308 Revision 1-A Safety Evaluation (SE) and Revision 2-A SE (Reference 2) are used for the inlet/outlet nozzle to upper shell forgings welds. WCAP-16143-P, Reference 7, documents the technical basis for the elimination of the flange requirements. These exceptions to the methodology in WCAP-14040-A, Revision 4 have been reviewed and accepted by the NRC in References 8, 9, and 10.

2.1 RCS Pressure and Temperature (P/T) Limits (LCO 3.4.3)

2.1.1 The RCS temperature rate-of-change limits defined in Reference 5 are:

a. A maximum heatup of 100°F in any 1-hour period,

b. A maximum cooldown of 100°F in any 1-hour period, and

c. A maximum temperature change of less than or equal to 10°F in any 1-hour period during inservice hydrostatic and leak testing operations above the heatup and cooldown limit curves.

2.1.2 The RCS P/T limits for heatup, inservice hydrostatic and leak testing, and criticality are specified by Figure 2.1 and Table 2.1a. The RCS P/T limits for cooldown are shown in Figure 2.2 and Table 2.1b. These limits were developed in WCAP-18371-NP, Revision 0 (Reference 5) using the limiting material between Byron Units 1 and 2. This approach is conservative. Consistent with the methodology described in Reference 1, the RCS P/T limits for heatup and cooldown shown in Figures 2.1 and 2.2 are provided without margins for instrument error. These limits were developed using ASME Boiler and Pressure Vessel Code Section XI, Appendix G, 1998 Edition through 2000 Addenda. The criticality limit curve specifies pressure-temperature limits for core operation to provide additional margin during actual power production as specified in 10 CFR 50, Appendix G.

The P/T limits for core operation (except for low power physics testing) are that the reactor vessel must be at a temperature equal to or higher than the minimum temperature required for the inservice hydrostatic test, and at least 40°F higher than the minimum permissible temperature in the corresponding P/T curve for heatup and cooldown.

MATERIAL PROPERTY BASIS

LIMITING MATERIAL: BYRON UNIT 1 INTERMEDIATE SHELL FORGING 5P-5933

LIMITING ART VALUES AT 57 EFFECTIVE FULL POWER YEARS (EFPY): 1/4T, 102°F
3/4T, 87°F

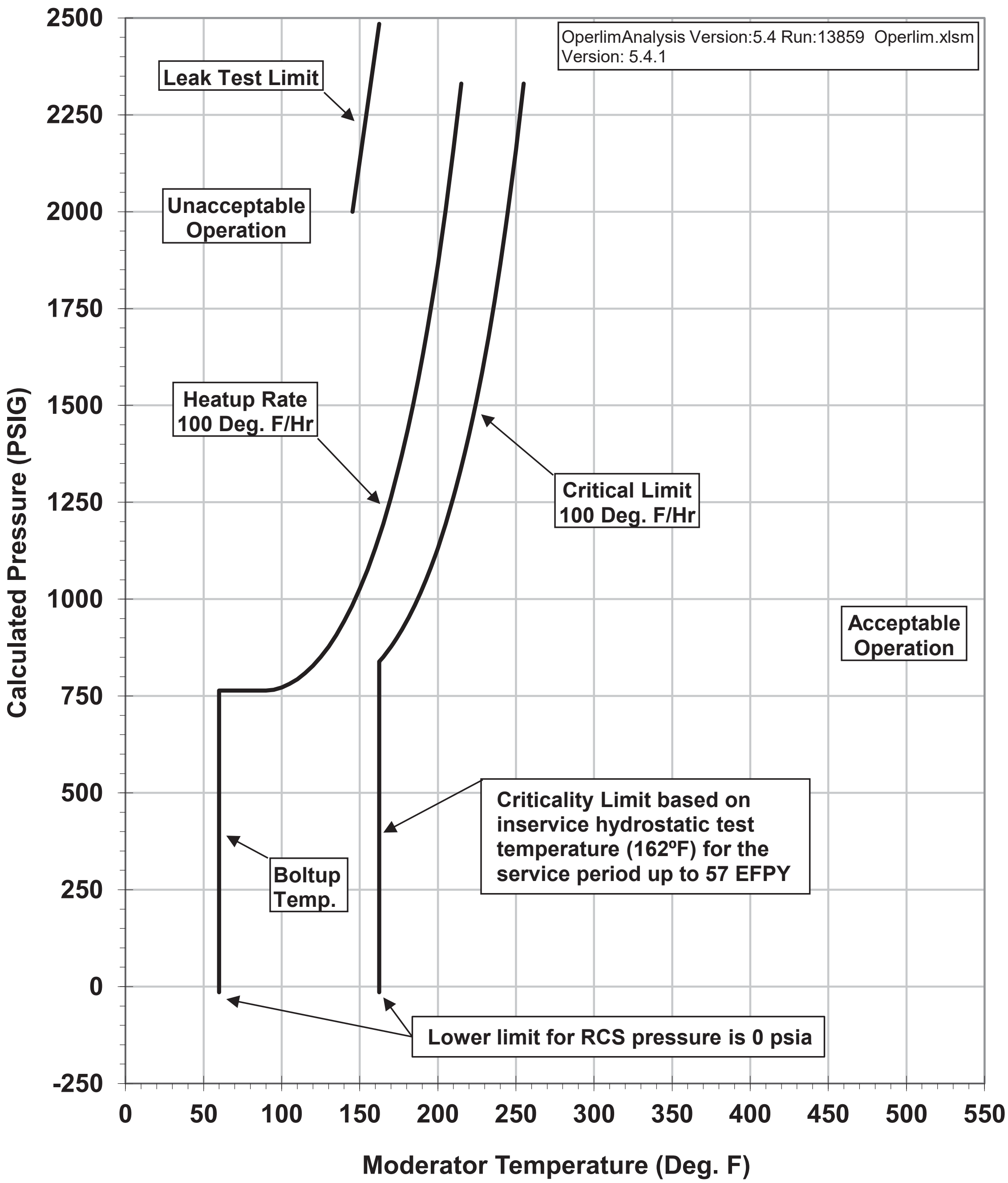


Figure 2.1
Byron Unit 2 Reactor Coolant System Heatup Limitations (Heatup rates of 100°F/hr) Applicable for 57 EFPY (Without Margins for Instrumentation Errors)

MATERIAL PROPERTY BASIS

LIMITING MATERIAL: BYRON UNIT 1 INTERMEDIATE SHELL FORGING 5P-5933

LIMITING ART VALUES AT 57 EFPY: 1/4T, 102°F
3/4T, 87°F

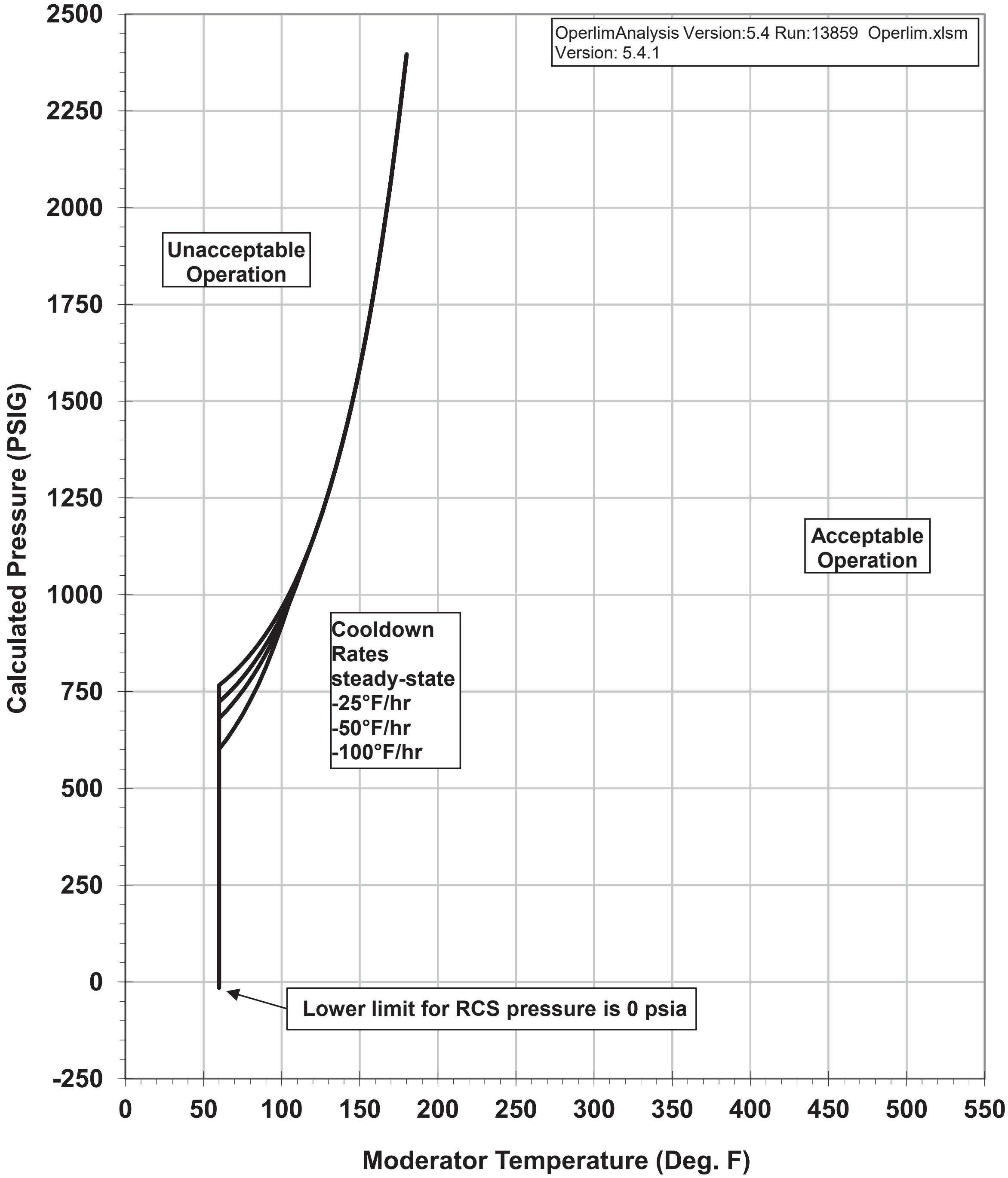


Figure 2.2

Byron Unit 2 Reactor Coolant System Cooldown Limitations (Cooldown Rates of 0, 25, 50 and 100°F/hr) Applicable for 57 EFPY (Without Margins for Instrumentation Errors)

Table 2.1a
Byron Unit 2 Heatup Data Points at 57 EFPY
(Without Margins for Instrumentation Errors)

Heatup Curve					
100 °F Heatup		Criticality Limit		Leak Test Limit	
T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)
60	Note 1	162	Note 1	145	2000
60	764	162	839	162	2485
65	764	165	851		
70	764	170	877		
75	764	175	908		
80	764	180	943		
85	764	185	982		
90	764	190	1027		
95	766	195	1076		
100	772	200	1132		
105	781	205	1194		
110	793	210	1263		
115	809	215	1339		
120	828	220	1424		
125	851	225	1518		
130	877	230	1622		
135	908	235	1737		
140	943	240	1864		
145	982	245	2004		
150	1027	250	2159		
155	1076	255	2330		
160	1132				
165	1194				
170	1263				
175	1339				
180	1424				
185	1518				
190	1622				
195	1737				
200	1864				
205	2004				
210	2159				
215	2330				

Note:

1. The minimum acceptable pressure is 0 psia.

Table 2.1b
Byron Unit 2 Cooldown Data Points at 57 EFPY
(Without Margins for Instrumentation Errors)

Cooldown Curves							
Steady State		25 °F Cooldown		50 °F Cooldown		100 °F Cooldown	
T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)	T (°F)	P (psig)
60	Note 1	60	Note 1	60	Note 1	60	Note 1
60	766	60	723	60	681	60	601
65	783	65	742	65	702	65	628
70	802	70	763	70	726	70	658
75	823	75	786	75	752	75	691
80	846	80	812	80	780	80	727
85	871	85	840	85	812	85	768
90	900	90	872	90	848	90	814
95	931	95	907	95	887	95	864
100	965	100	945	100	930	100	920
105	1003	105	988	105	979	105	979
110	1045	110	1035	110	1032	110	1032
115	1092	115	1088	115	1088	115	1088
120	1143	120	1143	120	1143	120	1143
125	1200	125	1200	125	1200	125	1200
130	1263	130	1263	130	1263	130	1263
135	1332	135	1332	135	1332	135	1332
140	1409	140	1409	140	1409	140	1409
145	1494	145	1494	145	1494	145	1494
150	1587	150	1587	150	1587	150	1587
155	1691	155	1691	155	1691	155	1691
160	1805	160	1805	160	1805	160	1805
165	1932	165	1932	165	1932	165	1932
170	2071	170	2071	170	2071	170	2071
175	2226	175	2226	175	2226	175	2226
180	2396	180	2396	180	2396	180	2396

Note:

1. The minimum acceptable pressure is 0 psia.

3.0 Low Temperature Overpressure Protection and Boltup

This section provides the Byron Unit 2 low temperature overpressure protection (LTOP) system pressurizer power operated relief valve (PORV) lift settings, LTOP system arming temperature, and minimum reactor vessel boltup temperature.

3.1 LTOP System Setpoints (LCO 3.4.12)

Two power operated relief valves (PORVs) shall have maximum lift settings in accordance with Figure 3.1 and Table 3.1. These settings are based on the LTOP calculation in Reference 3.

The LTOP setpoints are based on P/T limits that were established in accordance with 10 CFR 50, Appendix G without allowance for instrumentation error. The LTOP setpoints were developed using the methodology described in Reference 1. The LTOP PORV lift settings shown in Figure 3.1 and Table 3.1 account for appropriate instrument error.

3.2 LTOP Enable Temperature

Byron Unit 2 procedures governing the heatup and cooldown of the RCS require the arming of the LTOP system for RCS temperature less than 350°F and disarming of the LTOP system for RCS temperature of 350°F and above.

Note that the last LTOP PORV segment in Table 3.1 extends to 400°F where the pressure setpoint is 2335 psig. This is intended to prohibit PORV lift for an inadvertent LTOP system arming at power.

3.3 Reactor Vessel Boltup Temperature (Non-Technical Specification)

The minimum boltup temperature for the Reactor Vessel Flange shall be ≥ 60°F. Boltup is a condition in which the Reactor Vessel head is installed with tension applied to any stud, and with the RCS vented to atmosphere.

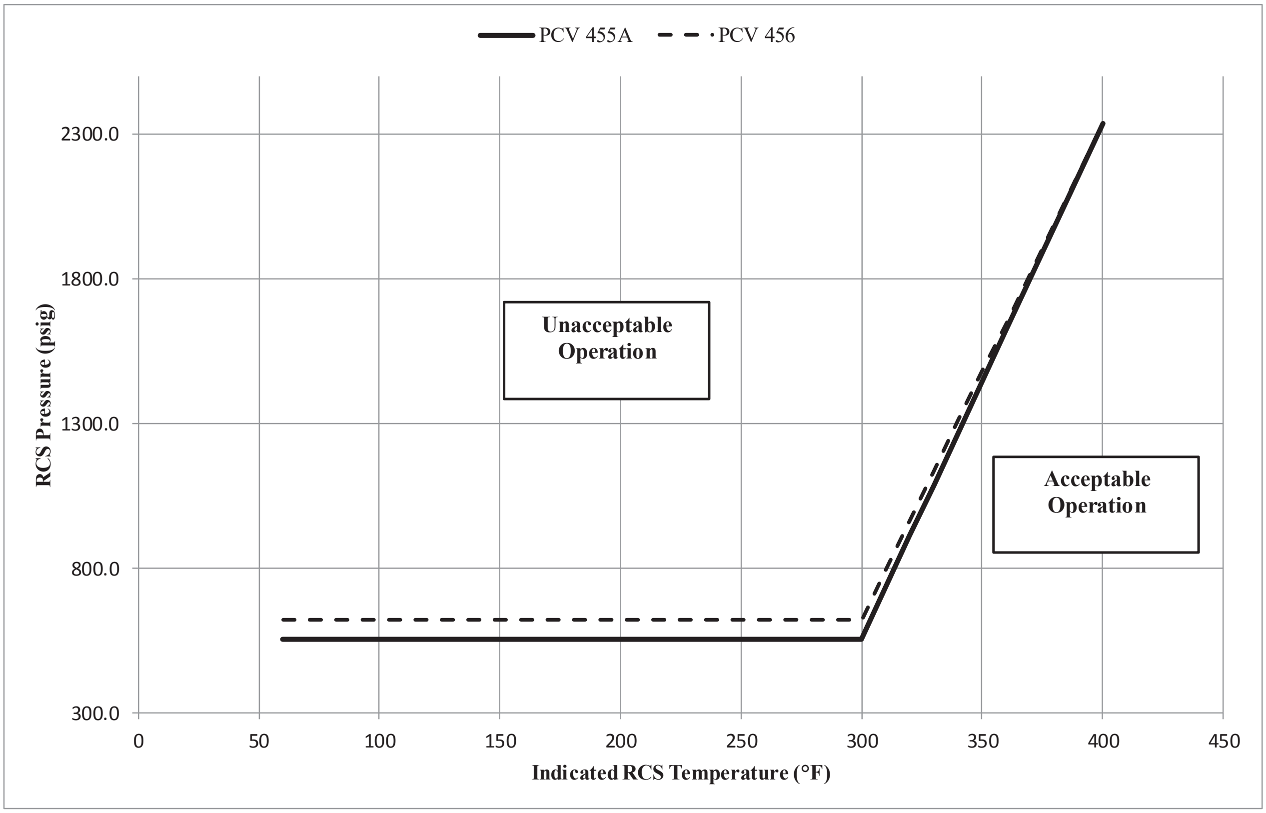


Figure 3.1
Byron Unit 2 Nominal PORV Setpoints for the Low Temperature Overpressure Protection (LTOP) System Applicable for 57 EFPY (Includes Instrumentation Uncertainty)

Table 3.1
Data Points for Byron Unit 2 Nominal PORV Setpoints for the LTOP System Applicable for 57 EFPY (Includes Instrumentation Uncertainty)

PCV-455A

(2TY-0413M)

AUCTIONEERED LOW RCS TEMP. (DEG. F)	RCS PRESSURE (PSIG)
60	555
300	555
310	733
320	911
330	1089
340	1267
350	1445
360	1623
400	2335

PCV-456

(2TY-0413P)

AUCTIONEERED LOW RCS TEMP. (DEG. F)	RCS PRESSURE (PSIG)
60	622
300	622
310	793
320	964
330	1135
340	1307
350	1478
360	1649
400	2335

Note: Setpoints extend to 400°F to prevent PORV liftoff from an inadvertent LTOP system arming while at power.

4.0 Reactor Vessel Material Surveillance Program

The pressure vessel material surveillance program (Reference 4) is in compliance with Appendix H to 10 CFR 50, "Reactor Vessel Radiation Surveillance Program." The material test requirements and the acceptance standard utilize the reference nil-ductility temperature, RT_{NDT}, which is determined in accordance with ASME Boiler and Pressure Vessel Code Section III, NB-2331. The empirical relationship between RT_{NDT} and the fracture toughness of the reactor vessel steel is developed in accordance with Appendix G, "Protection Against Non-Ductile Failure," to Section XI of the ASME Boiler and Pressure Vessel Code. The surveillance capsule removal schedule meets the requirements of ASTM E185-82.

The fourth reactor vessel material irradiation surveillance specimen (Capsule Y) has been removed and analyzed to determine changes in the reactor vessel material properties. The surveillance capsule testing has been completed for the licensed operating period. The remaining two capsules, V and Z, were removed and placed in the spent fuel pool to avoid excessive fluence accumulation should they be needed to support life extension. The removal summary is provided in Table 4.1.

Table 4.1

Byron Unit 2 Surveillance Capsule Withdrawal Summary[a]

Capsule	Capsule Location	Lead Factor	Withdrawal EFPY[b]	Fluence (n/cm^2, E > 1.0 MeV)
U	58.5°	4.02	1.19 (EOC 1)[d]	0.406×10^{19}
W	121.5°	4.08	4.67 (EOC 4)	1.21×10^{19}
X	238.5°	4.13	8.63 (EOC 7)	2.18×10^{19}
Y	241.0°	3.89	20.05 (EOC 15)	4.19×10^{19}
Z[c]	301.5°	4.10	14.28 (EOC 11)	3.25×10^{19}
V[c]	61.0°	3.87	14.28 (EOC 11)	3.07×10^{19}

Notes:

(a) Source document is WCAP-18056-NP (Reference 6), Table 7-1.
(b) Effective Full Power Years (EFPY) from plant startup.
(c) Standby Capsules Z and V were removed and placed in the spent fuel pool. No testing or analysis has been performed on these capsules.
(d) EOC = end-of-cycle.

5.0 Supplemental Data Tables

The following tables provide supplemental information on reactor vessel material properties and are provided to be consistent with Generic Letter 96-03. Some of the material property values shown were used as inputs to the P/T limits.

Table 5.1 shows the calculation of the surveillance material chemistry factors using surveillance capsule data.

Table 5.2 provides the reactor vessel material properties table.

Table 5.3 provides a summary of the Byron Unit 2 adjusted reference temperature (ART) values at the 1/4T and 3/4T locations for 57 EFPY.

Table 5.4 provides the Reference Temperature for Pressurized Thermal Shock (RT_{PTS}) values for Byron Unit 2 for 57 EFPY obtained from Reference 5.

Table 5.1

Byron Unit 2 Calculation of Chemistry Factors Using Surveillance Capsule Data [(a)]

Material	Capsule	Capsule f [(b)] (n/cm^2, E > 1.0 MeV)	FF [(c)]	ΔRT_{NDT} [(b)] (°F)	$FF^*\Delta RT_{NDT}$ (°F)	FF^2
Lower Shell Forging (Tangential)	U	0.406×10^{19}	0.750	0.0 [(d)]	0.00	0.56
	W	1.21×10^{19}	1.053	2.5	2.63	1.11
	X	2.18×10^{19}	1.211	14.9	18.05	1.47
	Y	4.19×10^{19}	1.366	44.5	60.79	1.87
Lower Shell Forging (Axial)	U	0.406×10^{19}	0.750	20.4	15.30	0.56
	W	1.21×10^{19}	1.053	32.1	33.81	1.11
	X	2.18×10^{19}	1.211	39.5	47.85	1.47
	Y	4.19×10^{19}	1.366	68.6	93.72	1.87
				SUM:	272.16	10.01
	$CF_{\text{Lower Shell Forging}} = \sum(FF * \Delta RT_{NDT}) \div \sum(FF^2) = (272.16) \div (10.01) =$ **27.2°F**					
Byron Unit 1 Surveillance Weld Material (Heat #442002)	U	0.409×10^{19}	0.752	10.4 (5.4)	7.82	0.57
	X	1.49×10^{19}	1.110	80.2 (40.1)	89.06	1.23
	W	2.26×10^{19}	1.221	101.2 (50.6)	123.54	1.49
	Y	3.97×10^{19}	1.355	153.4 (76.7)	207.79	1.83
Byron Unit 2 Surveillance Weld Material (Heat #442002)	U	0.406×10^{19}	0.750	17.4 (8.7)	13.05	0.56
	W	1.21×10^{19}	1.053	57.6 (28.8)	60.66	1.11
	X	2.18×10^{19}	1.211	108.4 (54.2)	131.32	1.47
	Y	4.19×10^{19}	1.366	117.4 (58.7)	160.39	1.87
				SUM:	793.63	10.13
	$CF_{\text{Weld Metal}} = \sum(FF * \Delta RT_{NDT}) \div \sum(FF^2) = (793.63) \div (10.13) =$ **78.3°F**					

Notes (listed on next page):

Notes:

a) Source document is WCAP-18371-NP (Reference 5), Table 5-2 and Table 5-3.

b) f = fluence; ΔRT_{NDT} values are the measured 30 ft-lb shift values taken from References 6 and 11. ΔRT_{NDT} values for the surveillance weld data are adjusted by a ratio of 2.0 to account for chemistry differences between the surveillance weld and the vessel weld (pre-adjusted values are listed in parentheses).

c) FF = fluence factor = $f^{(0.28 - 0.10*\log f)}$.

d) Measured ΔRT_{NDT} value was determined to be negative, but physically a reduction should not occur; therefore a conservative value of zero is used.

Table 5.2

Byron Unit 2 Reactor Vessel Material Properties [a]

Material Description	Cu (%)	Ni (%)	Chemistry Factor	Initial RT_{NDT} (ºF)[b]
Closure Head Flange, Heat # 5P7382 / 3P6407	--	0.71	--	0
Vessel Flange, Heat # 124L556VA1	--	0.70	--	30
Inlet Nozzle 01-001, Heat # 51-2979	0.07	0.86	44[d]	-10
Inlet Nozzle 01-002, Heat # 51-2979	0.07	0.86	44[d]	-20
Inlet Nozzle 02-001, Heat # 42-5105	0.07	0.84	44[d]	0
Inlet Nozzle 02-002, Heat # 42-5105	0.07	0.84	44[d]	0
Outlet Nozzle 01-001, Heat # 11-5052	0.09	0.85	58[d]	-10
Outlet Nozzle 01-002, Heat # 11-5052	0.08	0.81	51[d]	-10
Outlet Nozzle 02-001, Heat # 4-2953	0.09	0.78	58[d]	-20
Outlet Nozzle 02-002, Heat # 4-2956	0.09	0.81	58[d]	-10
Nozzle Shell Forging, Heat # 4P-6107	0.05	0.74	31[d]	10
Inter. Shell Forging, Heat # [49D329/49C297]-1-1	0.01	0.70	20[d]	-20
Lower Shell Forging, Heat # [49D330/49C298]-1-1	0.06	0.73	37[d], 27.2[e]	-20
Circumferential Weld WF-447 (HT# 442002)	0.04	0.63	54[d], 78.3[e]	10
Upper Circumferential Weld WF-562 (HT# 442011)	0.03	0.67	41[d], 31.2[e][f]	40
Byron Unit 1 Surveillance Program Weld Metal (Heat # 442002)	0.02	0.69	27[d]	--
Byron Unit 2 Surveillance Program Weld Metal (Heat # 442002)	0.02	0.71	27[d]	--
Braidwood Units 1 & 2 Surveillance Program Weld Metal (Heat # 442011)	0.03	0.67, 0.71	41[d]	--
Inlet Nozzle to Nozzle Shell Forging Circumferential Weld Seams WF-559 (Heat # 41403)	0.15	0.59	167.0[g]	-48.6[c]
Outlet Nozzle to Nozzle Shell Forging Circumferential Weld Seams WF-545 (Heat # 442010)	0.22	0.63	172.0[h]	-48.6[c]
Outlet Nozzle to Nozzle Shell Forging Circumferential Weld Seams WF-559 (Heat # 41403)	0.15	0.59	167.0[g]	-48.6[c]

Notes (listed on next page):

Notes:

a) Data taken from Reference 5.
b) Initial RT_{NDT} values are based on measured data.
c) Generic value taken from BAW-2308 (Reference 2).
d) Chemistry Factor calculated for Cu and Ni values per Regulatory Guide 1.99, Rev. 2, Position 1.1.
e) Chemistry Factor calculated per Regulatory Guide 1.99, Rev. 2, Position 2.1.
f) The Position 2.1 CF uses credible surveillance data from Braidwood in WCAP-18370-NP (Reference 12).
g) Minimum CF required by Reference 2 as a condition for using values from Reference 2. The actual calculated CF using Regulatory Guide 1.99, Rev. 2 is 144.3°F.
h) This CF value, calculated using Regulatory Guide 1.99, Rev. 2, satisfies the condition stipulated in Reference 2 that the CF be no less than 167°F when the initial RT_{NDT} values from BAW-2308 (Reference 2) are used.

Table 5.3

Summary of Byron Unit 2 Adjusted Reference Temperature (ART) Values at 1/4T and 3/4T Locations for 57 EFPY [a]

Reactor Vessel Material	Surface Fluence (n/cm^2, E > 1.0 MeV)	57 EFPY	
		1/4T ART (ºF)	3/4T ART (ºF)
Inlet Nozzle 01-001	1.29×10^{17}	1.4[b]	
Inlet Nozzle 01-002	1.29×10^{17}	-8.6[b]	
Inlet Nozzle 02-001	1.29×10^{17}	11.4[b]	
Inlet Nozzle 02-002	1.29×10^{17}	11.4[b]	
Outlet Nozzle 01-001	9.68×10^{16}	2.4[b][c]	
Outlet Nozzle 01-002	9.68×10^{16}	0.9[b][c]	
Outlet Nozzle 02-001	9.68×10^{16}	-7.6[b][c]	
Outlet Nozzle 02-002	9.68×10^{16}	2.4[b][c]	
Nozzle Shell Forging	1.01×10^{19}	63.3	46.6
Intermediate Shell Forging	2.96×10^{19}	26.3	15.0
Lower Shell Forging	2.90×10^{19}	56.6	44.4
→ Using non-credible surveillance data	2.90×10^{19}	42.7	27.3
Nozzle to Intermediate Shell Forging Circ. Weld Seam (Heat # 442011)	1.05×10^{19}	111.4	89.2
→ Using credible Braidwood Units 1 and 2 surveillance data	1.05×10^{19}	94.3	77.5
Intermediate to Lower Shell Forging Circ. Weld Seam (Heat # 442002)	2.82×10^{19}	127.8	103.1
→ Using credible surveillance data	2.82×10^{19}	127.7	105.5
Inlet Nozzle to Nozzle Shell Forging Circumferential Weld Seams WF-559 (Heat # 41403)	1.29×10^{17}	39.7[b]	
Outlet Nozzle to Nozzle Shell Forging Circumferential Weld Seams WF-545 (Heat # 442010)	9.68×10^{16}	36.4[b][c]	
Outlet Nozzle to Nozzle Shell Forging Circumferential Weld Seams WF-559 (Heat # 41403)	9.68×10^{16}	35.9[b][c]	

Notes (listed on next page):

Notes:

(a) The source document containing detailed calculations is WCAP-18371-NP (Reference 5), Table 7-2, Table 7-6, Table 7-7 and Table 7-8.

(b) The ART values for the extended beltline materials are conservatively calculated at the surface, i.e. without attenuation of the fluence.

(c) The outlet nozzle materials do not exceed the 1 x 10^{17} n/cm^2 fluence threshold at 57 EFPY; therefore, neutron irradiation embrittlement need not be considered for the nozzle materials. However, the results are included for information.

Table 5.4

RT_{PTS} Calculation for Byron Unit 2 Beltline Region Materials at End-of-Life Extension (EOLE) (57 EFPY) (a,b)

Reactor Vessel Material	R.G. 1.99, Rev. 2 Position	CF (°F)	Fluence (n/cm^2, E > 1.0 MeV)	FF	IRT_{NDT} (c) (°F)	ΔRT_{NDT} (°F)	σ_u (c) (°F)	σ_Δ (d) (°F)	Margin	RT_{PTS} (°F)
Inlet Nozzle 01-001	1.1	44	1.29×10^{17}	0.130	-10	5.7	0	2.9	5.7	1.4
Inlet Nozzle 01-002	1.1	44	1.29×10^{17}	0.130	-20	5.7	0	2.9	5.7	-8.6
Inlet Nozzle 02-001	1.1	44	1.29×10^{17}	0.130	0	5.7	0	2.9	5.7	11.4
Inlet Nozzle 02-002	1.1	44	1.29×10^{17}	0.130	0	5.7	0	2.9	5.7	11.4
Outlet Nozzle 01-001	1.1	58	9.68×10^{16}	0.107	-10	6.2	0	3.1	6.2	2.4
Outlet Nozzle 01-002	1.1	51	9.68×10^{16}	0.107	-10	5.5	0	2.7	5.5	0.9
Outlet Nozzle 02-001	1.1	58	9.68×10^{16}	0.107	-20	6.2	0	3.1	6.2	-7.6
Outlet Nozzle 02-002	1.1	58	9.68×10^{16}	0.107	-10	6.2	0	3.1	6.2	2.4
Nozzle Shell Forging	1.1	31	1.01×10^{19}	1.003	10	31.1	0	15.5	31.1	72.2
Intermediate Shell Forging	1.1	20	2.96×10^{19}	1.288	-20	25.8	0	12.9	25.8	31.5
Lower Shell Forging	1.1	37	2.90×10^{19}	1.283	-20	47.5	0	17.0	34.0	61.5
→ Using non-credible surveillance data	2.1	27.2	2.90×10^{19}	1.283	-20	34.9	0	17.0	34.0	48.9
Nozzle to Intermediate Shell Forging Circ. Weld Seam (Heat # 442011)	1.1	41	1.05×10^{19}	1.014	40	41.6	0	20.8	41.6	123.1
→ Using credible Braidwood Units 1 and 2 surveillance data	2.1	31.2	1.05×10^{19}	1.014	40	31.6	0	14.0	28.0	99.6
Intermediate to Lower Shell Forging Circ Weld Seam (Heat # 442002)	1.1	54	2.82×10^{19}	1.276	10	68.9	0	28.0	56.0	134.9
→ Using credible surveillance data	2.1	78.3	2.82×10^{19}	1.276	10	99.9	0	14.0	28.0	137.9
Inlet Nozzle to Nozzle Shell Forging Circumferential Weld Seams WF-559	1.1	167(e)	1.29×10^{17}	0.130	-48.6(e)	21.7	18.0(e)	28.0(e)	66.6	39.7
Outlet Nozzle to Nozzle Shell Forging Circumferential Weld Seams WF-545	1.1	172	9.68×10^{16}	0.107	-48.6(e)	18.4	18.0(e)	28.0(e)	66.6	36.4
Outlet Nozzle to Nozzle Shell Forging Circumferential Weld Seams WF-559	1.1	167(e)	9.68×10^{16}	0.107	-48.6(e)	17.9	18.0(e)	28.0(e)	66.6	35.9

Notes (listed on next page):

Notes:

(a) The 10 CFR 50.61 methodology was utilized in the calculation of the RT_{PTS} values.
(b) The source document containing detailed calculations is WCAP-18371-NP (Reference 5), Table E-2.
(c) Initial RT_{NDT} values are based on measured data, unless noted otherwise. Hence $\sigma_{u\,=}$ 0°F.
(d) Per the guidance of 10 CFR 50.61, the base metal $\sigma_{\Delta\,=}$ 17°F for Position 1.1 (without surveillance data) and for Position 2.1 with non-credible surveillance data; the weld metal $\sigma_{\Delta\,=}$ 28°F for position 1.1 (without surveillance data) and with credible surveillance data $\sigma_{\Delta\,=}$ 14°F for Position 2.1. However, σ_{Δ} need not to exceed 0.5*$\Delta RT_{NTD.}$
(e) The initial RT_{NDT} values are based on BAW-2308 (Reference 2). Use of BAW-2308 as an exemption to the 10 CFR 50.61 methodology was approved in Reference 10. BAW-2308 requires the use of σ_I = 18°F, σ_{Δ} = 28°F, and a minimum CF of 167°F.

6.0 References

1. WCAP-14040-A, Revision 4, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves," Andrachek, J.D., et al., May 2004.

2. AREVA Document, BAW-2308, Revision 1-A and 2-A, "Initial RT_{NDT} of Linde 80 Weld Materials," August 2005 and March 2008.

3. LTR-SCS-19-13, Revision 0, "Byron Units 1 and 2 Low Temperature Overpressure Protection System (LTOPS) Analysis for 57 EFPY," December 10, 2019.

4. WCAP-10398, "Commonwealth Edison Company, Byron Station Unit No. 2 Reactor Vessel Radiation Surveillance Program," Singer, L.R., December 1983.

5. WCAP-18371-NP, Revision 0, "Byron Units 1 and 2 Heatup and Cooldown Limit Curves for Normal Operation," September 2019.

6. WCAP-18056-NP, Revision 1, "Analysis of Capsule Y from the Exelon Generation Byron Unit 2 Reactor Vessel Radiation Surveillance Program," September 2018.

7. WCAP-16143-P, Revision 1, "Reactor Vessel Closure Head/Vessel Flange Requirements Evaluation for Byron/Braidwood Units 1 and 2," W. Bamford, et al., October 2014.

8. NRC Letter from R. F. Kuntz, NRR, to C. M. Crane, Exelon Generation Company, LLC, "Byron Station, Unit Nos. 1 and 2 and Braidwood Station Unit Nos. 1 and 2 – Exemption from the Requirements of 10 CFR Part 50, Appendix G (TAC Nos. MC8697, MC8698, MC8699, and MC8700)," November 22, 2006. *[ADAMS Accession Number ML061890003]*

9. NRC Letter from J. S. Wiebe, NRR, to B.C. Hanson, Exelon Generation Company, LLC, "Braidwood Station, Units 1 and 2, and Byron Station, Unit Nos. 1 and 2 – Issuance of Amendments to Utilize WCAP-16143-P, Revision 1 "Reactor Vessel Closure Head/Vessel Flange Requirements Evaluation for Byron/Braidwood Units 1 and 2," Dated October 16, 2014 (CAC Nos. MF5033, MF5034, MF5035 and MF5036)," October 28, 2015. *[ADAMS Accession Number ML15232A441]*

10. NRC Letter from J. S. Wiebe, NRR, to B.C. Hanson, Exelon Generation Company, LLC, "Braidwood Station, Units 1 and 2, and Byron Station, Unit Nos. 1 and 2- Issuance of Amendment Nos. 217, 217, 221, and 221 Regarding Reactor Coolant System Pressure and Temperature Limits Report Technical Specifications (EPID L-2019-LLA-0215)," September 18, 2020. [ADAMS Accession Number ML20163A046].

11. WCAP-18054-NP, Revision 1, "Analysis of Capsule Y from the Exelon Generation Byron Unit 1 Reactor Vessel Radiation Surveillance Program," September 2018.

12. WCAP-18370-NP, Revision 0, "Braidwood Units 1 and 2 Heatup and Cooldown Limit Curves for Normal Operation," June 2019.