PACKAGE 3.4

REACTOR COOLANT SYSTEM (RCS)

PART F

JUSTIFICATION FOR DIFFERENCES
(JFD)

from

NUREG-1431
IMPROVED STANDARD TECHNICAL SPECIFICATIONS

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

PART F

PACKAGE 3.4

REACTOR COOLANT SYSTEM (RCS)

JUSTIFICATION FOR DIFFERENCES FROM IMPROVED STANDARD TECHNICAL SPECIFICATIONS (NUREG-1431) AND BASES

See Part E for specific proposed wording and location of referenced deviations.

Difference Category	Difference Number 3.4-	Justification for Differences
PA	101	Minor editorial improvement to make it clear that all three parameters, pressure, temperature and flow are DNB limits. Without this correction the title could be interpreted that only flow is meant to be a DNB limit.
CL	102	In CTS the RCS total flow rate is specified in the COLR; thus for consistency with current requirements, the PI ITS refers to the COLR for RCS total flow rate.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	103	NUREG-1431 SR 3.4.1.3 was not included since PI CTS do not contain this requirement and the existing control board flow meters do not provide sufficient resolution to measure the specified values. These flow meters are 100% scale devices that are intended to provide operators with indication that RCS flow through each loop is approximately equal, but not an exact flow indication. Since a modification would be required to implement this SR, a reactor trip currently exists for low RCS flow, and RCS total flow rate is verified following startup from each refueling outage, this surveillance was not added.
X	104	The Note for PI ITS SR 3.4.1.3 was modified to require verification of RCS flow within 7 days after reaching 90% RTP since PI CTS do not contain any requirements on when this test must be performed. Requiring verification within 24 hours would place a burden on operations and reactor engineers immediately following startup. Allowing 7 days will provide sufficient time to perform the necessary calculations and allow any potential RCS fluctuations following the startup to stabilize and provide more accurate determination. Seven days may also allow time to reach a higher power level at which the test results will be more accurate. Since this a new requirement in the TS it is more restrictive on plant operations.

Difference Category	Difference Number 3.4-	Justification for Differences
	105	Not used.
PA	106	CTS does not specify a particular method for performing the RCS flow test. Thus the phrase, "by precision heat balance that" is not included in ITS SR 3.4.1.3.
X	107	The CTS requirement for this surveillance requires the test to be performed after each refueling cycle. Since PI intends to extend the plant refueling cycle up to 24 months, this Frequency is also extended to 24 months.
TA	108	This deviation implements approved TSTF-26.
TA	109	This change incorporates approved TSTF-339, Revision 1 except for the RCS flow which is already in the COLR per CTS. This is addressed in CL3.4-102. Since PI ITS retains the SL curves in Section SL 2.1.1, changes in the 3.4.1 Bases, Applicability, last paragraph, are not included.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	110	PI only has two groups of heaters to which this Specification applies and both groups are "required". Since both groups are required, the term "required" is not necessary and has been deleted in ITS 3.4.9, Condition B.
TA	111	This change implements TSTF-27, Rev. 3.
CL	112	Since PI is a two loop plant, "two" RCS loops has been specified and "all" has been replaced with "both".
CL	113	LCO, Actions, Surveillance Requirements and Bases are revised as appropriate to reflect that PI is a two loop plant. In some applications, use of "required" is not necessary or applicable since PI is a two loop plant; therefore, "required" has been deleted. (Markup did not include TSTF-263 since PI is a two loop plant).
CL	114	The Note to LCO 3.4.5 was modified by changing "All" to "Both" since PI is a two loop plant.
TA	115	This change incorporates TSTF-286, Revision 2.
TA	116	This change incorporates approved TSTF-153.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	117	The allowed time and purpose of allowing both pumps to be not operating was extended to 12 hours and clarified that it is "to perform preplanned work activities". These changes were justified in a License Amendment Request dated November 19, 1999 (This LAR was approved by License Amendment 152/143, July 14, 2000). The justification presented in the LAR is factored in to the Bases. This justification argues that natural circulation provides sufficient flow for decay heat removal, and for boron addition requisite for provision of shutdown margin. The justification notes that this circulation may not be sufficient to respond to all potential dilution events. Thus, preplanned activities that stop forced flow must include actions to preclude the potential for events such as boron dilution.
TA	118	This change incorporated traveler TSTF-87, Rev. 2.
TA	119	This change incorporates TSTF-233. The specific phrase that has been inserted is modified to include PI specific terminology for the LTOP system, "Over Pressure Protection System (OPPS)."

Difference Category	Difference Number 3.4-	Justification for Differences
PA	120	The purpose of allowing both pumps to be not operating was clarified for the operators by specifying that this is to perform testing.
X	121	Since this is a new SR for PI, the plant has determined that the appropriate SG level for this MODE is 60% on the Wide Range instrumentation.
	122	Not used.
CL	123	CTS require a steam or gas bubble in the pressurizer prior to low temperature starting of a RCP. This requirement has been included in the ITS for consistency with the current licensing basis.

Difference Category	Difference Number 3.4-	Justification for Differences
X	124	A Note was added to Required Action B.1 to clarify that if all RCS and RHR loops are inoperable, Condition C should be entered, not Condition B. With all RCS and RHR loops inoperable, this plant condition would envelop Condition B; however, under these circumstances, Required Action B would be inappropriate since immediate action would be required as provided by Required Actions C.1 and C.2. Thus this Note was added to direct operations to the correct Required Action.
TA	125	This change incorporates TSTF-265, Revision 2.
CL	126	CTS for this mode of operation require one SG to be operable; thus "one" is specified to retain current requirements.
PA	127	Minor wording change to make the ITS wording consistent with the NUMARC 93-03, Writer's Guide for Restructured Technical Specifications.
CL	128	LCO, Actions, Surveillance Requirements and Bases are revised as appropriate to reflect that PI has only two RHR loops.

Difference Category	Difference Number 3.4-	Justification for Differences
	129	Not used.
	130	Not used.
CL	131	The Note has been revised to not include the restriction on switching from one loop to another. CTS allow both RHR pumps to be inoperable up to 1 hour without restrictions on the nature of the required inoperability.
CL	132	A Note has been included in Required Action B.2 to incorporate current licensing basis provisions. As allowed by the CTS, a Safety Injection pump may be operated if required to maintain adequate core cooling and RCS inventory during reduced RCS water inventory operations.
CL	133	The PI CTS require the pressurizer to be operable with a steam bubble and no specific level is specified. The bracketed level has been replaced with the Pressurizer High Water Level Allowable Value. Use of this level assures that the reactor trips prior to exceeding the TS value.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	134	Since no specific power capacity is specified in the CTS, this requirement has been deleted. Approved TSTF-94 was not incorporated since the changes were not applicable to PI. PI CTS require two groups of heaters to be operable and this requirement is retained in the ITS.
	135	Not used.
X	136	This SR should be performed in conjunction with the plant refueling cycle. PI intends to extend the refueling cycle to 24 months and accordingly this frequency is changed to 24 months.
CL	137	As discussed in CL3.4-134, above, the CTS do not require a specified pressurizer heater capacity. Likewise it does not require testing of the heaters to a specified capacity. Thus this SR is not included in the PI ITS.
CL	138	This LCO is revised to reflect the PI design with two PSVs and incorporate the CTS PSV OPERABILITY pressure range.
TA	139	This change incorporates TSTF-352, Revision 1.

Difference Category	Difference Number 3.4-	Justification for Differences
	140	Not used.
PA	141	The bracketed time in the Note which allows final setting of the PSV under hot conditions allows 36 hours since PI has two PSVs.
CL	142	Condition B is modified to account for the PI design which has only two PSVs.
PA	143	The nominal setpoint pressure range is provided for clarity since it is not stated in the LCO or anywhere else in the TS.
TA	144	Incorporates TSTF-247. The portions of this TSTF which relate to a plant with three block valves were not included since PI has two PORVs and two block valves.
	145	Not used.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	146	Condition A and associated Required Action, Completion Time and Bases are modified to incorporate CTS provisions which require remedial actions if one or both PORVs are inoperable solely due to excessive seat leakage.
CL	147	Condition B and associated Required Action, Completion Time and Bases are modified to incorporate CTS provisions remedial actions if a PORV is inoperable for reasons other than excessive seat leakage.
TA	148	This change incorporated TSTF-309, Revision 2 with minor modifications to make it correct with approved TSTF-247.
	149	Not used.
	150	Not used.
	151	Not used.
CL	152	Condition E is modified to incorporate the PI design which comprises two PORVs and the CTS LCO related to inoperability due to causes other than excessive seat leakage.

Difference Category	Difference Number 3.4-	Justification for Differences
	153	Not used.
	154	Not used.
	155	Not used.
	156	Not used.
TA	157	This change incorporates TSTF-284, Revision 3.
CL	158	NUREG-1431 SR 3.4.11.3 and the associated Bases are not included since all required subcomponent testing is included in SR 3.4.11.2. Verification of the automatic PORV components is not required in order to meet the definition of PORV OPERABILITY as specified in the LCO Bases. Therefore this SR is not included.
PA	159	The Required Action has been modified by requiring action to "assure" a maximum of one SI pump is capable of injecting into the RCS in lieu of "verifying". Use of the term "verify" is passive and inconsistent with the urgency of the situation where the operators should immediately take decisive action to make one pump incapable of injecting.

Difference Category	Difference Number 3.4-	Justification for Differences
	160	Not used.
CL	161	NUREG-1431 SR 3.4.11.4 and the associated Bases are not included. Since the manual PORV function and block valves are supplied with permanent 1E power supplies, in accordance with the provisions of the Bases this SR is not required.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	162	The applicability of this Specification has been revised to apply only to MODE 4 when any RCS cold leg is less than the OPPS enable temperature and greater than the SI pump disable temperature to be consistent with CTS requirements. Accordingly, the title has been revised. Also the name of this Section is revised by deleting "System" to be consistent with the title of new Specification 3.4.13. These sections are not narrowly focused on a LTOP System but rather provide options for low temperature protection measures one of which is the LTOP System which at PI is titled, "Over Pressure Protection System (OPPS)". Thus the title, "Low Temperature Overpressure Protection" is more appropriate. The provisions of this Specification which apply when the RCS temperature is below the SI pump disable temperature are not included since they have been relocated to the new Specification 3.4.13. SRs 3.4.12.4 and 3.4.12.5 have also been revised to account for the OPPS circuitry which requires testing to support this Specification.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	163	The PI CTS and supporting analyses require that only one SI pump be capable of injecting in MODE 4 when the RCS temperature is below the LTOP enable temperature and above the SI pump disable temperature. CTS and design basis analyses do not require any restrictions on charging pump operation during RCS low temperature operations. Thus the bracketed requirements in NUREG-1431 LCO, Action, Surveillances Requirements and Bases have been deleted and NUREG-1431 SR 3.4.12.2 is not included. Since the system which provides LTOP at PI is the OPPS, this has been included in the LCO statement. To clarify the presentation of the LCO statement, the three provisions have been designated by a), b) and c). The complete name, "emergency core cooling system", is included in the LCO to make clear which accumulators are the subject of this Specification. The PORVs utilize back-up air accumulators; thus to prevent confusion, this clarifying phrase was added to the first use of accumulators in this Specification and the term "ECCS" is used thereafter. The LCO, Required Actions and Bases are revised to reflect that only the PORVs function as the RCS relief valves in the LTOP function. Since the RHR relief valve is not used in the LTOP function, NUREG-1431 SRs 3.4.12.4 and 3.4.12.7 were not

Difference Category	Difference Number 3.4-	Justification for Differences
CL	163	(continued) incorporated into the PI ITS. Since depressurizing and venting of the RCS is not an option in MODE 4, paragraph b. was deleted.
CL	164	A Note is included incorporating CTS 3.3.A.3 which provides for SI system testing (head removal is not included since it is not a viable option in MODE 4).
TA	165	This change incorporates TSTF-243.
TA	166	The Applicability Note was relocated to the LCO and reworded consistent with the guidance of approved TSTF-285, Revision 1. Since PI does not have restrictions on charging pump operation at low temperatures, the other portions of TSTF-285 are not applicable and have not been incorporated.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	167	The Applicability, Actions and Bases were revised to delete MODES 5 and 6 from this Specification since a new Specification, 3.4.13, "Low Temperature Overpressure Protection (LTOP) ≤ Safety Injection (SI) Pump Disable Temperature," has been included to address CTS requirements for operation in these MODES.
PA	168	Since the LTOP requirements have been split into two Specifications, PI ITS Required Action E has been split into E.1 which requires the plant to go to MODE 5. In NUREG-1431, when depressurizing and venting the RCS, the plant was still in a MODE included in the Applicability. Since MODE 5 is not applicable to Specification 3.4.12, the explicit requirement to change Modes is included.
CL	169	Plant specific vent area is provided in lieu of the bracketed value. This is specified as a nominal 3 square inches since the Bases, consistent with CTS Bases, states that the PORV opening of 2.956 square inches fulfills this requirement.
	170	Not used.

Difference Category	Difference Number 3.4-	Justification for Differences
X	171	ITS SR 3.4.12.2 includes a Note consistent with the LCO Note that these ECCS accumulator isolation SRs are only applicable when the accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed in the PTLR.
CL	172	A new Specification is included to incorporate CTS requirements that below the SI pump disable temperature (currently 218 F) both SI pumps shall be incapable of injecting into the RCS when it is intact and capable of maintaining pressure. All subsequent Specifications have been renumbered to incorporate this new Specification. This new Specification includes applicable portions of approved TSTF-205 Rev. 3, TSTF-233, TSTF-243, TSTF-271 Rev. 1; TSTF-280 Rev. 1, TSTF-284 Rev. 3 and TSTF-285 Rev. 1.
CL	173	The 1 gpm SG leakage limit has not been included since the CTS does not have this limit. The 1 gpm limit is enveloped by the 150 gpd limit and is unnecessary. This change is also consistent with current industry initiatives to remove this limit from NUREG-1431.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	174	Action statements A and B and the Bases have been revised to be consistent with CTS. Two new Action statements C and D have been included to develop the succession of possible events from unidentified LEAKAGE to pressure boundary LEAKAGE existing or SG LEAKAGE not within limits consistent with PI CTS. Supporting changes have also been made in the Bases.
CL	175	The CTS value of 150 gallons per day primary to secondary leakage is included.
TA	176	Incorporates TSTF-116, Rev. 2. "Equilibrium xenon" has been included in the Bases list of considerations for "steady state operating condition", since at PI this is a significant consideration affecting the RCS water inventory balance.
TA	177	Incorporates approved TSTF-61.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	178	The Applicability, Surveillance Requirements and Bases are revised to eliminate discussion concerning the exclusion for PIVs in the RHR flow path during the RHR mode of operation. The only PIV in the RHR system which is governed by this LCO is a check valve in the flow path which provides normal plant cooldown flow into the reactor vessel; thus this exception does not apply.
PA	179	In accordance with current industry guidance, "Tube Surveillance" is not included in the program title and the title has been changed to "Steam Generator Program". This change is also consistent with the program title and description in ITS 5.5.8.
	180	Not used.
X	181	The second option for Required Action A.2 was selected with the Bases revised accordingly. Since the second option does not require use of additional valves, SR 3.4.15.1 should not refer to Required Action A.2.

Difference Category	Difference Number 3.4-	Justification for Differences
PA	182	Minor change to delete reference to Condition A which is not required since Condition A is the only Action statement to which Condition B can apply per the Writer's Guide.
	183	Not used.
CL	184	The Frequency and Bases are revised to incorporate the CTS requirements for testing Frequency such as every 24 months, prior to entering Mode 2 under the specified conditions and prior to returning a PIV to service after maintenance, repair or replacement. The CTS require testing following each refueling outage; thus the Frequency is specified as 24 months to accommodate 24 month refueling cycles. These changes are acceptable since they are part of the plant current licensing basis and assure acceptable performance of these valves. NUREG-1431 requirements to test the valves following each use have not been included, since this is not a CTS requirement.
	185	Not used.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	186	The bracketed Condition C for the RHR System auto closure interlock (ACI) is not included in the PI ITS. This plant design feature is not included in the PI CTS and thus is not included in the ITS. The associated SRs (ISTS SR 3.4.14.2 and 3.4.14.3) have not been included. Likewise, the Bases associated with Condition C and the associated SR Bases have not been included.
X	187	This SR should be performed in conjunction with the plant refueling cycle. PI intends to extend the refueling cycle to 24 months and accordingly this frequency is changed to 24 months. Since this SR is new for the PI plant, there is no historical basis for not performing the SR at 24 month intervals.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	188	The LCO, Actions and Bases are revised to incorporate CTS requirements which make containment radionuclide monitoring one form of required RCS leakage detection instrumentation. The SRs associated with maintaining the radionuclide monitoring instrumentation have been included in the PI ITS. To be consistent with PI CTS which requires two methods for detecting RCS leakage, containment sump A pump run time monitoring is also included with appropriate Actions, SRs and Bases. PI uses other methods for RCS leakage detection, as discussed in the ITS Bases and the USAR; however, these other methods are not amenable to incorporation into the ITS and are not part of CTS. Operating experience for over twenty-five years has demonstrated on numerous occasions that the PI leakage detection methods, TS and non-TS, are adequate to provide early detection of RCS leakage.
CL	189	PI does not have CTS requirements for containment air cooler condensate flow rate monitoring and does not have a system which is amenable for inclusion in the ITS. Thus the LCO, Action, SR and associated Bases are not included in the PI ITS.
	190	Not used.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	191	The SR Note which eliminates a repetitive testing loop is not included in the PI ITS. CTS do not require testing of the PIVs after each use and thus the testing requirements do not introduce the possibility of a repetitive testing loop.
CL	192	The clause "reactor coolant pressure boundary [or the" has not been included since the PI system design does not include any isolation valves in the RCPB which will perform this function.
	193	Not used.
TA	194	This change incorporates TSTF-60. Some minor changes have been made to use PI terminology.
	195	Not used.
	196	Not used.
PA	197	The LCO and Condition A wording is revised to be consistent with each other and with Condition B. The limits are specified in the LCO statement and Figure 3.4.17-1. The appropriate changes have also been included in the Bases.

Difference Category	Difference Number 3.4-	Justification for Differences
	198	Not used.
	199	Not used.
	200	Not used.
TA	201	This change incorporates TSTF-28.
PA	202	Condition C is revised to clarify the terminology.
PA	203	SR 3.4.17.3 has been modified to eliminate redundancy and clarify intent.
CL	204	NUREG-1431 Specifications 3.4.17 and 3.4.18 are not included since PI does not have RCS loop isolation valves.
	205	Not used.
TA	206	Incorporates TSTF-108, Rev. 1.

Difference Category	Difference Number 3.4-	Justification for Differences
	207	Not used.
	208	Not used.
	209	Not used.
	210	Not used.
PA	211	Included throughout the Bases are reference corrections, renumbering and relettering of paragraphs and minor wording changes which have been made to accommodate changes to the Specifications and PI unique needs. These changes are not identified by change numbers.
CL	212	In Bases 3.4.1, deleted discussion of a specific DNBR limit. More than one limit is used in the PI safety analysis, depending on the event analyzed.
TA	213	This change incorporates TSTF-136

Difference Category	Difference Number 3.4-	Justification for Differences
CL	214	In Bases 3.4.1, revised discussion of the source of the DNB limits to agree with their development in the PI specific safety analysis. The safety analysis does not use the term analytical limits. It does use conservative assumptions for transient initial conditions.
CL	215	In Bases 3.4.1, revised discussion of treatment of the RCS flow uncertainty to agree with plant specific implementation, and clarified the purpose of the DNB parameter allowances.
PA	216	In Bases 3.4.1, revised discussion to clarify the significance of increasing vs. decreasing transients.
CL	217	PI CTS requirements are all based on isothermal temperature coefficient (ITC). Consistent with ITS Section 3.1.3, moderator temperature coefficient (MTC) is changed to ITC throughout B3.4.2.

Difference Category	Difference Number 3.4-	Justification for Differences
PA	218	PI transient analyses assume a conservatively high or conservatively low HZP temperature, depending on the transient analyzed. The range around nominal HZP is selected to account for the assumptions. The minimum temperature for criticality is the lower value of this range.
PA	219	In Bases 3.4.1, Applicability, deleted the last sentence. The sentence presents an expectation for operator action that is not prescribed in the Specification. Chapter 2 covers operator response to potential SL violations.
	220	Not used.
CL	221	PI was licensed prior to issuance of 10CFR50 Appendix A. PI did commit, to the extent described in the USAR Section 1, to the Atomic Energy Commission (AEC) draft General Design Criteria (GDC) which were issued for comment July 10, 1967. Generally the AEC GDC number is different than the 10CFR50 Appendix A GDC number.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	222	Discussion of the reactor vessel material surveillance program is revised to reflect the status of the planned program. The USAR description of the program and requirements is referenced to ensure consistency with current licensing basis.
PA	223	In Bases 3.4.4, Background, removed the secondary function that is not relevant during the MODES of APPLICABILITY covered by this Specification.
CL	224	In Bases 3.4.4, revised the Applicable Safety Analysis discussion to more clearly represent PI specific analyses accounting for RCS flow, DNBR and applicable events. These changes are made to avoid possible misinterpretation of the analysis.
	225	Not used.
CL	226	In Bases 3.4.5, Applicable Safety Analysis, deleted discussion of a power excursion due to rod ejection. PI does not specifically analyze this transient for sub-critical conditions since it would not result in a power excursion and the reactor would remain sub-critical irrespective of the number of RC loops in operation.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	227	Clarified discussion of safety analyses to more closely represent the PI specific analysis methodology, assumptions, transients analyzed, and results acceptability. The only transient analyzed from sub-critical is accidental rod withdrawal, which assumes both loops in operation.
PA	228	Edited discussion of the testing campaign that is used as the basis for the LCO Note to more closely present that campaign as historical, is not expected to be repeated, and likely would require new test procedures.
PA	229	In Bases 3.4.5, Action D, deleted second occurrence of the sentence regarding opening RTB's or de-energizing MG sets. This sentence is redundant due to the change earlier in the paragraph from TSTF-87.
	230	Not used.
	231	Not used.

Difference Category	Difference Number 3.4-	Justification for Differences
PA	232	In Sections 3.4.5, 3.4.6 and 3.4.7, Bases LCO, the statement defining an OPERABLE SG is edited. The terminology "...Steam Generator Tube Surveillance Program," is not utilized in the PI ITS. Operability is sufficiently defined in other sections of ITS; thus this clarification is not necessary. The clarification that is unique to operation in the shutdown modes of a minimum wide range level, specified in SR 3.4.7.2, is added to Bases 3.4.7, LCO. This is consistent with the other Bases, 3.4.5 and 3.4.6.
	233	Not used.
	234	Not used.
	235	Not used.
	236	Not used.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	237	Section 3.4.6, 3.4.7 and 3.4.8 Bases, Applicable Safety Analysis, is edited to recognize that while it is acknowledged that forced RCS circulation increases the time available, PI does not have a current licensing basis analysis that quantifies the relationship to the time available.
PA	238	NUREG 1431 Section 3.4.6 Bases, Applicability, statements regarding the purpose of requiring forced circulation are not included in PI ITS. The purpose of providing forced flow, and redundant forced flow, is sufficiently discussed in the Background and LCO discussion, phrased in a manner that is not inconsistent with current licensing basis. Also, providing this additional clarification in B3.4.6 Applicability is inconsistent with B3.4.5 Applicability.
PA	239	Added clarification in Section 3.4.6 Bases, Action A, to emphasize the importance of immediate restoration of an RCS or RHR loop to provide forced flow in the Condition where both RHR loops are inoperable. This emphasis notes that remaining in MODE 4 with an RCS loop providing forced flow is more conservative than entry to a reduced MODE that would necessitate use of other inoperable cooling mechanisms.
	240	Not used.

Difference Category	Difference Number 3.4-	Justification for Differences
	241	Not used.
	242	Not used.
	243	Not used.
	244	Not used.
	245	Not used.
TA	246	Incorporated approved TSTF-114.
CL	247	NUREG Section 3.4.7 Bases, Background, includes "protection" in the sentence defining what constitutes an operable RHR loop. The flow and temperature instrumentation associated with the RHR System at PI do not provide any form of protection, so this term is not included in the ITS.
	248-255	Not used.

Difference Category	Difference Number 3.4-	Justification for Differences
TA	256	Incorporated approved TSTF-162.
PA	257	Statements are added to Bases Section 3.4.9 Background to clarify the discussion of small amounts of non-condensible gases. The added statements point out that the existence of these gases is to be expected, and that this presence is not significant when there is a steam bubble. These editorial additions are to improve operator understanding.
PA	258	NUREG 1431 SR 3.4.9.1 Bases statements "...corresponds to verifying the parameter each shift." and "...verify that operation is within safety analysis assumptions." are not included in ITS. Over the plant life, the operator shift duration has varied between 8 hours and 12 hours. Including the statement would result in the need revise this Bases when the shift is other than 12 hours. Although there is tacit assumption in the safety analysis that the pressurizer is not water solid, there is no basis in the assumption from which to quantify a level as a basis for any particular surveillance criteria. Other areas of the Bases discuss the purpose of the level in general terms. These discussions provide sufficient insight. The NUREG statement can be misinterpreted as implying specific SR criteria. Since it could be misleading, and is otherwise addressed, it is not included in the SR Bases.

Difference Category	Difference Number 3.4-	Justification for Differences
	259	Not used.
	260	Not used.
CL	261	NUREG 1431 Section 3.4.10 Bases, Applicable Safety Analysis, includes the statement "Safety valve actuation is required in events c, d, and e (above) to limit the pressure increase." The set of transients that require safety valve operation per the PI safety analysis is cycle specific. The results of these analyses is documented in the cycle specific COLR. Thus the statement is not included in the ITS Bases.
	262-266	Not used.
TA	267	Incorporates TSTF-151. Bases Action 3.4.11 C is edited to delete "the power will be restored and". The Action does not require removal of power, and such removal may not be necessary to affect restoration.

Difference Category	Difference Number 3.4-	Justification for Differences
PA	268	Bases Section 3.4.11 Applicability is edited to emphasize the SGTR event which per safety analysis and procedures is the event that utilizes the PORV's for mitigation and recovery. The secondary purpose of PORV and block valve operability, which is not assumed in safety analysis, is clarified to be consistent with operational use of these valves. This is consistent with TSTF-151. ISTS discussion related to potential causes of PORV spurious opening is deleted. This discussion is inconsistent with 2-loop plant control system design and is extraneous. As determined in post-TMI control system evaluation, the 2-loop plant control system does not utilize a rate circuit similar to the 3 and 4-loop plant control system, thus is not susceptible to the postulated spurious operation. The remaining discussion provides sufficient basis to support the MODE Applicability requirements. These changes eliminate possible operator confusion by clarifying the need for the valves. This is considered an editorial change.
	269	Not used.
	270	Not used.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	271	The original implementation of the LTOP requirements at PI involved installation of the Over Pressure Protection System (OPPS) and air accumulators for the PORV's. OPPS used existing RCS parameters as inputs. OPPS provides the algorithms, logic, and setpoints for alarms and PORV actuation. The input instrumentation and the PORV's retain the original systems assignment. Thus, an "LTOP system" does not exist within PI terminology. The "LTOP function" used in the ITS Specification is provided by components assigned to multiple plant systems. The Bases is revised throughout to clearly identify OPPS, the functionality OPPS provides, and the distinction between OPPS and the components that are part of other systems.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	272	The LTOP requirements have been split into two Specifications based on mass input limits established in the PI specific analyses. Bases Section 3.4.12 and new Bases Section 3.4.13, Background and Applicable Safety Analyses are edited to correlate to the PI specific analyses. To ensure consistency with the analyses and avoid statements that may be inaccurate for the plant conditions within the applicable operating regime of each Specification, the summary purpose for provision of low temperature overpressure protection is replaced with CTS Bases statements. The analyzed transients, resultant limitations and mitigation requirements are edited to be consistent with the PI specific analysis and LCO. NUREG-1431 statements regarding analysis results that are not clearly stated within the PI analyses are not included. Since the Applicability split between the two Sections is a point that does not align with the MODE definitions in NUREG-1431, use of the term "LTOP MODES" is not directly applicable to either Specification. In order to provide a simple, understandable replacement for "LTOP MODES", reference to the Applicability statement of the Specification is inserted.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	273	The NUREG 1431 SR 3.4.12.1 and 3.4.12.2 Bases are edited to PI specific current license requirements and practices. The NUREG alternative methods for LTOP control other than removing power from the SI pumps. The ITS delineates the methods provided for in CTS. These methods are consistent with the criteria for acceptable alternatives listed in the NUREG bases. The method of verifying accumulator discharge valve status is delineated.
	274-296	Not used.
CL	297	The PIVs are included in the PI ITS as the result of an Order for Modification of License issued by the NRC April 20, 1981. Since the Regulations listed in the Bases Background are not the basis for including these valves in this Specification, they are not included in the discussion or as references in this Bases.
PA	298	The Background paragraph which discussed what LCO 3.4.14 (ISTS 3.4.13) is not included since this is not accurate for PI and this paragraph is not necessary in the Bases.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	299	The Bases Applicable Safety Analyses have been revised to provide clarification and agree with the USAR and CTS Bases for RCS leakage TS.
PA	300	Clarification is provided that leakage past pressurizer safety valve seats does not meet the definition of reactor coolant pressure boundary leakage. This is explicitly stated since it has been an issue with the PI operators previously.
CL	301	PI is not committed to R.G. 1.45 and thus the leakage detection requirements are referenced to the leakage detection instrumentation specification.
TA	302	This change incorporates TSTF-54, Revision 1.
CL	303	The 150 gallon per day SG primary to secondary leakage rate is based on the Steam Generator Voltage Based Alternate Repair Criteria approved for PI in License Amendments 133/125 issued November 18, 1997.
CL	304	CTS Bases discussion of the role of seal welds at threaded joints are included in the ITS to provide clarification.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	305	CTS requirements have been relocated to the ITS Bases.
CL	306	The PI list of PIVs is in the CTS and has been relocated to the Bases LCO discussion. Reference to a separate list in the USAR is not required. This list is based on the NRC study provided in the letter from Robert A. Clark, NRC, to L. O. Mayer, NSP, subject: "Order for Modification of License Concerning Primary Coolant System Pressure Isolation Valves," dated April 20, 1981.
CL	307	The CTS required minimum test pressure differential across the PIVs has been relocated to the Bases.
CL	309	The definition of PIVs provided in these Bases is very broad and thus the Bases are clarified to assure that only the PIVs included in the CTS are included in this LCO. The CTS lists PIVs based on the NRC study which identified the risk significant configurations. Thus the Bases are modified to clarify that this Specification applies to the risk significant valves as identified in the LCO section of the Bases.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	310	CTS Bases and the USAR (Ref. 2) describe methods for leakage detection at PI which are not included in the ISTS. Discussion of these methods have been included in the PI ITS Bases to make the presentation complete. As noted in the proposed Bases, these methods are not required by this LCO. Reference to Regulatory Guide 1.45 is not included since PI is not committed to this document.
CL	311	The NUREG-1431 discussion of air cooler condensate flow rates is not applicable to PI and has been replaced with a discussion of Sump A pump run time monitoring which provides comparable indication. Although run time instrumentation is not required by the CTS, it is included in the ITS.
	312	Not used.
TA	313	This change incorporates TSTF-205, Revision 3.
TA	314	This change incorporates TSTF-137.
	315	Not used.

Difference Category	Difference Number 3.4-	Justification for Differences
TA	316	This change incorporates TSTF-154, Revision 2.
CL	317	Clarification is provided in the LCO discussion of the Bases as to the purpose of this specification.
	318	Not used.
CL	319	The discussion of humidity measurements has been modified to reflect monitoring capabilities at PI.
	320	Not used.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	321	CTS require two methods of instrumentation to detect RCS leakage; however, the second method, other than radionuclide monitoring, is not required to indicate in the control room. The ITS includes containment sump monitoring because it is closest to the methods given in NUREG-1431 and is one of the methods currently used at PI. This is in addition to other indications in the control room such as containment pressure, temperature, humidity and pressurizer level. Some of these parameters are required to be monitored by other Specifications for other reasons, but would certainly be evaluated for RCS leakage if they indicated abnormally. However, containment sump monitoring is not installed instrumentation in the control room. A physical plant modification would be required to allow it to indicate in the control room. Therefore, the Bases Applicable Safety Analyses discussion references 10 CFR 50.36 (c)(2)(ii) Criterion 4 for this instrumentation.
CL	322	Since PI is extending the refueling cycle to 24 months through this license amendment, operating experience with this interval does not exist.
CL	323	Specific instruments which satisfy the requirements of this LCO have been included for clarity.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	324	The NUREG-1431 discussion of the analyses which support Specification 3.4.17 have not been included and have been replaced by the discussion from PI CTS. In 1979 PI was requested by the NRC to incorporate RCS Specific Activity limits which are equivalent to those in Specification 3.4.17. These limits were issued by the NRC on December 4, 1981 (ITS Bases 3.4.17 Ref. 2). However, NSP was not provided with the analyses which support these limits; thus the Bases were revised stating that the limits are based on NRC parametric evaluations. In November 1999 NSP requested these evaluations, but the NRC was unable to find them. Since PI does not have USAR analyses which support these limits, we continue to depend on the NRC parametric evaluations as stated in the Bases for ITS LCO 3.4.17. to determine that the NUREG-1431 Bases 3.4.16.
CL	325	NUREG-1431 does not provide a basis for operating within the limits of Figure 3.4.17-1; therefore, discussion from the CTS Bases is included.

Difference Category	Difference Number 3.4-	Justification for Differences
CL	326	The PI CTS and ITS specify instrumentation allowable values and do not specify setpoints. The values of these setpoints are determined by the PI Setpoint Methodology Program. Therefore the specific setpoints have been removed from the Bases for ITS 3.4.18. Placing setpoint requirements in the Bases is an obscure location for them.
PA	327	The NUREG-1431 discussion of tests which will be performed is not included since PI has already performed the tests required to operate. Any tests which may have to be performed in the future will be defined when they are required.

PACKAGE 3.4

REACTOR COOLANT SYSTEM (RCS)

PART G

NO SIGNIFICANT HAZARDS DETERMINATION (NSHD)

and

ENVIRONMENTAL ASSESSMENT

for

CHANGES TO PRAIRIE ISLAND CURRENT TECHNICAL SPECIFICATIONS

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

PART G

PACKAGE 3.4

REACTOR COOLANT SYSTEM (RCS)

NO SIGNIFICANT HAZARDS DETERMINATION AND ENVIRONMENTAL ASSESSMENT

NO SIGNIFICANT HAZARDS DETERMINATION

The proposed changes to the Operating License have been evaluated to determine whether they constitute a significant hazards consideration as required by 10CFR Part 50, Section 50.91 using the standards provided in Section 50.92.

For ease of review, the changes are evaluated in groupings according to the type of change involved. A single generic evaluation may suffice for some of the changes while others may require specific evaluation in which case the appropriate reference change numbers are provided.

A - Administrative (GENERIC NSHD)
(A3.4-03, A3.4-08, A3.4-14, A3.4-18, A3.4-22, A3.4-28, A3.4-39, A3.4-46, A3.4-49, A3.4-61, A3.4-71, A3.4-73, A3.4-77, A3.4-78, A3.4-83, A3.4-99)

Most administrative changes have not been marked-up in the Current Technical Specifications, and may not be specifically referenced to a discussion of change. This No Significant Hazards Determination (NSHD) may be referenced in a discussion of change by the prefix "A" if the change is not obviously an administrative change and requires an explanation.

These proposed changes are editorial in nature. They involve reformatting, renaming, renumbering, or rewording of existing Technical Specifications to provide consistency

Administrative (continued)

with NUREG-1431 or conformance with the Writer's Guide, or change of current plant terminology to conform to NUREG-1431. Some administrative changes involve relocation of requirements within the Technical Specifications without affecting their technical content. Clarifications within the new Prairie Island Improved Technical Specifications which do not impose new requirements on plant operation are also considered administrative.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed conversion of Prairie Island Current Technical Specifications to conform to NUREG-1431 involves reformatting, rewording, changes in terminology and relocating requirements. These changes are simply editorial, or do not involve technical changes and thus they do not impact any initiators of previously analyzed events or assumed mitigation of accident or transient events. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   These proposed administrative changes do not involve physical modification of the plant, no new or different type of equipment will be installed or removed associated with these administrative changes, nor will there be changes in parameters governing normal plant operation. The proposed administrative changes do not impose new or different requirements on plant operation. Therefore, these administrative changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   These proposed administrative changes do not impact any safety analysis assumptions. Therefore, these changes do not involve a reduction in the plant margin of safety.

M - More restrictive (GENERIC NSHD)
(M3.4-04, M3.4-06, M3.4-07, M3.4-11, M3.4-12, M3.4-13, M3.4-17, M3.4-21, M3.4-26, M3.4-31, M3.4-32, M3.4-33, M3.4-34, M3.4-37, M3.4-38, M3.4-41, M3.4-42, M3.4-43, M3.4-44, M3.4-45, M3.4-51, M3.4-52, M3.4-54, M3.4-57, M3.4-62, M3.4-63, M3.4-64, M3.4-72, M3.4-81, M3.4-84, M3.4-85)

This proposed Technical Specifications revision involves modifying the Current Technical Specifications to impose more stringent requirements upon plant operations to achieve consistency with the guidance of NUREG-1431, correct discrepancies or remove ambiguities from the specifications. These more restrictive Technical Specifications have been evaluated against the plant design, safety analyses, and other Technical Specifications requirements to ensure the plant will continue to operate safely with these more stringent specifications.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed changes provide more stringent requirements for operation of the plant. These more stringent requirements do not result in operation that will increase the probability of initiating an analyzed event and do not alter assumptions relative to mitigation of an accident or transient event.

   These more restrictive requirements continue to ensure process variables, structures, systems, and components are maintained consistent with the safety analyses and licensing basis. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   The proposed changes do not involve a physical alteration of the plant, that is, no new or different type of equipment will be installed, nor do they change the methods governing normal plant operation.

   These more stringent requirements do impose different operating restrictions. However, these operating restrictions are consistent with the boundaries established by the assumptions made in the plant safety analyses and licensing bases. Therefore, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

M - More restrictive (continued)

3. The proposed amendment will not involve a significant reduction in the margin of safety.

The imposition of more stringent requirements on plant operation either has no impact on the plant margin of safety or increases the margin of safety. Each change in this category is by definition providing additional restrictions to enhance plant safety by:

a) increasing the analytical or safety limit;
b) increasing the scope of the specifications to include additional plant equipment;
c) adding requirements to current specifications;
d) increasing the applicability of the specification;
e) providing additional actions;
f) decreasing restoration times;
g) imposing new surveillances; or
h) decreasing surveillance intervals.

These changes maintain requirements within the plant safety analyses and licensing bases. Therefore, these changes do not involve a significant reduction in a margin of safety.

R - Relocation (GENERIC NSHD)
(R3.4-56, R3.4-66, R3.4-67)

This License Amendment Request (LAR) proposes to relocate requirements contained in the Current Technical Specifications out of the Technical Specifications into licensee controlled programs. These requirements are relocated because they 1) do not meet the Technical Specifications selection criteria defined in 10 CFR 50.36; or 2) are mandated by current Nuclear Regulatory Commission (NRC) regulations and are therefore unnecessary in the Technical Specifications.

In the NRC Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors (dated 7/16/93), the NRC stated:

> . . . since 1969, there has been a trend towards including in Technical Specifications not only those requirements derived from the analyses and evaluations included in the safety analysis report but also essentially all other Commission requirements governing the operation of nuclear power reactors. . . This has contributed to the volume of Technical Specifications and to the several-fold increase, since 1969, in the number of license amendment applications to effect changes to the Technical Specifications. It has diverted both staff and licensee attention from the more important requirements in these documents to the extent that it has resulted in an adverse but unquantifiable impact on safety.

Thus, relocation of unnecessary requirements from the Current Technical Specifications should result in an overall improvement in plant safety through more focused attention to the requirements that are most important to plant safety.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   These proposed changes relocate requirements for structures, systems, components or variables which did not meet the criteria for inclusion in the improved Technical Specifications, or which duplicate regulatory requirements. The affected structures, systems, components or variables are not assumed to be initiators of analyzed events and are not assumed to mitigate accident or transient events.

Relocation (continued)

These relocated operability requirements will continue to be maintained pursuant to 10 CFR 50.59, other regulatory requirements (as applicable for the document to which the requirement is relocated), or the Administrative Controls section of these proposed improved Technical Specifications.

Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

These proposed changes do not involve a physical alteration of the plant (no new or different type of equipment will be installed) or changes in parameters governing normal plant operation. The proposed changes do not impose any different requirements and adequate control of existing requirements will be maintained. Thus, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment will not involve a significant reduction in the margin of safety.

These proposed changes will not reduce the margin of safety because they do not impact any safety analysis assumptions. In addition, the relocated requirements for the affected structure, system, component or variables are the same as the current Technical Specifications. Since future changes to these requirements will be evaluated per the requirements of 10 CFR 50.59, other regulatory requirements (as applicable for the document to which the requirement is relocated), or the Administrative Control section of the Improved Technical Specifications, proper controls are in place to maintain the plant margin of safety. Therefore, these changes do not involve a significant reduction in the margin of safety.

LR - Less restrictive, Relocated details (GENERIC NSHD)
(LR3.4-01, LR3.4-24, LR3.4-53, LR3.4-74, LR3.4-94, LR3.4-96, LR3.4-97, LR3.4-98)

Some information in the Prairie Island Current Technical Specifications that is descriptive in nature regarding the equipment, system(s), actions or surveillances identified by the specification has been removed from the proposed specification and relocated to the proposed Bases, Updated Safety Analysis Report or licensee controlled procedures. The relocation of this descriptive information to the Bases of the Improved Technical Specifications, Updated Safety Analysis Report or licensee controlled procedures is acceptable because these documents will be controlled by the Improved Technical Specifications required programs, procedures or 10CFR50.59. Therefore, the descriptive information that has been moved continues to be maintained in an appropriately controlled manner.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed changes relocate detailed, descriptive requirements from the Technical Specifications to the Bases, Updated Safety Analysis Report or licensee controlled procedures. These documents containing the relocated requirements will be maintained under the provisions of 10CFR50.59, a program or procedure based on 10CFR50.59 evaluation of changes, or NRC approved methodologies. Since these documents to which the Technical Specifications requirements have been relocated are evaluated under 10CFR50.59 or its guidance, or in accordance with NRC approved methodologies, no increase in the probability or consequences of an accident previously evaluate will be allowed without prior NRC approval. Therefore, these changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   These proposed changes do not necessitate physical alteration of the plant, that is, no new or different type of equipment will be installed, or change parameters governing normal plant operation. The proposed changes will not impose any different requirements and adequate control of the information will be maintained. Thus, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

LR - Less restrictive, Relocated details (continued)

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   The proposed changes will not reduce a margin of safety because it has no impact on any safety analysis assumptions. In addition, the requirements to be transposed from the Technical Specifications to the Bases, Updated Safety Analysis Report or licensee controlled procedures are the same as the existing Technical Specifications. Since future changes to these requirements will be evaluated under 10CFR50.59 or its guidance, or in accordance with NRC approved methodologies, no reduction in a margin of safety will be allowed without prior NRC approval. Therefore, these changes do not involve a significant reduction in a margin of safety.

L - Less restrictive, Specific

Each CTS change which is designated as Less (L prefix) restrictive on plant operations is provided with a specific NSHD.

Specific NSHD for Change L3.4-02

CTS DNB parameter limitations are modified by a Note which does not apply pressurizer pressure limits during power step or ramp increases. This change will delete the "increase" limitation in the note so that the Note also applies during decreases. This change is acceptable because DNBR increases when power is decreased; thus the protection intended by this specification continues to be provided. This change is consistent with NUREG-1431.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   Ramp and step decreases in power increase the DNBR since the power level is decreased; therefore this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   Relaxing pressurizer pressure limits during a ramp or step decrease in power does not change any plant operating parameters and does not involve any plant modifications or new equipment; thus the possibility of a new or different kind of accident is not created.

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   Since DNBR is increased as power decreases, allowing the pressurizer pressure limits to be exceeded does not reduce any safety margins. Therefore this change does not involve a significant reduction in the margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-05

This change will allow 6 hours to reduce power to MODE 2 when DNB limits are not met which is 2 hours in addition to the CTS allowed completion time for this action statement. This change is acceptable since 6 hours is a reasonable time to perform an orderly shutdown and is consistent with other TS Required Actions requiring transition to MODE 2. This change is consistent with the guidance of NUREG-1431.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The time allowed by the TS for shutting the unit down in the event of an out-of-limit DNB parameter is not a precursor of initiating event for any analyzed accidents. Therefore the proposed change will not affect the probability of any accident previously evaluated. Furthermore, the proposed change in the Completion Time for performance of this Required Action does not significantly increase the consequences of an accident because a change in the Completion Time does not change the assumed response of the equipment in performing its specified mitigation functions, or change the response of the core parameters to assumed scenarios, from that considered during the original Completion Time. Therefore, the proposed change does not involve a significant increase in the consequences of any accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   Extending the time to go to MODE 2 under these circumstances does not change any plant operating parameters and does not involve any plant modifications or new equipment; thus the possibility of a new or different kind of accident is not created.

Specific NSHD for Change L3.4-05 (continued)

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   Extending the time to go to MODE 2 by 2 hours does not significantly reduce the plant margin of safety since this change does not change any plant operating parameters or conditions. The extended time also allows the operators additional time to perform an orderly shutdown which may increase the margin of safety since plant safety may be challenged if the plant is subjected to a transient during the transition to MODE 2. Therefore, the short extension of the Completion Time interval does not involve a significant reduction in the margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-16

CTS allow 6 hours to cool down below 350°F if one RCS loop is inoperable in MODE 3 or MODE 2 with $k_{eff} < 1.0$. This change will allow 12 hours to cool down.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   Allowing 12 hours to go to MODE 4 does not increase the consequences of an accident since the plant operating conditions are not changed by this Completion Time change. Allowing an additional 6 hours to cool down to MODE 4 does not significantly increase the probability of an accident since this is a small amount of additional time and it is unlikely an accident would occur in this time.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   Extending the time to go to MODE 4 under these circumstances does not change any plant operating parameters and does not involve any plant modifications or new equipment; thus the possibility of a new or different kind of accident is not created.

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   Extending the time to go to MODE 4 by 6 hours does not significantly reduce the plant margin of safety since this change does not change any plant operating parameters or conditions. The extended time also allows the operators additional time to plan an orderly shutdown which may increase the margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-23

This deletes the CTS requirement to open the reactor trip breakers during the period when both reactor coolant pumps are not operating. Both pumps are permitted to be shut down to perform special tests. The ITS expands the special tests to include rod drop times which can not be performed if the reactor trip breakers are open. These tests are performed during MODE 3 when the reactor is subcritical under the guidance of preplanned test procedures; thus adequate shutdown margin may be provided by additional boration. This change is consistent with the guidance of NUREG-1431.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   CTS requires the reactor trip breakers to be opened when both RCPs are shut down to prevent a power excursion accident due to inadvertent control rod withdrawal. However, for these special test circumstances, the plant would assure that the RCS is sufficiently borated to prevent a criticality accident due to an uncontrolled rod withdrawal. Furthermore, the TS requires these tests to be limited to less than or equal to one hour and no operations permitted that would cause reduction of the RCS boron concentration. Since the time for these tests is restricted to one hour, this change does not significantly increase the probability of an accident previously evaluated. Since the boration will be appropriate for the planned test, this change does not involve a significant increase in the consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   The plant has been analyzed for uncontrolled rod withdrawal; thus this change does not create the possibility of a new or different kind of accident.

Specific NSHD for Change L3.4-23 (continued)

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   During the time that both RCPs are not operating, the plant would be under preplanned test conditions which require adequate boration to assure the plant is safe and any activities which would cause reduction of RCS boron concentration are not allowed. Additionally, these tests are performed very infrequently. Therefore, allowing the reactor trip breakers to remain closed does not significantly reduce the plant margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-36

This change will allow one RHR loop to be inoperable up to 2 hours to perform surveillance testing.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The RHR system is not an accident initiator; thus this change does not involve a significant increase in the probability of an accident. Since one RHR loop is OPERABLE and operating and other remedial equipment, such as the SI system, is also available to mitigate an accident the consequences of an accident are not significantly increased by this operational change.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   Allowing one RHR loop to be inoperable during this mode of operation does not change any plant operating parameters and does not involve any plant modifications or new equipment; thus the possibility of a new or different kind of accident is not created.

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   This change allows one RHR loop to be inoperable up to 2 hours to perform required surveillance testing. This permits periodic surveillance tests to be performed on the inoperable loop during the only time when such testing is safe and possible. The other RHR loop is required to be in operation and since this is a very reliable system it is unlikely to stop during this short time period. Performance of this testing which involves taking a RHR loop out of service when the plant is using RHR for cooling would be an unusual plant evolution which would be performed with heightened operator awareness and close supervision. These tests would also involve plant procedures which would require the availability of remedial equipment such as the SI and charging pumps. Thus, allowing one loop of RHR inoperable for surveillance testing does not significantly reduce the margin of safety .

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-47

This change will delete the requirement to maintain one pressurizer safety valve (PSV) operable when below 350°F (MODES 5 and 6).

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The PSV does not perform a safety function in MODES 5 and 6 since its lift setting exceeds the allowable RCS pressure under these plant conditions. Also, these valves are not assumed for mitigation of any accident under these plant conditions. Thus, deletion of these requirements does not significantly increase the probability or consequences of an accident.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   This proposed change does not involve a physical alteration of the plant, that is, no new or different type of equipment will be installed. This proposed change does not introduce any new mode of plant operation or change the methods governing normal plant operation. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   Deletion of the requirement for a PSV in MODES 5 and 6 does not impact any plant safety margins since the valve will not perform a safety function under these plant conditions. Therefore, this change does not involve a significant reduction in the plant margins of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-48

This change will add a Note which allows the pressurizer safety valve (PSV) lift settings to be outside the LCO limits for the purpose of setting the PSVs under hot conditions. This change is acceptable because the Note also requires the PSV lift settings to be set at cold conditions prior to startup and limits the time period during which the valves may be adjusted. This change is consistent with the guidance of NUREG-1431.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed change will allow the plant to adjust the PSV lift settings under hot conditions. Current TS and plant practices require the PSV lift settings to be adjusted under cold conditions prior to heatup. The new Note added by this change also requires the PSV lift settings to be adjusted under cold conditions prior to heatup. The PSV are not assumed accident initiators; thus this change does not significantly increase the probability of an accident previously evaluated. Since this Note applies when the plant is heating up, the decay heat will likely be much lower than when the plant is operating in MODE 1, the design basis condition for the PSVs. Since both PSVs are operable as the plant heats up, one PSV remains operable while one valve is adjusted, the plant decay heat load is low and the time for adjusting the PSVs is restricted by the Note, this change does not significantly increase the consequences of an accident.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   This proposed change does not involve a physical alteration of the plant, that is, no new or different type of equipment will be installed. This proposed change does not introduce any new mode of plant operation or change the methods governing normal plant operation. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Specific NSHD for Change L3.4-48 (continued)

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   The addition of this note may allow one PSV to be inoperable for a short period of time to be adjusted under hot conditions. This allows the valve to be set more accurately and thus may increase plant safety. During this time the plant has reduced decay heat because the plant has been shutdown. Thus, overall this change does not involve a significant reduction in the plant margins of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-50

This change will allow 12 hours to place the plant in MODE 5, depressurize and vent the RCS, when the RCS temperature is greater than the SI pump disable temperature and less than the OPPS enable temperature and a PORV is not restored within the allowed outage time or both PORVs are inoperable. CTS allows 8 hours to be in MODE 5 with the RCS depressurized and vented through at least a 3 square inch vent. This change is consistent with the guidance of NUREG-1431 as modified by approved TSTF-352, Revision 1.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The PORVs and OPPS are not assumed to be accident initiators and therefore this change does not involve a significant increase in the probability of an accident previously evaluated.

   This change does not change the temperature or pressure of the RCS or the condition of the coolant or fuel; it only changes the time allowed to fully depressurize and vent the RCS. Thus, if an accident were to occur, the consequences would not be significantly increased. This change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   This proposed change does not involve a physical alteration of the plant, that is, no new or different type of equipment will be installed. This proposed change does not introduce any new mode of plant operation or change the methods governing normal plant operation. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Specific NSHD for Change L3.4-50 (continued)

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   The CTS allowed shutdown time of 8 hours is considered by the industry to be insufficient time to perform an orderly shutdown. An additional 4 hours will maintain plant safety by allowing the operators to plan the shutdown and prevent challenges to plant systems which may initiate an overpressure event which the shutdown intends to prevent. Thus, the additional time the RCS can be pressurized is offset by the increased safety of the shutdown process. Therefore, overall this change does not involve a significant reduction in the plant margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431 as modified by approved TSTF-352, Revision 1.

Specific NSHD for Change L3.4-68

This change adds action statements and remedial actions which allow the plant to continue to operate if one means of leakage detection is inoperable. These actions and continued operation are acceptable since the plant will be required to implement compensatory actions which provide comparable detection capability while the leak detection instrumentation is inoperable. This change is consistent with the guidance of NUREG-1431.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   With this change RCS leakage will continue to be monitored by the remaining required leakage detection equipment and leakage will also be monitored by specified alternative means. These alternative methods usually involve performing manual sampling or evaluation, and therefore, there may be a small time delay in alerting operators to a leak compared to the required monitor. However, these alternative means are generally as sensitive as the required instrumentation. Thus this change does not involve a significant increase in the probability of an accident.

   This change does not change the plant conditions or potential for accident releases thus it does not involve a significant increase in the consequences of an accident.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   This proposed change does not involve a physical alteration of the plant, that is, no new or different type of equipment will be installed. The alternative means of monitoring leakage are not new methods since they are currently in use at PI. This change will recognize these monitoring methods in the TS to allow continued operation of the plant for a specified time. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Specific NSHD for Change L3.4-68 (continued)

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   This change does not involve a significant reduction in the margin of safety since alternative measures are required which will alert operators to RCS leakage on timely, but somewhat delayed, basis.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-79

This change provides a new Action Statement which allows 4 hours to isolate a PIV flow path with excessive leakage and 72 hours to restore the PIV to operability. CTS allows one hour to initiate plant shutdown and 6 hours to be in MODE 3. This change is acceptable because it is unlikely that a PIV will fail completely during the additional 3 hours allowed to isolate the flow path. Once the flow path is isolated, the safety function of the PIV is met. The 72 hour limit is consistent with allowed outage time for other safety equipment repairs and may also be limited by the specifications for other systems made inoperable when the PIV flow path is isolated. This change is consistent with the guidance of NUREG-1431.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This proposed change will allow 4 hours to isolate a PIV flow path by closing a valve which meets the PIV leakage limits. This proposed change will also allow the plant to continue to operate for 72 hours with the PIV flow path isolated. The TS allowed leakage limits are set conservatively low; therefore, a PIV that exceeds the TS limit is not near complete failure. Once the PIV flow path is isolated, the safety function is met. Therefore this change does not involve a significant increase in the probability of an accident. Allowing an additional option to isolate the PIV flow path and allowing an additional 3 hours to take action does not change the consequences of an accident and therefore does not involve a significant increase in the consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   This proposed change does not involve a physical alteration of the plant; that is, no new or different type of equipment will be installed. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Specific NSHD for Change L3.4-79 (continued)

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   This proposed change will allow 4 hours to isolate a PIV flow path by closing a valve which meets the PIV leakage limits. CTS allows plant operation for 1 hour and 6 hours to be in MODE 3 with PIV leakage in excess of the limits. The CTS requirements allow plant operations at normal operating pressures for up to 7 hours, during the completion time to be in MODE 3, with reliance on the leaking PIV. Thus the proposed ITS allows the plant to rely on the leaking PIV for less time than CTS and therefore, this change does not involve a significant reduction in the margin of safety. Once the PIV flow path is isolated by a valve which meets the PIV leakage limits, the safety function of the PIV is met and continued plant operation for 72 hours does not involve a significant reduction in the margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-82

This change will delete RCS activity limits when the RCS is < 500°F and above cold shutdown (200°F).

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The purpose of this specification is to limit the offsite doses following a SGTR to a small fraction of 10CFR100. When the RCS temperature is less than 500°F the release of radioactivity is unlikely since the saturation pressure of the reactor coolant is below the lift pressure settings of the main steam safety valves. Thus, eliminating the RCS activity limits in MODE 3 below 500°F and in MODES 4 and 5 does not involve a significant increase in the probability or consequences of an accident.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   This proposed change does not involve a physical alteration of the plant; that is, no new or different type of equipment will be installed. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   Since there is a very low probability of radioactive releases in the modes affected by this change, the change does not involve a significant reduction in the margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-86

This change will extend the surveillance interval to 24 months in support of planned refueling cycles of up to 24 months. CTS require SR each refueling outage or at 18 month intervals and allow this to be extended to 24 months under the provisions of CTS 4.0.A. CTS also specify that intervals between tests scheduled for refueling shutdowns shall not exceed two years and proposed SR 3.0.2 will retain this restriction. The specific change addresses extending the test interval for pressurizer PORV operability and pressurizer heater emergency power supply operability.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This change will clarify and codify the acceptability of repeatedly performing these surveillances at 24 month intervals when CTS require them to be performed every 18 months or each refueling cycle. As discussed above, the maximum surveillance interval is not changed by this proposed specification. Thus these changes do not involve a significant increase in the probability of an accident.

   Changing surveillance intervals does not change any plant conditions which would contribute to accident releases; therefore, these changes do not involve a significant increase in the consequences of an accident.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   These proposed changes may increase plant equipment surveillance intervals and do not involve a physical alteration of the plant; that is, no new or different type of equipment will be installed. Thus, these changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Specific NSHD for Change L3.4-86 (continued)

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   For any particular refueling cycle this change does not impact any margins of safety because CTS allows a maximum surveillance interval for all affected surveillances. Over many years of operation with the proposed specifications, these surveillances may be performed less times; that is, over the remaining licensed life of the plant these surveillances may be performed 2 times less than with CTS. Thus these changes do not involve a significant reduction in the margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This proposed change is consistent with the guidance of NRC issued Generic Letter 91-04.

Specific NSHD for Change L3.4-87

This change replaces the CTS 1.0 gpm PIV leakage rates with a new limit of 0.5 gpm per inch of nominal valve size up to 5 gpm maximum. This change is acceptable since it assures leakage is limited to a small, acceptable rate while it does not unduly penalize larger valves and require unwarranted repairs and associated radiation exposures. This change is consistent with the guidance of NUREG-1431.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed change revises the allowable pressure isolation valve leakage limit to a variable limit based on valve size which may allow more intersystem leakage. Revising the allowable intersystem leakage limits may in some cases permit a slightly higher leakage rate, but does not pose a threat to the integrity of the RCS or containment. The systems which could potentially receive the RCS leakage are appropriately protected with relief devices, thus ensuring the structural integrity of these systems. Thus, this change will not contribute to the failure probability of any plant structure, system or component. Because the probability of failure of plant equipment is not affected, there is no impact on the probability of occurrence of a previously analyzed accident.

   The allowable leakage through the PIVs is bounded by the accident analyses; thus the change does not involve an increase in the consequences of an accident previously evaluated. This change does not involve an increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   This proposed change does not involve a physical alteration of the plant; that is, no new or different type of equipment will be installed. The proposed change introduces no new mode of plant operation or changes in the methods governing normal plant operation. Intersystem leakage will be accounted for as either identified or unidentified leakage, both of which are limited to acceptable values by applicable LCOs. Therefore, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Specific NSHD for Change L3.4-87 (continued)

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   The margin of safety is established through equipment design, limitations on operating parameters, and the setpoints at which automatic actions are initiated. No equipment design features are impacted by this change, no operating parameters are revised, and no change is proposed to the actuation setpoints. Appropriate Technical Specification controls remain which will ensure that the operational limits and equipment necessary to maintain the design margins are not unacceptably degraded. Therefore, this change does not involve a significant reduction in a margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-88

This change will extend the interval for verifying RCS gross specific activity from 5 times per week to once per week. This change is consistent with the guidance of NUREG-1431.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   Verifying RCS gross specific activity is not considered as an initiator for any accidents; therefore, this change does not significantly increase the probability of a previously analyzed accident.

   The proposed change does not further degrade the capability of the plant to identify fuel failures since other indications, such as radiation alarms, are available; therefore this change does not involve a significant increase the consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   This proposed change does not involve a physical alteration of the plant; that is, no new or different type of equipment will be installed. The proposed change does not introduce a new mode of plant operation or changes in the methods governing normal plant operation. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   This change in a surveillance interval does not degrade the capability of the plant to identify gross fuel failure since other indications are available. Therefore, this change does not involve a significant reduction in a margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-89

This change increases the surveillance interval for performing an RCS water inventory balance from daily to once every 72 hours. This change is consistent with the guidance of NUREG-1431.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   Verification of RCS water inventory is not considered as an initiator for any accidents; therefore, this change does not significantly increase the probability of a previously analyzed accident.

   The proposed change does not further degrade the capability of operations to identify leakage in the RCS since other indications, including letdown, are available. Thus, this change does not involve a significant increase the consequences of an accident previously evaluated.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   This proposed change does not involve a physical alteration of the plant; that is, no new or different type of equipment will be installed. The proposed change does not introduce a new mode of plant operation or changes in the methods governing normal plant operation. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   This change in a surveillance interval does not degrade the capability of the plant to identify leakage in the RCS since other indications are available. Therefore, this change does not involve a significant reduction in a margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

Specific NSHD for Change L3.4-91

The requirement to sample the RCS for isotopic analysis every four hours when 100/$\bar{E}$ exceeds its limit is not included in the CTS. This change is acceptable since the plant is required to be shutdown within 6 hours of discovery of this condition. This change is consistent with the guidance of NUREG-1431.

1. The proposed amendment will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   Performing RCS isotopic analysis is not considered as an initiator for any accidents; therefore, this change does not significantly increase the probability of a previously evaluated accident.

   Additional TS required performance of RCS isotopic analysis when 100/$\bar{E}$ limits are exceeded does not change the level of activity in the RCS or change the plant actions since under these conditions the plant is required to shut down. Therefore, the consequences of an accident previously evaluated are not significantly increased.

2. The proposed amendment will not create the possibility of a new or different kind of accident from any accident previously analyzed.

   This proposed change does not involve a physical alteration of the plant; that is, no new or different type of equipment will be installed. The proposed change does not introduce a new mode of plant operation or changes in the methods governing normal plant operation. Thus, this change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

Specific NSHD for Change L3.4-91 (continued)

3. The proposed amendment will not involve a significant reduction in the margin of safety.

   Performance of RCS isotopic analysis when 100/$\bar{E}$ limits are exceeded does not change the level of activity in the RCS or change the plant actions since under these conditions the plant is required to shut down. Thus, removal of this requirement does not involve a significant reduction in a margin of safety.

Therefore it is concluded this proposed change does not involve a significant hazards consideration. This change is consistent with the guidance of NUREG-1431.

ENVIRONMENTAL ASSESSMENT

The Nuclear Management Company has evaluated the proposed changes and determined that:

1. The changes do not involve a significant hazards consideration, or

2. The changes do not involve a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or

3. The changes do not involve a significant increase in individual or cumulative occupational radiation exposure.

Accordingly, the proposed changes meet the eligibility criteria for categorical exclusion set forth in 10 CFR Part 51 Section 51.22(c)(9). Therefore, pursuant to 10 CFR Part 51 Section 51.22(b), an environmental assessment of the proposed changes is not required.

PACKAGE 3.4

REACTOR COOLANT SYSTEM (RCS)

CROSS - REFERENCE

CURRENT TECHNICAL SPECIFICATIONS

TO

IMPROVED TECHNICAL SPECIFICATIONS

List of Section Cross - References

3.1
3.3
3.10
4.3
4.6
4.18
Figure
Table 4.1-1C
Table 4.1-2A
Table 4.1-2B

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section 3.1				
3.1.A.1.a (1)		LCO	3.4.4	
3.1.A.1.a (1)		LCO	3.4.18	
3.1.A.1.a (2)		LCO	3.4.4	
New		SR	3.4.18.1	
New		SR	3.4.18.2	
New		SR	3.4.4.1	
3.1.A.1.b		LCO	3.4.5	
New		LCO	3.4.5	
New		SR	3.4.5.1	
New		SR	3.4.5.2	
New		SR	3.4.5.3	
3.1.A.1.c		LCO	3.4.6	
3.1.A.1.c		LCO	3.4.7	
3.1.A.1.c		(Partial)	Relocated - Bases	
New		LCO	3.4.7	
New		SR	3.4.6.1	
New		SR	3.4.6.2	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
New		SR	3.4.6.3	
New		SR	3.4.7.1	
New		SR	3.4.7.2	
New		SR	3.4.7.3	
3.1.A.1.d(1)		LCO	3.4.8	
3.1.A.1.d(1)		(Partial)	Relocated - Bases	
3.1.A.1.d(2)		LCO	3.4.8	
3.1.A.1.d(2)		LCO	3.4.13	
New		LCO	3.4.8	
New		SR	3.4.8.1	
New		SR	3.4.8.2	
3.1.A.2.a (1)		LCO	3.4.9	
3.1.A.2.a (1)		(Partial)	Relocated - Bases	
New		LCO	3.4.9	
3.1.A.2.a (2)		LCO	3.4.9	
3.1.A.2.a (3)		LCO	3.4.9	
New		LCO	3.4.9	
New		SR	3.4.9.1	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
3.1.A.2.b (1)		LCO	3.4.10	
New		LCO	3.4.10	
3.1.A.2.b (2)			Deleted	
3.1.A.2.c (1)		LCO	3.4.11	
3.1.A.2.c (2)		LCO	3.4.12	
3.1.A.2.c (2)		(Partial)	Relocated - Bases	
New		LOC	3.4.12	
New		SR	3.4.12.1	
New		SR	3.4.12.2	
New		SR	3.4.12.3	
3.1.A.2.c (3)		LCO	3.4.13	
3.1.A.2.c (3)		(Partial)	Relocated - Bases	
New		LCO	3.4.13	
New		SR	3.4.13.1	
New		SR	3.4.13.2	
New		SR	3.4.13.3	
New		SR	3.4.13.4	
3.1.A.3			Relocated - TRM	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
New		LCO	3.4.2	
New		SR	3.4.2.1	
3.1.B.1.a		LCO	3.4.3	
3.1.B.1.b		LCO	3.4.3	
New		LCO	3.4.3	
New		SR	3.4.3.1	
3.1.B.2			Relocated - PTLR	
3.1.B.3			Relocated - PTLR	
3.1.C.1		LCO	3.4.16	
New		LCO	3.4.16	
New		SR	3.4.16.1	
New		SR	3.4.16.2	
New		SR	3.4.16.3	
New		SR	3.4.16.4	
3.1.C.2.a		LCO	3.4.14	
3.1.C.2.b		LCO	3.4.14	
3.1.C.2.b		(Partial)	Relocated - Bases	
3.1.C.2.c		LCO	3.4.14	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
3.1.C.2.d		LCO	3.4.14	
3.1.C.2.e		LCO	3.4.14	
3.1.C.2.e		SR	3.4.14.2	
3.1.C.3		LCO	3.4.15	
New		LCO	3.4.15	
3.1.D.1		LCO	3.4.17	
3.1.D.2		LCO	3.4.17	
New		LCO	3.4.17	
3.1.D.3			Deleted	
3.1.E			Deleted	
3.1.F.1		LCO	3.1.3	
3.1.F.1		(Partial)	Relocated - COLR	
3.1.F.2		LCO	3.1.3	
3.1.F.2		(Partial)	Relocated - COLR	
3.1.F.3.a		LCO	3.1.3	
3.1.F.3.b			Relocated - Bases	
3.1.F.3.c			Deleted	
New		LCO	3.1.3	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
New		SR	3.1.3.1	
New		SR	3.1.3.2	
New		SR	3.1.3.3	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section 3.3				
3.3.A.1.a		LCO	3.5.4	
New		SR	3.5.4.1	
3.3.A.1.a		SR	3.5.4.1	
3.3.A.1.a		SR	3.5.4.2	
3.3.A.1.b		LCO	3.5.1	
3.3.A.1.b.(1)		SR	3.5.1.1	
New		SR	3.5.1.1	
New		SR	3.5.1.2	
3.3.A.1.b.(2)		SR	3.5.1.2	
3.3.A.1.b.(3)		SR	3.5.1.4	
3.3.A.1.b.(4)		SR	3.5.1.3	
New		SR	3.5.1.3	
New		SR	3.5.1.5	
3.3.A.1.c		LCO	3.5.2	
3.3.A.1.d		LCO	3.5.2	
3.3.A.1.e		LCO	3.5.2	
New		LCO	3.5.3	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
New		SR	3.5.2.1	
New		SR	3.5.2.2	
New		SR	3.5.2.3	
New		SR	3.5.2.8	
New		SR	3.5.3.1	
3.3.A.1.f		LCO	3.5.3	
3.3.A.1.f		(Partial)	Relocated - Bases	
3.3.A.1.g (1)		SR	3.5.2.1	
3.3.A.1.g (1)		SR	3.5.2.3	
3.3.A.1.g (1)		(Partial)	Relocated - TRM	
3.3.A.1.g (2)		SR	3.5.2.1	
3.3.A.1.g (2)		SR	3.5.2.3	
3.3.A.1.g (2)		(Partial)	Relocated - TRM	
3.3.A.1.g (3)			Deleted	
3.3.A.1.g (4)			Relocated - TRM	
3.3.A.2		LCO	3.5.2	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
3.3.A.2.a			Relocated - Bases	
3.3.A.2.b			Relocated - Bases	
3.3.A.2.c			Relocated - Bases	
3.3.A.2.d			Relocated - Bases	
3.3.A.2.e		LCO	3.5.1	
New		LCO	3.5.1	
3.3.A.2.f		LCO	3.5.2	
3.3.A.2.g			Relocated - TRM	
New		LCO	3.5.4	
3.3.A.3		LCO	3.4.12	
3.3.A.3		LCO	3.4.13	
3.3.A.4		LCO	3.4.13	
3.3.A.5		LCO	3.4.12	
3.3.A.5		LCO	3.4.13	
3.3.B.1.a		LCO	3.6.5	
3.3.B.1.b		LCO	3.6.5	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
3.3.B.1.c		LCO	3.6.6	
3.3.B.1.c		(Partial)	Relocated - Bases	
3.3.B.1.d			Relocated - Bases	
3.3.B.1.e			Relocated - Bases	
New		LCO	3.6.5	
New		LCO	3.6.6	
3.3.B.2.a		LCO	3.6.5	
3.3.B.2.b		LCO	3.6.5	
New		SR	3.6.5.1	
3.3.B.2.c		LCO	3.6.6	
New		SR	3.6.6.1	
New		SR	3.6.6.2	
3.3.C.1.a		LCO	3.7.7	
3.3.C.1.a.1		LCO	3.7.7	
3.3.C.1.a.2			Relocated - Bases	
3.3.C.1.b		LCO	3.7.7	
3.3.C.1.b.1		LCO	3.7.7	
3.3.C.1.b.2			Relocated - Bases	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
New		SR	3.7.7.1	
3.3.C.2			Relocated - Bases	
3.3.D.1		LCO	3.7.8	
3.3.D.1.a			Relocated - Bases	
3.3.D.1.b			Relocated - Bases	
3.3.D.1.c			Relocated - Bases	
3.3.D.1.d		LCO	3.7.8	
New		LCO	3.7.8	
New		SR	3.7.8.3	
3.3.D.2		LCO	3.7.9	
3.3.D.2		LCO	3.7.8	
3.3.D.2.a		LCO	3.7.8	
3.3.D.2.a.(1)			Relocated - SFDP	
3.3.D.2.a.(2)			Relocated - SFDP	
3.3.D.2.a(3)		LCO	3.7.8	
3.3.D.2.b		LCO	3.7.8	
3.3.D.2.b(1)			Relocated - SFDP	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
3.3.D.2.b(2)		LCO	3.7.8	
3.3.D.2.b(2)		(partial)	Relocated - SFDP	
New		SR	3.7.8.1	
3.3.D.2.c		LCO	3.7.9	
3.3.D.2.d		LCO	3.7.9	
3.3.D.2.e		LCO	3.7.9	
New		SR	3.7.9.1	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section 3.10				
3.10.A.1		LCO	3.1.1	
3.10.A.1			Relocated - COLR	
3.10.A.2		LCO	3.1.1	
3.10.A.3		LCO	3.1.1	
New		SR	3.1.1.1	
New		LCO	3.1.2	
New		SR	3.1.2.1	
3.10.B.1		LCO	3.2.1	
3.10.B.1		LCO	3.2.2	
3.10.B.1		(Partial)	Relocated - COLR	
3.10.B.2		SR	3.2.1.1	
3.10.B.2		SR	3.2.1.2	
3.10.B.2		SR	3.2.2.1	
3.10.B.2		SR	3.2.3.2	
3.10.B.3.a		LCO	3.2.1	
3.10.B.3.a		LCO	3.2.2	
3.10.B.3.a		(Partial)	Relocated - COLR	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
New		LCO	3.2.1	
New		LCO	3.2.2	
3.10.B.3.b		LCO	3.2.1	
3.10.B.3.b		(Partial)	Relocated - COLR	
New		LCO	3.2.1	
3.10.B.3.c		LCO	3.2.2	
3.10.B.3.d		SR	3.2.1.2	
3.10.B.3.d		(Partial)	Relocated - COLR	
3.10.B.4		LCO	3.2.3	
New		LCO	3.2.3	
3.10.B.5		LCO	3.2.3	
3.10.B.6		LCO	3.2.3	
New		LCO	3.2.3	
3.10.B.7		LCO	3.2.3	
3.10.B.8		LCO	3.2.3	
3.10.B.9			Relocated - TRM	
New		SR	3.2.3.1	
3.10.C.1		LCO	3.2.4	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
New		LCO	3.2.4	
New		SR	3.2.4.1	
3.10.C.2			Deleted	
3.10.C.3			Deleted	
3.10.C.4		SR	3.2.4.2	
3.10.C.4		LCO	3.3.1 D	
3.10.C.4		(Partial)	Relocated - Bases	
3.10.D.1		LCO	3.1.5	
New		LCO	3.1.5	
New		SR	3.1.5.1	
3.10.D.2		LCO	3.1.6	
New		LCO	3.1.6	
New		SR	3.1.6.1	
New		SR	3.1.6.2	
New		SR	3.1.6.3	
3.10.D.3		LCO	3.1.5	
3.10.D.3		LCO	3.1.6	
3.10.D.3		LCO	3.1.8	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
New		LCO	3.1.8	
New		SR	3.1.8.1	
New		SR	3.1.8.2	
New		SR	3.1.8.3	
New		SR	3.1.8.4	
3.10.E.1		LCO	3.1.4	
3.10.E.2			Deleted	
3.10.F.1		LCO	3.1.7	
3.10.F.1		(Partial)	Relocated - Bases	
3.10.F.2		LCO	3.1.7	
3.10.F.3		LCO	3.1.7	
3.10.F.4		LCO	3.1.7	
3.10.F.5		LCO	3.1.4	
New		LCO	3.1.7	
3.10.G.1			Relocated - Bases	
3.10.G.2		LCO	3.1.4	
3.10.G.3		LCO	3.1.4	
3.10.G.4		LCO	3.1.4	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
3.10.G.5		LCO	3.1.4	
3.10.G.5		(Partial)	Relocated - Bases	
3.10.G.6		LCO	3.1.4	
New		LCO	3.1.4	
3.10.H		SR	3.1.4.3	
3.10.I.1			Relocated - TRM	
3.10.I.2			Relocated - TRM	
3.10.I.3			Relocated - TRM	
3.10.J		LCO	3.4.1	
3.10.J		(Partial)	Relocated - COLR	
3.10.J		SR	3.4.1.1	
3.10.J		SR	3.4.1.2	
3.10.J		SR	3.4.1.3	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section 4.3				
4.3		SR	3.4.15.1	
New		SR	3.4.15.1	
4.3		(Partial)	Relocated - Bases	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section 4.6				
4.6.A.1.a		SR	3.8.1.4	
4.6.A.1.b		SR	3.8.3.1	
4.6.A.1.c		SR	3.8.3.2	
4.6.A.1.d		SR	3.8.1.5	
4.6.A.1.e		SR	3.8.1.2	
4.6.A.1.e		SR	3.8.1.3	
New		SR	3.8.1.1	
New Notes		SR	3.8.1.2 Notes	
New Notes		SR	3.8.1.3 Notes	
4.6.A.2.a		SR	3.8.1.6	
4.6.A.2.b			Relocated - TRM	
4.6.A.2.c		SR	3.8.1.6	
4.6.A.3.a			Relocated - TRM	
4.6.A.3.b.1		SR	3.8.1.10	
4.6.A.3.b.2		SR	3.8.1.10	
4.6.A.3.b.3			Relocated - TRM	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
4.6.A.3.c		SR	3.8.1.9	
4.6.A.3.c		(Partial)	Relocated - Bases	
4.6.A.3.d		SR	3.8.1.7	
4.6.A.3.e		SR	3.8.1.8	
New		SR	3.8.2.1	
New		SR	3.8.5.1	
New		SR	3.8.6.1	
New		SR	3.8.6.5	
New		SR	3.8.6.6	
New		SR	3.8.8.1	
New		SR	3.8.9.1	
New		SR	3.8.10.1	
4.6.B.1		SR	3.8.6.2	
4.6.B.1		SR	3.8.6.4	
4.6.B.1		(Partial)	Relocated - TRM	
New		SR	3.8.4.1	
4.6.B.2		SR	3.8.6.3	
4.6.B.2		(Partial)	Relocated - TRM	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
4.6.B.3			Relocated - TRM	
4.6.B.4		SR (Notes)	3.8.4.3	
4.6.B.4		(Partial)	Relocated - TRM	
4.6.B.5			Relocated - TRM	
New		SR	3.8.4.2	
New		SR	3.8.4.3	
New		SR	3.8.7.1	
4.6.C		SR	3.4.9.2	
4.6.C		(Partial)	Relocated - Bases	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section 4.18				
4.18			Relocated - TRM	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Figure				
Figure 2.1-1		FIGURE	2.1.1-1	
Figure 3.1-3		FIGURE	3.4.17-1	
Figure 3.8-1		FIGURE	3.7.17-1	
Figure 3.8-2		FIGURE	3.7.17-2	
Figure 3.10-1			Relocated - COLR	
Figure 4.4-1			Relocated - TRM	
Figure 5.6-1		FIGURE	4.3.1-1	
Figure 5.6-2		FIGURE	4.3.1-2	
Figure 5.6-3		FIGURE	4.3.1-3	
Figure 5.6-4		FIGURE	4.3.1-4	
Figure 5.6-5		FIGURE	4.3.1-5	
Figure 5.6-6		FIGURE	4.3.1-6	
Figure 5.6-7		FIGURE	4.3.1-7	
Figure 5.6-8		FIGURE	4.3.1-8	
Figure 5.6-9		FIGURE	4.3.1-9	
Figure 5.6-10		FIGURE	4.3.1-10	
Figure 5.6-11		FIGURE	4.3.1-11	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Figure 5.6-12		FIGURE	4.3.1-12	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section Table				
Table 1-1		TABLE	Table 1.1-1	
Table 1-1	Note *	LCO	3.9.1	
New		LCO	3.9.1	
Table 1-1	Note *	(Partial)	Relocated - COLR	
Table 1-1	Note **		Deleted	
Table 3.5-1	9	TABLE	3.3.5-1	Note c
Table 3.5-1	1	TABLE	3.3.2-1	1c
Table 3.5-1	2a	TABLE	3.3.2-1	2c
Table 3.5-1	2b	TABLE	3.3.2-1	4b
Table 3.5-1	3	TABLE	3.3.2-1	1d
Table 3.5-1	4	TABLE	3.3.2-1	1e
Table 3.5-1	4	TABLE	3.3.2-1	Note b
Table 3.5-1	5	TABLE	3.3.2-1	4c
Table 3.5-1	6	TABLE	3.3.2-1	4d
Table 3.5-1	7	SR	3.6.8.1	
Table 3.5-1	8		Relocated - TRM	
Table 3.5-1	9	TABLE	3.3.5-1	3

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-1	10	SR	3.3.4.2	
Table 3.5-2A	1	TABLE	3.3.1-1	1
Table 3.5-2A	2a	TABLE	3.3.1-1	2a
Table 3.5-2A	2b	TABLE	3.3.1-1	2b
Table 3.5-2A	3	TABLE	3.3.1-1	3a
Table 3.5-2A	4	TABLE	3.3.1-1	3b
Table 3.5-2A	5	TABLE	3.3.1-1	4
Table 3.5-2A	6	TABLE	3.3.1-1	5
Table 3.5-2A	7	TABLE	3.3.1-1	6
Table 3.5-2A	8	TABLE	3.3.1-1	7
Table 3.5-2A	9	TABLE	3.3.1-1	8a
Table 3.5-2A	10	TABLE	3.3.1-1	8b
Table 3.5-2A	11	TABLE	3.3.1-1	9
Table 3.5-2A	12	TABLE	3.3.1-1	10
Table 3.5-2A	13	TABLE	3.3.1-1	14
Table 3.5-2A	14	TABLE	3.3.1-1	13
Table 3.5-2A	15	TABLE	3.3.1-1	12
Table 3.5-2A	16a	TABLE	3.3.1-1	11a
Table 3.5-2A	16b	TABLE	3.3.1-1	11b

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	17	TABLE	3.3.1-1	15
Table 3.5-2A	18	TABLE	3.3.1-1	19
Table 3.5-2A	19	TABLE	3.3.1-1	17
Table 3.5-2A	20	TABLE	3.3.1-1	17
Table 3.5-2A	New Func	TABLE	3.3.1-1	16
Table 3.5-2A	New Func	TABLE	3.3.1-1	18
Table 3.5-2A	Act 1	LCO	3.3.1 B	
Table 3.5-2A	Action 1	LCO	3.3.1 M	
Table 3.5-2A	Action 2	LCO	3.3.1 D	
Table 3.5-2A	Action 2	LCO	3.3.1 E	
Table 3.5-2A	Act 2	SR	3.2.4.2	
Table 3.5-2A	Act 2c	SR	3.2.4.2	
Table 3.5-2A	Act 3	LCO	3.3.1 F	
Table 3.5-2A	New Action	LCO	3.3.1 G	
Table 3.5-2A	Action 4	LCO	3.3.1 H	
Table 3.5-2A	New Action	LCO	3.3.1 I	
Table 3.5-2A	Action 5	LCO	3.3.1 J	
Table 3.5-2A	Action 6	LCO	3.3.1 E	
Table 3.5-2A	Action 6	LCO	3.3.1 K	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	Action 6	LCO	3.3.1 N	
Table 3.5-2A	Action 7	LCO	3.3.1 O	
Table 3.5-2A	Act 8	LCO	3.3.1 C	
Table 3.5-2A	Action 9a	LCO	3.3.1 S	
Table 3.5-2A	Action 9a	LCO	3.3.1.P	
Table 3.5-2A	Action 9b	LCO	3.3.1 P	
Table 3.5-2A	Action 10	LCO	3.3.1 C	
Table 3.5-2A	Act 10	LCO	3.3.1 P	
Table 3.5-2A	Action11	LCO	3.3.1 L	
Table 3.5-2A	New Action	LCO	3.3.1 Q	
Table 3.5-2A	New Action	LCO	3.3.1 R	
Table 3.5-2A	New Action	LCO	3.3.1 S	
Table 3.5-2A	Note a	TABLE	3.3.1-1	Note a
Table 3.5-2A	Note b	TABLE	3.3.1-1	Note b
Table 3.5-2A	Note c	TABLE	3.3.1-1	Note d
Table 3.5-2A	Note d	TABLE	3.3.1-1	Note i
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note e
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note f
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note g

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note h
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note j
Table 3.5-2B	1a	TABLE	3.3.2-1	1a
Table 3.5-2B	1b	TABLE	3.3.2-1	1c
Table 3.5-2B	1c	TABLE	3.3.2-1	1e
Table 3.5-2B	1d	TABLE	3.3.2-1	1d
Table 3.5-2B	1e	TABLE	3.3.2-1	1b
Table 3.5-2B	2a	TABLE	3.3.2-1	2a
Table 3.5-2B	2b	TABLE	3.3.2-1	2c
Table 3.5-2B	2c	TABLE	3.3.2-1	2b
Table 3.5-2B	3a	TABLE	3.3.2-1	3c
Table 3.5-2B	3b	TABLE	3.3.2-1	3a
Table 3.5-2B	3c	TABLE	3.3.2-1	3b
Table 3.5-2B	4a	TABLE	3.3.5-1	5
Table 3.5-2B	4b	TABLE	3.3.5-1	1
Table 3.5-2B	4c	TABLE	3.3.5-1	6
Table 3.5-2B	4d	TABLE	3.3.5-1	4
Table 3.5-2B	4e	TABLE	3.3.5-1	3
Table 3.5-2B	4f	TABLE	3.3.5-1	2

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	5a	LCO	3.7.2	
Table 3.5-2B	5b	TABLE	3.3.2-1	4b
Table 3.5-2B	5c	TABLE	3.3.2-1	4d
Table 3.5-2B	5d	TABLE	Not used	
Table 3.5-2B	5e	TABLE	3.3.2-1	4a
Table 3.5-2B	6a	TABLE	3.3.2-1	5b
Table 3.5-2B	6b	TABLE	3.3.2-1	5c
Table 3.5-2B	6c		Relocated - TRM	
Table 3.5-2B	6d	TABLE	3.3.2-1	5a
Table 3.5-2B	7a		Relocated - TRM	
Table 3.5-2B	7b	TABLE	3.3.2-1	6b
Table 3.5-2B	7c	TABLE	3.3.2-1	6d
Table 3.5-2B	7c	TABLE	3.3.2-1	Note f
Table 3.5-2B	7d	TABLE	3.3.2-1	6e
Table 3.5-2B	7d*	TABLE	3.3.2-1	Note g
Table 3.5-2B	7e	TABLE	3.3.2-1	6c
Table 3.5-2B	7f	TABLE	3.3.2-1	6a
Table 3.5-2B	8a	LCO	3.3.4.a	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	8b	LCO	3.3.4.b	
Table 3.5-2B	9		Deleted - LAR	
Table 3.5-2B	Act 20	LCO	3.3.2 C	
Table 3.5-2B	Act 21	LCO	3.3.2 D	
Table 3.5-2B	Act 21	LCO	3.3.2 E	
Table 3.5-2B	Act 22	LCO	3.3.5 A	
Table 3.5-2B	Act 23	LCO	3.3.2 B	
Table 3.5-2B	Act 24	LCO	3.3.2 D	
Table 3.5-2B	Act 24	LCO	3.3.2 G	
Table 3.5-2B	Act 25	LCO	3.3.2 F	
Table 3.5-2B	Act 26	LCO	3.3.2 I	
Table 3.5-2B	Act 27	LCO	3.7.2	
Table 3.5-2B	Act 28	LCO	3.3.2 F	
Table 3.5-2B	Act 29	LCO	3.3.2 D	
Table 3.5-2B	Act 29	LCO	3.3.2 H	
Table 3.5-2B	Act 30	LCO	3.3.2 I	
Table 3.5-2B	Act 31	LCO	3.3.4 A	
Table 3.5-2B	Act 32		Deleted	
Table 3.5-2B	Act 33	LCO	3.3.4 B	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	Act 34		Deleted - LAR	
Table 3.5-2B	New Action	LCO	3.3.4 C	
Table 3.5-2B	New Action	LCO	3.3.4 D	
Table 3.5-2B	Act 35		Deleted - LAR	
Table 3.5-2B	Act 36		Deleted - LAR	
Table 3.5-2B	Note a	TABLE	3.3.2-1	Note a
Table 3.5-2B	Note b	TABLE	3.3.5-1	Note a, b
Table 3.5-2B	Note c	TABLE	3.3.2-1	Note c
Table 3.5-2B	Note c	LCO	3.7.2	
Table 3.5-2B	Note d	TABLE	3.3.2-1	Note c,d
Table 3.5-2B	New Note	TABLE	3.3.2-1	Note e
Table 3.15-1	1	TABLE	3.3.3-1	1
Table 3.15-1	2	TABLE	3.3.3-1	2
Table 3.15-1	3	TABLE	3.3.3-1	3
Table 3.15-1	4	TABLE	3.3.3-1	4
Table 3.15-1	5	TABLE	3.3.3-1	5
Table 3.15-1	6	TABLE	3.3.3-1	6
Table 3.15-1	7	TABLE	3.3.3-1	7
Table 3.15-1	8	TABLE	3.3.3-1	8

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	9	TABLE	3.3.3-1	9
Table 3.15-1	10	TABLE	3.3.3-1	10
Table 3.15-1	11	TABLE	3.3.3-1	11
Table 3.15-1	12	TABLE	3.3.3-1	12
Table 3.15-1	13	TABLE	3.3.3-1	13
Table 3.15-1	14	TABLE	3.3.3-1	14
Table 3.15-1	15	TABLE	3.3.3-1	15
Table 3.15-1	16	TABLE	3.3.3-1	16
Table 3.15-1	Action a	LCO	3.3.3	
Table 3.15-1	Action a1	LCO	3.3.3 A	
Table 3.15-1	Action a1	LCO	3.3.3 C	
Table 3.15-1	Action a2	LCO	3.3.3 D	
Table 3.15-1	Action a2	LCO	3.3.3 I	
Table 3.15-1	Action a3	LCO	3.3.3 D	
Table 3.15-1	Action a3	LCO	3.3.3 J	
Table 3.15-1	Action a4	LCO	3.3.3 E	
Table 3.15-1	Action a4	LCO	3.3.3 I	
Table 3.15-1	Action a5	LCO	3.3.3 B	
Table 3.15-1	Action a5	LCO	3.3.3 C	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	Action a5	LCO	3.3.3	
Table 3.15-1	Action a6	LCO	3.3.3 F	
Table 3.15-1	Action a6	LCO	3.3.3 G	
Table 3.15-1	Action a6	LCO	3.3.3 I	
Table 3.15-1	New Cond	LCO	3.3.3 H	
Table 3.15-1	Action b	TABLE	3.3.3-1	Note a
Table 3.15-1	Action c	TABLE	3.3.3-1	Note b
Table 3.15-1	New Note	TABLE	3.3.3-1	Note c
Table 4.1-1A	1	TABLE	3.3.1-1	1
Table 4.1-1A	2a	TABLE	3.3.1-1	2a
Table 4.1-1A	2a	TABLE	3.3.1-1	6
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Table 4.1-1C	3		Relocated - TRM	
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Table 4.1-1C	5		Deleted - Boric Acid LAR	

Current Technical Specification Cross-Reference

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
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Table 4.1-1C	Note 34		Deleted	
Table 4.1-1C	Note 35		Deleted	
Table 4.1-1C	Note 36		Deleted	
Table 4.1-1C	Note 37		Deleted	
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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
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PACKAGE 3.4

REACTOR COOLANT SYSTEM (RCS)

CROSS - REFERENCE

IMPROVED TECHNICAL SPECIFICATIONS

TO

CURRENT TECHNICAL SPECIFICATIONS

Section Cross - Reference

Section 3.4

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

Improved Technical Specification Cross-Reference

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3.4.1		LCO	3.10.J	
3.4.1.1		SR	3.10.J	
3.4.1.2		SR	3.10.J	
3.4.1.3		SR	3.10.J	
3.4.2		LCO	New	
3.4.2.1		SR	New	
3.4.3		LCO	3.1.B.1.a	
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3.4.3.1		SR	New	
3.4.4		LCO	3.1.A.1.a (1)	
3.4.4		LCO	3.1.A.1.a (2)	
3.4.4.1		SR	New	
3.4.5		LCO	3.1.A.1.b	
3.4.5.1		SR	New	
3.4.5.2		SR	New	
3.4.5.3		SR	New	

Improved Technical Specification Cross-Reference

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3.4.6		LCO	3.1.A.1.c	
3.4.6.1		SR	New	
3.4.6.2		SR	New	
3.4.6.3		SR	New	
3.4.7		LCO	3.1.A.1.c	
3.4.7.1		SR	New	
3.4.7.2		SR	New	
3.4.7.3		SR	New	
3.4.8		LCO	3.1.A.1.d(1)	
3.4.8		LCO	3.1.A.1.d(2)	
3.4.8.1		SR	New	
3.4.8.2		SR	New	
3.4.9		LCO	3.1.A.2.a (1)	
3.4.9		LCO	3.1.A.2.a (2)	
3.4.9		LCO	3.1.A.2.a (3)	
3.4.9.1		SR	New	
3.4.9.2		SR	4.6.C	
3.4.10		LCO	3.1.A.2.b (1)	
3.4.10.1		SR	Table 4.1-2A	3

Improved Technical Specification Cross-Reference

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3.4.12		LCO	3.1.A.2.c (2)	
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3.4.12		LCO	3.3.A.5	
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3.4.12.2		SR	New	
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3.4.12.4		SR	Table 4.1-1C	25
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3.4.12.5		SR	Table 4.1-1C	25
3.4.13		LCO	3.1.A.1.d (2)	
3.4.13		LCO	3.1.A.2.c (3)	
3.4.13		LCO	3.3.A.3	
3.4.13		LCO	3.3.A.4	
3.4.13		LCO	3.3.A.5	
3.4.13.1		SR	New	
3.4.13.2		SR	New	

Improved Technical Specification Cross-Reference

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3.4.13.3		SR	New	
3.4.13.4		SR	New	
3.4.13.5		SR	Table 4.1-1C	25
3.4.13.5		SR	Table 4.1-1C	Note 38
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3.4.14		LCO	3.1.C.2.c	
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3.4.15		LCO	3.1.C.3	
3.4.15.1		SR	4.3	
3.4.16		LCO	3.1.C.1	
3.4.16.1		SR	New	
3.4.16.2		SR	New	
3.4.16.3		SR	New	
3.4.16.4		SR	New	

Improved Technical Specification Cross-Reference

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3.4.17-1		FIGURE	Figure 3.1-3	
3.4.17		LCO	3.1.D.1	
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3.4.17		LCO	Table 4.1-2B	4a
3.4.17.1		SR	Table 4.1-2B	1
3.4.17.2		SR	Table 4.1-2B	2
3.4.17.2		SR	Table 4.1-2B	4b
3.4.17.3		SR	Table 4.1-2B	3
3.4.17.3		SR	Table 4.1-2B	Note 1
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3.4.18.2		SR	New	

ITS PACKAGE CONTENTS

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2. Part B Proposed PI ITS and Bases
3. Part C Markup of PI CTS
4. Part D DOC to PI CTS
5. Part E Markup of ISTS and Bases
6. Part F JD from ISTS
7. Part G NSHD for changes to PI CTS
8. Cross-Reference CTS to ITS
9. Cross-Reference ITS to CTS

PACKAGE 3.5

EMERGENCY CORE COOLING SYSTEMS (ECCS)

PART A

INTRODUCTION

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

LICENSE AMENDMENT REQUEST DATED December 11, 2000
Conversion to Improved Standard Technical Specifications

3.5
PART A

Introduction to the Discussion of the proposed Changes to the Current Technical Specifications, Justification of Differences from the Improved Standard Technical Specifications, and the supporting No Significant Hazards Determination

Pursuant to 10 CFR Part 50, Sections 50.59 and 50.90, the holders of Operating Licenses DPR-42 and DPR-60 hereby propose changes to the Facility Operating Licenses and Appendix A, Technical Specifications, as follows and as presented in the accompanying Parts B through G of this Package.

BACKGROUND

Over the past several years the nuclear industry and the Nuclear Regulatory Commission (NRC) have jointly developed Improved Standard Technical Specifications (ISTS). The NRC has encouraged licensees to implement these improved technical specifications as a means for improving plant safety through the more operator-oriented technical specifications, improved and expanded bases, reduced action statement induced plant transients, and more efficient use of NRC and industry resources.

This License Amendment Request (LAR) is submitted to conform the Prairie Island Nuclear Generating Plant (PINGP) Current Technical Specifications (CTS) to NUREG-1431, Improved Standard Technical Specifications, Westinghouse plants, Revision 1 issued April 1995 (ISTS). The resulting new Technical Specifications (TS) for Prairie Island (PI) are the PI Improved Technical Specifications (ITS) which incorporates the PI plant specific information.

NUREG-1431 is based on a hypothetical four loop Westinghouse plant. Since PI is similar in design and vintage to the R.E. Ginna Nuclear Power Plant which has already completed conversion to improved technical specifications, this amendment request relies on the Ginna ITS.

This LAR is also supported by Parts B through G. Part B contains a "clean" copy of the proposed PI ITS and Bases. Part C contains a mark-up of the PI CTS. Part D is the Description of Changes (DOC) to the PI CTS. Part E is a mark-up of the ISTS and Bases which shows the deviations from the standard incorporated to meet PI plant specific requirements. Part F gives the Justification for Deviations (JFD) from the ISTS and Part G provides the No Significant Hazards Determinations (NSHD) for changes to the PI CTS. To facilitate review of this LAR, cross-reference numbers from changes and deviations to the corresponding DOC, JFD and NSHD are provided. The methodology for mark-up and cross-references are described in the next section.

MARK-UP METHODOLOGY

The TS conversion package includes mark-ups of the CTS, the ISTS and the ISTS Bases in accordance with this guidance. Mark-up may be electronic or by hand as indicated.

Current Technical Specifications

The mark-up of the CTS is provided to show where current requirements are placed in the ITS, to show the major changes resulting from the conversion process, and to allow reviewers to evaluate significant differences between the CTS and ITS.

This ITS conversion LAR has been prepared in 14 packages following the Chapter/Section outline of the ITS as follows: 1.0, 2.0, 3.0, 3.1 . . . 3.9, 4.0 and 5.0. Accordingly, each package contains all the elements of Parts A through G as described above. The CTS Bases are not included in the CTS mark-up packages since the Bases have been rewritten in their entirety.

The current Specifications addressed by the associated ITS Chapter/Section are cross-referenced in the left margin to the new ITS location by Specification number and type (G-General, SL-Safety Limit, LCO-Limiting Condition for Operation or SR-Surveillance Requirements). Those portions of each CTS page which are not addressed in the associated ITS Chapter/Section are shadowed (electronic) or clouded and crossed out (by hand) and in the right margin is the comment, "Addressed Elsewhere".

The CTS are marked-up to incorporate the substance of NUREG-1431 Revision 1. It is not the intent to mark every nuance required to make the format change from CTS to ITS.

In general, only technical changes have been identified. However, some non-technical changes have also been included when the changes cannot easily be determined to be non-technical by a reviewer, or if an explanation is required to demonstrate that the change is non-technical.

Some apparent changes result from the different conventions and philosophies used in the ITS. Generally these apparent changes will not be marked-up in the CTS if there is no resulting change in plant operating requirements.

Changes are identified by a change number in the right margin which map the changed specification requirement to Part D, Discussion of Changes, and Part G, No Significant Hazards Determination (NSHD) and indicate the NSHD category. The change number form is R3.4-02 where the first two numbers, 3.4 in this example, refer to ITS Chapter/Section number 3.4, and the second number, 02 in this example, is a sequentially assigned number for changes within that Chapter/Section, starting with 01. The prefix letter(s) indicates the classification of the change impact. For CTS changes this is also the NSHD category.

The change impact categories defined below conveniently group the type of changes for consideration of the effect of the change on the current plant license in Part D and are also useful for efficient discussion in Part G the "No Significant Hazards Determination" (NSHD) section. If the same change is made in Part E, then the change impact category will also show up in the change number in Part F. These categories are:

A - Administrative changes, editorial in nature that do not involve technical issues. These include reformatting, renaming (terminology changes), renumbering, and rewording of requirements.

L - Less restrictive requirements included in the PI ITS in order to conform to the guidance of NUREG-1431. Generally these are technical changes to existing TS which may include items such as extending Completion Times or reducing Surveillance Frequencies (extended time interval between surveillances). The less restrictive requirements necessitate individual justification. Each is provided with its specific NSHD.

LR - Less restrictive Removal of details and information from otherwise retained specifications which are removed from the CTS and placed in the Bases, Technical Requirements Manual (TRM), Updated Safety Analysis Report (USAR) or other licensee controlled documents. These changes include details of system design and function, procedural details or methods of conducting surveillances, or alarm or indication-only instrumentation.

M - More restrictive requirements included in the PI ITS in order to provide a complete set of Specifications conforming to the guidance of NUREG-1431. Changes in this category may be completely new requirements or they may be technical changes made to current requirements in the CTS.

R - Relocation of Current Specifications to other controlled documents or deletion of current Specifications which duplicate existing regulatory requirements.

Current requirements in the LCOs or SRs that do not meet the 10 CFR 50.36 selection criteria and may be relocated to the Bases, USAR, Core Operating Limits Report (COLR), Operational Quality Assurance Plan (OQAP), plant procedures or other licensee controlled documents. Relocating requirements to these licensee controlled documents does not eliminate the requirement, but rather, places them under more appropriate regulatory controls, such as 10CFR 50.54 (a)(3) and 10 CFR 50.59, to manage their implementation and future changes. Maintenance of these requirements in the TS commands resources which are not commensurate with their importance to safety and distract resources from more important requirements. Relocation of these items will enable more efficient maintenance of requirements under existing regulations and reduce the need to request TS changes for issues which do not affect public safety.

Deletion of Specifications which duplicate regulations eliminates the need to change Technical Specifications when changes in regulations occur. By law, licensees shall meet applicable requirements contained in the Code of Federal Regulations, or have NRC approved exemptions; therefore, restatement in the Technical Specifications is unnecessary.

The methodology for marking-up these changes is as follows:

As discussed above, administrative changes may not be marked-up in detail. Portions of the specifications which are no longer included are identified by use of the electronic strike-out feature (or crossed out by hand). Information being added is inserted into the specification in the appropriate location and is identified by use of shading features (or handwritten/insert pages).

Improved Standard Technical Specifications (NUREG-1431, Rev. 1)

The ISTS mark-up is to identify changes from the ISTS required to create a plant specific ITS by incorporating plant specific values in bracketed fields and identifying other changes with cross-reference to the Part F Justification For Differences.

All deviations from the ISTS are cross-referenced to the Part F justification for differences by a change number in the right margin. The change number form is CL3.4-05 where the prefix letter(s), CL in this example, indicate the classification of the reason for the difference, the first two numbers, 3.4 in this example, refer to the ITS Chapter/Section number 3.4, and the second number, 05 in this example, is a sequentially assigned number for deviations within that Chapter/Section, starting with a number which is larger than the last number from the Part C CTS mark-up. In some instances where a change has been made to the CTS and ISTS, the Part D change number is given since the justification for difference is the same as the discussion of change. The following categories are used as prefixes to indicate the general reason for each difference:

CL - Current Licensing basis. Issues that have been previously licensed for PI and have been retained in the ITS. This includes Specifications dictated by plant design features or the design basis. Since no plant modifications have been or will be made to accommodate conversion to ITS, the plant design basis features shall be incorporated into the PI ITS.

PA - Plant, Administrative. Plant specific wording preference or minor editorial improvements made to facilitate operator understanding.

TA - Traveler, Approved. Deviations made to incorporate an industry traveler which has been approved by the NRC.

TP - Traveler, Proposed. Deviation made to incorporate a proposed industry traveler which as of the time of submittal has not been approved by the NRC.

X - Other, Deviation from the ISTS for any other reason than those given above.

Material which is deleted from the ISTS is identified by use of the WordPerfect strike-out feature (or crossed out by hand). Information being added to the ISTS to generate the PI ITS due to any of the deviations discussed above is identified by use of WordPerfect red-line features (or handwritten/insert pages).

Bracketed Information

Many parameters, conditions, notes, surveillances, and portions of sections are bracketed in the ISTS recognizing that plant specific values are likely to vary from the "generic" values provided in the standard.

If the bracketed value applies to PI, then the "generic" information is retained without any special indication and the brackets are marked using the WordPerfect strike-out feature. In some instances, bracketed material is not discussed. If bracketed material is discussed, a change number is provided which includes the appropriate prefix as described above. When bracketed "generic" material is not incorporated, the bracketed material and brackets are marked with the WordPerfect strike-out feature (or crossed out by hand), the plant specific information is substituted for the bracketed information and a change number is provided which includes the appropriate prefix. Information added is indicated by the WordPerfect red-line (shading) feature (or handwritten/insert pages).

Optional Sections

Due to differing Westinghouse plant designs and methodologies, some ISTS section numbers include a letter suffix indicating that only one of these sections is applicable to any specific plant. The appropriate section is indicated in the Table of Contents, the suffix letter is deleted, and justification, if required, is included in the appropriate Chapter/Section package.

Bases, Improved Standard Technical Specifications (NUREG-1431, Rev. 1)

The ISTS Bases have been marked-up to support the plant specific PI ITS and allow reviewers to identify changes from NUREG-1431. To the extent possible, the words of NUREG-1431, Rev. 1 are retained to maximize standardization. Where the existing words in the NUREG are incorrect or misleading with respect to Prairie Island, they have been revised. In addition, descriptions have been added to cover plant specific portions of the specifications. Change numbers have been provided for the ISTS Bases with the same format as the ISTS Specification mark-up. In some instances, the same change number is used to describe the change.

Material which is deleted from the ISTS Bases is identified by use of the strike-out feature of WordPerfect (or crossed out by hand). Information being added to the ISTS Bases to generate the PI ITS is identified by use of the red-line (shading) feature of WordPerfect (or handwritten/insert pages).

Bracketed Material

Many parameters and portions of Bases are bracketed in the ISTS recognizing that plant specific values and discussions are likely to vary from the "generic" information provided in the standard.

If the bracketed information applies to PI, then the "generic" information is retained without any special indication and the brackets are marked using the WordPerfect strike-out feature. No change number or justification is provided for use of bracketed material, unless special circumstances warrant discussion.

When bracketed "generic" Bases material is not incorporated, the bracketed material and brackets are marked with the WordPerfect strike-out feature (or crossed out by hand) and the plant specific information substituted for the bracketed information is indicated by the WordPerfect red-line (shading) feature (or handwritten/insert pages). A change number with the same format as those used for the ISTS Specification mark-up is provided.

ACRONYMS

Many acronyms are used throughout this submittal. The intent of the final ITS (Part B) is that in general acronyms be written in full prior to the first use. Commonly used acronyms may not be written in full. Other parts of this package may not always write in full each acronym prior to first use; therefore, a list of acronyms is attached to assist in the review of this package.

Attachment to Part A

LIST OF ACRONYMS

AB	Auxiliary Building
ABSVS	Auxiliary Building Special Ventilation System
AFD	Axial Flux Difference
AFW	Auxiliary Feedwater System
ALARA	As Low As Reasonably Achievable
ALT	Actuation Logic Test
ASA	Applicable Safety Analyses
ASME	American Society of Mechanical Engineers
AOO	Anticipated Operational Occurrences
AOT	Allowed Outage Time
BAST	Boric Acid Storage Tank
BIT	Boron Injection Tank
BOC	Beginning of Cycle
CC	Component Cooling
COT	CHANNEL OPERATIONAL TEST
CAOC	Constant Axial Offset Control
CET	Core Exit Thermocouple
CL	Cooling Water
CLB	Current Licensing Basis
COLR	Core Operating Limits Reports
CRDM	Control Rod Drive Mechanism
CRSVS	Control Room Special Ventilation System
CS	Containment Spray
CST	Condensate Storage Tanks
CTS	Current Technical Specification(s)
DBA	Design Basis Accident
DDCL	Diesel Driven Cooling Water
DG	Diesel Generator
DNB	Departure from Nucleate Boiling
DNBR	Departure from nucleate boiling ratio
ECCS	Emergency Core Cooling System

EDG	Emergency Diesel Generators
EFPD	Effective Full Power Days
EOC	End of Cycle
ESF	Engineered Safety Feature
ESFAS	Engineered Safety Features Actuation System
FWLB	Feedwater Line Break
GDC	General Design Criteria
GITS	Ginna Improved Technical Specifications
HELB	High Energy Line Break
HZP	Hot Zero Power
IPE	Individual Plant Evaluation
ISTS	Improved Standard Technical Specifications
ITC	Isothermal Temperature Coefficient
ITS	Improved Technical Specifications
LA	License Amendment
LAR	License Amendment Request
LBLOCA	Large Break LOCA
LCO	Limiting Conditions for Operation
LHR	Linear Heat Rate
LOCA	Loss of Coolant Accident
LTOP	Low Temperature Overpressure Protection
MFIV	Main Feedwater Isolation Valve
MFRV	Main Feedwater Regulation Valve
MFW	Main Feedwater
MOSCA	MODE or Other Specified Condition of Applicability
MOV	Motor Operated Valve
MSIV	Main Steam Isolation Valves
MSLB	Main Steam Line Break
MSLI	Main Steam Line Isolation
MSSV	Main Steam Safety Valves
MTC	Moderator Temperature Coefficient
NIS	Nuclear Instrumentation System
NMC	Nuclear Management Company
NPSH	Net Positive Suction Head

NRCV	Non-Return Check Valve
NUREG-1431	The ISTS for Westinghouse plants
OPPS	OverPressure Protection System
PCT	Peak Cladding Temperature
PI	Prairie Island
PITS	Prairie Island Technical Specifications
PIV	Pressure Isolation Valve
PORV	Power Operated Relief Valve
PRA	Probabilistic Risk Assessment
PSV	Pressurizer Safety Valve
PTLR	Pressure and Temperature Limits Report
QTPR	Quadrant Power Tilt Ratio
RCCA	Rod Cluster Control Assembly
RCP	Reactor Coolant Pump
RCPB	Reactor Coolant Pressure Boundary
RCS	Reactor Coolant System
RHR	Residual Heat Removal System
RPI	Rod Position Indication
RPS	Reactor Protection System
RTB	Reactor Trip Breaker
RTBB	Reactor Trip Bypass Breaker
RTP	Rated Thermal Power
RTS	Reactor Trip System
RWST	Refueling Water Storage Tank
SBLOCA	Small Break Loss of Coolant Accident
SBVS	Shield Building Ventilation System
SCWS	Safeguards Chilled Water System
SDM	Shut Down Margin
SFDP	Safety Function Determination Program
SFP	Spent Fuel Pool
SG	Steam Generator
SGTR	Steam Generator Tube Rupture
SI	Safety Injection
SL	Safety Limit

SLB	Steam Line Break
SR	Surveillance Requirements
SSC	Structures, Systems and Components
TADOT	Trip Actuating Device Operational Test
TDAFW	Turbine Driven Auxiliary Feedwater
TRM	Technical Requirements Manual
TS	Technical Specifications
TSSC	Technical Specification Selection Criteria
TSTF	Term used for a NUREG change (traveler)
VCT	Volume Control Tank
VFTP	Ventilation Filter Test Program
UHS	Ultimate Heat Sink
USAR	Updated Safety Analysis Report
WCAP	Westinghouse technical report

PACKAGE 3.5

EMERGENCY CORE COOLING SYSTEMS (ECCS)

PART B

PROPOSED PRAIRIE ISLAND IMPROVED TECHNICAL SPECIFICATIONS AND BASES

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PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

LCO 3.5.1 Two ECCS accumulators shall be OPERABLE.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS pressure > 1000 psig.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours
B. One accumulator inoperable for reasons other than Condition A.	B.1 Restore accumulator to OPERABLE status.	24 hours
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3. AND C.2 Reduce RCS pressure to ≤ 1000 psig.	6 hours 12 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Two accumulators inoperable.	D.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.1.1	Verify each accumulator motor operated isolation valve is fully open.	12 hours
SR 3.5.1.2	Verify borated water volume in each accumulator is ≥ 1250 cubic feet (25%) and ≤ 1290 cubic feet (91%).	12 hours
SR 3.5.1.3	Verify nitrogen cover pressure in each accumulator is ≥ 710 psig and ≤ 770 psig.	12 hours
SR 3.5.1.4	Verify boron concentration in each accumulator is ≥ 1900 ppm.	31 days
SR 3.5.1.5	Verify power is removed from each accumulator isolation valve operator when RCS pressure is ≥ 2000 psig.	31 days

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

----------NOTES----------
In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.15.1.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more trains inoperable.	A.1 Restore train(s) to OPERABLE status.	72 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
C. Less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	C.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.2.1	Verify the following valves are in the listed position. Unit 1 Valve Number / Unit 2 Valve Number / Position / Function 32070 / 32173 / OPEN / SI Injection to RCS Cold Leg A 32068 / 32171 / OPEN / SI Injection to RCS Cold Leg B 32073 / 32176 / OPEN / SI Cold Leg Injection Line 32206 / 32208 / CLOSED / SI Pump Suction from RHR 32207 / 32209 / CLOSED / SI Pump Suction from RHR	12 hours
SR 3.5.2.2	Verify each ECCS manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.5.2.3	Verify power to the valve operator has been removed for each valve listed in SR 3.5.2.1.	31 days
SR 3.5.2.4	Verify each ECCS 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
SR 3.5.2.5	Verify each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.6	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	24 months
SR 3.5.2.7	Verify each ECCS throttle valve listed below is in the correct position. Unit 1 Valve Number / Unit 2 Valve Number SI-15-6 / 2SI-15-6 SI-15-7 / 2SI-15-7 SI-15-8 / 2SI-15-8 SI-15-9 / 2SI-15-9	24 months
SR 3.5.2.8	Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.	24 months

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS - Shutdown

LCO 3.5.3 One ECCS train shall be OPERABLE.

----------NOTE----------
An RHR train may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned to the ECCS mode of operation.

APPLICABILITY: MODE 4 when both RCS cold leg temperatures are > SI pump disable temperature specified in PTLR.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required ECCS residual heat removal (RHR) subsystem inoperable.	A.1 Initiate action to restore required ECCS RHR subsystem to OPERABLE status.	Immediately
B. Required ECCS safety injection (SI) subsystem inoperable.	B.1 Restore required ECCS SI subsystem to OPERABLE status.	1 hour
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 5.	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.3.1	The following SRs are applicable for all equipment required to be OPERABLE: SR 3.5.2.1 SR 3.5.2.7 SR 3.5.2.3 SR 3.5.2.8 SR 3.5.2.4	In accordance with applicable SRs

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.4 Refueling Water Storage Tank (RWST)

LCO 3.5.4 The RWST shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RWST boron concentration not within limits.	A.1 Restore RWST to OPERABLE status.	8 hours
B. RWST water volume not within limits .	B.1 Restore RWST to OPERABLE status.	1 hour
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.4.1	Verify RWST borated water volume is ≥ 200,000 (68%).	7 days
SR 3.5.4.2	Verify RWST boron concentration is ≥ 2600 ppm and ≤ 3500 ppm.	7 days

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.1 Accumulators

BASES

BACKGROUND

The functions of the ECCS accumulators are to supply water to the reactor vessel during the blowdown phase of a large break loss of coolant accident (LOCA), to provide inventory to help accomplish the refill and reflood phases that follow thereafter, and to provide Reactor Coolant System (RCS) makeup for a small break LOCA.

The blowdown phase of a large break LOCA is the initial period of the transient during which the RCS departs from equilibrium conditions, and heat from fission product decay, hot internals, and the vessel continues to be transferred to the reactor coolant. The reactor coolant inventory is vacating the core during this phase through steam flashing and ejection out through the break. The blowdown phase of the transient ends when the RCS pressure falls to a value approaching that of the containment atmosphere.

In the refill phase of a LOCA, which immediately follows the blowdown phase, the balance of accumulator inventory is available to help fill voids in the lower plenum and reactor vessel downcomer, and to help the ongoing reflood of the core with the addition of emergency core cooling system (ECCS) water.

The accumulators are pressure vessels partially filled with borated water and pressurized with nitrogen gas. The accumulators are passive components, since no operator or control actions are required in order for them to perform their function. Internal accumulator tank pressure is sufficient to discharge the accumulator contents to the RCS, if RCS pressure decreases below the accumulator pressure.

Each accumulator is piped into an RCS cold leg via an accumulator line and is isolated from the RCS by a motor operated isolation valve and two check valves in series. The motor operated isolation valves (Unit 1 - MV 32071 and MV 32072, Unit 2 - MV 32174 and MV 32175) are maintained open with AC power removed under

BASES

BACKGROUND (continued)

administrative control when RCS pressure is > 2000 psig.

The accumulator size, water volume, and nitrogen cover pressure are selected so that one of the two accumulators is sufficient to partially cover the core before significant clad melting or zirconium water reaction can occur following a LOCA. The need to ensure that one accumulator is adequate for this function is consistent with the LOCA assumption that the entire contents of one accumulator will be lost via the RCS pipe break during the blowdown phase of the LOCA.

APPLICABLE SAFETY ANALYSES

The accumulators are assumed OPERABLE in both the large and small break LOCA analyses at full power (Ref. 1). These are the Design Basis Accidents (DBAs) that establish the acceptance limits for the accumulators. Reference to the analyses for these DBAs is used to assess changes in the accumulators as they relate to the acceptance limits.

In performing the LOCA calculations, conservative assumptions are made concerning the availability of ECCS flow. In the early stages of a large break LOCA, with or without a loss of offsite power, the accumulators provide the sole source of makeup water to the RCS. The assumption of loss of offsite power is required by regulations and conservatively imposes a delay wherein the ECCS pumps cannot deliver flow until the emergency diesel generators start, come to rated speed, and go through their timed loading sequence. In cold leg break scenarios, the entire contents of one accumulator are assumed to be lost through the break.

The limiting large break LOCA is a double ended guillotine break at the discharge of the reactor coolant pump. During this event, the accumulators discharge to the RCS as soon as RCS pressure decreases to below accumulator pressure.

BASES

APPLICABLE SAFETY ANALYSES (continued)

As a conservative estimate, no credit is taken for ECCS pump flow until an effective delay has elapsed. This delay accounts for safety injection (SI) signal generation, the diesels starting and the pumps being loaded and delivering full flow. During this time, the accumulators are analyzed as providing the sole source of emergency core cooling. No operator action is assumed during the blowdown stage of a large break LOCA.

The worst case small break LOCA analyses also assume a time delay before pumped flow reaches the core. For the larger range of small breaks, the rate of blowdown is such that the increase in fuel clad temperature is terminated solely by the accumulators, with pumped flow then providing continued cooling. As break size decreases, the accumulators and safety injection pumps both play a part in terminating the rise in clad temperature. As break size continues to decrease, the role of the accumulators continues to decrease until they are not required and the safety injection pumps become solely responsible for terminating the temperature increase.

This LCO helps to ensure that the following acceptance criteria established for the ECCS by 10 CFR 50.46 will be met following a LOCA:

a. The calculated peak fuel element cladding temperature is below the requirement of 2200°F;

b. The cladding temperature transient is terminated at a time when the core geometry is still amenable to cooling. The localized cladding oxidation limits of 17% are not exceeded during or after quenching;

c. The amount of hydrogen generated by fuel element cladding that reacts chemically with water or steam does not exceed an amount corresponding to interaction of 1% of the total amount of Zircaloy in the reactor; and

d. The core remains amenable to cooling during and after the break.

BASES

APPLICABLE SAFETY ANALYSES (continued)

Since the accumulators discharge during the blowdown phase of a LOCA, they do not contribute to the long term cooling requirements of 10 CFR 50.46.

For the large break LOCA analyses, a nominal contained accumulator water volume of 1270 cubic feet is used based on minimum and maximum volumes of 1250 cubic feet (25% indicated level) and 1290 cubic feet (91% indicated level).

The contained water volume is the same as the deliverable volume for the accumulators, since the accumulators are emptied, once discharged. For large breaks, an increase in water volume can be either a peak clad temperature penalty or benefit, depending on downcomer filling and subsequent spill through the break during the core reflooding portion of the transient. Prairie Island is a two loop plant with Upper Plenum Injection (UPI) LOCA analyses. For UPI plant small breaks, a decrease in water volume is a peak clad temperature penalty; thus a minimum contained water volume is assumed. Both large and small break analyses use a nominal accumulator line water volume from the accumulator to the check valve.

The minimum boron concentration setpoint is used in the post LOCA boron concentration calculation. The calculation is performed to assure reactor subcriticality in a post LOCA environment. Of particular interest is the large break LOCA, since no credit is taken for control rod assembly insertion. A reduction in the accumulator minimum boron concentration would produce a subsequent reduction in the available containment sump concentration for post LOCA shutdown and an increase in the maximum sump pH. For conservatism, the accumulators are not considered in the boron build up analyses since their inclusion would dilute the sump concentration.

The small break LOCA analyses are performed at the minimum nitrogen cover pressure, since sensitivity analyses have demonstrated that higher nitrogen cover pressure results in a computed peak clad

BASES

APPLICABLE SAFETY ANALYSES (continued)

temperature benefit. The large break analyses utilize the nominal nitrogen cover pressure as per approved methods (Ref. 1). The maximum nitrogen cover pressure limit prevents accumulator relief valve actuation, and ultimately preserves accumulator integrity.

The effects on containment mass and energy releases from the accumulators are accounted for in the appropriate analyses (Refs. 1 and 2).

The accumulators satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The LCO establishes the minimum conditions required to ensure that the accumulators are available to accomplish their core cooling safety function following a LOCA. Two accumulators are required to ensure that 100% of the contents of one accumulator will reach the core during a LOCA. This is consistent with the assumption that the contents of one accumulator spill through the break. If less than one accumulator is injected during the blowdown phase of a LOCA, the ECCS acceptance criteria of 10 CFR 50.46 could be violated.

For an accumulator to be considered OPERABLE, the motor-operated isolation valve must be fully open, power removed above 2000 psig, and the limits established in the SRs for contained volume, boron concentration, and nitrogen cover pressure must be met.

APPLICABILITY

In MODES 1 and 2, and in MODE 3 with RCS pressure > 1000 psig, the accumulator OPERABILITY requirements are based on full power operation. Although cooling requirements decrease as power decreases, the accumulators are still required to provide core cooling as long as elevated RCS pressures and temperatures exist.

This LCO is only applicable at pressures > 1000 psig. At pressures ≤ 1000 psig, the rate of RCS blowdown is such that the ECCS pumps can provide adequate injection to ensure that peak clad

BASES

APPLICABILITY (continued)

temperature remains below the 10 CFR 50.46 limit of 2200°F.

In MODE 3, with RCS pressure ≤ 1000 psig, and in MODES 4, 5, and 6, the accumulator motor operated isolation valves are closed to isolate the accumulators from the RCS. This allows RCS cooldown and depressurization without discharging the accumulators into the RCS or requiring depressurization of the accumulators.

ACTIONS

A.1

If the boron concentration of one accumulator is not within limits, it must be returned to within the limits within 72 hours. In this Condition, ability to maintain subcriticality may be reduced. The boron in the accumulators contributes to the assumption that the combined ECCS water in the partially recovered core during the early reflooding phase of a large break LOCA is sufficient to keep that portion of the core subcritical. One accumulator below the minimum boron concentration limit, however, will have no effect on available ECCS water and an insignificant effect on core subcriticality during reflood since the accumulator water volume is very small when compared to RCS and RWST inventory. Boiling of ECCS water in the core during reflood concentrates boron in the saturated liquid that remains in the core. In addition, current analysis techniques demonstrate that the accumulators are not expected to discharge following a large main steam line break. Even if they do discharge, their impact is minor and not a design limiting event. Thus, 72 hours is allowed to return the boron concentration to within limits.

B.1

If one accumulator is inoperable for a reason other than boron concentration, the accumulator must be returned to OPERABLE status within 24 hours. In this Condition, the required contents of one accumulator cannot be assumed to reach the core during a LOCA.

BASES

ACTIONS

B.1 (continued)

Due to the severity of the consequences should a LOCA occur in these conditions, the 24 hour Completion Time to open the valve, remove power to the valve, or restore the proper water volume or nitrogen cover pressure ensures that prompt action will be taken to return the inoperable accumulator to OPERABLE status. The Completion Time minimizes the potential for exposure of the plant to a LOCA under these conditions. The 24 hours allowed to restore an inoperable accumulator to OPERABLE status were justified in Reference 3.

C.1 and C.2

If the accumulator cannot be returned to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and RCS pressure reduced to ≤ 1000 psig within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

D.1

If both accumulators are inoperable, the plant is in a condition outside the accident analyses; therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1

Each accumulator motor operated valve should be verified to be fully open every 12 hours. Use of control board indication (position

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1 (continued)

monitor lights and alarms) for valve position is an acceptable verification. This verification ensures that the accumulators are available for injection and ensures timely discovery if a valve should be less than fully open. If an isolation valve is not fully open, the rate of injection to the RCS would be reduced. Although a motor operated valve position should not change with power removed, a closed or not fully open valve could result in not meeting accident analyses assumptions. This Frequency is considered reasonable in view of other administrative controls that ensure a mispositioned isolation valve is unlikely.

SR 3.5.1.2 and SR 3.5.1.3

Every 12 hours, borated water volume and nitrogen cover pressure are verified for each accumulator. This Frequency is sufficient to ensure adequate injection during a LOCA. Because of the static design of the accumulator, a 12 hour Frequency usually allows the operator to identify changes before limits are reached. Main control board instrumentation and alarms are available for verification of these accumulator parameters. Operating experience has shown this Frequency to be appropriate for early detection and correction of off normal trends.

SR 3.5.1.4

The boron concentration should be verified to be within required limits for each accumulator every 31 days since the static design of the accumulators limits the ways in which the concentration can be changed. The 31 day Frequency is adequate to identify changes that could occur from mechanisms such as stratification or inleakage.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.1.5

Verification every 31 days that power is removed from each accumulator isolation valve operator when the RCS pressure is ≥ 2000 psig ensures that an active failure could not result in the undetected closure of an accumulator motor operated isolation valve. If this were to occur, only one accumulator would be available for injection given a single failure coincident with a LOCA. Since power is removed under administrative control, the 31 day Frequency will provide adequate assurance that power is removed.

This SR allows power to be supplied to the motor operated isolation valves when RCS pressure is < 2000 psig, thus allowing operational flexibility by avoiding unnecessary delays to manipulate the breakers during plant startups or shutdowns.

REFERENCES

1. USAR, Section 14.

2. USAR, Section 6.2.

3. WCAP-15049-A, Revision 1, "Risk-Informed Evaluation of an Extension to Accumulator Completion Times," April 1999.

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.2 ECCS-Operating

BASES

BACKGROUND

The function of the ECCS is to provide core cooling and negative reactivity to ensure that the reactor core is protected after any of the following accidents:

a. Loss of coolant accident (LOCA) with coolant leakage greater than the capability of the normal charging system;

b. Loss of secondary coolant accident, including uncontrolled steam release; and

c. Steam generator tube rupture (SGTR).

The addition of negative reactivity is designed primarily for the loss of secondary coolant accident where primary cooldown could add enough positive reactivity to achieve criticality and return to significant power.

There are two phases of ECCS operation: injection and recirculation. In the injection phase, water is taken from the refueling water storage tank (RWST) and injected into the Reactor Coolant System (RCS) through the cold legs and reactor vessel upper plenum. When sufficient water is removed from the RWST to ensure that enough boron has been added to maintain the reactor subcritical and the containment sump has enough water to supply the required net positive suction head to the RHR pumps, suction is switched to containment Sump B for recirculation. When post accident RCS pressure drops below the RHR pump shutoff head, the RHR flow is directed into the reactor vessel upper plenum to reduce the boiling in the top of the core and any resulting boron precipitation.

BASES

BACKGROUND (continued)

The ECCS consists of two separate subsystems: safety injection (SI) and residual heat removal (RHR). Each subsystem consists of two redundant, 100% capacity trains. The ECCS accumulators and the RWST are also part of the ECCS, but are not considered part of an ECCS flow path as described by this LCO.

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps such that water from the RWST can be injected into the RCS following the accidents described in this LCO. The major components of each subsystem are the RHR pumps, RHR heat exchangers, and the SI pumps. Both subsystems consist of two 100% capacity trains that are interconnected and redundant such that either train is capable of supplying 100% of the flow required to mitigate the accident consequences. This interconnecting and redundant subsystem design provides the operators with the ability to utilize components from opposite trains to achieve the required 100% flow to the core if necessary due to individual component inoperability.

During the injection phase of LOCA recovery, a suction header supplies water from the RWST to the ECCS pumps. Separate piping supplies each subsystem. The discharge from each SI pump divides and feeds an injection line to each of the RCS cold legs. Throttle valves are set to balance the flow to the RCS. This balance ensures sufficient flow to the core to meet the analysis assumptions following a LOCA in one of the RCS cold legs. The discharge from each RHR pump divides and feeds an injection line to the reactor vessel upper plenum.

For LOCAs that are too small to depressurize the RCS below the shutoff head of the SI pumps, the steam generators provide core cooling until the RCS pressure decreases below the SI pump shutoff head.

BASES

BACKGROUND (continued)

During the recirculation phase of LOCA recovery, RHR pump suction is manually transferred to the containment sump. Initially, recirculation is through the same paths as the injection phase. The RHR pumps provide flow to the reactor vessel upper plenum. If the RCS pressure limits RHR flow, then the RHR pumps supply the SI pumps which provide flow to the cold legs.

The SI subsystem of the ECCS also functions to supply borated water to the reactor core following increased heat removal events, such as a main steam line break (MSLB). The limiting design conditions occur when the moderator temperature coefficient is highly negative, such as at the end of each cycle.

During low temperature conditions in the RCS, limitations are placed on the maximum number of ECCS pumps that may be OPERABLE. Refer to the Bases for LCOs 3.4.12, "Low Temperature Overpressure Protection (LTOP) > Safety Injection (SI) Pump Disable Temperature," and 3.4.13, "Low Temperature Overpressure Protection (LTOP) ≤ Safety Injection (SI) Pump Disable Temperature," for the basis of these requirements.

The ECCS subsystems are actuated upon receipt of an SI signal. The actuation of safeguards loads is accomplished in a programmed time sequence. If offsite power is available, the safeguards loads start immediately in the programmed sequence. If offsite power is not available, the safeguards buses shed normal operating loads and are connected to the emergency diesel generators (EDGs). Safeguards loads are then actuated in the programmed time sequence. The time delay associated with diesel starting, sequenced loading, and pump starting determines the length of time before pumped flow is available to the core following a LOCA.

The active ECCS components, along with the passive accumulators and the RWST covered in LCO 3.5.1, "Accumulators," and LCO 3.5.4, "Refueling Water Storage Tank (RWST)," provide the cooling water necessary to meet AEC GDC 44 (Ref. 1).

BASES (continued)

APPLICABLE SAFETY ANALYSES

The LCO helps to ensure that the following acceptance criteria for the ECCS, established by 10 CFR 50.46, will be met following a LOCA:

a. The calculated peak fuel element cladding temperature is below the requirement of 2200°F;

b. The cladding temperature transient is terminated at a time when the core geometry is still amenable to cooling. The localized cladding oxidation limits of 17% are not exceeded during or after quenching;

c. The amount of hydrogen generated by fuel element cladding that reacts chemically with water or steam does not exceed an amount corresponding to interaction of 1% of the total amount of Zircaloy in the reactor;

d. The core remains amenable to cooling during and after the break; and

e. The core temperature is reduced and decay heat is removed for an extended period of time, as required by the long-lived radioactivity remaining in the core.

The LCO also limits the potential for a post trip return to power following an MSLB event.

Both ECCS subsystems are taken credit for in a large break LOCA event at full power (Refs. 2 and 3). This event establishes the requirement for runout flow for the ECCS pumps, as well as the maximum response time for their actuation. The SI pumps are credited in small break LOCA, SGTR and MSLB events. The small break LOCA event establishes the flow and discharge head at the design point for the pumps. The SI pump head and flow characteristics also meet SGTR and MSLB requirements. The

BASES

APPLICABLE SAFETY ANALYSES (continued)

OPERABILITY requirements for the ECCS are based on the following LOCA analysis assumptions:

a. A large break LOCA event, with loss of a single ECCS train; and

b. A small break LOCA event, with a loss of offsite power and a single failure disabling one ECCS train.

During the blowdown stage of a LOCA, the RCS depressurizes as primary coolant is ejected through the break into the containment. The nuclear reaction is terminated either by moderator voiding during large breaks or control rod insertion for small breaks. Following depressurization, emergency cooling water is injected by the SI pumps into the cold legs, flows into the downcomer, fills the lower plenum, and refloods the core. The RHR pumps inject directly into the reactor vessel by upper plenum injection when the RCS pressure is less than the RHR pump shutoff head. The effects on containment mass and energy releases are accounted for in appropriate analyses (Refs. 2 and 3). The LCO ensures that an ECCS train will deliver sufficient water to match boiloff rates soon enough to minimize the consequences of the core being uncovered following a large LOCA. It also ensures that the SI pumps will deliver sufficient water and boron during a small LOCA to maintain core subcriticality. For smaller LOCAs, the SI pumps deliver sufficient fluid to maintain RCS inventory. For a small break LOCA, the steam generators continue to serve as the heat sink, providing part of the required core cooling.

The ECCS trains satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

In MODES 1, 2, and 3, two independent (and redundant) ECCS trains are required to ensure that sufficient ECCS flow is available, assuming a single failure affecting either train. Additionally, individual components within the ECCS trains may be called upon to

BASES

LCO (continued)

mitigate the consequences of other transients and accidents.

In MODES 1, 2, and 3, an ECCS train consists of an SI subsystem and an RHR subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWST upon an SI signal and RHR capable of being transferred to take suction from containment Sump B.

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the ECCS pumps and their respective supply headers to each of the two cold leg injection nozzles and the reactor vessel upper plenum. In the long term, this flow path may be switched to take its supply from the containment sump and to supply its flow to the RCS cold legs or directly into the reactor vessel upper plenum.

The flow path for each train must maintain its designed independence to ensure that no single failure can disable both ECCS trains.

Manual valves that could, if improperly positioned, reduce injection flow below that assumed for accident analyses, are blocked and tagged or locked in the proper position for injection. Changes in valve position must be under direct administrative control.

A block is a device that can be unclipped or unsnapped to allow a status change of the component to which it is applied. A lock is a device that must be unlocked, destroyed or mechanically removed (such as a cap or blank) to allow a status change of the component to which it is applied.

As indicated in the LCO Note, the SI flow paths may be isolated for 2 hours in MODE 3, under controlled conditions, to perform pressure isolation valve testing per SR 3.4.15.1. The flow path is readily restorable from the control room.

BASES (continued)

APPLICABILITY

In MODES 1, 2, and 3, the ECCS OPERABILITY requirements for the limiting Design Basis Accident, a large break LOCA, are based on full power operation. Although reduced power would not require the same level of performance, the accident analysis does not provide for reduced cooling requirements in the lower MODES. The SI pump performance requirements are based on a small break LOCA and meet required parameters for mitigation of a secondary side loss of fluid accident. MODE 2 and MODE 3 requirements are bounded by the MODE 1 analysis.

This LCO is only applicable in MODE 3 and above.

In MODES 4, 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low. MODE 4 core cooling requirements are addressed by LCO 3.5.3, "ECCS-Shutdown," and LCO 3.4.6, "RCS Loops-MODE 4". Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops-MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops-MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation-High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation-Low Water Level."

ACTIONS

A.1

With one or more trains inoperable and at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available, the inoperable components must be returned to OPERABLE status within 72 hours. The 72 hour Completion Time is based on an NRC reliability evaluation (Ref. 4) and is a reasonable time for repair of many ECCS components.

An ECCS train is inoperable if it is not capable of delivering design flow to the RCS. Individual components are inoperable if they are

BASES

ACTIONS

A.1 (continued)

not capable of performing their design function or required supporting systems are not available.

The LCO requires the OPERABILITY of a number of independent subsystems. Due to the redundancy of trains and the diversity of subsystems, the inoperability of one component in a train does not render the ECCS incapable of performing its function. Neither does the inoperability of two different components, each in a different train, necessarily result in a loss of function for the ECCS. This allows increased flexibility in plant operations under circumstances when components in opposite trains are inoperable.

An event accompanied by a loss of offsite power and the failure of an EDG can disable one ECCS train until power is restored. A reliability analysis (Ref. 4) has shown that the impact of having one full ECCS train inoperable is sufficiently small to justify continued operation for 72 hours.

With one or more component(s) inoperable such that 100% of the flow equivalent to a single OPERABLE ECCS train is not available, the facility is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be immediately entered.

B.1 and B.2

If the inoperable trains cannot be returned to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

BASES

ACTIONS (continued)

C.1

Condition A is applicable with one or more trains inoperable. The allowed Completion Time is based on the assumption that at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available. With less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available, the facility is in a condition outside of the accident analyses. Therefore, LCO 3.0.3 must be entered immediately.

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1

Verification of proper valve position ensures that the flow path from the ECCS pumps to the RCS is maintained. Use of control board indication for valve position is an acceptable verification. Misalignment of these valves could render one or both ECCS trains inoperable. These valves are secured in position by physically locking the motor control center supply breakers in the off position with the valve position monitor lights OPERABLE to assure that they cannot change position as a result of an active failure or be inadvertently misaligned. Verification of the valve breakers is performed by SR 3.5.2.3.

A 12 hour Frequency is considered reasonable in view of other administrative controls that ensure a mispositioned valve is unlikely.

SR 3.5.2.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these were verified to be in the correct position prior to locking, sealing, or securing (A seal is a device that must be

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.2.2 (continued)

destroyed to allow a status change of the component to which it is applied). A valve that receives an actuation signal is allowed to be in a nonaccident position provided the valve will automatically reposition within the proper stroke time. This Surveillance does not require any testing or valve manipulation. Rather, it involves verification that those valves capable of being mispositioned are in the correct position. The 31 day Frequency is appropriate because the valves are operated under administrative control, and an improper valve position would only affect a single train. This Frequency has been shown to be acceptable through operating experience.

SR 3.5.2.3

Verification every 31 days that the motor control center supply breakers are physically locked in the off position for each valve specified in SR 3.5.2.1 ensures that an active failure could not result in an undetected misposition of a valve. Since power is removed under administrative control and valve position is verified every 12 hours, the 31 day Frequency will provide adequate assurance that power is removed.

SR 3.5.2.4

Periodic surveillance testing of ECCS pumps to detect gross degradation caused by impeller structural damage or other hydraulic component problems is required by Section XI of the ASME Code. This type of testing may be accomplished by measuring the pump developed head at a single point of the pump characteristic curve. This verifies both that the measured performance is within an acceptable tolerance of the original pump baseline performance and that the performance at the test flow is within the performance

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.2.4 (continued)

assumed in the plant safety analysis. SRs are specified in the Inservice Testing Program, which encompasses Section XI of the ASME Code. Section XI of the ASME Code provides the activities and Frequencies necessary to satisfy the requirements.

SR 3.5.2.5 and SR 3.5.2.6

These Surveillances demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SI signal and that each ECCS pump starts on receipt of an actual or simulated SI signal. This test is met when control board indications and visual observations indicate that all components have received the safety injection signal in the proper sequence and timing, the appropriate pump breakers have opened and closed, and all automatic valves have been placed in the proper position required to establish a safety injection flow path to the reactor coolant system.

This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 24 month Frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for unplanned plant transients if the Surveillances were performed with the reactor at power. The 24 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment. The actuation logic is tested as part of Engineered Safety Feature (ESF) Actuation System testing, and equipment performance is monitored as part of the Inservice Testing Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.2.7

Surveillance requirements on ECCS throttle valves provide assurance that proper ECCS flows are maintained in the event of a LOCA. Proper flow resistance and pressure drop in the piping system to each injection point in the SI System is necessary to: 1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration; 2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS LOCA analyses; and 3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS LOCA analyses. The 24 month Frequency is based on the same reasons as those stated in SR 3.5.2.5 and SR 3.5.2.6.

SR 3.5.2.8

Periodic inspections of the containment sump suction inlet to the RHR System ensure that it is unrestricted and stays in proper operating condition. The 24 month Frequency allows this Surveillance to be performed under the conditions that apply during a plant outage. This Frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience.

BASES (continued)

REFERENCES

1. AEC "General Design Criteria for Nuclear Power Plant Construction Permits," Criterion 44, issued for comment July 10, 1967, as referenced in USAR Section 1.2.

2. USAR, Section 6.2.

3. USAR, Section 14.

4. NRC Memorandum to V. Stello, Jr., from R.L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.3 ECCS-Shutdown

BASES

BACKGROUND

The Background section for Bases 3.5.2, "ECCS Operating," is applicable to these Bases, with the following modifications.

In MODE 4, the required ECCS train consists of two separate subsystems: safety injection (SI) and residual heat removal (RHR).

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps such that water from the refueling water storage tank (RWST) or containment Sump B can be injected into the Reactor Coolant System (RCS) following the accidents described in Bases 3.5.2.

APPLICABLE SAFETY ANALYSES

There are no Applicable Safety Analyses which specify ECCS operability requirements in MODE 4 due to the stable conditions associated with operation in MODE 4 and the reduced probability of occurrence of a Design Basis Accident (DBA). Therefore, the ECCS operational requirements are reduced. It is understood in these reductions that certain automatic SI actuations are not available. Since the RHR System may be aligned to provide normal shutdown cooling, time may be required for manual alignment of ECCS equipment. In this MODE, sufficient time exists for manual actuation of the required ECCS to mitigate the consequences of a DBA. Therefore, only one train of ECCS is required for MODE 4. This requirement dictates that single failures are not considered for this LCO due to the time available for operators to respond to an accident.

The ECCS trains satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

BASES (continued)

LCO

In MODE 4, one of the two independent (and redundant) ECCS trains is required to be OPERABLE to ensure that sufficient ECCS flow is available to the core following a DBA.

In MODE 4, an ECCS train consists of an SI subsystem and an RHR subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWST and transferring suction to the containment sump.

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the ECCS pumps and their respective supply headers to each of the cold leg injection nozzles and reactor vessel upper plenum. In the long term, this flow path may be switched to take its supply from the containment sump.

This LCO is modified by a Note that allows an RHR train to be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the ECCS mode of operation and not otherwise inoperable. This allows operation in the RHR mode during MODE 4.

APPLICABILITY

In MODES 1, 2, and 3, the OPERABILITY requirements for ECCS are covered by LCO 3.5.2.

In MODE 4 with RCS temperature below 350°F and both RCS cold leg temperatures above the SI pump disable temperature specified in the PTLR, one OPERABLE ECCS train is acceptable without single failure consideration, on the basis of the stable reactivity of the reactor and the limited core cooling requirements.

In MODE 4 when any RCS cold leg temperature is ≤ the SI pump disable temperature, and MODES 5 and 6, plant conditions are such

BASES

APPLICABILITY (continued)

that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 4 when any RCS cold leg temperature is ≤ the SI pump disable temperature are addressed by LCO 3.4.6, "RCS Loops-MODE 4." Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops-MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops-MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation-High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation Low-Water Level."

ACTIONS

A.1

With no ECCS RHR subsystem OPERABLE, the plant is not prepared to respond to a loss of coolant accident or to continue a cooldown using the RHR pumps and heat exchangers. The Completion Time of immediately to initiate actions that would restore at least one ECCS RHR subsystem to OPERABLE status ensures that prompt action is taken to restore the required cooling capacity. Normally, in MODE 4, reactor decay heat is removed from the RCS by an RHR loop. If no RHR loop is OPERABLE for this function, reactor decay heat must be removed by some alternate method, such as use of the steam generators. The alternate means of heat removal must continue until the inoperable RHR loop components can be restored to operation so that decay heat removal is continuous.

With both RHR pumps and heat exchangers inoperable, it would be unwise to require the plant to go to MODE 5, where the only available heat removal system is the RHR. Therefore, the appropriate action is to initiate measures to restore one ECCS RHR subsystem and to continue the actions until the subsystem is restored to OPERABLE status.

BASES

ACTIONS (continued)

B.1

With no ECCS SI subsystem OPERABLE (neither train), due to the inoperability of the SI pump or flow path from the RWST, the plant is not prepared to provide high pressure response to Design Basis Events requiring SI. The 1 hour Completion Time to restore at least one SI subsystem to OPERABLE status ensures that prompt action is taken to provide the required cooling capacity or to initiate actions to place the plant in MODE 5, where an ECCS train is not required.

C.1

When the Required Actions of Conditions B cannot be completed within the required Completion Time, a controlled shutdown should be initiated. Twenty-four hours is a reasonable time, based on operating experience, to reach MODE 5 in an orderly manner and without challenging plant systems or operators.

SURVEILLANCE REQUIREMENTS

SR 3.5.3.1

The applicable Surveillance descriptions from Bases 3.5.2 apply.

REFERENCES

The applicable references from Bases 3.5.2 apply.

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.4 Refueling Water Storage Tank (RWST)

BASES

BACKGROUND

The RWST supplies borated water to the Chemical and Volume Control System (CVCS) during abnormal operating conditions, to the refueling pool during refueling, and to the ECCS and the Containment Spray System during accident conditions.

The RWST supplies both trains of the ECCS and the Containment Spray System during the injection phase of a loss of coolant accident (LOCA). A motor operated isolation valve is provided in each header to isolate the RWST from the ECCS once the system has been transferred to the recirculation mode. The recirculation mode is entered when RHR pump suction is transferred to the containment sump following receipt of the RWST Low Level alarm. Use of a single RWST to supply both trains of the ECCS and Containment Spray System is acceptable since the RWST is a passive component, and passive failures are not required to be assumed to occur coincidentally with initiation of Design Basis Events.

The RWST is located in the Auxiliary Building which maintains the tank temperature above freezing and therefore maintains the boron soluble (Ref. 1).

During normal operation in MODES 1, 2, and 3, the safety injection (SI), residual heat removal (RHR), and Containment Spray (CS) pumps are aligned to take suction from the RWST.

The ECCS and Containment Spray System pumps are provided with recirculation lines that ensure each pump can maintain minimum flow requirements when operating at or near shutoff head conditions. The recirculation lines for the RHR pumps are directed from the discharge of the pumps to the pump suction. The recirculation lines for the SI and CS pumps are directed back to the RWST.

BASES

BACKGROUND (continued)

When the suction for the ECCS pumps is transferred to the containment sump, the RWST and SI pump recirculation flow paths must be isolated to prevent a release of the containment sump contents to the RWST, which could result in a release of contaminants to the Auxiliary Building atmosphere and the eventual loss of suction head for the ECCS pumps.

This LCO ensures that:

a. The RWST contains sufficient borated water to support the ECCS during the injection phase;

b. Sufficient water volume exists in the containment sump to support continued operation of the ECCS pumps at the time of transfer to the recirculation mode of cooling; and

c. The reactor remains subcritical following a LOCA.

Insufficient water in the RWST could result in inadequate net positive suction head (NPSH) for the RHR pumps when the transfer to the recirculation mode occurs. Improper boron concentrations could result in a reduction of shutdown margin (SDM) or excessive boric acid precipitation in the core following the LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside the containment.

APPLICABLE SAFETY ANALYSES

During accident conditions, the RWST provides a source of borated water to the ECCS and Containment Spray System pumps. As such, it provides containment cooling and depressurization, core cooling, and replacement inventory and is a source of negative reactivity for reactor shutdown (Ref. 1). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of B 3.5.2, "ECCS Systems." These analyses are used to assess changes to the RWST in order to evaluate their effects in relation to the acceptance limits in the analyses.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The RWST must also meet volume and boron concentration requirements for non-LOCA events. The volume is not an explicit assumption in non-LOCA events since the required volume is a small fraction of the available volume. The deliverable volume limit is set by the LOCA and containment analyses. For the RWST, the deliverable volume is determined by the volume of water required in the containment sump to provide the necessary NPSH for the RHR pumps at the time of switchover to recirculation. The minimum boron concentration is an explicit assumption in the main steam line break (MSLB) analysis to ensure the required shutdown capability. The maximum boron concentration is an explicit assumption in the evaluation of chemical effects resulting from the operation of the CS System. Temperatures above freezing in the RWST in combination with the maximum boron concentration ensure that the boron will remain soluble while in the RWST.

For a large break LOCA analysis, the minimum water volume limit of 200,000 gallons (68% of indicated level) and the lower boron concentration limit of 2600 ppm are used to compute the post LOCA sump boron concentration necessary to assure subcriticality. The large break LOCA is the limiting case since the safety analysis assumes that all control rods are out of the core.

The upper limit on boron concentration of 3500 ppm is used in calculations which verify boron precipitation does not occur in the core following a LOCA. The upper limit on boron concentration is also used in containment sump chemistry calculations to assure that post-LOCA pH is within acceptable limits.

The RWST satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The RWST ensures that an adequate supply of borated water is available to cool and depressurize the containment in the event of a Design Basis Accident (DBA), to cool and cover the core in the event of a LOCA, to maintain the reactor subcritical following a DBA, and

BASES

LCO (continued)

to ensure adequate level in the containment sump to support ECCS pump operation in the recirculation mode.

To be considered OPERABLE, the RWST must meet the water volume and boron concentration limits established in the SRs.

APPLICABILITY

In MODES 1, 2, 3, and 4, RWST OPERABILITY requirements are dictated by ECCS and Containment Spray System OPERABILITY requirements. Since both the ECCS and the Containment Spray System must be OPERABLE in MODES 1, 2, 3, and 4, the RWST must also be OPERABLE to support their operation. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation Low Water Level."

ACTIONS

A.1

With RWST boron concentration not within limits, it must be returned to within limits within 8 hours. Under these conditions the ECCS can not perform its design function. Therefore, prompt action must be taken to restore the tank to OPERABLE condition. The 8 hour limit to restore the RWST boron concentration to within limits was developed considering the time required to change the boron concentration and the fact that the contents of the tank are still available for injection.

B.1

With the RWST water volume not within limits, it must be restored to OPERABLE status within 1 hour.

BASES

ACTIONS

B.1 (continued)

In this Condition, neither the ECCS nor the Containment Spray System can perform its design function. Therefore, prompt action must be taken to restore the tank to OPERABLE status or to place the plant in a MODE in which the RWST is not required. The short time limit of 1 hour to restore the RWST to OPERABLE status is based on this condition simultaneously affecting redundant trains.

C.1 and C.2

If the RWST cannot be returned to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.5.4.1

The RWST water volume should be verified every 7 days to be above the required minimum level in order to ensure that a sufficient initial supply is available for injection and to support continued ECCS pump operation on recirculation. Since the RWST volume is normally stable and the RWST is located in the Auxiliary Building which provides leak detection capability, a 7 day Frequency is appropriate and has been shown to be acceptable through operating experience.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.4.2

The boron concentration of the RWST should be verified every 7 days to be within the required limits. This SR ensures that the reactor will remain subcritical following a LOCA. Further, it assures that the resulting sump pH will be maintained in an acceptable range so that boron precipitation in the core will not occur and the effect of chloride and caustic stress corrosion on mechanical systems and components will be minimized. Since the RWST volume is normally stable, a 7 day sampling Frequency to verify boron concentration is appropriate and has been shown to be acceptable through operating experience.

REFERENCES

1. USAR, Section 6 and Section 14.

PACKAGE 3.5

EMERGENCY CORE COOLING SYSTEMS (ECCS)

PART C

MARKUP OF PRAIRIE ISLAND CURRENT TECHNICAL SPECIFICATIONS

List of Pages

Part C Page	Current Technical Specifications Page
1	TS.3.3-1
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PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

3.3 ENGINEERED SAFETY FEATURES

~~Applicability~~

~~Applies to the operating status of the engineered safety features.~~

~~Objective~~ A3.5-301

~~To define those limiting conditions that are necessary for operation of engineered safety features: (1) to remove decay heat from the core in an emergency or normal shutdown situations, and (2) to remove heat from containment in normal operating and emergency situations.~~

Specifications

A. ECCS ~~Safety Injection and Residual Heat Removal Systems~~ A3.5-302

1. A reactor shall not be in MODE 1, 2, 3 and 4 ~~made or maintained critical nor shall~~ A3.5-303
~~reactor coolant system average temperature exceed 200°F~~ unless the following conditions are satisfied ~~(except as specified in 3.3.A.2 below):~~

LCO3.5.4 a. The refueling water tank shall be OPERABLE: A3.5-01

SR3.5.4.1 New SR, verify RWST water level (the volume which contains not less than 200,000 gallons of water) with a M3.5-02

SR3.5.4.2 boron concentration of at least 2600~~2500~~ ppm. A3.5-20
but less than or equal to 3500 ppm. M3.5-03

LCO3.5.1 b. Each reactor coolant system accumulator shall be OPERABLE when reactor coolant system pressure is greater than 1000 psig.

~~OPERABILITY requires:~~ A3.5-04

SR3.5.1.1
SR3.5.1.2
SR3.5.1.3
SR3.5.1.5 New SRs requiring verification that isolation valves fully open, water level within limits, cover pressure within limits, and power removed from isolation valve operators. M3.5-05

SR3.5.1.1 (1) The isolation valve is open

SR3.5.1.2 (2) Volume is 1250 to 1290~~1270 ±20~~ cubic feet of borated water

SR3.5.1.4 (3) A minimum boron concentration of 1900 ppm A3.5-304

SR3.5.1.3 (4) A nitrogen cover pressure of 710 to 770~~740 ± 30~~ psig

~~Overflow TS 3.3.1~~

M3.5-06

LCO3.5.2 c. Two ECCS trains ~~safety injection pumps~~ are OPERABLE ~~except as specified in Sections 3.3.A.3 and 3.3.A.4~~ when in MODES 1, 2, and 3.

A3.5-07

~~d. Two residual heat removal pumps are OPERABLE.~~

M3.5-06

~~e. Two residual heat exchangers are OPERABLE.~~

SR3.5.2.1
SR3.5.2.2
SR3.5.2.3
SR3.5.2.8

New SRs which require verification of MOV positions, all system valve positions, MOV breaker positions and containment sumps clear of debris.

M3.5-08

LCO3.5.3

New Specification which requires one ECCS train OPERABLE during operations in MODE 4 with both RCS cold legs > SI pump disable temperature specified in the PTLR.

L3.5-09

SR3.5.3.1

New SR which requires performance of SRs 3.5.2.1, 3.5.2.3, 3.5.2.4, 3.5.2.7 and 3.5.2.8.

M3.5-10

3.3.A.1.f. ~~Manual valves in the above systems that could (if one is improperly positioned) reduce injection flow below that assumed for accident analyses, shall be blocked and tagged in the proper position for injection.~~ LR3.5-11

LCO3.5.3 LCO Note

RHR system valves, however, may be positioned as necessary to regulate plant heatup or cooldown rates when the reactor is subcritical. ~~All changes in valve position shall be under direct administrative control.~~ LR3.5-11

~~g. The following valve conditions shall exist:~~

SR3.5.2.1 SR3.5.2.3

(1) Safety injection system motor-operated valves 8801A, 8801B, 8806A ~~shall have valve position monitor lights OPERABLE and~~ shall be locked in the open position by having the motor control center supply breakers physically locked in the off position. LR3.5-12

SR3.5.2.1 SR3.5.2.3

(2) Safety injection system motor-operated valves 8816A and 8816B shall be closed~~, shall have valve position monitor lights OPERABLE,~~ and shall have the motor control center supply breakers physically locked in the off position. LR3.5-12

~~(3) Accumulator discharge valves 8800A and 8800B shall have position monitor lights and alarms OPERABLE.~~ M3.5-18

~~(4) Residual Heat Removal System valves 8701A and 8701B shall have normal valve position indication OPERABLE.~~ LR3.5-12

A3.5-303

2. During MODES 1, 2 and 3 ~~STARTUP OPERATION or POWER OPERATION, any one of the following conditions of inoperability may exist provided~~ A3.5-306

LCO3.5.2

STARTUP OPERATION is discontinued until OPERABILITY is restored. If OPERABILITY is not restored within the time specified, be in at least MODE 3 ~~HOT SHUTDOWN~~ within the next 6 hours A3.5-303
and in MODE 4 ~~COLD SHUTDOWN~~ within ~~the following~~ 12 ~~30~~ hours. L3.5-13

~~a. One safety injection pump may be inoperable for 72 hours.~~ LR3.5-14

~~b. One residual heat removal pump may be inoperable for 72 hours.~~

~~c. One residual heat exchanger may be inoperable for 72 hours.~~

~~d. Any redundant valve in the system required for safety injection, may be inoperable for 72 hours.~~ LR3.5-14

LCO3.5.1 e. One accumulator may be inoperable for reasons other than boron concentrations not within limits A3.5-15

for 24 ~~one~~ hours whenever pressurizer pressure is greater than 1000 psig. A3.5-307

One accumulator may be inoperable with the boron concentration not within limits for 72 hours L3.5-16

LCO3.5.2 f. One or more ECCS trains ~~safety injection system and one residual heat system~~ may be inoperable for 72 hours provided at least 100% ECCS flow equivalent to a single OPERABLE ECCS train is available. L3.5-17
~~the redundant safety injection system and heat removal system required for functioning during accident conditions is OPERABLE~~.

LR3.5-12

3.3.A.2.g. ~~The valve position monitor lights or alarms for motor-operated valves specified in 3.3.A.1.g above may be inoperable for 72 hours provided the valve position is verified once each shift.~~

Addressed Elsewhere

3. A maximum of one safety injection pump shall be capable of injecting into the RCS whenever RCS temperature is less than the Over Pressure Protection System Enable temperature specified in the COLR except that both SI pumps may be run for up to one hour while conducting the integrated SI test* when either of the following conditions is met:

(a) There is a steam or gas bubble in the pressurizer and an isolation valve between the SI pump and the RCS is shut, or

(b) The reactor vessel head is removed.

4. No safety injection pumps** shall be capable of injecting into the RCS whenever RCS temperature is less than the temperature specified in the PTLR for disabling both safety injection pumps (except one or both pumps may be run as specified in 3.3.A.3 and 3.1.A.1.d.(2)).

5. Both reactor coolant system accumulators shall be isolated whenever RCS temperature is less than the Over Pressure Protection System Enable Temperature specified in the PTLR.

LCO3.5.4 New Action Statement which allows 8 hours to restore RWST boron concentration within limits when it is found outside the limits. L3.5-19

Addressed Elsewhere

*This specification does not apply whenever the reactor coolant system accumulators are depressurized or the reactor vessel head is removed.

*Other SI system tests and operations may also be conducted under these conditions.

**This specification does not apply whenever the reactor vessel head is removed.

TABLE TS 4.1-2B

MINIMUM FREQUENCIES FOR SAMPLING TESTS

	TEST	FREQUENCY
1.	RCS Gross Activity Determination	5/Week
2.	RCS Isotopic Analysis for DOSE EQUIVALENT I-131 Concentration	1/14 days (when at power)
3.	RCS Radiochemistry E determination	1/6 months(1) (when at power)
4.	RCS Isotopic Analysis for Iodine Including I-131, I-133, and I-135	a) Once per 4 hours, whenever the specific activity exceeds 1.0 uCi/gram DOSE EQUIVALENT I-131 or 100/E uCi/gram (at or above cold shutdown), and b) One sample between 2 and 6 hours following THERMAL POWER change exceeding 15 percent of the RATED THERMAL POWER within a one hour period (above hot shutdown)
5.	RCS Radiochemistry (2)	Monthly
6.	RCS Tritium Activity	Weekly
7.	Deleted	
8.	RCS Boron Concentration (3)	2/Week (4)
9.	RWST Boron Concentration	Weekly
~~10.~~	~~Boric Acid Tanks Boron Concentration~~	~~2/Week~~ Deleted
11.	Caustic Standpipe NaOH Concentration	Monthly
12.	Accumulator Boron Concentration	Monthly
13.	Spent Fuel Pit Boron Concentration	Monthly/Weekly*

* Required at all times.

SR3.5.4.2

SR3.5.1.4

A3.5-20

Addressed Elsewhere

4.5 ENGINEERED SAFETY FEATURES

~~Applicability~~

~~Applies to testing of the Emergency Core Cooling System and the Containment Cooling Systems.~~

A3.5-301

~~Objective~~

~~To verify that the subject systems will respond promptly and perform their design functions, if required~~

Specification

A. System Tests

1. ECCS ~~Safety Injection System~~

SR3.5.2.6 a. System tests shall be performed during each reactor refueling shutdown. ~~With the Reactor Coolant System pressure less than or equal to 350 psig and temperature less than or equal to 350°F,~~ a test safety injection signal will be applied to initiate operation of the system. ~~The safety injection and residual heat removal pumps need not be operable for this test.~~

LR3.5-21

b. ~~The test will be considered satisfactory if control board indications and visual observations indicate that all components have received the safety injection signal in the proper sequence and timing, the appropriate pump breakers have opened and closed, and all automatic valves have been placed in the proper position required to establish a safety injection flow path to the reactor coolant system.~~

2. Containment Spray System

a. System tests shall be performed during each reactor refueling shutdown. The tests shall be performed with the isolation valves in the spray supply lines at the containment and the spray additive tank isolation valves blocked closed. Operation of the system is initiated by tripping the normal actuation instrumentation.

b. The spray nozzles shall be checked for proper functioning at least every ten years.

c. The test will be considered satisfactory if visual observations indicate all components have operated satisfactorily.

Addressed Elsewhere

B. Component Tests

1. Pumps

A3.5-302

SR3.5.2.4 a. The EGCS ~~safety injection pumps, residual heat removal pumps~~

Addressed Elsewhere

~~and containment spray pumps~~

A3.5-22

shall be tested pursuant to IST Program ~~Specification 4.2.~~

LR3.5-23

~~Acceptable levels of performance shall be that the pumps start and reach their required developed head on minimum recirculation flow and the control board indications and visual observations indicate that the pumps are operating properly for at least 15 minutes.~~

Addressed Elsewhere

~~b. A test consisting of a manually-initiated start of each diesel engine, and assumption of load within one minute, shall be conducted monthly.~~

~~c. The vertical motor-driven cooling water pump shall be operated at quarterly intervals. An acceptable level of performance shall be that the pump starts and reaches its required developed head and the control board indications and visual observations indicate that the pump is operating properly for at least 15 minutes.~~

~~2. Containment Fan Motors~~

~~The Containment Fan Coil Units shall be run on low motor speed for at least 15 minutes at intervals of one month. Motor current shall be measured and compared to the nominal current expected for the test conditions.~~

3. Valves

~~a. The refueling water storage tank outlet valves shall be tested in accordance with Section 4.2.~~ Deleted.

A3.5-20

~~b. The accumulator check valves will be checked for OPERABILITY during each refueling shutdown.~~

~~c. The boric acid tank valves to the Safety Injection System shall be tested in accordance with Section 4.2.~~ Deleted.

A3.5-20

~~d. The spray chemical additive tank valves shall be tested in accordance with Section 4.2.~~

~~e. Actuation circuits for Cooling Water System valves that isolate non-essential equipment from the system shall be tested each refueling outage. Unit 1 SI actuation circuits for Train A and Train B valves shall be tested during Unit 1 refueling outages. Unit 2 SI actuation circuits for Train A and Train B valves shall be tested during Unit 2 refueling outages.~~

Addressed Elsewhere

SR3.5.2.5 f. All motor-operated valves in the ECCS~~SIS, RHR~~, A3.5-302

Addressed Elsewhere

~~Containment Spray, Cooling Water, and Component Cooling Water~~

SR3.5.2.5 System that are designed for operation during the safety injection or recirculation phase of emergency core cooling, shall be tested for OPERABILITY at each refueling shutdown.

g. The correct position of the throttle valves below shall be verified as follows:

~~1. Within 4 hours following completion of each valve stroking operation.~~

LR3.5-24

~~2. Within 4 hours following maintenance on the valve when the Safety Injection System is required to be OPERABLE, and~~

L3.5-25

SR3.5.2.7

3. Periodically at least once per 24 ~~18~~ months ~~to the extent not verified in accordance with 1 and 2 above within this time period.~~

Unit 1 Valves	Unit 2 Valves
SI-15-6	2SI-15-6
SI-15-7	2SI-15-7
SI-15-8	2SI-15-8
SI-15-9	2SI-15-9

h. ~~Following completion of high head Safety Injection System or RHR system modifications that alter system flow characteristics a flow balance test shall be performed during shutdown to confirm the following injection flow rates are achieved:~~

LR3.5-26

~~1. High Head Safety Injection System:~~

~~(a) Flow through all four injection lines plus miniflow shall not exceed 835 gpm with one pump in operation.~~

~~(b) The minimum flow through loop A & B cold legs shall be 670 gpm with one pump in operation. The flow rates in each leg shall be within 20 gpm of each other with one pump in operation.~~

~~(c) Flow orifices and throttling valves will be used to limit and balance flow through the reactor vessel injection lines to a maximum of the total flow limit in Specification 4.5.B.3.h.1.(a) above, with one pump in operation. During this flow test the flow rates in each leg shall be within 50 gpm of each other.~~

~~2. RHR System:~~

~~The minimum flow through each RHR Reactor Vessel Injection line shall be at least 1800 gpm.~~

PACKAGE 3.5

EMERGENCY CORE COOLING SYSTEMS (ECCS)

PART D

DISCUSSION OF CHANGES
(DOC)

to

PRAIRIE ISLAND
CURRENT TECHNICAL SPECIFICATIONS

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

Part D

PACKAGE 3.5

EMERGENCY CORE COOLING SYSTEMS (ECCS)

DISCUSSION OF CHANGES TO CURRENT TECHNICAL SPECIFICATIONS

The proposed changes to PI Operating License Appendix A, TS are discussed below and the specific wording changes are shown in Parts B, C and E.

For ease of review, all package parts and discussions are organized according to the proposed PI ITS Table of Contents.

NSHD category	Change number 3.5-	Discussion Of Change
A	01	CTS 3.3.A.1.a. Specific details of RWST OPERABILITY requirements have been relocated to the Surveillance Requirements. Since these requirements remain within the TS, this change is administrative.
M	02	A new SR, 3.5.4.1, is included which requires verification of the RWST water volume. Operators are currently required to verify the RWST water volume in accordance with plant procedures; however, since this is now a formal TS requirement it is more restrictive on plant operations. This more restrictive change is included to make the PI ITS complete. This change is consistent with the guidance of NUREG-1431.

NSHD category	Change number 3.5-	Discussion Of Change
M	03	CTS 3.3.A.1.a. PI currently limits the upper boron concentration in the RWST to 3500 ppm to assure analysis assumptions are met. However this is not a requirement in the CTS. For completeness, this limit is included in the ITS. This is also consistent with the guidance of NUREG-1431.
A	04	CTS 3.3.A.1.b. The details of ECCS Accumulators OPERABILITY requirements have been relocated to the Surveillance Requirements. Since these requirements remain in TS, this change is administrative.
M	05	Four new SRs, 3.5.1.1, 3.5.1.2, 3.5.1.3 and 3.5.1.5, have been included which require verification that the isolation valves are fully open, the water volume is within limits, the cover pressure is within limits and power is removed from the ECCS accumulator isolation valves. Some of these requirements are currently part of the Specification requirements. Operators are currently required to verify these parameters in accordance with plant procedures; however, since these are now formal TS Surveillance Requirements it is more restrictive on plant operations. These more restrictive changes are included to make the PI ITS complete. These changes are consistent with NUREG-1431 guidance and are included to make the ITS complete.

NSHD category	Change number 3.5-	Discussion Of Change
M	06	CTS 3.3.A.1.c, 3.3.A.1.d and 3.3.A.1.e. This Specification is revised to require "ECCS trains" OPERABLE which is more inclusive of equipment than the specific requirement for SI pumps to be OPERABLE. "ECCS trains" also envelopes the details of Specifications 3.3.A.1.d and e. The details of equipment included in the ECCS subsystems is included in the USAR and the Bases and therefore is unnecessary in this specification. These changes are consistent with the guidance of NUREG-1431. Since the term "ECCS trains" is a general, more inclusive term, the proposed ITS specification requires more plant equipment to be OPERABLE; therefore, this change is more restrictive. These more restrictive changes are included to make the PI ITS complete.
A	07	CTS 3.3.A.1.c. This change restricts the applicability of the Specification requiring two trains to be OPERABLE to RCS MODES 1, 2 and 3 (RCS temperatures above 350 F). The Specification requirements for operation above 350°F are not changed; therefore, this change is considered administrative. ECCS specifications for operations in MODE 4 (RCS temperatures below 350°F) are addressed in a new specification which is discussed below. Since the exceptions "specified in Sections 3.3.A.3 and 3.3.A.4" only apply during temperatures below 350°F, this clause has not been included. This change is consistent with the guidance of NUREG-1431.

NSHD category	Change number 3.5-	Discussion Of Change
M	08	Four new SRs, 3.5.2.1, 3.5.2.2, 3.5.2.3, and 3.5.2.8, have been added to the PI ITS. These SRs require verification of ECCS MOV positions, non-MOV positions, MOV breaker positions and containment sumps clear of debris. Some of these requirements are currently part of the Specification requirements. While many of these verifications are currently performed as part of plant practices, these SRs may make the plant safer through formal TS Surveillance Requirements. These new SRs place more restrictions on plant operations and therefore these changes are more restrictive. These more restrictive changes are included to make the PI ITS complete. These changes are also consistent with the guidance of NUREG-1431.

NSHD category	Change number 3.5-	Discussion Of Change
L	09	New Specification. CTS require two trains of ECCS OPERABLE for MODES 1, 2 and 3 and MODE 4 down to the SI pump disable temperature (in accordance with the exception provided in CTS 3.3.A.4). For consistency with the guidance of NUREG-1431, the PI ITS requires two trains of ECCS in MODES 1, 2 and 3 and a new specification is included which will require one train of ECCS OPERABLE in MODE 4 above the SI pump disable temperature. This change in TS requirements is acceptable at PI because no Applicable Safety Analyses have been performed for MODE 4 due to the stable conditions associated with operation in MODE 4 and the reduced probability of occurrence and consequences of a Design Basis Accident. In MODE 4, sufficient time is expected for manual actuation of the required ECCS to mitigate the consequences of a DBA. This time is required since the RHR System may be aligned to provide normal shutdown cooling and the SI System may be isolated due to LTOP considerations. Thus, the ECCS operational requirements for MODE 4, above the SI pump disable temperature, are reduced. Only one train of ECCS is required and accordingly, single failures are not considered due to the time available for operators to respond to an accident. This new Specification is consistent with the guidance of NUREG-1431.
M	10	A new SR, 3.5.3.1, is included which invokes SRs 3.5.2.1, 3.5.2.3, 3.5.2.4, 3.5.2.7 and 3.5.2.8 when operating in MODE 4 with the RCS temperature above the SI pump disable temperature. This SR is included to be consistent with the guidance of NUREG-1431. Since this is a new requirement it is more restrictive on plant operations. This more restrictive change is included to make the PI ITS complete.

NSHD category	Change number 3.5-	Discussion Of Change
LR	11	CTS 3.3.A.1.f. Specific details on control of valve positions are relocated to the Bases. These details are not necessary in the TS since the LCO requirement that the systems are OPERABLE envelopes these requirements. This change is consistent with the guidance of NUREG-1431. Since the ITS Bases (under the Bases Control Program in Section 5.5 of the ITS) and plant procedures are licensee controlled, this change is less restrictive.
LR	12	3.3.A.1.g. and 3.3.A.2.9 Specific details on position indication monitoring light and alarm OPERABILITY are relocated to the TRM. These details are not necessary in the TS since the LCO requirement that the systems are OPERABLE envelopes these requirements. This change is consistent with the guidance of NUREG-1431. Since the TRM is licensee controlled under the USAR 10 CFR 50.59 requirements, this change is less restrictive.
L	13	CTS 3.3.A.2. A new specification 3.5.3 has been included which requires one train of ECCS OPERABLE in MODE 4; thus by reducing RCS temperatures to MODE 4 the plant is in a mode in which the LCO does not apply. Further reduction in RCS temperatures to cold shutdown are unnecessary and may be unsafe since RHR operability is required at lower temperatures. This change will require placing the plant in MODE 4 within an additional 6 hours in lieu of 30 hours, which is more restrictive. However, 6 hours is a reasonable time in which to reduce plant power in an orderly manner without challenging plant systems. These changes are consistent with the guidance of NUREG-1431. Overall these changes are less restrictive since the plant is maintained at higher temperatures which allows more flexibility.

NSHD category	Change number 3.5-	Discussion Of Change
LR	14	CTS 3.3.A.2.a, 3.3.A.2.b, 3.3.A.2.c and 3.3.A.2.d. Specific details on system components which could be inoperable are relocated to the Bases. These details are not necessary in ITS since an Action Statement is provided which envelopes these conditions. This change is consistent with the guidance of NUREG-1431. Since the ITS Bases (under ITS Section 5.5, Programs) are licensee controlled, this change is less restrictive.
A	15	CTS 3.3.A.2.e. Accumulator inoperability due to boron concentrations not within limits is excluded from this Action Statement since a new Action Statement is included which addresses boron concentration. This change is administrative since the impact of the new Action Statement is addressed separately. This change is consistent with the guidance of NUREG-1431.

NSHD category	Change number 3.5-	Discussion Of Change
L	16	A new Action Statement is included which allows the boron concentration in one accumulator to be outside its limits for up to 72 hours. This increase in the allowed outage time for boron concentration is acceptable because the boron concentration in the accumulators is not specifically evaluated in the injection phase of the LOCA analysis. Although the boron concentration of the accumulators is considered in the recirculation phase, the impact of a single accumulator's borated water volume is not significant when compared to the total borated water volume present during the recirculation phase. The proposed change is also acceptable based on the small probability of an event requiring the accumulator to function occurring in 72 hours. Also, the current 1 hour allowed outside the limits does not provide a reasonable time in which to restore and verify boron concentration if it is found out of limits. The proposed change allows sufficient time to correct a problem and therefore reduces the potential for a plant transient due to boron concentration being found outside the TS limits. This change is consistent with the guidance of NUREG-1431.
L	17	CTS 3.3.A.2.f. This action statement is revised to allow combinations of ECCS components or subsystems to be inoperable provided at least 100% ECCS flow equivalent to a single ECCS train remains OPERABLE. This Condition envelopes all other CTS conditions for ECCS equipment inoperability. This revised Action Statement is acceptable because it continues to require OPERABLE flow capacity equivalent to one ECCS train or 100% of the required flow. Thus the loss of function is limited to a single train of ECCS which is functionally equivalent to the CTS requirements. This change is consistent with the guidance of NUREG-1431.

NSHD category	Change number 3.5-	Discussion Of Change
M	18	CTS 3.3.A.3.g. CTS requirements to assure that the accumulator isolation valves are open through reliance on valve position indication lights and alarms has not been included in the ITS and instead more restrictive NUREG-1431 requirements to remove power from the isolation valves has been adopted. This change has been implemented through the addition of new SR 3.5.1.5, which requires verification that isolation valve power has been removed, and supporting discussion in the Bases. This change is consistent with the guidance of NUREG-1431 and is included to improve plant safety.
L	19	A new Action Statement is included which allows 8 hours to restore the RWST boron concentration to within its limits. CTS do not specify an allowable time to restore RWST boron concentration. Thus, the plant would enter CTS LCO 3.0.C which would require restoring RWST boron concentration within 1 hour and the plant would be shutdown within an additional 6 hours if the boron concentration could not be restored within that time. This change is acceptable since the RWST is still available for injection and the RWST is a very large volume of water which assures that the concentration is unlikely to be significantly outside the boron concentration limits. Eight hours is a reasonable time in which the concentration can be restored. This change is consistent with the guidance of NUREG-1431.

NSHD category	Change number 3.5-	Discussion Of Change
A	20	CTS 3.3.A.1.a, Table 4.1-2B, Test 10, 4.5.B.3.a and 4.5.B.3.c. These Specifications were revised by LAR entitled, "Removal of Boric Acid Storage Tanks from the Safety Injection System," submitted April 17, 2000. Since these changes were justified in that submittal, they are considered administrative changes in this submittal.
LR	21	CTS 4.5.A.1.a and 4.5.A.1.b. Specific test parameters, conditions and acceptance criteria have been relocated to the Bases. This level of detail is not consistent with the guidance of NUREG-1431. Since the ITS Bases (under the Bases Control Program in Section 5.5 of the ITS) are licensee controlled, this change is less restrictive. The provision which allows the SI and RHR pumps to be inoperable when this test is performed has been deleted since it is contradictory to the requirements of SR 3.5.2.6. This change reduces plant flexibility and is therefore more restrictive. This change is acceptable since it assures that these pumps will start as required and is consistent with current plant test practices.
A	22	CTS 4.5.B.1.a. CTS 4.2 require plant equipment testing in accordance with the IST Program; thus, this is an administrative change which is consistent with the guidance of NUREG-1431.

NSHD category	Change number 3.5-	Discussion Of Change
LR	23	CTS 4.5.B.1.a and 4.5.B.3.b. The requirements to test specific components such as pumps and valves have been relocated to the IST Program (under the IST Program requirements in Section 5.5 of the ITS). This change is consistent with the guidance of NUREG-1431. Since the IST Program is licensee controlled, this change is less restrictive.
LR	24	CTS 4.5.B.3.g.1 and 4.5.B.3.g.2. Requirements for verifying ECCS throttle valve stop position after each stroking or maintenance are relocated to the TRM. In accordance with NUREG-1431 guidance, post-maintenance test requirements have been completely removed from the PI ITS. This change is less restrictive since the TRM is under licensee control. However this change is acceptable since the TRM is under the controls of 10 CFR 50.59.
L	25	CTS 4.5.B.3.g.3. The surveillance interval for throttle valve position verification is increased from 18 months to 24 months to accommodate extended refueling cycles. In accordance with SR 3.0.2 this surveillance interval is fixed at this maximum and is not allowed to be extended beyond 24 months. This change is acceptable because there are no time dependent degradation mechanisms that affect the position of manual throttle valves. This change is consistent with the guidance of GL 91-04.

NSHD category	Change number 3.5-	Discussion Of Change
LR	26	CTS 4.5.B.3.h. Requirements for performing ECCS post-modification flow tests are relocated to the TRM. This change is consistent with the guidance of NUREG-1431. In accordance with this guidance, post-modification test requirements have been completely removed from the PI ITS. This change is less restrictive since the TRM is under licensee control. However this change is acceptable since the TRM is under the controls of 10CFR50.59.
	27 - 300	Not used in Part D.
A	301	CTS 3.3 and 4.5 Applicability and Objectives. The beginning of each CTS section contains general statements of Applicability and Objectives for that TS section. This Applicability states the plant operations to which the specifications apply, which is a different meaning than the Applicability in NUREG-1431. Since the ITS clearly states within each specification the operations to which it applies, administratively these statements have been incorporated. Likewise, the CTS Objectives statement provides an overall purpose for the specifications within the section. These objectives are administratively incorporated in general through the statement of the ITS specification LCO and the supporting Bases. Since these general CTS statements do not establish any regulatory requirements and are incorporated in a broad sense in the ITS, these are considered administrative changes.

NSHD category	Change number 3.5-	Discussion Of Change
A	302	CTS 3.3.A, 4.5.A.1, 4.5.B.1.a and 4.5.B.3.f. In ITS, these specification requirements apply to the ECCS. Thus the title has been changed to ECCS. The ITS Action Statements and SRs apply to ECCS rather than subsystem components; thus the title for these components has also been changed to ECCS. Since the ITS applies to the same equipment as CTS and no Specification changes have been made, these are administrative changes.
A	303	CTS 3.3.A.1 and 3.3.A.2. The CTS contain prose descriptions of the conditions for which the specification is applicable. This description has been replaced with the equivalent MODES of applicability for the ITS. Since the plant conditions to which this specification apply have not changed, this is an administrative change.
A	304	CTS 3.3.A.1.b. CTS provides the operable range for accumulator parameters in terms of a median value plus or minus the allowable variation. In accordance with the guidance of NUREG-1431, this presentation has been replaced by a simple range over which the parameters are acceptable without requiring the operators to perform any calculations. Since the required range for the parameters has not changed, this is an administrative change.
	305	Not used.

NSHD category	Change number 3.5-	Discussion Of Change
A	306	CTS 3.3.A.2. CTS states that. "any one of the following conditions of inoperability may exist . . ." This requirement prevents two or more of the listed conditions from existing at the same time. The limitation that only one condition of inoperability may exist is not explicitly stated in ITS. In ITS, these conditions may be in more than one specification. However, in the NUREG-1431 format, the SFDP exists to provide a mechanism to assure that entry into multiple TS Conditions will not result in loss of safety function. Thus the SFDP limits these conditions from simultaneous existence when there is a loss of safety function. The Maintenance Rule will also assure that multiple equipment inoperabilities are evaluated for reduction of plant safety. Since the ITS includes provisions to address this clause, there is no net change in plant safety and this is an administrative change.
A	307	CTS 3.3.A.2.e. CTS allows an accumulator to be inoperable for 1 hour, after which plant shutdown is required. This change proposes to allow an accumulator to be inoperable for 24 hours before plant shutdown is required. This change is based on WCAP-15049 which has been reviewed and approved by the NRC. Each plant which chooses to implement this WCAP must demonstrate that the plant meets certain criteria. PI will submit an separate LAR which demonstrates that PI meets the criteria as required by WCAP-15049. Since another LAR will justify this change, in this ITS conversion LAR the accumulator AOT extension is considered an administrative change.

PACKAGE 3.5

EMERGENCY CORE COOLING SYSTEMS (ECCS)

PART E

MARKUP OF NUREG-1431
IMPROVED STANDARD TECHNICAL SPECIFICATIONS AND BASES

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PRAIRIE ISLAND NUCLEAR GENERATING PLANT
UNITS 1 AND 2

Improved Technical Specifications
Conversion Submittal

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.1 Accumulators

LCO 3.5.1 [Two]~~[Four]~~ ECCS accumulators shall be OPERABLE. CL3.5-29

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS~~pressurizer~~ pressure > ~~[~~1000~~]~~ psig. TA3.5-31

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One accumulator inoperable due to boron concentration not within limits.	A.1 Restore boron concentration to within limits.	72 hours
B. One accumulator inoperable for reasons other than Condition A.	B.1 Restore accumulator to OPERABLE status.	24~~1~~ hours~~s~~ X3.5-34
C. Required Action and associated Completion Time of Condition A or B not met.	C.1 Be in MODE 3. AND C.2 Reduce RCS~~pressurizer~~ pressure to ≤ ~~[~~1000~~]~~ psig.	6 hours 1~~2~~ hours TA3.5-31

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Two ~~or more~~ accumulators inoperable.	D.1 Enter LCO 3.0.3.	Immediately CL3.5-29

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.1.1	Verify each accumulator motor operated isolation valve is fully open.	12 hours CL3.5-32
SR 3.5.1.2	Verify borated water volume in each accumulator is ≥ ~~[7853~~ 1250 cubic feet ~~gallons~~ (25%)~~%~~ and ≤ 1290 cubic feet ~~8171 gallons~~ (91%)~~%]~~.	12 hours CL3.5-33
SR 3.5.1.3	Verify nitrogen cover pressure in each accumulator is ≥ 710~~[385]~~ psig and ≤ 770~~[481]~~ psig.	12 hours

SURVEILLANCE		FREQUENCY
SR 3.5.1.4	Verify boron concentration in each accumulator is ≥ ~~[~~1900~~]~~ ppm ~~and ≤ [2100] ppm~~.	31 days CL3.5-35 ~~AND~~ ~~-----NOTE-----~~ ~~Only required to be performed for affected accumulators~~ CL3.5-36 ~~----------~~ ~~Once within 6 hours after each solution volume increase of ≥ [[ ] gallons, ( )% of indicated level] that is not the result of addition from the refueling water storage tank~~
SR 3.5.1.5	Verify power is removed from each accumulator isolation valve operator when RCS~~pressurizer~~ pressure is ≥ ~~[~~2000~~]~~ psig.	31 days TA3.5-31

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS – Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

~~APPLICABILITY: MODES 1, 2, and 3.~~ TA3.5-37

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

~~1.~~ In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.15~~4~~.1. PA3.5-38

~~2. Operation in MODE 3 with ECCS pumps declared inoperable pursuant to LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," is allowed for up to 4 hours or until the temperature of all RCS cold legs exceeds [375]°F, whichever comes first.~~ CL3.5-39

APPLICABILITY: MODES 1, 2, and 3. TA3.5-37

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more trains inoperable. ~~AND~~ ~~At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.~~	A.1 Restore train(s) to OPERABLE status.	72 hours TA3.5-40

ACTIONS (continued) 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 4.	6 hours 12 hours
C. Less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	C.1 Enter LCO 3.0.3.	Immediately TA3.5-40

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.5.2.1 Verify the following valves are in the listed position ~~with power to the valve operator removed~~. Unit 1 Valve Number / Unit 2 Valve Number / Position / Function B2070 [B2173] [OPEN] [SI Injection to RCS Cold Leg A] B2068 [B2171] [OPEN] [SI Injection to RCS Cold Leg B] B2073 B2176 OPEN SI Cold Leg Injection Line... B2206 B2208 CLOSED SI Pump Suction from RHR... B2207 B2209 CLOSED SI Pump Suction from RHR... [ ] [ ] [ ]	12 hours CL3.5-41 CL3.5-42

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.2	Verify each ECCS manual, power operated, and automatic valve in the flow path~~,~~ that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.5.2.3	Verify power to the valve operator has been removed for each valve listed in SR 3.5.2.1~~ECCS piping is full of water~~.	31 days X3.5-43
SR 3.5.2.4	Verify each ECCS 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
SR 3.5.2.5	Verify each ECCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal.	24~~[18]~~ months X3.5-44
SR 3.5.2.6	Verify each ECCS pump starts automatically on an actual or simulated actuation signal.	24~~[18]~~ months X3.5-44

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.5.2.7	Verify~~, for~~ each ECCS throttle valve listed below~~, each position stop~~ is in the correct position. Unit 1 Valve Number — Unit 2 Valve Number ~~[~~SI-15-6 ~~]~~ — 2SI-15-6 ~~[~~SI-15-7 ~~]~~ — 2SI-15-7 SI-15-8 — 2SI-15-8 ÷ SI-15-9 — 2SI-15-9 ÷ ~~[ ]~~	24~~[18]~~ months CL3.5-45
SR 3.5.2.8	Verify, by visual inspection, each ECCS train containment sump suction inlet is not restricted by debris and the suction inlet trash racks and screens show no evidence of structural distress or abnormal corrosion.	24~~[18]~~ months X3.5-44

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.3 ECCS – Shutdown

LCO 3.5.3 One ECCS train shall be OPERABLE. TA3.5-47

NOTE
An RHR train may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned to the ECCS mode of operation.

APPLICABILITY: MODE 4 when both RCS cold leg temperatures are > SI pump disable temperature specified in PTLR. CL3.5-48

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Required ECCS residual heat removal (RHR) subsystem inoperable.	A.1 Initiate action to restore required ECCS RHR subsystem to OPERABLE status.	Immediately
B. Required ECCS safety injection (SI) ~~[high head~~ subsystem~~]~~ inoperable.	B.1 Restore required ECCS SI ~~[high head~~ subsystem~~]~~ to OPERABLE status.	1 hour CL3.5-49
C. Required Action and associated Completion Time ~~[~~of Condition B~~]~~ not met.	C.1 Be in MODE 5.	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.3.1	~~NOTE~~ ~~An RHR train may be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned to the ECCS mode of operation.~~	
	The following SRs are applicable for all equipment required to be OPERABLE: ~~[~~SR 3.5.2.1~~]~~ ~~[~~SR 3.5.2.7~~]~~ ~~[~~SR 3.5.2.3~~]~~ SR 3.5.2.8 SR 3.5.2.4	TA3.5-47 In accordance with applicable SRs

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.4 Refueling Water Storage Tank (RWST)

LCO 3.5.4 The RWST shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RWST boron concentration not within limits. OR ~~RWST borated water temperature not within limits.~~	A.1 Restore RWST to OPERABLE status.	8 hours CL3.5-51
B. RWST water volume not within limits ~~inoperable for reasons other than Condition A~~.	B.1 Restore RWST to OPERABLE status.	1 hour CL3.5-52
C. Required Action and associated Completion Time not met.	C.1 Be in MODE 3. AND C.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.5.4.1~~	~~NOTE~~ ~~Only required to be performed when ambient air temperature is < [35]°F or > [100]°F.~~	CL3.5-51
	~~Verify RWST borated water temperature is ≥ [35]°F and ≤ [100]°F.~~	~~24 hours~~
SR 3.5.4.1~~2~~	Verify RWST borated water volume is ≥ ~~[466,200~~ 200,000 gallons (68%)~~%]~~.	7 days CL3.5-53
SR 3.5.4.2~~3~~	Verify RWST boron concentration is ≥ ~~[2600~~00~~]~~ ppm and ≤ ~~[3522~~00~~]~~ ppm.	7 days

CL3.5-54

~~3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)~~

~~3.5.5 Seal Injection Flow~~

~~LCO 3.5.5 Reactor coolant pump seal injection flow shall be ≤ [40] gpm with [centrifugal charging pump discharge header] pressure ≥ [2480] psig and the [charging flow] control valve full open.~~

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

~~ACTIONS~~

~~CONDITION~~	~~REQUIRED ACTION~~	~~COMPLETION TIME~~
~~A. Seal injection flow not within limit.~~	~~A.1 Adjust manual seal injection throttle valves to give a flow within limit with [centrifugal charging pump discharge header] pressure ≥ [2480] psig and the [charging flow] control valve full open.~~	~~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~~

~~SURVEILLANCE REQUIREMENTS~~

~~SURVEILLANCE~~		~~FREQUENCY~~
~~SR 3.5.5.1~~	~~NOTE~~ ~~Not required to be performed until 4 hours after the Reactor Coolant System pressure stabilizes at ≥ [2215 psig and ≤ 2255 psig].~~	
	~~Verify manual seal injection throttle valves are adjusted to give a flow within limit with [centrifugal charging pump discharge header] pressure ≥ [2480] psig and the [charging flow] control valve full open.~~	~~31 days~~

~~3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)~~

CL3.5-55

~~3.5.6 Boron Injection Tank (BIT)~~

~~LCO 3.5.6 The BIT shall be OPERABLE.~~

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

~~ACTIONS~~

~~CONDITION~~	~~REQUIRED ACTION~~	~~COMPLETION TIME~~
~~A. BIT inoperable.~~	~~A.1 Restore BIT to OPERABLE status.~~	~~1 hour~~
~~B. Required Action and associated Completion Time of Condition A not met.~~	~~B.1 Be in MODE 3.~~ ~~AND~~ ~~B.2 Borate to an SDM equivalent to [1]% Δk/k at 200°F.~~ ~~AND~~ ~~B.3 Restore BIT to OPERABLE status.~~	~~6 hours~~ ~~6 hours~~ ~~7 days~~
~~C. Required Action and associated Completion Time of Condition B not met.~~	~~C.1 Be in MODE 4.~~	~~12 hours~~

~~SURVEILLANCE REQUIREMENTS~~

~~SURVEILLANCE~~	~~FREQUENCY~~
~~SR 3.5.6.1 Verify BIT borated water temperature is ≥ [145]°F.~~	~~24 hours~~
~~SR 3.5.6.2 Verify BIT borated water volume is ≥ [1100] gallons.~~	~~7 days~~
~~SR 3.5.6.3 Verify BIT boron concentration is ≥ [20,000] ppm and ≤ [22,500] ppm.~~	~~7 days~~

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.1 Accumulators

PA3.5-61

BASES

BACKGROUND

The functions of the ECCS accumulators are to supply water to the reactor vessel during the blowdown phase of a large break loss of coolant accident (LOCA), to provide inventory to help accomplish the refill and reflood phase~~s~~ that follow~~s~~ thereafter, and to provide Reactor Coolant System (RCS) makeup for a small break LOCA. CL3.5-62

The blowdown phase of a large break LOCA is the initial period of the transient during which the RCS departs from equilibrium conditions, and heat from fission product decay, hot internals, and the vessel continues to be transferred to the reactor coolant. The reactor coolant inventory is vacating the core during this phase through steam flashing and ejection out through the break. The blowdown phase of the transient ends when the RCS pressure falls to a value approaching that of the containment atmosphere. PA3.5-63

In the refill phase of a LOCA, which immediately follows the blowdown phase, ~~reactor coolant inventory has vacated the core through steam flashing and ejection out through the break. The core is essentially in adiabatic heatup. T~~the balance of accumulator inventory is ~~then~~ available to help fill voids in the lower plenum and reactor vessel downcomer~~, so as to establish a recovery level at the bottom of the core~~ and to help the ongoing reflood of the core with the addition of emergency core cooling system (ECCS)~~safety injection (SI)~~ water. PA3.5-63 CL3.5-62

The accumulators are pressure vessels partially filled with borated water and pressurized with nitrogen gas. The

(continued)

accumulators are passive components, since no operator or control actions are required in order for them to perform

BASES

BACKROUND (continued)

their function. Internal accumulator tank pressure is sufficient to discharge the accumulator contents to the RCS, if RCS pressure decreases below the accumulator pressure.

Each accumulator is piped into an RCS cold leg via an accumulator line and is isolated from the RCS by a motor operated isolation valve and two check valves in series. The motor operated isolation valves (Unit 1 - MV 32071 and MV 32072; Unit 2 - MV 32174 and MV 32175) are maintained open with AC power removed under administrative control when RCS pressure is > 2000 psig ~~interlocked by P-11 with the pressurizer pressure measurement channels to ensure that the valves will automatically open as RCS pressure increases to above the permissive circuit P-11 setpoint.~~ CL3.5-66 TA3.5-67

~~This interlock also prevents inadvertent closure of the valves during normal operation prior to an accident. The valves will automatically open, however, as a result of an SI signal. These features ensure that the valves meet the requirements of the Institute of Electrical and Electronic Engineers (IEEE) Standard 279-1971 (Ref. 1) for "operating bypasses" and that the accumulators will be available for injection without reliance on operator action.~~ TA3.5-67

The accumulator size, water volume, and nitrogen cover pressure are selected so that one~~three~~ of the two~~four~~ accumulators is~~are~~ sufficient to partially cover the core before significant clad melting or zirconium water reaction can occur following a LOCA. The need to ensure that one~~three~~ accumulator~~s~~ is~~are~~ adequate for this function is consistent with the LOCA assumption that the entire contents of one accumulator will be lost via the RCS pipe break during the blowdown phase of the LOCA. CL3.5-62

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

The accumulators are assumed OPERABLE in both the large and small break LOCA analyses at full power (Ref. 1~~2~~). These are the Design Basis Accidents (DBAs) that establish the acceptance limits for the accumulators. Reference to the analyses for these DBAs is used to assess changes in the accumulators as they relate to the acceptance limits.

In performing the LOCA calculations, conservative assumptions are made concerning the availability of ECCS flow. In the early stages of a large break LOCA, with or without a loss of offsite power, the accumulators provide the sole source of makeup water to the RCS. The assumption of loss of offsite power is required by regulations and conservatively imposes a delay wherein the ECCS pumps cannot deliver flow until the emergency diesel generators start, come to rated speed, and go through their timed loading sequence. In cold leg break scenarios, the entire contents of one accumulator are assumed to be lost through the break. CI3.5-62

The limiting large break LOCA is a double ended guillotine break at the discharge of the reactor coolant pump. During this event, the accumulators discharge to the RCS as soon as RCS pressure decreases to below accumulator pressure.

As a conservative estimate, no credit is taken for ECCS pump flow until an effective delay has elapsed. This delay accounts for safety injection (SI) signal generation, the diesels starting and the pumps being loaded and delivering full flow. ~~The delay time is conservatively set with an additional 2 seconds to account for SI signal generation.~~ During this time, the accumulators are analyzed as providing the sole source of emergency core cooling. No operator action is assumed during the blowdown stage of a large break LOCA. CL3.5-71

The worst case small break LOCA analyses also assume a time delay before pumped flow reaches the core. For the larger

(continued)

range of small breaks, the rate of blowdown is such that the increase in fuel clad temperature is terminated solely by

BASES

APPLICABLE SAFETY ANALYSIS (continued)

the accumulators, with pumped flow then providing continued cooling. As break size decreases, the accumulators and safety injection~~centrifugal charging~~ pumps both play a part in terminating the rise in clad temperature. As break size continues to decrease, the role of the accumulators continues to decrease until they are not required and the safety injection~~centrifugal charging~~ pumps become solely responsible for terminating the temperature increase. CL3.5-72

This LCO helps to ensure that the following acceptance criteria established for the ECCS by 10 CFR 50.46~~(Ref. 3)~~ will be met following a LOCA:

CL3.5-73

a. The calculated peak fuel element cladding temperature is below the requirement of~~Maximum fuel element cladding temperature is~~ ≤ 2200°F;

b. The cladding temperature transient is terminated at a time when the core geometry is still amenable to cooling. The localized cladding oxidation limits of 17% are not exceeded during or after quenching~~Maximum cladding oxidation is ≤ 0.17 times the total cladding thickness before oxidation~~;

c. The amount of hydrogen generated by fuel element cladding that reacts chemically with water or steam does not exceed an amount corresponding to interaction of 1% of the total amount of Zircaloy in the reactor~~Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount that would be generated if all of the metal in the cladding cylinders surrounding the fuel, excluding the cladding surrounding the plenum volume, were to~~

(continued)

~~react~~; and

d. The core remains amenable to cooling during and after the break~~Core is maintained in a coolable geometry~~. CL3.5-73

BASES

APPLICABLE SAFETY ANALYSES (continued)

Since the accumulators discharge during the blowdown phase of a LOCA, they do not contribute to the long term cooling requirements of 10 CFR 50.46.

For ~~both~~ the large ~~and small~~ break LOCA analyses, a nominal contained accumulator water volume of 1270 cubic feet is used based on minimum and maximum volumes of 1250 cubic feet (25% indicated level) and 1290 cubic feet (91% indicated level). The contained water volume is the same as the deliverable volume for the accumulators, since the accumulators are emptied, once discharged. ~~For small breaks, an increase in water volume is a peak clad temperature penalty.~~ For large breaks, an increase in water volume can be either a peak clad temperature penalty or benefit, depending on downcomer filling and subsequent spill through the break during the core reflooding portion of the transient. Prairie Island is a two loop plant with Upper Plenum Injection (UPI) LOCA analyses. For UPI plant small breaks, a decrease in water volume is a peak clad temperature penalty; thus a minimum contained water volume is assumed. Both large and small break analyses use a nominal accumulator line water volume from the accumulator to the check valve.~~The analysis makes a conservative assumption with respect to ignoring or taking credit for line water volume from the accumulator to the check valve. The safety analysis assumes values of [6468] gallons and [6879] gallons. To allow for instrument inaccuracy, values of [6520] gallons and~~ CL3.5-74 CL3.5-74 PA3.5-76

(continued)

~~[6820] gallons are specified.~~

The minimum boron concentration setpoint is used in the post LOCA boron concentration calculation. The calculation is performed to assure reactor subcriticality in a post LOCA environment. Of particular interest is the large break LOCA, since no credit is taken for control rod assembly insertion. A reduction in the accumulator minimum boron concentration would produce a subsequent reduction in the

BASES

APPLICABLE SAFETY ANALYSES (continued)

available containment sump concentration for post LOCA shutdown and an increase in the maximum sump pH. For conservatism, the accumulators are not considered in the boron buildup analyses since their inclusion would dilute the sump concentration. ~~The maximum boron concentration is used in determining the cold leg to hot leg recirculation injection switchover time and minimum sump pH.~~ CL3.5-77

The ~~large and~~ small break LOCA analyses are performed at the minimum nitrogen cover pressure, since sensitivity analyses have demonstrated that higher nitrogen cover pressure results in a computed peak clad temperature benefit. The large break analyses utilize the nominal nitrogen cover pressure as per approved methods (Ref. 1). The maximum nitrogen cover pressure limit prevents accumulator relief valve actuation, and ultimately preserves accumulator integrity. CL3.5-81

The effects on containment mass and energy releases from the accumulators are accounted for in the appropriate analyses (Refs. 1~~-2~~ and 2~~4~~).

The accumulators satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii)~~, the NRC Policy Statement~~.

LCO

The LCO establishes the minimum conditions required to ensure that the accumulators are available to accomplish their core cooling safety function following a LOCA.

(continued)

Two~~Four~~ accumulators are required to ensure that 100% of the contents of one~~three of the~~ accumulator~~s~~ will reach the core during a LOCA. This is consistent with the assumption that the contents of one accumulator spill through the break. If less than one~~three~~ accumulator~~s~~ is~~are~~ injected during the blowdown phase of a LOCA, the ECCS acceptance criteria of 10 CFR 50.46 ~~(Ref. 3)~~ could be violated. CL3.5-62

For an accumulator to be considered OPERABLE, the

BASES

LCO (Continued)

motor-operated isolation valve must be fully open, power removed above ~~[~~2000~~]~~ psig, and the limits established in the SR~~r~~s for contained volume, boron concentration, and nitrogen cover pressure must be met. CL3.5-32

APPLICABILITY

In MODES 1 and 2, and in MODE 3 with RCS pressure > 1000 psig, the accumulator OPERABILITY requirements are based on full power operation. Although cooling requirements decrease as power decreases, the accumulators are still required to provide core cooling as long as elevated RCS pressures and temperatures exist.

This LCO is only applicable at pressures > 1000 psig. At pressures ≤ 1000 psig, the rate of RCS blowdown is such that the ECCS pumps can provide adequate injection to ensure that peak clad temperature remains below the 10 CFR 50.46 ~~(Ref. 3)~~ limit of 2200°F.

In MODE 3, with RCS pressure ≤ 1000 psig, and in MODES 4, 5, and 6, the accumulator motor operated isolation valves are closed to isolate the accumulators from the RCS. This allows RCS cooldown and depressurization without discharging the accumulators into the RCS or requiring depressurization of the accumulators.

BASES

ACTIONS A.1

If the boron concentration of one accumulator is not within limits, it must be returned to within the limits within

72 hours. In this Condition, ability to maintain subcriticality ~~or minimum boron precipitation time~~ may be reduced. The boron in the accumulators contributes to the assumption that the combined ECCS water in the partially CL3.5-82

ACTIONS A.1 (continued)

recovered core during the early reflooding phase of a large break LOCA is sufficient to keep that portion of the core subcritical. One accumulator below the minimum boron concentration limit, however, will have no effect on available ECCS water and an insignificant effect on core subcriticality during reflood since the accumulator water volume is very small when compared to RCS and RWST inventory. Boiling of ECCS water in the core during reflood concentrates boron in the saturated liquid that remains in the core. In addition, current analysis techniques demonstrate that the accumulators are~~do~~ not expected to discharge following a large main steam line break~~ for the majority of plants~~. Even if they do discharge, their impact is minor and not a design limiting event. Thus, 72 hours is allowed to return the boron concentration to within limits. CL3.5-82

B~~A~~.1

If one accumulator is inoperable for a reason other than boron concentration, the accumulator must be returned to OPERABLE status within 24~~1~~ hours. In this Condition, the required contents of one~~three~~ X3.5-34

accumulator~~s~~ cannot be assumed to reach the core during a LOCA. Due to the severity of the consequences should a LOCA occur in these conditions, the 24~~1~~ hour Completion Time to open the valve, remove power to the valve, or restore the proper water volume or nitrogen cover pressure ensures that prompt action will be taken to return the inoperable accumulator to OPERABLE status. The Completion Time minimizes the potential for exposure of the plant to a LOCA under these conditions. The 24 hours allowed to restore an inoperable accumulator to OPERABLE status were justified in Reference 3.

X3.5-34

BASES

ACTIONS (continued)

C.1 and C.2

If the accumulator cannot be returned to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and RCS~~pressurizer~~ pressure reduced to ≤ 1000 psig within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

TA3.5-31

D.1

If both~~more than one~~ accumulators are~~is~~ inoperable, the plant is in a condition outside the accident analyses; therefore, LCO 3.0.3 must be entered immediately.

CL3.5-62

SURVEILLANCE REQUIREMENTS

SR 3.5.1.1

Each accumulator motor operated valve should be verified to be fully open every 12 hours. Use of control board indication (position monitor lights and alarms) for valve position is an acceptable verification. This verification ensures that the accumulators are available for injection and ensures timely discovery if a valve should be less than fully open. If an isolation valve is not fully open, the rate of injection to the RCS would be reduced. Although a motor operated valve position should not change with power removed, a closed or not fully open valve could result in not meeting accident analyses assumptions. This Frequency is considered reasonable in view of other administrative controls that ensure a mispositioned isolation valve is unlikely.

CL3.5-32

CL3.5-84

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.5.1.2 and SR 3.5.1.3

Every 12 hours, borated water volume and nitrogen cover pressure are verified for each accumulator. This Frequency is sufficient to ensure adequate injection during a LOCA. Because of the static design of the accumulator, a 12 hour Frequency usually allows the operator to identify changes before limits are reached. Main control board instrumentation and alarms are available for verification of these accumulator parameters. Operating experience has shown this Frequency to be appropriate for early detection and correction of off normal trends.

PA3.5-86

SR 3.5.1.4

The boron concentration should be verified to be within required limits for each accumulator every 31 days since the

static design of the accumulators limits the ways in which the concentration can be changed. The 31 day Frequency is adequate to identify changes that could occur from mechanisms such as stratification or inleakage. ~~Sampling the affected accumulator within 6 hours after a 1% volume increase will identify whether inleakage has caused a reduction in boron concentration to below the required limit. It is not necessary to verify boron concentration if the added water inventory is from the refueling water storage tank (RWST), because the water contained in the RWST is within the accumulator boron concentration requirements. This is consistent with the recommendation of NUREG-1366 (Ref. 5).~~ CL3.5-36

SR 3.5.1.5

Verification every 31 days that power is removed from each accumulator isolation valve operator when the RCS~~pressurizer~~ TA3.5-31

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.5 (continued)

pressure is ≥ 2000 psig ensures that an active failure could not result in the undetected closure of an accumulator motor operated isolation valve. If this were to occur, only one~~two~~ accumulator~~s~~ would be available for injection given a single failure coincident with a LOCA. Since power is removed under administrative control, the 31 day Frequency will provide adequate assurance that power is removed.

This SR allows power to be supplied to the motor operated isolation valves when RCS~~pressurizer~~ pressure is < 2000 psig, thus allowing operational flexibility by avoiding unnecessary delays to manipulate the breakers during plant startups or shutdowns. ~~Even with power supplied to the valves, inadvertent closure is prevented by the RCS pressure interlock associated with the valves.~~ TA3.5-31 TA3.5-67

~~Should closure of a valve occur in spite of the interlock, the SI signal provided to the valves would open a closed valve in the event of a LOCA.~~ TA3.5-67

REFERENCES

1. ~~IEEE Standard 279-1971.~~
2. ~~UFSAR, Chapter~~ Section 14~~[6]~~.
3. ~~10 CFR 50.46.~~
4. ~~UFSAR, Section 6.2 Chapter [15]~~. X3.5-34
5. WCAP-15049-A, Revision 1, "Risk-Informed Evaluation of an Extension to Accumulator Completion Times," April 1999.
6. ~~NUREG-1366, February 1990.~~

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.2 ECCS Operating

PA3.5-61

BASES

BACKGROUND

The function of the ECCS is to provide core cooling and negative reactivity to ensure that the reactor core is protected after any of the following accidents:

a. Loss of coolant accident (LOCA)~~,~~ with coolant leakage greater than the capability of the normal charging system;

CL3.5-87

~~b. Rod ejection accident;~~

~~b~~e. Loss of secondary coolant accident, including uncontrolled steam release~~ or loss of feedwater~~; and

~~c~~d. Steam generator tube rupture (SGTR).

The addition of negative reactivity is designed primarily for the loss of secondary coolant accident where primary cooldown could add enough positive reactivity to achieve criticality and return to significant power.

There are two~~three~~ phases of ECCS operation: injection~~, cold leg recirculation,~~ and ~~hot leg~~ recirculation. In the injection phase, water is taken from the refueling water storage tank (RWST) and injected into the Reactor Coolant System (RCS) through the cold legs and reactor vessel upper plenum. When sufficient water is removed from the RWST to ensure that enough boron has been added to maintain the reactor subcritical and the containment sump~~s~~ has~~have~~ enough water to supply the required net positive suction head to the RHR~~ECCS~~ pumps, suction is switched to ~~the~~ containment S~~s~~ump B for ~~cold leg~~ recirculation. When post accident RCS pressure drops below the RHR pump shutoff head, the RHR flow is directed into the reactor vessel upper plenum to~~After approximately 24 hours,~~

CL3.5-88

~~the ECCS flow is shifted~~

BASES

BACKROUND (continued)

~~to the hot leg recirculation phase to provide a backflush, which would~~ reduce the boiling in the top of the core and any resulting boron precipitation.

The ECCS consists of two~~three~~ separate subsystems: ~~centrifugal charging (high head),~~ safety injection (SI) ~~(intermediate head),~~ and residual heat removal (RHR) ~~(low head)~~. Each subsystem consists of two redundant, 100% capacity trains. The ECCS accumulators and the RWST are also part of the ECCS, but are not considered part of an ECCS flow path as described by this LCO. CL3.5-72

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps such that water from the RWST can be injected into the RCS following the accidents described in this LCO. The major components of each subsystem are the ~~centrifugal charging pumps, the~~ RHR pumps, RHR heat exchangers, and the SI pumps. Both~~Each of the three~~ subsystems consist~~s~~ of two 100% capacity trains that are interconnected and redundant such that either train is capable of supplying 100% of the flow required to mitigate the accident consequences. This interconnecting and redundant subsystem design provides the operators with the ability to utilize components from opposite trains to achieve the required 100% flow to the core if necessary due to individual component inoperability. CL3.5-72 PA3.5-91

During the injection phase of LOCA recovery, a suction header supplies water from the RWST to the ECCS pumps. Separate piping supplies each subsystem~~ and each train within the subsystem~~. ~~The discharge from the centrifugal charging pumps combines prior to entering the boron injection tank (BIT) (if the plant utilizes a BIT) and then divides again into four supply lines, each of which feeds the injection line to one RCS cold leg.~~ The discharge from CL3.5-93 CL3.5-94

each~~the~~ SI pump divides and feeds an injection line to each of the RCS cold legs. ~~and RHR pumps divides and feeds an injection line to each of the RCS cold legs.~~ Throttle~~Control~~

BASES

BACKROUND (continued)

valves are set to balance the flow to the RCS. CL3.5-94 This balance ensures sufficient flow to the core to meet the analysis assumptions following a LOCA in one of the RCS cold legs. The discharge from each RHR pump divides and feeds an injection line to the reactor vessel upper plenum.

For LOCAs that are too small to depressurize the RCS below the shutoff head of the SI pumps, the steam generators provide core cooling~~centrifugal charging pumps supply water~~ until the RCS pressure decreases below the SI pump shutoff head. CL3.5-96 ~~During this period, the steam generators are used to provide part of the core cooling function.~~

During the recirculation phase of LOCA recovery, RHR pump suction is manually transferred to the containment sump. ~~The RHR pumps then supply the other ECCS pumps.~~ CL3.5-97 Initially, recirculation is through the same paths as the injection phase. The RHR pumps provide flow to the reactor vessel upper plenum. If the RCS pressure limits RHR flow, then the RHR pumps supply the SI pumps which provide flow to the~~Subsequently, recirculation alternates injection between the hot and~~ cold legs. CL3.5-88

The SI~~centrifugal charging~~ subsystem of the ECCS also functions to supply borated water to the reactor core following increased heat removal events, such as a main steam line break (MSLB). CL3.5-72 The limiting design conditions occur when the ~~negative~~ moderator temperature coefficient is highly negative, such as at the end of each cycle. PA3.5-101

During low temperature conditions in the RCS,

limitations are placed on the maximum number of ECCS pumps that may be OPERABLE. Refer to the Bases for LCOs 3.4.12, "Low Temperature Overpressure Protection (LTOP) ≤ Safety Injection (SI) Pump Disable Temperature~~System~~," and 3.4.13, "Low Temperature Overpressure Protection (LTOP) ≤ Safety Injection (SI) Pump Disable Temperature," for the basis of these requirements. PA3.5-102

The ECCS subsystems are actuated upon receipt of an SI signal. The actuation of safeguards loads is accomplished in a programmed time sequence. If offsite power is available,

BASES

BACKROUND (continued)

the safeguards loads start immediately in the programmed sequence. If offsite power is not available, the safeguards ~~Engineered Safety Feature (ESF)~~ buses shed normal operating loads and are connected to the emergency diesel generators (EDGs). Safeguards loads are then actuated in the programmed time sequence. The time delay associated with diesel starting, sequenced loading, and pump starting determines the length of time ~~required~~ before pumped flow is available to the core following a LOCA.

The active ECCS components, along with the passive accumulators and the RWST covered in LCO 3.5.1, "Accumulators," and LCO 3.5.4, "Refueling Water Storage Tank (RWST)," provide the cooling water necessary to meet AEC GDC ~~4~~435 (Ref. 1). CL3.5-103

APPLICABLE SAFETY ANALYSES

The LCO helps to ensure that the following acceptance criteria for the ECCS, established by 10 CFR 50.46~~ (Ref. 2)~~, will be met following a LOCA: CL3.5-73

a. The calculated peak fuel element cladding temperature is below the requirement of~~Maximum fuel element cladding temperature is ≤~~ 2200 °F;

b. The cladding temperature transient is terminated at a time when the core geometry is still amenable to cooling. The localized cladding oxidation limits of 17%

are not exceeded during or after quenching~~Maximum cladding oxidation is ≤ 0.17 times the totalcladding thickness before oxidation;~~ CL3.5-73

c. The amount of hydrogen generated by fuel element cladding that reacts chemically with water or steam does not exceed an amount corresponding to interaction of 1% of the total amount of Zircaloy in the reactor~~Maximum hydrogen generation from a zirconium water reaction is ≤ 0.01 times the hypothetical amount generated if all of the metal in the cladding cylinders surrounding the fuel, excluding the cladding~~

BASES

APPLICABLE SAFETY ANALYSES (continued)

~~surrounding the plenum volume, were to react~~;

d. The core remains amenable to cooling during and after the break~~Core is maintained in a coolable geometry~~; and

e. The core temperature is reduced and decay heat is removed for an extended period of time, as required by the long-lived radioactivity remaining in the core~~Adequate long term core cooling capability is maintained~~.

The LCO also limits the potential for a post trip return to power following an MSLB event~~and ensures that containment temperature limits are met~~.

~~[illegible]~~Both~~Each~~ ECCS subsystems are~~is~~ taken credit for in a large break LOCA event at full power (Refs. 2~~3~~ and 3~~4~~). This event establishes the requirement for runout flow for the ECCS pumps, as well as the maximum response time for their actuation. The ~~centrifugal charging pumps and~~ SI pumps are credited in ~~a~~ small break LOCA, SGTR and MSLB events. The small break LOCA~~. This~~ event establishes the flow and discharge head at the design point for the ~~centrifugal charging~~ pumps. The SI pump head and flow characteristics also meet SGTR and MSLB requirements ~~events also credit the centrifugal charging pumps~~. The OPERABILITY requirements for the ECCS are based on CL3.5-88 CL3.5-72 CL3.5-88

the following LOCA analysis assumptions:

a. A large break LOCA event, with loss of ~~offsite power and~~ a single ECCS train ~~failure disabling one RHR pump (both EDG trains are assumed to operate due to requirements for modeling full active containment heat removal system operation)~~; and CL3.5-88

b. A small break LOCA event, with a loss of offsite power and a single failure disabling one ECCS train.

During the blowdown stage of a LOCA, the RCS depressurizes as primary coolant is ejected through the break into the containment. The nuclear reaction is terminated either by moderator voiding during large breaks or control rod

BASES

APPLICABLE SAFETY ANALYSES (continued)

insertion for small breaks. Following depressurization, emergency cooling water is injected by the SI pumps into the cold legs, flows into the downcomer, fills the lower plenum, and refloods the core. The RHR pumps inject directly into the reactor vessel by upper plenum injection when the RCS pressure is less than the RHR pump shutoff head.

The effects on containment mass and energy releases are accounted for in appropriate analyses (Refs. 2~~3~~ and 3~~4~~). The LCO ensures that an ECCS train will deliver sufficient water to match boiloff rates soon enough to minimize the consequences of the core being uncovered following a large LOCA. It also ensures that the ~~centrifugal charging and~~ SI pumps will deliver sufficient water and boron during a small LOCA to maintain core subcriticality. For smaller LOCAs, the SI~~centrifugal charging~~ pumps delivers sufficient fluid to maintain RCS inventory. For a small break LOCA, the steam generators continue to serve as the heat sink, providing part of the required core cooling. CL3.5-88 CL3.5-72

The ECCS trains satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii) ~~the NRC Policy Statement~~.

LCO In MODES 1, 2, and 3, two independent (and redundant)ECCS trains are required to ensure that sufficient ECCS flow is available, assuming a single failure affecting either train. Additionally, individual components within the ECCS trains may be called upon to mitigate the consequences of other transients and accidents.

In MODES 1, 2, and 3, an ECCS train consists of ~~a centrifugal charging subsystem,~~ an SI subsystem~~,~~ and an RHR subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWST upon an SI signal and ~~automatically~~ RHR capable of being transferred~~ing~~ to take suction from ~~to the~~ containment S~~s~~ump B. CL3.5-72 CL3.5-97

BASES

LCO (continued) During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the ECCS pumps and their respective supply headers to each of the two~~four~~ cold leg injection nozzles and the reactor vessel upper plenum. In the long term, this flow path may be switched to take its supply from the containment sump and to supply its flow to the RCS ~~hot and~~ cold legs or directly into the reactor vessel upper plenum. CL3.5-88

The flow path for each train must maintain its designed independence to ensure that no single failure can disable both ECCS trains.

Manual valves that could, if improperly positioned, reduce injection flow below that assumed for accident analyses, are blocked and tagged or locked in the proper position for injection. Changes in valve position must be under direct administrative control. CL3.5-107

A block is a device that can be unclipped or unsnapped to allow a status change of the component to which it PA3.5-108

is applied. A lock is a device that must be unlocked, destroyed or mechanically removed (such as a cap or blank) to allow a status change of the component to which it is applied.

As indicated in the LCO Note, the SI flow paths may be isolated for 2 hours in MODE 3, under controlled conditions, to perform pressure isolation valve testing per SR 3.4.15.1. The flow path is readily restorable from the control room. TA3.5-37 PA3.5-38

APPLICABILITY

In MODES 1, 2, and 3, the ECCS OPERABILITY requirements for the limiting Design Basis Accident, a large break LOCA, are based on full power operation. Although reduced power would not require the same level of performance, the accident analysis does not provide for reduced cooling requirements in the lower MODES. ~~The centrifugal charging pump performance is based on a small break LOCA, which establishes the pump performance curve and has less dependence on power.~~ The SI

BASES

APPLICABILITY (continued)

pump performance requirements are based on a small break LOCA and meet required parameters for mitigation of a secondary side loss of fluid accident. MODE 2 and MODE 3 requirements are bounded by the MODE 1 analysis. CL3.5-72 CL3.5-88 PA3.5-111

This LCO is only applicable in MODE 3 and above. ~~Below MODE 3, the SI signal setpoint is manually bypassed by operator control, and system functional requirements are relaxed as described in LCO 3.5.3, "ECCS Shutdown."~~ TA3.5-37

~~As indicated in Note 1, the flow path may be isolated for 2 hours in MODE 3, under controlled conditions, to perform pressure isolation valve testing per SR 3.4.14.1. The flow path is readily restorable from the control room.~~ CL3.5-37

~~As indicated in Note 2, operation in MODE 3 with ECCS trains declared inoperable pursuant to LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," is necessary for plants with an LTOP arming temperature at or near the MODE 3 boundary temperature of 350EF. LCO 3.4.12 requires that certain pumps be rendered inoperable at and below the LTOP arming temperature. When this temperature is at or near the MODE 3 boundary temperature, time is needed to restore the inoperable pumps to OPERABLE status.~~ CL3.5-39

In MODES 4, 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low. MODE 4 core cooling requirements are addressed by LCO 3.5.3, "ECCS - Shutdown," and LCO 3.4.6, "RCS Loops - MODE 4." Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops - MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops - MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation - High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation - Low Water Level." CL3.5-111

BASES

ACTIONS

A.1

With one or more trains inoperable and at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available, the inoperable components must be returned to OPERABLE status within 72 hours. The 72 hour Completion Time is based on an NRC reliability evaluation (Ref. 45) and is a reasonable time for repair of many ECCS components.

An ECCS train is inoperable if it is not capable of

delivering design flow to the RCS. Individual components are inoperable if they are not capable of performing their design function or required supporting systems are not available.

The LCO requires the OPERABILITY of a number of independent subsystems. Due to the redundancy of trains and the diversity of subsystems, the inoperability of one component in a train does not render the ECCS incapable of performing its function. Neither does the inoperability of two different components, each in a different train, necessarily result in a loss of function for the ECCS. ~~The intent of this Condition is to maintain a combination of equipment such that 100% of the ECCS flow equivalent to a single OPERABLE ECCS train remains available.~~ This allows increased flexibility in plant operations under circumstances when components in opposite trains are inoperable. TA3.5-40

An event accompanied by a loss of offsite power and the failure of an EDG can disable one ECCS train until power is restored. A reliability analysis (Ref. ~~4~~5) has shown that the impact of having one full ECCS train inoperable is sufficiently small to justify continued operation for 72 hours. PA3.5-112

~~Reference 6 describes situations in which one component, such as an RHR crossover valve, can disable both ECCS trains.~~ With one or more component(s) inoperable such that 100% of the flow equivalent to a single OPERABLE ECCS train is not

BASES

ACTIONS

A.1 (continued)

available, the facility is in a condition outside the accident analysis. Therefore, LCO 3.0.3 must be immediately entered.

B.1 and B.2

If the inoperable trains cannot be returned to OPERABLE

status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to MODE 3 within 6 hours and MODE 4 within 12 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

C.1

Condition A is applicable with one or more trains inoperable. The allowed Completion Time is based on the assumption that at least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train is available. With less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available, the facility is in a condition outside of the accident analyses. Therefore, LCO 3.0.3 must be entered immediately. TA3.5-40

SURVEILLANCE REQUIREMENTS

SR 3.5.2.1

Verification of proper valve position ensures that the flow path from the ECCS pumps to the RCS is maintained. Use of control board indication for valve position is an acceptable verification. CL3.5-113 Misalignment of these valves could render one or both ECCS trains inoperable. These valves are secured in position by physically locking the motor control center supply breakers in the off position with the valve position monitor lights OPERABLE to assure ~~Securing these valves in position by removal of power or by key locking the control in the correct position ensures~~ that they cannot change position as a result of an active failure or be inadvertently misaligned. ~~These valves are of the type, described in Reference 6, that can disable the function of both ECCS trains and invalidate the accident analyses.~~ Verification of the valve breakers is performed by SR 3.5.2.3. CL3.5-114 CL3.5-114

BASES

SURVEILLANCE REQUIREMENTS SR 3.5.2.1 (continued)

A 12 hour Frequency is considered reasonable in view of other administrative controls that ~~will~~ ensure a mispositioned valve is unlikely.

SR 3.5.2.2

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths will exist for ECCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these were verified to be in the correct position prior to locking, sealing, or securing (A seal is a device that must be destroyed to allow a status change of the component to which it is applied). A valve that receives an actuation signal is allowed to be in a nonaccident position provided the valve will automatically reposition within the proper stroke time. This Surveillance does not require any testing or valve manipulation. Rather, it involves verification that those valves capable of being mispositioned are in the correct position. The 31 day Frequency is appropriate because the valves are operated under administrative control, and an improper valve position would only affect a single train. This Frequency has been shown to be acceptable through operating experience. PA3.5-116

SR 3.5.2.3

Verification every 31 days that the motor control center supply breakers are physically locked in the off position for each valve specified in SR 3.5.2.1 ensures that an active failure could not result in an undetected misposition of a valve. Since power is removed under administrative control and valve position is verified every 12 hours, the 31 day Frequency will provide adequate assurance that power is removed. X3.5-43

BASES

X3.5-43

SURVEILLANCE REQUIREMENTS

SR 3.5.2.3 (continued)

~~With the exception of the operating centrifugal charging pump, the ECCS pumps are normally in a standby, nonoperating mode. As such, flow path piping has the potential to develop voids and pockets of entrained gases. Maintaining the piping from the ECCS pumps to the RCS full of water ensures that the system will perform properly, injecting its full capacity into the RCS upon demand. This will also prevent water hammer, pump cavitation, and pumping of noncondensible gas (e.g., air, nitrogen, or hydrogen) into the reactor vessel following an SI signal or during shutdown cooling.~~

~~The 31 day Frequency takes into consideration the gradual nature of gas accumulation in the ECCS piping and the procedural controls governing system operation.~~

SR 3.5.2.4

Periodic surveillance testing of ECCS pumps to detect gross degradation caused by impeller structural damage or other hydraulic component problems is required by Section XI of the ASME Code. This type of testing may be accomplished by measuring the pump developed head at a single~~only one~~ point of the pump characteristic curve. This verifies both that the measured performance is within an acceptable tolerance of the original pump baseline performance and that the performance at the test flow is within~~greater than or equal to~~ the performance assumed in the plant safety analysis. SRs are specified in the Inservice Testing Program, which encompasses Section XI of the ASME Code. Section XI of the ASME Code provides the activities and Frequencies necessary to satisfy the requirements.

CL3.5-117

BASES

SR 3.5.2.5 and SR 3.5.2.6

These Surveillances demonstrate that each automatic ECCS valve actuates to the required position on an actual or simulated SI signal and that each ECCS pump starts on receipt of an actual or simulated SI signal. This test is met when control board indications and visual observations indicate that all components have received the safety injection signal in the proper sequence and timing, the appropriate pump breakers have opened and closed, and all automatic valves have been placed in the proper position required to establish a safety injection flow path to the reactor coolant system. CL3.5-121

This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 24~~18~~ month Frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for unplanned plant transients if the Surveillances were performed with the reactor at power. The 24~~18~~ month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment. The actuation logic is tested as part of Engineered Safety Feature (ESF) Actuation System testing, and equipment performance is monitored as part of the Inservice Testing Program. X3.5-44

SR 3.5.2.7

Surveillance requirements on ECCS throttle valves provide assurance that proper ECCS flows are maintained in the event of a LOCA. Proper flow resistance and pressure drop in the piping system to each injection point in the SI System is necessary to: 1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration; 2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS LOCA analyses; and 3) provide an CL3.5-122

acceptable

BASES

CL3.5-122

SURVEILLANCE REQUIREMENTS

SR 3.5.2.7 (continued)

level of total ECCS flow to all injection points equal to on above that assumed in the ECCS LOCA analyses. ~~Realignment of valves in the flow path on an SI signal is necessary for proper ECCS performance. These valves have stops to allow proper positioning for restricted flow to a ruptured cold leg, ensuring that the other cold legs receive at least the required minimum flow. This Surveillance is not required for plants with flow limiting orifices.~~ The 24~~18~~ month Frequency is based on the same reasons as those stated in SR 3.5.2.5 and SR 3.5.2.6.

SR 3.5.2.8

PA3.5-123

Periodic inspections of the containment sump suction inlet to the RHR System ensure that it is unrestricted and stays in proper operating condition. The 24~~18~~ month Frequency allows ~~is based on the need to perform~~ this Surveillance to be performed under the conditions that apply during a plant outage ~~, on the need to have access to the location, and because of the potential for an unplanned transient if the Surveillance were performed with the reactor at power~~. This Frequency has been found to be sufficient to detect abnormal degradation and is confirmed by operating experience.

X3.5-44

PA3.5-123

CL3.5-103

REFERENCES

1. ~~6.~~ AEC "General Design Criteria for Nuclear Power Plant Construction Permits," Criterion 44, issued for comment July 10, 1967, as referenced in USAR Section 1.~~210 CFR 50, Appendix A, GDC 35~~.

2. USAR, Section 6.~~210 CFR 50.46~~.

3. UFSAR, Section 14~~Section [ ]~~.

4. ~~FSAR, Chapter [15], "Accident Analysis."~~

BASES

REFERENCES
(continued) ~~5.~~ NRC Memorandum to V. Stello, Jr., from R.L. Baer, "Recommended Interim Revisions to LCOs for ECCS Components," December 1, 1975.

~~6. IE Information Notice No. 87-01.~~

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.3 ECCS – Shutdown

PA3.5-61

BASES

BACKGROUND

The Background section for Bases 3.5.2, "ECCS – Operating," is applicable to these Bases, with the following modifications.

In MODE 4, the required ECCS train consists of two separate subsystems: safety injection (SI)~~centrifugal charging (high head)~~ and residual heat removal (RHR)~~ (low head)~~. CL3.5-72

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps such that water from the refueling water storage tank (RWST) or containment Sump B can be injected into the Reactor Coolant System (RCS) following the accidents described in Bases 3.5.2. CL3.5-124

APPLICABLE SAFETY ANALYSES

There are no Applicable Safety Analyses which specify ECCS operability requirements in MODE 4 due to the stable conditions associated with operation in MODE 4 and the reduced probability of occurrence of a Design Basis Accident (DBA). Therefore, ~~The Applicable Safety Analyses section of Bases 3.5.2 also SAFETY ANALYSES applies to this Bases section.~~ CL3.5-126

~~Due to the stable conditions associated with operation in MODE 4 and the reduced probability of occurrence of a Design Basis Accident (DBA),~~ the ECCS operational requirements are reduced. It is understood in these reductions that certain automatic ~~safety injection (SI)~~ actuations are~~is~~ not available. Since the RHR System may be aligned to provide normal shutdown cooling, time may be required for manual alignment of ECCS equipment. In this CL3.5-127

MODE, sufficient time

BASES

APPLICABLE SAFETY ANALYSES (continued)

exists for manual actuation of the required ECCS to mitigate the consequences of a DBA.

Therefore, o~~O~~nly one train of ECCS is required for MODE 4. This requirement dictates that single failures are not considered for this LCO due to the time available for operators to respond to an accident~~during this MODE of operation~~. The ECCS trains satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii) ~~the NRC Policy Statement~~. CL3.5-127

LCO

In MODE 4, one of the two independent (and redundant) ECCS trains is required to be OPERABLE to ensure that sufficient ECCS flow is available to the core following a DBA. CL3.5-72

In MODE 4, an ECCS train consists of an SI~~centrifugal charging~~ subsystem and an RHR subsystem. Each train includes the piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWST and transferring suction to the containment sump.

During an event requiring ECCS actuation, a flow path is required to provide an abundant supply of water from the RWST to the RCS via the ECCS pumps and their respective supply headers to each of the ~~four~~ cold leg injection nozzles and reactor vessel upper plenum. In the long term, this flow path may be switched to take its supply from the containment sump~~ and to deliver its flow to the RCS hot and cold legs~~. CL3.5-88

This LCO is modified by a Note that allows an RHR train to be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the ECCS mode of TA3.5-47

operation and not otherwise inoperable. This allows operation in the RHR mode during MODE 4.

BASES

APPLICABILITY

In MODES 1, 2, and 3, the OPERABILITY requirements for ECCS are covered by LCO 3.5.2.

CL3.5-48

In MODE 4 with RCS temperature below 350°F and both RCS cold leg temperatures above the SI pump disable temperature specified in the PTLR, one OPERABLE ECCS train is acceptable without single failure consideration, on the basis of the stable reactivity of the reactor and the limited core cooling requirements.

CL3.5-48

In MODE 4 when any RCS cold leg temperature is ≤ the SI pump disable temperature, and MODES 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 4 when any RCS cold leg temperature is ≤ the SI pump disable temperature are addressed by LCO 3.4.6, "RCS Loops - MODE 4." Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops – MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops – MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation – High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation – Low Water Level."

ACTIONS

A.1

With no ECCS RHR subsystem OPERABLE, the plant is not prepared to respond to a loss of coolant accident or to continue a cooldown using the RHR pumps and heat exchangers. The Completion Time of immediately to initiate actions that would restore at least one ECCS RHR subsystem to OPERABLE status ensures that prompt action is taken to restore the required cooling capacity. Normally, in MODE 4, reactor

decay heat is removed from the RCS by an RHR loop. If no RHR loop is OPERABLE for this function, reactor decay heat must be removed by some alternate method, such as use of the steam generators. The alternate means of heat removal must continue until the inoperable RHR loop components can be restored to operation so that decay heat removal is continuous.

BASES

ACTIONS

A.1 (continued)

With both RHR pumps and heat exchangers inoperable, it would be unwise to require the plant to go to MODE 5, where the only available heat removal system is the RHR. Therefore, the appropriate action is to initiate measures to restore one ECCS RHR subsystem and to continue the actions until the subsystem is restored to OPERABLE status.

B.1

With no ECCS SI~~high head~~ subsystem OPERABLE (neither train), due to the inoperability of the SI~~centrifugal charging~~ pump or flow path from the RWST, the plant is not prepared to provide high pressure response to Design Basis Events requiring SI. The 1 hour Completion Time to restore at least one SI~~ECCS high head~~ subsystem to OPERABLE status ensures that prompt action is taken to provide the required cooling capacity or to initiate actions to place the plant in MODE 5, where an ECCS train is not required.

CL3.5-49

CL3.5-72

BASES

ACTIONS (continued)

C.1

When the Required Actions of Condition B cannot be completed within the required Completion Time, a controlled shutdown should be initiated. Twenty-four hours is a reasonable

time, based on operating experience, to reach MODE 5 in an orderly manner and without challenging plant systems or operators.

SURVEILLANCE REQUIREMENTS

SR 3.5.3.1

The applicable Surveillance descriptions from Bases 3.5.2 apply. ~~This SR is modified by a Note that allows an RHR train to be considered OPERABLE during alignment and operation for decay heat removal, if capable of being manually realigned (remote or local) to the ECCS mode of operation and not otherwise inoperable. This allows operation in the RHR mode during MODE 4, if necessary.~~ TA3.5-47

REFERENCES

The applicable references from Bases 3.5.2 apply.

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.4 Refueling Water Storage Tank (RWST)

PA3.5-61

BASES

BACKGROUND

The RWST supplies borated water to the Chemical and Volume Control System (CVCS) during abnormal operating conditions, to the refueling pool during refueling, and to the ECCS and the Containment Spray System during accident conditions.

The RWST supplies both trains of the ECCS and the Containment Spray System ~~through separate, redundant supply headers~~ during the injection phase of a loss of coolant accident (LOCA) ~~recovery~~. A motor operated isolation valve is provided in each header to isolate the RWST from the ECCS once the system has been transferred to the recirculation mode. The recirculation mode is entered when RHR pump suction is transferred to the containment sump following receipt of the RWST – Low Low ~~(~~Level alarm~~1) signal~~. Use of a single RWST to supply both trains of the ECCS and Containment Spray System is acceptable since the RWST is a passive component, and passive failures are not required to be assumed to occur coincidentally with initiation of Design Basis Events.

CL3.5-94

CL3.5-106

The RWST is located in the Auxiliary Building which maintains the tank temperature above freezing and therefore maintains the boron soluble (Ref. 1). ~~The switchover from normal operation to the injection phase of ECCS operation requires changing centrifugal charging pump suction from the CVCS volume control tank (VCT) to the RWST through the use of isolation valves. Each set of isolation valves is interlocked so that the VCT isolation valves will begin to close once the RWST isolation valves are fully open. Since the VCT is under pressure, the preferred pump suction will be from the VCT~~

CL3.5-51

CL3.5-131

(continued)

~~until the tank is isolated. This will result in a delay in obtaining the RWST borated water. The~~ CL3.5-131

BASES

BACKROUND (continued)

~~effects of this delay are discussed in the Applicable Safety Analyses section of these Bases.~~

During normal operation in MODES 1, 2, and 3, the safety injection (SI), ~~and~~ residual heat removal (RHR), and Containment Spray (CS) pumps are aligned to take suction from the RWST. CL3.5-94

The ECCS and Containment Spray System pumps are provided with recirculation lines that ensure each pump can maintain minimum flow requirements when operating at or near shutoff head conditions. The recirculation lines for the RHR pumps are directed from the discharge of the pumps to the pump suction. The recirculation lines for the SI and CS pumps are directed back to the RWST. CL3.5-94

When the suction for the ECCS ~~and Containment Spray System~~ pumps is transferred to the containment sump, the RWST and SI pump recirculation flow paths must be isolated to prevent a release of the containment sump contents to the RWST, which could result in a release of contaminants to the Auxiliary Building atmosphere and the eventual loss of suction head for the ECCS pumps. CL3.5-132

This LCO ensures that:

a. The RWST contains sufficient borated water to support the ECCS during the injection phase;

b. Sufficient water volume exists in the containment sump to support continued operation of the ECCS ~~and Containment Spray System~~ pumps at the time of transfer to the recirculation mode of cooling; and CL3.5-132

(continued)

c. The reactor remains subcritical following a LOCA.

Insufficient water in the RWST could result in inadequate net positive suction head (NPSH) for the RHR pumps~~insufficient cooling capacity~~ when the CL3.5-133

BASES

BACKROUND (continued)

transfer to the recirculation mode occurs. Improper boron concentrations could result in a reduction of shutdown margin (SDM) or excessive boric acid precipitation in the core following the LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside the containment.

APPLICABLE SAFETY ANALYSES

During accident conditions, the RWST provides a source of borated water to the ECCS and Containment Spray System pumps. As such, it provides containment cooling and depressurization, core cooling, and replacement inventory and is a source of negative reactivity for reactor shutdown (Ref. 1). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of B 3.5.2, "ECCS–Operating"; B 3.5.3, "ECCS–Shutdown"; and B 3.6.5~~6~~, "Containment Spray and Cooling Systems." These analyses are used to assess changes to the RWST in order to evaluate their effects in relation to the acceptance limits in the analyses.

The RWST must also meet volume~~,~~ and boron concentration~~, and temperature~~ requirements CL3.5-51 for non-LOCA events. The volume is not an explicit assumption in non-LOCA events since the required volume is a small fraction of the available volume. The deliverable volume limit is set by the LOCA and containment analyses. For the RWST, the deliverable volume is determined by the volume of water required in CL3.5-133 the containment sump to provide the necessary

(continued)

NPSH for the RHR pumps at the time of switchover to recirculation~~different from the total volume contained since, due to the design of the tank, more water can be contained than can be delivered~~. The minimum boron concentration is an explicit assumption in the main steam line break (MSLB) analysis to ensure the required shutdown capability. ~~The importance of its value is small for units with a boron injection tank (BIT) with a~~

CL3.5-133

CL3.5-93

BASES

APPLICABLE SAFETY ANALYSES (continued)

~~high boron concentration. For units with no BIT or reduced BIT boron requirements, the minimum boron concentration limit is an important assumption in ensuring the required shutdown capability.~~ The maximum boron concentration is an explicit assumption in the evaluation of chemical effects resulting from the operation of the CS System~~inadvertent ECCS actuation analysis, although it is typically a nonlimiting event and the results are very insensitive to boron concentrations. The maximum temperature ensures that the amount of cooling provided from the RWST during the heatup phase of a feedline break is consistent with safety analysis assumptions; the minimum is an assumption in both the MSLB and inadvertent ECCS actuation analyses, although the inadvertent ECCS actuation event is typically nonlimiting.~~ Temperatures above freezing in the RWST in combination with the maximum boron concentration ensure that the boron will remain soluble while in the RWST.

CL3.5-134

CL3.5-51

~~The MSLB analysis has considered a delay associated with the interlock between the VCT and RWST isolation valves, and the results show that the departure from nucleate boiling design basis is met. The delay has been established as [27] seconds, with offsite power available, or [37] seconds without offsite power. This response time includes [2] seconds for electronics delay, a [15] second stroke time for the RWST valves, and a [10] second stroke time for the VCT valves.~~

CL3.5-137

(continued)

~~Plants with a BIT need not be concerned with the delay since the BIT will supply highly borated water prior to RWST switchover, provided the BIT is between the pumps and the core.~~ CL3.5-131

For a large break LOCA analysis, the minimum water volume limit of 200,000~~[466,200]~~ gallons (68% of indicated level) and the lower boron concentration limit of 2600~~[2000]~~ ppm are used to compute the post LOCA sump boron concentration necessary to assure subcriticality. The large break LOCA is the limiting case since the safety analysis assumes that all control rods are out of the core. CL3.5-53

BASES

APPLICABLE SAFETY ANALYSES (continued)

~~The upper limit on boron concentration of [2200] ppm is used to determine the maximum allowable time to switch to hot leg recirculation following a LOCA. The~~ upper limit on boron concentration of 3500 ppm is used in calculations which verify ~~The purpose of switching from cold leg to hot leg injection is to avoid~~ boron precipitation does not occur in the core following ~~the accident~~ a LOCA. The upper limit on boron concentration is also used in containment sump chemistry calculations to assure that post-LOCA pH is within acceptable limits. CL3.5-136

~~In the ECCS analysis, the containment spray temperature is assumed to be equal to the RWST lower temperature limit of [35]°F. If the lower temperature limit is violated, the containment spray further reduces containment pressure, which decreases the rate at which steam can be vented out the break and increases peak clad temperature. The upper temperature limit of [100]°F is used in the small break LOCA analysis and containment OPERABILITY analysis. Exceeding this temperature will result in a higher peak clad temperature, because there is less heat transfer from the core to the injected water for the small break LOCA and higher~~ CL3.5-51

(continued)

~~containment pressures due to reduced containment spray cooling capacity. For the containment response following an MSLB, the lower limit on boron concentration and the upper limit on RWST water temperature are used to maximize the total energy release to containment.~~

The RWST satisfies Criterion 3 of 10 CFR 50.36(c)(2)(ii) ~~the NRC Policy Statement~~.

LCO

The RWST ensures that an adequate supply of borated water is available to cool and depressurize the containment in the event of a Design Basis Accident (DBA), to cool and cover the core in the event of a LOCA, to maintain the reactor subcritical following a DBA, and to ensure adequate level in

BASES

LCO (continued)

the containment sump to support ECCS ~~and Containment Spray System~~ pump operation in the recirculation mode. CL3.5-132

To be considered OPERABLE, the RWST must meet the water volume~~,~~ and boron concentration~~, and temperature~~ limits established in the SRs. CL3.5-51

APPLICABILITY

In MODES 1, 2, 3, and 4, RWST OPERABILITY requirements are dictated by ECCS and Containment Spray System OPERABILITY requirements. Since both the ECCS and the Containment Spray System must be OPERABLE in MODES 1, 2, 3, and 4, the RWST must also be OPERABLE to support their operation. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops – MODE 5, Loops Filled," and LCO 3.4.8, "RCS

(continued)

Loops – MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation – High Water Level," and LCO 3.9.6, "Residual Heat Removal (RHR) and Coolant Circulation – Low Water Level."

ACTIONS

A.1

With RWST boron concentration~~ or borated water temperature~~ not within limits, it~~they~~ must be returned to within limits within 8 hours. Under these conditions ~~neither~~ the ECCS ~~nor the Containment Spray System~~ can not perform its design function. Therefore, prompt action must be taken to restore the tank to OPERABLE condition. The 8 hour limit to restore the RWST ~~temperature or~~ boron concentration to within limits was developed considering the time required to change~~ either~~ the boron concentration ~~or temperature~~ and the fact that the contents of the tank are still available for injection.

CL3.5-51

CL3.5-132

BASES

ACTIONS (continued)

B.1

With the RWST water volume not within limits~~ inoperable for reasons other than Condition A (e.g., water volume)~~, it must be restored to OPERABLE status within 1 hour.

CL3.5-52

In this Condition, neither the ECCS nor the Containment Spray System can perform its design function. Therefore, prompt action must be taken to restore the tank to OPERABLE status or to place the plant in a MODE in which the RWST is not required. The short time limit of 1 hour to restore the RWST to OPERABLE status is based on this condition simultaneously affecting redundant trains.

(continued)

C.1 and C.2

If the RWST cannot be returned to OPERABLE status within the associated Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.5.4.1

~~The RWST borated water temperature should be verified every 24 hours to be within the limits assumed in the accident analyses band. This Frequency is sufficient to identify a temperature change that would approach either limit and has been shown to be acceptable through operating experience.~~ CL3.5-51

~~The SR is modified by a Note that eliminates the requirement~~

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.4.1 (continued)

~~to perform this Surveillance when ambient air temperatures are within the operating limits of the RWST. With ambient air temperatures within the band, the RWST temperature should not exceed the limits.~~

(continued)

~~SR 3.5.4.2~~

The RWST water volume should be verified every 7 days to be above the required minimum level in order to ensure that a sufficient initial supply is available for injection and to support continued ECCS ~~and Containment Spray System~~ pump operation on recirculation. Since the RWST volume is normally stable and the RWST is located in the Auxiliary Building which provides leak detection capability~~is protected by an alarm~~, a 7 day Frequency is appropriate and has been shown to be acceptable through operating experience.

CL3.5-132

CL3.5-141

SR 3.5.4.~~2~~3

The boron concentration of the RWST should be verified every 7 days to be within the required limits. This SR ensures that the reactor will remain subcritical following a LOCA. Further, it assures that the resulting sump pH will be maintained in an acceptable range so that boron precipitation in the core will not occur and the effect of chloride and caustic stress corrosion on mechanical systems and components will be minimized. Since the RWST volume is normally stable, a 7 day sampling Frequency to verify boron concentration is appropriate and has been shown to be acceptable through operating experience.

BASES (continued)

REFERENCES 1. UFSAR, ~~Chapter~~Section ~~[~~6~~]~~ and ~~Chapter~~Section ~~[~~14~~5]~~.

(continued)