Westinghouse

Westinghouse Electric Company
Nuclear Power Plants
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555

Direct tel: 412-374-6206
Direct fax: 724-940-8505
e-mail: sisk1rb@westinghouse.com

Your ref: Docket No. 52-006
Our ref: DCP_NRC_003017

August 20, 2010

Subject: AP1000 Response to Open Item (SRP9)

Westinghouse is submitting a response to the NRC Open Item (OI) on SRP Section 9. This OI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in this response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

Enclosure 1 provides the response for the following OI(s):

OI-SRP9.1.3-SBPA-13 R3

Questions or requests for additional information related to the content and preparation of this response should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

Robert Sisk, Manager
Licensing and Customer Interface
Regulatory Affairs and Strategy

/Enclosure

1. Response to Open Item on SRP Section9

D063
NRO

cc:	D. Jaffe	-	U.S. NRC	1E
	E. McKenna	-	U.S. NRC	1E
	P. Buckberg	-	U.S. NRC	1E
	T. Spink	-	TVA	1E
	P. Hastings	-	Duke Energy	1E
	R. Kitchen	-	Progress Energy	1E
	A. Monroe	-	SCANA	1E
	P. Jacobs	-	Florida Power & Light	1E
	C. Pierce	-	Southern Company	1E
	E. Schmiech	-	Westinghouse	1E
	G. Zinke	-	NuStart/Entergy	1E
	R. Grumbir	-	NuStart	1E
	P. Loza	-	Westinghouse	1E

ENCLOSURE 1

Response to Open Item on SRP Section9

AP1000 TECHNICAL REPORT REVIEW

Response to SER Open Item (OI)

RAI Response Number: OI-SRP9.1.3-SBPA-13
Revision: 3

Question: (Revision 0)

In its response [to RAI-SRP9.1.3-SBPA-13] dated August 25, 2009, the applicant described the operator actions required to makeup to the SFP, and that makeup water would be required approximately 15 hours after boiling has begun in order to prevent fuel in the SFP from being uncovered. The applicant further identified that detailed information concerning operator action time will be contained in [a revision] to calculation APP-SFS-M3C-012.The staff finds that an audit of [this revised calculation] should be performed and the corresponding DCD markup [of Table 9.1-4, "Station Blackout/Seismic Event Times"] to confirm adequate response to RAI-SRP9.1.3-SBPA-13 should be provided by the applicant. The staff has identified this as OI-SRP9.1.3-SBPA-13.

Additional Question: (Revision 1)

1. In the 2/10/10 response letter to OI-SRP 9.1.3-SBPA-13 [DCP NRC 002770, 2/10/10], Note 6 in Table 9.1-4 "Station Blackout/Seismic Event Times" states:

   "Alignment of the PCS ancillary water storage tank and initiation of PCS recirculation pumps provide a makeup water supply to maintain this pool level or higher above the top of the fuel."

   The PCS ancillary water storage tank is a RTNSS system, and as such it should not be credited for accident mitigation prior to 72 hours after the seismic event. AP1000 DCD Revision 17 added this note to the first offloading scenario, water level prior to 72 hrs.

   Crediting a RTNSS system for accident mitigation prior to 72 hrs is inconsistent with the system description provided in the DCD Section 9.1.3.4.3, "Abnormal Conditions," inconsistent with the system description provided in the TS Basis for TS 3.7.9, and inconsistent with the staff position documented in the FSER for AP600, AP1000 Rev.15, on SECY-94-084 and SECY-98-161

   DCD Section 9.1.3.4.3 states:

   "During the first 72 hours any required makeup water is supplied from safety related sources. If makeup water beyond the safety related sources is required between 72 hours and 7 days, water from the passive containment cooling system ancillary water storage tank is provided to the spent fuel pool."

   The staff requests that the applicant reconcile the inconsistency between the system description provided in DCD Tier 2 Section 9.1.3.4.3, the TS Basis, and Table 9.1-4. The staff also requests that the applicant clarify/justify if the AP1000 design is in accordance with the established staff position, or if the design is being change to introduce a new design basis.

2. In response to OI-SRP9.1.3-SBPA-13, the applicant provided a DCD markup of Tier 2 Section 9.1.3.4.3, "Abnormal Conditions," changing the heat load values for several offload conditions and scenarios. The staff determined that the changes identified in the OI response were consistent with the revised thermal analysis report for the SFP. Heat load values are also reflected in DCD Tier 2 Section 16, "Technical Specifications," (TS) 3.7.9 and its basis.

   The staff requests that the applicant reconcile the inconsistencies between the new heat loads presented in Section 9.1.3.4.3 and the TS (and its basis).

3. Note 9 was added to Table 9.1-4 in the 2/10/10 OI response letter. The staff feels that Note 9 is not clear about the timing requirements with regard to operator action. The staff requests that the wording for Note 9 be edited so that the clarity/intent is improved.

4.
   a. DCD Table 9.1-2 lists a 'maximum normal refueling case' temperature of <140 degrees F while DCD Section 9.1.3.1.3.2 reads ≤120 degrees F for what appears to be the same scenario. The staff requests that the applicant explain and/or reconcile the inconsistency.

   b. For the worst case scenario, does Westinghouse use the 140ºF as the initial condition of the event? Or do they use 120ºF, like in the other scenarios? If the thermal analysis has not been done to 140ºF, Westinghouse will need to justify this.

Additional Question: (Revision 2)

The information presented in DCD Table 9.1-2, "Spent Fuel Pool Cooling and Purification System Design Parameters," is not supported by the discussion in DCD Section 9.1.3.1.3.2, "Full Core Off-Load." A statement is needed in Section 9.1.3.1.3.2 that discusses that with a full core offload, with only one of the SFS cooling trains and one RNS train in operation, the maximum fuel pool temperature is less than 140ºF.

Additional Question: (Revision 3)

During the July 16, 2010, audit of the thermal calculation the staff discussed with the applicant the need to clarify DCD Tier 2 Section 9.1.3.1.3.1 "Partial Core." This section describes that the thermal analysis for the SFP cooling partial core scenario is based on a CCS supply temp limited by the maximum **normal** ambient wet bulb temp. This is not entirely correct, as while the reactor is at power, the CCS temp limit is based on the maximum **safety** ambient wet bulb temp.

The applicant should clarify the third bullet in DCD Tier 2 Section 9.1.3.1.3.1, or add a new fourth bullet to clarify this condition.

Westinghouse Response: (Revision ~~0~~)

- This response supersedes the response to RAI-SRP9.1.3-SBPA-13 (DCP NRC 002600, August 25, 2009).
- The markup of DCD Tier 2 Table 9.1-4, "Station Blackout/Seismic Event Times" below supersedes the markup in the response to RAI-SRP9.1.3-SBPA-08 R1 (DCP NRC 002694, November 18, 2009).
- The markup of DCD Section 9.1.3.4.3, "Abnormal Conditions," below supersedes the markup in the response to RAI-SRP 9.1.3-SBPA-04 R1 (DCP NRC 002476, May 14, 2009)

Assuming that a seismic event and a loss of site power occur after a full core is transferred from the reactor to the SFP (following a resumption of power after a typical core refueling), and that the pool is occupied by a whole fresh irradiated core plus the fuel from the recent offload plus 15.0 years worth of spent fuel, the operator will need to align makeup water within 18 hours after boiling has begun in order for fuel not to be uncovered. Reference 1, Case 6 details the amount of time within which a proper valve alignment must occur to a makeup source before fuel is uncovered.

Note: In all cases in the AP1000 boiloff calculation (Ref.1) in which the cask washdown pit is used as a makeup source, it is assumed that the initial water elevation of the cask washdown pit is the same as the initial spent fuel pool water elevation. If makeup to the pool is added so that water from the cask washdown pit does not spill out of the postulated SFS suction piping break, the time for the spent fuel pool to reach the top of fuel increases.

Values recalculated in Reference 1 are provided in markups of DCD Tier 2 Table 9.1-4, "Station Blackout/Seismic Event Times," and DCD Section 9.1.3.4.3, "Abnormal Conditions" below.

Reference(s):

1. APP-SFS-M3C-012 R3, "AP1000 Spent Fuel Pool Heatup, Boiloff, and Emergency Makeup on Loss of Cooling"

2. APP-SFS-M3-001 R1, "Spent Fuel Pool Cooling System - System Specification Document"

Additional Westinghouse Response: (Revision 1)

1. The AP1000 does not require the use of any safety related makeup sources to the spent fuel pool for the first 72 hours after a design basis event. DCD Section 9.1.3.4.3 and the Tech Spec Bases are correct as written. The DCD markup included in this RAI response removes the discrepancy that references Note 6 in the second column of Table 9.1-4.

   Note 8 of Table 9.1-4 is revised on the basis that non-safety related makeup water is not needed for 72 hours after a design basis event. This markup is showing the DCD markup section.

2. The values found in Tech Specs Section 3.7.9 are conservative values; however they do not represent the latest decay heat analysis. The markup to the tech specs and their bases is provided below to reflect the latest values shown in Section 9.1.3.4.3.

3. Note 9 under Table 9.1-4 is clarified in the DCD markup section.

4.

   a. The temperature values shown in Section 9.1.3.1.3.2, "Full Core Off-Load," and Table 9.1-2, "Spent Fuel Pool Cooling and Purification System Design Parameters," have different bases.

      Section 9.1.3.1.3.2 lists the maximum fuel pool temperature as less than 120ºF, assuming a normal full core offload for a scheduled outage, with the assumption that both SFS cooling trains and one RNS train in operation. Table 9.1-2 lists the maximum fuel pool temperature as less than 140ºF assuming the same normal refueling case (full core offload), the difference being the assumption of only one of the SFS cooling trains and one RNS train in operation.

      These two temperatures are listed in the SSD (Reference 2) in Table 3.1, "SFS Performance Summary," and reflect the design limit temperatures for the same heat removal loads for two different performance conditions.

   b. All scenarios analyzed for Table 9.1-4, "Station Blackout/Seismic Event Times," are calculated with a starting temperature of 120ºF (Reference 1). Starting at this temperature, the time to saturation for this emergency full core offload scenario is 1.33 h, or approximately 80 min. The heat up rate calculated for this case is (212 - 120) / 80 = 1.15 F/min. All other conditions equal, starting the analysis at a temperature of 140 F is expected to reduce the time to saturation to a minimum value of 80 – (1.15 * (140 - 120)) = 57 min.

In an emergency full core offload scenario with power available, the spent fuel pool heat exchangers along with a train of RNS cooling is capable of maintaining the temperature below 140ºF, as shown in DCD Table 9.1-2. In the event the spent fuel pool is at 140ºF and cooling ceases as the last fuel assembly is lowered into its rack position, Westinghouse believes that the current calculation contains significant margin with respect to the conservative method, initial conditions, and heat loss assumptions. Together with a sufficient amount of makeup water available in the PCCWST, the reduction in calculated time to saturation will not adversely affect the safe cooling of the SFP. The time for operator response shown in Note 9 of Table 9.1-4 will not be affected.

Additional Westinghouse Response: (Revision 2)

DCD Section 9.1.3.1.3.2, "Full Core Off-Load," is modified to include a fourth bullet indicating

"Assuming the heat load scenario identified above, the spent fuel pool water temperature will be < 140°F with one SFS cooling train and one RNS train in operation. "

Additional Westinghouse Response: (Revision 3)

DCD Section 9.1.3.1.3.1, "Partial Core," is modified to indicate that the CCS supply temperature used to determine the performance of the SFS heat exchangers is based on a service water system heat sink with different maximum ambient wet bulb temperatures from Table 2-1, "Site Parameters." While the reactor is shut down, the **normal** value is used; while the reactor is at power, the **safety** values is used.

A corresponding modification is also made to Section 9.1.3.1.3.2, "Full Core Off Load."

Note (Revision 3) : Portions of the change previously indicated below on DCD Section 9.1.3.4.3, "Abnormal Conditions," DCD Tier 2 Table 9.1-4, "Station Blackout/Seismic Event Times," and Tech Spec and Bases 3.7.9 have been superseded. See the transmittal of Technical Report APP-GW-GLR-096 Revision 1, (Proprietary), "Evaluation of the Effect of the AP1000 Enhanced Shield Building Design on the Containment Response and Safety Analyses," sent via DCP_NRC_002998 on August 6, 2010.

Design Control Document (DCD) Revision: (Revision 0, 1, 2, 3)

DCD Section 9.1.3.1.3.1, "Partial Core [Off Load]," is revised as follows:

9.1.3.1.3.1 Partial Core

The spent fuel pool cooling system is designed to remove heat from the spent fuel pool such that the spent fuel pool water temperature will be ≤120°F following a partial core fuel shuffle refueling. The system is designed to perform this function based on the following:

- The assumed heat load is based on the decay heat generated by the accumulated maximum number of fuel assemblies stored in the fuel pool, which includes 44% of a core (69 assemblies) being placed into the pool beginning at 120 hours after shutdown.
- Both trains of the spent fuel pool cooling system are assumed to be operating.
- While the reactor is shut down, the component cooling water system (CCS) supply temperature used to determine the performance of the spent fuel pool cooling system (SFS) heat exchangers is based on a service water system heat sink with a maximum normal ambient design wet bulb temperature as defined in Chapter 2, Table 2-1.
- While the reactor is at power, the CCS supply temperature to the SFS heat exchangers is based on a service water system heat sink with a maximum safety ambient design wet bulb temperature as defined in Chapter 2, Table 2-1.

DCD Section 9.1.3.1.3.2, "Full Core Off Load," is revised as follows:

9.1.3.1.3.2 Full Core Off-Load

The AP1000 normal refueling basis heat load is from a full core off-load. The spent fuel pool cooling system is designed to remove heat from the spent fuel pool such that the spent fuel pool water temperature will be ≤120°F following a full core off-load based upon a service water heat sink at a maximum normal ambient wet bulb temperature as defined by Chapter 2, Table 2-1. The system is designed to perform this function based on the following:

- The assumed heat load is based on the decay heat generated by the accumulated maximum number of fuel assemblies stored in the fuel pool, plus one full core placed in the pool at 120 hours after shutdown. The time during the plant operating cycle at which the full core off-load occurs is chosen to maximize the required spent fuel pool cooling system heat load.

- The spent fuel pool cooling system is assumed to function with its full set of equipment available. One train of the normal residual heat removal system (RNS) is also connected to the spent fuel pool and provides cooling as described in subsection 5.4.7.4.5.

- While the reactor is shut down, the ~~component cooling water system~~CCS supply temperature used to determine the performance of the ~~spent fuel pool cooling system~~SFS heat exchangers is based on a service water system heat sink with a maximum normal ambient design wet bulb temperature as defined in Chapter 2, Table 2-1.

- While the reactor is at power, the CCS supply temperature to the SFS heat exchangers is based on a service water system heat sink with a maximum safety ambient design wet bulb temperature as defined in Chapter 2, Table 2-1.

- Assuming the heat load scenario identified above, the spent fuel pool water temperature will be < 140°F with one SFS cooling train and one RNS train in operation.

<u>Revise DCD Tier 2 Table 9.1-4 as follows:</u>

Table 9.1-4

STATION BLACKOUT/SEISMIC EVENT TIMES(1)(9)

Event	Time to Saturation(1) (hours)	Height of Water Above Fuel at 72 Hours(4) (feet)	Height of Water Above Fuel at 7 Days(4) (feet)
Seismic Event(2) – Power Operation Immediately Following a Refueling(7)	6.38~~6.50~~	1.0 ~~1.6(6)~~	1.0 ~~1.6~~(6)
Seismic Event(8) – Refueling, Immediately Following Spent Fuel Region Offload(3)(7)	4.58~~4.68~~	8.0 ~~8.3~~(5)	8.0 ~~8.3~~(5)
Seismic Event(8) – Refueling, Emergency Full Core Off-Load(3) Immediately Following Refueling(7)	1.33~~1.37~~	8.0 ~~8.3~~(5)	8.0 ~~8.3~~(6)

<u>Notes:</u>

1. Times calculated neglect heat losses to the passive heat sinks in the fuel area of the auxiliary building.
2. Seismic event assumes water in the pool is initially drained to the level of the spent fuel pool cooling system connection simultaneous with a station blackout. Fuel cooling water sources are spent fuel pool, fuel transfer

canal (including gate), and cask washdown pit for 72 hours. Between 72 hours and 7 days fuel cooling water provided from passive containment cooling system ancillary water storage tank.
3. Fuel movement complete, 150 hours after shutdown.
4. See subsection 9.1.3.5 for minimum water level.
5. Alignment of PCS water storage for supply of makeup water permits maintaining pool level at this elevation. Decay heat in reactor vessel is less that 9 MW, thus no PCS water is required for containment cooling.
6. Alignment of the PCS ancillary water storage tank and initiation of PCS recirculation pumps provide a makeup water supply to maintain this pool level or higher above the top of the fuel.
7. The number of fuel assemblies refueled has been conservatively established to include the worst case between an 18-month fuel cycle plus 5 defective fuel assemblies (69 total assemblies or 44% of the core) and a 24-month fuel cycle plus 5 defective fuel assemblies (77 total assemblies or 49% of the core).
8. Seismic event assumes water in the pool is initially drained to the level of the spent fuel pool cooling system connection simultaneous with a station blackout. Fuel cooling water sources are spent fuel pool, fuel transfer canal (including gate), cask washdown pit, and passive containment cooling system water storage tank for ~~7 days~~ 72 hours.
9. A minimum of 18 hours is available for operator action to align makeup water to the spent fuel pool after a seismic event.

DCD Section 9.1.3.4.3, "Abnormal Conditions," is revised as follows:

(Two paragraphs unchanged)

- When the calculated decay heat level in the spent fuel pool is less than ~~4.6~~ 4.7 MWt, no makeup is needed to achieve spent fuel pool cooling for at least 72 hours.

- When the calculated decay heat level in the spent fuel pool is greater than or equal to ~~4.6~~ 4.7 MWt and less than or equal to ~~5.4~~ 5.6 MWt, safety related makeup from the cask washdown pit is sufficient to achieve spent fuel pool cooling for at least 72 hours. A minimum level of 13.75 feet in the cask washdown pit is provided for this purpose. Availability of the makeup source is controlled by technical specifications.

- When calculated decay heat level in the spent fuel pool is greater than ~~5.4~~ 5.6 MWt makeup from the passive containment cooling water storage tank or passive containment cooling ancillary water storage tank, or combination of the two tanks, is sufficient to achieve spent fuel pool cooling for at least 7 days.

Revise DCD Tier 2 Tech Spec and Bases 3.7.9 as follows:

3.7.9 Fuel Storage Pool Makeup Water Sources

LCO 3.7.9 Fuel storage pool makeup water source shall be OPERABLE.

- NOTES -

1. OPERABILITY of the cask washdown pit is required when the calculated fuel storage pool decay heat ≥4.7 ~~4.6~~ MWt and ≤~~5.4~~ 5.6 MWt, and with the calculated reactor decay heat > 9 MWt.

2. OPERABILITY of the passive containment cooling water source is required when the calculated fuel storage pool decay heat > ~~5.4~~ 5.6 MWt.

APPLICABILITY: During storage of fuel in the fuel storage pool with a calculated decay heat ≥~~4.6~~ 4.7 MWt.

B 3.7.9 Fuel Storage Pool Makeup Water Sources

BASES

BACKGROUND

The spent fuel storage pool is normally cooled by the nonsafety spent fuel pool cooling system. In the event the normal cooling system is unavailable, the spent fuel storage pool can be cooled by the normal residual heat removal system. Alternatively, the spent fuel storage pool contains sufficient water inventory for decay heat removal by boiling. To support extended periods of loss of normal pool cooling, makeup water is required to provide additional cooling by boiling. Both safety and non-safety makeup water sources are available on-site.

Two safety-related, gravity fed sources of makeup water are provided to the spent fuel storage pool. These makeup water sources contain sufficient water to maintain spent fuel storage pool cooling for 72 hours. The containment cooling system water storage tank provides makeup water when pool decay heat is > ~~5.4~~ 5.6 MWt and the decay heat in the reactor is less than 9.0 MWt. The cask washdown pit provides makeup water when decay heat in the pool is ≥~~4.6~~ 4.7 MWt and ≤~~5.4~~ 5.6 MWt. Additional on-site makeup water sources are available to provide fuel pool cooling between 3 and 7 days.

The containment cooling system water storage tank is isolated by two normally closed

Westinghouse

valves. The normally closed valves will be opened only to provide emergency makeup to the spent fuel storage pool. A third downstream valve permits the operator to regulate addition of water to the spent fuel storage pool as required to maintain the cooling water inventory.

Once decay heat in the fuel pool is reduced to below ~~4.6~~ 4.7 MWt, the spent fuel storage pool water inventory is sufficient, without makeup, to maintain spent fuel storage pool for 72 hours. When the spent fuel storage pool decay heat load is reduced below ~~4.6~~ 4.7 MWt, the cask washdown pit may be drained and returned to use for shipping cask cleaning operations.

A general description of the fuel storage pool design is given in Section 9.1.2 (Ref. 1). A description of the Spent Fuel Pool Cooling and Cleanup System is given in Section 9.1.3 (Ref. 2).

BASES

APPLICABLE SAFETY ANALYSES

In the event the normal spent fuel storage pool cooling system is unavailable, the spent fuel cooling is provided by the heat capacity of the water in the pool. The worst case decay heat load (decay heat > ~~5.4~~ 5.6 MWt) is produced by an emergency full core off-load following a refueling plus ten years of spent fuel. For this case the spent fuel storage pool inventory provided by the water over the stored fuel and below the pump suction connection is capable of cooling the spent fuel storage pool without boiling for at least 2.5 hours, following a loss of normal spent fuel storage pool cooling. After boiling starts, makeup water may be required to replace water lost by boiling and is available, without offsite support, via the passive containment cooling water storage tank.

The requirements of LCO 3.6.6, "Passive Containment Cooling System – Operating," are applicable in MODES 1, 2, 3, and 4 and LCO 3.6.7, "Passive Containment Cooling System – Shutdown," are applicable in MODES 5 and 6 with decay heat > 9.0 MWt. LCOs 3.6.6 and 3.6.7 require availability of the containment cooling water tank for containment heat removal. Below 9.0 MWt decay heat, containment air cooling is adequate. Since there are no design conditions which result in both reactor decay heat > 9.0 MWt and spent fuel storage pool decay heat > ~~5.4~~ 5.6 MWt, the applicability for LCOs 3.6.6/3.6.7 and for LCO 3.7.9 are mutually exclusive.

Since none of the Chapter 15 Design Basis Accident analyses assume availability of the containment cooling water tank or the cask washdown pit for spent fuel storage pool makeup, the fuel storage pool makeup water sources specification does not satisfy any of the 10 CFR 50.36(c)(2)(ii) criteria. This LCO is included in accordance with NRC guidance provided in an NRC letter (Reference 3).

LCO

The fuel storage pool makeup water sources, the cask washdown pit, and the containment cooling water tank are required to contain 13.75 ft and 400,000 gallons of water, respectively. An OPERABLE flow path from the required makeup source assures spent fuel cooling for at least 72 hours. Several additional makeup sources are available, including the ground level containment cooling ancillary water storage tank. These makeup sources assure spent fuel cooling for at least 7 days.

Note 1 specifies that either the cask washdown pit or the passive containment cooling water storage tank is required to be OPERABLE when the spent fuel storage pool decay heat ≥~~4.6~~ 4.7 MWt and ≤~~5.4~~ 5.6 MWt. Note 2 specifies that the passive containment

BASES

cooling water storage tank source is required to be OPERABLE when the spent fuel storage pool decay heat is > ~~5.4~~ 5.6 MWt, which is normal following a full core off load. The larger makeup source is necessary for the higher decay heat load.

LCO (continued)

When a portion of the fuel is returned to the reactor vessel in preparation for startup, the pool decay heat is reduced to ≤~~5.4~~ 5.6 MWt and makeup from the cask washdown pit is sufficient.

APPLICABILITY

This LCO applies during storage of fuel in the fuel storage pool with a calculated decay heat ≥~~4.6~~ 4.7 MWt. With decay heat < ~~4.6~~ 4.7 MWt, the assumed spent fuel storage pool water inventory (i.e., level below the pump suction connection to the pool) provides for 3 days of cooling without makeup.

ACTIONS

LCO 3.0.3 is applicable while in MODE 1, 2, 3, or 4. Since spent fuel pool cooling requirements apply at all times, the ACTIONS have been modified by a Note stating that LCO 3.0.3 is not applicable. Spent fuel pool cooling requirements are independent of reactor operations. Entering LCO 3.0.3 while in MODE 1, 2, 3, or 4 would require the unit to be shutdown unnecessarily.
LCO 3.0.8 is applicable while in MODE 5 or 6. Since spent fuel pool cooling requirements apply at all times, the ACTIONS have been modified by a Note stating that LCO 3.0.8 is not applicable. Spent fuel pool cooling requirements are independent of shutdown reactor operations. Entering LCO 3.0.8 while in MODE 5 or 6 would require the optimization of plant safety, unnecessarily.

A.1

If the passive containment cooling water storage tank (with decay heat > ~~5.4~~ 5.6 MWt) and/or the cask washdown pit (with decay heat ≥~~4.6~~ 4.7 and ≤~~5.4~~ 5.6 MWt) is inoperable, Action must be initiated immediately to restore the makeup source or its associated flow path to OPERABLE status.
Additionally, in order to provide the maximum cooling capability, the spent fuel pool should be filled to its maximum level. Nonsafety related makeup sources can be used to fill the pool. This action is not specified in the specification, since the benefit of adding approximately 6 inches of water to the pool is less than a 5% improvement in cooling capability.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.9.1

This SR verifies sufficient passive containment cooling system water storage tank volume is available in the event of a loss of spent fuel cooling.
The 7 day Frequency is appropriate because the volume in the passive containment cooling system water storage tank is normally stable and water level changes are controlled by plant procedures.

BASES

SR 3.7.9.2

This SR verifies sufficient cask washdown pit water volume is available in the event of a loss of spent fuel cooling. The 13.75 ft level specified provides makeup water for stored fuel with decay heat ≥~~4.6~~ 4.7 and ≤~~5.4~~ 5.6 MWt.

The 30 day Frequency is appropriate because the cask washdown pit has only one drain line which is isolated by series manual valves which are only operated in accordance with plant procedures, thus providing assurance that inadvertent level reduction is not likely.

SR 3.7.9.3

This SR requires verification of the OPERABILITY of the manual makeup water source isolation valves in accordance with the requirements and Frequency specified in the Inservice Testing Program. Manual valves PCS-PL-V009, PCS-PL-V045, PCS-PL-V051, isolate the makeup flow path from the passive containment cooling system water storage tank. Manual valves SFS-PL-V042, SFS-PL-V045, SFS-PL-V049, SFS-PL-V066, and SFS-PL-V068 isolate the makeup flow path from the cask washdown pit.

PRA Revision: None

Technical Report (TR) Revision: None