Duke Energy®
Carolinas

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November 12, 2012

10 CFR 50.90

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

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Catawba Nuclear Station, Units 1 and 2
Docket Numbers 50-413 and 50-414
Proposed Technical Specifications (TS) and Bases Amendment
TS and Bases 3.7.8, Nuclear Service Water System (NSWS)
Response to NRC Request for Additional Information (RAI)
(TAC Nos. ME7659 and ME7660)

References:

1. Letters from Duke Energy to the NRC, same subject, dated November 22, 2011 and July 9, 2012.

2. Letter from the NRC to Duke Energy, same subject, dated October 9, 2012.

Reference 1 constitutes Duke Energy's request for amendments to the Catawba Facility Operating Licenses and TS to modify the subject TS and Bases to allow single discharge header operation of the NSWS (Duke Energy designation "RN") for a time period of 14 days. The requested change will facilitate future maintenance of the Unit 2 NSWS discharge headers in the Auxiliary Building. In Reference 2, the NRC transmitted additional RAIs associated with this amendment request. The purpose of this letter is to provide responses to these RAIs. The attachment to this letter provides the responses. The format of each response is to restate the RAI question, followed by the associated response.

The original regulatory evaluation contained in Reference 1 is unaffected as a result of this RAI response supplement. As discussed in a telephone conference call between Duke Energy and the NRC on September 20, 2012, there is one regulatory commitment associated with this RAI response supplement. **The pending procedural controls to prevent and mitigate the effects of flooding as discussed in the responses to Questions 3 and 4 of the attachment represent a regulatory commitment.**

Pursuant to 10 CFR 50.91, a copy of this RAI response supplement is being sent to the appropriate State of South Carolina official.

A001
NRR

Inquiries on this matter should be directed to L.J. Rudy at (803) 701-3084.

Very truly yours,

Kelvin Henderson

LJR/s

Attachment

Kelvin Henderson affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

Kelvin Henderson, Site Vice President

Subscribed and sworn to me: November 12, 2012
Date

Diane C Loreton
Notary Public

My commission expires: 04/17/2017
Date

SEAL

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ATTACHMENT

RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION (RAI)

REQUEST FOR ADDITIONAL INFORMATION

BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REGARDING LICENSE AMENDMENT RELATED TO

REVISION OF THE TECHNICAL SPECIFICATION 3.7.8 TO ALLOW

SINGLE DISCHARGE HEADER OPERATION OF THE NUCLEAR SERVICE WATER SYSTEM

FOR A TIME PERIOD OF 14 DAYS

CATAWBA NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOS. 50-413 AND 50-414

By letter dated November 22, 2011, (Agencywide Document Access and Management System Accession No. ML 11327A149), Duke Energy Carolinas, LLC (Duke Energy, the licensee), submitted a proposed license amendment request (LAR) in the form of changes to the Technical Specifications (TSs) for Catawba Nuclear Station, Units 1 and 2. The proposed LAR would revise TS 3.7.8 to allow single discharge header operation of the Nuclear Service Water System (NSWS) (Duke Energy designation "RN") for a time period of 14 days.

To complete its review, the U.S. Nuclear Regulatory Commission (NRC) staff requests the following additional information:

1. In the response to request for additional information (RAI) question 7, the licensee stated that in the event of a failure of the common discharge line, the return to Lake Wylie can be realigned from the Control Room. The licensee did not address what they would do to the supply side to NSWS if this event occurred.

Duke Energy Response:

In the event of a failure of the in-service common discharge line, the supply side of the NSWS will be realigned to Lake Wylie, so that both the suction and discharge of the NSWS will be aligned to Lake Wylie. Alignment of the NSWS into and out of the Single Discharge Header alignment will be controlled by approved station procedures, including NSWS Operating Procedures (OP) and Abnormal Operating Procedures (AP).

2. The licensee is not consistent and clear as to which motor operated valves will have power removed.

   a. The description on Attachment 1, page 3, is not consistent with the figures and notes on Attachment 1, pages 5 and 6.

   b. The description for general design criterion (GDC) 44 on Attachment 1, page 11, does not define which valves have power removed.

   c. Attachment 1, pages 18, 19, and 21 have only the crossover valves with power removed, whereas the associated figures on Attachment 1, pages 20 and 22, have additional valves with power removed, i.e. return isolation valves.

   d. The conclusion section in Attachment 1, page 23, is equally unclear by not stating any specific valves will have power removed.

   e. Attachment 1, page 30, in the probabilistic risk assessment (PRA) section, is unclear regarding which valves have power removed.

   f. The licensee response to RAI question 7b states that the crossover valves, the discharge isolation valve for the out of service NSWS train, and the discharge valve for the in-service NSWS train all will have the power removed.

Duke Energy Response:

a. - f. The NSWS motor operated valves which are described in the NSWS Single Discharge Header alignment License Amendment Request are positioned and powered as follows with Train A discharge isolated:

1RN63A Closed, power removed
1RN58B Open, power removed
1RN53B Open, power removed
1RN54A Open, power removed
1RN843B Closed, powered
1RN57A Closed, powered
2RN148A Closed, power removed*

The NSWS motor operated valves which are described in the NSWS Single Discharge Header alignment License Amendment Request are positioned and powered as follows with Train B discharge isolated:

1RN58B Closed, power removed
1RN63A Open, power removed

1RN53B Open, power removed
1RN54A Open, power removed
1RN843B Closed, powered
1RN57A Closed, powered
2RN229B Closed, power removed*

***The NSWS motor operated valves associated with the Containment Spray System heat exchangers on Unit 1 and Unit 2 (1RN148A, 1RN229B, 2RN148A, and 2RN229B) are normally closed. When NSWS Train A discharge is isolated for the NSWS Single Discharge Header alignment, 2RN148A will be closed with power removed. Likewise, when NSWS Train B discharge is isolated for the NSWS Single Discharge Header alignment, 2RN229B will be closed with power removed.**

3. In the licensee's response to RAI question 10, it stated that any passive leakage on valves 1RN63A or 1RN58B will be addressed depending on the amount of leakage. When each valve is closed for the planned maintenance described in the submittal, discuss the effects of complete valve failure or an operator error which opens the valves. What equipment in the Auxiliary Building could get splashed by incoming water and discuss the effects loss of the wetted equipment?

Duke Energy Response:

<u>Failure of 1RN63A or 1RN58B</u>

Complete failure of 1RN63A or 1RN58B when the valve is closed can be addressed by looking at the valve failure modes. A review of industry operating experience (OE) has shown that the primary failure mode of this type of butterfly valve is the separation of the disc from the valve stem, usually due to a failure of the disc to stem taper pins. Other failure modes described in industry OE are associated with a failure of the valve stem to remain mechanically connected to the gearbox (i.e., shaft key, whereby the gearbox and motor operator rotate but the disc does not).

It is not credible for any of these failures to occur when the valve is closed and the disc, stem, gearbox, and motor operator are not moving. If a tapered pin or stem to gearbox failure were to occur while the valve is being repositioned to the closed position, then the valve disc will likely not close fully. The valve seat could fail during disc repositioning.

All of these failures would impact the ability of the piping to be drained and depressurized, and released for work. If any of these failures occur while the valve is being repositioned to the closed position and the valve went to the fully closed position, there would be no plausible way for the disc to reposition to the open position due to the valve construction, as described previously. Valve disc to stem taper pins on 1RN63A and 1RN58B can be verified to be installed from inside the pipe. If taper pins are intact, there is no credible mechanical failure

that could cause disc and stem separation and disc repositioning once the valve is closed. The construction of the valve is such that the disc is centered on the valve stem, and the valve body has an integral stop so the disc cannot rotate through the seat. It is not credible for any of these failures to occur when the valve is closed and the disc, stem, gearbox, and motor operator are not moving. If a tapered pin or stem to gearbox failure were to occur while the valve is being repositioned to the closed position, then the valve disc will likely not close fully.

In summary, valve failures typically occur when the isolation valve is repositioned. If a failure were to occur, it would be evident because the piping could not be effectively isolated and drained, and the piping could not be released for work because isolation could not be effectively accomplished.

Operator error resulting in the opening of 1RN63A or 1RN58B

Valves 1RN63A and 1RN58B will be closed with power removed when their associated NSWS Train is out of service. In order for 1RN63A or 1RN58B to be inadvertently repositioned, multiple operators would have to make multiple errors. The Safety Tagging process requires multiple Operations personnel, including a Senior Reactor Operator, to clear tags and return equipment to service. Additionally, valves 1RN63A and 1RNP19 will have locks and red tags installed on the handwheels when the NSWS Train A return header is isolated, so that personnel do not inadvertently manually operate the valves. Likewise, when the NSWS Train B return header to the SNSWP is isolated for Single Discharge Header alignment, valves 1RN58B and 1RNP20 will have locks and red tags installed on the handwheels. The installation and removal of locks on the handwheels will be controlled by station procedures.

The above measures ensure that it will not be possible for a single operator to make a single error to reposition either 1RN63A or 1RN58B while in the NSWS Single Discharge Header alignment.

Equipment qualification and submergence qualification

In the unlikely event that a failure of 1RN58B or 1RN63A were to occur, a calculation of the buried 42-inch piping downstream of 1RN58B or 1RN63A and the 10-inch buried NSWS piping from the diesel generators shows that the total volume of NSWS that could drain into the Auxiliary Building is approximately 170,000 gallons. The equipment in the affected rooms of the Auxiliary Building on the 577' elevation, 560' elevation, 543' elevation, and 522' elevation has previously been analyzed and qualified for the consequences of pipe rupture, including at least 6 inches of submergence. If the entire 170,000 gallons were to drain to the 522' elevation, it would drain to the Residual Heat Removal/Containment Spray Sump. This sump has a capacity of approximately 218,000 gallons before the nuclear safety related RHR minimum flow instrumentation could be impacted.

Additionally, there are floor drains which could affect the Auxiliary Feedwater Sump. The flow rate into this sump is limited by piping, and is approximately 250 gpm. The AFW sump capacity is calculated to be approximately 23,675 gallons at

the 544' 6" elevation, where water begins to overflow the curb into the AFW pump pits. Based on this flow rate and capacity, the time required for operators to take action per the Abnormal Operating Procedure for flooding and address a failure of 1RN58B, 1RN63A, 1RNP19, or 1RNP20 is approximately 90 minutes. This assumes that 100% of the water reaching the AFW pump room overflows into the room up to the 544' 6" level. No credit is taken for the Liquid Radwaste System sump pumps, although each of the two sump pumps is rated at 50 gpm.

In summary, the total volume of the 42-inch and 10-inch NSWS buried discharge piping to the SNSWP that could drain into the Auxiliary Building was calculated above at approximately 170,000 gallons. The volume of the Residual Heat Removal/Containment Spray Sump is greater than the piping volume; therefore, the RHR miniflow instrumentation would not be submerged if 1RN58B or 1RN63A were to open while the NSWS is aligned in the Single Discharge Header alignment. To address the impact on the AFW sump, operators will have to take action per the station Abnormal Operating Procedure on flooding within 90 minutes. This procedure will specifically address the NSWS while aligned in the Single Discharge Header alignment.

4. In the licensee's response to RAI question 10, they stated that valves 1RNP19 and 1RNP20 have redundant isolation valves that could be repositioned to isolate valve failure and mitigate flooding. Describe what valves could be repositioned and discuss the effects of flooding that could occur until the redundant valves are closed. How long would it take to shut the redundant valve(s)?

Duke Energy Response:

<u>Failure of 1RNP19 or 1RNP20</u>

As discussed above, valve failures typically occur when the isolation valve is repositioned. If a failure were to occur, it would be evident because the piping could not be effectively isolated and drained, and the piping could not be released for work because isolation could not be effectively accomplished.

<u>Operator error resulting in the opening of 1RNP19 or 1RNP20</u>

Valves 1RNP19 and 1RNP20 are manual valves which will be closed and have red tags on their handwheels with their associated NSWS Train out of service. In order for 1RNP19 and 1RNP20 to be inadvertently repositioned, multiple operators would have to make multiple errors. The Safety Tagging process requires multiple Operations personnel, including a Senior Reactor Operator, to clear tags and return equipment to service. In addition, when the NSWS Train A return header to the SNSWP is isolated for Single Discharge Header alignment, valves 1RN63A and 1RNP19 will have locks and red tags installed on the handwheels, so that personnel do not inadvertently manually operate the valves. Likewise, when the NSWS Train B return header to the SNSWP is isolated for Single Discharge Header alignment, valves 1RN58B and 1RNP20 will have locks and red tags

installed on the handwheels. The installation and removal of locks on the handwheels will be controlled by station procedures.

The above measures ensure that it will not be possible for a single operator to make a single error to reposition either 1RNP19 or 1RNP20 while in the NSWS Single Discharge Header alignment.

<u>Redundant isolation valves</u>

In the unlikely event that a failure of 1RNP19 or 1RNP20 were to occur, the flow rate through the open isolation valve could be in the 15,000 to 20,000 gpm range, assuming that one Nuclear Service Water pump is in service. To isolate this failure, one of the return header crossover valves 1RN53B or 1RN54A would have to be closed. Both of these valves will be open with power removed for the NSWS Single Discharge Header alignment, so the station Abnormal Operating Procedure for flooding will direct the restoration of power to either valve, and the manual and automatic operation to place either valve in the closed position. Additionally, the Abnormal Operating Procedure for flooding will direct the closing of the appropriate motor operated supply isolation valve from the Control Room to isolate flow to the NSWS Train 1A or 1B, as appropriate. The timeframe for isolation of the failure depends upon the time it takes for operators to diagnose the failure. The motor operated supply isolation valve is positioned from the Control Room. The effects of flooding on equipment in the Auxiliary Building until these redundant isolation valves are closed have been discussed previously in the response to Question 3.

5. The RAI question 12 discussed inconsistencies in the licensee's submittal. In its response, the licensee still appears to have inconsistencies. The licensee states that both trains of NSWS are OPERABLE [conflicts with the table on Attachment 1, page 17]. That would mean that the limiting condition of operation (LCO) for TS 3.7.8 is met and that a new condition C would not be applicable. You cannot be in a TS Condition and meet the LCO at the same time. You cannot have the NSWS discharge header inoperable with the corresponding NSWS train OPERABLE. Note the updated final safety analysis report in Section 9.2.1.2.4 "ensures two independent, redundant supplies and returns, satisfying the single failure criteria."

Duke Energy Response:

Refer to the revised reprinted TS and TS Bases pages which now indicate that the affected NSWS train is inoperable while in the single Auxiliary Building discharge header configuration.

6. Discuss why notes [similar to NOTES 1 and 2 of Required Action A.1] are not provided for Required Action C.1.

Duke Energy Response:

Notes 1 and 2 of Required Action A.1 state the following:

1. ***Enter applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources—Operating," for emergency diesel generator made inoperable by NSWS.***

2. ***Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops—MODE 4," for residual heat removal loops made inoperable by NSWS.***

Proposed Condition C contains the following three Notes:

1. ***Entry into this Condition shall only be allowed for Unit 1 and for pre-planned activities as described in the Bases of this Specification. Entry into this Condition shall not be allowed while Unit 2 is in MODE 1, 2, 3, or 4.***

2. ***Immediately enter Condition A of this LCO if one or more Unit 1 required NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE.***

3. ***Immediately enter LCO 3.0.3 if one or more Unit 1 required NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE.***

The proposed Condition C Bases discussion for these three Notes is as follows:

Condition C is modified by three Notes. Note 1 states that entry into this Condition shall only be allowed for Unit 1 and for pre-planned activities as described in the Bases of this Specification. Condition C is only allowed to be entered in support of planned maintenance or modification activities associated with the Auxiliary Building discharge header that is taken out of service. An example of a situation for which entry into this Condition is allowed is refurbishment of an Auxiliary Building discharge header. Entry into this Condition is not allowed in response to unplanned events or for other events involving the NSWS. Examples of situations for which entry into this Condition is prohibited are emergent repair of discovered piping leaks and other component failures. For unplanned events or other events involving the NSWS, Condition A must be entered. In addition, Note 1 states that entry into this Condition shall not be allowed while Unit 2 is in MODE 1, 2, 3, or 4. Entry into this Condition is only allowed while the LCO is not applicable to Unit 2. Note 2 requires immediate entry into Condition A of this LCO if one or more Unit 1 required NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE. With one remaining OPERABLE NSWS train, the NSWS can still perform its safety related function. However, with one inoperable NSWS train, the NSWS cannot be assured of performing its safety related function in the event of a single failure of another NSWS component. While the loss of any NSWS component subject to the requirements of this LCO can result in the entry

into Condition A, the most common example is the inoperability of an NSWS pump. This occurs during periodic testing of the emergency diesel generators. Inoperability of an emergency diesel generator renders its associated NSWS pump inoperable. Note 3 requires immediate entry into LCO 3.0.3 if one or more Unit 1 required NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE. In this case, the NSWS cannot perform its safety related function.

Based on the above information, it is therefore unnecessary to add Notes similar to Notes 1 and 2 of Required Action A.1 into Required Action C.1. If any emergent situation were to occur while Unit 1 is in Condition C, then Unit 1 would be immediately required to enter LCO 3.7.8 Condition A or LCO 3.0.3, as applicable. (Note that if Unit 1 were in LCO 3.0.3 as a result of two inoperable NSWS trains, then Unit 1 would also be in LCO 3.7.8 Condition A for one inoperable NSWS train, since <u>all</u> Conditions and LCOs must be immediately entered when they become applicable.) In this situation, Notes 1 and 2 of Required Action A.1 would immediately become applicable.

It should also be noted that entry into Condition C by itself does not render any emergency diesel generator or residual heat removal loop inoperable, since the NSWS is capable of providing flow through the normal flow paths with return to both the normal Lake Wylie return and the Standby Nuclear Service Water Pond (SNSWP) return lines.

7. For the case when NSWS Train A or Train B is out of service, the licensee should prove by calculation that NSWS pump 1A provides sufficient flow to safety related components in Train 1A considering that the flow combines with the flow from NSWS pumps 1B and 2B in the discharge header and returns to the SNSWP through the B loop (for Train A through 1RN58B) or through the A loop (for Train B through 1RN63A).

Duke Energy Response:

A calculation has been performed that demonstrates that when the NSWS is aligned in the Single Discharge Header alignment and the Train A discharge header to the SNSWP is out of service, the NSWS Train 1A components will receive sufficient flow. In this alignment, Train 1A NSWS discharge flow combines with the Train 1B and Train 2B NSWS discharge flow and discharges through the Train B header to the SNSWP.

Likewise, a calculation has been performed that demonstrates that when the NSWS is aligned in the Single Discharge Header alignment and the Train B discharge header to the SNSWP is out of service, the NSWS Train 1B components will receive sufficient flow. In this alignment, Train 1B NSWS discharge flow combines with the Train 1A and Train 2A NSWS discharge flow and discharges through the Train A header to the SNSWP.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ----------NOTES---------- 1. Entry into this Condition shall only be allowed for pre-planned activities as described in the Bases of this Specification. 2. Immediately enter Condition A of this LCO if one or more NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE. 3. Immediately enter LCO 3.0.3 if one or more NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE. ---------- One NSWS supply header inoperable due to NSWS being aligned for single supply header operation.	B.1 Restore NSWS supply header to OPERABLE status.	30 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ----------NOTES---------- 1. Entry into this Condition shall only be allowed for Unit 1 and for pre-planned activities as described in the Bases of this Specification. Entry into this Condition shall not be allowed while Unit 2 is in MODE 1, 2, 3, or 4. 2. Immediately enter Condition A of this LCO if one or more Unit 1 required NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE. 3. Immediately enter LCO 3.0.3 if one or more Unit 1 required NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE. ---------- One NSWS train inoperable due to NSWS being aligned for single Auxiliary Building discharge header operation.	C.1 Restore NSWS train to OPERABLE status.	14 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A, B, or C not met.	D.1 Be in MODE 3. AND D.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.8.1	----------NOTE---------- Isolation of NSWS flow to individual components does not render the NSWS inoperable. ---------- Verify each NSWS manual, power operated, and automatic valve in the flow path servicing safety related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.8.2	----------NOTE---------- Not required to be met for valves that are maintained in position to support NSWS single supply or discharge header operation. ---------- Verify each NSWS 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.	In accordance with the Surveillance Frequency Control Program
SR 3.7.8.3	Verify each NSWS pump starts automatically on an actual or simulated actuation signal.	In accordance with the Surveillance Frequency Control Program

B 3.7 PLANT SYSTEMS

B 3.7.8 Nuclear Service Water System (NSWS)

BASES

BACKGROUND

The NSWS, including Lake Wylie and the Standby Nuclear Service Water Pond (SNSWP), provides a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient. During normal operation, and a normal shutdown, the NSWS also provides this function for various safety related and nonsafety related components. The safety related function is covered by this LCO.

The NSWS consists of two independent loops (A and B) of essential equipment, each of which is shared between units. Each loop contains two NSWS pumps, each of which is supplied from a separate emergency diesel generator. Each set of two pumps supplies two trains (1A and 2A, or 1B and 2B) of essential equipment through common discharge piping. While the pumps are unit designated, i.e., 1A, 1B, 2A, 2B, all pumps receive automatic start signals from a safety injection or blackout signal from either unit. Therefore, a pump designated to one unit will supply post accident cooling to equipment in that loop on both units, provided its associated emergency diesel generator is available. For example, the 1A NSWS pump, supplied by emergency diesel 1A, will supply post accident cooling to NSWS trains 1A and 2A.

One NSWS loop containing two OPERABLE NSWS pumps has sufficient capacity to supply post loss of coolant accident (LOCA) loads on one unit and shutdown and cooldown loads on the other unit. Thus, the OPERABILITY of two NSWS loops assures that no single failure will keep the system from performing the required safety function. Additionally, one NSWS loop containing one OPERABLE NSWS pump has sufficient capacity to maintain one unit indefinitely in MODE 5 (commencing 36 hours following a trip from RTP) while supplying the post LOCA loads of the other unit. Thus, after a unit has been placed in MODE 5, only one NSWS pump and its associated emergency diesel generator are required to be OPERABLE on each loop, in order for the system to be capable of performing its required safety function, including single failure considerations.

Additional information about the design and operation of the NSWS, along with a list of the components served, is presented in the UFSAR, Section 9.2.1 (Ref. 1). The principal safety related function of the NSWS is the removal of decay heat from the reactor via the CCW System.

BASES

APPLICABLE SAFETY ANALYSES

The design basis of the NSWS is for one NSWS train, in conjunction with the CCW System and a containment spray system, to remove core decay heat following a design basis LOCA as discussed in the UFSAR, Section 6.2 (Ref. 2). This prevents the containment sump fluid from increasing in temperature during the recirculation phase following a LOCA and provides for a gradual reduction in the temperature of this fluid as it is supplied to the Reactor Coolant System by the ECCS pumps. The NSWS is designed to perform its function with a single failure of any active component, assuming the loss of offsite power.

The NSWS, in conjunction with the CCW System, also cools the unit from residual heat removal (RHR), as discussed in the UFSAR, Section 5.4 (Ref. 3), from RHR entry conditions to MODE 5 during normal and post accident operations. The time required for this evolution is a function of the number of CCW and RHR System trains that are operating. Thirty six hours after a trip from RTP, one NSWS train is sufficient to remove decay heat during subsequent operations in MODES 5 and 6. This assumes a maximum NSWS temperature, a simultaneous design basis event on the other unit, and the loss of offsite power.

The NSWS satisfies Criterion 3 of 10 CFR 50.36 (Ref. 4).

LCO

Two NSWS trains are required to be OPERABLE to provide the required redundancy to ensure that the system functions to remove post accident heat loads, assuming that the worst case single active failure occurs coincident with the loss of offsite power.

While the NSWS is operating in the normal dual supply and discharge header alignment, an NSWS train is considered OPERABLE during MODES 1, 2, 3, and 4 when:

a. 1. Both NSWS pumps on the NSWS loop are OPERABLE; or

2. One unit's NSWS pump is OPERABLE and one unit's flowpath to the non essential header, AFW pumps, and Containment Spray heat exchangers are isolated (or equivalent flow restrictions); and

b. The associated piping, valves, and instrumentation and controls required to perform the safety related function are OPERABLE.

BASES

LCO (continued)

The NSWS system is shared between the two units. The shared portions of the system must be OPERABLE for each unit when that unit is in the MODE of Applicability. Additionally, both normal and emergency power for shared components must also be OPERABLE. If a shared NSWS component becomes inoperable, or normal or emergency power to shared components becomes inoperable, then the Required Actions of this LCO must be entered independently for each unit that is in the MODE of applicability of the LCO, except as noted in a.2 above for operation in the normal dual supply header alignment. In this case, sufficient flow is available, however, this configuration results in inoperabilities within other required systems on one unit and the associated Required Actions must be entered. Use of a NSWS pump and associated diesel generator on a shutdown unit to support continued operation (> 72 hours) of a unit with an inoperable NSWS pump is prohibited. A shutdown unit supplying its associated emergency power source (1EMXG/2EMXH) cannot be credited for OPERABILITY of components supporting the operating unit.

APPLICABILITY

In MODES 1, 2, 3, and 4, the NSWS is a normally operating system that is required to support the OPERABILITY of the equipment serviced by the NSWS and required to be OPERABLE in these MODES.

In MODES 5 and 6, the requirements of the NSWS are determined by the systems it supports.

ACTIONS

A.1

If one NSWS train is inoperable, action must be taken to restore OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE NSWS train is adequate to perform the heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE NSWS train could result in loss of NSWS function. Due to the shared nature of the NSWS, both units are required to enter a 72 hour Action when a NSWS Train becomes inoperable on either unit. Required Action A.1 is modified by two Notes. The first Note indicates that the applicable Conditions and Required Actions of LCO 3.8.1, "AC Sources—Operating," should be entered if an inoperable NSWS train results in an inoperable emergency diesel generator. The second Note indicates that the applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops—MODE 4," should be entered if an inoperable NSWS train results in an inoperable decay heat removal train

BASES

ACTIONS (continued)

(RHR). An example of when these Notes should be applied is with both units' loop 'A' NSWS pumps inoperable, both units' 'A' emergency diesel generators and both units' 'A' RHR systems should be declared inoperable and appropriate Actions entered. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components. The 72 hour Completion Time is based on the redundant capabilities afforded by the OPERABLE train, and the low probability of a DBA occurring during this time period.

B.1

While the NSWS is operating in the single supply header alignment, one of the supply headers is removed from service in support of planned maintenance or modification activities associated with the supply header that is taken out of service. In this configuration, each NSWS train is considered OPERABLE with the required NSWS flow to safety related equipment being fed through the remaining OPERABLE NSWS supply header. While the NSWS is operating in the single supply header alignment, an NSWS train is considered OPERABLE during MODES 1, 2, 3, and 4 when:

a. The associated train related NSWS pumps are OPERABLE; and

b. The associated piping (except for the supply header that is taken out of service), valves, and instrumentation and controls required to perform the safety related function are OPERABLE.

If one NSWS supply header is inoperable due to the NSWS being aligned for single supply header operation, the NSWS supply header must be restored to OPERABLE status within 30 days. Dual supply header operation is the normal alignment of the NSWS. The Completion Time of 30 days is supported by probabilistic risk analysis. While in Condition B, the single supply header is adequate to perform the heat removal function for all required safety related equipment for both safety trains. Due to the shared nature of the NSWS, both units are required to enter this Condition when the NSWS is aligned for single supply header operation. In order to prevent the potential for NSWS pump runout, the single NSWS pump flow balance alignment is prohibited while the NSWS is aligned for single supply header operation.

BASES

ACTIONS (continued)

Condition B is modified by three Notes. Note 1 states that entry into this Condition shall only be allowed for pre-planned activities as described in the Bases of this Specification. Condition B is only allowed to be entered in support of planned maintenance or modification activities associated with the supply header that is taken out of service. An example of a situation for which entry into this Condition is allowed is refurbishment or inspection of a supply header. Entry into this Condition is not allowed in response to unplanned events or for other events involving the NSWS. Examples of situations for which entry into this Condition is prohibited are emergent repair of discovered piping leaks and other component failures. For unplanned events or other events involving the NSWS, Condition A must be entered. Note 2 requires immediate entry into Condition A of this LCO if one or more NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE. With one remaining OPERABLE NSWS train, the NSWS can still perform its safety related function. However, with one inoperable NSWS train, the NSWS cannot be assured of performing its safety related function in the event of a single failure of another NSWS component. The most limiting single failure is the failure of an NSWS pit to automatically transfer from Lake Wylie to the SNSWP during a seismic event. While the loss of any NSWS component subject to the requirements of this LCO can result in the entry into Condition A, the most common example is the inoperability of an NSWS pump. This occurs during periodic testing of the emergency diesel generators. Inoperability of an emergency diesel generator renders its associated NSWS pump inoperable. Note 3 requires immediate entry into LCO 3.0.3 if one or more NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE. In this case, the NSWS cannot perform its safety related function.

C.1

While the NSWS is operating in the single Auxiliary Building discharge header alignment, one of the Unit 2 Auxiliary Building discharge headers is removed from service in support of planned maintenance or modification activities associated with the Auxiliary Building discharge header that is taken out of service. In this configuration, the corresponding (train related) Unit 1 NSWS train is inoperable and the required NSWS flow to safety related equipment is discharged through the remaining OPERABLE NSWS Auxiliary Building discharge header.

When in the single Auxiliary Building discharge header alignment with the NSWS Train A discharge header inoperable, the NSWS piping between

BASES

ACTIONS (continued)

valves 1RNP19 and 1RN63A is isolated. Likewise, when in the single Auxiliary Building discharge header alignment with the NSWS Train B discharge header inoperable, the NSWS piping between valves 1RNP20 and 1RN58B is isolated.

Operation of the NSWS in the single supply header alignment and the single Auxiliary Building discharge header alignment at the same time is prohibited.

If one NSWS train is inoperable due to the NSWS being aligned for single Auxiliary Building discharge header operation, the NSWS train must be restored to OPERABLE status within 14 days. Dual Auxiliary Building discharge header operation is the normal alignment of the NSWS. The Completion Time of 14 days is supported by probabilistic risk analysis. While in Condition C, the single Auxiliary Building discharge header is adequate to perform the heat removal function for all required safety related equipment for its respective safety train. Due to the design of the NSWS, only the operating unit is required to enter this Condition when the NSWS is aligned for single Auxiliary Building discharge header operation. Pre-planned activities requiring entry into this Condition are only performed with Unit 2 in an outage (MODE 5, 6, or defueled).

Condition C is modified by three Notes. Note 1 states that entry into this Condition shall only be allowed for Unit 1 and for pre-planned activities as described in the Bases of this Specification. Condition C is only allowed to be entered in support of planned maintenance or modification activities associated with the Auxiliary Building discharge header that is taken out of service. An example of a situation for which entry into this Condition is allowed is refurbishment or inspection of an Auxiliary Building discharge header. Entry into this Condition is not allowed in response to unplanned events or for other events involving the NSWS. Examples of situations for which entry into this Condition is prohibited are emergent repair of discovered piping leaks and other component failures. For unplanned events or other events involving the NSWS, Condition A must be entered. In addition, Note 1 states that entry into this Condition shall not be allowed while Unit 2 is in MODE 1, 2, 3, or 4. Entry into this Condition is only allowed while the LCO is not applicable to Unit 2. Note 2 requires immediate entry into Condition A of this LCO if one or more Unit 1 required NSWS components become inoperable while in this Condition and one NSWS train remains OPERABLE. With one remaining OPERABLE NSWS train, the NSWS can still perform its safety related function. However, with one inoperable NSWS train, the NSWS cannot be assured of performing its safety related function in the event of a

BASES

ACTIONS (continued)

single failure of another NSWS component. While the loss of any NSWS component subject to the requirements of this LCO can result in the entry into Condition A, the most common example is the inoperability of an NSWS pump. This occurs during periodic testing of the emergency diesel generators. Inoperability of an emergency diesel generator renders its associated NSWS pump inoperable. Note 3 requires immediate entry into LCO 3.0.3 if one or more Unit 1 required NSWS components become inoperable while in this Condition and no NSWS train remains OPERABLE. In this case, the NSWS cannot perform its safety related function.

D.1 and D.2

If the NSWS train cannot be restored to OPERABLE status within the associated Completion Time, or if the NSWS supply header cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.8.1

This SR is modified by a Note indicating that the isolation of the NSWS components or systems may render those components inoperable, but does not affect the OPERABILITY of the NSWS.

Verifying the correct alignment for manual, power operated, and automatic valves in the NSWS flow path provides assurance that the proper flow paths exist for NSWS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since they are verified to be in the correct position prior to being locked, sealed, or secured. This SR does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position. This SR does not apply to valves that cannot be inadvertently misaligned, such as check valves. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.8.2

This SR verifies proper automatic operation of the NSWS valves on an actual or simulated actuation signal. The signals that cause the actuation are from Safety Injection and Phase 'B' isolation. The NSWS is a normally operating system that cannot be fully actuated as part of normal testing. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

This SR is modified by a Note that states that the SR is not required to be met for valves that are maintained in position to support NSWS single supply or discharge header operation. When the NSWS is placed in this alignment, certain automatic valves in the system are maintained in position and will not automatically reposition in response to an actuation signal while the NSWS is in this alignment.

SR 3.7.8.3

This SR verifies proper automatic operation of the NSWS pumps on an actual or simulated actuation signal. The signals that cause the actuation are from Safety Injection and Loss of Offsite Power. The NSWS is a normally operating system that cannot be fully actuated as part of normal testing during normal operation. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program.

REFERENCES

1. UFSAR, Section 9.2.

2. UFSAR, Section 6.2.

3. UFSAR, Section 5.4.

4. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).