Progress Energy

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JUN 3 0 2009

Serial: HNP-09-067
10 CFR 50.90

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

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/RENEWED LICENSE NO. NPF-63
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING THE LICENSE AMENDMENT REQUEST TO REVISE TECHNICAL SPECIFICATION 3.7.5a, ULTIMATE HEAT SINK MAIN RESERVOIR MINIMUM LEVEL

Reference:

1. Letter from R. J. Duncan to the Nuclear Regulatory Commission (Serial: HNP-08-049), "REQUEST FOR LICENSE AMENDMENT TECHNICAL SPECIFICATION 3.7.5a," dated April 30, 2008

2. Letter from C. L. Burton to the Nuclear Regulatory Commission (Serial: HNP-08-118), "RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING THE LICENSE AMENDMENT REQUEST TO REVISE TECHNICAL SPECIFICATION 3.7.5a, ULTIMATE HEAT SINK MAIN RESERVOIR MINIMUM LEVEL," dated December 03, 2008

3. Letter from M. G. Vaaler, Nuclear Regulatory Commission, "SHEARON HARRIS NUCLEAR POWER PLANT, UNIT 1 -REQUEST FOR ADDITIONAL INFORMATION REGARDING AMENDMENT TO LOWER THE MINIMUM ALLOWED LEVEL OF THE ULTIMATE HEAT SINK MAIN RESERVOIR," dated June 11, 2009

Ladies and Gentlemen:

In accordance with the Code of Federal Regulations, Title 10, Part 50.90, "Application for Amendment of License, Construction Permit, or Early Site Permit," Carolina Power & Light Company (CP&L) doing business as Progress Energy Carolinas, Inc. (PEC), submitted the above License Amendment Request to the Technical Specifications of the Harris Nuclear Plant (HNP) (Reference 1) and Response to Request for Additional Information (Reference 2). The proposed amendment would lower the minimum allowed level of the Ultimate Heat Sink Main Reservoir during Modes 1-4. On June 11, 2009, HNP received a second request for additional information from the NRC to facilitate review of the proposed license amendment (Reference 3). This second request is best answered by expanding on the technical discussion contained in Enclosure 1 of the original submittal contained in Reference 1.

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As such, Enclosure 1 to HNP-08-049 has been revised to incorporate the requested additional information and is included as Enclosure 1 to this letter. This enclosure should replace Enclosure 1 of HNP-08-049 in its entirety.

Enclosure 2 specifies the location of the requested additional information.

This document contains no new or revised regulatory commitments.

Please refer any questions regarding this submittal to D. H. Corlett at (919) 362-3137.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on JUN 3 0 2009

Sincerely,

Christopher L. Burton
Vice President
Harris Nuclear Plant

CLB/adz

Enclosure 1: HNP Evaluation of the Proposed Change

Enclosure 2: Response to the June 11, 2009, Request for Additional Information Regarding the License Amendment Request to Revise Ultimate Heat Sink Main Reservoir Minimum Level

cc:

Mr. J. D. Austin, NRC Sr. Resident Inspector, HNP
Ms. B. O. Hall, N.C. DENR Section Chief
Mr. L. A. Reyes, NRC Regional Administrator, Region II
Ms. M. G. Vaaler, NRC Project Manager, HNP

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Enclosure 1
HNP Evaluation of the Proposed Change
(24 Pages)

Note: This attachment replaces Enclosure 1 to SERIAL: HNP-08-049 in its entirety. The subsequent header pages of this enclosure are labeled "Enclosure 1 to SERIAL: HNP-08-049" for consistency.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/LICENSE NO. NPF-63
REQUEST FOR LICENSE AMENDMENT
EVALUATION OF PROPOSED CHANGES

Subject: Request for License Amendment of Technical Specification 3.7.5a, "Ultimate Heat Sink" to recover margin in Main Reservoir minimum allowed level

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1.0 DESCRIPTION

This evaluation supports a request from Carolina Power & Light Company (CP&L), doing business as Progress Energy Carolinas, Inc. (PEC), to amend Appendix A, Technical Specifications (TS), of Facility Operating License No. NPF-63 for the Shearon Harris Nuclear Power Plant, Unit No. 1 (HNP). The proposed change revises TS Section 3.7.5a to restore Ultimate Heat Sink (UHS) Main Reservoir minimum level to the value allowed by the initial operating license as a result of improvements made to the Emergency Service Water system. The change will allow continued plant operation to a Main Reservoir minimum level of 206 FT Mean Sea Level (MSL) in Modes 1-4.

The current Main Reservoir minimum level allowed in Modes 1-4 by TS is 215 FT MSL. The initial as designed Main Reservoir minimum level approved by the Nuclear Regulatory Commission (NRC) Safety Evaluation Report (SER) for HNP was 205.7 FT MSL. This level was changed by License Amendment 80 based on calculations and analyses revised or created in response to NRC Generic Letter 89-13 implementation and the Self-Service Water Operational Performance Inspection (SWOPI) conducted at HNP. Several improvements have been made to Emergency Service Water (ESW) system performance since that Amendment was issued, and conditions now allow continued operation at reduced levels in the UHS Main Reservoir.

This amendment request will restore the Main Reservoir minimum allowed level to the initial as designed value of 206 FT MSL (rounded up from 205.7 FT MSL), as approved by the Nuclear Regulatory Commission in the Harris Nuclear Plant Final Safety Evaluation Report, NUREG-1038.

This proposed revision is part of HNP's Drought Mitigation Plan, and approval is requested prior to January 2009.

2.0 PROPOSED CHANGE

Specifically, the proposed change makes the following revision to HNP's TS 3.7.5a:

> 3.7.5 The ultimate heat sink shall be OPERABLE with:
>
> a. A minimum auxiliary reservoir water level at or above elevation 250 feet Mean Sea Level, USGS datum, and a minimum main reservoir water level at or above 215 feet Mean Sea Level, USGS datum, and
>
> b. A water temperature as measured at the respective intake structure of less than or equal to 94°F.

Incorporating the above change, TS 3.7.5a would then reflect:

3.7.5 The ultimate heat sink shall be OPERABLE with:

a. A minimum auxiliary reservoir water level at or above elevation 250 feet Mean Sea Level, USGS datum, and a minimum main reservoir water level at or above 206 feet Mean Sea Level, USGS datum, and

b. A water temperature as measured at the respective intake structure of less than or equal to 94°F.

In summary, Carolina Power & Light Company, doing business as Progress Energy Carolinas, Inc., proposes to modify Harris Nuclear Plant's Technical Specifications relating to Ultimate Heat Sink Main Reservoir minimum level as a result of several improvements made to the Emergency Service Water system. This change will restore Main Reservoir minimum level to the initial as designed value approved by the Nuclear Regulatory Commission, allowing continued plant operation in Modes 1-4 to a Main Reservoir minimum level of 206 FT Mean Sea Level.

3.0 BACKGROUND

Beginning in the summer of 2007, much of the southeastern U.S. was subject to extreme drought conditions. This resulted in significant drops in many lake levels. For power plants in this region which rely on lake water as a source of cooling for both normal and emergency operation, this posed a threat to continued generation. Low lake levels can adversely affect the flows, temperatures, and water inventory required for plant heat removal.

The function of the UHS, a complex of water sources including associated retaining structures and any canals or conduits connecting the sources with the intake structure, is to dissipate reactor decay heat and essential cooling system heat after a shutdown following an abnormal condition including a loss-of-coolant accident. The design bases for the UHS are (Reference 1):

a. The UHS has sufficient capacity to:
   1. Provide a source of cooling water to the Emergency Service Water (ESW) System for at least 30 days to permit safe shutdown and cooldown of the plant and to maintain it in the safe shutdown condition; or

2. Provide a source of cooling water for at least 30 days to permit emergency shutdown and cooldown of the plant and to maintain the Unit in the safe shutdown condition.

b. The 30-day cooling supply is based upon conservative assumptions of meteorological and other parameters such as solar radiation, ambient air temperature, dewpoint temperature, windspeed, rainfall, creek inflow, reservoir pumped make up, and the total heat rejected from the plant.
c. The design maximum allowed service water system inlet temperature is 95°F.
d. The UHS is protected from or designed to withstand without loss of function, the following design basis natural phenomena:
   1. Hurricane and tornado
   2. Flood
   3. Earthquake
   4. Icing
e. The UHS is designed, as applicable, to ASME Section III, Class 3 and Seismic Category I requirements.
f. The Auxiliary Reservoir is the preferred source of cooling water for emergency operations.
g. The Main Reservoir serves as a backup source of water in the unlikely event of the unavailability of water from the Auxiliary Reservoir.

The UHS for HNP utilizes two alternate sources of cooling water: the Auxiliary Reservoir and the Main Reservoir. At HNP, normal plant heat loads are rejected to the Normal Service Water (NSW) system while post-accident heat loads are rejected to the Emergency Service Water (ESW) system. The ESW system can draw water from either the Main or Auxiliary Reservoirs and always discharges to the Auxiliary Reservoir. Overflow from the Auxiliary Reservoir spills back into the Main Reservoir.

HNP TS 3.7.5a limits the low-water levels in the Main and Auxiliary Reservoirs to 215 FT MSL and 250 FT MSL, respectively. Since the Auxiliary Reservoir can be filled from the Main Reservoir, the Auxiliary Reservoir level remains relatively constant over time. The Main Reservoir level, on the other hand, will vary with changing ambient conditions.

In 2007, minimum level in the Main Reservoir approached 217 FT MSL. While this level was still above the TS limit of 215 FT MSL and did not immediately threaten the continued operation of the plant, it served as a warning that extended drought conditions could challenge the TS 3.7.5a Main Reservoir level limit. This prompted a desire to restore UHS Main Reservoir minimum allowed level to that approved by the NRC in the initial SER by accounting for ESW system performance improvements.

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The original (plant start-up) TS 3.7.5a limit on Main Reservoir level was 205.7 FT MSL. This limit existed from initial plant start-up in 1987 until 1996. In 1994, a Generic Letter (GL) 89-13 program review revealed that inadequate techniques and acceptance criteria were being used for ESW System flow balancing. When the acceptance criteria were revised, there was little system flow margin available, particularly for the containment fan coolers. As a result, the minimum Main Reservoir limit was increased in 1996 to 215 FT MSL, first administratively and then through License Amendment 80, in order to ensure sufficient flow to various ESW heat exchangers (Reference 2).

At the time the TS limit was officially changed to 215 FT, it was recognized that future improvements to system performance would eliminate the need for such an increase. However, as stated in ESR 96-00510, Revision 4, the change was made permanent in order to eliminate the need for future reanalysis of the ESW System to determine operability. The level change was a conservative margin increase that, at the time, did not need to be undone.

Several improvements to ESW performance have been made to increase system operating margin as a result of the GL 89-13 review:

- The single stage ESW pump rotating elements were replaced with two stage elements, resulting in an increase of Total Developed Head from 190FT to 225FT.
- The bore in the orifice plates downstream of the containment fan coolers (CFCs) was increased, allowing increased flow to these components.

Other activities which have helped to establish or maintain margin since 1996 include:

- The ESW booster pump casings have been cleaned and internally coated with corrosion-resistant Belzona, improving pump performance.
- All heat exchangers are regularly inspected and cleaned.

As a result of these improvements, it is now possible to restore the Main Reservoir minimum TS level to the original value of 206 FT MSL, rounded up from 205.7 FT MSL.

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4.0 TECHNICAL ANALYSIS

This License Amendment changes the TS 3.7.5a limit for Main Reservoir minimum level from 215 FT Mean Sea Level (MSL) to 206 FT MSL.

Areas of consideration for this analysis are the effects of reduced Main Reservoir level on:

- Minimum Emergency Service Water flow rates
- Minimum ESW pressures inside containment
- Maximum ESW supply/inlet temperature
- Minimum ESW Pump submergence
- RG 1.27 compliance
- Minimum Cooling Tower Make-Up (CTMU) pump submergence
- Impact on plant setpoints and procedures
- FSAR Chapter 15 Accident Analysis considerations

4.1 Minimum ESW Flow Rates

As Main Reservoir level decreases, the suction pressure available to the ESW Pumps decreases, and as a result system flow rates will drop. A lower limit for Main Reservoir level will result in potentially lower flow rates. The flow rates through the various heat exchangers served by ESW determine how much heat can be transferred to the ultimate heat sink (UHS).

Calculation SW-0080, Revision 12, summarizes the minimum required flow rates for each of the components served by ESW and adjusts these minimum requirements for variations in reservoir level. This adjustment is necessary so that the corresponding limits under test conditions, when reservoir levels will be higher than the TS limit, are known.

Calculation HNP-M/MECH-1011, Revision 13, determines how much margin is available to the ESW Pumps and ESW Booster pumps based, in part, on SW-0080 flow limits. In this calculation, margin is expressed in terms of percent degradation of the pump performance curves.

Calculations SW-0080 and HNP-M/MECH-1011 have been revised concurrent with the Engineering Change (EC) developed to incorporate the proposed 206 FT minimum limit for the Main Reservoir. The results show that there is positive flow margin available with a 206 FT minimum limit. The below table provides recent ESW system flow balance results listed beside the proposed 206 FT-based flow limits and show positive margin:

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EPT-250 (A)					EPT-251 (B)				
Aux.					Main				
251.3					217.3				
5/24/2007					10/13/2007				
	Recorded	Limit	Margin	Design Min.		Recorded	Limit	Margin	Design Min.
	gpm	*gpm*	*%*	*gpm*		*gpm*	*gpm*	*%*	*gpm*
AH-2	1555	1446	7.5	1,300	AH-4	1596	1368	16.6	1,300
AH-3	1670	1446	15.5	1,300	AH-1	1495	1368	9.3	1,300
ESCW	2450	2351	4.2	2,000	ESCW	2488	2126	17.0	2,000
CCW	11180	10373	7.8	8,825	CCW	10580	9381	12.8	8,825
EDG	1039	934	11.2	800	EDG	938	851	10.3	800
CSIP A Pump	19.2	15	25.9	13	CSIP A Pump	-	-	-	13
CSIP A Gear	20.7	8	151.6	7	CSIP A Gear	-	-	-	7
CSIP B Pump	-	-	-	13	CSIP B Pump	22.06	14	59.9	13
CSIP B Gear	-	-	-	7	CSIP B Gear	18.65	7	150.5	7
CSIP C Pump	-	-	-	13	CSIP C Pump	-	-	-	13
CSIP C Gear	-	-	-	7	CSIP C Gear	-	-	-	7
Sum	17934	16574	8.2		Sum	17138	15116	13.4	

In the table above, the "Recorded" column contains flows measured in the field during the performance of Engineering Periodic Tests (EPT) EPT-250 and EPT-251, ESW Train Flow Verification/Balance. These procedures, which are run at least once per cycle, are used to measure and adjust system flow rates (i.e., they are used for system flow balancing). The "Limit" column contains the minimum acceptable flows provided in the EPTs. The limits in the EPTs are adjusted for reservoir level. The "Margin" column is the percent difference between the recorded value and the associated limit. The "Design Min" column shows the minimum required (design-basis) service water flow rate for each component independent of reservoir level and without any margin added.

As noted previously, the flow limits in EPT-250 and EPT-251 are based on calculation SW-0080. This calculation assigns design minimum flows to each component, adds margin, and begins with ESW aligned to the Main Reservoir at 206 FT. Equivalent limits are then calculated for various higher reservoir levels by analytically raising the water level and also switching reservoirs to allow for Auxiliary Reservoir limits to be calculated. The SW-0080 hydraulic model accounts for the different flow paths that exist between the Main and Auxiliary Reservoir alignments. This ensures that minimum flow limits will be met should Main Reservoir level ever reach the TS limit.

So, for example, if AH-4 recorded flow had been 1,368 gpm instead of the 1,596 gpm actually measured on 10/13/2007, then AH-4 flow would be expected to at least equal its design minimum value of 1,300 gpm if 'B' ESW were to be aligned to the Main Reservoir at 206 FT. The percent margin for this hypothetical example would have been 0%. Since the flow was actually measured to be 1,596 gpm, the percent margin available was (1,596-1,368)/1,368*100, or 16.6%.

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Recorded flows and limits from 2005 and 2006 flow balance results are shown below for historical perspective:

	6/28/2005			6/27/2006		
	Meas.	Limit		Meas.	Limit	
AH-2	1549	1435		1582	1435	
AH-3	1667	1435		1663	1435	
A ESCW	2510	2295		2494	2300	
A CCW	10700	9750		11040	10150	
A EDG	866	818		1053	915	
Sum	17292	15733	9.9%	17832	16235	9.8%

	6/5/2005			6/15/2006		
	Meas.	Limit		Meas.	Limit	
AH-4	1735	1390		1718	1395	
AH-1	1565	1390		1556	1395	
B ESCW	2470	2180		2489	2190	
B CCW	10650	9300		10880	9610	
B EDG	975	870		980	875	
Sum	17395	15130	15.0%	17623	15465	14.0%

Overall system flow margins have remained relatively constant over the last several years. Thus, the proposed 206 FT Main Reservoir limit is acceptable with respect to flow requirements.

Note that the above flow limits are conservative. The ESW system is throttled, and HNP-M/MECH-1011 only takes partial credit for this. Also, the SW-0080 limits include a 4% flow penalty for model uncertainty.

SW-0080 also assumes that the failure of breaker MCC 1B35SB is the most limiting single failure affecting the 'A' train when, in fact, the loss of an entire ESW train is the most limiting in terms of the entire ESW system. Failure of MCC 1B35SB prevents the isolation valve in the 'B' train ESW discharge line to the Auxiliary Reservoir from opening. This results in both trains of ESW discharging through the Normal Service Water cross-connect line and out through the 'A' return line to the Auxiliary Reservoir. This reduces flow in both ESW trains slightly; however, both trains continue to operate. When the MCC 1B35SB failure was originally considered, flow through the 'B' train was ignored and only flow through the 'A' train was credited. This is very conservative. The total flow through both trains under this condition is far more than that which would result from the loss of an entire ESW train. This is recoverable analytical margin that continues to exist regardless of the limit on Main Reservoir level.

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4.2 Minimum ESW Pressures inside Containment

Besides meeting minimum flow requirements, another requirement of ESW is to maintain a minimum system pressure inside containment that is equal to or greater than the maximum calculated post-accident containment pressure (41.8 PSIG per Reference 1, Table 6.2.1-2). This will prevent leaks in ESW piping from creating an unmonitored release path. In the ESW system, minimum pressure will occur just downstream of containment fan coolers AH-3 and AH-4.

As Main Reservoir level decreases, the suction pressure available to the ESW Pumps decreases. As a result, pump discharge pressures will drop. Therefore, a lower limit for Main Reservoir level will result in potentially lower ESW pressures.

Calculation HNP-M/MECH-1011 determines how much margin is available to the ESW Pumps and ESW Booster Pumps based, in part, on minimum system pressures. This calculation has been revised concurrent with the EC evaluating a new 206 FT minimum limit for the Main Reservoir. The results show that there is positive pressure margin available with a 206 FT minimum limit. That is, ESW pressures immediately downstream of Air Handling Units AH-3 and AH-4 will remain above 41.8 PSIG even if the ESW Pumps are aligned to the Main Reservoir at 206 FT. The results also show that ESW pressure, not flow, currently defines the available ESW system margin so that, as either the ESW Pump or ESW Booster Pump degrades, the air handler discharge pressure will reach its limit before ESW system flow limits are reached.

Since the ESW Pumps and ESW Booster Pumps both contribute to ESW pressure inside containment, HNP-M/MECH-1011 provides the minimum allowable pump differential pressures (dP) for both pumps for each train on a single graph. This allows for various combinations of limits between the ESW and ESW Booster Pumps. The calculation also graphs the current Operations Surveillance Test (OST) limits and some recent and historical OST data against the new pump dP limits. These graphs are shown on pages 12 and 13 of Enclosure 1.

Each graph shows the limits of pump performance based on the ability to maintain ESW pressure above 41.8 PSIG. Because the ability of the ESW system to maintain minimum pressure is more limiting than the ability to provide minimum flow, all areas on the graph which ensure acceptable system pressure also ensure acceptable system flow.

In these graphs, the box labeled "Current OST-1214(1215) Test Window" represents the current OST limits for the ESW and ESW Booster Pumps. The two vertical (left and right) sides of this box represent the current minimum and maximum OST dP limits for each ESW Pump. Similarly, the two horizontal (top and bottom) sides represent the current minimum and maximum OST dP limits for each ESW Booster Pump. Note that the lower left corner of the 'A' OST window is truncated by the "A Mech-1011 Limits..." curve (described below). As a result, the dashed line on the 'A' graph represents the proposed change to the 'A' ESW Booster Pump lower limit resulting from the new Main Reservoir limit of 206 FT.

The "A(B) Mech-1011 Limits..." curve represents the minimum acceptable combination of ESW Pump and ESW Booster Pump dP values required to ensure that containment fan cooler discharge pressures remain above 41.8 PSIG. As long as the combination of ESW Pump dP (x-axis) and ESW Booster Pump dP (y-axis) remains above and to the right of this curve, fan cooler discharge pressure will meet or exceed 41.8 PSIG when the Main Reservoir is at 206 FT.

For example, the point 106.9, 50.7 on the 'A' train graph represents the condition where the 'A' ESW Pump is not degraded at all but the 'A' ESW Booster Pump is degraded 22% by flow. Under these conditions – that is, with the 'A' ESW Pump at nominal strength and the 'A' ESW Booster Pump degraded 22% by flow – containment fan cooler discharge pressure will equal 41.8 PSIG when the Main Reservoir is at 206 FT. Any further degradation of the 'A' ESW Booster Pump will cause fan cooler discharge pressure to fall below 41.8 PSIG. The horizontal line at this point on the graph is a conservative extension of the calculated "A Mech-1011 Limits..." curve. If a stronger 'A' ESW Pump performance curve had been used in the calculation, the "A Mech-1011 Limits..." curve could continue to slope down and to the right. Drawing a horizontal line at this point is conservative and convenient and ensures that minimum system pressures and flows will be met without any further analysis.

Similarly, the point 95.1, 56.2 represents maximum 'A' ESW Pump degradation with no degradation of the 'A' ESW Booster Pump, and the curve conservatively becomes a vertical line at this point on the graph. If a stronger 'A' ESW Booster Pump performance curve had been used in the calculation, the "A Mech-1011 Limits..." curve could continue to slope up and to the left. Drawing a vertical line at this point is conservative and convenient and ensures that minimum system pressures and flows will be met without any further analysis.

Individual surveillance test results from a roughly two-year period are also plotted as points on the graph to show the margin between the pumps and the "A(B) Mech-1011 Limits" curve. It may be noted that some of these points fall above the nominal dP value for the respective pump. For example, 'A' ESW Booster Pump OST data falls between 56 and 58 PSID, whereas the nominal 'A' ESW Booster Pump dP is shown as 56.2 PSID. This is because the pump curves in the model were biased toward the low end of the most recent OST data scatter. Biasing the modeled pump curves in this way, combined with the truncation of the ends of the limiting curves using vertical and horizontal lines, is conservative.

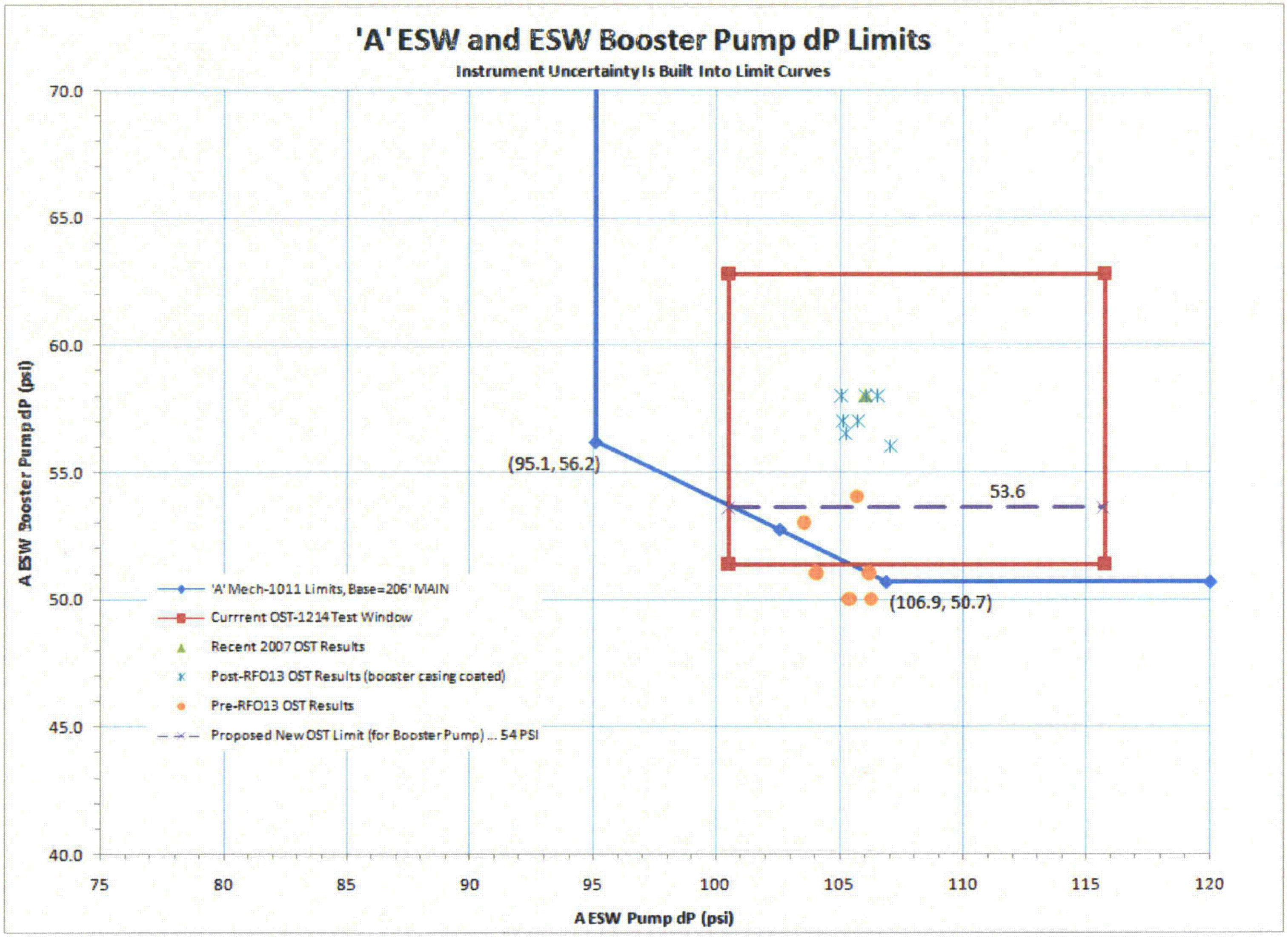
From the graphs, it can be seen that recent OST results are all greater than the proposed pump dP limits. This data indicates that the pumps are not likely to challenge the new limits in the near future. The graphs also show that current 'A' train OST limits are truncated by the new limits. As a result, OST-1214 (ESW System Operability, Train A) will need to be revised. HNP intends to raise the minimum allowable pump dP for the 'A' Booster Pump to 53.6 PSID without changing existing 'A' ESW Pump limits. All 'B' train OST-1215 (ESW System Operability, Train B) limits (ESW Pump and ESW Booster Pump) remain unaffected.

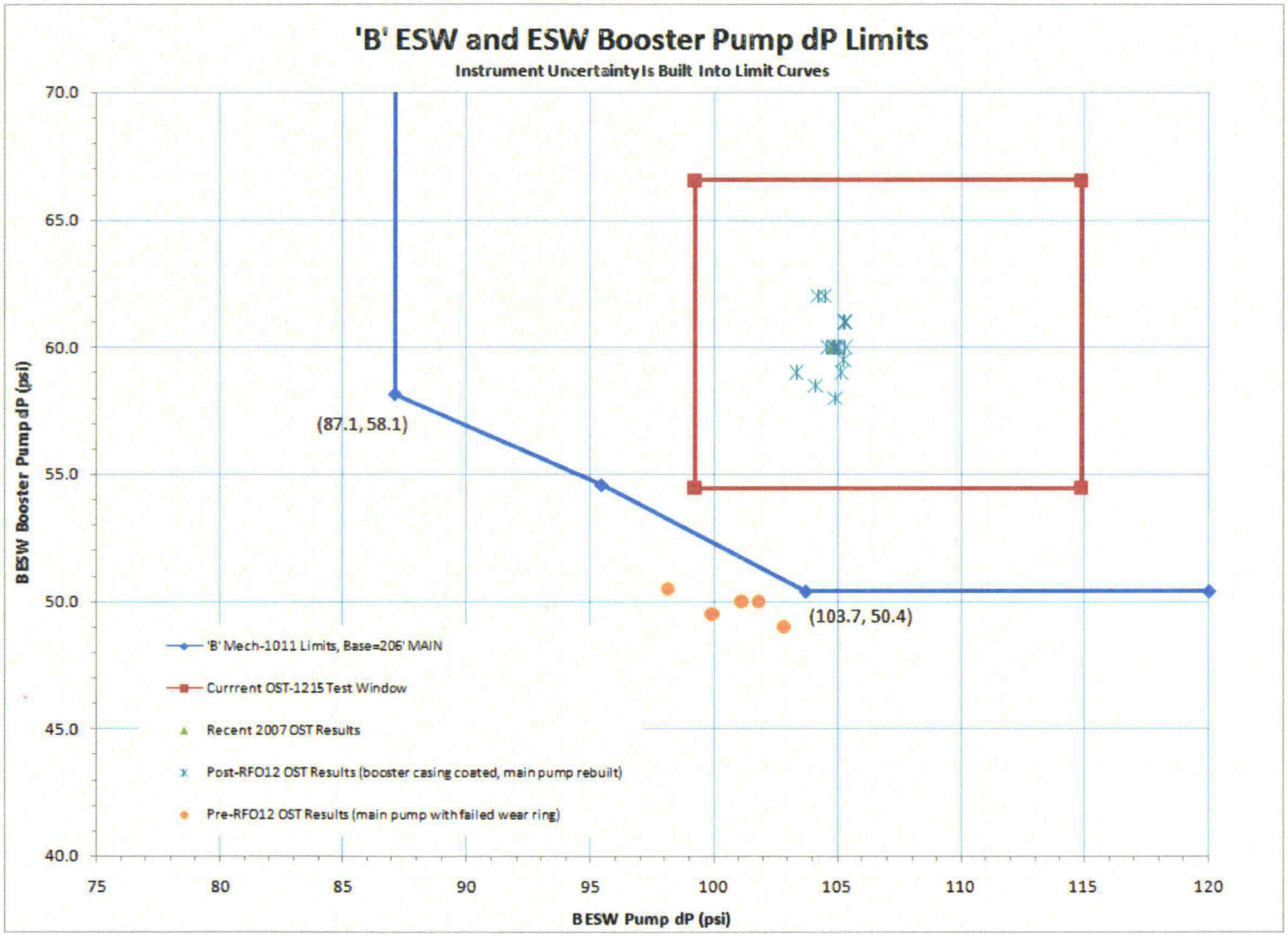
Over time, ESW system resistance is not expected to change significantly due to natural processes. During the vast majority of normal plant operation, Normal Service Water (NSW) supplies most service water components, including the containment fan coolers. NSW takes suction from the Cooling Tower basin and is treated with biocide, corrosion inhibitors, and suspended solid dispersants in accordance with plant procedure CRC-155. In addition, all safety-related heat exchangers are inspected internally on a regular basis and cleaned as necessary. Therefore, the HNP-M/MECH-1011 analysis and limits are expected to remain valid over time with pump performance being the primary variable.

Pump performance will continue to be measured quarterly using OST procedures which set pump flow within a prescribed range before measuring pressure across the pump. This is in contrast to EPT-250 and EPT-251, which are primarily used to set system flow rates. Limits from HNP-M/MECH-1011 will be incorporated into the applicable OSTs. Pump performance is monitored and trended over time within the In-Service Testing Program and by System Engineering.

Calculation SW-0086, Revision 3, considers the ESW pressures inside containment following the single failure of either a booster pump or a containment fan cooler orifice bypass valve, or both. The minimum calculated pressure for the worst-case failure scenario based on a minimum Main Reservoir level of 215 FT is 17 PSIG. EOP-FRP-J.1, "Response to High Containment Pressure," will isolate the containment fan coolers if containment pressure exceeds 10 PSIG and the booster pumps are not running. Therefore, there is 7 PSI margin before the procedure would require revision.

HNP-M/MECH-1011 indicates that ESW pressures in containment decrease less than 3 PSI when Main Reservoir level drops from 220 FT to 206 FT. Based on this, there will be no impact to EOP-FRP-J.1 as a result of the SW-0086 revision. Therefore, SW-0086 does not need to be revised to support this amendment.


'A' ESW and ESW Booster Pump dP Limits
Instrument Uncertainty Is Built Into Limit Curves
A ESW Booster Pump dP (psi)
A ESW Pump dP (psi)
70.0
65.0
60.0
55.0
50.0
45.0
40.0
75
80
85
90
95
100
105
110
115
120
(95.1, 56.2)
(106.9, 50.7)
53.6
'A' Mech-1011 Limits, Base=206' MAIN
Currrent OST-1214 Test Window
Recent 2007 OST Results
Post-RFO13 OST Results (booster casing coated)
Pre-RFO13 OST Results
Proposed New OST Limit (for Booster Pump) ... 54 PSI


'B' ESW and ESW Booster Pump dP Limits
Instrument Uncertainty Is Built Into Limit Curves
BESW Booster Pump dP (psi)
70.0
65.0
60.0
55.0
50.0
45.0
40.0
75
80
85
90
95
100
105
110
115
120
BESW Pump dP (psi)
(87.1, 58.1)
(103.7, 50.4)
'B' Mech-1011 Limits, Base=206' MAIN
Currrent OST-1215 Test Window
Recent 2007 OST Results
Post-RFO12 OST Results (booster casing coated, main pump rebuilt)
Pre-RFO12 OST Results (main pump with failed wear ring)

4.3 Maximum ESW Supply Temperature

In order for the various heat exchangers served by the ESW system to be able to remove their design-basis heat loads, ESW inlet temperature must remain at or below the maximum assumed value of 95°F.

Calculation SW-0085, Revision 2, determines Main and Auxiliary Reservoir temperatures and levels over various durations, including a 30-day case, assuming worst-case accident and meteorological conditions. The calculation concludes that ESW supply temperature is expected to remain below 95°F for all cases. This conclusion is based on an initial Main Reservoir level of 205.7 FT.

Since the Main Reservoir TS limit is being returned to a value slightly greater than the 205.7 FT starting point used in SW-0085, the UHS temperature study remains valid and no revision is necessary. A higher lake level will result in increased lake volume and a lower calculated peak temperature.

4.4 Minimum ESW Main Pump Submergence

For vertical pumps like the ESW Pumps, the bottom of the suction bell must remain a certain distance below the water level in order to maintain adequate net positive suction head (NPSH). Adequate NPSH prevents cavitation near the pump impeller and ensures the pump will perform as designed.

Calculation SW-0082, Revision 1, states that the ESW Pumps require a minimum submergence of 6 FT above the bottom of the bell. This equates to a water level elevation of 197.7 FT per the diagram in the calculation. This is well below the proposed Main Reservoir minimum level of 206 FT. It is also below the minimum post-accident Main Reservoir level of 203.6 FT as calculated in SW-0085 (the maximum evaporation case). Therefore, the 206 FT limit will have no adverse impact on ESW Pump performance.

The value for minimum submergence applies to a design capacity of 20,000 GPM. This capacity exceeds the total pump flow rates recorded during typical flow balances (EPT-250 and EPT-251).

4.5 RG 1.27 Compliance

RG 1.27, Revision 2, describes the requirements for meeting GDC 44 and 2. For plants using lakes as their UHS, RG 1.27 requires that a conservative transient analysis be done to show that flows and inlet temperatures remain above or below design-basis limits (as applicable) assuming worst-case meteorological conditions for periods of up to 30 days. Such an analysis has been performed for HNP:

- Calculation SW-0085 concludes that peak lake temperatures will not exceed 95 °F (the TS 3.7.5b limit) under worst-case conditions. This analysis assumes an initial Main Reservoir level of 205.7 FT. This bounds the proposed new limit of 206 FT.
- Calculation HNP-M/MECH-1011 finds that positive flow and pressure-based margin will exist with a 206 FT limit imposed on the Main Reservoir.
- Calculation SW-0082 finds that the ESW Pumps will have sufficient submergence, assuming a pre-accident Main Reservoir level of 205.7 FT. This bounds the proposed new limit of 206 FT.

4.6 Minimum Cooling Tower Make-Up Pump Submergence

The CTMU Pumps are not safety-related components. However, they do draw water from the Main Reservoir, so their minimum required submergence is considered in this proposed change.

According to specification CAR-SH-M-067P, the CTMU Pumps require 8.6 FT of submergence at a runout capacity of 33,800 GPM. According to drawing 1364-044820, the minimum submergence is 109 IN (9.1 FT) at runout capacity. Per the elevations shown on drawing 1364-044820, 109 IN of submergence (the larger of the two values) is equivalent to an elevation of 200.6 FT. This is well below the proposed Main Reservoir minimum level of 206 FT. It is also below the minimum post-accident Main Reservoir level of 203.6 FT as calculated in SW-0085 (the maximum evaporation case). Therefore, the 206 FT limit will have no adverse impact on CTMU Pump performance.

4.7 Low Level Alarm Setpoints Adjustments

The low-level alarm setpoints for LS-*1SC-8750 ASA and LS-*1SC-8750 BSB will be changed from their current value of 215.5 FT ± 0.3 FT to a new value of 207 FT ± 0.3 FT based on the following:

Instrument uncertainty is not addressed in the current setpoint. Per 1364-049242 S01, the instrument accuracy is 2%. Calibration accuracy is also 2% per PIC-I275. Instrument uncertainty is found using the square root of the sum of the squares (SRSS) per EGR-NGGC-0153:

Calibration accuracy 2%
Instrument accuracy 2%
Assumed drift...............................1%

Total Instrument Uncertainty = $(2^2+2^2+1^2)^{1/2}$
Total Instrument Uncertainty = 3%

Instrument span............................345 IN

Total Instrument Uncertainty = 3% * 345 IN
Total Instrument Uncertainty = 10.35 IN

Based on this, the low-level alarm setpoint must be at least 10.35 IN above the 206 FT low level limit. An alarm setpoint of 207 FT will be used. The new reset point will be 207.08 FT (1 IN above the setpoint). The new setpoint is within the range of the existing instruments, so no new hardware will be required. Associated instrument data sheets will be updated to reflect the change. The new setpoints meet the requirements of Regulatory Guide (RG) 1.105, Revision 1.

4.8 Operations Surveillance Test Considerations

As noted in Section 4.2, the minimum OST-1214 differential pressure limit for the 'A' ESW Booster Pump will need to be increased to 53.6 PSID. Recent OST data shows that 'A' ESW Booster Pump should continue to remain above this new minimum limit. No changes are required for the 'A' ESW Pump limits.

OST-1215 limits for the 'B' ESW Pump and the 'B' ESW Booster Pump remain unaffected by this activity.

If pump performance should fall below OST limits, potential courses of action include pump maintenance, administrative limits on reservoir level, or system modifications depending on the nature of the problem.

Lowering the Main Reservoir TS level limit will have no effect on ESW pump surveillance testing as OST-1214 and OST-1215 both require an Auxiliary Reservoir suction source for ESW pump performance testing.

ESW Booster Pump surveillance testing would not be affected by reduced Main Reservoir level. ESW Booster Pump flow is throttled in order to achieve the required OST flow rate. Any small decrease in flow due to a drop in lake level would be compensated by a change in throttle valve position.

4.9 FSAR Chapter 15 considerations

This proposed amendment recovers margin made available in the UHS Main Reservoir as a result of improvements made to the ESW system, and will allow continued plant operation at a Main Reservoir minimum level of 206 FT MSL. The proposed change will restore Main Reservoir minimum operating level slightly above the original level approved by the NRC in Reference 3, HNP's SER, NUREG-1038. All accident and design basis scenarios evaluated in the original SER will remain valid following the proposed change, as these evaluations were conducted assuming a Main Reservoir minimum level limit of 205.7 FT MSL.

In summary, revising the TS 3.7.5a limit on Main Reservoir minimum level from 215 FT MSL to 206 FT MSL:

- Will not reduce the heat removal capacity of the ESW system below currently analyzed values.
- Will not prevent the ESW system from maintaining a positive pressure differential inside containment in order to prevent the unmonitored release of post-accident contamination.
- Will not result in increased ESW supply temperatures above currently analyzed values.
- Will not adversely affect ESW or CTMU pump performance.
- Is consistent with RG 1.27 requirements.
- Is bounded by current FSAR Chapter 15 Accident Analysis.

This change does reduce the margin available for pump performance degradation. However, this reduction only results in an increase to the 'A' ESW Booster Pump lower OST dP limit, and data shows that the 'A' ESW Booster Pump will continue to operate above the revised lower limit.

Document revisions, procedure revisions, low level alarm and computer setpoint changes will be required following NRC approval of this amendment.

5.0 REGULATORY SAFETY EVALUATION

The proposed change will modify Harris Nuclear Plant's (HNP) Technical Specifications (TS) related to Ultimate Heat Sink (UHS) Main Reservoir minimum level. License Amendment 80 currently requires a Main Reservoir minimum level of 215 FT Mean Sea Level (MSL) when in Modes 1-4. The proposed License Amendment to modify Ultimate Heat Sink (UHS) Main Reservoir minimum level will allow continued plant operation at a Main Reservoir minimum level of 206 FT MSL. The proposed change will restore Main Reservoir minimum operating level to the original level approved by the Nuclear

Regulatory Commission (NRC) in Reference 3, NUREG-1038, HNP's Safety Evaluation Report (SER) as a result of improvements made to the Emergency Service Water (ESW) system. All accident and design basis scenarios evaluated in the original SER will remain valid following the proposed change, as these evaluations were conducted assuming a Main Reservoir minimum level limit of 205.7 FT MSL. This change is supported by an engineering evaluation that evaluates minimum ESW flow rates, pump submergence and pressure inside containment, maximum ESW supply/inlet temperature, minimum Cooling Tower Make-Up (CTMU) pump submergence, and compliance with existing regulatory requirements.

5.1 No Significant Hazards Consideration

Carolina Power & Light Company (CP&L), doing business as Progress Energy Carolinas, Inc. (PEC), has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below. This evaluation is in conformance with the guidance provided in NRC Regulatory Issue Summary (RIS) 2001-22.

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed change to decrease the UHS Main Reservoir minimum level does not alter the function, design, or operating practices for plant systems or components. The UHS is utilized to remove heat loads from plant systems during normal and accident conditions. This function is not expected or postulated to result in the generation of any accident and continues to adequately satisfy the associated safety functions with the proposed change. Therefore, the probability of an accident presently evaluated in the safety analyses will not be increased because the UHS function does not have the potential to be the source of an accident.

The heat loads that the UHS is designed to accommodate have been evaluated for functionality with the reduced level requirement. The result of these evaluations is that there is existing margin associated with the systems that utilize the UHS for normal and accident conditions. This margin is sufficient to accommodate the postulated normal and accident heat loads with the proposed change to the UHS. Since the safety functions of the UHS are maintained, the systems that ensure acceptable offsite dose consequences will continue to operate as designed.

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Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change does not introduce any new modes of plant operation and will not result in a change to the design function of any structure, system, or component that is used for accident mitigation. By allowing the proposed change in the UHS Main Reservoir level, only the parameters for UHS operation are changed, while the safety functions of the UHS and systems that provide heat sink capability continue to be maintained. The UHS function provides accident mitigation capabilities and does not reflect the potential for accident generation. Therefore, the possibility for creating a new or different kind of accident is not feasible because the UHS is only utilized for heat removal functions that are not a potential source for accident generation.

The proposed change does not result in any credible new failure mechanisms, malfunctions, or accident initiators not considered in the original design and licensing basis. The engineering analyses performed to support the proposed change demonstrate that affected safety-related systems and components are capable of performing their intended safety functions at the reduced Main Reservoir level. Therefore, the proposed change will not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed amendment involve a significant reduction in the margin of safety?

Response: No.

The proposed change has been evaluated for systems that are needed to support accident mitigation functions as well as normal operational evolutions. Operational margins were found to exist in the systems that utilize the UHS capabilities such that this proposed change will not result in the loss of any safety function necessary for normal or accident conditions. While operating margins have been reduced by the proposed changes, safety margins have been maintained as assumed in the accident analyses for postulated events. Therefore, the proposed changes do not involve a significant reduction in the margin of safety.

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Based on the above, PEC concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92, paragraph (c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

The proposed change has been evaluated to determine that applicable regulations and requirements for HNP will continue to be met. PEC has determined that the proposed change does not require any exemptions or relief from regulatory requirements, other than the Technical Specifications. Applicable regulatory requirements will continue to be met, adequate defense-in-depth will be maintained, and sufficient safety margins will be maintained.

This amendment request will restore the UHS Main Reservoir minimum level to the initial, as designed, value of 206 FT MSL (rounded up from 205.7 FT MSL) approved in Reference 3 as a result of improvements made in the ESW system.

The Commission's regulatory requirements related to the content of the TS are contained in Title 10, Code of Federal Regulations (10 CFR), Section 50.36. The TS requirements in 10 CFR 50.36 include the following categories:

1. Safety limits, Limiting Safety Systems Settings, and Control Settings
2. Limiting Condition for Operation (LCO)
3. Surveillance Requirements
4. Design Features
5. Administrative Controls

The water elevation requirements for the UHS Main Reservoir are included in the TS in accordance with 10 CFR 50.36(c)(2), LCO. As stated in 10 CFR 50.59(c)(1)(i), a Licensee is required to submit a license amendment pursuant to 10 CFR 50.90 if a change to the TS is required. Furthermore, the requirements of 10 CFR 50.59 necessitate that the NRC approve the TS changes before the TS changes are implemented.

10 CFR 50.36(c)(2)(ii)(B) specifies that a TS LCO must be established for, among other things, each operating restriction that is an initial condition of a design-basis accident or transient analysis that assumes either failure of or presents a challenge to the integrity of a fission product barrier.

10 CFR 50.36(c)(3) specifies that "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained . . . "

Together, these two provisions of 10 CFR 50.36 require that the surveillance practice and the associated LCO result in adequate assurance that, if the level limit in the surveillance requirement is met, the actual value of the UHS Main Reservoir level will not exceed the limit assumed in the associated safety analyses, despite the presence of unavoidable measurement error. This error is included in the revised Main Reservoir low-level setpoint determination and validates this requirement.

10 CFR 50 General Design Criterion (GDC) 2, "Design Bases for Protection Against Natural Phenomena," requires that structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunami, and seiches without loss of capability to perform their safety functions. HNP structures, systems and components important to safety are protected from or designed to withstand the effects of natural phenomena without loss of capability to perform their safety functions. Natural phenomena factored into the design of plant structures, systems and components important to safety were determined from recorded data for the site vicinity with appropriate margin to account for uncertainties in historical data.

The most severe natural phenomena considered in the design in terms of induced stresses are the safe shutdown earthquake (SSE) and the design basis tornado. Those structures, systems and components essential for the mitigation and control of postulated accident conditions are designed to withstand the effects of a loss-of-coolant accident (LOCA) coincident with the effects of the SSE. Structures, systems and components essential to the safe shutdown of the plant are designed to withstand the effects of the most severe natural phenomena, including floods, hurricanes, tornadoes or the SSE, as appropriate. The proposed change restores Main Reservoir level to that originally found acceptable in the approved SER by recovering margin developed as a result of ESW system improvements. HNP has evaluated the proposed change and its impact based on the criteria in GDC 2 and has determined that these criteria continue to be met.

GDC 16, " Containment Design," requires that reactor containment and associated systems shall be provided to establish an essentially leaktight barrier against the uncontrolled release of radioactivity to the environment and to assure that the containment design conditions important to safety are not exceeded for as long as postulated accident conditions require. The Containment, in conjunction with the Containment Isolation System, provides an essentially leaktight barrier designed to protect the public from the consequences of a LOCA based on a postulated break of reactor coolant piping up to and including a double ended break of the largest reactor coolant pipe. The Containment and associated Engineered Safety Features Systems (ESFS) are designed to safely withstand all internal and external environmental conditions that may be postulated to occur during the life of the plant, including both short and long term effects following a LOCA. The proposed change restores Main Reservoir level to that originally found acceptable in the approved SER by recovering margin developed as a result of ESW system improvements. HNP has evaluated the proposed change and its impact based on the criteria in GDC 16, and has determined that these criteria continue to be met.

GDC 44, "Cooling Water," requires a system to transfer heat from SSCs important to safety to an UHS shall be provided and capable of performing its function under normal and accident conditions. RG 1.27 provides an acceptable approach for satisfying these criteria. The guidance provides four criteria for an acceptable UHS function. These criteria include recommendations for sufficient cooling capability, integrity during postulated events, function availability and redundancy, and control by the TSs.

HNP has evaluated the proposed changes and their impact on the UHS design based on the criteria in RG 1.27 and has determined that these recommendations continue to be met. The cooling ability of the UHS, with the proposed reduction in minimum level, has been evaluated and verified to satisfy the recommendations for heat removal considerations. The proposed water elevation change has been evaluated and verified to continue to meet the recommendations for integrity and availability of the UHS. The TS will continue to meet the recommendation to provide actions in the event the function of the UHS cannot be satisfied. Therefore, operation of HNP with the proposed TS change will not result in a deviation from the recommendations of RG 1.27.

GDC 45, "Inspection of Cooling Water System," requires that cooling water system be designed to permit appropriate periodic inspection of important components, such as heat exchangers and piping, to assure the integrity and capability of the system. The Essential Services Chilled Water System (ESCWS), the Component Cooling Water System (CCWS) and the Service Water System (SWS) are designed to permit periodic inspection, to the extent practical, of important components including pumps, strainers, heat exchanger isolation valves, and piping to assure the integrity and capability of the systems. The CCWS is normally pressurized, permitting leakage detection by routine surveillance or monitoring instrumentation. The UHS is two open reservoirs within the site boundary and is thus accessible to inspection. All important components are located in accessible locations to facilitate periodic inspection during normal plant operation. Suitable manholes, handholes, inspection ports, or other design and layout features are provided for this purpose. The proposed change restores Main Reservoir level to that originally found acceptable in the approved SER by recovering margin developed as a result of ESW system improvements and does not modify the inspection program currently in place.

GDC 46, "Testing of Cooling Water System," specifies The Cooling Water System shall be designed to permit appropriate periodic pressure and functional testing to assure the structural and leaktight integrity of its components, the operability and the performance of the active components of the system, and the operability of the system as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the system into operation for reactor shutdown and for loss-of-coolant accidents, including operation of applicable portions of the protection system and the transfer between normal and emergency power sources.

The ESCWS, CCWS and SWS are in operation during normal plant operation. The structural and leaktight integrity of the system components and the operability and performance of their active components are demonstrated in this way. The operation of pumps and heat exchangers will be rotated on a scheduled basis to monitor operational capability of redundant components. Data will be taken periodically during normal plant operation to confirm heat transfer capabilities. The systems are designed to permit testing of system operability encompassing simulation of emergency reactor shutdown or LOCA conditions, including the transfer between normal and emergency power sources. The proposed change restores Main Reservoir level to that originally found acceptable in the approved SER by recovering margin developed as a result of ESW system improvements. Testing periodicities or methodologies will not be modified as a result of this change, and the evaluations detailed in the initial SER remain valid. The Main Reservoir low level alarm setpoint will be reduced as detailed in Section 4.0, Technical Analysis, to support this TS change.

RG 1.105, "Instrument Setpoints," specifies the requirements pertaining to setpoint determination in Nuclear Steam Supply Systems and Balance of Plant systems. The revised setpoint for UHS Main Reservoir low-level alarm meets the RG requirements as detailed in Section 4.

NUREG-0800, "Standard Review Plan, Section 9.2.5 Ultimate Heat Sink," requirements were evaluated in the SER prepared for HNP (Reference 3). The staff concluded in the SER that:

1. The UHS meets GDC 2, 5, 44, 45, and 46 with respect to protection against natural phenomena, missiles, pipe break effects, shared system function, and heat dissipation capability, inservice inspection and functional testing
2. The UHS meets RGs 1.29, Position C.1; 1.27, Positions C.2 and C.3; and BTP ASB 9-2, with respect to seismic classification and the capability to remove sufficient decay heat to maintain plant safety
3. The UHS meets the applicable acceptance criteria of Standard Review Plan 9.2.5

The proposed change restores Main Reservoir level to that originally found acceptable in the approved SER by recovering margin developed as a result of ESW system improvements. This change does not invalidate the conclusions reached by the staff during initial licensing with respect to NUREG-0800.

5.3 Conclusion

Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, "Standards for Protection Against Radiation," or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9).

Therefore, pursuant to 10 CFR 51.22, Paragraph (b), an Environmental Impact Statement or Environmental Assessment is not required in connection with the proposed amendment.

7.0 REFERENCES

1. Harris Nuclear Plant Final Safety Analysis Report

2. Letter from W.R. Robinson (Carolina Power & Light Company) to the Nuclear Regulatory Commission (Serial: HNP-96-172), "Shearon Harris Nuclear Power Plant Request for License Amendment Ultimate Heat Sink Level and Temperature," dated October 31, 1996

3. NUREG-1038 Safety Evaluation Report Related to the Operation of Shearon Harris Nuclear Power Plant, Units 1 and 2, dated November 1983

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Enclosure 2
Response to the June 11, 2009, Request for Additional Information Regarding the License Amendment Request to Revise Ultimate Heat Sink Main Reservoir Minimum Level
(5 Pages)

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RAI 1: *The design basis of the Service Water System (SWS), as stated in FSAR Section 9.2.1.1 b, is to provide cooling water at a maximum temperature of 95 degrees Fahrenheit in order to remove essential plant heat loads by utilizing the Auxiliary Reservoir or its backup, the Main Reservoir, during emergency operation. This design basis function is performed by the ESW pumps and booster pumps. The licensee stated in Section 4.1 of the LAR that calculation SW-0080 summarizes the minimum required flow rates for each of the components served by Emergency Service Water (ESW). These flow rates are not stated in Section 4.1, nor was the explanation clear as to how the licensee will continue to meet the minimum flow rates at a Main Reservoir level of 206 feet.*

Section 4.1 of the LAR states that the results of calculations SW-0080 and HNP-M/MECH-1011 show that there is positive flow margin available with a 206 feet minimum level limit in the Main Reservoir. To explain the positive flow margin, the licensee presented data from EPT-250 (A) and EPT-251 (6), recorded in 2007, and flow balance results from 2005 and 2007. The NRC staff is unclear as to how the licensee obtained the data in these tables as well as how the data in these tables show that the minimum flow requirements of the SWS are met when the Main Reservoir level is lowered to 206 feet.

Request 1: *What are the minimum required flow rates to the components cooled by the ESW pumps and booster pumps to remove essential plant heat loads at a maximum service water temperature of 95°F? Please state these flow rates in the appropriate LAR section.*

Response 1: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 7.

Request 2: *Explain the EPT-250 (A) and EPT-251 (B) calculations more fully and describe what the associated data tables represent. How do the data in these tables prove that the minimum flow rates to components cooled by the ESW pumps and booster pumps will be met when the Main Reservoir level is 206 feet?*

Response 2: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 7.

Request 3: *Are the "recorded gpm [gallons per minute]" values actual measured flow data or are they calculated results?*

Response 3: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 7.

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Request 4: *How are the "limit gpm" values obtained, and what do the comparisons of "recorded gpm" and "limit gpm" mean?*

Response 4: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 7.

Request 5: *The "limit gpm" values are apparently calculated for a Main Reservoir level of 206 feet. Do the results of EPT-250 (A) remain valid in that it appears that the values were obtained when lined up to the Auxiliary Reservoir at a level of 251.3 feet? Please explain this apparent inconsistency.*

Response 5: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 7.

Request 6: *Please more fully explain the meaning of "Margin [Percent]?" Does the 1596 gpm value for AH-4 of EPT-251 (B) represent the actual flow through AH-4 with a Main Reservoir level of 217.3 feet as measured by an actual flow test? Does 1368 gpm represent what the flow would have been through AH-4 if the Main Reservoir had been at 206 feet as determined by flow model and calculation? If so, would not the real flow margin be 1368 gpm/1352 gpm = a 1.2 percent margin, instead of the 16.6 percent margin listed [assuming, from calculation SW-0080, that 1352 gpm is the minimum flow required to remove the essential heat load from AH-4 with a service water temperature of 95°F at a Main Reservoir Level of 206 feet]? Please explain the basis for the 16.6 percent flow margin calculation and provide any additional information that may help the staff understand how this margin was determined.*

Response 6: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 7.

Request 7: *Please correct or explain the information provided on Page 7 of the LAR: the year 2003 does not correspond to any of the data tables and is apparently a typographical error.*

Response 7: Typographical error corrected in the revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 8.

Request 8: *Please ensure that all calculations referenced in the LAR contain revision numbers.*

Response 8: Revision numbers added to calculations upon first use throughout the revised Enclosure 1, "HNP Evaluation of the Proposed Change."

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Request 9: *Section 4.1 of the LAR states that "SW-0080 also assumes that the failure of breaker MCC 1B35SB is the most limiting single failure affecting the 'A' train when, in fact, the loss of an entire ESW train is the most limiting in terms of the entire ESW system." Please explain the significance and relevance of this statement in regard to lowering the Main Reservoir level to 206 feet, as well as how this assumption adds conservatism to the flow limit results of calculation SW-0080.*

Response 9: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 8.

Request 10: *Explain the process by which the licensee will ensure that the minimum Main Reservoir level [proposed to be 206 feet] will continue to be satisfactory over time with respect to ESW flow rates and pressure in containment as the system degrades over time.*

Response 10: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 11.

RAI 2: *FSAR Section 9.2.1, "Service Water System," states that under accident conditions, the service water booster pumps, in conjunction with the containment fan cooler orifice bypass valves, will function to maintain the service water pressure inside the coolers above the containment design pressure to prevent leaks into the SWS.*

Section 4.2 of the LAR states that calculation HNP-M/MECH-1011 demonstrates that there is positive pressure margin available with a 206 feet minimum level in the Main Reservoir. Since the ESW Pumps and the ESW Booster Pumps both contribute to ESW pressure inside containment, the figures shown in the submittal provide the minimum allowable pump differential pressures for both pumps of each train on a single graph. The NRC staff is not clear as to how the licensee generated the figures in the LAR shown on pages 10 of 23 and 11 of 23, and how these figures demonstrate that the licensee will continue to meet the minimum service water pressure requirements inside the containment coolers.

Request 1: *Explain the shape of the graphs for the 'A' and 'B' ESW and Booster Pumps, and how the graphs prove that the required service water pressure will be available when the Main Reservoir level is at 206 feet.*

Response 1: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 10. Note that the figures on pages 10 of 23 and 11 of 23 referenced above in RAI 2 were based on the original submittal. These figures are now located on pages 12 of 24 and 13 of 24 of revised Enclosure 1.

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Request 2: *Explain why 95.1 pounds per square inch (psi) is the minimum A ESW Pump differential pressure. Per the staff's understanding of the graph, why would 90 psi not be sufficient?*

Response 2: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 10.

Request 3: *Explain why 50.7 psi is the minimum 'A' ESW Booster Pump differential pressure. Why would 49 psi not be sufficient, if the 'A' ESW Pump differential pressure were raised?*

Response 3: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 10.

Request 4: *Explain the Operations Surveillance Tests (OST) and how they are different / related to the EPT data from Section 4.1 of the LAR. In addition, provide a frequency on how often these tests are performed for each ESW pump and ESW booster pump.*

Response 4: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 11.

Request 5: *How are the values of the OST 1214 and OST 1215 test windows determined and what do the test windows mean (i.e., what establishes the upper limits and edges of the curves depicted? explain the surveillance requirement box and the curve derivations)?*

Response 5: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," pages 9 and 10.

Request 6: *Section 4.8, "OST Considerations," of the LAR states that the 'A' ESW Booster Pump should continue to remain above this new minimum limit. What will be the course of action if the 'A' ESW Booster Pump does not remain above the new limit?*

Response 6: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 16.

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-400/RENEWED LICENSE NO. NPF-63
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING THE LICENSE AMENDMENT REQUEST TO REVISE TECHNICAL SPECIFICATION 3.7.5a, ULTIMATE HEAT SINK MAIN RESERVOIR MINIMUM LEVEL

Request 7: *Section 4.2 of the LAR states that the results of calculation HNP-M/MECH-1011 show that ESW pressure, not flow, currently defines the available ESW system margin. Do the differential pressure limits shown in the figures on pages 10 of 23 and 11 of 23 in the LAR reflect limits based on ESW flow or ESW pressure or both? Please explain.*

Response 7: Reference revised Enclosure 1, "HNP Evaluation of the Proposed Change," page 9. Note that the figures on pages 10 of 23 and 11 of 23 referenced above in RAI 2 were based on the original submittal. These figures are now located on pages 12 of 24 and 13 of 24 of revised Enclosure 1.