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July 5, 2012

SOUTHERN COMPANY

Docket Nos.: 50-321
50-366

NL-12-1078

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Edwin I. Hatch Nuclear Plant
License Amendment Request to
Revise the Minimum Water Level in the Plant Service Water Pump Well

Ladies and Gentlemen:

On December 15, 2011, Southern Nuclear Operating Company (SNC) requested amendments to the Edwin I. Hatch Nuclear Plant (HNP) Units 1 and 2 Technical Specifications (TS). The proposed amendments would revise the minimum water level referenced in the Units 1 and 2 TS Surveillance Requirement (SR) associated with the Limiting Condition for Operation (LCO) for the plant service water (PSW) system and ultimate heat sink (UHS) (LCO 3.7.2). Specifically, TS SR 3.7.2.1 verifies that the UHS is OPERABLE by ensuring the water level in the PSW pump well of the intake structure is sufficient for the proper operation of the PSW, residual heat removal service water (RHRSW), and the standby service water pumps, as stated in the applicable safety analyses documented in the HNP Final Safety Analysis Report (FSAR).

By letter dated April 20, 2012, SNC withdrew the subject HNP TS change to facilitate addressing safety analysis inconsistencies, discovered in February 2012, related to the RHRSW pumps, because their resolution might impact certain parameters in the technical evaluation supporting the subject HNP TS change. Those inconsistencies have now been resolved with no impact on the conclusions of the technical evaluation supporting the subject HNP TS change and limited updating of the technical evaluation, including an updated river level history over time and updated minimum submergence values for the PSW pumps.

Therefore, pursuant to 10 CFR 50.90, SNC again requests a revision to the minimum water level referenced in TS SR 3.7.2.1. Also, as noted in the April 20, 2012 SNC letter, the response to the March 21, 2012 NRC request for additional information (RAI) regarding the distance from the HNP Unit 1 PSW and RHRSW pump bells to the bottom of the intake structure is included in this updated submittal. This submittal supersedes in its entirety the original December 15, 2011 submittal.

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The revised minimum water level in the proposed amendments is based on updated design basis analyses that revise the minimum river level necessary for the Altamaha River, the plant UHS, to support post-accident cooling requirements for a 30 day period. The revised minimum water level will provide additional operational flexibility during periods of low river levels. HNP is currently experiencing low river levels due to drought conditions. SNC has determined that the proposed amendments do not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c).

Enclosure 1 provides the basis for the proposed change to the HNP TS. Enclosure 2 provides HNP TS and Bases markup pages showing the proposed change. Enclosure 3 provides HNP TS and Bases clean typed pages showing the proposed change. Enclosure 4 provides the United States Geological Survey (USGS) review of HNP river flow rating verification. Enclosure 5 provides the previously referenced response to the NRC RAI.

SNC requests approval of the proposed license amendments by June 28, 2013. The proposed change would be implemented within 60 days of issuance of the amendments.

In accordance with 10 CFR 50.91, "Notice for Public Comment; State Consultation," a copy of this application, with enclosures, is being provided to the appropriate designated Georgia official.

This letter contains no NRC commitments. If you have any questions, please contact Jack Stringfellow at (205) 992-7037.

Mr. Ajluni states he is Nuclear Licensing Director of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and, to the best of his knowledge and belief, the facts set forth in this letter are true.

Sworn to and subscribed before me this 5th *day of* July, *2012.*

Notary Public

My commission expires: 11-2-13

Respectfully submitted,

M. J. Ajluni
Nuclear Licensing Director

MJA/CLT/lac

Enclosures:
1. Basis for Proposed Change
2. Technical Specifications and Bases Markup Pages
3. Technical Specifications Clean Typed Pages
4. United States Geological Survey (USGS) Review of Hatch River Flow Rating Verification
5. Response to Request for Additional Information Regarding Distance from PSW and RHRSW Pump Bells to Intake Structure Bottom

cc: Southern Nuclear Operating Company
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Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer
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RType: CHA02.004

U. S. Nuclear Regulatory Commission
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Mr. E. D. Morris, Senior Resident Inspector – Hatch

State of Georgia
Mr. J. H. Turner, Environmental Director Protection Division

Edwin I. Hatch Nuclear Plant
License Amendment Request to
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Enclosure 1

Basis for Proposed Change

Table of Contents

1.0 Summary Description

This evaluation supports a request to amend Appendix A of Operating Licenses DPR-57 and NPF-5 for Edwin I. Hatch Nuclear Plant (HNP) Unit 1 and Unit 2, respectively.

The proposed amendment would revise the minimum water level referenced in a Technical Specification (TS) Surveillance Requirement (SR) associated with the Limiting Condition for Operation (LCO) for the plant service water (PSW) system and ultimate heat sink (UHS) (LCO 3.7.2). The revised minimum water level in the proposed amendment is based on updated design basis analyses that revise the minimum river level necessary for the Altamaha River, the plant UHS, to support post-accident cooling requirements for a 30 day period. The revised minimum water level will provide additional operational flexibility during periods of low river levels. HNP is currently experiencing low river levels due to drought conditions.

SNC requests approval of the proposed license amendments by June 28, 2013. The proposed changes would be implemented within 60 days of issuance of the amendments.

2.0 Detailed Description

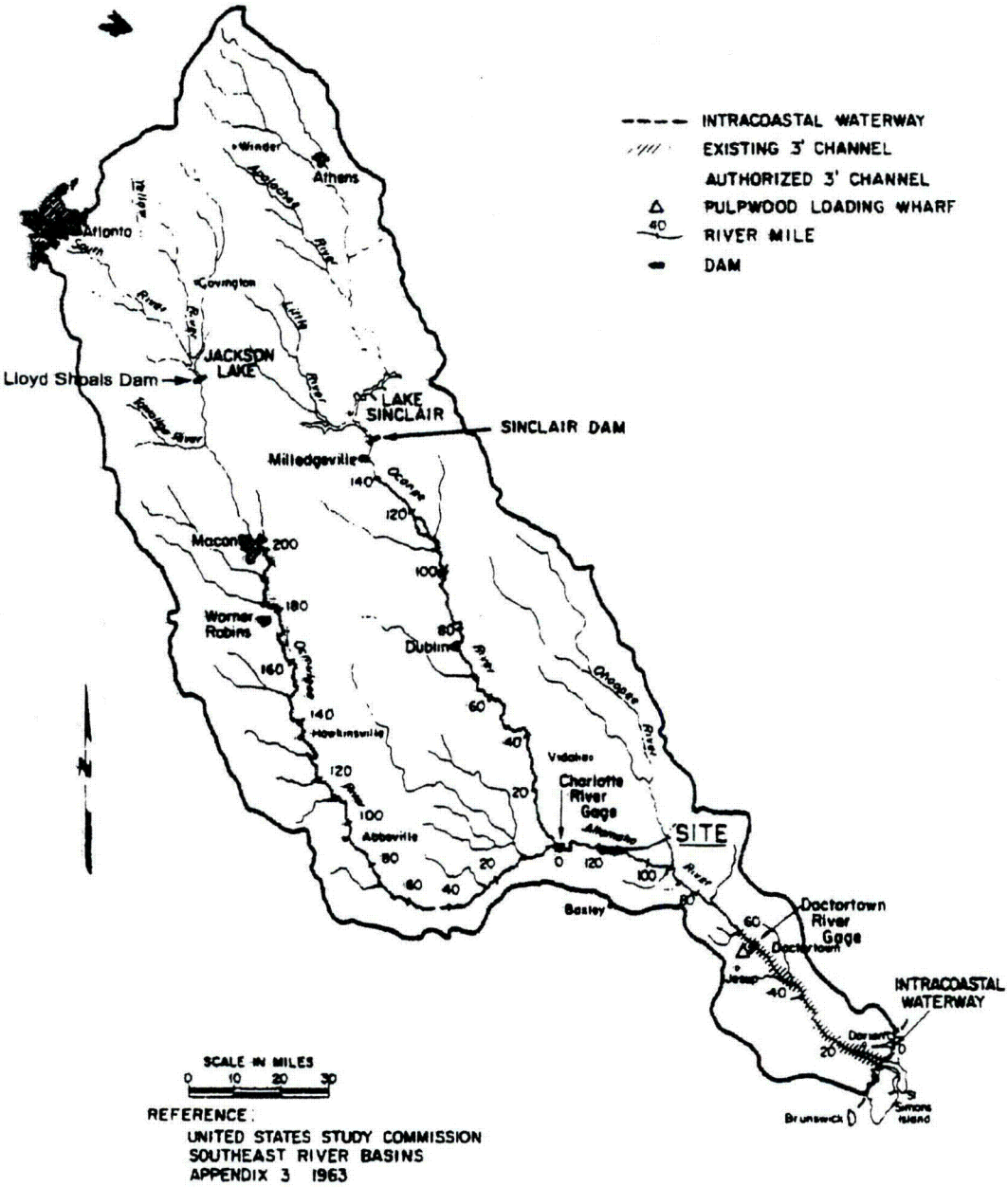
The proposed TS change revises the minimum water level in the PSW pump well, as required by SR 3.7.2.1, from 60.7 feet (ft) mean sea level (MSL) to 60.5 ft MSL. This change is based on updated design basis analyses that demonstrate that, at a new minimum level of 60.5 ft MSL, sufficient water inventory remains available from the Altamaha River for PSW, residual heat removal service water (RHRSW), and the standby service water pump to meet loss-of-coolant accident (LOCA) cooling requirements for 30 days post-accident with no additional makeup water source available.

This revised PSW pump well minimum water level for SR 3.7.2.1 is being proposed to avoid a potential unnecessary plant shutdown due to low river level thereby providing additional operational flexibility. HNP is currently experiencing low river levels due to drought conditions.

The Altamaha drainage basin is shown in Figure 1. The Altamaha River begins at the confluence of the Ocmulgee and Oconee Rivers. Three significant sources for the Altamaha River, upstream of the HNP intake structure, are the Lloyd Shoals dam on the Ocmulgee, the Sinclair dam on the Oconee, and the Altamaha drainage basin, which is 11,600 square miles in size according to United States Geological Service (USGS) records. There are no dams on the Altamaha River downstream of the HNP intake structure.

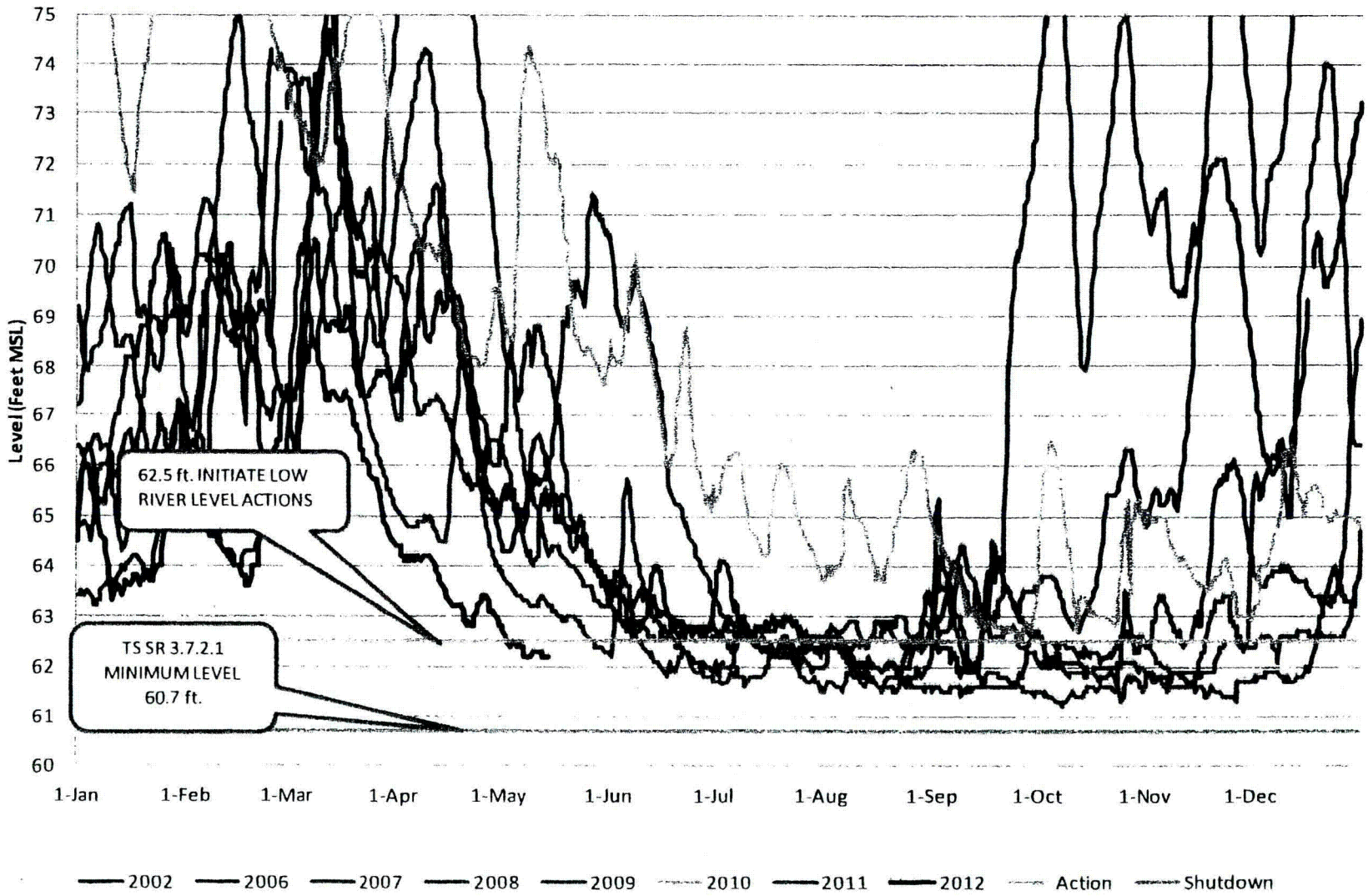
Figure 1

ALTAMAHA DRAINAGE BASIN



Due to the summer/early fall weather conditions in the Altamaha drainage basin, the Altamaha River at the HNP intake structure experiences low river levels approaching the referenced TS SR 3.7.2.1 minimum level of 60.7 ft MSL. HNP low river level procedural actions start at a river level of 62.5 ft MSL and include actions to assure compliance with TS SR 3.7.2.1. Figure 2 illustrates the frequency that the HNP low river level procedural actions have been initiated since 2002. Note that HNP is currently experiencing low river levels due to drought conditions.

Figure 2
Altamaha River at Hatch



3.0 Technical Evaluation

The HNP intake structure is shared by both HNP units and contains the PSW pumps, the RHRSW pumps, and the standby service water pump. Three of four PSW pumps per unit are typically required to supply equipment cooling requirements during normal operation. One PSW pump per unit is required for HNP plant shutdown and post-accident cooling. Four 50% capacity RHRSW pumps per unit provide cooling water for the RHR heat exchangers during normal shutdown and post-accident conditions. Finally, there is a separate standby service water pump which provides cooling water for diesel generator 1B (shared between Units 1 and 2). The Altamaha River, the plant UHS, is the sole source of water for the PSW, RHRSW and standby service water pumps.

TS SR 3.7.2.1 verifies that the UHS is OPERABLE by ensuring the water level in the PSW pump well of the intake structure is sufficient for the proper operation of the PSW, RHRSW and standby service water pumps. Per SNC procedure, the water level in the PSW pump well of the intake structure is monitored by operations personnel in compliance with the monitoring frequency specified for TS SR 3.7.2.1. The components used to monitor water level in the PSW pump well are redundant river level indicators in the main control room and the intake structure, and the pump well level stick. As mentioned earlier, HNP low river level procedural actions start at a river level of 62.5 ft MSL.

In the following sections, the three technical areas potentially impacted by the proposed TS change were evaluated to demonstrate that normal operation and post-LOCA cooling requirements could be met with a PSW pump well minimum water level of 60.5 ft MSL. First, the PSW pump well minimum water level must satisfy net positive suction head (NPSH) and minimum submergence requirements for the PSW, RHRSW and standby service water pumps in the intake structure. Second, the Altamaha river flow related to the proposed PSW pump well minimum water level of 60.5 ft MSL must supply sufficient water over a 30 day period post-LOCA to support cooling requirements. Third, the proposed PSW pump well minimum water level of 60.5 ft MSL must support compliance with HNP Environmental Protection Plan section 3.1 requirements and 10 CFR 50 Appendix I operational radiological dose requirements.

Finally, for reference purposes, it is noted that the current HNP Units 1 and 2 PSW pump well minimum water level of 60.7 ft MSL was approved by the NRC in 1988 (Reference 1). As documented in Reference 1, the PSW pump well minimum water level should be established based on the safe shutdown and post-LOCA cooling requirements which consist, per unit, of one PSW pump and two RHRSW pumps. Additionally, there is the separate standby service water pump which provides cooling water for diesel generator 1B (shared between Units 1 and 2).

3.1 NPSH and Minimum Submergence

The proposed PSW pump well minimum water level of 60.5 ft MSL continues to meet the NPSH and minimum submergence requirements, associated with their safe shutdown and post-LOCA cooling functions, for the affected PSW, RHRSW and standby service water pumps, with the minimum submergence requirements being limiting for each of the affected pumps. It is noted that, by meeting the minimum submergence requirement, pump vortexing is prevented. The river levels necessary

to meet the minimum submergence requirements of each pump are provided in Table 1. The limiting requirement is the minimum submergence of 60.0 ft MSL for the standby service water pump.

Table 1

Pump	PSW Pump Well Minimum Water Level for Minimum Submergence (ft MSL)
Unit 1 PSW pumps	59.1
Unit 2 PSW pumps	59.3
Standby Service Water pump	60.0
Units 1 and 2 RHRSW pumps	59.8

3.2 Thirty Day Post-LOCA Water Supply

River Flow

River flow, also referred to as river discharge, is measured in cubic feet per second (cfs). A discharge rating table shows the river discharge in cfs at specific river levels or elevations. The river discharge rating table at the HNP intake structure is developed by making appropriate adjustments to the discharge data from the nearest USGS gage, specifically gage 02-2250-00, on the Altamaha River near Baxley, Georgia. The Baxley gage is located on the south bank of the river upstream from the HNP intake structure on the same side.

The discharge data at the Baxley gage are developed and periodically updated by the USGS as follows. At the Baxley gage, the USGS performs bathymetric surveys of the river cross-section and measures a river-stage relationship on regular intervals to calculate area. Additionally, velocities are measured at selected locations. The river flow or discharge data at specific elevations at the Baxley gage are developed using the following equation: $Q = VA$ where Q = discharge in cfs, V = velocity in feet per second, and A = area in square feet. Periodically as needed, the USGS revises the discharge rating table at the Baxley gage when adequate additional data are collected, and the data show the river bottom has stabilized. The current USGS rating table is No. 13.1.

For development of an HNP intake structure discharge rating table, the Baxley gage discharge data retrieved on August 22, 2011 provides the most representative data for predicting decreased streamflow during extended dry conditions. The river discharge rating table at the HNP intake structure is updated on at least an annual basis per SNC procedure. When updating the HNP intake structure discharge rating table, the Baxley gage discharge data is adjusted to:

- Reflect an estimated static drop of 0.24 ft from the USGS gage to inside the intake structure, specifically a drop of 0.14 ft from the USGS gage to the intake structure and an additional 0.1 ft drop through the traveling water screens
- Reflect the reference elevation at the Baxley gage of 61.08 feet. The reference elevation is used because a datum elevation is not provided for the current Baxley gage by USGS.

Table 2 is the discharge rating table for the PSW pump well inside the HNP intake.

Table 2
USGS Rating Table No. 13.1 (data retrieved August 22, 2011) at Baxley Gage (USGS No. 02-2250-00) and Corresponding Rating Table at the HNP Intake

Gage Height (ft)	Water Elevation at Baxley Gage (ft MSL)	Water Elevation in the PSW Pump Well inside HNP Intake (ft MSL)	River Discharge (cfs)
-4.00	57.08	56.84	0
-3.50	57.58	57.34	8
-3.00	58.08	57.84	39
-2.50	58.58	58.34	96
-2.00	59.08	58.84	183
-1.50	59.58	59.34	303
-1.33	59.75	59.51	351
-1.00	60.08	59.84	457
-0.50	60.58	60.34	646
0.00	61.08	60.84	870
0.50	61.58	61.34	1080
1.00	62.08	61.84	1350
1.50	62.58	62.34	1680
2.00	63.08	62.84	2050
2.50	63.58	63.34	2460
3.00	64.08	63.84	2910
3.50	64.58	64.34	3400
4.00	65.08	64.84	3940
5.00	66.08	65.84	5130
6.00	67.08	66.84	6500
8.00	69.08	68.84	9930
10.00	71.08	70.84	14200
12.00	73.08	72.84	19400
14.00	75.08	74.84	26500
16.00	77.08	76.84	38000
18.00	79.08	78.84	54700
20.00	81.08	80.84	76000

As documented in Reference 1, the PSW pump well minimum water level should be established based on the safe shutdown and post-LOCA cooling requirements which consist, per unit, of one PSW pump and two RHRSW pumps. Additionally, there is the separate standby service water pump which provides cooling water for diesel generator 1B (shared between Units 1 and 2). Based on consideration of river flow and the limiting minimum submergence of 60.0 ft MSL (based on minimum submergence of 60.0 ft MSL for the standby service water pump), safe shutdown cooling requirements can be met at a PSW pump well water level of 60.0 ft MSL. The proposed PSW pump well minimum water level of 60.5 ft MSL provides margin to assure that the UHS would remain available for 30 days post-LOCA. As interpolated from Table 2, the river flows would be 718 cfs at 60.5 ft MSL and 517 cfs

at 60.0 ft MSL, with both flows sufficient to support safe shutdown cooling requirements.

The river flows from the HNP intake structure discharge rating table, Table 2, are used as input to demonstrate that the proposed PSW pump well minimum water level of 60.5 ft MSL provides margin to assure that the UHS would remain available for 30 days post-LOCA. That process is described in the next section.

Thirty Day Supply

A recession formula (Reference 2), also referred to as a normal groundwater-depletion curve, has been used to determine the number of days it will take for the PSW pump well water level to decrease from the proposed TS SR 3.7.2.1 minimum level of 60.5 ft MSL to the minimum water level at which post-LOCA cooling requirements can be met which is 60.0 ft MSL. Demonstration that the UHS would remain available post-LOCA is accomplished by showing that PSW pump well water level remains above 60.0 ft MSL for at least 30 days.

SNC requested review of this recession formula by the USGS. The USGS letter documenting their review is provided in Enclosure 4 of this submittal. USGS concluded the following: "The stated objective of this analysis is to 'verify sufficient water supply at river intake for low flows'. The normal groundwater-depletion curve method that you have used predicts the decreased streamflow during extended dry conditions. Our review indicates that your methods are conservative and satisfactory for your stated objective."

The time (in days), based on the recession formula, for the PSW pump well level to reach 60.0 ft MSL when starting from the TS SR 3.7.2.1 minimum level is updated at least annually, per SNC procedure, like the river discharge rating table at the HNP intake structure.

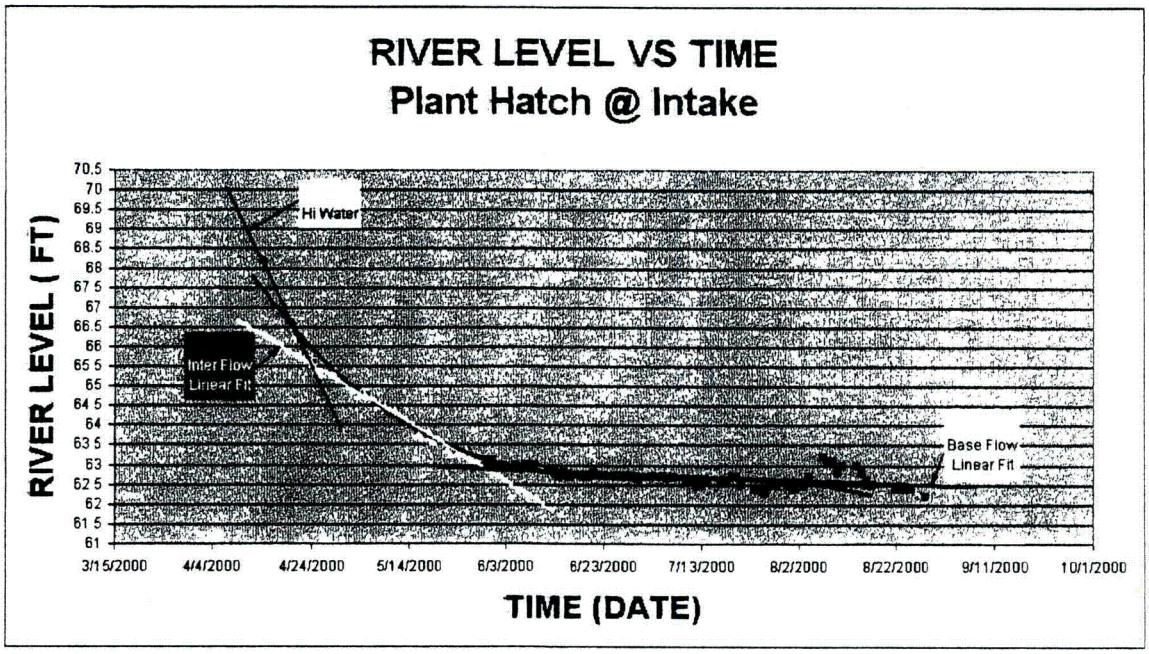
Specifically, a recession formula models the part of a flood hydrograph which covers the decreasing river flow after a river crests due to a rainfall event. The flow, referred to as baseflow, accounts for the constant flow of water in rivers during times of low or no rainfall. Baseflow makes up the river's base line on a hydrograph. The baseflow of a stream or river is the amount of groundwater discharged from an aquifer to the watercourse. This discharge occurs year-round, and fluctuates seasonally depending on the level of the water in the aquifer. Baseflow is supplemented by direct runoff during and immediately after precipitation, resulting in peaks on a hydrograph showing stream flow through time.

The slope of the hydrograph flattens over time from its initial steepness reflecting the direct runoff during and immediately after precipitation and baseflow becomes dominant. Segments are selected from the hydrograph and can be individually or collectively analyzed to gain an understanding of the discharge processes that make up baseflow. For HNP a recession formula has been used to model the applicable hydrograph segments.

The recession formula (References 2 and 3) is expressed as $Q_t = Q_0 e^{-\alpha t}$, where Q_t is the stream flow at time t, Q_0 is the initial stream flow. The term $e^{-\alpha}$ in this equation

is replaced by 'k', called the recession constant or depletion factor, which is commonly used as an indicator of the extent of baseflow. The typical ranges of recession constants for streamflow components are 0.2 – 0.8 for runoff (hi water), 0.7 - 0.94 for interflow and 0.93 - 0.995 for groundwater flow (baseflow) and they do overlap. High recession constants (e.g., > 0.9) tend to indicate dominance of baseflow in streamflow (Reference 3). The 'k' value used typically at HNP is 0.995; the range for the 'k' value being from 0.995 to 0.997. Figure 3 is an example of a hydrograph prepared for HNP.

Figure 3



With the applicable HNP recession constant or 'k' value determined, flow values from the HNP intake structure discharge rating table and the recession formula are used to project the time (in days) for the PSW pump well level to reach 60.0 ft MSL when starting from the proposed TS SR 3.7.2.1 minimum level of 60.5 ft MSL. This projection demonstrates that it would take at least 30 days for this drop in pump well level to occur. Specifically, based on Table 2, the duration for the water level to drop from the proposed TS SR 3.7.2.1 minimum level of 60.5 ft MSL to 60.0 ft MSL would be 66 days. Application of the recession formula demonstrates that there will continue to be significant margin to assure that the UHS would remain available for 30 days post-LOCA.

This recession formula has been used for this HNP application for a number of years and has proven very effective at conservatively predicting the behavior of the Altamaha River at these lower levels that have occurred in recent years. Uncertainties exist in low river level conditions, such as the possibility of smaller upstream tributary flow reduction, or additional farm, industrial, or municipal uptake. However, even with consideration of the variations in upstream usage that occur on a regular basis throughout the year, dramatic changes over a short period of time (e.g., 30 days) have not been seen historically.

Finally, at least three other factors provide reasonable assurance that the river levels are predictable. First, the drainage basin for the Altamaha River (Figure 1) is 11,600 sq. miles in size. Its large size increases the probability of the availability of water. Second, two dams supply the Altamaha River as previously described, the Lloyd Shoals dam on the Ocmulgee and the Sinclair dam on the Oconee. Georgia Power Company (GPC) has a FERC drought contingency plan that states GPC will release a minimum of 250 cfs from Sinclair, even when inflows are less. Sinclair has been at ~ 250 cfs for much of the summer/fall for the last few years. At Lloyd Shoals the minimum release is 400 cfs, or inflow, whichever is less. However, Lloyd Shoals recently has maintained 250 cfs, even when inflows were less. Therefore, the combined minimum discharge from Sinclair and Lloyd Shoals dams is around 500 cfs. Third, the HNP site is underlain by a shallow unconfined aquifer and a deeper lying, minor confined aquifer. The unconfined aquifer lies above elevation 100 to 120 ft MSL in the area of HNP, with the unconfined water table generally reflecting the site topography. The minor confined aquifer consists of silty sands of the Hawthorn Formation between approximate elevations 65 and 0 ft MSL. Piezometric levels generally are below elevation 80 ft MSL, and the potentiometric surface slopes northeastward toward the Altamaha River. The Altamaha is hydraulically connected to the two aquifers.

3.3 Environmental Evaluation

The proposed PSW pump well minimum water level of 60.5 ft MSL must support compliance with HNP Environmental Protection Plan (EPP), Appendix B to Facility Operating Licenses DPR-57 and NPF-5, section 3.1 requirements (Reference 4). EPP section 3.1 states that:

> "...the licensee may make changes in plant design or operation, or perform tests or experiments affecting the environment provided such activities do not involve an unreviewed environmental question and do not involve a change to the EPP."

EPP section 3.1 requires that an environmental evaluation be prepared and recorded prior to engaging in any activity which may significantly affect the environment. EPP section 3.1 further states that:

> "A proposed change, test, or experiment shall be deemed to constitute an unreviewed environmental question if it concerns: (1) a matter which may result in a significant increase in any adverse environmental impact previously evaluated in the FES, environmental impact appraisals, or in any decisions of the Atomic Safety and Licensing Board; or (2) a significant change in effluents or power level; or (3) a matter, not previously reviewed and evaluated in the documents specified in (1) of this Subsection, which may have a significant adverse environmental impact."

SNC has performed an environmental evaluation, in accordance with the above requirements, assessing the environmental impact of the proposed PSW pump well minimum water level of 60.5 ft MSL. This evaluation, described below, documents

that HNP normal operation with the proposed PSW pump well minimum water level of 60.5 ft MSL will not result in a significant adverse environmental impact.

Evaluation

The HNP Final Environmental Statement (FES) (Reference 5) evaluates the nonradiological impact of normal operation of the two units at HNP. In accordance with EPP requirements, the parameters evaluated in the Environmental Report – Operating License Stage (Reference 6) and the subsequent FES were re-evaluated to determine if the proposed TS change represented by potential HNP normal operation at river levels below 60.7 ft MSL is acceptable.

Currently, radiological and non-radiological environmental evaluations have been performed for normal plant operation down to a minimum river level of 60.7 ft MSL. This proposed TS change, revising the minimum water level in the PSW pump well, as required by SR 3.7.2.1, from 60.7 ft MSL to 60.5 ft MSL, could result in HNP normal operation at a river level that is 2.4 inches lower than previously evaluated. HNP normal operation at this lower level of 60.5 ft MSL will result in the following changes:

- Altered discharge plume mixing zone,
- Altered discharge dilution for liquid radwaste discharges, and
- Slightly increased through-screen velocity at the river intake traveling screens and slightly increased percentage of the river diverted through the plant.

SNC performed a detailed river bottom survey and modeling study of the HNP discharge in order to ascertain potential changes in environmental impacts if HNP were to continue plant operations at a river level down to 60.5 ft MSL. This modeling incorporated ambient conditions from both summer and winter seasons, and utilized historical river and plant discharge information. The following results were obtained from this modeling:

- State and Federal limitations regarding water quality criteria and thermal impacts to the Altamaha River continue to be satisfied.
- The postulated lower river level does not impact radiological liquid effluent dose calculations. The radiological liquid effluent dose calculation methodology does not need to be revised. The radioactive effluent controls program will continue to conform to 10 CFR 50.36a for the control of radioactive effluents and for maintaining the doses to members of the public from radioactive effluents as low as reasonably achievable.

The calculated intake through-screen velocity at the 60.5 ft MSL river elevation is 0.12 feet per second (fps) higher than the calculated velocity at the 60.7 ft MSL river elevation. No serious change in fish impingement rates is anticipated from this fractional change in through-screen velocity. Entrainment impacts are typically proportional to the total volume of the river that is diverted through the plant. The FES concluded that no significant entrainment would result at minimum flow conditions that equated to approximately 11% of the river flow passing through the plant. Proposed operation at the 60.5 ft MSL river elevation would result in approximately 11.5% of the river being diverted through the plant. Therefore, no

significant change in entrainment rates is anticipated from this fractional change. SNC did not observe any evidence of a significant change in impingement or entrainment during the drought period experienced in the Altamaha drainage basin during 2007 and 2008.

Finally, it was not necessary to perform concentration modeling for other non-radiological environmental parameters as part of this evaluation. The National Pollutant Discharge Elimination System (NPDES) permit for HNP restricts the concentrations of various parameters at the point of discharge (i.e., prior to mixing with the river). Therefore, these items are not impacted by the postulated change in river level and associated changes in river flow/dilution.

Conclusions

Based on the above information, the normal plant operating parameters impacted by the proposed TS change, revising the minimum water level in the PSW pump well, as required by SR 3.7.2.1, from 60.7 ft MSL to 60.5 ft MSL, do not result in significant adverse environmental impact. The FES and Supplemental Environmental Impact Statement (Reference 7) both concluded that no significant environmental impact would result from the operation of HNP. This conclusion remains valid for operation with this proposed TS change.

3.4 10 CFR 50 Appendix I Evaluation

The HNP 10 CFR 50 Appendix I evaluation was reviewed for any potential impact by the proposed TS change, revising the minimum water level in the PSW pump well, as required by SR 3.7.2.1, from 60.7 ft MSL to 60.5 ft MSL. The river flows that will exist at 60.5 ft MSL significantly bound the Altamaha River flows assumed in the Appendix I evaluation. Therefore, this proposed TS change has no impact on the existing Appendix I evaluation.

4.0 Regulatory Evaluation

4.1 Significant Hazards Consideration

The proposed TS change revises the minimum water level in the plant service water pump well, as required by SR 3.7.2.1, from 60.7 ft MSL to 60.5 ft MSL. This change is based on updated design basis analyses that demonstrate that at the new minimum level of 60.5 ft MSL sufficient water inventory remains available from the Altamaha River for PSW and RHRSW to handle LOCA cooling requirements for 30 days post-accident with no additional makeup water source available.

SNC has evaluated whether or not a significant hazards consideration is involved with the proposed amendments by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

   Response: No.

The proposed TS change revises the minimum water level in the PSW pump well, as required by SR 3.7.2.1, from 60.7 ft MSL to 60.5 ft MSL.
TS SR 3.7.2.1 verifies that the UHS is OPERABLE by ensuring the water level in the PSW pump well of the intake structure is sufficient for the PSW, RHRSW and standby service water pumps to supply post-LOCA cooling requirements for 30 days. The safety function of the UHS is to mitigate the impact of an accident. The proposed TS change does not result in or require any physical changes to HNP systems, structures, and components, including those intended for the prevention of accidents. The potential impact of the lower PSW pump well minimum water level on pump operation requirements, supply of water for 30 days post-LOCA, and potential environmental impact have been evaluated and found to be acceptable.

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 TS change revises the minimum water level in the PSW pump well, as required by SR 3.7.2.1, from 60.7 ft MSL to 60.5 ft MSL.
   TS SR 3.7.2.1 verifies that the UHS is OPERABLE by ensuring the water level in the PSW pump well of the intake structure is sufficient for the PSW, RHRSW and standby service water pumps to supply post-LOCA cooling requirements for 30 days. The proposed TS change does not result in or require any physical changes to HNP systems, structures, and components. The potential impact of the lower PSW pump well minimum water level on pump operation requirements, supply of water for 30 days post-LOCA, and potential environmental impact have been evaluated and found to be acceptable.

   Therefore, the proposed change does 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 a margin of safety?

   Response: No.

   The proposed TS change revises the minimum water level in the PSW pump well, as required by SR 3.7.2.1, from 60.7 ft MSL to 60.5 ft MSL.
   TS SR 3.7.2.1 verifies that the UHS is OPERABLE by ensuring the water level in the PSW pump well of the intake structure is sufficient for the PSW, RHRSW and standby service water pumps to supply post-LOCA cooling requirements for 30 days. The proposed TS change does not result in or require any physical changes to HNP systems, structures, and components. The potential impact of the lower PSW pump well minimum water level on pump operation requirements, supply of water for 30 days post-LOCA, and

potential environmental impact have been evaluated and found to be acceptable.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, SNC concludes that the proposed amendments do not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.2 Applicable Regulatory Requirements/Criteria

10 CFR 50 Appendix A General Design Criterion (GDC) 44, titled "Cooling Water," requires (Reference 8): "A system to transfer heat from structures, systems, and components important to safety, to an ultimate heat sink shall be provided." HNP Unit 2 conforms with Regulatory Guide (RG) 1.27, revision 1 dated March 1974, titled "Ultimate Heat Sink for Nuclear Power Plants" (Reference 9). The proposed TS change revising the minimum water level in the PSW pump well, as required by SR 3.7.2.1, from 60.7 ft MSL to 60.5 ft MSL, maintains conformance with the applicable RG 1.27 regulatory position C-1.

Specifically, RG 1.27 regulatory position C-1 states: "The ultimate heat sink should be capable of providing sufficient cooling for at least 30 days (a) to permit simultaneous safe shutdown and cooldown of all nuclear reactor units that it serves and to maintain them in a safe shutdown condition and (b) in the event of an accident in one unit, to limit the effects of that accident safely, to permit simultaneous and safe shutdown of the remaining units, and to maintain them in a safe shutdown condition." The potential impact of the lower PSW pump well minimum water level on pump operation requirements, supply of water for 30 days post-LOCA, and potential environmental impact have been evaluated consistent with the HNP licensing basis and found to be acceptable.

4.3 Precedent

A review has been performed to identify any applicable industry precedents with regards to modifying minimum river levels related to the credited UHS. Three precedents have been identified potentially dealing with river level.

A December 2007 Duane Arnold submittal, approved by the NRC in December 2008, added a TS SR for river depth. However, the scope of the Duane Arnold submittal is different. The new TS SR for river depth was added to supplement an existing minimum river level TS SR and monitors potential changes in river bed conditions.

A July 2006 Sequoyah submittal with associated supplemental submittals, approved by the NRC in September 2007, raised the minimum required river water level and increased the maximum allowed UHS temperature. However, again the scope of the Sequoyah submittal is different. Specifically, differences in the UHS water source and inclusion of a change in UHS temperature impact the scope.

HNP previously received NRC approval on May 12, 1988 to modify minimum river level for a different reason. The technical basis for the minimum river level was

changed from the water necessary to support full-power operation to the water necessary to support safe-shutdown cooling for HNP (Reference 1).

4.4 Conclusions

In 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.

5.0 Environmental Consideration

The proposed TS change revises the minimum water level in the PSW pump well, as required by SR 3.7.2.1, from 60.7 ft MSL to 60.5 ft MSL. As documented in sections 3.0, 3.1, 3.2, 3.3, 3.4, and 4.1 of this submittal, the required evaluations have been performed of the proposed TS change. HNP normal operation at this lower level of 60.5 ft MSL will result in an altered discharge plume mixing zone, altered discharge dilution for liquid radwaste discharges, slightly increased through-screen velocity at the river intake traveling screens, and slightly increased percentage of the river diverted through the plant. The evaluations demonstrated these normal plant operating parameter changes do not result in significant adverse environmental impact.

The proposed amendments do not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendments meet the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 References

1. NRC letter to R. P. McDonald, "Issuance of Amendment Nos. 154 and 92 to Facility Operating Licenses DPR-57 – and NPF-5 – Edwin I. Hatch Nuclear Plant, Units 1 and 2 (TACS 62127/62128)," May 12, 1988.

2. "Handbook of Applied Hydraulics" C. V. Davis and K. E. Sorensen

3. R. J. Nathan and T. A. Mc Mahan, 1990, "Evaluation of Automated Techniques for Baseflow and Recession Analysis," Water Resources Research 26(7): 1465-1473.

4. Edwin I. Hatch Nuclear Plant Environment Protection Plan (EPP), Appendix B to Facility Operating Licenses DPR-57 and NPF-5.

5. Edwin I. Hatch Nuclear Plant Final Environmental Statement (NUREG-0417).

6. Edwin I. Hatch Nuclear Plant Environmental Report – Operating License Stage.

7. Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Supplement 4 Regarding the Edwin I. Hatch Nuclear Plant, Units 1 and 2 (NUREG-1437, Supplement 4).

8. 10 CFR 50 Appendix A, General Design Criterion 44 "Cooling Water."

9. NRC Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Power Plants," Revision 1, March 1974.

Edwin I. Hatch Nuclear Plant
License Amendment Request to
Revise the Minimum Water Level in the Plant Service Water Pump Well

Enclosure 2

Technical Specifications and Bases Markup Pages

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Verify the water level in each PSW pump well of the intake structure is ≥ 60.7 ft mean sea level (MSL). 5	In accordance with the Surveillance Frequency Control Program AND 12 hours when water level is ≤ 61.7 ft MSL
SR 3.7.2.2	----------NOTE---------- Isolation of flow to individual components or systems does not render PSW System inoperable. ---------- Verify each PSW subsystem manual, power operated, and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.2.3	Verify each PSW subsystem actuates on an actual or simulated initiation signal.	In accordance with the Surveillance Frequency Control Program

B 3.7 PLANT SYSTEMS

B 3.7.2 Plant Service Water (PSW) System and Ultimate Heat Sink (UHS)

BASES

BACKGROUND

The PSW System is designed to provide cooling water for the removal of heat from equipment, such as the diesel generators (DGs), residual heat removal (RHR) pump coolers, and room coolers for Emergency Core Cooling System equipment, required for a safe reactor shutdown following a Design Basis Accident (DBA) or transient. The PSW System also provides cooling to unit components, as required, during normal operation. Upon receipt of a loss of offsite power or loss of coolant accident (LOCA) signal, nonessential loads are automatically isolated, the essential loads are automatically divided between PSW Divisions 1 and 2, and one PSW pump is automatically started in each division.

The PSW System consists of the UHS and two independent and redundant subsystems. Each of the two PSW subsystems is made up of a header, two 8500 gpm pumps, a suction source, valves, piping and associated instrumentation. Either of the two subsystems is capable of providing the required cooling capacity to support the required systems with one pump operating. The two subsystems are separated from each other so failure of one subsystem will not affect the OPERABILITY of the other system.

Cooling water is pumped from the UHS (i.e., the Altamaha River) by the PSW pumps to the essential components through the two main headers. After removing heat from the components, the water is discharged to the circulating water flume to replace evaporation losses from the circulating water system, or directly to the river via a bypass valve.

APPLICABLE SAFETY ANALYSES

Sufficient water inventory is available from the Altamaha River when the river level is at 60.~~7~~ 5 ft MSL for all PSW System post-LOCA cooling requirements for a 30 day period with no additional makeup water source available. The ability of the PSW System to support long term cooling of the reactor containment is assumed in evaluations of the equipment required for safe reactor shutdown presented in the FSAR, Section 10.7 (Ref. 1). These analyses include the evaluation of the long term primary containment response after a design basis LOCA.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The ability of the PSW System to provide adequate cooling to the identified safety equipment is an implicit assumption for the safety analyses evaluated in References 2 and 3. The ability to provide onsite emergency AC power is dependent on the ability of the PSW System to cool the DGs. The long term cooling capability of the RHR, core spray, and RHR service water pumps is also dependent on the cooling provided by the PSW System. In the analysis presented in Reference 1, only one PSW pump is required for safe shutdown, including RHR Shutdown Cooling System requirements.

The PSW System, together with the UHS, satisfy Criterion 3 of the NRC Policy Statement (Ref. 4).

LCO

The PSW subsystems are independent of each other to the degree that each has separate controls, power supplies, and the operation of one does not depend on the other. In the event of a DBA, one PSW pump is required to provide the minimum heat removal capability assumed in the safety analysis for the system to which it supplies cooling water. To ensure this requirement is met, two subsystems, each with two pumps, of PSW must be OPERABLE. At least one pump will operate, if the worst single active failure occurs coincident with the loss of offsite power.

A subsystem is considered OPERABLE when it has an OPERABLE UHS, two OPERABLE pumps, and an OPERABLE flow path capable of taking suction from the intake structure and transferring the water to the appropriate equipment.

The OPERABILITY of the UHS is based on having a minimum water level in the pump well of the intake structure of 60.[illegible] ft MSL. This value is well above that required to operate one PSW pump at a reduced (post-accident) flow rate.

The isolation of the PSW System to components or systems may render those components or systems inoperable, but does not affect the OPERABILITY of the PSW System.

APPLICABILITY

In MODES 1, 2, and 3, the PSW System and UHS are required to be OPERABLE to support OPERABILITY of the equipment serviced by the PSW System. Therefore, the PSW System and UHS are required to be OPERABLE in these MODES.

(continued)

BASES

ACTIONS

E.1 (continued)

heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE PSW subsystem could result in loss of PSW function.

The 72 hour Completion Time is based on the redundant PSW System capabilities afforded by the OPERABLE subsystem, the low probability of an accident occurring during this time period, and is consistent with the allowed Completion Time for restoring an inoperable DG.

Required Action E.1 is modified by two Notes indicating that the applicable Conditions of LCO 3.8.1, "AC Sources - Operating," LCO 3.4.7, "Residual Heat Removal (RHR) Shutdown Cooling System - Hot Shutdown," be entered and Required Actions taken if the inoperable PSW subsystem results in an inoperable DG or RHR shutdown cooling subsystem, respectively. This is in accordance with LCO 3.0.6 and ensures the proper actions are taken for these components.

F.1 and F.2

If any Required Action and associated Completion Time of Condition A, B, C, D, or E cannot be met, or both PSW subsystems are inoperable for reasons other than Conditions C and D, or the UHS is determined inoperable, 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 12 hours and in MODE 4 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 3.7.2.1

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This SR verifies the UHS is OPERABLE by ensuring the water level in the pump well of the intake structure to be sufficient for the proper operation of the PSW pumps (net positive suction head and pump vortexing are considered in determining this limit). In addition, if a temporary weir is in place, the river level must also correspond to a level in the pump well of the intake structure of ≥ 60.7 ft MSL with no weir in place. If the water level is > 61.7 ft MSL, there is sufficient

(continued)

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.2.1 (continued)

margin to the minimum level requirement (60.7 ft MSL), so the Surveillance is only required to be performed in accordance with the Surveillance Frequency Control Program. However, if the level is ≤ 61.7 ft, the Surveillance must be performed more frequently (every 12 hours), since the conditions are closer to the minimum level limit.

SR 3.7.2.2

Verifying the correct alignment for each manual, power operated, and automatic valve in each PSW subsystem flow path provides assurance that the proper flow paths will exist for PSW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve is also allowed to be in the nonaccident position, and yet considered in the correct position, provided it can be automatically realigned to its accident position within the required time. 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.

This SR is modified by a Note indicating that isolation of the PSW System to components or systems may render those components or systems inoperable, but does not affect the OPERABILITY of the PSW System. As such, when all PSW pumps, valves, and piping are OPERABLE, but a branch connection off the main header is isolated, the PSW System is still OPERABLE.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.7.2.3

This SR verifies that the automatic isolation valves of the PSW System will automatically switch to the safety or emergency position to provide cooling water exclusively to the safety related equipment during an accident event. This is demonstrated by the use of an actual or simulated initiation signal. This SR also verifies the automatic start capability (on a LOCA or LOSP signal) of one of the two PSW pumps in each subsystem.

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SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Verify the water level in each PSW pump well of the intake structure is ≥ 60.7 ft mean sea level (MSL). 5	In accordance with the Surveillance Frequency Control Program AND 12 hours when water level is ≤ 61.7 ft MSL
SR 3.7.2.2	----------NOTE---------- Isolation of flow to individual components or systems does not render PSW System inoperable. ---------- Verify each PSW subsystem manual, power operated, and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.2.3	Verify each PSW subsystem actuates on an actual or simulated initiation signal.	In accordance with the Surveillance Frequency Control Program

B 3.7 PLANT SYSTEMS

B 3.7.2 Plant Service Water (PSW) System and Ultimate Heat Sink (UHS)

BASES

BACKGROUND

The PSW System is designed to provide cooling water for the removal of heat from equipment, such as the diesel generators (DGs), residual heat removal (RHR) pump coolers, and room coolers for Emergency Core Cooling System equipment, required for a safe reactor shutdown following a Design Basis Accident (DBA) or transient. The PSW System also provides cooling to unit components, as required, during normal operation. Upon receipt of a loss of offsite power or loss of coolant accident (LOCA) signal, nonessential loads are automatically isolated, the essential loads are automatically divided between PSW Divisions 1 and 2, and one PSW pump is automatically started in each division.

The PSW System consists of the UHS and two independent and redundant subsystems. Each of the two PSW subsystems is made up of a header, two 8500 gpm pumps, a suction source, valves, piping and associated instrumentation. Either of the two subsystems is capable of providing the required cooling capacity to support the required systems with one pump operating. The two subsystems are separated from each other so failure of one subsystem will not affect the OPERABILITY of the other system.

Cooling water is pumped from the UHS (i.e., the Altamaha River) by the PSW pumps to the essential components through the two main headers. After removing heat from the components, the water is discharged to the circulating water flume to replace evaporation losses from the circulating water system, or directly to the river via a bypass valve.

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APPLICABLE SAFETY ANALYSES

Sufficient water inventory is available from the Altamaha River when the river level is at 60.7 feet MSL for all PSW System post-LOCA cooling requirements for a 30 day period with no additional makeup water source available. The ability of the PSW System to support long term cooling of the reactor containment is assumed in evaluations of the equipment required for safe reactor shutdown presented in the FSAR, Section 9.2.1 (Ref. 1). These analyses include the evaluation of the long term primary containment response after a design basis LOCA.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The ability of the PSW System to provide adequate cooling to the identified safety equipment is an implicit assumption for the safety analyses evaluated in References 2 and 3. The ability to provide onsite emergency AC power is dependent on the ability of the PSW System to cool the DGs. The long term cooling capability of the RHR, core spray, and RHR service water pumps is also dependent on the cooling provided by the PSW System. In the analysis presented in Reference 1, only one PSW pump is required for safe shutdown, including RHR Shutdown Cooling System requirements.

The PSW System, together with the UHS, satisfy Criterion 3 of the NRC Policy Statement (Ref. 4).

LCO

The PSW subsystems are independent of each other to the degree that each has separate controls, power supplies, and the operation of one does not depend on the other. In the event of a DBA, one PSW pump is required to provide the minimum heat removal capability assumed in the safety analysis for the system to which it supplies cooling water. To ensure this requirement is met, two subsystems, each with two pumps, of PSW must be OPERABLE. At least one pump will operate, if the worst single active failure occurs coincident with the loss of offsite power.

A subsystem is considered OPERABLE when it has an OPERABLE UHS, two OPERABLE pumps, and an OPERABLE flow path capable of taking suction from the intake structure and transferring the water to the appropriate equipment.

The OPERABILITY of the UHS is based on having a minimum water level in the pump well of the intake structure of 60.7 ft MSL. This value is well above that required to operate one PSW pump at a reduced (post-accident) flow rate.

The isolation of the PSW System to components or systems may render those components or systems inoperable, but does not affect the OPERABILITY of the PSW System.

APPLICABILITY

In MODES 1, 2, and 3, the PSW System and UHS are required to be OPERABLE to support OPERABILITY of the equipment serviced by the PSW System. Therefore, the PSW System and UHS are required to be OPERABLE in these MODES.

(continued)

BASES

ACTIONS

E.1 (continued)

heat removal function. However, the overall reliability is reduced because a single failure in the OPERABLE PSW subsystem could result in loss of PSW function.

The 72 hour Completion Time is based on the redundant PSW System capabilities afforded by the OPERABLE subsystem, the low probability of an accident occurring during this time period, and is consistent with the allowed Completion Time for restoring an inoperable DG.

Required Action E.1 is modified by two Notes indicating that the applicable Conditions of LCO 3.8.1, "AC Sources - Operating," LCO 3.4.7, "Residual Heat Removal (RHR) Shutdown Cooling System - Hot Shutdown," be entered and Required Actions taken if the inoperable PSW subsystem results in an inoperable DG or RHR shutdown cooling subsystem, respectively. This is in accordance with LCO 3.0.6 and ensures the proper actions are taken for these components.

F.1 and F.2

If any Required Action and associated Completion Time of Condition A, B, C, D, or E cannot be met, or both PSW subsystems are inoperable for reasons other than Conditions C and D, or the UHS is determined inoperable, 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 12 hours and in MODE 4 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 3.7.2.1

This SR verifies the UHS is OPERABLE by ensuring the water level in the pump well of the intake structure to be sufficient for the proper operation of the PSW pumps (net positive suction head and pump vortexing are considered in determining this limit). In addition, if a temporary weir is in place, the river level must also correspond to a level in the pump well of the intake structure of ≥ 60.7 ft MSL with no weir in place. If the water level is > 61.7 ft MSL, there is sufficient

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(continued)

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.2.1 (continued)

margin to the minimum level requirement (60.7 ft MSL), so the Surveillance is only required to be performed in accordance with the Surveillance Frequency Control Program. However, if the level is ≤ 61.7 ft, the Surveillance must be performed more frequently (every 12 hours), since the conditions are closer to the minimum level limit.

SR 3.7.2.2

Verifying the correct alignment for each manual, power operated, and automatic valve in each PSW subsystem flow path provides assurance that the proper flow paths will exist for PSW operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves were verified to be in the correct position prior to locking, sealing, or securing. A valve is also allowed to be in the nonaccident position, and yet considered in the correct position, provided it can be automatically realigned to its accident position within the required time. 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.

This SR is modified by a Note indicating that isolation of the PSW System to components or systems may render those components or systems inoperable, but does not affect the OPERABILITY of the PSW System. As such, when all PSW pumps, valves, and piping are OPERABLE, but a branch connection off the main header is isolated, the PSW System is still OPERABLE.

The Surveillance Frequency is controlled under the Surveillance Frequency Control Program.

SR 3.7.2.3

This SR verifies that the automatic isolation valves of the PSW System will automatically switch to the safety or emergency position to provide cooling water exclusively to the safety related equipment during an accident event. This is demonstrated by the use of an actual or simulated initiation signal. This SR also verifies the automatic start capability (on a LOCA or LOSP signal) of one of the two PSW pumps in each subsystem.

(continued)

Edwin I. Hatch Nuclear Plant
License Amendment Request to
Revise the Minimum Water Level in the Plant Service Water Pump Well

Enclosure 3

Technical Specifications Clean Typed Pages

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Verify the water level in each PSW pump well of the intake structure is ≥ 60.5 ft mean sea level (MSL).	In accordance with the Surveillance Frequency Control Program AND 12 hours when water level is ≤ 61.7 ft MSL
SR 3.7.2.2	----------NOTE---------- Isolation of flow to individual components or systems does not render PSW System inoperable. ---------- Verify each PSW subsystem manual, power operated, and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.2.3	Verify each PSW subsystem actuates on an actual or simulated initiation signal.	In accordance with the Surveillance Frequency Control Program

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Verify the water level in each PSW pump well of the intake structure is ≥ 60.5 ft mean sea level (MSL).	In accordance with the Surveillance Frequency Control Program AND 12 hours when water level is ≤ 61.7 ft MSL
SR 3.7.2.2	----------NOTE---------- Isolation of flow to individual components or systems does not render PSW System inoperable. ---------- Verify each PSW subsystem manual, power operated, and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	In accordance with the Surveillance Frequency Control Program
SR 3.7.2.3	Verify each PSW subsystem actuates on an actual or simulated initiation signal.	In accordance with the Surveillance Frequency Control Program

Edwin I. Hatch Nuclear Plant
License Amendment Request to
Revise the Minimum Water Level in the Plant Service Water Pump Well

Enclosure 4

United States Geological Survey (USGS) Review of
Hatch River Flow Rating Verification

United States Department of the Interior

GEOLOGICAL SURVEY
Water Resources Division
Peachtree Business Center, Suite 130
3039 Amwiler Road
Atlanta, Georgia 30360-2824

Mr. David Gambrell
Chief Engineer - Design Support
Southern Nuclear, Southern Company
Inverness Building 44,
Birmingham, Alabama 35242

March 2, 2009

Dear Mr. Gambrell,

We have reviewed the Plant Hatch river flow rating verification calculation for 2008, as you requested. The stated objective of this analysis is to 'verify sufficient water supply at river intake for low flows'. The normal groundwater-depletion curve method that you have used predicts the decreased streamflow during extended dry conditions. Our review indicates that your methods are conservative and satisfactory for your stated objective.

In addition to reviewing your analysis, we conducted a low-flow probability analysis and have provided those results herein. This is a method often used by for prediction of hydrologic extremes. The method begins with the minimum daily flow for each climatic year (April 1 to March 31) and fits these data points to a log-Pearson III statistical distribution. Based on this analysis, the lowest daily flow ever observed at this site (from 1972 to present) is slightly greater than the 1-in-50 chance low flow event. This minimum flow, 1330 cubic feet per second (cfs), occurred on September 29, 2008. The flow with a probability of only 0.002, that is, a 1-in-500 chance of being less than or equal to, is 1104 cfs.

The stage-discharge relation indicates that a flow of 1104 cfs would result in a gage height of 0.18 feet or an elevation of 61.69 feet (per USGS published Datum for gage of 61.51 feet). As noted in your design calculation, a June 2007 survey found the elevation of the gage datum to be 61.08 feet, a lower elevation than the USGS published datum. Using the more conservative gage datum of 61.08 feet, the elevation of a flow of 1104 cfs would be 61.26 feet. According to your design calculation, a conservative estimate of the water surface elevation drop from the USGS stream gage to your intake elevation is 0.24 feet. The elevation of a 1-in-500 chance low flow would thus be, conservatively, 61.02 feet at your intakes, above the intake water elevation of 60.7 feet. Thus, the overall finding of our probability analysis is in basic agreement with your ground-water depletion analysis.

As you know the USGS regularly measures stage and streamflow to evaluate our stage-discharge rating curves and make adjustments when needed. A shifted rating (rating 13.1) for Altamaha River at Baxley was developed for the 2008 water year. This rating is identical to the previous rating (rating 13.) at stages greater than 0.50 feet. We have attached a copy of the new rating, with current shifts applied.

Please let us know if you have any questions or if we can be of further assistance.

Sincerely,

Mark N. Landers, P.E.
USGS, Georgia Water Science Center

cc: Michael Macfarlane, Southern Nuclear
John Howser, Southern Nuclear

#212

1-Day Low-Flow Frequency Analysis
02225000 Altamaha River near Baxley, Georgia
Based on 1972-2008 continuous records

Log-Pearson Type III Statistics
SWSTAT 4.1 (based on USGS Program A193

April 1 - start of season
March 31 - end of season
1972 - 2008 - time period
1-day low - parameter
36 - non-zero values

The following 7 statistics are based on Daily Values 1972-2008

Mean (logs)	3.3546
Variance (logs)	0.0164
Standard Deviation (logs)	0.1281
Skewness (logs)	0.37
Standard Error of Skewness (logs)	0.388
Serial Correlation Coefficient (logs)	0.205
Coefficient of Variation (logs)	0.038

Non-Exceedance Probability	Recurrence Interval	"K" Value	log-10 Discharge (cfs)	Discharge (cfs)
0.002	500	-2.43246	3.043	1104
0.005	200	-2.22705	3.069	1173
0.01	100	-2.05022	3.092	1236
0.02	50	-1.84928	3.118	1311
0.05	20	-1.53245	3.158	1440
0.1	10	-1.23507	3.196	1572
0.2	5	-0.85446	3.245	1759

Edwin I. Hatch Nuclear Plant
License Amendment Request to
Revise the Minimum Water Level in the Plant Service Water Pump Well

Enclosure 5

Response to Request for Additional Information Regarding
Distance from PSW and RHRSW Pump Bells to Intake Structure Bottom

NRC Question

Reference

1. Hatch Drawing S56317, "Residual Heat Removal (RHR) Service Water Pumps w/Cutter Pump Modification"

2. Hatch Drawing S52586, "Plant Service Water (PSW) Pumps Outline and Parts Assembly-Stainless Steel Bowl Assembly"

3. Hatch Drawing S60315, "RHR Service Water Pumps-Section Illustration 36 X 14 Type A Discharge"

4. Hatch Drawing S60778, "PSW Pump Outline and Parts Assembly"

5. Hatch Drawing SX24108, "Outline Standby S.W. Pump"

Background

Hatch drawings S56317 and S52586 show the Unit 1 residual heat removal service water (RHRSW) pumps and the plant service water (PSW) pumps. Drawings S60315 and S60778 show the Unit 2 RHRSW and PSW pumps. Drawing SX24108 shows the Standby Service water pump (SSWP) for Unit 2. The drawings for Unit 2 show the distance from pump bell to the bottom of the intake structure, which is critical in determining the minimum intake water level to assure minimum net positive suction head (NPSH) and preclude vortexing. Surveillance Requirement (SR) 3.7.1 for both Unit 1 and Unit 2 verify water level in each PSW pump well to ensure satisfactory NPSH.

Noted:
RHRSW and Standby SW do not have a similar SR, but the RHRSW pump drawing S60315 and standby SW pump drawing SX24108 for Unit 2 show that a satisfactory intake level for PSW pumps would satisfy a minimum level for RHRSW pumps and Standby SW pump as long as the bottom of the intake structure was the same for all three pump types.

Issue

The critical dimensions of the distance from pump bell to the bottom of intake structure are not shown on drawings for Unit 1.

Regulatory Guidance

The Nuclear Regulatory Commission (NRC) staff notes that Nuclear Energy Institute (NEI) 97-04 Revised Appendix B, which was endorsed by the NRC in Regulatory Guide (RG) 1.186, "Guidance and Examples for Identifying [Title] 10 [of the Code of Federal Regulations] CFR [Section] 50.2 Design Basis," states that both 10 CFR 50.2 design basis and supporting design information are subject to design control and other requirements of 10 CFR 50 Appendix B. as applicable to the safety classification of particular systems, structures, and components (SSCs). As a minimum the staff considers the minimum intake level

required by SR 3.7.1 to be 10 CFR 50.2 Design Bases and the distance of the suction bell from the bottom of the intake structure to be supporting design basis information and thus subject to 10 CFR 50 Appendix B.

Therefore the staff considers that the distance relationship of the suction bell to the bottom of the intake structure should be shown on the pump drawings for Unit 1 also in accordance with 10CFR 50 Appendix B (III Design Control and VI Document Control).

Request

A) Please explain why these values are not shown on the drawings for Unit 1 and what action the licensee will take to update the drawings accordingly.

SNC Response

The Hatch Unit 1 PSW and RHRSW pump vendor drawings, drawings S52586 and S56317 respectively, have been updated to include the elevation of the bottom of the intake structure pump well to be consistent with similar Unit 2 drawings. For the Unit 1 PSW drawing S52586 the elevation of the bottom of the intake structure, 56 feet (ft) 0 inches (in) mean sea level (MSL), and the distance from pump bell to the bottom of intake structure, 1 ft 0⅝ in, are both added. For the Unit 1 RHRSW drawing S56317 the elevation of the bottom of the intake structure, 56 ft 0 in MSL, and the distance from pump bell to the bottom of intake structure, 10 in, are both added.

It is noted that the intake structure is common for Hatch Units 1 and 2 and both the Units 1 and 2 PSW pump wells have the same bottom elevation. Since the PSW, RHRSW and standby service water pumps are all located in these Units1 and 2 PSW pump wells, the elevation of the bottom of the pump wells is the same for all 3 pump types.

In addition, one clarification to the background information is provided as follows. The Unit 1 and Unit 2 TS SR 3.7.2.1 serve to verify that the UHS is OPERABLE by ensuring the water level in the PSW pump wells of the intake structure is sufficient for the proper operation of the PSW, RHRSW and standby service water pumps since, as previously stated, all 3 pump types, the PSW, RHRSW, and standby service water pumps are located in the Unit 1 and Unit 2 PSW pump wells. This information is covered in section 3.0 of Enclosure 1 of this submittal. Expressed differently, compliance with TS SR 3.7.2.1 assures meeting the NPSH and minimum submergence (which assures pump vortexing is prevented) requirements for the RHRSW and standby service water pumps, as well as the PSW pumps.