



Serial: NPD-NRC-2009-072
April 13, 2009

10CFR52.79

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

**SHEARON HARRIS NUCLEAR POWER PLANT, UNITS 2 AND 3
DOCKET NOS. 52-022 AND 52-023
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 060 RELATED TO
POTENTIAL DAM FAILURES**

Reference: Letter from Tanya Simms (NRC) to James Scarola (PEC), dated March 17, 2009,
"Request for Additional Information Letter No. 060 Related to SRP Section
02.04.04 for the Harris Units 2 and 3 Combined License Application"

Ladies and Gentlemen:

Progress Energy Carolinas, Inc. (PEC) hereby submits our response to the Nuclear Regulatory Commission's (NRC) request for additional information provided in the referenced letter.

A response to the NRC request is addressed in the enclosure. The enclosure also identifies changes that will be made in a future revision of the Shearon Harris Nuclear Power Plant Units 2 and 3 application.

If you have any further questions, or need additional information, please contact Bob Kitchen at (919) 546-6992, or me at (919) 546-6107.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on April 13, 2009.

Sincerely,

Garry D. Miller
General Manager
Nuclear Plant Development

Enclosures/Attachments

cc: U.S. NRC Director, Office of New Reactors/NRLPO
U.S. NRC Office of Nuclear Reactor Regulation/NRLPO
U.S. NRC Region II, Regional Administrator
U.S. NRC Resident Inspector, SHNPP Unit 1
Mr. Manny Comar, U.S. NRC Project Manager

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NPD Document Control Inbox (Records: Correspondence)
File: NGG-NPD (Dawn Bisson)

**Shearon Harris Nuclear Power Plant Units 2 and 3
Response to NRC Request for Additional Information Letter No. 060 Related to SRP
Section 02.04.04 for the Shearon Harris Units 2 and 3 Combined License Application,
Dated March 17, 2009**

| <u>NRC RAI #</u> | <u>Progress Energy RAI #</u> | <u>Progress Energy Response</u> |
|------------------|------------------------------|---|
| 02.04.04-1 | H-0445 | Response enclosed – see following pages |

NRC Letter No.: HAR-RAI-LTR-060

NRC Letter Date: March 17, 2009

NRC Review of Final Safety Analysis Report

NRC RAI #: 02.04.04-1

Text of NRC RAI:

The staff reviewed 2008 National Agricultural Imagery Program (NAIP) 1-meter resolution imagery and found 137 engineered small water storage areas within the Buckhorn Creek drainage area above the main dam. Five additional sites were registered in the National Inventory of Dams database (<http://crunch.tec.army.mil/nidpublic/webpages/nid.cfm>). The 137 identified sites were selected based on an interpretation of current orthoimagery in open water areas that appeared to have been modified or engineered. The staff requests the applicant identify and evaluate the potential of existing dams upstream of the Main and Auxiliary Reservoirs to affect the timing, frequency, or amount of natural water supply to the Main and Auxiliary reservoirs, or whose failure can cause flooding or flood waves that can jeopardize safety-related facilities.

PGN RAI ID #: H-0445

PGN Response to NRC RAI:

The National Agriculture Imagery Product (NAIP) orthoimagery dataset must be purchased from the NAIP and may take up to 24 days to receive. For this reason, the NAIP data were not readily available for this RAI response. However, orthoimagery of the same resolution (1 meter) is available from the North Carolina Department of Transportation. In addition, the United States Geological Survey's National Hydrography Dataset (NHD) is available and provides a comprehensive set of digital spatial data representing the surface water of the United States using common features such as lakes, ponds, streams, rivers, canals, and oceans (Reference 02.04.04-01 – 01). Because the NHD provides the most complete set of hydrology-related features for the Buckhorn Creek Drainage Basin, the NHD dataset for the Upper Cape Fear River Basin (USGS Sub-basin 03020201) was downloaded.

A GIS-based analysis was performed to determine the impoundments within the Buckhorn Creek Drainage Basin. 267 impoundments were identified in the Buckhorn Creek Drainage Basin which is shown in Figure 1 (attached). These impoundments were compared with the orthoimagery data to verify consistency between the two sources. The NHD provides a more conservative estimate of impoundments since orthoimagery can be difficult to interpret for impoundments that are partially filled with vegetation.

The National Inventory of Dams Program includes an inventory of dams that meet at least one of the following criteria:

- 1) High hazard classification - loss of one human life is likely if the dam fails.
- 2) Significant hazard classification - possible loss of human life and likely significant property or environmental destruction if the dam fails.
- 3) Dam equals or exceeds 25 feet in height and impoundment exceeds 15 acre-feet (ac.-ft.) of storage.

4) Dam exceeds 6 feet in height and impoundment equals or exceeds 50 ac.-ft. of storage.

North Carolina uses these criteria but has revised Criteria 3 to require a dam safety permit for all dams that are 15 feet or more in height. Only impoundments that meet these criteria are included in the North Carolina Dam Safety Program database.

The impoundments identified in the NHD dataset are not considered to be a risk to the HAR safety-related structures due to their small size and location within the drainage basin, as described below.

Based on a GIS analysis, seven dams in the Buckhorn Creek Drainage Basin meet at least one of the criteria above and, therefore, are included in the North Carolina Dam Safety Program database. The locations of these seven impoundments, which correspond to seven of the 267 impoundments identified in the NHD dataset, are shown on Figure 1 (attached). Information on the surface area and capacity of each of these impoundments is provided in Table 1.

While 21 of the remaining impoundments have surface areas in the same range as those indicated in Table 1, these impoundments are not included in the North Carolina Dam Safety Program database because the corresponding dam heights are assumed to be less than 15 feet as specified by North Carolina criteria. The other 239 impoundments have surface areas that range from less than approximately 0.1 ac. to 2.5 ac. and assumed dam heights of less than 15 feet.

Table 1. Description of Impoundments Listed in the North Carolina Dam Safety Program Database within the Buckhorn Creek Drainage Basin

| Dam Name | Surface Area (Acres) | Normal Pool Capacity (Acre-Feet) | Max Impoundment Capacity (Acre-Feet) |
|----------------------------------|---------------------------------|---|---|
| Adcock Dam | 4.5 | 23 | 36 |
| Adcock Lake Dam | 3.5 | 48 | 60 |
| Betts Pond Dam | 5.0 | Not specified | 40 |
| Capital Kiwanis Club Lake Dam | 6.0 | 80 | 96 |
| Cook Pond Dam | 5.3 | 0 | 21 |
| Evans Lake Dam | 2.5 | 60 | 79 |
| Vaughn Dam | 10.0 | 68 | 118 |

The estimated surface area of Harris Reservoir at an elevation of 240 feet National Geodetic Vertical Datum of 1929 is 11.9 square miles (mi²) or about 7616 ac. If the seven largest impoundments (total of 450 ac-feet) were to breach simultaneously, the change in lake level would be approximately 0.7 inch. A breach of one of the smaller impoundments would have a lesser effect. For this reason and because of their locations within the drainage basin in respect

to the HAR site, a dam breach of one or multiple impoundments within the Buckhorn Creek Drainage Basin will not impact the safety-related structures associated with HAR 2 and HAR 3.

The presence of small water storage areas in a watershed can change the timing of flow by detaining runoff. A GIS-based analysis was performed to identify drainage areas that are partially or wholly influenced by the presence of an impoundment. As shown in Figure 2 (attached), many of the small water storage areas are located in the headwater areas of the drainage basin and do not have large upstream drainage areas. Based on the GIS-based analysis, the total area partially or wholly influenced by these storage areas is 9016 ac.; the total area draining to the Auxiliary and Main Reservoirs is 70.3 mi² or about 44,992 ac. For this reason, runoff from approximately 20 percent of the watershed may be influenced by these water storage areas.

The presence of small water storage areas within the Buckhorn Creek Drainage Basin above the Main Dam can potentially reduce the amount of runoff delivered to the Auxiliary and Main Reservoirs during drought periods. The amount of reduction will be attributable to runoff retention within the impoundments and subsequent use or evaporation. However, as noted previously, the drainage area controlled by all of the impoundments in the Buckhorn Creek Drainage Basin is approximately 20 percent of the total drainage area. Sixty percent of these impoundments (approximately 160 of the total 267 water storage areas) have surface areas of less than 1 ac. Water storage areas of this size are not expected to retain a significant amount of runoff during larger storm events. Therefore, the size and location of the water storage areas are expected to have minimal effects on the timing, frequency, or amount of natural water runoff to the Auxiliary and Main Reservoirs.

Based on the review of all documented impoundments in the Buckhorn Creek Drainage Basin, an assessment of dam failure permutations, unsteady flow analyses, and water level evaluation, as described in Regulatory Guide 1.206, is not required.

References

Reference 02.04.04-01 – 01

USGS. 2009. *National Hydrography Dataset*. U.S. Geological Survey, Washington, DC. Downloaded from <http://nhd.usgs.gov/index.html> on February 12, 2009.

Associated HAR COL Application Revisions:

The following change will be made to FSAR Chapter 2 in a future revision to the document:

Revise FSAR Subsection 2.4.4 from:

“There are no existing dams upstream or downstream of Harris Lake that can affect the HAR site safety-related facilities or the availability of the cooling water supply. Furthermore, HAR 2 and HAR 3 will use a passive core cooling system designed to provide emergency core cooling without the use of active equipment such as pumps and AC power sources under conditions of Main Dam failure. The passive core cooling system depends on reliable passive components and processes such as gravity injection and expansion of compressed gases.”

to:

“There are no existing dams upstream or downstream of Harris Reservoir that can affect the HAR site safety-related facilities or the availability of the cooling water supply. The National

Hydrography Dataset (Reference number to be determined at time of revision) was reviewed to identify impoundments in the Buckhorn Creek Drainage Basin. All impoundments, other than the Auxiliary and Main Reservoirs, were less than or equal to 10 ac. in size and were therefore not considered to be large enough to affect HAR safety-related facilities or the availability of the cooling water supply.

Furthermore, HAR 2 and HAR 3 will use a passive core cooling system designed to provide emergency core cooling without the use of active equipment such as pumps and AC power sources under conditions of Main Dam failure. The passive core cooling system depends on reliable passive components and processes such as gravity injection and expansion of compressed gases.”

Attachments/Enclosures:

Figure 1 – Impoundments in the Buckhorn Creek Drainage Basin

Figure 2 – Drainages Partially or Wholly Controlled by Impoundments in the Buckhorn Creek Drainage Basin

List of Attachments [associated with NRC RAI #: 02.04.04-1 (PGN RAI ID #: H-0445)]:

1. Figure 1 – Impoundments in the Buckhorn Creek Drainage Basin (1 page)
2. Figure 2 – Drainages Partially or Wholly Controlled by Impoundments in the Buckhorn Creek Drainage Basin (1 page)



