Progress Energy

Serial: NPD-NRC-2010-074
September 22, 2010

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 U.S. ARMY CORPS OF ENGINEERS REVIEW COMMENTS ON SECTION 404(b)(1) – ALTERNATIVES ANALYSIS REVISION 1

Reference: Letter from Donald Palmrose (NRC) to John Elnitsky (PEC), dated April 20, 2010, "Transmittal of U.S. Army Corps of Engineers Review Comments on Revision 1 of Harris Advanced Reactor Section 404(b)(1) – Alternatives Analysis"

Ladies and Gentlemen:

Progress Energy Carolinas, Inc. (PEC) hereby submits our response to the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (EPA) comments provided in the referenced letter. This response answers the USACE and EPA comments from their review of the "Harris Advanced Reactor (HAR) Section 404(b)(1) Alternatives Analysis, Revision 1."

If you have any further questions, or need additional information, please contact Bob Kitchen at (919) 546-6992, or me at (727) 820-4481.

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

Executed on September 22, 2010.

Sincerely,

John Elnitsky
Vice President
New Generation Programs & Projects

Enclosure/Attachments

cc : U.S. NRC Region II, Regional Administrator
U.S. NRC Resident Inspector, SHNPP Unit 1
Mr. Brian Hughes, U.S. NRC Project Manager
Dr. Donald Palmrose, U.S. NRC Environmental Project Manager
Mr. Monte Matthews, U.S. Army Corps of Engineers

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NRO

Shearon Harris Nuclear Power Plant Units 2 and 3
Response to Review Comments on Section 404(b)(1) Alternatives Analysis, Revision 1, for the Combined License Application, dated April 20, 2010

NRC RAI #	Progress Energy RAI #	Progress Energy Response
NA	H-0612 & H-0622	Response enclosed – see following pages

NRC Letter: Review Comments on Alternatives Analysis

NRC Letter Date: April 20, 2010

NRC Review of Environmental Report

USACE Action ID Number: SAW-2007-01748

USACE Letter Date: April 15, 2010

PGN RAI ID #: H-0612 and H-0622

Progress Energy Carolinas, Inc. (PEC) provides the below responses to the comments, concerns, and requests for clarification and additional information in the U.S. Army Corps of Engineers (Corps) letter dated April 15, 2010, which included an attached letter from U.S. Environmental Protection Agency (EPA) dated March 19, 2010. Responses have been provided for the general and specific comments included in the letter concerning the documents entitled "*Harris Advanced Reactor (HAR) Section 404(b)(1) Alternatives Analysis (Revision 1)*" dated September 2009, and "*Technical Memorandum 107, Determination of Harris Reservoir Storage Requirements, Revision 1*" dated September 9, 2009.

Corps Comments:

1. **Comment:** "Please reference the additional information provided by Progress Energy in response to our letter dated June 19, 2009. This information was contained within the documents entitled "Harris Advanced Reactor Section 404 (b)(1) Alternatives Analysis Revision 1" dated September 2009, and "Technical Memorandum 107, Determination of Harris Reservoir Storage Requirements, Revision 1" dated September 2009. These documents support the proposal by Progress Energy Carolinas, Inc. (PEC) to create new sources of electricity in and around North Carolina. PEC's preferred alternative for this is to expand the Shearon Harris Nuclear Power Plant by adding two new reactors. The U.S. Army Corps of Engineers (Corps) is acting as a cooperating agency, with the Nuclear Regulatory Commission (NRC) acting as the lead agency in development of an Environmental Impact Statement under the National Environmental Policy Act (NEPA). We supplied both documents to the United States Environmental Protection Agency (EPA) for comments. Please find the EPA's letter attached for your consideration. In addition, we offer the following comments to ensure the decision document contains all aspects required by NEPA and the Corps 404 (b)(1) Guidelines."

   Response: Acknowledged. Responses to the Corps' comments are provided herein. Responses to EPA's letter are provided following responses to the Corps letter. To facilitate review, Corps comments are numbered 1 through 16, and EPA comments are numbered 17 through 30.

2. **Comment:** "The first document is the "Technical Memo 107" (TM 107) which details the applicant's proposal to raise the normal pool of Harris Lake from 220 MSL to 240 MSL. Because this component comprises the majority of impacts associated with the Harris alternative, any minimization measure to the proposed water level increase could protect a substantial amount of aquatic resources. The attached EPA letter requests several valid items for review and clarification and requests that the North Carolina Division of Water Resources staff review the TM 107 and the supporting information for concurrence with the

assumptions and model results. We agree and believe that coordination with the state will provide a level of assurance with this approach and may find ways to minimize this portion of the alternative. In short, we believe that further exploration of lower pool levels may be necessary before the Corps can concur that a 240 MSL elevation is the minimum practicable pool level for the project."

Response: A revised TMEM-107 is attached to this response. The revised TM provides additional information on cooling water requirements for the HAR2 and HAR3 and alternative operating pool levels. The information in TMEM-107 demonstrates that an operating level of 240 feet National Geodetic Vertical Datum of 1929 (NGVD29) is required to meet the purpose and need of the project, providing continued reliable power generation from the three units, while minimizing impacts to water resources in the Cape Fear River Basin.

PEC provided TMEM-107 to the North Carolina Division of Water Resources (NCDWR) for review in June 2010 and engaged NCDWR in a discussion of the methodology and results of the lake level analysis. NCDWR comments and suggestions were incorporated in the revised analysis.

3. **Comment:** "The second document, "Harris Advanced Reactor Section 404 (b)(1) Alternatives Analysis Revision 1" (Alternatives, rev1) examines the practicable alternatives and begins a more detailed analysis to determine which alternative is least damaging on the aquatic environment. The requirement for this analysis is found within 40 CFR Part 230.10(a), which states: "Except as provided under section 404 (b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." The analysis presented is an effort to assess aquatic impacts of the various alternatives to allow a fair comparison between alternatives. We understand that Geographic Information Systems (GIS) and Data Management Tasks were completed using the MS Access GeoDatabases and ESRI ArcGIS software (with Spatial Analyst and 3D Analyst Extensions) to ascertain impacts within the 400-acre power block, localized watersheds, and transmission lines for all four viable alternatives. The wetland component of this approach was further refined by conducting site visits and by utilizing the dichotomous key for the North Carolina Wetlands Assessment Method."

   Response: Acknowledged. Informational comment, no action required.

4. **Comment:** "The results of this assessment found that the Marion and Robinson sites would result in higher impacts to the aquatic environments when compared to the Shearon Harris site as presented. The same drought requirement was used at these sites as was used at the Harris site, which provided a consistent review across alternatives. It is unclear, however, if the drought requirement used at Harris could be minimized, thus resulting in lower impacts to the aquatic environment. Since this drought requirement is used for the other alternatives, it is possible that this change could reflect different impact amounts from the various alternatives and may require a re-evaluation."

   Response: The drought requirement used at Harris has been verified through additional modeling and the results are documented in revisions to TM 107. Results from the

Determination of Future Harris Reservoir Storage Requirements confirm that the volume of storage that is provided at the 240 MSL level will be required for the expanded Harris Reservoir to provide sufficient water for PEC to continue to reliably operate the two new units at the Shearon Harris facility during drought conditions. The estimates of storage volumes for the Robinson and Marion sites that would provide comparable cooling water for reliable operation during drought conditions were based on the storage volume determined for the Harris alternative at the 240 MSL elevation. With confirmation that expansion to the 240 MSL elevation is required to provide sufficient water for the Harris alternative, no change in assumptions is needed for the Marion and Robinson alternatives regarding drought mitigation needs. No additional re-evaluation was undertaken for the Robinson or Marion sites based on no change in drought requirement demonstrated for the Harris site.

5. **Comment:** "The two remaining alternatives, Brunswick and Harris, were carried forward for additional study because their aquatic impacts were somewhat comparable. As you are aware, in order to fully satisfy our requirements relative to the 404 (b) (1) Guidelines, we must describe and compare the loss of aquatic function(s) associated with the flooding of existing streams and wetlands (Harris alternative) vs. the loss of aquatic function, including habitat loss associated with the removal of mature trees (Brunswick alternative) within an existing wetland. We acknowledge that the magnitude of loss between the two alternatives is different; however, we believe that the flooding of existing wetlands and streams could result in greater functional loss than the removal of trees from an existing forested wetland. Accordingly, the EIS must adequately describe both the magnitude of loss associated with each of the alternatives (in acres and feet) as well as the expected loss (or changes) of aquatic function associated with each. In addition the document must adequately describe practicable actions that further minimize these impacts. Given that significant functional differences exist between the Brunswick and Harris alternatives, and that PEC has not adequately demonstrated that 240 MSL is the minimum practicable pool level, we concur with EPA and cannot agree that the Harris alternative is the least environmentally damaging practicable alternative."

   Response: Additional evaluation has been undertaken to better describe existing wetland and stream function and anticipated functional changes resulting from actions associated with the Harris and Brunswick alternatives. The methods and results of this functional assessment are presented in the Aquatic Resource Functional Assessment (ARFA) document and the results are summarized in the appropriate sections of the revised Alternatives Analysis document, which are attached with this response. The revised Alternatives Analysis document describes the magnitude of loss associated with each of the alternatives, based on best information available. The expected changes in aquatic function for the Harris and Brunswick alternatives, as evaluated in the ARFA document, are summarized in the revised Alternatives Analysis document. PEC anticipates that the additional evaluation and clarification provided by the revised TM 107 and Alternatives Analysis documents and ARFA document will provide the Corps and EPA with the information needed to find that the Harris alternative is the least environmentally damaging practicable alternative.

6. **Comment:** "The topic of water quality, page 27 of the Alternatives rev1, finds that the Harris alternative will have no adverse consequence on water quality and that all state water quality permits will be in compliance. However, the results of water quality modeling studies for Harris Lake have not been approved by the North Carolina Department of Environment

and Natural Resources (NCDENR) which makes the finding of 'no consequence' premature. Also, since the amount of potential increase in elevation of Harris Lake is still uncertain, model results should clearly disclose the elevation of the lake used and discuss whether a lower lake level would change the water quality expectations. Since minimizing the lake level increase is still a possibility and would affect the overall dilution potential, water quality expectations might be uncertain. Additional coordination with state and federal agencies on water quality should continue."

Response: A re-evaluation of required lake level elevation was undertaken as reported in the attached revised TM 107, with results supporting the need for expansion to the 240-foot elevation. In-stream flow studies are currently underway to assess aquatic resource protection schemes associated with the withdrawal of water from the Cape Fear River and the implementation of prescribed releases to Buckhorn Creek. These studies will incorporate hydrologic modeling to identify operating scenarios consistent with aquatic resource protection needs. The in-stream flow studies will be completed in 2011 in support of the Clean Water Act Section 404/401 permit application. When compared with the Brunswick alternative, water quality impacts associated with the preferred Harris alternative will not be greater, and are actually likely to be less when the potential for salt water intrusion into groundwater sources near Brunswick is considered.

7. **Comment:** "On page 28 of the Alternatives rev1, flood control, storm, and wave impacts are discussed and the Brunswick alternative is listed as having the potential for an adverse impact during extreme storm events, but not during normal weather conditions. This statement is based on the elevation of the current facility, 20 MSL, and the elevation of the maximum storm of 22 MSL. Current flood control levees and waterproofed buildings alleviate the potential for flood damage due to this 2 foot elevation difference. Current NEPA requirements call for an assessment of climate change and the potential for sea level rise. It is unclear if this requirement was incorporated within this evaluation. If it was not, please describe and re-evaluate these topics because it appears that sea level rise may have major implications to this alternative. The climate assessment should also be extended to the other viable alternatives."

   Response: Climate change and sea level rise were not previously considered in Alternatives rev1. Appropriate sections of the Alternatives Analysis document (Sections IV.A.5 and IV.A.6) have been revised to provide an overview of generally accepted effects that predicted climate change and sea level rise may have on the Harris and Brunswick alternatives, and the additional measures that have been considered for planning for these effects.

8. **Comment:** "Page 30 describes expected changes to baseflow from each alternative. As you are aware, there is an on-going instream flow study to determine future releases from Harris dam into Buckhorn Creek if the Harris alternative is permitted. The NCDENR has indicated the results of this study will require a minimum flow release into Buckhorn Creek in addition to a prescribed release schedule based on percentage of inflow. Current water release regulations on Harris dam do not require a minimum flow release, or even a structured release schedule which might benefit existing ecological features. This could be considered a beneficial effect with this alternative; however it is not discussed within this document. NEPA and the 404(b)(1) analysis allows for the discussion of positive influences

that may be incurred from a component of an alternative. Please address this, and any additional positive impacts associated with other alternatives."

Response: An instream flow study is currently being performed on Buckhorn Creek. The results of this study may indicate that a minimum release is required to support aquatic life in the creek. Raising the reservoir operating level would provide a mechanism to provide a minimum flow since water could be withdrawn from the Cape Fear River, stored in Harris Reservoir, and released during drought periods when inflows from the watershed below the Main Dam are minimal. This would provide a positive benefit to aquatic life in Buckhorn Creek.

Section IV.A.8 of the Alternatives Analysis document has been revised to incorporate the beneficial effects of a minimum flow release at Harris dam. Appropriate sections of the Alternatives Analysis document (Sections IV.A.4 through .6, and IV.B.1 and .4) have been revised to provide the additional positive impacts associated with either the Harris or Brunswick alternative that are identified through the wetland and stream functional assessment. Other sections of the Alternatives Analysis document (Sections IV.C.2 and IV.C.3) have been revised to provide the additional positive impacts.

9. **Comment:** "Within the topic of special aquatic sites on pages 32-35 and again on page 37, the re-establishment of marsh wetlands along the proposed flooded fringe area of Harris Lake is discussed as a potential mitigation measure. We have surveyed other Corps Districts within the southeast to see whether any other District has approved of the use of newly formed wetlands as compensatory mitigation for flooding similar features. To date, we are unable to find a previous circumstance where this was successfully used and the Districts were not in favor of this type of passive approach to mitigation. Moreover, operations of the proposed reactors would prohibit PEC from providing these newly-created wetlands with the level of protection that would be expected for wetlands used as compensatory mitigation. As stated earlier, flooding a wetland is a loss of waters. Because of this, we are unable to agree that flooding is both an impact and yet self-mitigating."

   Response: The intent of the text as presented in Alternatives rev1 was not to discuss compensatory mitigation requirements, which is understood to be a consideration only after the LEDPA has been determined and practicable avoidance and minimization efforts for the LEDPA have been adequately addressed. The intent of the discussion of special aquatic sites on pages 32-35 and habitat for fish and other aquatic organisms on page 37 was to identify additional considerations in evaluating the overall impact of inundating the existing non-tidal freshwater marsh wetlands. As originally acknowledged on page 37, although not quantifiable at this time in terms of extent or timing of establishment, non-tidal freshwater marsh wetland features similar to those being inundated are expected to re-establish where suitable conditions will exist in and surrounding the new pool, just as the existing wetlands formed following construction and filling of the current reservoir and represent, at least in part, only a temporary loss of aquatic habitat.

   The ARFA (Section 4.3.1) provides a summary documenting the relatively rapid establishment of non-tidal freshwater marsh wetlands within and along the fringes of the pool of Harris Reservoir as documented in annual monitoring reports for the period following establishment of the existing reservoir. The ARFA (Section 4.3.4) also provides documentation for recent reservoir fluctuations to approximately 7 feet below the 220-foot normal pool elevation, and summarizes data from the revised TM 107 that indicates that the

new normal pool level is expected to remain between 237 and 240 feet most of the time, with pool level dropping below 234 feet (6 feet below the normal pool level) infrequently during drought conditions. Based on the relatively high function identified in the non-tidal marsh wetlands occurring below the 220-foot normal pool level, the recent fluctuation of approximately 7 feet below the normal pool level does not appear to have adversely affected these wetlands. The fluctuations expected to occur at the new operating level are not expected to adversely affect wetlands that may become established in a similar zone. Documentation for the rapid establishment of the non-native hydrilla within Harris Reservoir is also summarized in ARFA Section 4.3.1. Hydrilla is presently dominant or co-dominant in much of the non-tidal freshwater marsh acreage included as impact from flooding. Hydrilla will likely reestablish itself once the lake level reaches the new elevation, and may be able to keep pace with the gradual rise of the pool elevation as the expanded reservoir fills.

Additional evaluation of the functions of the Harris Reservoir wetlands that will be inundated are provided in the ARFA document and the appropriate sections of the Alternatives Analysis document (Sections IV.A and IV.B) have been revised to include this information. Compensatory mitigation is understood to be required for unavoidable impacts resulting from the alternative determined to be the LEDPA after practicable avoidance and minimization efforts have been demonstrated. A compensatory mitigation plan will be developed after the LEDPA has been determined and mitigation requirements determined for the unavoidable impacts.

10. **Comment:** "We can concur that the existing Harris dam is a structure that would affect and sever the biological connection to downstream ecosystems. It should be a factor when weighing this alternative. However, we cannot concur with some of the other functional changes (on page 34) that the applicant expects to occur by raising Harris Lake. Therefore, we ask that PEC provide further explanation or reference the literature supporting the claims for:

    1) the lower aquatic functional value on intermittent streams and how this affects the proposal.
    2) the upslope migration of aquatic life when gradual flooding occurs (as listed within 3 or more functional bullets).
    3) the shifting ephemeral/intermittent/perennial continuum and the conclusions reached within the document.
    4) the watershed size supporting an intermittent stream and how this relates to the Harris alternative.
    5) please expand to include functional losses expected by flooding wetlands."

    Response: Clarification is provided in the ARFA document as well as revisions to the appropriate sections of the Alternatives Analysis document (Sections IV.A and IV.B) for the functions of existing stream types and expected functional changes that were not previously clearly described. Citations are provided in these documents for the sources of the information presented. Additional clarification is provided below for the specific comments:

    1) Statements regarding intermittent streams generally having lower functional value have been clarified in the revised Alternatives Analysis document. The general condition of the intermittent streams affected by project alternatives is discussed in the

ARFA to provide a basis for discussions on expected functional changes resulting from the proposed action.

2) The upstream migration of aquatic life, where suitable conditions allow, has been identified as a trend by the North Carolina Department of Water Quality (DWQ) in various documents. This trend is summarized in "Stream Mitigation Requirements and the 401 Water Quality Certification and Isolated Wetland Programs: Proposed changes in internal DWQ policy" (DWQ 2008):

> Intermittent stream segments have a much more even mix of terrestrial and aquatic species, with the composition shifting as the water table rises above the stream bed or falls below it. When the water table is above the elevation of the stream bed the stream is wet and short-lived aquatic species, such as amphipods, isopods, winter stoneflies, diving beetles, and various dipteran (fly) larvae, dominate the community. Most of these aquatic organisms are also found downstream in the perennial reaches since only a few species (e.g. the dipteran *Dasyhela* and the larvae of the aquatic beetle *Helichus*) live only in the intermittent segments. These observations are similar to those of Boulton and Lake (1992); del Rosario and Resh (2000); and Feminella (1996) who found that rather than being discrete communities, biota in ephemeral, intermittent and perennial segments mostly are distributed along a gradient – the more tolerant or drought resistant the species, the further up the Ephemeral/Intermittent/Perennial (E/I/P) continuum it can be found. This community continuum shifts up and down the stream depending on the season and the wetness or dryness of the year. . . . Species living downstream in perennial reaches include nearly all the species found in intermittent segments, plus a suite of species that require water year around to complete their life cycles. These groups include mayflies, stoneflies (non-winter), caddisflies, dobsonflies, dragonflies, damselflies, some beetles (riffle beetles and water pennies), most mollusks, larval salamanders and fish.

3) The statements regarding the shifting of the perennial, intermittent, ephemeral continuum were intended to describe the inundation of the lower reaches of intermittent streams. Clarification has been provided in the revised Alternatives Analysis document as well as the ARFA. In general, within a zone located at and near the new reservoir pool level, perennial waters associated with the new pool elevation of the lake are expected to partially mimic lower perennial stream systems in the more confined valley types found along the shoreline of Harris Lake. The existing intermittent channel reaches influenced by the presence of perennial waters are expected to experience a shift from intermittent stream-based aquatic life to aquatic life more consistent with perennial water bodies. As described in DWQ's Methodology for Identification of Intermittent and Perennial Streams and Their Origins, Version 4 (2010), the North Carolina stream definitions do not require water to be flowing, but only present to meet the definition of intermittent or perennial flow for regulatory purposes. This document also indicates that within the regulatory framework an intermittent or perennial steam origin is defined as a specific location in a stream, but further states that "in most cases, stream origins usually occur as transition zones in which the location and length of the zone is subject to fluctuations in groundwater levels and precipitation."

4) The watershed size supporting intermittent streams was based on the 90th percentile for minimum area required in NC to form an intermittent stream in the Triassic Basin, as reported in a presentation by Dr. James Gregory (Professor Emeritus, North Carolina State University Department of Forestry & Environmental Resources). This information has been updated in the ARFA and revised Alternatives Analysis using information available through DWQ (Mapping Headwater Streams: Intermittent and Perennial Headwater Stream Model Development and Spatial Application, 2008), which indicates that in the Triassic Basin of North Carolina, contributing watershed size for intermittent streams evaluated ranged from a minimum of 0.1 acre to a maximum of 16.51 acres, with the 90th percentile reported as 11.87 acres. The intent of presenting watershed size was to indicate that intermittent streams were understood to require less contributing watershed than perennial streams and that intermittent stream function could be expected in relatively small watersheds. Additional information on intermittent stream function is presented in the ARFA document which is attached to this response.

5) A functional assessment was undertaken for wetlands and streams affected by the Harris and Brunswick alternatives to identify the functional changes that can be expected from inundation as well as other project-related impacts. The results are provided in the ARFA and summarized in Sections IV.A and IV.B of the revised Alternatives Analysis document, which are attached to this response.

11. Comment: "There is an appearance of contradictory conclusions between the ER rev1 and the current Alternatives rev1 at the Brunswick site with respect to impingement and entrainment of aquatic species and impacts to federally listed species. For example, the ER rev1 (page 9-69) concludes that the impingement of fish, both adult and larval, would be minimal due to the small additional volume of water needed and the deepwater location of the intake. It also states that the operation of additional reactors would not adversely affect listed species. However, the Alternatives rev1 states that an increase in entrainment and impingement makes Brunswick less attractive an alternative (page 36). This discussion is extended to impacts to federally listed species which finds that increased impingement rates might increase the incidental take of listed turtles, and may also pertain to essential fish habitat. The differences between documents may be due to the Alternatives rev1 reflecting the most up-to-date information on the project. However, we need a clear evaluation of all impacts associated with the need for additional cooling water."

Response: These are not contradictory conclusions. Impingement and entrainment criteria can be met by the addition of two new units at Brunswick, but there would be an incremental impingement and entrainment impact that would be greater than with the Harris site due to the estuarine environment present at the Brunswick site. Appropriate sections of the Alternatives Analysis document (Sections IV.B.2 and IV.B.4) have been revised to provide additional clarification regarding anticipated entrainment and impingement concerns resulting from increased flow through the intake canal.

The Brunswick site currently operates two units with once through cooling. This cooling water is withdrawn from the Cape Fear River Estuary, provides condenser cooling capacity to the existing units, and is then discharged to the Atlantic Ocean via a 6-mile long discharge canal. Current velocity in the intake canal, with the existing units, is approximately 0.6 feet per second (Brunswick ER Section 3.1.2.1). The two added units would use closed cycle cooling, which will require less water flow than once through cooling, but will result in an overall greater volume of water being necessary for cooling the two

existing and the two new units. The increased volume of cooling water will require an increase in the velocity of water being pumped through the intake canal. The increase in water flow required as a result of the addition of the closed cycle cooling system, though nominal in comparison to once through cooling systems, could cumulatively increase the entrainment and impingement of aquatic organisms. The Phase II rules of 316(b) regulations require that power plants reduce impingement by 80 to 95 percent from uncontrolled levels and reduce entrainment by 60 to 90 percent from uncontrolled levels. The design of the fish diversion structure was engineered for the existing two operating units only. Based on the additional stressor contributed by the presence of an invasive species of macroalgae, the make-up water for two additional units could challenge the integrity of the diversion structure resulting in damaged diversion screens and extensive maintenance activities.

The marine algae *Gracillaria vermiculophylla* is a non-native species introduced from Southeast Asia that is very prevalent in the Cape Fear River estuary. This invasive species has been identified as a major fouling organism on the Brunswick Nuclear Power Plant's cooling water and diversion and intake screens (COLA ER Section 9.3.2.2.2.5). This macroalgae currently causes significant screen fouling issues at the entrance to the intake canal and has caused blow-outs of the diversion structures when too much of the material has accumulated. Repairs are completed as quickly as possible. However, past data have indicated the temporary openings provide entry points for larger aquatic organisms including endangered and threatened species such as loggerhead, green, and Kemp's ridley sea turtles. In addition to the possibility of increased impingement rates, this increases the risk of increased incidental takes of sea turtles. The National Marine Fisheries Service (NMFS)-Southeast Region issued their Biological Opinion regarding the operation of the existing Brunswick site on January 20, 2000. This biological opinion was based on their review of the cooling water intake system at the Brunswick site for the next 20 years. A new biological opinion from NMFS would be required to formally document the effect on protected sea turtle and shortnose sturgeon if additional cooling water capacity is required based on additional power plants.

The current NPDES permit for the Brunswick site (NC0007064) limits cooling water flows to 922 cfs/unit over the December to March period and 1,105 cfs/unit over the April to November period, with the stipulation that one unit may increase its flow to 1,230 cfs during the months of July, August, and September. These NPDES permit limits translate into two-unit flows of 1,844 cfs, 2,210 cfs, and 2,335 cfs, respectively. These reduced flows in the winter months are necessary for the additional reductions of the entrainment losses of finfish larvae, particularly winter-spawning species. The additional requirement of 134 cfs for the two new units would result in an increase of water flow in the intake canal, which would require a revised NPDES permit be applied for by PEC.

12. **Comment:** "Please include a map showing all transmission line routes and impacts to environmental features (including federal property) for the two alternatives. Please ensure that impacts from all expected line routes are included. We realize that functional impacts to forested wetlands from transmission lines are a major component with these alternatives. Because of this, please continue to evaluate alternative means of line location to minimize impacts. For example, co-locating lines on existing poles could reduce a substantial amount of aquatic impacts. Document all attempts at minimizing impacts and list the reasons why, or why not, a particular minimization attempt is viable."

Response: Figures will be made available for review in Progress Energy-provided reading rooms that depict the preliminary transmission line routes that were evaluated as well as environmental features that were identified and considered in the Alternatives Analysis. Environmental features on the figures include NCWAM wetland types, surface water features, occurrences of federally protected species, federally-owned lands, state-owned lands, conservation lands, and Significant Natural Heritage Areas. Given the conceptual nature of the project at the alternatives evaluation stage, detailed routing and design of transmission has not been prepared for either alternative. The transmission impact evaluation was based on the likely routes and corridors that would be used to add needed transmission capacity, and the use of standard PEC procedures for siting and routing transmission was assumed. These procedures include incremental widening of existing transmission corridors where possible, avoidance of fill in wetlands, and minimization of impacts from stream and wetland crossings.

13. **Comment:** "We understand that the State Historic Preservation Officer (SHPO) is engaged for coordination on issues related to National Historic Preservation Act within the Area of Potential Effect on the Harris site. This includes the 400-acre site, the area within the expanded reservoir site, and the make-up water line. To comply with section 404 of the Clean Water Act, there is a possibility that coordination with the SHPO will also be required on areas not included within the NRC's license area, but within the 404 permit area. These areas might included but not be limited to: transmission corridors, areas indicated for roadway construction/improvements, etc."

    Response: As noted in PEC's April 17, 2009 letter to the SHPO transmitting the Management Summary for the Phase I Archaeological Survey of the potential reservoir expansion:

    > "Although a final decision has not been made to proceed with new plant construction at the Harris site, Progress Energy will notify your office as additions to the APE are needed for potential construction areas, roads and transmission lines, etc. We will seek your concurrence with the revised definitions of the APE, and will complete the required Phase I archaeological and historic resources surveys, Phase II evaluations (where indicated), and the Phase III mitigation of adverse effects (if needed). Progress Energy will continue to conduct all work in consultation and compliance with the North Carolina Office of State Archaeology, in keeping with the Department of Interior standards."

14. **Comment:** "Please provide a breakdown of impacts for all major components of the preferred alternative. Table 4 of the Alternatives rev1 shows a partial breakdown, but anticipated impact amounts for additional components are needed. Examples would include items such as interchange construction, roadway improvements, blowdown lines, rail line extensions, transmission lines, staging areas, drinking and waste water treatment plant upgrades, make-up water lines, power block impacts, drought mitigation measures (i.e. lake elevation increase), water make-up lines, blasting, and re-establishment of park and other public facilities."

    Response: An evaluation of impacts for major components of the preferred alternative are provided in the Harris ER and in subsequent RAI responses submitted to the NRC. Chapter 4 of the ER outlines impacts associated with the proposed expansion of transmission lines

to support the operation of HAR Units 2 and 3 (HAR2 and HAR3). Specifically, ER Sections 4.1.2.2, 4.3.1.5, and 4.3.2.5 discuss impacts related to the construction of the expanded transmission line. Wetland and surface water impacts are specifically discussed in Section 4.3.1.5 of the ER.

A breakdown of other impacts related to project components such as roadways, blowdown lines, and staging areas was provided to the NRC in Progress Energy's letter: *Response to USACE Requests for Additional Information Regarding the Environmental Review*, dated February 12, 2009. Specifically, Progress Energy's response to USACE 12, documented in PGN RAI ID #: H-362, including Attachment 1A, identifies disturbed areas (including lakes and streams) resulting from construction activities. Wetlands and streams that are present in the project area are described in Section 2.3 of the ER.

A detailed breakdown of impacts for all major components is not available for the other alternatives evaluated. The information for the preferred alternative was not provided in the Alternatives Analysis (Revision 1) to keep the comparison among alternatives consistent.

15. **Comment:** "Also, please expand the no action alternative to describe the project going forward without a 404 permit (i.e. no impacts to waters of the U.S.) even if licensed by the Nuclear Regulatory Commission. Finally, please provide a report summary showing structural integrity of the existing Harris dam with respect to the potential for expanding the normal pool."

Response: Section III.B.1 of the Alternatives document has been revised to provide information for a no-action alternative for the Harris site. This no-action alternative would not require a 404 permit by maintaining the current 220-foot NGVD29 operating level of Harris Reservoir, but would instead supplement cooling water supply by withdrawals from the Cape Fear River. Hydrologic modeling presented in the revised TM 107 demonstrated that this scenario provided an insufficient water supply for the facility for more than 40 percent of the 80-year simulation period, and as such does not meet PEC's stated purpose and need and is not a viable alternative. Times of drought are typically times of peak energy demand in PEC's service territory. Therefore, losing generating capacity during a drought is inconsistent with PEC's business objectives, inconsistent with meeting goals for reliable service, and potentially results in life-threatening service interruptions. The no-reservoir option for the Harris alternative has been dropped from further consideration.

Although the physical impact caused by inundating wetlands and streams is considered an impact by the USACE under regulatory guidelines for permitting and mitigation purposes, inundation does not result in a complete loss of aquatic function but rather represents a conversion of one aquatic type to another that also provides aquatic function. The ARFA document that has been prepared and is attached to this response summarizes the functional changes that are expected to occur as a result of reservoir expansion and identifies the aquatic functions that will be present within the expanded reservoir.

TM 107 has been revised to include a summary showing structural integrity of the existing Harris dam with respect to the potential for expanding the normal pool. The analyses cited by TM 107 indicate that dam safety is not an issue for reservoirs at least as high as 245-feet NVGD29.

16. **Comment:** "Please realize with the information provided to date, we are unable to concur that the Harris site has the least amount of aquatic impacts of the alternatives considered. PEC's development of information addressing these comments and those presented by EPA will help ascertain the alternative with the least aquatic impacts."

    Response: PEC has reviewed the comments and requests for additional information received from the Corps and EPA on the Alternatives Analysis rev1 and TM 107 documents. PEC is herewith providing additional information on the Harris and Brunswick alternatives for further consideration by the Corps and EPA in evaluating the two alternatives. These additional efforts are summarized in the responses provided to the Corps and EPA comments and are presented in the revised TM 107 and Alternatives Analysis documents and Aquatic Resources Functional Assessment document that are attached to this response. PEC believes that the Harris site has the least overall impact on the aquatic environment and no other significant adverse environmental consequences, and should be the least environmentally damaging practicable alternative.

EPA Comments:

17. **Comment:** "Progress Energy Carolinas (PEC) is proposing to construct two additional reactor units at the Shearon Harris Nuclear Power Plant in Wake County, North Carolina (NC). The project, as proposed includes the construction of an intake structure and pipeline to supply water from the Cape Fear River to Harris Reservoir, placement of a second discharge structure within Harris Lake, upgrades to transmission lines and roads and increasing in the normal pool elevation of Harris Lake from 220 feet to 240 feet mean sea level (MSL). The Environmental Protection Agency (EPA) has reviewed the Alternatives Analysis (Revision 1) and the Technical Memorandum (Determination of Harris Reservoir Storage Requirement) documents. It is our understanding that Revision 1 of the Alternatives Analysis document was revised in response to comments from the U.S. Army Corps of Engineers (Corps). We have also reviewed Enclosure 2 which provides a response to the Corps' comments. The Technical Memorandum (TM) was prepared for PEC by CH2M Hill to respond in greater detail to the concern raised in the Corps' comments concerning the justification of raising Harris Lake level from 220 feet to 240 feet MSL."

    Response: Acknowledged. Responses to the EPA's specific comments are provided herein.

TM 107 (Determination of Harris Reservoir Storage Requirement)

18. **Comment:** "PEC is proposing to raise the level of the cooling reservoir (Harris Lake) at the Shearon Harris facility from its current elevation of 220 feet to 240 feet MSL as part of the expansion of the current facility to provide sufficient cooling water for the two new reactors in the event of an extreme extended drought. The proposed increase in elevation will flood approximately 500 acres of wetlands and 24.4 miles of streams. [There is some discrepancy as to what actual level the current dam, as designed, can safely accommodate. Different levels are cited in the material provided, i.e., 239.1, 240, 250. Since the level of 240 is most frequently cited, for the purpose of this discussion, we are assuming this to be the both the level that can be safely accommodated by the current dam and the applicant preferred level, but this issue needs to be resolved.]"

Response: As described in TMEM-107 Rev 3, a probable maximum hurricane (PMH) evaluation was performed to support the HAR Final Safety Analysis Report (FSAR). This analysis determined that 240 feet NGVD29 is the highest level that can be safely maintained under extreme conditions. The safety of the dam was also evaluated in support of the FSAR. Reviews of the Main Dam slope protection and slope stability indicate that the dam can support operating levels of at least 245 feet NGVD29.

240 feet NGVD is also the applicant-preferred level based on an evaluation of water supply constraints. TMEM-107 demonstrates that an operating level of 240 feet NGVD29 is required to meet the purpose and need of the project, providing continued reliable power generation from the three units while minimizing impacts to water resources in the Cape Fear River Basin.

19. **Comment:** "After reviewing both the TM and the responses to the Corps in the Enclosure 2, we continue to have concerns with the proposal to raise the level of Harris Lake to 240. This process seems to have been conducted in reverse, in that 240 was selected because this is the level the current dam can safely accommodate and Shearon Harris owns the land to the 243 MSL contour. There was no discussion of beginning this process from the other end and determining what would be the minimum rise in cooling lake elevation that would be the least environmentally damaging practicable alternative. EPA is concerned with the very large aquatic environmental impacts (loss of waters) associated with raising the lake to the 240 contour level."

    Response: Acknowledged. Responses to additional questions and concerns on TM 107 are provided to comments numbered 20 through 25.

20. **Comment:** "The lake elevation rise appears to be only needed in the case of severe drought, i.e., 220 would be sufficient except in a severe extended drought situation. From the information presented, even the 240 level would not be sufficient in a very severe extended drought. Although some extrapolations can be made, there was no discussion of what raising the lake to 225, 230, 235, etc. would provide as far as operation in drought and the environmental impacts associated with these levels. There needs to be a comparison and in depth discussion as to what would be provided by levels other than 240 and the associated environmental impacts."

    Response: The revised TMEM-107 documents the impacts on reservoir level and generation reliability for a "no action alternative," which specified an operation level of 220 feet NGVD29. Results show that the units would need to shut down due to lack of cooling for at least 40 percent of the time.

    TMEM-107 also presents a comparison of reservoir levels for operating levels of 240, 238, and 236 feet NGVD29.

    - A 240-foot NGVD29 operating level met the objective of providing a reliable source of power at all times. The maximum drop in reservoir level was an elevation of 226.6 feet NGVD29, which is 2.4 feet below the reserve level. Water was withdrawn from the reserve pool for 343 days or approximately 1.17 percent of the 80-year evaluation period. Occasional brief withdrawals from the reserve pool are acceptable since one purpose of the reserve pool is to provide a cooling water supply in the case of extreme conditions or unforeseen conditions. The period from May 1988 through April 1989 was

one such period where rainfall was limited and flow in the Cape Fear River was frequently less than 600 cfs. During this period, water was withdrawn for 207 of 365 days or 56.7 percent of the time of withdrawal from the reserve pool.

- A 238-foot NGVD29 operating level does not meet the reliability criteria. In the model run, shutdown was required twice during late 1988 and early 1989. The first occurrence began on September 24, 1988 and lasted for 39 days. The reservoir level fell to 223.6 feet NGVD29, which is below the 224-foot NGVD29 minimum level required by engineering design. The second shutdown began on December 27, 1989 and continued for 11 days. The second shutdown would have occurred when power demands were potentially very high due to use for heating.

  The operating level of 238 feet NGVD29 would require withdrawals from the reserve pool for approximately 939 days over the 80-year evaluation period or 3.2 percent of the time. For the same extreme drought period from May 1988 through April 1989, water was withdrawn from the reserve pool for 249 of 365 days or 68.2 percent of the time.

- A 236-foot NGVD29 operating level would not meet the reliable generation of power criteria. In this scenario, the reservoir level fell to 220.3 feet NGVD29, requiring the plant to shut down. For this scenario, the plant would be shut down for 231 days during the period from July 1988 through February 1989. Four other shutdowns of shorter duration were predicted to occur in the period from 1930 through 2009. These shutdowns would occur during the summer when power demands could potentially be very high due to use cooling requirements and during the winter when power demands could potentially be very high due to use for heating.

  A 236 foot NGVD29 operating level increased the number of days the reserve pool was used to 1,986 or 6.8 percent of the time over the 80-year evaluation period. For the same extreme drought period from May 1988 –through April 1989, water was withdrawn from the reserve pool for 324 of 365 days or 88.8 percent of the time.

A sensitivity analysis was performed to determine the impacts to jurisdictional wetlands associated with reservoir levels of 240, 238, and 236 feet NGVD29. The results showed that approximately 565.2 acres or 91.3 percent of the total wetland impacts occur if the reservoir is raised above 224 feet NGVD29. Additional impacts occur gradually at higher elevations. Approximately 614.2 acres of wetlands may be impacted if the reservoir operating level is 236 feet NGVD29. An additional increase of 0.5 percent (2.8 acres) of wetland impacts is associated with a reservoir level of 238 feet NGVD29. Approximately 4.9 acres of additional wetland impacts, or an increase of 0.8 percent, is associated with a reservoir level of 240 feet NGVD29.

21. **Comment:** "The Western Wake Partners' new Water Reclamation Facility (WRF) will be releasing an estimated 25 million gallons per day (mgd) by 2020 and 38 mgd by 2050 somewhere (most likely the Cape Fear River). How have these numbers been incorporated into the modeling of water in the Cape Fear? The TM states the new reactors will require 63 cubic feet per second (cfs) or 40.7 mgd for replacement water for evaporation from the cooling towers. We understand Shearon Harris has investigated the possibility of having the WRF water discharged directly to Harris Lake, so less water would need to be pumped from the Cape Fear River but this would also necessitate raising the lake level and would have similar flooding impacts as withdrawing the water from the Cape Fear. We are aware that the current NC Department of Environment and Natural Resources approved discharge

point for the WRF water may be below Buckhorn dam but it appears there is still some flexibility in the location of the discharge point. Could it be moved to accommodate the Shearon Harris withdrawal needs from the Cape Fear or could Shearon Harris have a withdrawal pump below the WRF discharge point? These issues concerning the impact of the WRF discharge into the Cape Fear and how this might impact the ability for Shearon Harris to withdraw without the increase storage to 240 should be addressed."

Response: The Western Wake Water Reclamation Facility (WRF) is included in the analysis as a direct discharge to the Cape Fear River. The Western Wake Partners have evaluated the potential for discharging the effluent from the WRF to Harris Lake. However, the regulations for interbasin transfers have made this option infeasible.

The specific location of the discharge point on the Cape Fear River, above or below the proposed intake point, would not have an impact on water resources in the Cape Fear River basin since the net flow as recorded at the Lillington USGS gage would be the same.

22. **Comment:** "We recommend the NC Division of Water Resources (NCDWR) review the TM and supporting information, including the Sargent and Lundy 2009 report, modeling assumptions, WRF input, etc., and provide their analysis of the information contained in the TM. One of the model assumptions utilizes the maximum withdrawal rates from the Cape Fear based on future demands. EPA region 4 is currently finalizing Water Efficiency guidelines. Any proposed water supply reservoir will be required to use these guidelines where practicable. These water efficiency measures have the ability to greatly reduce water needs. Although, this is not directly applicable to this project, these measures, once approved, should become widely used for any water supply provider (not just new reservoir projects) and may influence future demands on the Cape Fear River."

    Response: PEC has provided TMEM-107 to the NCDWR for review and has taken part in discussions with the NCDWR regarding this analysis. The basis for the analysis is the NCDWR's Cape Fear River Basin Hydrologic Model (CFRBHM), including their predictions of future demands. While the U.S. EPA's Water Efficiency guidelines may revise future use predictions, the analysis utilizes the best information on demands in the Cape Fear River that is currently available.

23. **Comment:** "The TM states the proposed project will provide the applicant with the ability to operate with reduced withdrawals from the Cape Fear during drought conditions and thereby minimize adverse impacts to aquatic life. This statement fails to address the very large impacts to aquatic life that will occur from flooding 500 acres of wetlands and 24.4 miles of streams. We do not believe this project to be a net gain for aquatic life."

    Response: This statement has been revised to clarify that reducing withdrawals from the Cape Fear River during drought periods will minimize impacts to aquatic life in the Cape Fear River.

    It is recognized that the project will impact existing wetlands around Harris Reservoir. However, an operating level of 240 feet NGVD29 is required to meet the objectives of the project. A review of the wetland delineations was performed to determine the impacts to jurisdictional wetlands associated with reservoir levels of 240, 238, and 236 feet NGVD29. The results showed that approximately 565.2 acres, or 91.3 percent, of the total wetland

impacts occur if the reservoir is raised above 224 feet NGVD29. Less than 1 percent of the impacts occur within the range of 236 to 240 feet NGVD29.

24. **Comment:** "The TM discusses the use of NCDWR's model for the Cape Fear River. The discussion states modeled inflows are primarily due to rainfall runoff and point discharges. There is no mention of the future WRF discharge which will be a significant inflow and should be considered. Although the WRF project has not yet been permitted, the final environmental impact statement (EIS) was released in December 2009 and the WRF is scheduled to be operational as of the third quarter of 2013. Although this project has not yet been permitted, we believe the WRF potential inflow to the Cape Fear should be considered in the modeling for the Shearon Harris project. To be able to include the years from October 2004 to December 2008 (where NCDWR data was not available), data was used from the U. S. Geological Survey gage at Lillington to be able to capture the extreme drought of 2007. We believe the model should be rerun to include 2009 data which was a very wet year."

    Response: The NCDWR's CFRBHM was used to evaluate the required reservoir level. The model does include a discharge from the proposed Western Wake WRF.

    The modeling period in the CFRBHM was extended to December 2009 to include the recent drought of 2007 and the wet year of 2009. The results included in the revised TMEM-107 are based on this extended period.

25. **Comment:** "The last section of the TM discusses the benefits from the increased reservoir level, including increased shoreline and lake habitat. As we stated earlier the proposed elevation of the lake level to the 240 contour will result in the flooding of 500 acres of wetlands and 24.4 miles of streams. EPA considers this a very significant net loss of aquatic resources. The information reviewed to date does not provide a compelling justification that the anticipated benefits of water supply during a severe extended drought outweighs the magnitude of the impacts associated with raising Harris Lake to the 240 contour level."

    Response: It is recognized that the project will impact existing wetlands around Harris Reservoir. However, maintaining the reservoir elevation at an operating level of 240 feet NGVD29 is required to meet the project objective of reliable power.

Alternatives Analysis

26. **Comment:** "The alternatives analysis evaluated eleven potential sites to fulfill the project's purpose to develop new nuclear baseload generating capacity to supply electricity to PEC's service area. Of those sites, seven were eliminated during the siting study. The four sites carried forward for further consideration were Marion, Robinson, Brunswick and Harris. Of these four, the Marion and Robinson sites were dropped from further evaluation because the alternatives analysis indicated they would have significantly higher impacts to wetlands and streams than the applicant preferred site (Harris). There was not an alternative which evaluated constructing the two new reactors at the Shearon Harris site but without raising Harris Lake to the 240 contour. With the information we have been presented to date, we believe an expansion alternative operating at a 220 level or somewhere less than 240 to be

a viable alternative and should be evaluated. The Brunswick and Harris sites were carried forward for a more detailed evaluation."

Response: Section III.B.1 of the Alternatives document has been revised to provide information for a no-action alternative for the Harris site. This no-action alternative would not require a 404 permit by maintaining the current 220-foot NGVD29 operating level of Harris Reservoir, but would instead supplement cooling water supply by withdrawals from the Cape Fear River. Hydrologic modeling presented in the revised TM 107 demonstrated that this scenario provided an insufficient water supply for the facility for more than 40 percent of the 80-year simulation period, and as such does not meet PEC's stated purpose and need and is not a viable alternative.

TMEM-107 also provides a comparison of reservoir levels for operating levels of 240, 238, and 236 feet NGVD29, as summarized in a previous response to an EPA comment (see response to Comment #20 above).

27. **Comment:** "The Brunswick site is located on the lower Cape Fear estuary and currently has two existing nuclear reactors. Due to the water supply at the site location, a reservoir is not required and consequently no loss of waters of the U. S. would occur from flooding impacts. This alternative would require approximately 360 miles of transmission lines and conversion of approximately 1450 acres of wetlands from forested to herbaceous in the right of way areas. Although the Brunswick site would result in greater impacts to wetlands than the Harris site, it would be a conversion of wetlands from forested to herbaceous. The transmission lines will span streams and no direct impacts to stream channels are expected. The increase of Harris Lake from 220 to 240 would result in a loss of waters of approximately 500 acres of wetlands and 24.4 miles of stream due to inundation. In addition, there would a transmission line right of way conversion of approximately 99 acres of wetlands from forested to herbaceous associated with the Harris alternative."

Response: The acreages presented in the Alternatives Analysis Revision 1 document for the Harris alternative were based on a GIS-based evaluation comparable to the level of evaluation available for the other three alternatives. This was presented in this manner to provide a more direct comparison among the four alternatives utilizing the same level of evaluation of potential impacts. The preliminary results of the jurisdictional delineation undertaken for the Harris alternative, as provided in a footnote to Table 4 in the Alternatives Analysis Revision 1 document, provided a more refined assessment of the potential impacts. The revised Alternatives Analysis document provides the updated information from the jurisdictional delineation of the Harris site as well as updated information resulting from additional ground reconnaissance along the Brunswick transmission lines during the NCWAM evaluation in Sections III.B.3.d and III.B.3.c. Additional evaluation has been undertaken to better describe existing wetland and stream function and anticipated functional changes resulting from actions associated with the Harris and Brunswick alternatives. The methods and results of this functional assessment are presented in the Aquatic Resource Functional Assessment (ARFA) document and the results are summarized in the appropriate sections of the revised Alternatives Analysis document, which are attached with this response. The revised Alternatives Analysis document describes the magnitude of loss associated with each of the alternatives, based on best information available. The expected changes in aquatic function for the Harris and

Brunswick alternatives, as evaluated in the ARFA document, are summarized in the revised Alternatives Analysis document.

28. **Comment:** "A Geographic Information System (GIS) desktop analysis was conducted to determine aquatic impacts for the four sites carried forward. The Harris site is the only site which has had extensive field level impact analysis. We believe the GIS level analysis was sufficient to estimate potential impacts for a rough comparison of alternatives to be able to tell which alternatives should be carried further in the analysis. At this point, we think it may be appropriated to collect more field based delineation data for the Brunswick alternative. We do not agree with the executive summary conclusion that "...the Brunswick alternative does not constitute an alternative demonstrating less adverse impact on the aquatic ecosystem in comparison to the preferred alternative, the Harris site." Although the Brunswick site converts 1450 acres of wetlands from forested to herbaceous, the Harris site permanently inundates 500 acres of wetlands, 24.4 miles of streams and converts 99 acres from forested to herbaceous. The alternatives analysis states that most of the 24.4 miles of stream impacts is not perennial, however information presented at the September 29, 2009, interagency review team meeting shows the breakdown to be almost evenly divided between perennial and intermittent with slightly more perennial impacts. This should be corrected in the alternatives analysis."

    Response: Field-based delineation data is not believed to be warranted for this alternative analysis due to the limited additional information that would be provided by such an effort compared to the additional cost and time involved. The transmission line analysis is not based on actual siting studies and undertaking the siting studies for an alternative not identified as the preferred alternative would represent an undue burden for PEC and its ratepayers. Changes in wetland acreages obtained through a refinement of the GIS level analysis by field delineation once siting studies have been completed would not likely result in substantive changes in the comparison of aquatic impacts resulting from conversion of wetlands and streams within and upstream from the existing Harris reservoir resulting from the Harris alternative reservoir expansion versus the relative acreage converted from forested to herbaceous wetlands resulting from the Brunswick alternative transmission line upgrades. The comparison of the GIS level analysis for the Harris Reservoir expansion to the actual delineation, as presented in Table 4 of the Alternatives Analysis (Revision 1) and footnotes, demonstrated that the GIS level analysis provided what is believed to be a reasonable approximation of the actual aquatic resource features present. The Corps jurisdictional determination has been completed and the results are reported in Table 4 in Section III.B.3.d of the revised Alternatives Analysis document. The GIS-based estimate of wetlands and streams for the Harris reservoir expansion is now provided in a footnote to Table 4 for comparison.

    PEC is herewith providing additional information on the Harris and Brunswick alternatives for further consideration by the Corps and EPA in evaluating the two alternatives, including additional information in the attached ARFA document summarizing the anticipated magnitude of aquatic resource impacts and anticipated resulting changes to aquatic resource functional change. Based on this information, along with information presented in the revised TM 107 and Alternatives Analysis documents attached to this response, PEC believes that the Harris site has the least overall impact on the aquatic environment and no other significant adverse environmental consequences, and should be the least environmentally damaging practicable alternative.

The information presented at the September 29, 2009, interagency meeting regarding breakdown of stream impacts by perennial versus intermittent channel was based on preliminary results of the actual field delineation at that time. The Corps jurisdictional determination has been completed and the results are reported in Table 4 in Section III.B.3.d of the revised Alternatives Analysis document. The 24.40 miles of stream referred to in the Alternatives Analysis (Revision 1) is based on the GIS level analysis for the Harris alternative, which was used so that a direct comparison could be made to the other alternatives using results obtained from comparable methodology of assessment. This was described in footnotes to Table 4 and Table 6 in Alternatives Analysis (Revision 1) and in the text in Section III.B.4. The revised Alternatives Analysis document (Revision 2) has been updated to incorporate the results of the delineation, with clarification provided in Section I.D (Analysis Methodology) and footnote to Table 4 (Section III.B.3.d).

29. **Comment:** "Based on the information we have reviewed, we believe the Brunswick site to be a viable alternative. There are several issues associated with the Brunswick site which we believe require additional information to allow us to conduct a better review. Besides a better understanding of the actual impacts, we recommend the following items be addressed in greater detail for the Brunswick alternative:
    1. Entrainment and impingement impacts from the increased volume of cooling water to aquatic organisms, including sea turtles. The discussion comparing the aquatic impacts from increased cooling water flow from adding two reactors to either facility should be better quantified to help weigh the costs between the two facilities, including information that quantifies the current aquatic impacts of the facility, along with those anticipated with project impacts.
    2. Because of the location of the Brunswick facility on the Cape Fear estuary, we recommend Sections 5 (Flood Control Functions) and 6 (Storm, Wave and Erosion buffers) be expanded to provide a more thorough discussion concerning both potential sea level rise and hurricane impacts.
    3. It would also be useful in evaluating the two alternatives to include a conceptual discussion of mitigation for the impacts associated with each alternative, including conversion and flooding impacts."

Response: Additional information pursuant to 40 CFR 230 and 33 CFR 320 has been provided for the Brunswick site in the revised Alternatives Analysis document. This additional information provides information for the EPA and Corps to more fully evaluate the impacts associated with the Brunswick site in comparison to the Harris site.

There would be an incremental impingement and entrainment impact at the Brunswick site that would be greater than with the Harris site due to the estuarine environment present at the Brunswick site. Appropriate sections of the Alternatives Analysis document (Sections IV.B.2 and IV.B.4) have been revised to provide additional clarification regarding anticipated entrainment and impingement concerns resulting from increase flow through the intake canal.

Climate change and sea level rise were not previously considered in Alternatives rev1. Appropriate sections of the Alternatives Analysis document (Sections IV.A.5 and IV.A.6) have been revised to provide an overview of generally accepted effects that predicted

climate change and sea level rise may have on the Harris and Brunswick alternatives, and the additional measures that have been considered for planning for these effects.

Compensatory mitigation is understood to be required for unavoidable impacts resulting from the alternative determined to be the LEDPA after practicable avoidance and minimization efforts have been demonstrated. A compensatory mitigation plan will be developed after the LEDPA has been determined and mitigation requirements determined for the unavoidable impacts. Beneficial effects on aquatic resources and aquatic resource functions resulting from conversion and flooding impacts are included in the ARFA and appropriate sections of the revised Alternatives document. PEC understands the Corps and EPA will consider beneficial effects as well as negative effects when evaluating which alternative results in the least overall environmental impact to aquatic resources.

30. **Comment:** "EPA appreciates the opportunity to review and comment on the TM and Alternatives Analysis documents during the EIS development process. We recommend the alternatives issues discussed above be further addressed to provide us with a better understanding of the alternatives and to enable us to provide further input in the determination of the least environmentally damaging practicable alternative."

Response: PEC has reviewed the comments and requests for additional information received from the EPA and Corps on the Alternatives Analysis rev1 and TM 107 documents. PEC has undertaken efforts intended to provide additional information on the Harris and Brunswick alternatives for further consideration by the EPA and Corps in evaluating the two alternatives. These additional efforts are summarized in the responses provided to the EPA and Corps comments and are provided to the EPA and Corps in revised TM 107 and Alternatives Analysis documents and Aquatic Resources Functional Assessment document that are attached to this response. PEC believes that the Harris site has the least overall impact on the aquatic environment and no other significant adverse environmental consequences, and should be the least environmentally damaging practicable alternative.

Associated HAR COLA Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

Attachment 1: 338884-TMEM-107 Rev 3 – Determination of Future Harris Reservoir Storage Requirements, Revision 3 [41 pages]

Attachment 2: Harris Advanced Reactor (HAR) Section 404(b)(1) Alternatives Analysis, Revision 2 [103 pages]

Attachment 3: Aquatic Resource Functional Assessment in support of the Harris Advanced Reactor 404(b)(1) Alternatives Analysis [57 pages]