Progress Energy

Serial: NPD-NRC-2011-030
March 31, 2011

10 CFR 52.80

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 FOR THE ENVIRONMENTAL REVIEW – NEED FOR POWER

References:
1. Letter from Donald E. Palmrose (NRC) to John Elnitsky (PEC), dated January 13, 2011, "Request for Additional Information for the Environmental Review of the Combined License Application for the Shearon Harris Nuclear Power Plant, Units 2 and 3"

2. Letter from Robert H. Kitchen (PEC) to U. S. Nuclear Regulatory Commission (NRC), dated February 11, 2011, "Proposed Schedule for Transmittal of Requested Information Supporting the Environmental Review", Serial: NPD-NRC-2011-012

Ladies and Gentlemen:

Progress Energy Carolinas, Inc. (PEC) hereby submits a partial response to the Nuclear Regulatory Commission's (NRC) requests for additional information provided in Reference 1. A future response to the remaining requests will be provided in accordance with the schedule discussed in Reference 2.

Responses to the Need for Power questions are 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 (727) 820-4481.

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

Executed on March 31, 2011.

Sincerely,

John Elnitsky
Vice President
New Generation Programs & Projects

Progress Energy Florida, Inc.
P.O. Box 14042
St. Petersburg, FL 33733

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NRO

Enclosure/Attachment

cc : U.S. NRC Region II, Regional Administrator
U.S. NRC Resident Inspector, SHNPP Unit 1
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Shearon Harris Nuclear Power Plant Units 2 and 3
Response to NRC Request for Additional Information for the Environmental Review of the Combined License Application, dated January 13, 2011

NRC RAI #	Progress Energy RAI #	Progress Energy Response
1.1.7-1	H-0655	Response enclosed – see following pages
8.0-1	H-0656	Response enclosed – see following pages
8.3-1	H-0657	Response enclosed – see following pages
8.3-2	H-0658	Response enclosed – see following pages
8.3-3	H-0659	Response enclosed – see following pages
9.4-3	H-0660	Future response
3.1-1	H-0661	Future response

NRC Letter No.: Environmental Review RAI

NRC Letter Date: January 13, 2011

NRC RAI #: 1.1.7-1

Text of NRC RAI:

Provide in ER Section 1.1.7, Construction Start Date, the new proposed dates for the start and completion of major activities for the proposed action.

PGN RAI ID #: H-0655

PGN Response to NRC RAI:

The HAR COLA will be revised to reflect the current plans for HAR as follows:

"HAR 2

Construction Completion/Fuel Load	2nd Quarter 2025 (or later)
Commercial Operation	1st Quarter 2026 (or later)

HAR 3

Construction Completion/Fuel Load	4th Quarter 2026 (or later)
Commercial Operation	3rd Quarter 2027 (or later)

The Progress Energy Carolinas Integrated Resource Plan filing (IRP filing) dated September 13, 2010 covers the period 2011 through 2025. As discussed in the IRP filing, base load nuclear generation is not anticipated until after 2025 and therefore the IRP filing does not identify a specific date for the construction and/or operation of new nuclear facilities at PEC's Harris site. However, each scenario evaluated in the IRP filing includes nuclear generation. In addition, the IRP identifies the potential for regional partnerships during the 15-year planning period rather than full ownership of a nuclear facility. Progress Energy has determined that a nuclear option is an essential part of a balanced solution that will be required to meet current and anticipated environmental requirements, including carbon regulation, and the uncertainties associated with fossil fuel supply and pricing.

The results of the planning study indicate that nuclear generation is an essential component of any resource plan. Under a broad range of assumptions, and as tested across very divergent scenarios, nuclear generation provides the most economic alternative for meeting customer demand over the 15 year planning horizon and beyond. Although the need for nuclear generation is confirmed, the specific timing and amount vary depending on the assumptions upon which the analysis is based. This last point is key to understanding why licensing the Harris project is needed, despite the uncertainty over an initial operation date.

The very long lead times associated with nuclear licensing and construction set it apart from conventional fossil-fueled generation like combustion turbines and combined cycles, where the time from decision to in-service may only be 3 to 5 years. The significant lead times associated with nuclear plant licensing and construction increase the uncertainty regarding future conditions. Consider uncertainty over carbon regulation and fuel prices. The planning study results demonstrate that under the assumption of high carbon and/or high natural gas prices, a

plan with more nuclear capacity is favorable. (See pages A-5 and A-6 of the IRP filing). If Progress Energy were to wait until there was more certainty over carbon regulation and fuel prices to begin the preconstruction activities planning process for new nuclear units at Harris, the in-service date would remain 10-11 years into the future from the decision point. While NRC approval is not needed to commence some preconstruction activities, issuing a COL, or at least completing the associated environmental review, is required to support the major environmental permits required for HAR construction. The infrastructure projects at HAR include raising the level of Harris Lake and transportation upgrades. These preconstruction activities will require about 10 years to complete and must be commenced prior to safety-related nuclear activities. The U.S. Army Corps of Engineers cannot issue required environmental permits without a Final Environmental Impact Statement and a demonstrated project need, i.e., COL.

In HAR COLA Revision 3, ER section 1.1.7 and FSAR section 1.1.5 will be revised as noted below.

Associated HAR COL Application Revisions:

1. ER Section 1.1.7 will be revised to read:

Overall construction and pre-construction activities specific to HAR are expected to take at least 10 years. Pre-construction activities include long-lead infrastructure work, such as raising the level of Harris Lake and planned transportation infrastructure upgrades to accommodate construction traffic. Then, primary HAR site preparation activities and plant pre-construction activities will take approximately 18 months to complete. On-site construction activities for Unit 2 will take approximately 3 to 4 more years, followed by 6 months of startup testing. On-site construction activities for Unit 3 will take about as long as Unit 2 and start a year or two later. The actual construction and operation schedules are provided in FSAR Section 1.1.5.

2. FSAR Section 1.1.5 will be revised to read:

"HAR 2

Construction Completion/Fuel Load	2nd Quarter 2025 (or later)
Commercial Operation	1st Quarter 2026 (or later)

HAR 3

Construction Completion/Fuel Load	4th Quarter 2026 (or later)
Commercial Operation	3rd Quarter 2027 (or later)

The dates assume a COL is issued in 2014. A site-specific construction plan and startup schedule will be provided to the NRC after issuance of the COL.

Attachments/Enclosures:

None.

NRC Letter No.: Environmental Review RAI

NRC Letter Date: January 13, 2011

NRC RAI #: 8.0-1

Text of NRC RAI:

Provide an updated ER Chapter 8 based on the latest documents from other organizations and governmental agencies such as the North Carolina Utilities Commission.

PGN RAI ID #: H-0656

PGN Response to NRC RAI:

An updated ER Chapter 8, which will be in HAR COLA Revision 3, is provided in an attachment to this response. This updated ER Chapter 8 will replace the previous ER Chapter 8 in its entirety.

Associated HAR COL Application Revisions:

See Attachment 1: Revision 3 to HAR ER Chapter 8

Attachments/Enclosures:

Attachment 1: Revision 3 to HAR ER Chapter 8, Need for Power

NRC Letter No.: Environmental Review RAI

NRC Letter Date: January 13, 2011

NRC RAI #: 8.3-1

Text of NRC RAI:

Provide a detailed accounting of the need for baseload capacity in the form of a baseload capacity forecast to accompany the peakload forecast from the current Sept. 13, 2010 IRP. Provide the projected baseload demand from the present to 3 years after initial commercial operation of the proposed units. Prepare a table showing baseload demands, baseload capacities, and resulting deficit or surplus (see Table 8.4-1 on p. 8.4-10 of NUREG-1555, rev. 1, for an example) and a table showing peakload responsibilities, accredited generating capacities, and resulting reserve margin (see Table 8.4-2 on p. 8.4-11 for an example).

PGN RAI ID #: H-0657

PGN Response to NRC RAI:

As discussed in response to RAI 1.1.7-1, above, the expected in-service dates for HAR are outside the IRP planning window. Baseload demand projected through 2032 is difficult to estimate with the level of precision suggested in this RAI. Instead, as described in the revised ER Chapter 8, expected load growth, adjusted for implementing energy efficiency and other demand management programs, is assumed, according to IRP p. 5, to average 1.1%. Therefore, net new generation assets needed to be added over any ten-year period can be expected to be at least 2000 MW. As described in response to RAI 1.1.7-1, new nuclear is an essential part of any plan for new generation assets and there is adequate system load growth to accommodate meeting that load growth through HAR. Under a regional plan, the load growth throughout the entire region would be a relevant consideration. Because neighboring utilities face similar needs and constraints as Progress, nuclear generation is expected to be a part of any regional plan. Under a regional plan, the need for nuclear generation in the PEC service territory is not diminished, but only some of power from HAR would be available to PEC. Therefore, analysis relying on load growth in PEC service territory alone is appropriately conservative and provides a bounding analysis in comparison to the need for the power from HAR should a regional plan be developed.

Progress Energy does not forecast load in segments and the need for capacity is not driven solely by loadshape or the growth of any particular segment of load. Therefore, a projected "baseload" forecast cannot be provided in the level of detail implied in the question. The forecast presented in Progress Energy's 2010 IRP filing dated September 13, 2010 is an aggregate demand of all customers, retail and wholesale. It reflects some shifting in load shape to the extent Demand Side Management (DSM) results in shifting peak loads to off-peak periods. The uncertainty as to which DSM programs will be implemented and their effectiveness is hard to project and contributes to the decision by Progress not to rely on specific projections of baseload demand through 2033.

The need for baseload generation, defined generally as generation expected to have annual capacity factors of 70% or greater (definitions may vary) is driven by many factors, including loadshape, the relationship of competing fuel prices, the makeup of the existing generation fleet, and operational needs of the system.

In Progress Energy's case, the need for new "baseload" nuclear capacity is driven, as discussed in the response to RAI 1.1.7-1, by factors that include load growth, but also heavily consider future carbon regulation and fuel price and availability. Regardless of the direction of carbon regulation and fuel prices, Progress Energy cannot initiate construction of any new capacity, nuclear or fossil, without obtaining a Certificate of Public Convenience and Necessity (CPCN) from the State of North Carolina. The process by which a Certificate is obtained requires that Progress Energy demonstrate that the proposed capacity additions are needed to maintain system adequacy and they are the most cost-effective alternative available to meet that need. The state process is the conclusive determination of the need for new generation. As previously discussed, nuclear generation is considered to be an essential element of a balanced solution meeting the forecast conditions of customer growth, increasingly stringent environmental regulations, and fuel price volatility.

Associated HAR COL Application Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

None.

NRC Letter No.: Environmental Review RAI

NRC Letter Date: January 13, 2011

NRC RAI #: 8.3-2

Text of NRC RAI:

Of the Alternative Plans for Scenario Analysis offered as part of the 2010 IRP, Progress indicates that the least favorable Plan is that which includes the proposed project (pgs. A-5 through A-11), and does not offer an alternative or a forecast that appears to include the proposed project.

PGN RAI ID #: H-0658

PGN Response to NRC RAI:

As discussed in the response to RAI 1.1.7-1, the IRP filing, which covers the period 2011 through 2025, does not include the proposed project in that planning horizon, but the planning study results demonstrate the need for increasing amounts of nuclear capacity in response to variation of the critical assumptions used in the analysis.

Referring to Appendix A of the IRP filing, note that sensitivities were run to identify alternative resource plans. The alternative resource portfolios identified vary principally by the amount of nuclear versus gas-fired generation in each. The amount of nuclear generation is heavily driven by three key factors: carbon regulation and pricing, natural gas pricing, and the cost of the nuclear generation itself. The results of the sensitivity analyses suggest several alternative scenarios under which the Harris project would be desirable. Any scenario that assumes high gas prices and high carbon prices would favor increased nuclear in the generation mix, all other factors being equal. Note that in the scenarios studied and described in the IRP filing, the scenario corresponding to high gas and carbon prices, described as CO2 Aggressive (see page A-7), also assumed a 30% increase in nuclear construction cost, as well as a high construction escalation rate. It is this latter assumption of high cost coupled with high escalation that results in Plan C, with its higher reliance on nuclear capacity, being unfavorable versus the competing portfolios. Even with this assumption of higher costs, additional nuclear capacity is the preferred alternative; reinforcing that it is reasonably foreseeable to expect HAR to be approved for a CPCN. Furthermore, in an analysis where the primary focus is on weighing the environmental impacts, nuclear is environmentally preferred as discussed in ER Chapter 9.

The effect of the higher cost assumptions can be seen in the table presented on page A-16 of Appendix A of the IRP Filing. Note that customer cost is heavily impacted versus the competing plans. However, Plan C, with the higher proportion of nuclear capacity, fares very well in the fuel price volatility and CO2 categories.

The preferred resource plan presented in the IRP filing includes nuclear generation; the difference between Plan A and Plan C is the amount of nuclear in the generation mix, not whether or not it should be included in the plan. Changes in the assumptions regarding participation in regional nuclear projects, as well as the key drivers discussed above of carbon prices, natural gas prices and nuclear costs, impact the fraction of nuclear in the generation mix. All credible projections reinforce the need for the Harris project, and, as discussed in the response to RAI 1.1.7-1, the long lead times associated with licensing and infrastructure preconstruction activities require relying on the generalized projections of need.

Associated HAR COL Application Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

None.

NRC Letter No.: Environmental Review RAI

NRC Letter Date: January 13, 2011

NRC RAI #: 8.3-3

Text of NRC RAI:

Provide a forecast which includes proposed commercial start dates for the proposed project, the capacity that Progress would anticipate owning and dispatching within their service territory, and the disposition of the remaining capacity should Progress not use 100% of the proposed project.

PGN RAI ID #: H-0659

PGN Response to NRC RAI:

As previously discussed, the Harris project, defined as the total output of a new unit at the Harris site, is not included in the period covered by the IRP filing, 2011-2025. The 50% generating capacity of nuclear units included in Plan C, described on page A-5 of Appendix A in the filing, discuss regional plans. While a regional plan could include the Harris project or participation in another project, such regional nuclear projects are currently undefined. If Harris were included in a regional projection, the need for nuclear would be reinforced, while PEC's share of the HAR project would be less. The IRP analyses do demonstrate the need for 2000MW of nuclear capacity in the PEC service territory alone, and the fraction of the new generation that is met by nuclear capacity is dependent on carbon and fuel price assumptions. Referring to the language in the IRP Filing:

> This generation could come from partnerships in self-built nuclear facilities or from a partnership in another utility's regional nuclear project. Under this regional assumption nuclear projects would be jointly undertaken by utilities in the region with participating utilities and load serving organizations taking ownership stakes in each others' projects. At this point in time no specific plans for such partnerships have been entered into and the 25 percent nuclear blocks simply represent undesignated baseload generation for planning purposes. Analysis conducted for the 2010 IRP selected approximately 550 (e.g. 25% ownership in two units) of undesignated nuclear resources over the 2011 through 2025 study period with 275 MW coming online in 2020 and another 275 MW coming online in 2021. In practice, the exact timing and amount ownership of an eventual regional partnership would depend on the specific project resulting in potential adjustments of both timing and volume. Under the current assumptions for future carbon legislation carbon dioxide limits would continue to ramp down significantly beyond the study period. Such an outcome would likely require additional nuclear generation after 2025 to meet declining CO_2 targets. (pages 3-4)

Nuclear generation must be pursued in light of the potential for strict carbon regulation, and environmental regulation in general, and that this fact holds true not only for Progress Energy, but regional neighbors as well. The Harris project will meet the needs of Progress Energy, and possibly its neighbors as well, if the future develops as forecast in the planning studies that were conducted and described in the IRP Filing. An analysis that relies on load growth in PEC service territory alone is conservative in analyzing the need for HAR. As described in the IRP, a regional plan would not reduce the demand for nuclear generation in the PEC service territory but would decrease the fraction of HAR output available to Progress Energy.

Consideration of the balance of risks associated with pursuit of the nuclear option also favors continuation of HAR. Considering the long-lead time for various infrastructure preconstruction activities to support HAR, a decision on HAR will need to be on generalized projections of reasonably foreseeable need. This assessment of the need for 2000MW of power in the PEC service territory is reasonable as it is reasonable to foresee conditions continue to develop in a manner favorable to construction of HAR. However, any projection of electricity supply and demand over ten years in the future has significant inherent uncertainty. Given that the licensing of HAR, at least completing the associated environmental assessment, is a practical prerequisite to long lead time preconstruction activities, such as raising the level of Harris Lake and constructing transportation upgrades to accommodate construction traffic, Progress Energy will not be able to respond in timely fashion to provide the appropriate fraction of nuclear in its generation mix unless decisions are based on more generalized projections of power needs. Progress Energy expects to be able to demonstrate that the Harris project is the most cost effective alternative to meet customer needs, and the Certificate of Public Convenience and Necessity process in the State of North Carolina will authorize further development.

Associated HAR COL Application Revisions:

No COLA revisions have been identified associated with this response.

Attachments/Enclosures:

None.

Attachment 1

Revision 3 to HAR ER Chapter 8
Need for Power

[25 pages attached following this cover page]

CHAPTER 8
NEED FOR POWER

TABLE OF CONTENTS

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

CPCN	Certificate of Public Convenience and Necessity
Duke	Duke Energy Corporation
EIA	Energy Information Administration
ER	Environmental Report
ESRP	Environmental Standard Review Plan
FERC	Federal Energy Regulatory Commission
HAR	proposed Shearon Harris Nuclear Power Plant Units 2 and 3
IRP	Integrated Resource Plan
kWh	kilowatt hour
MW	megawatt
MWh	megawatt hour
NCUC	North Carolina Utilities Commission
NERC	North American Electric Reliability Corporation
NRC	U.S. Nuclear Regulatory Commission
PEC	Progress Energy Carolinas, Inc.
ROI	Region of Interest
REPS	Renewable Energy Portfolio Standard

8.0 NEED FOR POWER

This chapter of the Environmental Report (ER) supports the overall cost-benefit analysis by describing the process for determining the need for the power generated by the proposed Shearon Harris Nuclear Power Plant Units 2 and 3 (HAR). This chapter also describes the Region of Interest (ROI) for determining the need for power that supports evaluating the practical alternatives to the proposed project. Integrated Resource Plans (IRPs) are fundamental to the state processes to determine need for power.

PEC prepares similar IRPs for both North Carolina and South Carolina. PEC is a regulated public utility whose territory consists of an area approximately 34,000 square miles ($mi.^2$), and includes northeastern South Carolina, portions of the coastal plain, lower piedmont section, and a portion of western North Carolina. Figure 8.0-1 shows the PEC service territory. The ROI for the HAR ER is PEC's service territory in both North Carolina and South Carolina. PEC's service territory and the ROI are also the relevant service area that will be served by the HAR.

As noted in NUREG-1555, Environmental Standard Review Plan (ESRP) 8.1:

> Affected States and/or regions are expected to prepare a need-for-power evaluation. NRC will review the evaluation and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need-for-power evaluation is found acceptable, no additional independent review by NRC is needed, and the analysis can be the basis for ESRPs 8.2 through 8.4.

North Carolina provides a comprehensive and systematic process for evaluating power. It is subject to confirmation and responsive to forecasting uncertainty. It consists of two steps: (1) a North Carolina Utilities Commission (NCUC) annual report analyzing the long-range needs for electricity in North Carolina, with NCUC review and approval of IRPs submitted by utilities, and (2) NCUC review and approval of certificate applications submitted by utilities prior to construction of electricity generation facilities.

Because the proposed HAR is in the state of North Carolina, North Carolina is the affected state, responsible for conducting a need-for-power evaluation. The following sections show that the North Carolina need-for-power evaluation process meets these four criteria. The North Carolina process is informed by the similar IRP process conducted by South Carolina.

8.1 STATE NEED FOR POWER PLANNING

This section reviews the criteria described in NUREG-1555, ESRP 8.1:

> Affected States and/or regions are expected to prepare a need-for-power evaluation. NRC will review the evaluation and determine if it is

(1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need for power evaluation is found acceptable, no additional independent review by NRC is needed, and the analysis can be the basis for ESRPs 8.2 through 8.4.

As part of their analyses of the need for power, States and/or regional authorities are expected to describe and assess the regional power system. The reviewer should evaluate the description, and determine if it is comprehensive and subject to confirmation. If it is found acceptable, no additional data collection by NRC should usually be needed. These data may be supplemented by information sources such as the Energy Information Administration (EIA), Federal Energy Regulatory Commission (FERC), the North American Electric Reliability Council, and others.

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The following subsections explain North Carolina's power evaluation process and how it meets the four evaluation criteria provided in NUREG-1555. They explain how North Carolina assesses its need for and the economic feasibility of power generating facilities.

North Carolina's robust evaluation process culminates with the issuance of a "Certificate of Public Convenience and Necessity" (CPCN), which is granted only if the economic prerequisites to construction of the proposed power plant are met. While the current IRP shows a general trend of economic growth and associated need for future electricity generation facilities, the specific data that would support the basis to commit to construct HAR will not be submitted to the state until much later in North Carolina's planning process. *See* Progress Energy Carolinas Integrated Resource Plan, September 13, 2010, at 5 (Reference 8.1-011). Therefore, the NRC can rely on the state process because it is systematic, comprehensive, subject to confirmation, and considers uncertainty. Based on the rules and regulations pertaining to the issuance of a CPCN in North Carolina, a CPCN for HAR will not be issued unless Progress Energy demonstrates, amongst other things, a need for at least 2,000 MW of power and that the HAR project is the most cost effective means of meeting that need for power. While not required, it is reasonable to predict that an IRP filed in advance of the application for a CPCN would show the need for and cost effectiveness of 2,000 MW of nuclear power. Accordingly, an independent review by the NRC should consider the reliability of the state process. An independent review at this relatively early stage of the planning process should consider reasonably foreseeable generalized predictions of need, as it is not practical to quantify data on power generation and consumption that far in the future.

8.1.1 OVERVIEW OF THE NORTH CAROLINA PROCESS

It is the policy of the state of North Carolina to "assure that resources necessary to meet future growth through the provision of adequate, reliable utility service include use of the entire spectrum of demand-side options" and to "require energy planning and fixing of rates in a manner to result in the least cost mix of generation and demand-reduction measures which is achievable . . ." N.C. Gen. Stat. § 62-2(3a) (Reference 8.1-012). To meet this and other state policies, NCUC is vested with the authority to regulate public utilities, including their expansion in relation to statewide development requirements. *Id.* § 62-2(b).

N.C. Gen. Stat. § 62-110.1 requires NCUC to "develop, publicize, and keep current an analysis of the long-range needs for expansion of facilities for the generation of electricity in North Carolina. . . " N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). This analysis includes:

(1) NCUC's estimate of the probable future growth of the use of electricity;

(2) the probable needed generating reserves;

(3) the extent, size, mix, and general location of generating plants; and

(4) arrangements for pooling power to the extent not regulated by the Federal Energy Regulatory Commission (FERC).

Id.

In developing its long-range analysis, NCUC is required to confer and consult with the public utilities in North Carolina, utilities commissions or comparable agencies of neighboring states, FERC, the Southern Growth Policies Board, and other agencies having relevant information. *Id.* NCUC also may participate as it deems useful in any joint boards investigating generating plant sites or the probable need for future generating facilities. *Id.* The NCUC Public Staff, an independent agency created in 1977 that reviews, investigates, and makes appropriate recommendations to NCUC, is also required to assist NCUC in developing the long-range analysis and plan. N.C. Gen. Stat. § 62-15(d) (Reference 8.1-014).

As part of NCUC's need-for-power evaluation process, utilities are required to file IRP reports with NCUC. NCUC Rule R8-60 (Reference 8.1-015); *see* N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). NCUC Rule R8-60 sets forth requirements for utilities' IRP reports and the process for review and approval of such IRPs. NCUC Rule R8-60 (Reference 8.1-015). NCUC Rule R8-60 requires that utilities furnish NCUC with a biennial report, in even-numbered years, that contains both its IRP covering a two-year period and additional information. NCUC Rule R8-60(h),(i). *Id.* In odd-numbered years, each utility is required to file an annual report containing *inter alia* an updated 15-year forecast and significant amendments or revisions to the most recently filed biennial report. *Id.*

IRPs submitted by utilities are reviewed publicly through (i) an evidentiary hearing that may be held at the discretion of NCUC and (ii) one or more hearings to receive testimony from the public. *Id.* at Rule R8-60(j). Within 150 days after the filing of each utility's biennial report and within 60 days after the filing of each utility's annual report, the Public Staff or any other intervenor may file its own plan or an evaluation of, or comments on, the utilities' biennial and annual reports. *Id.* at R8-60(j) (Reference 8.1-015). Furthermore, the Public Staff or any other intervenor may identify any issue that it believes should be the subject of an evidentiary hearing. *Id.* The parties may file reply comments addressing any substantive or procedural issue raised by any other party. *Id.* A hearing to address issues raised by the Public Staff or other intervenors may be scheduled at the discretion of NCUC, limited to such issues as identified by NCUC. *Id.* In addition to an evidentiary hearing, NCUC is required to receive testimony from the public. *Id.* At the conclusion of this process, NCUC will approve or disapprove respective utilities' IRP reports.

Utilities may, in addition to submitting IRP reports, submit proposals regarding future needs for electricity to NCUC as it prepares its analysis regarding the long-range needs for expansion of facilities for the generation of electricity in North Carolina. *Id.* In the course of developing its analysis, NCUC is required to hold one or more public hearings. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-015). To the extent practicable, utilities may attend or be represented at any formal conference conducted by NCUC in developing the long-range plan. *Id.* The Public Staff, which is not subject to the supervision, direction, or control of NCUC, assists NCUC in making the analysis and plan. *Id.* at § 62-15(b),(d)(5) (Reference 8.1-014).

After completing the analysis and hearing, NCUC is required to annually submit its report to the North Carolina Governor and to the appropriate committees of the General Assembly its report, consisting of: (1) NCUC's analysis and plan; (2) NCUC's progress to date in carrying out such plan; and (3) the program of NCUC for the ensuing year in connection with such plan. *Id.*

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A utility may not commence construction of any facility for the generation of electricity in North Carolina without first obtaining a certificate from NCUC that the "public convenience and necessity requires, or will require, such construction." N.C. Gen. Stat. § 62-110.1(a) (Reference 8.1-013). Accordingly, prior to construction, PEC is required to obtain a CPCN from NCUC prior to construction. *See id.* The purpose of requiring the CPCN before a generating facility can be built is to prevent costly overbuilding. NCUC Rule R8-61 outlines specific information that the applicant must include to NCUC, both prior to and at the time of filing its application. NCUC Rule R8-61 (Reference 8.1-015).

CPCN applicants must publish a notice of the application in a newspaper in the county where the facility is proposed to be constructed. N.C. Gen. Stat. § 62-82(a) (Reference 8.1-016). This notice is required at least once per week for four weeks. *Id.* Within three months following the application's filing, NCUC may

commence a hearing to determine whether the certificate should be awarded. *Id.* NCUC is required to hold a hearing upon receiving a filed complaint or it may call a hearing on its own initiative. *Id.* It is the duty and responsibility of the Public Staff to intervene on behalf of the public in all certificate applications filed pursuant to N.C. Gen. Stat. § 62-110.1. N.C. Gen. Stat. § 62-15(d)(5) (Reference 8.1-014). In the event there is a hearing, NCUC will require that briefs and oral arguments be submitted, furnish a transcript of evidence and testimony submitted after the taking each day of testimony, and issue a decision within 60 days after submission of the briefs. *Id.* at § 62-82(a) (Reference 8.1-016). However, if NCUC does not receive a complaint within ten days after the last day of publication of the notice and does not, on its own initiative, order a hearing, NCUC shall enter an award awarding the certificate. *Id.*

North Carolina law requires NCUC to consider its analysis of the "long-range needs for the expansion of facilities for the generation of electricity in North Carolina" in acting upon any petition for the issuance of a CPCN of construction of a generating facility. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). NCUC shall also take into account the applicant's arrangements with other electric utilities for interchange of power, pooling of plants, purchase of power and other methods for providing reliable, efficient, and economical electric service, and approve the estimated construction costs and made a finding that construction will be consistent with NCUC's plan for expansion of electric generating capacity. *Id.* at § 62-110.1(d),(e).

8.1.2 SYSTEMATIC PROCESS

North Carolina uses a detailed and systematic process for evaluating power, as shown in Figure 8.1-1. It consists of two interrelated steps.

First, state law requires NCUC to "develop, publicize, and keep current an analysis of the long-range needs for expansion of facilities for the generation of electricity in North Carolina . . ." N.C. Gen. Stat. § 62-110.1 (Reference 8.1-013). NCUC's implementing rules define an overall framework for reviewing and approving IRPs from the state's utilities. *See, e.g.,* NCUC Rule R8-60; Rule 8-61 (Reference 8.1-015).

As part of NCUC's need-for-power evaluation process, utilities are required to file IRP reports to NCUC. Utilities are required to analyze and account for conservation, load management, and other demand-side options, along with new utility-owned generating plants, non-utility generation, and other supply-side options through the IRP process. *Id.* at Rule R8-60(b),(i). IRPs submitted by utilities are reviewed publicly through (i) an evidentiary hearing that may be held at the discretion of NCUC and (ii) one or more hearings to receive testimony from the public. *Id.* at Rule R8-60(j). NCUC issues an order approving or disapproving the IRP report.

In addition to reviewing the IRP process, NCUC annually prepares a report of: (1) NCUC's analysis and plan for the long-range needs for expansion of facilities for

the generation of electricity in North Carolina; (2) NCUC's progress to date in carrying out such plan; and (3) the program of NCUC for the ensuing year in connection with the plan. N.C. Gen. Stat. § 62-110.1 (Reference 8.1-013). The Public Staff, which is not subject to the supervision, direction, or control of NCUC, assists NCUC in making the analysis and plan. *Id.* at § 62-15(b),(d)(5) (Reference 8.1-014). Following a hearing, NCUC submits this report to the North Carolina Governor and to appropriate committees of the General Assembly. N.C. Gen. Stat. § 62-110.1 (Reference 8.1-013).

Second, North Carolina law requires that NCUC issue a CPCN that "public convenience and necessity" requires the construction of a facility for the generation of electricity prior to construction. N.C. Gen. Stat. § 62-110.1(a) (Reference 8.1-013). The purpose of requiring the certificate is to prevent costly overbuilding. NCUC, upon complaint shall, or upon its own initiative may, commence a hearing to determine whether the certificate should be awarded. *Id.* at § 62-82(a) (Reference 8.1-016). If an evidentiary hearing is conducted, NCUC will hear testimony from experts, the utilities, and interested parties. In acting on a utility's application for a certificate for construction, NCUC "shall consider" its analysis regarding the long-range needs for the expansion of electricity generation facilities in North Carolina. *Id.* at § 62-110.1(c) (Reference 8.1-013). NCUC is also required to take into account the applicant's arrangements with other electric utilities for interchange of power, pooling of plant, purchase of power and other methods for providing reliable, efficient, and economical electric service. *Id.* at § 62-110.1(d). Therefore, the North Carolina review process to determine the need for power is informed by the South Carolina process. NCUC must approve the estimated construction costs and make a finding that construction will be consistent with NCUC's plan for expansion of electric generating capacity. *Id.* at § 62-110.1(e). A CPCN for a nuclear facility may only be granted if the applicant demonstrates and the Commission finds that "energy efficiency measures; demand-side management; renewable energy resource generation; combined heat and power generation; or any combination thereof, would not establish or maintain a more cost-effective and reliable generation system and that the construction and operation of the facility is in the public interest." *Id.*

8.1.3 COMPREHENSIVE PROCESS

The North Carolina power evaluation process consists of reporting detailed forecasting information by utilities through IRPs and an overall analysis by NCUC that examines long-range needs for electricity in North Carolina. The process is designed to incorporate probable future growth of the use of electricity, the probable needed generating reserves, the extent, size, mix and general location of generating plants and arrangements for pooling power to benefit of the people of North Carolina. *See* N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013).

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North Carolina requires each regulated utility to develop and keep current an IRP which incorporates *inter alia*, a 15-year forecast of native load requirements,

supply-side and demand-side resources, and an updated comprehensive analysis of all resource options considered by the utility for satisfaction of native load requirements and other system obligations. NCUC Rule R8-60(c) (Reference 8.1-015). As required by state law, the IRP must include an assessment of demand-side management and energy efficiency, including alternative supply-side energy resources, and incorporate the utility's obligation to comply with the Renewable Energy and Energy Efficiency Portfolio Standard (REPS). *Id.* As part of the IRP process, each utility is required to assess, on an ongoing basis: the potential benefits of soliciting proposals from wholesale power suppliers and power marketers to supply needed capacity, the potential benefits of reasonably available alternative supply-side energy resource options, and programs to promote demand-side management. *Id.* at Rule R8-60(d),(e),(f). Additionally, each utility is required to:

- Evaluate its comprehensive set of potential resource options, including both demand-side and supply-side options, to determine an IRP that offers the least cost combination (on a long-term basis) of reliable resource options;

- Analyze potential resource options and combinations of resource options to serve its system needs, taking into account variations in future estimates of peak load, energy requirements, and other significant assumptions; and

- Take into account, as applicable, system operations, environmental impacts, and other qualitative factors.

Id. at Rule R8-60(g).

Each utility is required to file a biennial report with NCUC containing its current IRP. *Id.* at Rule R8-60(h). In addition to the IRP, utilities are required to provide the following information:

- Forecasts of load requirements, supply-side resources, and demand resources, including the methods, models and assumptions used to prepare the peak load and energy sales forecasts and variables used in the models.

- The existing and planned generating facilities, including information regarding: (1) existing generation facilities, including the type of fuel used, location of each unit, and units expected to be retired from service; (2) planned generation additions, the rationale as to why each listed generation addition was selected, and a 15-year projection of each; and (3) a list of all non-utility electric generating facilities in its service areas by name, location, fuel type, and capacity.

- A calculation and analysis of winter and summer peak reserve margins over a projected 15-year period.

- A list of firm wholesale purchased power contracts by fuel type, capacity, location, expiration date, and volume of purchases, the results of any requests for proposals for purchased power since the last biennial IRP, and a

list of wholesale power contracts for the sale of capacity or firm energy for which the utility has committed to sell power.

- A list of transmission lines and other associated facilities, which are under construction or for which there are specific plans to be constructed during the planning horizon.
- An overall assessment of existing and potential demand-side management programs by type of resource, capacity, and energy available in the program.
- A current overall assessment of existing and potential alternative supply-side energy resources.
- A description and summary of the results of its analyses of potential resource options and combinations of resource options performed.
- Levelized busbar costs for various generation technologies.

NCUC Rule R8-60(h),(i) (Reference 8.0-015).

In each year in which a biennial report is not required to be filed, utilities are required to file an annual report. *Id.* at Rule R8-60(h). Annual reports must contain an updated 15-year forecast of native load, supply-side, and demand-side requirements (described in NCUC Rule R8-60(c)(1)), as well as significant amendments or revisions to the most recently filed biennial report. *Id.* at R8-60(h)(2). Additionally, each utility's biennial and annual report must be accompanied by a short-term action plan that discusses those specific actions currently being taken by the utility to implement the activities chosen as appropriate per the applicable biennial and annual reports and include the utility's REPS compliance plan. NCUC Rule R8-60(h)(3),(h)(4).

After the filing of a biannual or annual report, the Public Staff or any other intervener may file a report, evaluation, or comments to a utility's report and identify issues that interested parties believe should be the subject of an evidentiary hearing. *Id.* at Rule R8-60(j). NCUC may hold an evidentiary hearing at its discretion. *Id.*

In turn, NCUC is required to "develop, publicize, and keep current an analysis of the long-range needs for expansion of facilities for the generation of electricity in North Carolina. . . " N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). This analysis is comprehensive, including: NCUC's estimate of the probable future growth of the use of electricity; the probable needed generating reserves; the extent, size, mix, and general location of generating plants; and arrangements for pooling power to the extent not regulated by the Federal Energy Regulatory Commission (FERC). *Id.*

In developing its long-range analysis, NCUC is required to confer and consult with the public utilities in North Carolina, utilities commissions or comparable

agencies of neighboring states, FERC, the Southern Growth Policies Board, and other agencies having relevant information. *Id.* NCUC also may participate as it deems useful in any joint boards investigating generating plant sites or the probable need for future generating facilities. *Id.* Utilities may, in addition to submitting IRP reports, submit proposals regarding future needs for electricity to NCUC as it prepares its analysis regarding the long-range needs for expansion of facilities for the generation of electricity in North Carolina. *Id.* In the course of developing its analysis, NCUC is required to hold one or more public hearings. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-015). To the extent practicable, utilities may attend or be represented at any formal conference conducted by NCUC in developing the long-range plan. *Id.*

Following a public hearing, NCUC is required to submit annually to the North Carolina Governor and to the appropriate committees of the General Assembly a report of: (1) NCUC's analysis and plan; (2) NCUC's progress to date in carrying out such plan; and (3) the program of NCUC for the ensuing year in connection with such plan. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-015).

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The process for approving construction of electricity-generating facilities is similarly comprehensive. For generating facilities with capacities of 300 MWe or more, at least 120 days before filing a CPCN application with NCUC, a utility is required to file, among other things, a "statement of need" for the facility, providing information on loads and generating capability. NCUC Rule R8-61(a)(3) (Reference 8.1-015). Information to be provided in the CPCN application itself, supported by relevant testimony, includes:

- The most recent biennial IRP report and the most recent annual IRP report of the utility, plus any proposals by the utility to update the report.
- The extent to which the proposed construction conforms to the utility's most recent biennial report and most recent annual report.
- Support for any utility proposals to update its most recent biennial report and its most recent annual report.
- Updates, if any, to the Rule R8-61(a) information that was provided at least 120 days prior to the application's filing.
- If the application is for a coal or nuclear generating facility, information demonstrating that energy efficiency measures; demand-side management; renewable energy resource generation; combined heat and power generation; or any combination thereof, would not establish or maintain a more cost-effective and reliable generation system.

NCUC Rule R8-61(b)(1)-(4),(13) (Reference 8.1-015).

Therefore, an IRP report issued this year is not controlling to the state's decision regarding the CPCN because what is most relevant is the most recent IRP that is

filed immediately preceding the filing of the CPCN. Ensuring the IRP evaluated during the CPCN proceeding is current and updated is one element relied on by the state to handle the uncertainty inherent in forecasting long-term need for power.

Like IRP reports, CPCN applications are also subject to a hearing process. NCUC is required to hold a hearing upon receiving a filed complaint or may call a hearing on its own initiative. *Id.* It is the duty and responsibility of the Public Staff to intervene on behalf of the public in all certificate applications filed pursuant to N.C. Gen. Stat. § 62-110.1. N.C. Gen. Stat. § 62-15(d)(5) (Reference 8.1-014). In the event there is a hearing, NCUC will require that briefs and oral arguments be submitted, furnish a transcript of evidence and testimony submitted after the taking each day of testimony, and issue a decision within 60 days after submission of the briefs. *Id.* at § 62-82(a) (Reference 8.1-016).

North Carolina law requires NCUC to consider its analysis of the "long-range needs for the expansion of facilities for the generation of electricity in North Carolina" in acting upon any petition for the issuance of a Certificate for Public Convenience and Necessity (CPCN) of construction of a generating facility. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). NCUC shall also take into account the applicant's arrangements with other electric utilities for interchange of power, pooling of plants, purchase of power and other methods for providing reliable, efficient, and economical electric service, and approve the estimated construction costs and made a finding that construction will be consistent with NCUC's plan for expansion of electric generating capacity. *Id.* at § 62-110.1(d),(e).

8.1.4 PROCESS IS SUBJECT TO CONFIRMATION

Utilities' IRP reports are subject to confirmation through public comment and an opportunity to be heard. Within 150 days after the filing of each utility's biennial report, or within 60 days after the filing of a utility's annual report, the Public Staff or any other intervenor may file its own plan or an evaluation of, or comments on, the utilities' biennial and annual reports. NCUC Rule R8-60(j) (Reference 8.1-015). The Public Staff or any other intervenor may identify any issue that it believes should be the subject of an evidentiary hearing. *Id.* The parties may file reply comments addressing any substantive or procedural issue raised by any other party. *Id.* At the discretion of NCUC, a hearing to address issues raised by the Public Staff or other intervenors may be scheduled, which may be limited to issues identified by NCUC. *Id.* Additionally, NCUC, as required by law, shall set a time and place to receive testimony from the public. *Id.*

The following description provides an example of how the North Carolina IRP review process provides for confirmation. In late 2007, Duke Power Corporation (Duke) and PEC filed their IRP annual reports. NCUC Docket No. E-100, Sub. 114, Order Approving Integrated Resource Plans, September 19, 2008, at 5 (Reference 8.1-017). Several organizations, including the Public Staff, filed interventions and comments to these annual reports and requested an evidentiary hearing regarding the validity of the utilities' load forecasts, the effects

of oversupply and overbuilding, and to review the impacts of demand-increasing programs on the load forecasts. *Id.* at 5-6. NCUC scheduled an evidentiary hearing on the limited issue of the validity of the load forecasts because "the load forecasts are the basic building blocks upon which the IRP rests" and "the issue of their reliability is of crucial importance." *Id.* at 6. Before the public and evidentiary hearings, PEC and an intervenor filed testimony, Duke filed rebuttal testimony, and NCUC received letters and e-mails from the public. *Id.* NCUC held a public hearing in which 22 witnesses testified regarding issues such as energy conservation and energy efficiency. *Id.* A month after the public hearing, NCUC held the evidentiary hearing. *Id.* PEC, Duke and the intervenors presented direct and, in some cases, rebuttal testimony. *Id.* Following the evidentiary hearing, one intervenor filed proposed findings and a brief; the Public Staff, and PEC and Duke jointly, filed proposed orders. *Id.* at 7. Two months later, NCUC issued its order approving the Duke and PEC IRPs, finding that the energy and peak load forecasts were reasonable. *Id.* at 21-22.

NCUC's analysis of the long-range needs for expansion of facilities for the generation of electricity in North Carolina is subject to confirmation through public scrutiny and reporting to executive and legislative authorities. NCUC is required to annually submit its report to the North Carolina Governor and to the appropriate committees of the General Assembly. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). Additionally, the report's viability is bolstered by public input through required public hearings, by the ability of public utilities to attend or be represented at any formal conference conducted by NCUC in developing the long-range plan, and input of the Public Staff. *Id.* at §§ 62-110.1(c) (Reference 8.1-013); 62-15(b),(d)(5) (Reference 8.1-014).

Like the IRP review process, utilities' CPCN applications are subject to public confirmation through a hearing process. No later than three months following the application's filing, NCUC, upon complaint shall, or upon its own initiative may, commence a hearing to determine whether the certificate should be awarded after providing reasonable notice. N.C. Gen. Stat. § 62-82(a) (Reference 8.1-016). NCUC will require that briefs and oral arguments be submitted, furnish a transcript of evidence and testimony submitted after the taking each day of testimony, and issue a decision within 60 days after submission of the briefs. *Id.* However, if NCUC does not receive a complaint and does not order a hearing on its own initiative, NCUC shall enter an award awarding the certificate. *Id.*

8.1.5 PROCESS CONSIDERS UNCERTAINTY

As part of the IRP process, each utility must take uncertainties into account in its analysis. For example, utilities must "analyze potential resource options and combinations of resource options to serve its system needs, taking into account the sensitivity of its analysis to variations in future estimates of peak load, energy requirements, and other significant assumptions, including, but not limited to, the risks associated with wholesale markets, fuel costs, construction/implementation costs, transmission and distribution costs, and costs of complying with environmental regulation." NCUC Rule R8-60(g) (Reference 8.1-015). Similarly, when providing data for existing electric generating facilities, forecast for a 15-year period, the IRP analysis is to include changes to existing units that are "expected to increase or decrease generation capability of the unit in question by an amount that is plus or minus 10%, or 10 MW, whichever is greater."

NCUC's analysis of the long-range needs for expansion of facilities for generation of electricity in North Carolina must include probabilities involving uncertainties: an estimate of the "probable future growth of the use of electricity" and the "probable needed generating reserves." N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). Additionally NCUC may participate in any joint boards investigating generating plant sites or the probable need for future generating facilities. *Id.*

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In determining whether to grant a utility's CPCN application, NCUC is required to consider a current long-range needs analysis regarding the long-range needs for expansion of facilities for the generation of electricity in North Carolina, thereby incorporating the uncertainties considered in its annual report. *See* N.C. Gen. Stat. § 62-110.1(c).

8.2 POWER DEMAND

This section describes the need-for-power evaluation process used by North Carolina with respect to power demand.

8.2.1 POWER AND ENERGY REQUIREMENTS

This section describes the need-for-power evaluation process used by North Carolina with respect to the historic and projected electricity consumption and peakload demands in the relevant service area or market.

NUREG-1555 provides the following guidance in ESRP 8.2.1:

> Affected States and/or regions continue to prepare need-for-power evaluations for proposed energy facilities. The NRC will review the evaluation and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. Forecasts should include demand scenarios for midrange, high, low, 75th

> percentile, and 25th percentile conditions. If the need for power evaluation is found acceptable, no additional independent review by the NRC is needed, and the analysis can be the basis for ESRPs 8.2 through 8.4.

Under NCUC Rule R8-60, utilities are required to examine multiple scenarios in providing their 15-year forecast for power demand. IRP reports are required to include peak load (MW) and energy sales (MWh) forecasts, including descriptions of the methods, models, and assumptions used. NCUC Rule R8-60(i)(1) (Reference 8.1-015). At a minimum, utilities' forecasts must include:

> (i) the most recent ten-year history and a forecast of customers by each customer class, the most recent ten-year history and a forecast of energy sales (kWh) by each customer class;
>
> (ii) A tabulation of the utility's forecast for at least a 15-year period, including peak loads for summer and winter seasons of each year, annual energy forecasts, reserve margins, and load duration curves, with and without projected supply- or demand-side resource additions. The tabulation shall also indicate the projected effects of demand response and energy efficiency programs and activities on the forecasted annual energy and peak loads on an annual basis for a 15-year period, and these effects also may be reported as an equivalent generation capacity impact; and
>
> (iii) Where future supply-side resources are required, a description of the type of capacity/resource (base, intermediate, or peaking) that the utility proposes to use to address the forecasted need.

Id.

Additionally, IRP reports are required to provide a calculation and analysis of winter and summer peak reserve margins over a projected 15-year period, and provide information on levelized busbar costs for various generation technologies. *Id.* at Rule R8-60(i)(4),(9). Utilities are also required to provide a description and a summary of the results of analyses of potential resource options and combinations of resource options performed. *Id.* at Rule R8-60(i)(8).

Similarly, NCUC's analysis of the long-range needs for electricity in North Carolina includes analysis of power and energy requirements, including NCUC's estimate of the probable future growth of the use of electricity, the probable needed generating reserves, the extent, size, mix, and general location of generating plants, and arrangements for pooling power to the extent not regulated by FERC. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). In determining whether to grant a utility's CPCN application, NCUC is required to consider its long-range needs analysis, thereby incorporating the long-term energy evaluation process set forth in NCUC Rule R8-60. *See* N.C. Gen. Stat. § 62-110.1(c).

8.2.2 FACTORS AFFECTING POWER GROWTH AND DEMAND

This section describes the need-for-power evaluation process used by North Carolina with respect to the rate of growth of electricity demand in the applicant's service area.

NUREG-1555 provides the following guidance in ESRP 8.2.2:

> Affected States and/or regions continue to prepare a need-for-power evaluation for proposed energy facilities. The NRC will review the evaluation for the proposed facility, if available, and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the State/regional need-for-power evaluation is found to be acceptable, no additional independent review by NRC is needed, and the State or regional analysis can be the basis for ESRPs 8.2 through 8.4.

Under NCUC Rule R8-60, utilities are required to forecast rate of growth of electricity demand in their IRPs for 15 years. NCUC Rule R8-60(i)(1) (Reference 8.1-015). These tabulations include peak loads for summer and winter seasons of each year, annual energy forecasts, reserve margins, and load duration curves, with and without projected supply- or demand-side resource additions, and indicate the projected effects of demand response and energy efficiency programs and activities on the forecasted annual energy and peak loads on an annual basis for a 15-year period. *Id.* at Rule R8-60(i)(1)(ii).

Utilities are also required to provide the results of their overall assessment of existing and potential demand-side management programs, including a descriptive summary of each analysis performed or used by the utility in the assessment. *Id.* at Rule R8-60(i)(6) (Reference 8.1-015). For demand-side programs available at the time of the report, utilities are required to provide the type of resource, the capacity and energy available in the program, the number of customers enrolled in each program, the number of times the utility has called upon the resource, and, where applicable, the capacity reduction realized each time since the previous biennial report. *Id.* at Rule R8-60(i)(6)(i). Utilities are also required to list any demand-side resource they have discontinued since the previous biennial report and the reasons for that discontinuance. *Id.* For demand-side management programs utilities propose to implement within the next two years, NCUC Rule R8-60 requires the type of resource, a description of the new program and the target customer segment, the capacity and energy expected to be available from the program, projected customer acceptance, the date the program will be launched, and the rationale as to why the program was selected. *Id.* at Rule R8-60(i)(6)(ii). For programs evaluated but rejected, utilities are required to provide the following information for each resource considered: the type of resource, a description of the program and the target customer segment,

the capacity and energy available from the program, projected customer acceptance, and reasons for the program's rejection. *Id.* at Rule R8-60(i)(6)(iii).

In developing its long-range analysis, NCUC is required to confer and consult with the public utilities in North Carolina, the utilities commissions or comparable agencies of neighboring states, FERC, the Southern Growth Policies Board, and other agencies having relevant information and may participate as it deems useful in any joint boards investigating generating plant sites or the probable need for future generating facilities. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). This enables NCUC to assess factors external to North Carolina in determining growth of electricity demand.

NCUC's analysis of the long-range needs for electricity in North Carolina includes analysis of power and energy requirements, including an estimate of the probable future growth of the use of electricity and arrangements for pooling power to the extent not regulated by FERC. *Id.* at § 62-110.1(c) (Reference 8.1-013). In determining whether to grant a utility's CPCN application, NCUC is required to consider its long-range needs analysis, thereby incorporating the process set forth in NCUC Rule R8-60. *See id.* Additionally, after a CPCN is granted, NCUC may review the certificate to determine whether changes in the probable future growth of the use of electricity indicate that the public convenience and necessity require modification or revocation of the certificate. *Id.* at § 62-110.1(e1).

Past IRPs do not control whether the NCUC will to approve a CPCN application; what is most relevant is the information in the CPCN filing. It is reasonable to expect that the most recent IRP that is filed immediately preceding the filing of the CPCN application will contain the most recent information that will form the basis for the CPCN application. Past data provides a reliable indicator of what a future IRP will contain; hence what will likely be in a CPCN application for HAR.

Based on the rules and regulations pertaining to the issuance of a CPCN in North Carolina, Progress Energy will be required to demonstrate a need for at least 2,000 MW of power and that the HAR project is the most cost effective means of meeting that need for power. PEC's 2010 IRP assumes that the ROI has an adjusted demand growth of 1.1% per year. Progress Energy Carolinas Integrated Resource Plan, September 13, 2010, at 5 (Reference 8.1-011). The trend shows an average increase in demand sufficient aggregated over about ten years of at least 2,000 megawatts. Therefore, it is reasonable to predict that an IRP filed in advance of the application for a CPCN would show the need for 2,000 MW of nuclear power. *See id.*

8.3 POWER SUPPLY

This section describes the need-for-power evaluation process used by North Carolina with respect to present and planned generating capability and the present and planned purchases and sales of power and energy.

The NRC's NUREG-1555 guidance allows an applicant to rely on a state's regulatory power planning structure:

> Affected States and/or regions are expected to prepare a need-for-power evaluation. NRC will review the evaluation and determine if it is (1) systematic, (2) comprehensive, (3) subject to confirmation, and (4) responsive to forecasting uncertainty. If the need for power evaluation is found acceptable, no additional independent review by NRC is needed, and the analysis can be the basis for ESRPs 8.2 through 8.4.
>
> As part of their analyses of the need for power, States and/or regional authorities are expected to describe and assess the regional power system. The reviewer should evaluate the description, determine if it is comprehensive, and subject to confirmation. If it is found acceptable, no additional data collection by NRC should usually be needed. These data may be supplemented by information from sources such as the EIA, FERC, NERC, and others.

Utilities are required to provide information regarding their existing and planned electric generating facilities, including planned additions and retirements, but excluding cogeneration and small power production facilities. NCUC Rule R8-60(i)(2) (Reference 8.1-015). With respect to existing generation facilities, utilities are required to provide a list of existing units in service by type of fuel(s) used, type of unit (e.g., base, intermediate, or peaking), the location of each existing unit, a list of units to be retired from service with location, capacity, and expected date of retirement from the system, and a list of units for which there are specific plans for life extension, refurbishment or upgrading. *Id.* at Rule R8-60(i)(2)(i). Utilities are also required to provide the expected or actual date removed from service, location, capacity rating upon return to service, expected return to service date, and a general description of work to be performed. *Id.* With respect to planned generation additions, utilities are required to provide a list of planned generation additions, the rationale as to why each listed generation addition was selected, and a 15-year projection of the following for each listed addition by type of fuel used, type of unit, the location of each planned unit to the extent such location has been determined, and summaries of the analyses supporting any new generation additions included in the 15-year forecast, including designation as base, intermediate, or peaking capacity. *Id.* at Rule R8-60(i)(2)(ii). With respect to non-utility generation, utilities are required to provide a separate and updated list of all non-utility electric generating facilities in their respective service areas, including customer-owned and stand-by generating facilities by facility name, location, primary fuel type, and capacity, including designation as base, intermediate, or peaking capacity. Utilities are also required to indicate which facilities are included in the total supply of resources. *Id.* at Rule R8-60(i)(2)(iii). Utilities must include a calculation and analysis of winter and summer peak reserve margins over a projected 15-year period, and provide information on levelized busbar costs for various generation technologies. *Id.* at Rule R8-60(i)(4),(9).

Utilities are also required to provide an assessment of existing and potential alternative supply-side energy resources, including a descriptive summary of each analysis performed or used by the utility in the assessment. *Id.* at Rule R8-60(i)(7) (Reference 8.1-015). For currently operational or potential future alternative supply-side energy resources, utilities are required to provide information on the capacity and energy actually available or projected to be available, as applicable, from the resource. *Id.* Utilities are required to provide this information for any actual or potential alternative supply-side energy resources that have been discontinued since the last biennial report and the reasons for discontinuance. *Id.* For alternative supply-side energy resources evaluated but rejected, utilities shall provide the following information for each resource considered: a description of the resource, the potential capacity and energy associated with the resource, and the reasons for the rejection of the resource. *Id.*

In developing its long-range analysis, NCUC is required to confer and consult with the public utilities in North Carolina, the utilities commissions or comparable agencies of neighboring states, FERC, the Southern Growth Policies Board, and other agencies having relevant information and may participate as it deems useful in any joint boards investigating generating plant sites or the probable need for future generating facilities. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). This enables NCUC to assess factors external to North Carolina in determining sources of supply.

NCUC's analysis of the long-range needs for electricity in North Carolina includes analysis of power and energy requirements, including the probable needed generating reserves, the extent, size, mix, and general location of generating plants, and arrangements for pooling power to the extent not regulated by FERC. N.C. Gen. Stat. § 62-110.1(c) (Reference 8.1-013). In determining whether to grant a utility's CPCN application, NCUC is required to consider its long-range needs analysis, thereby incorporating the process set forth in NCUC Rule R8-60. *See id.* The purpose of this certificate is to determine whether there is a need for a new electric generating plant to meet the electricity needs of PEC's customers. A CPCN for the construction of a nuclear facility may only be granted if the applicant demonstrates, and NCUC finds, that energy efficiency measures, demand-side management, renewable energy resource generation, combined heat and power generation, or any combination thereof, would not establish or maintain a more cost-effective and reliable generation system and that the construction and operation of the facility is in the public interest. *Id.* at § 62-110.1(e).

8.4 ASSESSMENT OF NEED FOR POWER

The state process will evaluate the economic appropriateness of viable generation alternatives and will consider any economic impact from regulation of emissions, including greenhouse gases by electric generators. ER Section 9.2 discusses the environmental impact of various baseload energy alternatives. ER Section 10.4 compares the overall costs and benefits of the HAR. This data

shows it is reasonable to predict that a future CPCN for HAR would be granted to compensate for increasingly aging and costly fossil generators, particularly coal. Power demand in the ROI is generally increasing as discussed in Section 8.2 above. Power generation assets, particularly those fossil-fueled are aging and can be expected to become relatively more costly in the future as discussed in Section 8.3. Increased generation within the ROI will be needed to meet state objectives for system reliability. It is reasonable to predict that at least 2000 MW of nuclear power will be needed to provide an adequate mix of nuclear and fossil-fueled baseload generation at a reasonable price.

Throughout the Carolinas region, utilities and state regulators are considering the possible advantages of regional partnerships for new nuclear construction. In practice, the exact timing and amount ownership of an eventual regional partnership would depend on the specific project resulting in potential adjustments of both timing and volume of available generation. Under the current assumptions for future carbon legislation, carbon dioxide limits would continue to ramp down significantly beyond 2025. Such an outcome would likely require an increasing fraction of nuclear generation in the mix of baseload generation in the ROI after 2025 to meet declining greenhouse gas reduction targets further supporting a predicted need for at least 2000 MW of nuclear power generation in the ROI after 2025.

8.5 REFERENCES

8.0-001 NOT USED.

8.0-002 NOT USED.

8.0-003 NOT USED.

8.0-004 NOT USED.

8.0-005 NOT USED.

8.1-001 NOT USED.

8.1-002 NOT USED.

8.1-003 NOT USED.

8.1-004 NOT USED.

8.1-005 NOT USED.

8.1-006 NOT USED.

8.1-007 NOT USED.

8.1-008 NOT USED.

8.1-009 NOT USED.

8.1-010 NOT USED.

8.1-011 Progress Energy Carolinas, Inc., "Progress Energy Carolinas Integrated Resource Plan," North Carolina Utilities Commission Docket No. E-100, Sub 128, Public Service Commission of South Carolina Docket No. 2010-8-E, September 13, 2010. Website, http://ncuc.commerce.state.nc.us/docksrch.html, accessed November 15, 2010.

8.1-012 North Carolina General Assembly, North Carolina General Statute 62-2. Website, http://www.ncga.state.nc.us/gascripts/statutes/statutes.asp, accessed November 15, 2010.

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8.1-015 North Carolina Utilities Commission, "Rules and Regulations of the North Carolina Utilities Commission," Ch. 8, Annual Report, Website, http://www.ncuc.commerce.state.nc.us/ncrules/Chapter08.pdf, accessed November 11, 2010.

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8.2-002 NOT USED.

8.2-003 NOT USED.

8.2-004 NOT USED.

8.3-001 NOT USED.

8.4-001 NOT USED.

8.4-002 NOT USED.

8.4-003 NOT USED.

8.4-004 NOT USED.

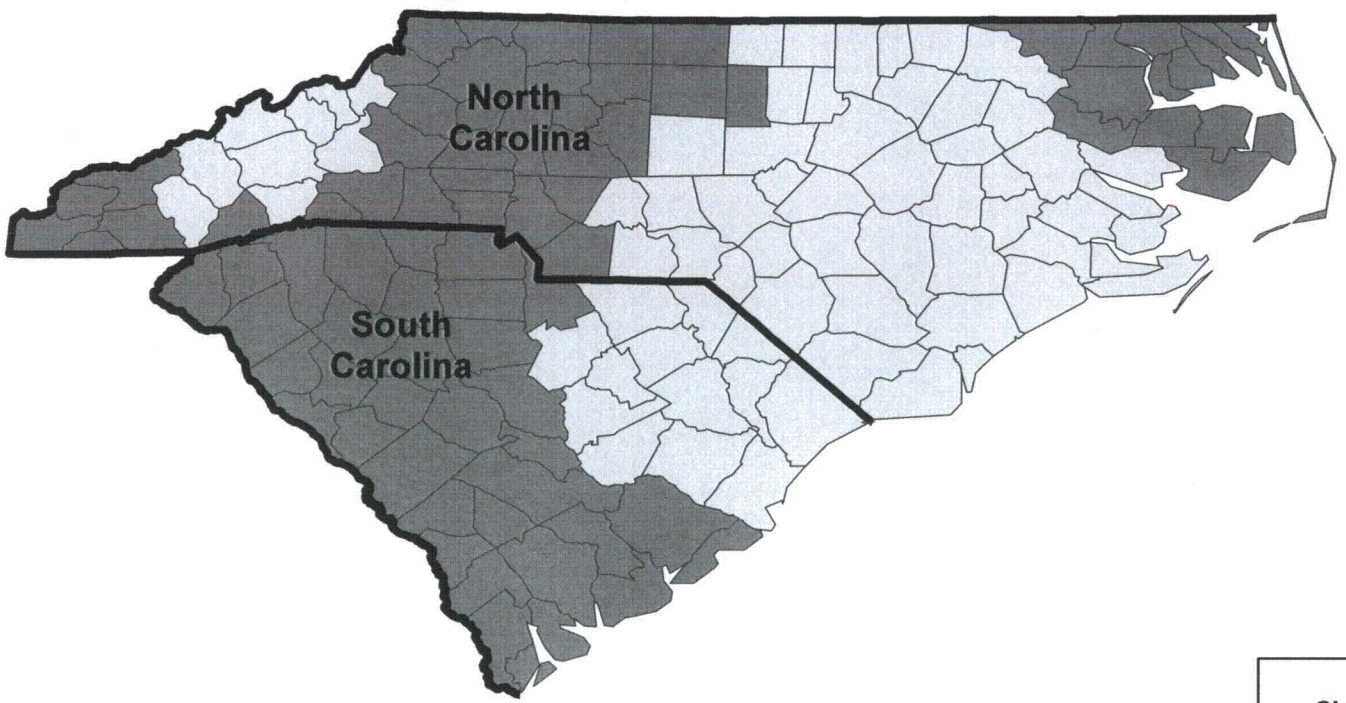
8.4-005 NOT USED.

8.4-006 NOT USED.

8.4-007 NOT USED.

8.4-008 NOT USED.

8.4-009 NOT USED.



N
W E
S

LEGEND

State Boundary

Service Area

0 50 100 150

Kilometers

0 50 100 150

Miles

Progress Energy Carolinas

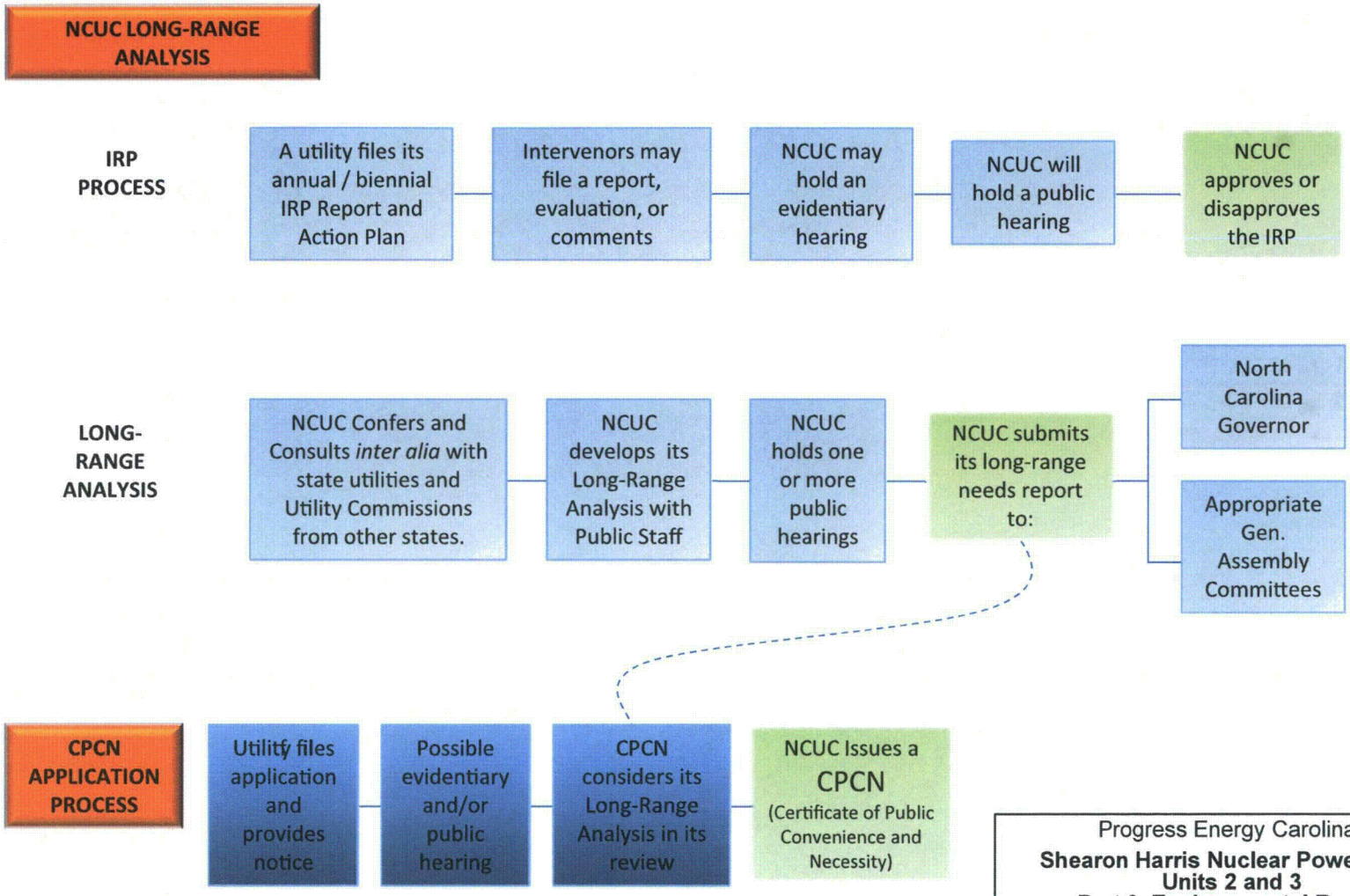
Shearon Harris Nuclear Power Plant
Units 2 and 3
Part 3, Environmental Report

New Hill, North Carolina

Progress Energy Carolinas Region of Interest

FIGURE 8.0-1

Rev 3



Progress Energy Carolinas

Shearon Harris Nuclear Power Plant Units 2 and 3
Part 3, Environmental Report

New Hill, North Carolina

Summary of the North Carolina Power Planning and Plant Construction Approval Process

FIGURE 8.1-1 Rev 3