Duke Energy®

~~This letter contains Security Sensitive Information~~
~~Withhold from Public Disclosure under 10 CFR 2.390~~

T. PRESTON GILLESPIE, Jr.
Vice President
Oconee Nuclear Station

Duke Energy
ON01VP / 7800 Rochester Hwy.
Seneca, SC 29672

864-873-4478
864-873-4208 fax
T.Gillespie@duke-energy.com

October 17, 2011

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: Duke Energy Carolinas, LLC (Duke Energy)
Oconee Nuclear Station (ONS), Units 1, 2, and 3
Renewed Facility Operating License Numbers DPR-38, DPR-47, and DPR-55;
Docket Numbers 50-269, 50-270, and 50-287;
Response to Requests for Additional Information Regarding Necessary Modifications to Enhance the Capability of the ONS Site to Withstand the Postulated Failure of the Jocassee Dam

References:

1. Duke Energy letter from T. Preston Gillespie to Luis Reyes (Nuclear Regulatory Commission), Oconee Response to Confirmatory Action Letter (CAL) 2-10-003, dated November 29, 2010
2. Duke Energy letter from T. Preston Gillespie to Victor McCree (Nuclear Regulatory Commission), Oconee Response to Confirmatory Action Letter (CAL) 2-10-003, dated April 29, 2011
3. Nuclear Regulatory Commission (NRC) letter from John Grobe to Preston Gillespie (Duke Energy), Oconee Nuclear Station, Units 1, 2, and 3, Assessment of Duke Energy Carolinas, LLC's, April 29, 2011, Response to Confirmatory Action Letter Regarding Modifications to Address External Flooding Concerns (TAC Nos. ME6133, ME6134, and ME6135), dated August 18, 2011

By letter dated November 29, 2010 (Reference 1), Duke Energy committed to provide the NRC with a list of necessary modifications to enhance the capability of the ONS site to withstand the postulated failure of the Jocassee Dam. This list of necessary modifications was provided to the NRC in a letter dated April 29, 2011 (Reference 2). Subsequently, the NRC transmitted a Request for Additional Information (RAI) letter to Duke Energy on August 18, 2011 (Reference 3), concerning information provided in the April 29, 2011 letter. The Enclosure to this letter provides Duke Energy's responses to the NRC RAIs contained in the August 18, 2011 letter (Reference 3).

Since this letter and its enclosure contain security sensitive information, Duke Energy hereby requests the NRC to withhold them from public disclosure pursuant to 10 CFR 2.390(d)(1), "Public inspections, exemptions, requests for withholding."

A001
NRR

This letter contains no new regulatory commitments. If there are any questions regarding this submittal, please contact Kent Alter, the ONS Regulatory Compliance Group Manager, at (864) 873-3255.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 17, 2011.

Sincerely,

TPGillespie

T. Preston Gillespie, Jr.
Vice President
Oconee Nuclear Station

Enclosure: Response to August 18, 2011 Requests for Additional Information Regarding ONS External Flooding

cc w/Enclosure:

Mr. Victor McCree, Regional Administrator
U. S. Nuclear Regulatory Commission - Region II
Marquis One Tower
245 Peachtree Center Ave., NE, Suite 1200
Atlanta, Georgia 30303-1257

Mr. John Stang, Project Manager
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop 0-8 G9A
Washington, DC 20555

Mr. Andy Sabisch
Senior Resident Inspector
Oconee Nuclear Site

Ms. Susan E. Jenkins, Manager
Radioactive & Infectious Waste Management
Division of Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull St.
Columbia, SC 29201

bcc w/Enclosure:

L. S. Nichols
J. E. Burchfield
J. A. Kammer
R. J. Freudenberger
T. L. Patterson
K. R. Alter
R. H. Guy
C. J. Thomas - GO
R. D. Hart - CNS
K. L. Ashe - MNS
NSRB, ECOSN
ELL, EC050
ONS Document Management

ENCLOSURE

Response to

August 18, 2011 Requests for Additional Information

Regarding ONS External Flooding

Response to August 18, 2011 Requests for Additional Information Regarding ONS External Flooding

Duke Energy's responses to NRC RAIs documented in the August 18, 2011 letter regarding ONS external flooding are provided in this enclosure. Please note that the 'number' assigned to each RAI corresponds to the sequence of the 'bulleted' items from the NRC August 18, 2011 letter.

NRC RAI 1:

Provide justification for the statement in your April 29, 2011, letter that the postulated failure of the Jocassee Dam is considered a beyond design basis event.

Response:

Within the April 29, 2011 letter (Response Reference 1), the statement related to the postulated failure of the Jocassee Dam being beyond design basis was a historical discussion relative to the Updated Final Safety Analysis Report (UFSAR) Criterion 2. From a historic perspective, the failure of the Jocassee Dam was not postulated within the Oconee licensing or design basis and therefore, would have been a beyond design basis event. As discussed in previous correspondence and below, Duke Energy plans to incorporate external flooding resulting from a postulated Jocassee Dam failure into the Oconee licensing basis.

With regard to the Jocassee Dam, Oconee Nuclear Station (ONS) remains in full compliance with its original design and licensing basis. There are two potential failures considered for the Jocassee Dam in the original licensing basis for ONS. These separate failures are associated with overtopping of the dam due to Probable Maximum Precipitation (PMP) and application of seismic loads to the Jocassee Dam. The PMP induced external flooding analysis shows that the Jocassee project is designed with adequate margin to contain and control floodwaters without resulting in a failure of the Jocassee Dam (Reference UFSAR Section 2.4.2). In addition, Jocassee Dam is designed to ensure an adequate factor of safety under postulated seismic design criteria. As such, no failures of the Jocassee Dam are assumed under seismic conditions (Reference UFSAR Section 2.4.4). Consequently, the postulated failure of the Jocassee Dam for purposes of the licensing basis revision does not have an initiating event (Response Reference 6).

Duke Energy submitted a supplemental response to Generic Letter No. 83-28 on April 12, 1995 (Response Reference 3) which described the ONS licensing basis and general criteria for classifying QA-1 systems, structures, and components (SSCs). The QA-1 designation defined in the Duke Energy Quality Assurance Program Topical Report (Response Reference 4) is analogous to the term safety related. The Duke Energy Topical Report describes how 10 CFR 50, Appendix B is implemented at Oconee. Attachment 4, "Oconee Licensing Position on Non QA-1 SSCs Which are Used to Mitigate Accidents," is included in the April 12, 1995 letter. High wind, external flooding, and seismic events are included in Attachment 4a which describes events which are treated as design criteria to provide a high level of confidence that the equipment needed to safely shut down the plant will remain functional. The conclusion that

these events are considered design criteria rather than design basis events is included in the NRC Safety Evaluation dated August 3, 1995, (Response Reference 5) issued in response to Duke Energy's April 12, 1995 response (Response Reference 3).

Duke Energy letter dated April 12, 1995 (Response Reference 3) described the events treated as QA-1 and Non QA-1. Attachment 4a of this letter defined external flooding as design criteria that was not included in the QA or augmented QA program. This position is consistent with the NRC review documented in the associated NRC Safety Evaluation dated August 3, 1995 (Response Reference 5).

Duke Energy has decided to enhance the overall safety performance of ONS through the implementation of modifications to address external plant flooding conditions. These modifications, considered safety enhancements, would be designed to withstand the effects of a postulated failure of the Jocassee Dam to provide reasonable assurance that:

- The three Oconee units can be safely shut down and maintained in a safe shutdown condition, and
- The two spent fuel pools can be maintained in a safe condition.

Similar to the site PMP, external flooding as a result of a postulated Jocassee Dam failure is to be treated as a design criterion, not a design basis event. External flooding is not included as a design basis event within the existing Oconee licensing basis. The distinction between the treatment of external flooding at ONS as a design criterion rather than a design basis event is inherent in documentation within ONS UFSAR Chapter 15 (accident analysis chapter). This UFSAR chapter states, "This section details the expected response of the plant to the spectrum of transients and accidents which constitute the design basis events." High wind, external flooding, and seismic events are not included in UFSAR Chapter 15, and therefore, are treated as design criteria.

As with the implementation and licensing of other safety enhancements at ONS (i.e., Station Blackout, Anticipated Transient without Scram), it is consistent to classify these enhancements as beyond design basis events.

Duke Energy plans to incorporate these modifications into the licensing basis through an update of the UFSAR in accordance with the requirements of 10 CFR 50.71, "Maintenance of records, making or reports," and 10 CFR 50.59, "Changes, tests, or experiments," or 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," as appropriate. 10 CFR 50.71(e) requires that the description of new analysis of issues affecting safety be included in the UFSAR. As such, Duke Energy plans to include a description of the analysis in UFSAR Chapter 2.4, "Hydrologic Engineering" as well as conforming changes to other sections of the UFSAR, as appropriate. This is consistent with our previous correspondence in the letter dated July 9, 2009 (Response Reference 2). Upon completion of the UFSAR update, external flooding associated with the postulated Jocassee Dam failure will be included in the licensing basis as a design criterion.

NRC RAI 2:

Provide clarification that natural phenomena are not design basis events at ONS (i.e., high winds, external flooding, and seismic events).

Response:

Oconee Nuclear Station (ONS) was designed, constructed, and licensed to design criteria that are described in the ONS UFSAR and predate 10 CFR 50, Appendix A, "General Design Criteria for Nuclear Power Plants," and the use of the term design basis event. Based on regulations that were in place during original ONS licensing, Oconee's license relies on features that are safe and effective, were approved by the NRC, but that are not always consistent with the NRC Standard Review Plan.

There are two potential failures considered for the Jocassee Dam in the original licensing basis for ONS. These separate failures are associated with overtopping of the dam due to Probable Maximum Precipitation (PMP) and application of seismic loads to the Jocassee Dam. The PMP induced external flooding analysis shows that the Jocassee project is designed with adequate margin to contain and control floodwaters without resulting in a failure of the Jocassee Dam (Reference UFSAR Section 2.4.2). In addition, Jocassee Dam is designed to ensure an adequate factor of safety under postulated seismic design criteria. As such, no failures of the Jocassee Dam are assumed under seismic conditions (Reference UFSAR Section 2.4.4). Consequently, the postulated failure of the Jocassee Dam for purposes of the licensing basis revision does not have an initiating event (Response Reference 6).

The postulated failure of the Jocassee Dam has no initiating event and would result in external flooding at ONS. External flooding is addressed within the licensing basis for Oconee. For example, external flooding as a result of PMP is classified as design criteria within the Oconee licensing basis. As such, Duke Energy proposes treatment of these mitigating features in a manner consistent with the Oconee licensing basis.

Generic Letter No. 83-28, "Required Actions Based on Generic Implications of Salem ATWS Events," addressed four specific areas including the programs for ensuring that all components necessary for accomplishing required safety-related functions are properly identified in documents, procedures, and information handling systems that are used to control safety related plant activities. Duke Energy submitted a supplemental response to Generic Letter No. 83-28 on April 12, 1995 (Response Reference 3) which described the ONS licensing basis and general criteria for classifying QA-1 systems, structures, and components (SSCs). The QA-1 designation defined in the Duke Energy Quality Assurance Program Topical Report (Response Reference 4) is analogous to the term safety related. The Duke Energy Topical Report describes how 10 CFR 50, Appendix B is implemented at Oconee.

Attachment 4, "Oconee Licensing Position on Non QA-1 SSCs Which are Used to Mitigate Accidents," is included in the April 12, 1995 letter. High wind, external flooding, and seismic events are included in Attachment 4a which describes events which are treated as design criteria to provide a high level of confidence that the equipment needed to safely shut down the plant will remain functional. The conclusion that these events are considered design criteria

rather than design basis events is included in the NRC Safety Evaluation dated August 3, 1995 (Response Reference 5), issued in response to Duke Energy's April 12, 1995 response (Response Reference 3).

The distinction between the treatment of natural phenomena at ONS as design criteria rather than design basis events is also inherent in documentation within ONS UFSAR Chapter 15 (accident analysis chapter). This UFSAR chapter states, "This section details the expected response of the plant to the spectrum of transients and accidents which constitute the design basis events." High wind, external flooding, and seismic events are not included in UFSAR Chapter 15, and therefore, are treated as design criteria.

NRC RAI 3:

Provide justification for the assumptions used in the development of the mitigating strategies and the entry conditions associated with each phase of the mitigation strategies.

Response:

The following licensing and design basis inputs and assumptions have been defined for the postulated failure of the Jocassee Dam:

Design and Licensing Basis Inputs and Assumptions:

1. No initiating event is assumed for the postulated failure of the Jocassee Dam.
2. No single active or passive failure is assumed in addition to the postulated failure of the Jocassee Dam. The failure of a control rod to fully insert is not assumed.
3. The postulated failure is not combined with any other design criteria, design basis event, operational occurrence, transient, or design basis accident.
4. The external flood mitigating features will not be seismically designed.
5. This postulated failure of the Jocassee Dam is not treated as a design basis event. (See response to RAI 1 for justification).
6. Inputs and assumptions associated with inundation analyses are in accordance with the base case (Case 2) as reviewed by the NRC in the Safety Evaluation dated January 28, 2011 (Response Reference 6).

It should be noted that in executing the detailed design of the passive mitigating features for a postulated failure of the Jocassee Dam a number of calculations and analyses will have to be performed. These calculations will adopt the design and licensing basis inputs and assumptions listed above, as appropriate. In addition, a number of other inputs and assumptions will be made in completing this analytical work. These inputs and assumptions will be reasonable and appropriate for their use and will be justified and documented in calculations and analyses that will be available for NRC inspection.

The PMP induced flood studies showed that both Lake Jocassee and Lake Keowee were designed with adequate margin to contain and control flood waters (Reference UFSAR section 2.4.2). In addition, the Keowee Dam, Little River Dam, Jocassee Dam, and the Intake Canal Dike have been designed to have an adequate factor of safety under the same conditions of seismic loading used in the design of Oconee (Reference UFSAR section 2.4.4). As a result, a

postulated failure of the Jocassee Dam with no accident initiator is being added to the Oconee licensing basis as a design criterion (Response Reference 6).

The design basis events for Oconee are addressed in Chapter 15 of the UFSAR. Each event is considered individually without the concurrence of other events. The Loss of Off-site Power (LOOP) is not listed as a design basis event. However, a LOOP was a consideration for certain design basis events. The design basis events that consider a concurrent LOOP are the loss of coolant accident and the main steam line break.

As such, it is consistent with the ONS licensing basis to treat this postulated failure individually without combination with other design criteria or design basis events such as LOOP or seismic activity.

The external flooding from a postulated Jocassee Dam failure will not be combined with any other single active or passive failure. This conclusion is consistent with the ONS licensing basis.

The entry conditions associated with each phase are described in the response to the RAI 4.

NRC RAI 4:

Provide a summary of the sequence of actions for achieving each phase of the mitigating strategies. Identify when each operator action has to be completed. In addition, demonstrate that the sequence of events would not result in unacceptable radiological consequences. Identify and justify the selected acceptance criteria, and provide a detailed description of the analyses performed to support the conclusion.

Response:

The following response is based on the committed modifications being implemented. The sequence of actions is also based on preliminary analyses. Procedures have not yet been written to address the required operator actions. The following discussion of operator actions is intended to provide an overview of the strategy that may be employed post dam failure.

The mitigation of a postulated failure of the Jocassee Dam has been divided into three distinct phases based on the potential consequences. The first phase was established as the postulated failure of the Jocassee Dam itself. Monitoring activities performed by Duke Energy personnel at the Jocassee Hydroelectric Station result in notification to ONS regarding potential degradation and/or failure of the dam using the Jocassee Hydroelectric Station emergency action plans. Once notifications have been received at ONS actions are taken to provide a protected offsite AC power source to ONS. In addition, actions are taken to protect the yard (elevation 796'), the turbine building, and the auxiliary building from potential flooding that may result if the Keowee Dam and the Intake Canal dike are overtopped following the Jocassee Dam failure. Additional actions are to be taken to protect and conserve the water in the condenser circulating (CCW) water system to conserve the stored inventory should the Keowee Dam and the Intake Canal dike fail after overtopping occurs. Finally, the operators would take actions to place all three ONS units in hot standby with reactor coolant system (RCS) temperature at

approximately 555°F and RCS pressure at approximately 2155 psig. Normal plant systems remain available during this phase to maintain these conditions. Calculations indicate that two (2) hours would be available to complete these actions prior to overtopping of the Keowee Dam. Operators may initiate boration of the RCS from either the concentrated boric acid storage tank (CBAST) or from the borated water storage tank (BWST) while normal systems remain available.

When overtopping of the Keowee Dam and the Intake Canal dike occurs, the integrity of the dam and dike can no longer be assured. The failure of the Keowee Dam was assumed to result in the loss of both Keowee Hydroelectric Units and all of the unprotected offsite power sources (including the 230kV Switchyard). This results in a momentary loss of power until power is automatically restored from the protected offsite power source established in the first phase. Main feedwater (MFW) pumps and the reactor coolant pumps would be lost as a consequence. In addition, cooling for the spent fuel pools (SFP) would be lost. This marks the transition to the second phase of the scenario.

Operators would initiate the Loss of Power Abnormal Procedure to verify proper electrical load transfers and to reestablish power to needed equipment that experienced a load shed. The emergency feedwater (EFW) pumps would have automatically started due to the loss of the main feedwater pumps. Steam generator (SG) levels would be automatically controlled at the natural circulation setpoint. Operator action would be taken to control the makeup flow to the RCS using the high pressure injection (HPI) system. Natural circulation conditions would be verified. Actions would also be initiated to stop the low pressure service water (LPSW) pumps. This action would also require the motor-driven EFW pumps to be stopped. The EFW function would be maintained by the turbine-driven EFW pump. The elevated water storage tank (EWST) would provide cooling for the turbine-driven EFW pump and the HPI pump motor coolers. The high pressure service water (HPSW) jockey pump would be operated as necessary to maintain water level in the EWST. Actions would be taken to monitor the SFP for temperature and level.

At this point it would be clear that reactor coolant pumps could not be restored. Consequently, a natural circulation cooldown would be initiated. Operators would be required to borate the RCS by aligning HPI pump suction to the BWST and by opening the reactor vessel (RV) head vents. If no boration occurred during the first phase, boration using the RV head vents could require approximately 1.5 to 4 hours to complete sufficient boration of the RCS to initiate a plant cooldown. Operators would be dispatched to operate the atmospheric dump valves to initiate RCS cooldown. The RV head vents are required to remain open while performing a natural circulation cooldown at the maximum allowable cooldown rate to preclude void formation in the RV head. The HPI pumps would be operated to provide makeup to the RCS to compensate for density changes in the RCS as well as for inventory losses through the RV head vents. Suction for the HPI pumps would be provided by the BWST. The BWST will provide sufficient boration of the RCS to maintain adequate shutdown margin for the RCS cooldown. The pressurizer heaters would be de-energized and the power-operated relief valve (PORV) would be cycled, as necessary, to reduce RCS pressure during the natural circulation cooldown. When the main steam (MS) pressure is reduced to approximately 250 psig, the standby shutdown facility (SSF) auxiliary service water (ASW) system would be placed into service to feed the SGs to continue

the natural circulation cooldown. RCS cooldown and depressurization continues until RCS temperature is approximately 250°F and RCS pressure is approximately 300 psig.

The transition to the third phase is marked by the RCS having been cooled to approximately 250°F. At this point, the RV head vents are closed and the HPI pumps are stopped. RCS boron concentration would be sufficient to maintain adequate shutdown margin for an RCS temperature of 200°F. RCS pressure would be maintained such that adequate subcooling margin is maintained in the reactor core and the high points of the RCS loops. The SSF ASW system remains in operation to control SG water levels at the natural circulation setpoint to remove core decay heat. Water level in the SFP would continue to be monitored with makeup established and controlled. SFP makeup would be required within 36 hours following the loss of spent fuel cooling. Proper control of water level in the pool will provide sufficient radiation shielding from the spent fuel as well as maintain adequate heat removal from the spent fuel.

In each of the phases, the mitigation strategy maintains the integrity of the reactor coolant pressure boundary as well as protecting the reactor core against fuel failures. In the first phase, the reactor and turbine would be shutdown as a precautionary measure. Should a turbine trip occur, the minimum departure from nucleate boiling ratio (DNBR) remains above the design limit and RCS pressure does not exceed 110% of design pressure. In the second phase, a loss of reactor coolant pumps and main feedwater pumps would be expected; however, unlike the first phase, the reactor has already been shut down. The loss of reactor coolant pumps and main feedwater pumps has been previously analyzed assuming the reactor was operating at full power. The results of that analysis showed that the minimum DNBR remained above the design limit and RCS pressure did not exceed 110% of design pressure. The results with the reactor operating at full power would bound the results with the reactor already shutdown. Adequate core cooling will be maintained during natural circulation. Since the RCS pressure boundary and the nuclear fuel are protected against failure, no unacceptable radiological consequences would occur.

NRC RAI 5:

Provide justification for not installing the modifications, to enhance the capability of the ONS site to mitigate the postulated failure of the Jocassee Dam, in accordance with the Title 10 of the *Code of Federal Regulations,* Appendix B, quality assurance criteria.

Response:

The Duke Energy Quality Assurance Program Topical Report (Response Reference 4) describes how 10 CFR 50, Appendix B is implemented for the Duke Energy Fleet. The Topical Report is NRC approved and describes a graded quality assurance (QA) program in which the QA-1 designation is considered analogous to safety related.

Duke Energy letter dated April 12, 1995 (Response Reference 3) described the events treated as QA-1 and Non QA-1. Attachment 4a of this letter defined external flooding as design criteria that was not included in the QA or augmented QA program. This position is consistent with the NRC review documented in the associated NRC Safety Evaluation dated August 3, 1995. (Response Reference 5).

The SSCs designed, procured, constructed, and operated to mitigate external flooding due to a postulated failure to the Jocassee Dam are not required to be classified as safety related. As with any modifications, design control processes applied will evaluate impacts, such as interactions with existing SSCs, and apply appropriate quality standards.

Although the Jocassee Dam failure mitigative features are not required to be nuclear safety related, assurance of the mitigative features' capability is provided in design, construction, and maintenance by Duke Energy and regulatory processes.

The means by which the mitigative features' capability is assured by Duke Energy processes are described as follows:

- With respect to design and construction, the new SSCs are to be designed utilizing applicable industry and regulatory design criteria, as appropriate. The documentation of the design capabilities of the Jocassee Dam failure mitigative features are to be captured within Duke Energy analyses. Industry accepted codes and standards used in establishing the design and operation of the external flood mitigation features will also be documented within Duke Energy analyses. The internal standards associated with analyses are prescribed by corporate directive EDM-101, "Engineering Calculations/Analyses." EDM-101 provides assurance that analyses are auditable, retrievable, and technically correct. The records associated with this activity will be available for NRC inspection.

- The critical aspects of generally accepted design criteria are captured within Duke Energy Design Specifications associated with procurement and construction. The critical aspects are defined from an inspectability and testability perspective as critical characteristics. During material procurement and construction, the critical characteristics from the Duke Energy Design Specifications are captured as acceptance criteria within receipt inspection and construction procedures to ensure the quality of the final design matches the critical aspects of the associated SSC design criteria.

- The modifications will be installed in accordance with procedures by individuals who are qualified to perform their tasks. The design of the Jocassee Dam failure mitigative features will be conducted under the same procedures that are used to conduct safety related analysis. The records associated with this activity will be available for NRC inspection.

- Update of the licensing and design basis will capture the criteria and analyses justifying the capabilities described for the Jocassee Dam failure mitigative features. The addition of the mitigative features to the design basis provides assurance that the critical assumptions, initial conditions, and equipment capabilities are tested and maintained through station preventive maintenance and testing programs.

- The design and licensing basis addition provides assurance that details of the Jocassee Dam failure mitigative features are properly captured and utilized within station procedures. The internal standards associated with procedures are prescribed by

corporate directive NSD-703, "Administrative Instructions for Technical Procedures". NSD-703 provides assurance that the procedures are safe and effective.

In addition, the mitigative features' capability is assured by existing regulatory processes. Examples are as follows:

- From a site risk perspective, tracking and trending of maintenance and unavailability of mitigating equipment are performed in accordance with 10 CFR 50.65. This program ensures that the effectiveness of maintenance is evaluated to provide reasonable assurance that structures, systems, and components are capable of fulfilling their intended functions regardless of quality assurance classification. Furthermore, the 10 CFR 50.65 program requires risk management with appropriate contingencies in the event that SSCs become unavailable due to either planned or corrective maintenance.

- The addition of the Jocassee Dam failure mitigative features to the ONS licensing basis provides assurance of their long term maintenance. As stated in this letter, the Jocassee Dam failure mitigative features are to be added to the UFSAR thereby incorporating it within the licensing basis subject to considerations of regulatory related processes such as 10 CFR 50.59 and functionality (NRC Inspection Manual Part 9900). These processes provide assurance that features are evaluated, restored, and maintained as appropriate.

NRC RAI 6:

Provide a description of the standards used in the development of the calculations and the new procedures to support your mitigating strategies.

Response:

The Jocassee Dam failure mitigative features that Duke Energy plans to implement at ONS will be designed, procured, constructed, and operated in accordance with the applicable regulatory and industry standards, as appropriate. The records associated with this activity will be available for NRC inspection.

These standards will be identified during the design, procurement, work planning, and procedural development phases of this project. The Duke Energy response to NRC RAI 7 provides a schedule defining future activities. The detailed design phase is initiated at T1 and spans through T12. Procurement, work planning, and procedural development activities will span through the Regulatory Review Period and into the construction phase.

These standards will be documented in design, procurement, and construction records (calculations, drawings, specifications, modifications packages, and work orders). Standard requirements that impact operations will be contained in the procedures used to operate the facility.

These activities will be executed in accordance with procedures by trained individuals who are qualified to perform their tasks. The design of the Jocassee Dam failure mitigative features will

be conducted under the same procedures that are used to conduct safety related analysis. The records associated with this activity will be available for NRC inspection.

Design requirements will identify critical characteristics that are translated into specifications for the procurement of materials, the inspection and testing of materials, and the inspection and testing of construction activities. These requirements will be documented in records that are available for NRC inspection.

NSD-703, "Administrative Instructions for Technical Procedures," guides the development of procedures and will provide assurance that the critical design and licensing requirements are translated into procedural guidance.

NRC RAI 7:

Provide a schedule for the modifications with identification of key elements. Include justification for time required to implement the modifications.

Response:

The following milestone schedule identifies key elements of the design, procurement, and construction processes required to execute the major construction of the project and bound the overall project timeline of modifications. Details of the content of each activity are provided to define the specific activities contained in each milestone. (Notes associated with the milestone schedule follow the schedule.)

T0	Resolution of all requests for additional information (RAIs) on Duke Energy Confirmatory Action Letter (CAL) 2-10-003 dated April 29, 2011 (Response Reference 1)
T1	Initiation of detailed engineering based on finalized design scope. Detailed engineering will consist of the development, review and approval of calculations, design drawings, 10 CFR 50.59s and other associated supporting documentation
T12	Submittal of Detailed Design including calculations and detailed drawings to Federal Regulatory Energy Commission (FERC) for review
T15	Submittal of License Amendment Request (LAR) to NRC based on the design attributes not covered by the 10 CFR 50.59 review process. The LAR submittal will address impacts to the internal flooding analysis
RRP	Regulatory Review Period (RRP)
T15 + RRP	Begin Construction Activities; construction is expected to require 15 months of effort
T30 + RRP	Completion of Construction Activities

Notes:

1) All milestones are preliminary and are subject to change as the engineering design package and the field implementation plans are developed and executed.
2) All durations are expressed in months, i.e., T12 = twelve (12) months after resolution of all requested additional information.
3) Design and Construction durations are based on the design inputs and assumptions described in this response. Changes to design inputs and assumptions may result in an impact to the schedule and to the approach for addressing this postulated failure of Jocassee Dam.
4) The T30 schedule assumes that the key assumptions made by Duke Energy, as defined in the April 29, 2011 (Response Reference 1) CAL responses, do not change as part of the regulatory review process.
5) It is assumed that at the end of the Regulatory Review Period that Duke Energy has all of the necessary NRC and FERC approvals to proceed with the construction activity.

The schedule durations are required due to:

- Extensive geotechnical exploration and lab analysis for design inputs
- Origination, checking and approval of detailed design calculations and design drawings
- Development of regulatory approval submittals (internal flooding analysis, security plan, etc.)
- Requisition of long lead time materials / equipment
- Resolution of interactions with security related equipment and plant structures, systems and components
- Identification and remediation of existing underground commodities interferences
- Development of modification work packages
- Planning and scheduling of modification work packages
- Recruitment, training, and qualification of a large technical and implementation workforce
- The scope of the construction activity
- Managing the Security / Safety interface with construction activities
- Resolution of unanticipated interferences / interaction / conflicts

Response References

1. Duke Energy letter from T. Preston Gillespie to Victor McCree (Nuclear Regulatory Commission), Oconee Response to Confirmatory Action Letter (CAL) 2-10-003, dated April 29, 2011

2. Duke Energy letter from Dave Baxter to NRC Document Control Desk, Oconee Final 60-Day Response to NRC Letter from Joseph G. Giitter to Dave Baxter, dated July 9, 2009

3. Duke Energy letter from J.W. Hampton to NRC Document Control Desk, Oconee QA-1 Licensing Basis and Generic Letter 83-28, Section-2.2.1, Subpart 1 Supplemental Response, dated April 12, 1995

4. Duke Energy Carolinas Topical Report Quality Assurance Program, September 30, 2011

5. Safety Evaluation by the Office of Nuclear Reactor Regulation Supplemental Response to Subpart 1 of Section 2.2.1 of Generic Letter 83-28 General Criteria for Classifying QA-1 for Structures, Systems, and Components, dated August 3, 1995

6. Safety Evaluation by the Office of Nuclear Reactor Regulation related to Duke Energy Carolinas, LLC, Confirmatory Action Letter – Commitments to Address External Flooding Concerns, Closure of Inundation Site Results, Oconee Nuclear Station Units 1, 2, and 3 (ONS), dated January 28, 2011