Questions and Answers Related to the Oconee External Flooding Issue

1. NRC has regulatory requirements to ensure that the design of nuclear power plants can withstand external floods.
    a. What specific requirements govern design basis external flooding issues? (Fernando)
        i. What supporting regulatory guidance exists? (Fernando)
        ii. What types of external floods need to be considered? (Fernando)
    b. What is the licensing basis for external flood protection of the Oconee Nuclear Station? (Jeff C.)
    The licensing basis for external flood protection of Oconee is:

    "*Those systems and components of reactor facilities which are essential to the prevention of accidents which could affect the public health and safety or to mitigation of their consequences shall be designed, fabricated, and erected to performance standards that will enable the facility to withstand, without loss of the capability to protect the public, the additional forces that might be imposed by natural phenomena such as earthquakes, tornadoes, flooding conditions, winds, ice, and other local site effects. The design bases so established shall reflect: (a) appropriate consideration for the most severe of these natural phenomena that have been recorded for the site and the surrounding areas and (b) an appropriate margin for withstanding forces greater than those recorded to reflect uncertainties about the historical data and their suitability as a basis for design.*"

    c. How are the designs of new reactors being assessed relative to external flooding hazards? (Ken)
        i. Is the regulatory guidance being updated? When? (Jim)
    d. How are all other operating reactors being assessed with respect to the issues identified at Oconee? (Fernando)
        i. Are these issues similar to those identified for the TVA plants? (Jim)

2. The Oconee Nuclear Station is making a significant number of improvements.
    a. What are these improvements?

    These improvements include upgrades to the site's tornado protection, high-energy line break protection, digital instrumentation and control system, and the offsite power supply by installation of the protected service water system; installation of main steam isolation valves; and transition to risk-informed fire protection.

    b. From a risk perspective, what is the relative importance of these improvements? **(Jeff C. based on input from Walt expected by 2/5 to be provided by Jeff M.)**

3. The Oconee Nuclear Station includes a standby shutdown facility (SSF).
    a. How is the SSF protected from flooding hazards? **(Jeff C.)**
    The south entrance to the SSF has a five foot external flood wall equipped with a water tight door. A stairway over the wall provides access to the north entrance. The yard elevation at both the north and the south entrance to the SSF is 796.0 feet above mean sea level (msl). SSF external flood protection is provided for floods that

don not exceed 801 feet above mean sea level. In addition, there are seals on the conduits penetrating into the facility.

b. Why is the standby shutdown facility of such importance in external flooding scenarios? **(Jeff C.)**
External floods are postulated to simultaneously inundate the switchyard and overtop Keowee Dam which will induce a station blackout (SBO) by rendering both emergency on-site and offsite sources of ac power unavailable Under SBO conditions, the SSF contains the only source of power and accident mitigation capability.

4. One source of external floods is the postulated failures of dams.
   a. What dams could affect Oconee? **(Jeff C.)**
   The major source of floodwater upstream of Lake Keowee from dam rupture primarily comes from Jocassee Dam. A cascade failure of the Bad Creek dam, upstream of Jocassee, could occur with a maximum precipitation event. There is an impact of failure of Hartwell Dam downstream of Oconee.

   b. How and by whom were these dams licensed? **(Jeff C.)**
   Jocassee, Bad Creek, and Keowee dams are licensed by the Federal Energy Regulatory Commission (FERC), are classified as "high hazard" dams, and part of the Emergency Action Plan (EAP). Hartwell Dam is licensed by the US Army Corps of Engineers, is classified as a "high hazard" dam, and part of the EAP.

   c. How has the NRC assessed the postulated failure of Jocassee Dam? (answered by input provided by Ken expected 2/3 and provided by Jeff M. or MAG)

5. The Oconee Nuclear Station has made improvements in response to security issues (B5b) that could benefit plant safety.
   a. What improvements have been made? **(Jeff C.)**
   (b)(7)(F)

   b. Are they of benefit in external flooding scenarios? **(Jeff C.)**
   (b)(7)(F)

6. The Federal Energy Regulatory Commission has Federal responsibility for dam safety.
   a. How are we interacting with the Federal Energy Regulatory Commission as part of our assessment of the Jocassee Dam?

NRC and FERC have been cooperating in order to ensure that NRC has the benefit of FERC insights on dam safety and that we each understand the other's regulatory approach to evaluating Jocassee for a consistent message.

As the next step in our cooperation, NRC plans to have a conference call with FERC and Duke in January in order to respond to Duke questions regarding the impact of NRC's requests for information on FERC conclusions reached based on previous information provided by Duke to FERC. The message that NRC and FERC will provide is one of coordination and alignment.

To date, these interactions have included:

In a conference call on November 14, we engaged FERC (headquarters and regional staff in Atlanta) on technical topics related to our evaluation of the Jocassee Dam. During this call, FERC management offered information and their insights to us on the evaluation of dam safety.

Subsequent calls were held to coordinate the timing and agenda of a planned subsequent technical meeting.

NRC and FERC management and staff met at the FERC headquarters offices (Atlanta staff were present and also participated over the phone) on December 1. FERC provided us information on the construction and inspection history of the dam and shared their regulatory framework for evaluating the safety of dams. We discussed our need to evaluate the impact of the dam failure on the Oconee units.

In a call with FERC on Dec. 8, FERC affirmed that it is not concerned about new information undermining their inundation studies that support their emergency action plans. Our counterpart indicated that any new information arising out of NRC's review will further inform their knowledge of the dam. As such, they welcome new information and will consider it as appropriate within their regulatory framework.

In a conversation with FERC on Dec. 16, our counterpart noted that FERC's interest in information that Duke provides to us is consistent with the above, that is, gaining any information that may better inform their understanding of the safety of the dam.

We have a cooperative and coordinated relationship with FERC and will continue to foster that relationship by speaking to them regularly.

b. How is FERC's assessment of dam safety different from NRC's and why? (Jeff C.)

7. Duke has proposed a probabilistic approach to resolving the Oconee external flooding issue.
   a. What is the staff's conclusion regarding this approach? (Jeff C.)
   b. Why has the staff reached this conclusion? (Jeff and Jeff)

8. The NRC has raised questions regarding Duke's demonstration of adequate protection against external flooding at the Oconee units.
   a. What must the licensee do to demonstrate adequate protection? (Jeff M.—take the items from the letter)
   b. What has the NRC concluded about whether the units need to be shut down? (take basis for continued operation already developed and input here)