From: Warren Lyon
To: gbswindl@duke-energy.com,
Date: 4/16/03 8:00AM
Subject: Re: Letter From B&WOG dated 3/13/2003 - Review of BAW-2374 Rev. 1

Any time today (Wednesday) is fine at 410-381-5455 (I'm working at home). Monday PM at my work phone also works.

<<< "Gregg B Swindlehurst" <gbswindl@duke-energy.com> 4/15 10:54a >>>
Warren: At the direction of my VP, I am to get involved in helping direct the B&WOG in the proper direction for the next attempt to resolve the LOCA/SG tube loads issue (BAW-2374 Rev. 1 continuation). I would like to have a phone call with you to get your insights, since I have not been attending meetings on this issue in the past. I assume that you have seen the March 13 letter from the B&WOG. We can use that as a starting point for our discussion. My objective is simply to try to steer the project in a successful direction. With two previous attempts under our belt we need to get it right this time. Let me know when you are available to talk. I am available Tuesday afternoon, any time Wednesday, and Monday afternoon. This is not an official B&WOG call - this is a Duke Power call. Of course, you can involve your B&WOG PM at your discretion. I intend to only have one other person, the Duke rep on the B&WOG Analysis Committee join me on the call. Thanks.

From: Warren Lyon
To: Brian Benney; gbswindl@duke-energy.com; Leonard Olshan
Date: 4/17/03 9:55AM
Subject: 4/16/2003 telephone call with Duke regarding Oconee and BAW-2374

The first attachment is my description of the subject phone call. The second attachment is the referenced 3/13/2003 letter.

Greg - would you provide a feedback on accuracy to me and to Brian Benney? Would you also see that Eric gets a copy - I don't have his email address.

Brian - Will you take responsibility for seeing that this gets into the public domain after we get Greg's feedback?

CC: Jennifer Uhle; Kenneth Karwoski; Matthew Mitchell; Steve LaVie; Steven Long

Gregg B. Swindlehurst of Duke Energy Company initiated a telephone call to Warren C. Lyon (NRC) on April 16, 2003 to discuss aspects of the BAW-2374 issues that are applicable to Oconee. Eric Henshaw of Duke also participated. The following summary was prepared by Warren C. Lyon.

I indicated that I was willing to discuss aspects applicable to Oconee in an initial call, but further interactions would have to be preceded by a docketed request from Duke or would have to be a part of the B&WOG's activities on the BAW-2374 issues. Gregg indicated that the results of this call would be conveyed to the B&WOG.

Roughly 3/4 of the time was devoted to a range of topics and then I addressed my initial impressions regarding the B&WOG letter of March 13, 2003 titled "Review of BAW-2374" since the topics of that letter could influence Duke's approach to Oconee-specific aspects of the issues. All aspects of the telephone call can be addressed within the context of the letter, and I have elected to document the call by following the organization of the Attachment to the letter. I also noted that Brian Benney has replaced D. G. Holland as the NRC's Project Manager for the BAW-2374 review.

I indicated that a new topical report, such as a BAW-2374 Rev. 2, would be acceptable to the staff. This should be a stand-alone report and should contain the applicable information previously provided in Revs. 0 and 1 since those Revs. have been withdrawn. I would envision that each licensee operating a B&W - designed nuclear steam supply system would incorporate the Rev. 2 by reference into plant-specific requests. Since the requests would likely involve an accident of a different type than previously evaluated in the FSAR, it appears that the criteria set in 10 CFR 50.59(c)(2)(v) through (viii) would apply and license amendments would probably be required.

The following items identified in the March 13 letter were discussed:

1. In the first paragraph, the letter identifies "an assumed large, hot leg break." I pointed out that a spectrum of break sizes and locations must be addressed. Duke indicated that it considered that tube integrity was maintained for a surge line break and a break in the Davis Besse pipe that connects between the top of the hot leg and the upper reactor vessel head. I agreed this was consistent with our understanding of the problem. Hence the breaks of concern are the sizes and locations in the range between those breaks and the large break at the top of the hot leg.

   In the first paragraph, there is no identification of release of fission products into the secondary and the resultant impact on such areas as 50.67, 100.11, applicable commitments to NUREG-0737, equipment qualification, post-accident vital access doses, and control room habitability. These should be addressed as appropriate.

2. Regulatory Basis. The letter wording implies that single failure considerations are not necessary and realistic assumptions may be used to demonstrate compliance with such

regulations as 50.46 and Part 100. This is incorrect. With acceptable justification, realistic assumptions may be used to determine a reasonable bound in regard to tube response following initiation of the LOCA. Duke pointed out that the blowdown - refill - reflood aspects of the LOCAs have been addressed by the existing design bases analyses and are unaffected by the BAW-2374 issues. I agreed.

I identified that an important consideration is the meaning of "suitable redundancy" with respect to the single failure aspect of Criterion 35 in 10 CFR 50 Appendix A. The staff will address this during its review and probabilistic aspects of the likelihood of the accident and of risk will be important. Where acceptable to the staff, the probabilistic information contained in BAW-2374 Rev. 1 is applicable.

3. Break Size. The letter indicates a limiting break size will be selected by maximizing the amount of ECCS injection lost through any failed steam generator (SG) tubes by evaluating a small number of candidate break sizes. I agreed with the concept of using a realistically-based upper bound break for evaluation of secondary side response, including feedback into ECCS behavior, but I pointed out that acceptable justification of the concept and the selection will be necessary. This includes using a test such as the amount of ECCS injection lost - no justification has been provided for this and the amount of ECCS injection lost may not be the appropriate test with respect to release of radioactive material to the environment.

4. SG Mechanical Loads. I repeated the need for acceptable justification.

5. Secondary Isolation. The comments provided above with respect to single failure apply. We also discussed defense-in-depth considerations for extremely low likelihood events and the interaction of this with the meaning of suitable redundancy, including the influence of main steam isolation valves, downstream valves, and connections upstream of main steam isolation valves. I indicated that a concept of not conducting an analysis if main steam isolation occurred prior to tube failure may not adequately address defense-in depth and could become a review concern.

   Duke asked whether changes in emergency operating procedures would be acceptable for addressing BAW-2374 concerns if warranted as a result of their investigation. I indicated this appeared to be reasonable - and during the ensuing discussion we agreed that such changes should not be made unless there was essentially no impact on other aspects of the procedures, an approach consistent with the low likelihood of the BAW-2374 LOCAs.

   I asked about the possibility of terminating ECCS water loss into the secondary by initiating the decay heat removal system to depressurize the reactor coolant system and to allow lowering the reactor coolant system level to below the steam line elevation. Duke indicated this would probably not be an attractive solution because it is inconsistent with the existing approach to LOCA mitigation actions.

6. Steam Line Integrity. Duke asked about potential water hammer and I indicated this

should be addressed. Duke indicated this was unlikely to be a technical concern. I indicated that the reasonable bound approach should be used as opposed to a calculation with no safety factor regarding loadings due to the water-filled pipes.

7. Offsite Dose. Duke indicated there are several potential approaches to dose analyses, including (a) taking the traditional TID source term and adding the dose contribution due to the BAW-2374 accident, (b) using the alternate source term, and (c) using a more realistic approach. Duke also indicated that the assumed core condition could be 100% cladding failure, core melt, or core-on-the-floor. I added that a cladding condition predicted by the LOCA analyses might also be a bounding condition for this accident. We discussed one possible approach as separating the accident into two parts: (a) Starting with the existing licensing basis for the spectrum of hot leg LOCAs that represents the plant response and (b) adding the contribution due to loss of SG tube integrity. Part (a) should be consistent with existing regulatory practice, such as assuming a core melt. Since the likelihood of a SG tube loss as addressed in BAW-2374 is extremely small, it may be acceptable to address Part (b) via a realistically-based bounding approach. No decisions were reached.

   We also discussed such considerations as it may be shown that no significant release of radioactive material into the secondary side will occur prior to initiation of taking water from the containment emergency sump and there may be a delay between that initiation and the sump water reaching the tube failure location.

   I indicated that the March 13 letter appears to imply an approach that may be inconsistent with regulatory requirements.

From: "Gregg B Swindlehurst" <gbswindl@duke-energy.com>
To: "Brian Benney" <BJB@nrc.gov>
Date: 4/21/03 8:14AM
Subject: Re: 4/16/2003 telephone call with Duke regarding Oconee and BAW-2374

Duke has no problems with Warren Lyon's 4/16/2003 phone call minutes.

"Brian Benney" <BJB@nrc.gov> 04/17/2003 01:13 PM

To: <gbswindl@duke-energy.com>, "Leonard Olshan" <LNO@nrc.gov>, "Warren Lyon" <WCL@nrc.gov>
cc: "Jennifer Uhle" <JXU1@nrc.gov>, "Kenneth Karwoski" <KJK1@nrc.gov>, "Matthew Mitchell" <MAM4@nrc.gov>, "Steve LaVie" <SFL@nrc.gov>, "Steven Long" <SML@nrc.gov>
Subject: Re: 4/16/2003 telephone call with Duke regarding Oconee and BAW-2374

Warren,

I'll wait for Greg's feedback to document this.

Brian

CC: "Jennifer Uhle" <JXU1@nrc.gov>, "Kenneth Karwoski" <KJK1@nrc.gov>, "Leonard Olshan" <LNO@nrc.gov>, "Matthew Mitchell" <MAM4@nrc.gov>, "Steve LaVie" <SFL@nrc.gov>, "Steven Long" <SML@nrc.gov>, "Warren Lyon" <WCL@nrc.gov>