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Date: 1/4/2008 3:43:14 PM
Subject: Draft 2nd Round RAIs for Review of LWA-2 Supplement

Jim,

Attached are the draft RAIs that the staff plans to issue next Friday. Please review the attached draft RAIs and let me know if you would like to setup a phone call to discuss. Thanks.

Christian

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Draft Second Round Requests for Additional Information Regarding the Southern Nuclear Operating Company (SNC) Supplement to the Vogtle ESP Application

RAI 2.5.4-19

The staff's review of SNC's response to RAI 1.1-1 identified the following four issues:

(1) An issue discussed at the meeting during the LWA-2 site visit conducted on September 5 and 6, 2007, is how the impact of: compaction equipment size, number of passes, lift thickness, etc. on the uniformity of compaction and soil wave velocity achieved are to be determined. During the second LWA-2 site visit (December 10 and 11, 2007), the staff found that SNC is currently conducting a test bed program that considers several factors (number of passes, lift thickness, use of a single compactor, etc.) to determine the state of compaction of the production fill. Through the discussion during the second LWA-2 site visit, the staff found that SNC may adopt a Phase II compaction program, modified from Phase I of the test bed program, and revise the compaction procedures determined from Phase II of the test compaction program. SNC needs to provide information on how these modified procedures are to be developed and also indicate if a section of the mechanically-stabilized earth (MSE) wall is to be included in the Phase II program. If so, SNC needs to provide information on how the planned compaction is to be accomplished in and around the test wall section. It is presumed that the compaction procedures developed at the end of the Phase II program will be used during the placement of the production fill. In addition, SNC should provide information on how soil wave velocity testing is to be accomplished during the placement of the production fill in and around the final nuclear island (NI) configuration.

(2) The second paragraph of the response states that "the construction of the MSE wall begins with installation of a concrete footer, and … the size and reinforcement of the concrete footer will be as required by the designer of the MSE wall." A description of the design details of the concrete footer (e.g., concrete mix design, reinforcing steel sizes) needs to be provided in the response for staff review of its design adequacy.

(3) In its response, SNC stated that when the lower mud mat slab has reached the specified strength, a layer of waterproof membrane will be applied to the entire top of the slab, and extended vertically up the face of the MSE wall surface. During a conference call on November 14, 2007, Westinghouse stated that in order to develop a friction coefficient of 0.7 between the mudmat and the waterproofing membrane, spikes are to be provided on both sides of the waterproofing membrane by the manufacturer. SNC should explain how the spikes can be anchored into the lower mudmat after the mudmat concrete is hardened and reaches its specified strength. SNC needs to provide details to explain how the waterproofing material is to be connected to both the top and bottom mudmats.

(4) SNC needs to provide details to explain how the waterproofing membrane (with spikes on both sides) is to be placed against the vertical MSE wall, and how the connection is to be made between the vertical and horizontal sections.

SNC is requested to provide additional information to address these four issues.

RAI 2.5.4-20

The response to RAI 2.5.4-1 indicates that only 42 borings have penetrated the Blue Bluff Marl (BBM) extending into the Lower Sands and therefore can be counted on to satisfy the site foundation criteria provided in Regulatory Guides (RG) 1.132 and 1.138, including boring depth requirements. SNC is requested to provide additional information to demonstrate how these RG criteria are satisfied. In addition, the statement, "six of the 70 borings penetrated into the underlying Lower Sands (LS) accounting for 611 linear feet of drilling in this stratum," in Page 6 of 32 of the response indicates that only 6 of the borings penetrated the LS. SNC should clarify this inconsistency.

RAI 2.5.4-21

From its review of the response to RAI 2.5.4-2, the staff requests SNC to provide a clarification of how the formulae provided in the response were used to obtain corrected standard penetration test (SPT) blow counts.

RAI 2.5.4-22

The last sentence of the third paragraph of the response to RAI 2.5.4-3 states that resonance-column torsional-shear (RCTS) test samples were transported to Fugro's Houston laboratory by automobile using approved transportation procedures. SNC is requested to provide a description of the approved transportation procedures and also describe which sources the requirements are derived from.

RAI 2.5.4-23

The staff found that the response to RAI 2.5.4-4 did not address the concern regarding "the effect of the two-dimensional wave velocity configuration of the excavated zone on site response and soil-structure interaction (SSI) effects." Additional information should be provided to justify why the effect of the two-dimensional wave velocity consideration was not considered in the SSI analysis.

RAI 2.5.4-24

The staff's review of the response to RAI 2.5.4-6 identified the following concerns:

(1) SNC's response addressed only static bearing capacity evaluations for failure conditions and did **NOT** consider settlement considerations, which normally control the allowable pressures under large rigid basemats. In addition, the response did not address dynamic effects, which are the overwhelming effects on the computed toe pressures. Additional information is needed.

(2) SNC should justify how the compacted fill (about 50' of which is below the basemat and above the BBM) can be considered the "**strong"** layer (as compared to the "**weak**" BBM), since the calculation provided did not show that the shear wave velocity of the backfill soil is higher than that of the BBM which is above 2,000 fps.

(3) The calculations provided in the response do not indicate that the design value for

cohesion of 10,000 psf was used. SNC is requested to further justify why this value was not used. Also the adequacy of the assumption for slope of the influence zone (1v:2h) = 0.5 is questionable. SNC needs to justify the adequacy of this assumption.

RAI 2.5.4-25 (from the review of the response to RAIs 2.5.4-7 and 3.8.5-1)

During the second site visit (December 10-11, 2007), the staff observed the Phase I Test Fill program and conducted a discussion with SNC staff regarding the application of this program to the production backfill. According to the SNC staff, the controlling parameters of the program (compaction equipment, number of passes, lift thicknesses, soil water content) were preliminarily selected and these parameters will be finalized during the Phase II program. One of these parameters that the staff is concerned with is the acceptable range of sizes of the backfill material, because the grain size of the backfill material may have a significant impact on the shear wave velocity, soil nonlinear degradation properties and the results of the SSI response calculation. For both the test program and production backfill, SNC is requested to explain how the limitation of 25% fines was selected, how different the fines content can be and still be acceptable for the production backfill, and how an acceptable range of sizes will be defined.

RAI 2.5.4-26

In the response to the RAI 2.5.4-9, SNC stated in part that "SNC will revise ESP application Section 2.5.4.3 in revision 3 to conform to the testing frequency recommended by NQA-1-2004, Section 506, In-Process Tests on Compacted fill." Table 506 of this standard recommends a frequency for performing field density tests for mass earthwork as one test for every 2,000 cubic yards of compacted material placed. The response further states in part that "…adopting the ASME … standard will provide an accepted consistent industry testing frequency not tied to lift thickness…" This does not appear to be completely correct, since the standard still requires one test per lift as part of the criteria, in addition to the criteria of one test for every 2,000 cubic yards of compacted material placed. SNC is requested to provide further clarification on how this standard would be implemented, since two criteria would need to be tracked under the standard. SNC also needs to provide justification for using this testing density and how this number will provide assurance of adequate uniformity of shear wave velocity.

RAI 2.5.4-27

In the response to RAI 2.5.4-10, SNC states in part that "Sufficient borrow material … has been identified and no additional investigations and testing is necessary." The response further states that "These materials (identified) were classified … as silty sands (SM), poorly graded sands (SP), and lesser amounts of clayey sands (SC)." The response further describes testing of various material properties and borrow sources, but does not include figures or survey results to justify that sufficient material exists. It is also unclear in the response whether all or just part of the stockpiled material is suitable material. SNC is requested to provide further clarification and justification of the quantity of suitable material in the switchyard area stockpiles. Further, SNC states that approximately 30% of the excavated material from the power block will be salvageable for reuse as structural backfill. However, SNC needs to provide a description of how the 30% value was determined so the staff can evaluate whether sufficient borrow material exists.

RAI 2.5.4-28

From the review of the response to RAIs 2.5.4-14 and 2.5.4-15, it is not clear that the normal variability inherent in the compaction test program (variability of fill grain size distribution, uniformity of water content of compacted soil, etc,) will be evaluated sufficiently to capture the variability expected during the production fill program without shear wave velocity testing. In SNC's proposed approach, the wave velocity in its final configuration under the facility and 40 feet of fill to the side will be generated using both analytic approximations for the effects of confinement on in-situ velocity as well as the results from a few RCTS samples of the fill. In-situ wave velocity measurements during production backfill placement are needed for confirmatory purposes to be able to estimate the average velocities of placed soil as well as variability in these velocities under the completed facility. The objective of this confirmatory program is to ensure that in-situ wave velocities in the completed backfill will be equal to or greater than 1,000 fps. SNC is requested to provide additional information and justification of the adequacy of its testing program or a revised testing program.

RAI 13.7-2

In an October 26, 2007, letter from Christian Araguas, NRC, to J.A. "Buzz" Miller, Southern Nuclear Operating Company (SNC), the NRC requested that the applicant provide a description of the Fitness for Duty (FFD) program and its implementation consistent with the guidance in the August 16, 2007, letter from NRC to Nuclear Energy Institute and the guidance in the August 16, 2007, letter from NRC to Nuclear Energy Institute and the NRC's regulations. The application's description of the FFD program and its implementation in SNC's November 28, 2007, response is not consistent with the NRC's regulations. 10 CFR 26.2(c) describes the required elements of an FFD program for applicants seeking NRC authority to perform certain construction activities, including the activities proposed by SNC. SNC's FFD program plan contains the following deficiencies:

(a) 10 CFR 26.2(c)(1) requires compliance with 10 CFR 26.20. 10 CFR 26.20(b), (e), and (f) state that the written policies and procedures must: (1) contain a description of programs which are available to personnel desiring assistance in dealing with drug, alcohol, or other problems that could adversely affect the performance of activities within the scope of this part; (2) ensure that persons called in to perform an unscheduled working tour are fit to perform the task assigned; and (3) allow for the Commission at any time to review the licensee's written policy and procedures to assure that they meet the performance objectives of Part 26. Please revise the FFD program plan to comply with 10 CFR 26.20(b), (e), and (f).

(b) 10 CFR 26.2(c)(1) requires compliance with 10 CFR 26.23. 10 CFR 26.23(a)(2) states that personnel that violate a fitness for duty policy will not be assigned to work within the scope of the rule without the knowledge and consent of the licensee. The submitted FFD program plan, however, states that: "A construction site entity can maintain an [individual's access to the construction facility] as long as the person remains in the construction site entity random fitness for duty testing program for new plant construction." Please revise the FFD program plan to comply with 10 CFR 26.23(a)(2).

(c) 10 CFR 26.2(c)(1) requires compliance with 10 CFR 26.70. 10 CFR 26.70 contains provisions for NRC inspections. The FFD program plan does not address NRC inspections. Please revise the FFD program plan to comply with 10 CFR 26.70.

(d) 10 CFR 26.2(c)(1) requires compliance with 10 CFR 26.73. 10 CFR 26.73(a) specifies the FFD events that must be reported to NRC. The FFD program plan does not specify these events. Please revise the FFD program plan to comply with 10 CFR 26.73(a).