Summary of May 8, 2009 Public Meeting on Backfill ITAAC

Conclusions from meeting on December 18, 2008

During the May 8 meeting, industry recapped the following conclusions from the public meeting that was held on December 18, 2008, to discuss the shear wave velocity (SWV) ITAAC for backfill under seismic Category I structures:

1. No SWV ITAAC necessary for: (1) Category I structures founded on native material (soil or rock) or on concrete fill, and (2) Category I structures founded on a shallow ($\leq$ ≈5 feet) soil leveling course.

2. For other cases, ITAAC will require field measurement and analyses of SWV in backfill under Category I structures.

3. The effect of confining pressure may be considered when determining the SWV in backfill under Category I structures.

4. Details of test methodology for ITAAC closure will be provided in site-specific FSAR documentation

5. No additional ITAAC for backfill parameters beyond SWV and compaction (i.e., those in the Vogtle COLA)

As discussed during the May 8 meeting, SWV and compaction are the key soil parameters that cannot be verified prior to backfill installation, and thus these parameters are subject to ITAAC (as applicable). Grain size and other backfill characteristics will be described in the FSAR, along with information regarding the placement and expected performance of proposed backfill materials. If the source material is not known at the COL phase, the applicant must ensure that the backfill material ultimately selected conforms to the characteristics described in the FSAR. In combination with the ITAAC, the FSAR description must be sufficient for the NRC to make a safety finding on the adequacy of the backfill design. The FSAR should include a description of the QC process to be used during construction to ensure that the material delivered and placed conforms to the FSAR description.

Recommended Approach for Design Certification and COL ITAAC

During the May 8 meeting, industry recommended that wording be included in the DCD and COL ITAAC to allow use of site-specific analyses to demonstrate seismic design adequacy for backfill shear wave velocities less than the value specified in Tier 1 of the DCD.

For example, two DCDs currently contain the following or similar language in the Tier 1 section on site parameters:

> "In the case of seismic design and soil parameters not meeting the defined conditions, site-specific soil-structure interaction analyses may be performed. The results may be used to confirm the seismic design adequacy of the certified design using approved methods and acceptance criteria."

With this type of provision in the DCD, COL applicants could establish a site-specific minimum SWV (different from the value specified in the DCD) by submitting their site-specific analyses to NRC for approval. The COL applicant would not need to request a Tier 1 exemption to do that.

If this type of provision did not exist in the DCD, a COL applicant could seek it via exemption request from Tier 1 to ensure consistency with the proposed ITAAC for SWV in backfill (below).

Industry proposed the following ITAAC for SWV in backfill under seismic Category I structures:

Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
Shear Wave Velocity of Category I backfill material meets [Tier 1 or site-specific value]; or seismic design adequacy is demonstrated through site-specific SSI and structural analyses.	Field measurements and analyses of shear wave velocity in backfill will be performed. If necessary, site-specific SSI and structural analyses will be performed.	An engineering report exists that concludes that the shear wave velocity within the backfill material placed under Seismic Category I structures meets [Tier 1 or site-specific value]; or seismic design adequacy is demonstrated through site-specific SSI and structural analyses.

Note: The COL applicant would replace the information in the brackets with a specific value of SWV, either that specified in Tier 1 or a site-specific value established via the COL process.

<u>Base Case: SWV Meets the DCD Tier 1 Parameter</u>

This is the situation where the licensee thinks the backfill will meet the Tier 1 SWV value, and it does. No site-specific analyses are needed to justify a different value of SWV. Consistent with the process for closing ITAAC, SWV testing and analyses will be documented in the ITAAC closure package and made available for NRC inspection prior to ITAAC closeout.

<u>Special Case 1: SWV is Not Expected to Meet DCD Tier 1 Parameter</u>

Some sites do not meet the DCD Tier 1 parameter for SWV and require use of backfill. In this case, the COL applicant would know up front that they will not meet the SWV value in Tier 1. Site-specific soil-structure interaction (SSI) and structural analyses would be performed (including the effects of any proposed backfill) to demonstrate the adequacy of the seismic design. With the proposed DCD provision, COL applicants would not need an exemption from Tier 1 to use the site-specific analyses.

The SWV for backfill used in the site-specific analyses would establish the minimum SWV that must be met for ITAAC closure.

Special Case 2: Surface-founded Structures

Some designs include seismic Category I structures that are founded at or near ground surface. The weight of the overlying Category I structure is insufficient to produce a confining pressure that results in a SWV of 1,000 fps at the foundation level. Site-specific SSI and structural analyses can be performed to demonstrate the seismic adequacy of those structures. With the proposed DCD provision, site-specific analyses may be used without an exemption. The SWV for backfill used in the site-specific analyses described above would establish the minimum SWV that must be met for ITAAC closure.

Special Case 3: Completed Backfill Fails to Achieve Minimum SWV in Tier 1

Even if all efforts have been made to ensure that completed backfill meets the pre-established SWV value (the value that was used to fill in the brackets in the ITAAC), there is a possibility that the measured SWV could be less than that value. Site-specific SSI and structural analyses may be used to show seismic design adequacy for the measured SWV. The analyses would be documented in the ITAAC closure package and made available for NRC inspection prior to ITAAC closeout, with conforming changes made to the FSAR. With the proposed DCD provision and ITAAC, site-specific analyses may be used to close ITAAC without a License Amendment.

NRC indicated that the approaches discussed for the base case and special cases 1 and 2 appeared to be generally reasonable. The staff took an action to confirm that use of site specific analyses for SWV would not require exemption from Tier 1 provided the Tier 1 Site Parameter contains language providing for the use of site specific analyses. For special case 3, NRC indicated they needed to further consider the industry proposal.

ITAAC for Backfill Compaction

Industry discussed how the backfill compaction ITAAC has evolved. In August 2007, industry proposed an ITAAC for compaction of backfill materials under seismic Category I structures. That ITAAC included average and minimum compaction requirements. Industry subsequently developed the following backfill compaction ITAAC:

Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
Backfill material under Seismic Category I structures is installed to meet a minimum of 95 percent of the Modified Proctor density.	Testing will be performed during placement of the backfill material.	A report exists that concludes the installed backfill material under Seismic Category I structures meets a minimum of 95 percent of the Modified Proctor density.

NRC stated that this is an acceptable ITAAC for compaction of backfill under seismic Category I structures.