

TECHNICAL FEEDBACK ON SCE&G LAR 14-01 POST 2/20/14 MEETING:

During the February 20, 2014 meeting on the SCE&G Auxiliary building roof/floor LAR, SEB1 committed to provide additional information relating to the discussion of apparent inconsistencies on the methods of design and analysis. In response, Mohamed and I developed the below clarification:

10 CFR Part 52.47 requires that the description of the analysis of SSCs be sufficient to permit the understanding of the system design and their relationship to the safety evaluation. Staff review of the draft LAR finds that method of analysis of the proposed system is not clear and is not sufficiently detailed to permit the preparation of acceptance and inspection requirements by the NRC.

For example, the proposed change to UFSAR section 3H.5.3 (described in LAR Enclosure 2, page 4) states that the reinforcement in the cast-in place concrete portion of the reinforced concrete slab is relied on to resist the loads without contribution from the strength of the longitudinal reinforcement in the pre-cast panel. However, the same UFSAR section also states that the pre-cast panels and cast-in place concrete act together as a composite reinforced concrete slab when subjected to loading.

A second example is the licensee's evaluation described in LAR Enclosure 1 (page 10), which states that the cast-in place portion of the floor is designed and analyzed to resist the loads without contribution of the precast panel. However, during the February 20, 2014 meeting, the licensee provided a description of the analysis which made use of an elastic concrete beam model. The licensee stated that the full-depth thickness (including the pre-cast portion) was assumed for the beam model and that the concrete elastic modulus was reduced to 80-percent of the elastic un-cracked concrete material modulus to account for cracking. The analysis and design assumptions should be consistent and should ultimately conform to the detailing of the slabs. For example, the location of the effective (i.e. adequately developed) longitudinal rebar should guide the selection of the effective slab thickness and the level of reduction in stiffness associated with concrete cracking.

Staff review of the draft LAR finds that the set of assumptions used for design and seismic analysis of the cast-in place and pre-cast concrete floor system are not clear and do not appear to be consistent with one another. On this basis, in addition to other modifications discussed in the pre-application meeting, the staff requests the licensee to revise the LAR to address the inconsistency associated with the assumed behavior for the slabs (i.e. composite versus non-composite) and to clearly describe in UFSAR section 3H.5.3 the method of design and analysis of the proposed system as well as demonstrate that the analysis assumptions are consistent with those assumed for design, and vice-versa. Also, staff requests the applicant to revise the LAR to provide justification for assuming 80-percent of the elastic modulus in the pre-cast concrete portion of the beam analysis given that the pre-cast slab lacks continuous horizontal reinforcement (Figure 3H.5-8, Section C, Looking West).