DESIGNATED ORIGINAL

Nuclear Operating Company

South Texas Project Electric Generating Station 4000 Avenue F – Suite A Bay City, Texas 77414

September 16, 2009
U7-C-STP-NRC-090148

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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Rockville MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Response to Request for Additional Information

Attached is the response to NRC staff question included in Request for Additional Information (RAI) letter number 190 related to Combined License Application (COLA) Part 2, Tier 2 Chapter 19. The attachment contains the response to the following RAI question.

19-22

There are no new commitments in this letter.

If you have any questions regarding these RAI responses, please contact me at (361) 972-7206, or Bill Mookhoek at (361) 972-7274.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 9/16/2009

MA McBurnett

Mark McBurnett
Vice President,
Oversight & Regulatory Affairs
South Texas Project Units 3 & 4

dws

Attachment:
Question 19-22

D091
NRO

STI 32535759

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RAI 19-22

QUESTION:

With respect to determination of the housing capability referred to in STP 3/4 COL application FSAR, Tier 2, Revision 2, Section 19.9.21 (COL License Information Item 19.19b) to withstand the site-specific seismic events, flooding, and other site-specific external events, provide more detailed information addressing the approach, analysis methods, computer codes, seismic structural modeling, damping and pertinent sections of SRP acceptance criteria to be used in determining the housing structural capacity.

RESPONSE:

The Alternating Current Independent Water Addition (ACIWA) equipment is located in the Fire Water Pump House (FWPH) which houses portions of the Fire Protection System. The FWPH is a non-safety related structure, designed to commercial building codes. However, as described in the DCD, the ACIWA is a risk-significant system and portions of the FWPH housing ACIWA equipment will be designed to ensure that ACIWA equipment remains functional following a Safe Shutdown Earthquake (SSE). As described in FSAR (Tier 2), Section 19, "Response to Severe Accident Policy Statement," the capability of the ACIWA housing will be included in the plant-specific Probabilistic Risk Assessment (PRA).

As described below, the design of the portion of the FWPH structure housing ACIWA equipment will consider site-specific events including postulated seismic events and wind. The FWPH is located above the design basis flood level for the site (33 feet MSL) for non-safety related structures, and therefore flooding is not a design consideration for the ACIWA housing.

Factored loads are combined using a strength design approach including both concrete and steel design. Basic load combinations are found in American Society of Civil Engineers (ASCE) 7-05. In addition to earthquake and wind, these load combinations include a variety of other types of load applicable to commercial structures, including but not limited to dead load, hydrostatic pressure, earth pressure, live load, snow, rain, and thermal load.

Site-specific extreme loads are conservatively substituted in these combinations for loads that otherwise can be determined by ASCE 7-05. The site-specific SSE is conservatively substituted for the earthquake load, E. The design site-specific SSE response spectra will be per Regulatory Guide 1.60, Revision 1," Design Response Spectra for Seismic Design of Nuclear Power Plants," anchored at 0.13 g, modified as discussed in the STPNOC response to NRC RAI No. 03.07.01-2. The site-specific wind speed used in the design of the ACIWA housing will be, at a minimum, the 50-year recurrence maximum (125 mph – 3-second gust) as specified in FSAR Table 2.0-2, "Comparison of ABWR Standard Plant Site Design Parameters and STP 3 & 4 Site Characteristics."

RISA 3D is the structural analysis and design tool. Input to RISA 3D includes building geometry, boundary conditions, material properties, section properties, nodal loads, line loads, surface loads, and seismic design criteria. Output includes member loads, stresses, member deflections, building drift, seismic loads, and mode shapes. In addition, RISA 3D performs steel member design in accordance with appropriate codes, such as the American Institute of Steel

Construction (AISC) Steel Manual, 13th Edition. RISA 3D is an industry-accepted structural analysis code used extensively in commercial and industrial applications. RISA 3D is capable of performing concrete beam, slab, and column design in accordance with codes such as American Concrete Institute (ACI) 318-05. The pcaColumn computer program is used for detailed concrete column design along with various MathCAD worksheets.

Seismic structural modeling is done in the RISA 3D environment where seismic parameters required by ASCE 7-05 are supplied. Typically, the response spectrum used for seismic analysis is the curve found in ASCE 7-05 Section 11.4.5; however, this will be replaced by the site specific SSE, as noted above. Seismic design is in accordance with ASCE 7-05 using an occupancy category of IV and the appropriate response modification factor, R, system overstrength factor, Ω_o, and deflection amplification factor, C_d, which are dependent on the seismic force-resisting system selected.

Structural damping is used in accordance with Regulatory Guide 1.61, Revision 1, "Damping Values for Seismic Design of Nuclear Power Plants." Damping values used in the seismic model will be taken from Table 2 (OBE Damping Values) of Regulatory Guide 1.61. These values range from 3 percent to 5 percent of the critical damping, depending upon the material being considered.

The acceptance criteria found in NUREG 0800, Revision 3, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants—LWR Edition," are applied as described below:

Wind Loading – Standard Review Plan 3.3.1:

1) The procedures used to transform the wind speed into an equivalent pressure to be applied to the ACIWA housing are as delineated in American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI) 7-05, "Minimum Design Loads for Buildings and Other Structures."

Seismic System Analysis – Standard Review Plan 3.7.2:

1) An Equivalent Static Load Method will be used for this structure. Justification will be provided that the system can be realistically represented by a simple model and the method produces conservative results in terms of responses.
2) The model will account for relative motion between all points of support.

No COLA revision is required as a result of this RAI response.