Nuclear Operating Company

South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

December 30, 2009
U7-C-STP-NRC-090228

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

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

Reference: Letter, Scott Head to Document Control Desk, "Response to Request for Additional Information," U7-C-STP-NRC-090146 dated September 21, 2009 (ML092710096).

Attached is a supplement to the response to RAI question 02.05.04-29, related to COLA Part 2, Tier 2, Section 2.5S.4, "Stability of Subsurface Materials and Foundations." This supplement completes the response to RAI question 02.05.04-29 that was provided in the referenced letter. Also attached is the response to the NRC staff question in Request for Additional Information (RAI) letter 294, related to COLA Part 2, Tier 2, Section 8.2, "Offsite Power Systems." This letter provides the complete response to RAI letter 294.

Attachments 1 and 2 provide responses to the following NRC staff questions:

02.05.04-29, Supplement 1

08.02-23

When a change to the COLA is indicated, the change will be incorporated into the next routine revision of the COLA following NRC acceptance of the RAI response.

There are no commitments in this letter.

If you have any questions regarding these responses, please contact me at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

D091

STI 32590826 NRO

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

Executed on 12/30/09

Scott Head
Manager, Regulatory Affairs
South Texas Project Units 3 & 4

rhb

Attachments:

1. RAI 02.05.04-29, Supplement 1
2. RAI 08.02-23

cc: w/o attachments and enclosure except*
(paper copy)

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RAI 02.05.04-29, Supplement 1

QUESTION:

In response to RAI 2.5.4-15, you provide a brief description of the calculation procedure used to determine the dynamic bearing capacity, but you did not report the calculated factor of safety for the safety-related structures under SSE dynamic loading. Similarly, in the mark up of the FSAR submitted as response to question RAI 2.5.4-13, Supplement 1, FSAR subsection 2.5.4.10.3 does not indicate the factors of safety calculated for the safety-related structures. Additionally, reference was made to a criterion factor of safety of 1.5 when dynamic or transient loading conditions apply. The staff has two questions related to this RAI response.

1. What are the factors of safety for STP Units 3 and 4 safety-related structures under the dynamic SSE loading?

2. Given that reference 2.5S.4-69 is a 1980 era document, and higher factors of safety are being applied by other applicants, please justify the use of a factor of safety of 1.5 for STP Units 3 and 4.

SUPPLEMENTAL RESPONSE:

The response to RAI question 02.05.04-29, submitted in Letter U7-C-STP-NRC-090146, dated September 21, 2009 (ML092710096), required that STPNOC complete site-specific seismic analyses of the Reactor and Control Buildings and the UHS/RSW Pump Houses and provide dynamic bearing capacity factors of safety (FOS) for the site-specific conditions. Dynamic bearing capacity factors of safety for the Reactor Buildings, Control Buildings, and UHS/RSW Pump Houses are provided in the attached table, Table 2.5S.4-41C, "Capacity of Foundations under Dynamic or Transient Loading." Static bearing capacity factors of safety (FOS) were already provided in Revision 3 of COLA Part 2, Tier 2, in Table 2.5S.4-41B, "Bearing Capacity of Foundation."

As a result of this supplemental response, COLA Part 2, Tier 2, will be revised to include Table 2.5S.4-41C and Section 2.5S.4.10.3 will be revised as shown below:

2.5S.4.10.3 STP 3 & 4 Bearing Capacity Evaluation

The allowable bearing pressure due to seismic loads would be calculated from the allowable bearing pressure under equivalent static loads. For a transient (dynamic) loading condition applied to the foundation after it has adjusted to its applied static loading, the allowable bearing pressure is computed using the consolidated-undrained (CU) total stress shear strength parameters in the clay soils layers. The effective stress shear strength parameters are used in the sand soil layers.

The bearing capacity calculation for seismic loading utilizes the CU (total) strength parameters for the clay layers, the effective strength for the sand layers and the same bearing capacity equations as for static loading, and a reduced foundation width and

length due to the eccentricity caused by the seismic loading. The equation for the reduced foundation width and length is:

$B' = B - 2e_x$, Equation 2.5S.4-24B
$L' = L - 2e_y$, where

B' = Reduced foundation width,
L' = Reduced foundation length,
e_x = eccentricity of load in direction parallel to B, and
e_y = eccentricity of load in direction parallel to L.

The criterion factor of safety (FOS) is 1.5 when dynamic or transient loading conditions such as seismic apply (Reference 2.5S.4-69). The calculated FOS values during dynamic or transient loading for the Reactor Buildings, Control Buildings, and UHS/RSW Pump Houses are shown on Table 2.5S.4-41C.

Table 2.5S.4-41C Bearing Capacity of Foundations under Dynamic or Transient Loading

Structure	STP	Soil Strength Selection [1]	Factor of Safety (FOS) [2]
Reactor Building	3	Short Term	2.35
	4	Short Term	4.55
Control Building	3	Short Term	6.01
	4	Short Term	1.73
UHS/RSW Pump House	3	Short Term	5.89
	4	Short Term	7.94

[1] Short term – undrained condition
[2] See Section 2.5S.4.10.3 STP 3 & 4 Bearing Capacity Evaluation

RAI 08.02-23

QUESTION:

In response to RAI 08.02-11, the applicant stated that the switchyard control cables at STP are routed in concrete modular trench with drain holes in the bottom and trench covers at grade to facilitate cable installation. The applicant also stated that at South Texas the water table is about six feet below grade and that the switchyard elevation would be increased by at least a foot above grade to facilitate runoff during heavy rainfalls. Additionally, the trenches will be mounted on 6-8 inches of crushed stone with a top layer of 2-3 inches of sand to facilitate leveling of the trench and further improve natural drainage of potential water accumulation in the trench. Lastly, the applicant indicated that the cables used at STP are designed for wet/dry environments and should not be challenged since they will not be continuously submerged. However, this response does not meet the intent of Generic Letter 2007-01 to describe inspection, testing, and monitoring programs to detect the degradation of inaccessible or underground power cables that support equipment and other systems that are within the scope of 10 CFR 50.65 (the Maintenance Rule). Indicate whether there are any plans to implement a program for inaccessible or underground power, control, and instrumentation cables for testing and inspection; and indicate the frequency for such testing and inspection or provide justification for not developing such program.

RESPONSE:

STP Units 3 & 4 offsite power systems, described in FSAR Section 8.2, include the cables described above. These cables are not within the scope of the Maintenance Rule and, therefore, will not be subject to routine monitoring.

STP Units 3 & 4 will meet the requirements of Generic Letter 2007-01 for all onsite cables within the scope of FSAR Section 8.3, covered by the Maintenance rule, and installed below grade where they could be subjected to submergence. It should be noted that a significant portion of the onsite cables in the STP Unit 3 & 4 design are installed above grade (e.g., cables that originate and stay within the Reactor building), or are installed in tunnels, neither of which is subject to submergence. The methodology for testing will be as follows:

1. STP Units 3 & 4 utilizes 4.16kV safety related and non-safety related systems and 13.8kV non-safety related medium voltage AC distribution systems that are covered by the Maintenance Rule. Testing of medium voltage power cables will be performed by DC megger as part of routine preventative and corrective maintenance activities associated with the end devices, which include the switchgear and transformers. Motor and transformer testing is normally performed from the switchgear and includes the cable within the test scope. Medium voltage motor and transformer testing includes polarity index and power factor tip up testing.

2. STP Units 3 & 4 testing of 480 volt power cables will be performed by DC megger as part of routine preventative and corrective maintenance activities associated with the end devices, which include the load and motor control centers.

3. STP Units 3 & 4 will use grounded 120 volt AC and ungrounded 125 volt DC and 250 volt DC systems. No routine testing of power cables is performed because these are low potential cables. Cables may be tested as part of troubleshooting or corrective maintenance activities. The DC systems will be equipped with permanently installed continuous ground detection systems that provide local and control room alarms in the event of a system ground. Additionally, surveillance test procedures performed periodically on safety-related equipment demonstrate that the tested cables are functional.

No COLA revisions are required as a result of this RAI response.