Nuclear Operating Company

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

October 12, 2009
U7-C-STP-NRC-090170

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
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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 are the responses to the NRC staff questions included in Request for Additional Information (RAI) letter numbers 224 and 268 related to Combined License Application (COLA) Part 2, Tier 2, Sections 2.5.4 and 3.11, respectively. This submittal completes the response to each of these RAI letters.

Attachments 1 through 7 address the responses to the RAI questions listed below:

RAI 02.05.04-31
RAI 03.11-1
RAI 03.11-2
RAI 03.11-3
RAI 03.11-4
RAI 03.11-5
RAI 03.11-6

There are no commitments in this letter.

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

DD91
NRO

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

Executed on 10/12/09

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

jep

Attachments:

1. RAI 02.05.04-31
2. RAI 03.11-1
3. RAI 03.11-2
4. RAI 03.11-3
5. RAI 03.11-4
6. RAI 03.11-5
7. RAI 03.11-6

cc: w/o attachment except*
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RAI 02.05.04-31

QUESTION:

FSAR Table 3.0-11 of Part 9: ITAAC, "ITAAC For Backfill Under Category I Structures," (1) does not specify the inspections, tests, or analyses that will be used to ensure that the properties of the selected backfill meet the site-specific assumptions used in the static and dynamic analyses, (2) only commits to meeting minimum density values, and (3) does not provide specific acceptance criteria. 10 CFR 100.23 (d) (4) requires that "Each applicant shall evaluate all siting factors and potential causes of failure, such as the physical properties of the materials underlying the site ...," and Regulatory Guide 1.206 section C.I.2.5.4.5, "Excavations and Backfill," states that the applicant should discuss "sources and quantities of backfill and borrow, including a description of exploration and laboratory studies and the static and dynamic engineering properties of these materials."

Please describe how you will ensure that the backfill placed below Category 1 structures meets or exceeds your design assumptions used in the site-specific static and dynamic analyses performed for STP Units 3 and 4, to include assumed shear wave velocity, compressibility properties and shear strength parameters for the backfill placed under Category 1 structures.

RESPONSE:

Quality control procedures to verify key parameters of the backfill material during placement were provided in the response to NRC RAI 14.03.02-6 (STPNOC letter U7-C-STP-NRC-090150 dated September 21, 2009, ML092660093) and are included in COLA Revision 3, Table 2.5S.4.5.3-1, "Quality Control Recommendations for Structural Fill." The response to NRC RAI 14.03.02-6 also proposed new ITAAC in COLA Part 9, Table 3.0-11, "Backfill under Category 1 Structures," to require testing and verification of shear wave velocity as compared to the value used in design analyses, along with the ITAAC previously proposed for verifying backfill compaction.

When the source of backfill material to be placed under Seismic Category I structures is identified, testing will be conducted to ensure that the backfill properties, such as compressibility and shear strength, are consistent with design inputs used in the analysis of these structures. This backfill material will also be characterized by key indicator parameters (i.e., gradation, moisture content, Atterberg limits, density) that will be used for field quality control of backfill placed. The relationship between these key indicator parameters and the design input parameters will be established to ensure that the backfill placed under Seismic Category I structures meets or exceeds the requirements of the design analyses.

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

RAI 03.11-1

QUESTION:

Provide or reference the following information, or indicate the status of and schedule for its availability, related to the environmental qualification (EQ) operational program for safety-related mechanical equipment for the STP Units 3 & 4 nuclear power plant, including (a) a description of the process to determine the suitability of environmentally sensitive mechanical equipment needed for safety-related functions and to verify that the design of such materials, parts, and equipment is adequate, such as (i) identifying safety-related mechanical equipment located in harsh environmental areas, (ii) identifying nonmetallic subcomponents of such equipment, (iii) identifying environmental conditions and process parameters for which this equipment must be qualified, (iv) identifying nonmetallic material capabilities, and (v) evaluating the environmental effects on the nonmetallic components of the equipment; and (b) a description of the approach to document the successful completion of qualification tests and/or analysis, and qualification status for each type of equipment.

Section 3.11, "Environmental Qualification of Mechanical and Electrical Equipment," in the STP Units 3 & 4 3 FSAR incorporates by reference Section 3.11 of the ABWR DCD Tier 2, with supplemental information. The process for implementation of the provisions for environmental qualification of safetyrelated mechanical equipment (such as by procurement specifications) has not been described in the STP Units 3 & 4 COL application. Provide examples of the implementation for environmental qualification of safety-related mechanical equipment or provide a schedule when the implementation will be available for an NRC on-site review.

RESPONSE:

The STP Units 3 and 4 Equipment Qualification Program ("the Program") is currently being developed. It includes the operational program for environmental qualification (EQ) for safety-related mechanical and electrical equipment. The STP Units 3 and 4 environmental qualification of safety-related mechanical and electrical equipment is consistent with NEDE-24326-1-P (see Reference 3.11-2, COLA Part 2, Tier 2, Section 3.11.8), as reviewed in Section 3.11.2 of NUREG-1503, Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design, dated July 1994. The Program will include a description of the process used to determine the suitability of environmentally sensitive mechanical equipment that performs safety-related functions and to verify that the design of such materials, parts, and equipment is adequate. The Program will address: (i) identifying safety-related mechanical equipment located in harsh environmental areas, (ii) identifying nonmetallic subcomponents of such equipment, (iii) identifying environmental conditions and process parameters for which this equipment must be qualified, (iv) identifying nonmetallic material capabilities, and (v) evaluating the environmental effects on the nonmetallic components of the equipment. The Program will also require documentation of the approach(s) allowed for the successful completion of qualification tests and/or analysis, and qualification status for each type of equipment.

The document described above will be used to determine the environmental qualification requirements for the STP Units 3 and 4 safety-related mechanical equipment. These requirements will be incorporated in the equipment purchase specifications. The response to RAI 03.10-1, Supplement 1, (see letter U7-C-STP-NRC-090160, dated October 5, 2009) provides a list of mechanical and electrical components that require seismic/dynamic qualification. The environmental qualification requirements for the mechanical items on that list will be specified in accordance with the Program.

The STP Units 3 and 4 Equipment Qualification Program will be available for review in the 2nd Quarter 2010.

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

RAI 03.11-2

QUESTION:

Discuss the plan for the implementation of the environmental qualification approach, including the application of industry standards.

Subsection 3.11.2 "Qualification Tests and Analyses," of the ABWR DCD Tier 2 states that safety-related mechanical equipment that is located in a harsh environment is qualified by analysis of materials data which are generally based on test and operating experience. ABWR DCD Tier 2 Subsection 3.11.2 states that for safety-related equipment located in a mild environment, certificate of compliance shall be submitted certifying that the equipment has been qualified to assure its required safety-related function in its applicable environment. The STP Units 3 & 4 FSAR does not discuss the implementation of the environmental qualification approach required by the ABWR DCD.

RESPONSE:

The STP Units 3 and 4 Equipment Qualification Program will be used, as stated in the response to RAI 03.11-1. It includes the environmental qualification (EQ) approach, including the application of industry standards. The program incorporates the reference ABWR DCD approach for the safety-related mechanical equipment that is located in a harsh environment or a mild environment. COLA Part 2, Tier 2, Section 3.11.6S, Qualification of Mechanical Equipment, explains the approach. Thus, the DCD Tier 2, Section 3.11.2 requirements for qualification of equipment in harsh or mild environments will be a part of the equipment purchase specifications, as explained in the response to RAI 03.11-1.

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

RAI 03.11-3

QUESTION:

Describe the plan for the implementation of Toshiba Replacement EQ Program Document for environmental qualification of safety-related mechanical equipment at STP Units 3 & 4. Subsection 3.11.6S of the STP Units 3 & 4 FSAR states that the process for determining the suitability of environmentally sensitive soft parts in mechanical equipment has been established for all commodities and sub-components of mechanical equipment that perform a safety-related function by adherence to the requirements of Topical Report NEDE-24326-1-P "General Electric Environmental Qualification Program." As discussed in RAI 3.11-1, Toshiba will prepare a derivative document based on GE's EQ Program (Proprietary) topical report NEDE-24326-1-P, 1983.

RESPONSE:

As discussed in the response to RAI 03.11-1, the STP Units 3 and 4 environmental qualification of safety-related mechanical and electrical equipment is consistent with the requirements of NEDE-24326-1-P. There is no replacement document. The process for determining the suitability of environmentally sensitive soft parts in mechanical equipment will be included in the implementation program, as discussed in the responses to RAIs 03.11-1 and 03.11-2.

RAI 03.11-1 does not discuss a derivative document. Issues related to derivative documents should be addressed through the assessment of the STPNOC due diligence, which is outside the scope of the COLA RAIs.

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

RAI 03.11-4

QUESTION:

Operating experience from nuclear power plants has revealed the potential for adverse flow effects during normal plant operation that can impact safety-related components (such as safety relief valves). As a result, equipment qualification programs need to address these adverse flow effects to provide confidence in the capability of safety-related equipment to be capable of performing their safety functions. Please provide additional details how STP Units 3 and 4 plan to implement the DCD provisions for equipment qualification to address the effects of flow induced vibration.

RESPONSE:

The STP Units 3 and 4 Equipment Qualification Program will be used, as stated in the response to RAI 03.11-1. It will include the operational program for seismic and dynamic qualification (DQ) for safety-related mechanical and electrical equipment, and will address the potential vibratory effects from instabilities or rapid changes of the flow in the piping during normal and anticipated plant operation. The effect of the specified non-seismic related vibration due to normal and transient plant operating conditions and in-plant (suppression pool hydrodynamic) vibration will be accounted for as a portion of the seismic tests. The vibration events will be specified based upon potential system operating cycles (see DCD Tier 2, Table 3.9-1, items 14 and 15, and Table 3.9-2, items 2(a), 2(b), 5, 6, 7 and 9 as well as the second sentence of Note (5) and Note (10)). BWR operating experience provides a basis for determining the operating events. The requirement to account for the vibratory effects will be a part of the purchase specifications via incorporation of the program requirements, as explained in the response to RAI 03.11-1.

Adverse piping vibration may occur due to disturbances or instabilities of the flow in the piping, depending upon the as-built piping configuration including supports, and the operating (e.g., pumps, valves and SRVs) and non-operating (e.g., pressure reducing devices and flow restrictors) components in the system. DCD Tier 2, Section 3.9.2.1.1 includes requirements for pre-operational and initial start-up testing for piping vibrations. During this testing, piping vibration is corrected if it does not meet the acceptance criteria.

In summary, the safety related equipment is required to be qualified, via purchase specifications, for dynamic conditions, events and loads as addressed in DCD Tier 2, Sections 3.9 and 3.10.

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

RAI 03.11-5

QUESTION:

Clarify the plans for the commencement of the Environmental Qualification Program and its transition into the site-specific operating reactor program as described in Section 3.11.7 of the STP Units 3 & 4 FSAR for both mechanical and electrical/I&C equipment.

Implementation of the environmental qualification program, including development of the plant specific Equipment Qualification Document (EQD), will be in accordance with the milestone defined in FSAR Section 13.4S "Operational Program Implementation." STP Units 3 & 4 FSAR Section 13.4S indicates that FSAR Table 13.4S-1, "Operational Programs Required by NRC Regulations and Program Implementation," lists each operational program, the regulatory source for the program, the FSAR section in which the operational program is described, and the associated implementation milestones. FSAR Table 13.4S-1 specifies the implementation milestone for the Environmental Qualification Program as "fuel load." This milestone is not sufficiently clear to establish the commencement of the Environmental Qualification Program and its subsequent transition to an ongoing program during plant operation. For example, will commencement of this program be tied to the completion of construction activities for the component, system, or elevation? What will be the process for turnover of the EQ program to plant operations staff? Discuss development and turnover of the preventive maintenance, surveillance, and periodic testing programs identified in Section 3.11.7 of the FSAR.

RESPONSE:

The steps/chronology in support of the "Fuel Load" milestone will be as follows:

1. As stated in the response to RAI 3.11-1, the STP Units 3 and 4 Equipment Qualification Program includes the operational program for environmental qualification (EQ) for safety-related mechanical and electrical/instrumentation and control (I&C) equipment. The procurement specifications incorporate the applicable requirements from the program, as noted also in the response to RAI 3.11-1.

2. A specification is attached to the purchase specifications, which provides the equipment vendors with the guidance/direction to prepare test plans, to perform the environmental qualification and submit the results of the testing in a structured EQ report for equipment. An environmental data sheet summarizing the environmental conditions that the equipment must be qualified to is also attached to the purchase specifications. These data sheets are prepared based on the equipment location in the plant, and the environmental data for that location as documented in the program. Both of these attachments to the procurement documents become a requirement for the vendors to demonstrate suitability of the supplied equipment.

3. The EQ reports, as noted in (2) above, will be reviewed, as they become available. The review ensures that the vendor's EQ meets the procurement specification requirements,

which include qualified life based on the environmental conditions, items/materials that may have a shelf life issue and items that must be replaced to maintain their qualification, when disturbed in the field or during normal maintenance/troubleshooting in the plant, such as o-ring replacement when a cover on a transmitter is removed.

4. The Environmental Qualification Document (EQD) will be prepared summarizing the qualification results for all safety-related electrical and mechanical equipment located in harsh environments. The EQD will include the following: (a) The test environmental parameters and the methodology used to qualify the equipment located in harsh environments will be identified, and (b) A summary of environmental conditions and qualified conditions for the safety-related equipment located in a harsh environment zone will be presented in the system component evaluation work sheets.

5. The approved records and reports from (3) above and the EQD will be entered into electronic searchable databases. These databases provide basis for the maintenance activities and insure that the equipment is identified that requires replacement based on shelf life, qualified life and maintenance activities.

6. The EQ program will be implemented/utilized during construction, and will be completed for turnover to STPNOC by fuel load as described in the response to RAI 3.11-6. Also, the preventive maintenance, surveillance, and periodic testing programs are discussed in the response to RAI 3.11-6.

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

RAI 03.11-6

QUESTION:

The applicant is requested to fully describe the proposed site-specific operational EQ program (based on STP 1 & 2) in Subsection 3.11.7 of the STP Units 3 & 4 FSAR and note any differences with the mechanical environmental qualification program as approved by the NRC in NUREG-1503 and NEDE-24326-1-P, 1983. For mechanical components, also describe the qualification methods and record keeping requirements for the site-specific operational program. Also, state if this program will include electrical/I&C equipment and, if so, fully describe the program with respect to electrical/I&C equipment.

Subsection 3.11.7 of the STP Units 3 & 4 FSAR provides a site-specific supplement for the operational description of the STP Units 3 & 4 Environmental Qualification (EQ) Program and states that the EQ Program for STP Units 3 & 4 will be consistent with the STP Units 1 & 2 Program, taking into consideration the appropriate differences between new and existing units. The FSAR references the STP 1 & 2 EQ Program without sufficient detail.

RESPONSE:

The following provides the requested information:

1. The STP Units 3 and 4 Equipment Qualification Program will be used as stated in the response to RAI 03.11-1. It includes the operational program for environmental qualification (EQ) for safety-related mechanical and electrical equipment, including instrumentation and control (I&C) equipment. The program is consistent with NEDE-24326-1-P, 1983, as reviewed in Section 3.11.2.2 of NUREG-1503 for program requirements for mechanical environmental qualification. The EQ program is also consistent with the EQ descriptions contained in DCD Tier 2, Section 3.11 and COLA Part 2, Tier 2, Section 3.11. The COL License Information that is described in COLA Part 2, Tier 2, Sections 3.11.6 and 3.11.6S will be included in the EQ program. The administrative and process management requirements of the STP Units 1 and 2 EQ Program will be merged, as described below, with the technical requirements of the STP Units 3 and 4 Equipment Qualification Program for implementation during the operation.

2. As described in the response to RAI 03.11-5, the vendors are required to provide the EQ information that will be needed during construction and subsequent operation of STP Units 3 and 4. The STP Units 1 and 2 EQ program includes programs for preventive maintenance, surveillance, and periodic testing, which provide for replacement of parts and equipment prior to the end of qualified life. These programs will be included into the STP Units 3 and 4 EQ program, before fuel load, as part of the EQ Program, Item 3 of COLA Part 2, Tier 2, Table 13.4S-1.

3. The STP Units 1 and 2 EQ program includes specific administrative and quality assurance activities, such as design changes, procurement, work control, and maintenance. It also

administers procedural controls for evaluating changes, preparing documentation, maintaining databases, calculating qualified life of components, performing various technical evaluations, and reviewing equipment purchase specifications. For planning of such procedural activities during operation of the STP Units 3 and 4 units, the STP Units 1 and 2 activities will be used as guidelines. Documentation of these procedural activities will be prepared, before the fuel load, as part of the STP Units 3 and 4 EQ Program, Item 3 of COLA Part 2, Tier 2, Table 13.4S-1.

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