Nuclear Operating Company

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

June 3, 2010
U7-C-STP-NRC-100123

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 Requests for Additional Information

Attached are the South Texas Project Nuclear Operating Company (STPNOC) responses to NRC staff questions in Request for Additional Information (RAI) letter number 342, related to Combined License Application (COLA) Part 2, Tier 2, Section 2.5S.4, "Stability of Subsurface Materials and Foundations," and RAI letter number 343, related to COLA Part 2, Tier 2, Section 8.2, " Offsite Power Systems." This letter completes the response to RAI letters 342 and 343. Attachments 1 and 2 provide the responses to the RAI questions listed below:

02.05.04-36 08.02-24

When a change to the COLA is indicated, it 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, please contact me at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

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

Executed on 6/3/10

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

rhb

Attachments: 1. RAI 02.05.04-36
2. RAI 08.02-24

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cc: w/o attachments and enclosure except*
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02.05.04-36

QUESTION:

Table 3.0-11, Backfill under Category I Structures, provided in Supplement 1 to RAI 2.5.4-33, includes an ITAAC for shear wave velocity and the newly proposed ITAAC for lab testing of backfill from unidentified sources. Table 3.0-13, submitted in the response to RAI 2.5.4-30, contains the settlement ITAAC. All of these ITAAC lack specific acceptance criteria, as well as specificity in the other elements of the ITAAC. Please update these three ITAAC to reflect a clear demonstration that the assumptions in the safety analyses are verified consistent with requirement in 10 CFR 100.23. For the shear wave velocity ITAAC, please refer the NRC's August 7, 2009 letter to NEI regarding the NRC staff position and standard wording for backfill ITAAC under Category I structures.

RESPONSE:

This RAI requests that STPNOC update three previously proposed ITAAC. These ITAAC are discussed separately below.

Shear Wave Velocity

In STPNOC's response to RAI 14.03.02-6 (STPNOC letter U7-C-STP-NRC-090150 dated September 21, 2009 (ML092660093)) STPNOC proposed an additional ITAAC in COLA Part 9, Section 3.0, Table 3.0-11, Backfill Under Category I Structures, to address shear wave velocity. In response to this RAI, STPNOC has updated the proposed ITAAC consistent with the NRC position discussed in this RAI to provide specific quantitative acceptance criteria for the shear wave velocity in the backfill under specified Category I structures. A markup of the revised ITAAC is provided with this response.

Engineering Properties of Backfill

In Supplement 1 to the response to RAI 02.05.04-33 (STPNOC letter U7-C-STP-NRC-100057 dated March 15, 2010 (ML100770389)), STPNOC proposed an additional ITAAC in COLA Part 9, Section 3.0, Table 3.0-11, Backfill Under Category I Structures to confirm that the engineering properties of backfill under Category I structures from laboratory analyses met the values used in the site-specific design analysis. This proposed ITAAC was provided in lieu of listing specific engineering properties of backfill in COLA Part 2, Tier 2, Section 2.5S.4.5, since the source of backfill material has not been identified. This RAI requests additional specificity in order to more clearly demonstrate that the assumptions of the safety analysis are verified by this ITAAC. The COLA markup provided with this response provides the criteria for the engineering properties of backfill in three additional tables and two additional figures in COLA Part 2, Tier 2, Section 2.5S.4.5.3, "Compaction Specifications." The addition of these specific quantitative values in COLA Part 2, in combination with an ITAAC requiring confirmation that the as built condition of the backfill is consistent with these assumed values, provides the necessary verification that the assumptions in the safety analyses are properly verified. The COLA markup provided with this response retains the proposed ITAAC in COLA Part 9, Section 3.0, Table 3.0-11.

Settlement

STPNOC's response to RAI 02.05.04-30 (STPNOC letter U7-C-STP-NRC-090146 dated September 21, 2009 (ML092710096)) provided ITAAC related to settlement of Category I structures (COLA, Part 9, Section 3.0, Table 3.0-13, Settlement). This RAI response revises the previously proposed ITAAC to provide more specificity regarding the testing required and includes quantitative acceptance criteria. The revised ITAAC is provided in the COLA markup below.

The STP Units 3 and 4 COLA will be revised as indicated in the following markups. These markups supersede markups to the affected COLA sections previously provided in the responses to RAIs 02.05.04-30, 02.05.04-33 (original response and Supplement 1) and 14.03.02-6.

COLA Part 2 (Tier 2), Section 2.5S.4.3, Compaction Specifications

2.5S.4.5.3 Compaction Specifications

Once structural fill sources are identified, as discussed in Subsection 2.5S.4.5.1, several samples of materials are obtained and tested for index properties and for engineering properties, including grain size and plasticity characteristics, moisture-density relationships, and dynamic properties. For foundation support and for backfill against walls, structural fill ~~needs are~~ is compacted to a minimum of 95% of its maximum dry density and within + or -3% of its optimum moisture content, as determined based on the modified Proctor compaction test procedure (Reference 2.5S.4-42).

A trial fill program is normally conducted for the purposes of determining the optimum number of compactor coverages (passes), the maximum loose lift thickness, and other relevant data for optimum achievement of the specified moisture-density (compaction) criteria.

Quality control for structural fill placement includes observation of borrow area excavation, moisture conditioning, and compaction. Representative samples of the structural fill material are selected and tested to verify that material classification and compaction characteristics are within range of the materials specified and used for design. ~~It is anticipated that the bulk of the structural fill will come from off-site sources.~~ Prior to the delivery of the material to the project site, each off-site source of backfill will be sampled at the source and tested for compliance with the specifications. Tests will include grain size (ASTM D6913), organic matter (ASTM D2488) and compaction tests (ASTM D-1557). Testing of materials sampled at the source will also include consolidation (ASTM D2435), triaxial shear (USACE Procedure) and Resonant Column Torsional Shear (RCTS) (University of Texas procedure PBRCTS-1).

The results of the triaxial shear tests will be evaluated to determine that the strength of the material will be at least as good as the values used in the engineering analyses of lateral earth pressure and bearing capacity.

The granular structural backfill will be relatively low in compressibility and therefore no specific acceptance criterion is applied. The results of the consolidation tests will be evaluated to determine that the compression of the fill layers results in settlement consistent with values computed during design.

The results of the RCTS tests will be evaluated to determine that the low strain shear modulus of the material, when placed and compacted, will lie within the range used in the analysis for soil-structure interaction and also that the modulus and damping variations with shear strain are within the range used for the analysis.

The materials from each source will be stockpiled separately to permit sampling and verification of the material properties before placement. These tests will include grain size (ASTM D6913) and organic matter (ASTM D2488). Additional compaction tests (ASTM D1557) at the site will be performed on samples obtained from the backfill material as it is placed for compaction.

Prior to placing backfill in the excavation for the plant structure, a test fill pad will be constructed on-site using the equipment and granular fill materials to be used in the backfill. The test pad will be used to confirm requirements for the size of compaction equipment, number of passes, lift thickness and other relevant data for achieving the specified compaction. The low strain shear wave velocity achieved in the test pad will be measured in-situ using surface wave and downhole methods.

Prior to placing the materials as backfill, an engineering report will be prepared to confirm that the materials, construction equipment and methods used to construct the test pad are capable of producing acceptable and consistent results.

Depending on the on-site handling of the ~~imported~~ material, moisture content adjustment may be necessary to achieve proper compaction. If water is added, it is uniformly applied and thoroughly mixed into the soil by discing. Testing of the backfill material during construction is required to verify that the engineering properties are compatible with the pre-construction qualification testing. Periodic density testing is performed on compacted fill as the material is placed. A quality control sampling and testing program inclusive of the items provided by Table 2.5S.4.5.3-1 is implemented during placement of the structural fill. This quality control sampling and testing program verifies that the structural fill is placed in accordance with the design parameters described in this Subsection.

Table 2.5S.4.5.3-1 Quality Control Recommendations for Structural Fill

Material	Test	Minimum Sampling and Testing Frequency[1]
Structural Fill	Field Density	For backfill placed in trenches and surrounding structures: Minimum 1 sample per 200 cubic yards placed, sample taken at suspect areas, and at least one per every lift. Elsewhere: Minimum 1 sample per 500 cubic yards placed, sample taken at suspect areas, and at least one per every lift.
	Moisture	One test for each Field Density test
	Moisture-Density Relationship (Modified Proctor)	One test for every borrow area and material type and any time material type changes. Additional test for every ~~40~~ 10 Field Density test (ASTM D1557)
	Gradation	One test for each Moisture-Density test. (ASTM D 6913)
	~~Atterburg~~ Atterberg Limits	One test for each Moisture-Density test~~.~~ (ASTM D 4318) for backfill types appropriate for this test.
	Material Type	Soil must come from an approved borrow source. Other soil sources must be tested and approved.

Note 1: Consistent with the requirements of NQA-1 (1994) Subpart 2.5, the need for each specific test shall be established in site-specific construction specifications. In-process tests shall be performed more frequently if the test results are erratic, or if the trend of results or an apparent change in material characteristics indicates that the frequency should be increased. These test frequencies shall be considered minimum unless documentary test data are available to establish adequate confidence in conformance with specification requirements.

The following laboratory tests will be performed on samples of the proposed granular fill materials before they are approved for use. An engineering report will be prepared to confirm that the granular fill material will produce a backfill having acceptable engineering properties.

Test	**Minimum No. of Tests**	**Criterion for Acceptance Unless Approved by Engineer of Record**
Grain Size ASTM D6913	1 per material type per source	Complies with Specifications
Organic Matter ASTM D2488	1 per material type per source	Complies with Specifications
Specific Gravity ASTM D854	1 per material type per source	Complies with Specifications
Modified Proctor ASTM D1557	1 per material type per source	Maximum Dry Density Will Result in a Saturated Total Unit Weight ≥ 120 lb/ft^3
Constant Head Permeability ASTM D2434	1 per material type per source	Complies with Specifications
pH ASTM G51	1 per material type per source	Complies with Specifications
Chloride Content EPA SW-846 9056/300.0	1 per material type per source	Complies with Specifications
Sulfate Content EPA SW-846 9056/300.0	1 per material type per source	Complies with Specifications
Resistivity ASTM G 57	1 per material type per source	Complies with Specifications
Consolidated Drained Triaxial Shear USACE EM-1110-2-1906 Appendix X (30 Nov. 70)	1 per material type per source	□' ≥ 30°
Consolidation ASTM D2435	1 per material type per source	Compression of fill layer results in settlement consistent with values computed during design
Resonant Column Torsional Shear University of Texas Procedure PBRCTS-1	1 per material type per source Test at 4 to 6 isotropic confining stress values	Maximum shear modulus, modulus ratio, and damping ratio consistent with upper range and lower range values used for soil-structure interaction analysis

The static and dynamic properties of structural fill are presented in Tables 2.5S.4.5.3-2, 2.5S.4.5.3-3, and 2.5S.4.5.3-4 and Figures 2.5S.4-80 and 2.5S.4-81. The following criteria are required for structural fill placement beneath and around the STP Units 3 & 4 Seismic Category I Structures:

- The on-site equipment includes earthwork equipment for both drying and wetting of soils
- Materials selected for use as structural fill are free from roots and other organic matter, trash, debris, frozen soil, and stones larger than 6 inches in any dimension. The following soil types are considered unsuitable for use as structural fill: PT, OH, OL, MH, ML, CL, and CH (Referenced from Unified Soil Classification System).
- Suitable structural fill soils of the types ~~on-site~~ (SM, SC, SW and GW) are placed in accordance with specifications developed following testing. The soil is compacted by mechanical means such as steel drum, tamping, or rubber-tired rollers.
- Structural fill is compacted to at least 95 percent of the modified Proctor maximum dry density (ASTM D 1557) to within 3 percent of the optimum moisture content.

Table 2.5S.4.5.3-2 Engineering Parameters for Backfill

Parameter	**Acceptance Criteria**
Grain Size Distribution	Well graded granular material Percent passing #200 sieve < 25 percent
Total Unit Weight	≥ 120 lb/ft^3
Phi Angle	≥ 30 degrees
Shear Modulus Reduction	Within UB and LB in Figure 2.5S.4-80
Damping Ratio	Within UB and LB in Figure 2.5S.4-81

Table 2.5S.4.5.3-3 Representative Range for Grain Size Distribution of Backfill

Sieve Size		Acceptance Criteria for Percent Passing
1 inch	25.4 mm	100
¾ inches	19 mm	97 – 100
No. 4	4.75 mm	30 – 100
No. 40	425 µm	10 – 100
No. 100	150 µm	0 – 65
No. 200	75 µm	0 – 25

Table 2.5S.4.5.3-4 Dynamic Engineering Parameters for Backfill

Shear Strain γ (%)	Shear Modulus Parameter K2 and Damping Ratio Values for SSI Analyses					
	Lower Bound Parameter K2 (2)	Upper Bound Soil Damping Ratio (4,5)	Mean		Upper Bound Parameter K2 (3)	Lower Bound Soil Damping Ratio (4,5)
			Parameter K2 (1)	Soil Damping Ratio (4,5)		
0.0001	45	0.7	67	0.5	101	0.3
0.0003	44	1.2	66	0.9	99	0.4
0.0005	43	1.6	65	1.2	97	0.5
0.001	42	2.7	63	1.7	94	0.7
0.003	37	5.5	56	3.1	84	1.4
0.005	34	7.3	51	4.0	77	1.9
0.01	29	9.9	43	5.6	65	2.8
0.03	20	14.9	29	9.6	44	5.1
0.05	15	17.5	23	12.0	35	6.8
0.1	11	20.9	16	15.4	24	9.8
0.3	5	25.6	8	20.7	11	15.5
0.5	3	26.9	5	22.8	8	18.0
1	2	27.9	3	24.5	5	21.1

Notes:
1) For parameter K2 see Figure 2.5S.4-80. K2 values are for relative density, Dr = 85% (interpolated from Dr =75% and Dr = 90%) from Figure 5 of Report EERC 70-10, December 1970 by Seed and Idriss.

2) K2 values for Lower Bound are K2 values for Mean divided by 1.5.

3) K2 values for Upper Bound are K2 values for Mean multiplied by 1.5.

4) Damping values are from Figure 10 of Report EERC 70-10, December 1970 by Seed and Idriss. Note that Upper Bound damping values shall be used with Lower Bound Shear Modulus and Lower Bound damping values shall be used with Upper Bound Shear Modulus.
5) Damping values used in analysis shall not exceed 15% per SRP 3.7.2.

Lateral pressures applied against the below grade Nuclear Island walls are evaluated and discussed in Subsection 2.5S.4.10.3. Evaluation and discussion of liquefaction issues related to the structural fill materials is provided in Subsection 2.5S.4.8.

Measurements of the shear wave velocity will be made when the backfill surface has reached an elevation corresponding to placement of approximately half the total backfill thickness below the Category I structures, when the backfill surface has reached the elevation corresponding to approximately the foundation (base of concrete fill) level of the structure and at the finish grade elevation. The shear wave velocity measurements will be analyzed and compared to the acceptance criteria in COLA Part 9, Table 3.0-11. The shear wave velocity measurement methods will be the SASW technique and at least one of the following techniques: Seismic CPT (downhole) or crosshole.

Figure 2.5S.4-80 Dynamic Engineering Parameters for Backfill (85% Relative Density) Shear Modulus Parameter, K2

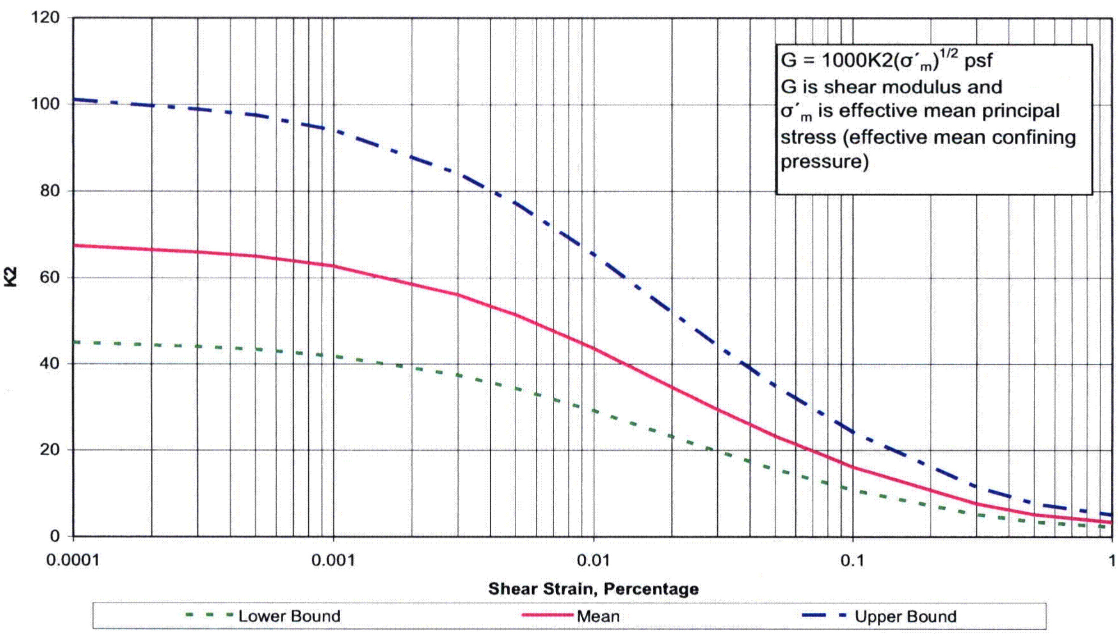
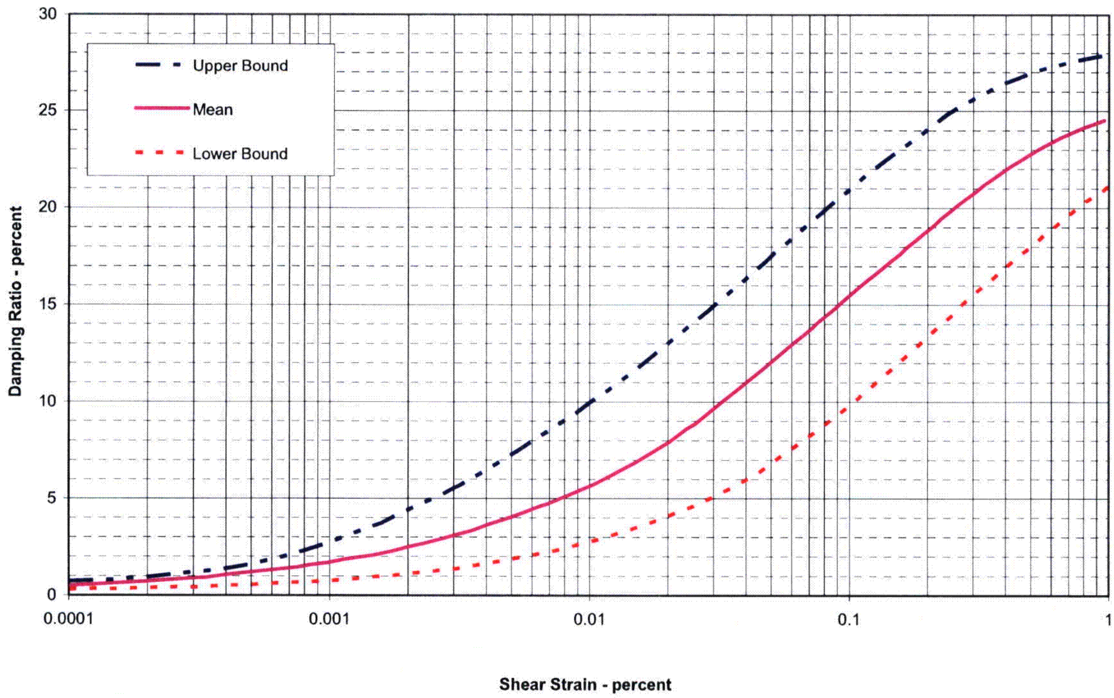


Figure 2.5S.4-81 Dynamic Engineering Parameters for Backfill (85% Relative Density) Damping Ratio



COLA Part 9, Section 3

Table 3.0-11 Backfill ~~u~~Under Seismic Category ~~1~~I Structures

Design Requirement	Inspections, Tests, and Analyses	Acceptance Criteria
1. Backfill material under Seismic Category I structures is ~~compacted to not less than 95% of maximum dry density and within plus or minus 3% of the optimum moisture content~~ installed to meet a minimum of 95 percent of the Modified Proctor density.	1. Testing will be performed during placement of the backfill materials.	1. ~~Installed backfill under Category I structures meets the minimum soil density design requirements.~~ 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.
2. The shear wave velocity of backfill under Seismic Category I structures meets the value used in the site-specific design analyses.	2. Field measurements and analyses of shear wave velocity in backfill will be performed when backfill placement is at approximately the elevations corresponding to: (1) half the backfill thickness to be placed below the foundation level, (2) the foundation depth (i.e., base of concrete fill), and (3) the finish grade around the structure.	2. An engineering report exists that concludes that the shear wave velocity within the backfill material placed under Seismic Category I structures at their foundation depth and below is greater than or equal to 600 feet/second for the RSW Tunnels and Diesel Generator Fuel Oil Storage Vaults and 470 feet/second for the Diesel Generator Fuel Oil Storage Vault Tunnels.
3. The engineering properties of backfill under Seismic Category I structures bound the values used in the site-specific design analyses.	3. Laboratory tests, field measurements and analyses of engineering properties of the backfill will be performed.	3. An engineering report exists that concludes that the engineering properties of backfill under Seismic Category I structures (unit weight, phi angle, shear strength, shear modulus, shear modulus degradation and damping ratio) meet the values used in the site-specific design analyses.

COLA Part 9, Section 3

Table 3.0-13 Settlement

Design Commitment	Inspections, Tests, and Analyses	Acceptance Criteria
1. Settlement of structures measured three (3) months prior to fuel load shall be less than the values in the acceptance criterion.	1. Field measurements of actual settlement of Seismic Category I structures will be taken three (3) months prior to fuel load.	1. Maximum allowable tilt (defined as the differential settlement between two edges on the centerline axes of a structure divided by the lateral dimension between these two points) is 1/600.

08.02-24

QUESTION:

In response to RAI 8.2-23, Supplement 1, regarding implementing a program for inaccessible or underground power, control, and instrumentation cables, the applicant stated that low-voltage power (120 volt AC and 125 volt and 250 volt DC), control and instrument cables are not included in monitoring and testing programs consistent with STP Units 1 and 2. This is inconsistent with the requirements of 10 CFR 50.65(a)(1) which states that, "Each holder of a license to operate a nuclear plant ... shall monitor the performance or condition of structures, systems, or components... in a manner sufficient to provide reasonable assurance that such structures, systems, and components... are capable of fulfilling their intended functions." Additionally, Standard Review Plan Section 8.2III.L, states, "Operating experience has shown that undetected degradation of underground ...could result in multiple equipment failures. Underground or inaccessible power and control cable runs that are susceptible to protracted exposure to wetted environments or submergence... should be reviewed. Guidance on the selection of electric cable condition monitoring can be found in Sections 3 and 4.5 of NUREG/CR-7000.

Additionally, the applicant stated that the testing of medium voltage and 480 volt cables will be performed using a DC megger or other acceptable method based on the cable type/construction. The testing will be performed as part of routine preventive and corrective maintenance activities associated with the end device. The staff finds the applicant's response to be inadequate because DC megger test alone is not sufficient to identify incipient cable degradation that can lead to a cable failure during plant operations, thereby causing challenges to safety systems and systems important to safety. The megger test is not as sensitive to insulation degradation as other tests. EPRI studies for cable testing and condition monitoring support other tests in addition to megger test to detect incipient degradation in cables. Therefore, the staff believes that a combination of megger and other state-of-the-art tests are needed for cable condition monitoring program. In addition, the staff does not consider the megger testing including the end device as an acceptable method for cable condition monitoring program because the test results would be masked by the conditions of the end device insulation rather than revealing the condition of the cable insulation itself. Therefore, the staff requests that the applicant revise its response to provide an appropriate condition monitoring program for detecting incipient degradation in cables based on the industry (EPRI, IEEE and nuclear entities including regulatory bodies) recommended practices or provide justification for supporting its position.

Response:

The response below supersedes in its entirety the response provided in RAI 08.02-23, Supplement 1 (STPNOC letter U7-C-STP-NRC-100067, dated April 1, 2010 (ML 100990227)).

Description of raceway design associated with offsite power system feeds and safety related cabling between the Reactor Building and exterior structures:

As described below, most STP 3 & 4 cable raceways are above grade and the cables are not subject to submergence. In cases where the cables are below grade, the manholes are subjected to periodic inspections and provided with sump pumps and high water level alarms.

The normal preferred feeds from the unit auxiliary transformers are routed around the Turbine Building in an electrical tunnel from the unit auxiliary transformers to the Turbine Building switchgear rooms as shown on FSAR Figure 8.2-1. (An underground duct bank is an acceptable alternate.) The tunnel or duct bank manholes are subjected to periodic inspections and are provided with high water level alarms. Where necessary, sump pumps are provided. The feeds to the Reactor Building exit the Turbine Building and cross the roof on the Division I and III side of the Control Building (FSAR Figure 8.2-1, Sheet 3). The feeds then drop down the side of the Control Building in the space between the Control and Reactor Buildings and enter the Reactor Building and continue through the Division I and III side of the Reactor Building to the associated Class 1E switchgear rooms in the Reactor Building.

The alternate preferred feeds from the reserve auxiliary transformers are routed inside the Turbine Building. The Turbine Building switchgear feeds from the reserve auxiliary transformer are routed directly to the Turbine Building switchgear rooms. The feeds to the Control Building are routed in corridors outside of the Turbine Building switchgear rooms. The feed exits the Turbine Building and crosses the Control Building roof on the side opposite the route for the normal preferred power feeds. The alternate preferred power feed turns down between the Control and Reactor Building and enters the Reactor Building on the Division I side. From there, the alternate preferred feeds continue to the respective switchgear rooms in the Reactor Building.

Safety-related cables routed from the Reactor Building to the Reactor Service Water (RSW) Pump house are routed via three underground tunnels with a separate tunnel for each safety division. The cables are routed in cable trays in the tunnel above the RSW pipes and are accessible. This design is illustrated in FSAR Figure 1.2-36.

The safety-related cables from the Reactor Building to the Diesel Generator Fuel Vaults are routed via underground ducts with manholes at each end of the duct. The ducts share a common concrete wall with the tunnels carrying fuel from the Diesel Generator Fuel Vaults to the Reactor Building. The manholes include sump pumps and level monitoring.

Testing and Monitoring

STPNOC will test all onsite safety and non safety related medium and low voltage power, control and instrumentation cables covered by the Maintenance Rule (chapter 8.3) by monitoring and/or testing cables which are installed below grade and potentially subjected to submergence.

The offsite power system cables that fall within the scope of the maintenance rule, and their associated manholes, will be included in a monitoring and/or inspection program.

a. Monitoring

Monitoring includes inspection of the manholes for water level above the lowest layer of cable, confirmation of sump pump functionality, confirmation that manhole covers are properly seated, and, if required, sealed to prevent/minimize water ingression.

b. Testing

Testing for inaccessible underground cables will be conducted as follows:

1. STP Units 3 & 4 utilize shielded cables for the 4.16 kV safety related and non-safety related systems and 13.8 kV non-safety related medium voltage AC distribution systems covered by the Maintenance Rule. Testing of medium voltage power cables will be performed as part of routine preventative and corrective maintenance activities associated with the end device including load centers and transformers. This will provide early indication of any problems with cable insulation. In addition, testing will be done at ten year intervals to trend cable health using other industry methods such as Tan Delta (Dielectric Loss) for medium voltage cables.

2. Testing of 480 Vac, 120 Vac and 125/250 Vdc volt power cables in systems covered by the Maintenance Rule will be performed using an insulation resistance test (DC megger) every ten years as part of routine preventative and corrective maintenance activities associated with the end device including loads and motor control centers. These cables do not have a shield which limits the kind of testing that can be performed effectively. At present there is no other effective method for detecting insulation system degradation in unshielded cables. The meggering will be performed at the source end and will capture both the cable and the end device. If a low megger reading is obtained, the end device (load) is separated from the cable and they are then individually tested to determine which item has degraded (i.e., the cable or the end device). In addition to the above, the DC systems are equipped with permanently installed continuous ground detection systems that provide local and control room alarms in the event of a system ground. Additionally, surveillance tests, which periodically demonstrate functional capability of the equipment supported by these cables, demonstrate that the cables are functional.

3. For control and instrumentation cables in systems covered by the Maintenance Rule, STPNOC will perform testing at ten year intervals in accordance with EPRI test methods that are presently under development (Reference INPO Topical Report TR10-69 dated May 2010).

STPNOC will continue to evaluate using the latest testing technology for performance of the tests described above.

COLA Part 2, Tier 2, Section 8.3.3 will be revised as follows:

8.3.3.2.1S Testing of Power Cables

The condition of medium voltage power cables which are underground and which support equipment covered by the Maintenance Rule is trended using testing such as Tan Delta (Dielectric Loss) every ten years.

480 Vac, 120 Vac and 125/250 Vdc power cables which are underground and support equipment covered by the Maintenance Rule will be tested every ten years using an insulation resistance test (DC megger).

8.3.3.9S Monitoring of Manholes

Manholes are provided with high water level alarms. Where appropriate, sump pumps are provided. Additionally, manholes are inspected every year to ensure water levels are below the lowest layer of cables, to confirm sump pump and alarm functionality, and to ensure proper seating of manhole covers. If warranted, manhole covers will be sealed to minimize water ingression.