



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

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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

South Texas Project
Units 1&2
Docket Nos. STN 50-498, STN 50-499
Overall Integrated Plan Regarding Commission Order Modifying Licenses with Regard to
Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)

- References:
1. Letter, Eric Leeds to E. D. Halpin, "Issuance of Order to Modify Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation," March 12, 2012 (EA-12-051)
 2. NRC Interim Staff Guidance JLD-ISG-2012-03, Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, Revision 0, August 29, 2012
 3. Letter D. W. Rencurrel to NRC, "Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051)", dated October 24, 2012

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued an order (Reference 1) to STP Nuclear Operating Company (STPNOC). Reference 1 directs STP Nuclear Operating Company to provide a reliable indication of the water level in associated spent fuel storage pools. Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 required submission of an overall integrated plan, including how compliance will be achieved. The final interim staff guidance (Reference 2) was issued August 29, 2012 providing licensees an acceptable approach for complying with the order. The purpose of this letter is to provide the overall integrated plan, including a description of how compliance will be achieved pursuant to Section IV, Condition C.1.a, of Reference 1 in accordance with the guidance in Attachment 2 to Reference 1 and the guidance in Reference 2. See the Enclosure for STPNOC's response to the requested information.

There are no new commitments in this letter.

ADD
LRR

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If there are any questions regarding this letter, please contact Robyn Savage at (361) 972-7438.

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

Executed on: 2/28/13

A handwritten signature in black ink, appearing to read "Dennis L. Koehl", written over a horizontal line.

Dennis L. Koehl
President and CEO/CNO

Enclosure: South Texas Project (STP) Overall Integrated Plan for Implementation of Unit 1 &
Unit 2 Spent Fuel Pool Level Instrumentation to Meet NRC Order EA-12-051

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South Texas Project (STP)
Overall Integrated Plan for Implementation of Unit 1 & Unit 2
Spent Fuel Pool Level Instrumentation
to Meet NRC Order EA-12-051

1.0 OVERALL INTEGRATED PLAN INTRODUCTION

This document provides the overall Integrated Plan (the "Plan") which the STP Nuclear Operating Company ("STPNOC") will implement for Units 1 and 2 to comply with the requirements of NRC Order EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" (Ref.2), (the "ORDER"), NRC Interim Staff Guidance JLD-ISG-2012-003 [Rev.0] (Ref.3), (the "ISG"), and NEI Report 12-02 [Rev.1] ("NEI 12-02").

This Plan follows the format and provides all of the information on the STP 1 & 2 Integrated Plan that is required in NEI 12-02 [Rev.1] (Ref.1), Section A-2-2. Throughout this Plan, any reference to NEI 12-02 and the ISG will be based on the revisions above. Any reference to NEI 12-02 will include compliance to the clarifications and exceptions to NEI 12-02 required by the Interim Staff Guidance, Rev. 0.

In response to the NRC requirements, STPNOC will provide two channels of independent, permanently-installed, wide-range spent fuel pool level instrumentation ("SFPLI"), for the spent fuel pool ("SFP") of each unit. The spent fuel pool for each unit is independent and not interconnected in any way. For each SFP, the instrumentation provided for each channel will utilize the same technology, as permitted by the NEI 12-02 [Rev.1]. The spent fuel pool level instrumentation will provide continuous level indication for each SFP on both the Primary and Backup Channels.

Both the Primary and Backup Channel/Instrument location and display of the SFP level will be independently mounted in each unit's Radwaste Control Room in the Mechanical Electrical Auxiliary Building (MEAB), which is an accessible post-event location. Other locations are still being considered.

Both the Primary and Backup Channel remote, non-safety related indication of the SFP level will also be provided in each unit's Control Room via input to the Plant Computer.

The instrumentation systems will not be safety-related, but will meet the requirements for augmented quality in accordance with NEI 12-02 [Rev.1] and the ISG as described below.

Since all of the potential suppliers have not completed development, the information in this Plan is based on the overall strategy and on information which, based on current information from potential suppliers, is thought to envelope the systems being developed for this application.

If there are any changes to the requirements in NRC JLD-ISG-2012-003 [Rev.0] and NEI 12-02 [Rev.1], relief from the requirements and schedule documented in this Plan may be required, in accordance with Section 12.0. Any required changes to this Plan will be defined in the periodic status reports submitted to the NRC.

2.0 APPLICABILITY:

This Plan applies to the spent fuel pools for South Texas Project Unit 1 and Unit 2.

3.0 SCHEDULE:

The installation of reliable spent fuel pool level instrumentation for the spent fuel pool associated with Unit 1 is scheduled for completion prior to 10/28/2015, which is the end of the second refueling outage (1RE19) following submittal of this Plan.

The installation of reliable spent fuel pool level instrumentation for the spent fuel pool associated with Unit 2 is scheduled for completion prior to 4/29/2015, which is the end of the second refueling outage (2RE17) following submittal of this Plan.

Unit 1 Milestones are as follows:

- Design/Engineering – September of 2014
- Purchase of instruments & equipment – February of 2015
- Receipt of equipment – June of 2015
- Unit 1 Installation & Functional Testing – October of 2015

Unit 2 Milestones are as follows:

- Design/Engineering – December of 2013
- Purchase of instruments & equipment – August of 2014
- Receipt of equipment – November of 2014
- Installation & Functional Testing – April of 2015

Consistent with the requirements of the ORDER and the guidance from NEI 12-02 [Rev.1], status reports will be generated in six (6) month intervals from the submittal of this Plan.

4.0 IDENTIFICATION OF SPENT FUEL POOL WATER LEVELS:

The STP Unit 1 and 2 spent fuel pools are essentially identical. The following SFP elevations are identified:

- The bottom of the pool is at Plant El. 21 ft. 11 in.
- The top of the SFP racks is approximately at Plant El. 39 ft. 10 in.
- The minimum Limiting Condition for Operation SFP level is Plant El. 62 ft.
- Normal SFP water level is at Plant El. 66 ft. 6 in.
- Non-safety related level switch alarms are activated at Plant El. 67 ft. on high level and Plant El. 66 ft. on low level.
- The spent fuel pool deck is at Plant El. 68 ft.

The required key SFP water levels, per guidance of NEI 12-02 [Rev.1] and ISG (with clarifications and exceptions), are as follows:

4.1 LEVEL 1: Level adequate to support operation of the normal fuel pool cooling system.

LEVEL 1 represents the HIGHER of either the level at which reliable suction loss to the cooling pump occurs, or, the required NPSH (Nominal Pump Suction Head) of the cooling pump.

Loss of reliable suction to SFP cooling pumps. For the purposes of this Plan, this level will conservatively be placed at Plant El. 64 ft. 2 in. This allows for just over 1 ft. of SFP water level above the top of the suction inlet flange (SFP Cooling Pump 14 in. suction line with centerline of suction inlet flange at Plant El. 62 ft. 6 in.) which will be sufficient for NPSH. (Ref. 9)

Therefore, considering the top of SFP fuel storage rack is at Plant El. 39 ft. 10 in., the indicated level on either the Primary or Backup Instrument Channel of greater than 24 ft. 4 in. above the top of the SFP fuel storage racks based on the design accuracy for the instrument channel per NEI 12-02 [Rev.1], for both the Primary and Backup Instrument Channels, is adequate for normal SFP cooling system operation.

LEVEL 1 = Plant El. 64 ft. 2 in or 24 ft. 4 in. water level above the top of the SFP fuel storage rack

4.2 LEVEL 2: Level adequate to provide substantial radiation shielding for a person standing on the SFP operating deck.

Indicated level on either the Primary or Backup Instrument Channel of greater than 10 ft. above the top of SFP stored fuel assemblies based on current guidance in NRC RG 1.13 [Rev.2] (Ref. 4) will achieve substantial radiation shielding. Requirements on substantial SFP radiation shielding is also given in ANSI/ANS-57.2-1983 (Ref. 5), and states that radiation shall not exceed 2.5 mRem/hr, but the minimum water depth to achieve this is undefined. NRC RG 1.13 [Rev.2] took exception to using dose rates as design input for minimum SFP water level, and instead defined the minimum level as 10 ft. above the stored fuel assemblies.

STPNOC elects to use the conservative approach of defining the top of the fuel rack as a basis for measurement. Therefore, indicated level on either the Primary or Backup Instrument Channel of greater than 10 ft. above the top of the SFP fuel storage rack, based on the design accuracy of the instrument channel per NEI 12-02 [Rev.1], for both the Primary and Backup Instrument Channels, ensures there is adequate water level to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck.

LEVEL 2 = Plant EI 49 ft. 10 in. or 10 ft. water level above the top of the SFP fuel storage rack.

4.3 LEVEL 3: Level where the fuel remains covered.

As stated above, STPNOC elects to use the conservative approach of defining the top of the fuel rack as a basis for measurement. The installation of the SFPLI sensor will be such that it will measure as close as possible to the top of the SFP fuel rack. Indicated level on either the Primary or Backup Instrument Channel of greater than ½ ft. above the top of SFP fuel storage racks based upon the design accuracy of the instrument channel per NEI 12-02 [Rev.1], for both the Primary and Backup Instrument Channels, satisfies the NEI 12-02 [Rev.2] requirement of ± 1 ft. from the top of the fuel rack. This monitoring level ensures there is adequate water level above the stored fuel seated in the SFP fuel storage rack.

LEVEL 3 = Plant EI 40 ft. 4 in. or 6 in. water level above the top of the SFP fuel storage rack.

5.0 INSTRUMENTS:

Both the Primary and Backup Instrument Channels will utilize permanently-installed instruments. The design of the primary and backup instruments will be consistent with the requirements by NEI 12-02 [Rev.1], the ISG, and this Plan.

The current plan is for both channels to utilize Guided Wave Radar, which functions according to the principle of Time Domain Reflectometry (TDR). A generated pulse of electromagnetic energy travels down the probe. Upon reaching the liquid surface the pulse is reflected and based upon reflection times level is inferred. The measured range will be continuous from the high pool level elevation (67') to the top of the spent fuel racks (Ref. 8). However, STP is still evaluating other designs for this application. Any changes to the current plan will be reported in the 6 month update letter.

The supplier for the SFP instrumentation will be chosen by a competitive bidding process completed after submittal of this Plan, so the information in this Plan is based on the overall strategy and on available information from potential supplier's information on systems being developed for this application.

5.1 Primary (fixed) Instrument Channel

The Primary Instrument Channel level sensing components will be located in the northeast corner of the Spent Fuel Pool, as shown in Attachment 1. The primary instrument channel will provide continuous level indication over a range from Plant EI. 40 ft. 4 in. (LEVEL 3) to Plant EI. 67 ft. (SFP high level alarm) or a range of 26 ft. 8 in. In addition, the capability for discrete level indications at LEVEL1, LEVEL 2 and LEVEL 3, as described in Section 4.0, will be available.

5.2 Backup Instrument Channel

The Backup Instrument Channel level sensing components will be located in the northwest corner of the Spent Fuel Pool, as shown in Attachment 1. The Backup Instrument Channel will provide continuous level indication over a range from Plant El. 40 ft. 4 in. (LEVEL 3) to Plant El. 67 ft. (SFP high level alarm) or a range of 26 ft 8 in. In addition, the capability for discrete level indications at LEVEL1, LEVEL 2 and LEVEL 3 as described in Section 4.0, will be available.

6.0 RELIABILITY:

The reliability of the Primary and Backup Instrument Channels will be assured by conformance with the guidance by NEI 12-02 [Rev.1] and the ISG.

The reliability of the instruments to function as required will be demonstrated through testing, analysis, qualification and operating experience, as discussed in Section 7.3, Qualification.

The SFPLI systems will meet the requirements of Section 3 of NEI 12-02 [Rev.1] and implementation of the programmatic features discussed in Section 11.0.

7.0 INSTRUMENT CHANNEL DESIGN CRITERIA:

The instrument channel design criteria specified for this instrumentation will be based on standard specifications which have been utilized to provide reliable, high-quality, accurate level instruments for similar applications and which meet the requirements of NEI 12-02 [Rev.1] and the ISG. Some of the requirements, based on NEI 12-02 [Rev.1], will include:

- Environmental qualification with respect to the ORDER as given in guidance in NEI 12-02 [Rev.1], Section 3.4. Notwithstanding the pertinent sections of NEI 12-02 relating to SFPLI System components in the Fuel Handling Building (FHB) itself, all other SFPLI System components shall be qualified for the environmental conditions experienced under normal operations, and under post-accident conditions.
- Seismic qualifications are with respect to the ORDER as given in guidance in NEI 12-02 [Rev 1], Section 3.3 & 3.4 and the ISG. Notwithstanding the pertinent sections of NEI relating to SFPLI System components in the FHB itself, all other SFPLI System components shall be qualified for the Plant Design Basis Earthquake (DBE) seismic conditions.
- The SFPLI System components will be required to withstand both normal and post-accident radiological conditions.

7.1 ARRANGEMENT:

The spent fuel pools for both units are essentially identical and are described in detail in UFSAR Section 9.1.2 (Ref. 6). The dimensions of the spent fuel pools are 52 ft. in the north-south direction by 28 ft. 6 in. in the east-west direction. The fuel

handling machine travels on rails in the North-South direction and has a clearance of approximately 3 ½ in. between the bottom of the machine and the SFP deck.

The plan is to mount the sensor for one channel in the northeast corner of the SFP and the other channel in the opposite, northwest corner of the SFP (see Attachment 1). Although the level probes may protrude slightly above the level of the spent fuel pool deck, mounting these in corner locations will provide sufficient protection from missiles and debris required by NEI 12-02 [Rev.1], Section 3.2, as discussed in Section 7.2 Mounting.

The current Plan is to mount the supporting electronic instruments outside of the spent fuel pool area, to provide a more benign radiation and environmental conditions, and also provide for reasonable and accessible locations for operators.

SFP Primary and Backup Channel Level Instruments are currently planned to be located in Radwaste Control Room of the MEAB; however, STPNOC is still evaluating other possible locations (i.e. relay room).

7.2 MOUNTING:

Consideration will be given to the maximum seismic ground motion that occurs at the installation location for the permanently installed equipment which is documented in the UFSAR Section 3.7. The mountings shall be designed consistent with the highest safety or seismic classification of the SFP. The level sensors will be mounted on seismically qualified brackets.

As permitted by NEI 12-02, Section 3.2, missile barriers will not be installed. Channel separation will be utilized to minimize the possibility that damage due to an explosion or extreme natural phenomena will render both fixed channels of SFP instrumentation unavailable. Acceptable channel separation will be provided by mounting instruments in different places in the SFP area, in accordance with NEI 12-02, as follows:

- Opposite sides or corners of the spent fuel pool
- Separated by a distance comparable to the shortest length of a side of the pool.

Therefore, although there may be sensor components which extend slightly above the spent fuel pool deck, since the mounting location will be in opposite sides of the SFP, separated by the distance of the shortest side of the SFP, it meets the requirements of NEI 12-02 and no separate missile barriers or other protection is required or will be provided.

7.3 QUALIFICATION:

In accordance with the requirements of NEI 12-02 [Rev.1] and the ISG, the reliability of the two permanently installed instrumentation channel components will be demonstrated to remain functional when subjected to the vibration, seismic,

environmental and radiation conditions which will exist at the installed location during and following a large scale external event (LSEE).

Both channels will be reliable at temperature, humidity and radiation levels consistent with the SFP water at saturation conditions for no fewer than seven (7) days post-event. Level equipment installed in the SFP and areas in the Fuel Handling Building (FHB) will be designed and tested to remain functional when subjected to the following expected post-event conditions:

- Radiological conditions for a normal refueling quantity of freshly discharged (100 hours) fuel with SFP water at LEVEL 3 as described in the ORDER
- Temperatures of 212 °F and 100% relative humidity environment
- Boiling Water and/or steam environment
- Concentrated borated water environment

7.3.1 Seismic Reliability:

The reliability of the permanently installed instrument channel components will be demonstrated through an appropriate combination of design, analysis, operating experience and/or testing of components to meet the seismic conditions in the area of the SFP that are applicable at the time of submittal of this Plan and will meet the seismic reliability requirements of NEI 12-02 [Rev.1] and the ISG. If changes in the seismic design basis occur, they will be processed in accordance with existing plant procedures.

The reliability of seismic design and installation will be demonstrated in accordance with the guidance in Sections 7, 8, 9, and 10 of IEEE Standard 344-2004 (Ref. 7) or a substantially similar industrial standard. The instruments will meet the shock and vibration requirements of NEI 12-02 [Rev.1] and the ISG.

7.3.2 Environmental Reliability:

The permanently installed instrumentation components for each channel will be demonstrated to remain functional when subjected to the temperature, humidity and radiation conditions that could occur in their installed location, as defined in existing design basis documents and will meet the environmental reliability requirements required by NEI 12-02 [Rev.1] and the ISG. If changes occur to the applicable conditions, they will be processed in accordance with existing plant procedures.

In accordance with NEI 12-02, Section 3.4, the instruments will be demonstrated to be reliable for seven days post event or until the time additional off-site resources can be obtained.

7.3.3 Other Qualification and Testing:

In addition to the tests above, the instruments will be subjected to a factory acceptance test that is sufficient to demonstrate the operability, reliability and accuracy of the components and compliance with specification requirements.

7.4 INDEPENDENCE:

The instruments and power supplies for all of the components of the Primary Channel will be independent of the components of the Backup Channel in accordance with existing plant design standards for electrical channel separation. However, the SFPLI will utilize the same technology.

AC or DC power sources utilized for the Primary and Backup Channels will be from different buses such that no one single failure will interrupt power to both SFPLI channels.

7.5 POWER SUPPLIES:

For Unit 1 and Unit 2, the power supplies for the Primary and Backup Instrument Channels will be provided from different power buses to assure that the loss of one bus will not result in the loss of both channels. In addition, each instrument channel shall have a backup battery power supply for uninterrupted operation after loss of power. Power will be of sufficient capacity to maintain level indication until offsite resources become available.

8.0 ACCURACY:

The accuracy for the instrument channels selected will meet the guidelines of the ISG and NEI 12-02 [Rev.1], with the clarifications noted below. The minimum accuracy requirement for each channel will include all components from the sensor through the remote readout display.

The minimum accuracy for the channel will be maintained following a loss of power, without calibration and will consider the effect of environmental conditions on the accuracy. Minimum accuracy requirements shall meet the requirements of NEI 12-02. Additionally, instrument accuracy will be sufficient to allow trained personnel to determine when the actual level exceeds the specified lower level of each indicating range (levels 1, 2 and 3) without conflicting or ambiguous indication.

9.0 TESTING:

Testing of the installed instrument channels will be consistent with the guidelines of NEI 12-02 [Rev.1] and the ISG. Specific test procedures will be implemented for functional testing of the installed instrument systems, from the sensor through the display, as defined in Section 11.0.

10.0 DISPLAY:

The Primary and Backup Instrument Channel display(s) are located in the Radwaste Control Room, which is an accessible location following a Large Scale External Event (LSEE); however, other locations are still being considered.

The two displays will be sufficiently separated by the distance required for independent channels. The location selected for these displays will be such that damage resulting from a LSEE will not damage both displays.

In addition, the Primary and Backup Channel Instruments will drive remote indication located in the Main Control Room.

The display(s) will be consistent with the guidance of NEI 12-02 [Rev.1] and the ISG.

11.0 INSTRUMENT CHANNEL PROGRAM CRITERIA:

The program criteria will be consistent with the guidelines by NEI 12-02 [Rev.1] and the ISG.

Procedures for the maintenance and testing, and the training of the required personnel on these procedures will be completed prior to the required date for completion of these modifications per Section 3.0.

Selection of instruments, installation requirements and applicable procedures shall consider the need for replacement of components during and following an event.

Existing procedures for the Spent Fuel Pool will be revised as required and training of the required personnel on the revised procedures will be completed prior to the date for completion of these modifications per Section 3.0.

12.0 NEED FOR RELIEF AND BASIS, IF ANY:

The provision of two channels of independent, permanently-installed, wide-range level instrumentation, each with a remote display, for the spent fuel pool of each unit is based on the requirements defined in the NEI 12-02 [Rev.1] and the ISG.

Should the completion of the planned outages identified in Section 2.0 above be delayed for any reason, any required changes in the planned schedule will be documented in the 6-month status reports submitted to the NRC.

If any changes in the technical, schedule or any other requirements in NRC ORDER, NEI 12-02 [Rev.1] or NRC JLD-ISG-2012-003 [Rev.0] occur after January 1, 2013, which require a change to this Plan, the changes will be documented in the 6-month status reports submitted to the NRC.

REFERENCES

- 1) NEI 12-02, Industry Guidance for Compliance with NRC Order EA-12-051, "To Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," Revision 1, dated August 2012 [ADAMS Accession No. ML122400399]
- 2) NRC Order EA-12-051, Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, issued March 12, 2012 [ADAMS Accession No. ML12056A044]
- 3) NRC Japan Lessons-Learned Project Directorate Interim Staff Guidance JLD-ISG-2012-03, "Compliance with Order EA-12-051, Reliable Spent Fuel Pool Instrumentation, Revision 0, August 29, 2012 [ADAMS Accession No. ML12221A339]
- 4) NRC RG 1.13 Revision 2; Spent Fuel Storage Facility Design Basis
- 5) ANSI/ANS-57.2-1983; Design Requirements for Light Water Reactor Spent Fuel Storage Facilities at Nuclear Power Plants
- 6) UFSAR; STP FSAR Updated, Revision 16, Section 9.1.2 Spent Fuel Storage
- 7) IEEE std. 344-2004: IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations
- 8) Instrument Setpoint Index, 5Z01-0-Z-48001
- 9) Spent Fuel Pool Cooling Pumps Calc 3R219MC5050, Rev. 1

STP Overall Integrated Plan for Implementation of Unit 1 & Unit 2 Spent Fuel Pool Instrumentation to Meet NRC Order EA 12-051

Revision: 00

ATTACHMENT 1

