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CP-201401341
Log # TXX-14132

REF 10 CFR 2.202

December 16, 2014

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

SUBJECT: Comanche Peak Nuclear Power Plant, Docket Nos. 50-445 AND 50-446, Compliance with NRC Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051) (TAC NOS. MF0862 AND MF0863)

REFERENCE: 1. NRC Order Number EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, dated March 12, 2012.

Dear Sir or Madam:

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Luminant Generation Company LLC (Luminant Power). Reference 1 was immediately effective and directed Luminant Power to install reliable spent fuel pool instrumentation. Specific requirements are outlined in Attachment 2 of Reference 1.

Pursuant to Section IV, Condition C.3 of Reference 1, Attachment 1 of TXX-14132 provides a summary of Comanche Peak Nuclear Power Plant Units 1 and 2 full compliance with the requirements of Attachment 2 of Reference 1.

This letter contains no new regulatory commitments.

If you have any questions regarding this report, please contact Carl B. Corbin at (254) 897-0121 or carl.corbin@luminant.com.

Scan as Original JRM 1/16/2015

A001
NRR

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

Executed on December 16, 2014.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

By: Fred W. Madden
Fred W. Madden
Director, External Affairs

Attachment 1 Comanche Peak Nuclear Power Plant (CPNPP), Compliance with NRC Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation

Attachment 2 CPNPP Spent Fuel Pool Level Instrumentation Equipment Locations

c - William M Dean, Director, Office of Nuclear Reactor Regulation
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Comanche Peak Nuclear Power Plant (CPNPP), Compliance with NRC Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation

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LICENSEE/INTRO/INFO

On March 12, 2012, the Nuclear Regulatory Commission ("NRC" or "Commission") issued an order (Reference 1) to Luminant Generation Company LLC (Luminant Power). Reference 1 was immediately effective and directed Luminant Power to have a reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of specified levels in the pool water level conditions by trained personnel. Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 required submission of an initial status report 60 days following issuance of the final interim staff guidance (Reference 2 and an overall integrated plan pursuant to Section IV, Condition C. Reference 2 endorsed industry guidance document NEI 12-02, Revision 1 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 4 provided Luminant Power's initial status report regarding Reliable Spent Fuel Pool Instrumentation, as required by Reference 1. Reference 5 provided Luminant Power's integrated plan.

Reference 1 required submission of a status report at six-month intervals following submittal of the overall integrated plan. References 6, 7, and 8 provided the first, second, and third six-month status reports, respectively, pursuant to Section IV, Condition C.2 of Reference 2.

The purpose of letter is to provide the report of full compliance pursuant to Section IV, Condition C.3 of Reference 1 for Comanche Peak Nuclear Power Plant Units 1 and 2 (CPNPP).

CPNPP has installed two independent full scale level monitors for our Spent Fuel Pools (SFPs) in response to Order EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation," (Reference 1). The information provided herein documents compliance for CPNPP Units 1 and 2 with Reference 1.

Request for Information – Responses to all RAIs identified in the NRC Interim Staff Evaluation (Reference 9) are provided below.

RESPONSES TO REQUEST FOR ADDITIONAL INFORMATION IN NRC INTERIM STAFF EVALUATION

In Reference 9 (NRC Interim Staff Evaluation and RAIs for CPNPP Overall Integrated Plan (OIP) for Order EA-12-051, dated November 4, 2013) and Reference 10 (NRC correction letter regarding NRC Interim Staff Evaluation previously transmitted on November 4, 2014, dated November 19, 2013) the NRC transmitted RAIs which subsumed the previously transmitted RAIs (Reference 11). As noted in References 7 and 8, CPNPP participated in the virtual audit process described in Reference 12. Below are the NRC RAIs and the CPNPP responses. The CPNPP responses below supersede RAI responses provided previously by References 6, 7, 8, 13, and 14.

RAI #1

Please provide the following:

a) **The plant-specific performance evaluation result and a brief summary of the proposed wireless technology that will be used in the primary and backup measurement systems to address the criteria summarized in Section 3.1 of NEI 12-02.**

Response: Comanche Peak Nuclear Power Plant has opted to use hardwired spent fuel pool level measurement systems instead of wireless.

b) **A description of the proposed wireless SFP instrumentation connections. Indicate whether the proposed SFP wireless instrumentation will use an existing wireless network or would use a dedicated point-to-point transmission path.**

Response:

Comanche Peak Nuclear Power Plant has opted to use hardwired spent fuel pool level measurement systems instead of wireless.

c) **Further information on how the proposed SFP wireless instrumentation will be designed and installed to address EMI/RFI emissions/susceptibility issues under BDB event conditions.**

Response:

Comanche Peak Nuclear Power Plant has opted to use hardwired spent fuel pool level measurement systems instead of wireless.

d) **A description of the manner by which the proposed SFP wireless instrumentation will be operable and available under BDB event conditions.**

Response:

Comanche Peak Nuclear Power Plant has opted to use hardwired spent fuel pool level measurement systems instead of wireless.

RAI #2

Please provide the following:

a) **The final locations/placement of the primary and back-up SFP level channel components, cable routing, credited display units, and wireless instruments.**

Response:

See Attachment 2 for SFPLIS Equipment Location drawings.

b) **Additional information describing how the proposed arrangement of the sensor probe assembly and routing of the cabling between the sensor probe assembly and the electronics in the Auxiliary Building meets the Order requirement to arrange the SFP level instrument channels in a manner that provides reasonable protection of the level indication function against missiles that may result from damage to the structure over the SFP.**

Response:

Physical separation of the primary and backup instrument channel signal cables, to the extent practicable, is used to provide reasonable protection of the level indication function against missiles that may result from the damage to the structure over the SFP. This arrangement initially separates the raceway containing the signal cables by a distance comparable to the shortest length of a side of the pool. The sensors are located close to the side walls of the SFP and below the floor elevation to utilize the pool walls as inherent protection. In addition, the primary and backup signal and power cables are routed continuously in rigid steel conduit or flexible steel conduit and spaced in such a manner as to meet site requirements for Class 1E separation.

The spent fuel pool X-01 primary instrument channel sensor is mounted on the south side of the pool, near the east end. From the primary sensor, the primary coaxial signal cable raceway is routed west along the south side of the pool until it enters a fire/radiation barrier wall penetration to the adjacent Auxiliary Building 852' elevation, room X-235.

The spent fuel pool X-01 backup instrument channel sensor is mounted on the west end of the pool, near the south side wall. This places the backup sensor between the south side wall and the gate to the transfer canal, and a least 30 feet from the primary sensor. From the backup sensor, the backup coaxial signal cable raceway is routed west around the transfer canal until it enters a second fire/radiation barrier wall penetration to the adjacent Auxiliary Building 852' elevation, room X-235.

The spent fuel pool level instrumentation for pool X-02 is a mirror image of the instrument layout in X-01. In the Auxiliary Building the raceway for both pools maintain physical separation of the primary and backup instrument channel signal cables and power cables that meet site standards for separation for Class 1E conduit.

RAI #3

Please provide the results of the analyses used to verify the design criteria and methodology for seismic testing of the SFP instrumentation and the electronics units, including, design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.

Response:

Using the Level Transmitter maximum weight provided by Westinghouse drawing 10116D44 (VDRT-4749939) and the coaxial cable weight provided by Westinghouse specification WNA-DS-02957-GEN (VDRT-4770033), a conservative total load was taken. This load was compared to the allowable bolt loads per DBD-CS-015. Through the result of this comparison, the mounting was determined to adequately meet Seismic Category II requirements. The support and mounting for the Remote Display panels is qualified per site calculation CS-CA-0000-5519, Revision 0.

The SFPLIS conduit is field run and is supported with 0210-TC0-0002 drawing series typical supports. These supports are pre-qualified by calculation CS-CND-TC-TC0-0002 for Seismic Category II requirements.

RAI #4

For each of the mounting attachments required to attach SFP Level equipment to plant structures, please describe the design inputs, and the methodology that was used to qualify the structural integrity of the affected structures/equipment.

Response:

The design input and qualification methodology will be consistent with the current seismic design for existing plant structures/equipment.

The mounting attachments are qualified by analysis. With the exception of the level sensor probe mounting bracket, all the system equipment is seismically qualified by testing. The outputs of the seismic test of all equipment were used as the design input for the qualification of the mounting for that specific equipment.

The mounting bracket for the sensing probe was designed according to the plant design basis for SSE seismic hazard curve at the appropriate plant elevation. Loads that were considered in the evaluation of the bracket and its mounting are: 1- Static loads including the dead weight of the mounting bracket in addition to the weight of the level sensing instruments, pipe guard and cabling; 2- Dynamic loads including the seismic load due to excitation of the dead weight of the system in addition to the hydrodynamic effects resulting from the excitation of the Spent Fuel Pool Water. A response spectra analysis was performed for the seismic evaluation of the mounting bracket using a Finite Element Analysis (GTSTRUDL software) and using floor response spectrum at the operating deck elevation. Hydrodynamic effects on the mounting bracket were evaluated using TID-7024 and added to the GTSTRUDL model. Plant acceptance criteria and applicable codes were used for the design of the bracket and its anchorage. CPNPP-specific analyses were completed, with the results provided in Westinghouse documents CN-PEUS-13-29 and CN-PEUS-13-30 (proprietary).

RAI #5

Please provide analysis of the maximum expected radiological conditions (dose rate and total integrated dose) to which the transmitter electronics will be exposed. Also, please provide documentation indicating the radiological dosage amount that the electronics for this equipment is capable of withstanding. Please discuss the time period over which the analyzed total integrated dose was applied.

Response:

A summary of the radiological conditions to which the equipment is to be qualified is provided below. Current results of vendor tests and analysis demonstrating the qualification of the equipment to be installed have been provided by Westinghouse (WNA-TR-03149-GEN / proprietary) .

Radiological conditions transmitter electronics

The level sensor electronics, sensor electronics bracket, indicators, and the electronics enclosures outside of the spent fuel pool area are required to operate reliably in the service environmental conditions specified in the table below. Comanche Peak is not utilizing wireless technology for this application, so there is no wireless transmitter or receiver to be installed.

Parameter	Normal	Beyond Design Basis
Radiation TID	≤ 1E03 Rads γ	≤ 1E03 Rads γ

Based on the above Westinghouse environmental qualifications (WNA-TR-03149-GEN / proprietary) and the radiological assessment in site calculation ME-CA-0000-5530, the SFPLIS components and associated level indication functions mounted outside the SFP environment were evaluated for a 40 year normal operating dose of 876 Rem based on a dose rate of 2.5 mrem/hr and a conservative one year SFP Beyond Design Basis (BDB) accident dose of 0.1 Rem based on a resultant concrete shielded/attenuated dose rate of 7.06E-06 rem/hr at the location of the transmitter electronics, [Accident dose assessment based on a fully loaded SPF array source with 0.5' of water above the top of fuel and 12 ft mean-free-path thickness of normal concrete shielding between the transmitter electronics and the SFP fuel array]. The resultant 40 years of normal operations plus 1 year BDB Accident Total Integrated Dose (TID) is 876.1 Rem. Therefore, the transmitter electronics can be expected to operate satisfactorily for the normal and BDB service.

RAI #6

Please provide the following:

a) **Information describing the temperature ratings for all system electronics (including sensor electronics, system electronics, level and wireless transmitter, wireless receiver and display) and whether the ratings are continuous duty ratings; and,**

Response:

A summary of the environmental temperature (and associated relative humidity (RH)) conditions to which the equipment is to be qualified is provided below. Current results of vendor tests and analysis demonstrating the qualification of the equipment to be installed have been provided by Westinghouse (Document WNA-TR-03149-GEN / proprietary).

Qualification Environmental temperature (and associated relative humidity) conditions for the SFPIS components in the Spent Fuel Pool Area

The coaxial cable, the coupler, the pool-side bracket, and the probe in the spent fuel pool area are required to operate reliably in the service environmental conditions specified in the table below.

Parameter	Normal	Beyond Design Basis
Temperature	50-140 °F	212 °F
Humidity	0-95% RH	100% RH (saturated steam)

Qualification Environmental temperature (and associated relative humidity) conditions Outside of the Spent Fuel Pool Area

The level sensor electronics, sensor electronics bracket, indicators, and the electronics enclosures outside of the spent fuel pool area are required to operate reliably in the service environmental conditions specified in the table below. Comanche Peak is not utilizing wireless technology for this application, so there is no wireless transmitter or receiver to be installed.

Parameter	Normal	Beyond Design Basis
Temperature	50-120 °F	140 °F
Humidity	0-95% RH	95% RH (non-condensing)

b) **Information describing what will be the maximum expected temperature and relative humidity conditions in the room(s) in which the sensor electronics and wireless technologies will be located under BDB conditions in which there is no ac power available to run Heating, Ventilation, and Air Conditioning (HVAC) systems.**

Response:

Under bounding plant accident conditions, the maximum expected temperature for the AB 852.5' areas containing SFPLIS components (X-235 & X-241) has been evaluated for 130.8 deg (F); the maximum expected temperature for the SFP FB 860' area containing SFPLIS components (X-272) has been evaluated for 160 deg (F).

Post-ELAP BDB accident Relative Humidity environmental parameters are not available for the AB 852.5' Rm X-235/ X241 areas. To estimate a realistic post-ELAP event RH data range, the historical temperature data and actual field temperature / RH values were used to establish a baseline set of data typically expected under normal conditions such as to derive a spectrum set of post-accident values. The estimated maximum expected RH for the AB 852.5' areas containing SFPLIS components (X-235 & X-241) under post-ELAP accident conditions is expected to be < 95% (non-condensing); the FB 860' Elev. at the SFPs is conservatively expected to achieve 100% RH (Saturated Steam). Therefore, as documented within FDA-2013-000008-25, it is determined that the SFPLIS component qualifications bound the estimated RH values and maximum temperatures expected for the respective areas of concern.

RAI #7

Please provide the following:

a) **Information describing the evaluation of the sensor electronics design, the shock test method, test results, and forces applied to the sensor electronics applicable to its successful tests demonstrating that the testing provides an appropriate means to demonstrate reliability of the sensor electronics under the effects of severe shock.**

Response:

The active electronic components of the SFPIS are firmly mounted inside NEMA-4X housings. These housings are mounted to a seismically qualified support / structure and will not be subject to additional shock or vibration forces outside of those for seismic. Therefore, no additional shock testing is required beyond Seismic Qualification Requirements defined in IEEE 344-2004.

The Westinghouse SFPIS's equipment seismic adequacy is demonstrated based on the guidance in Sections 7, 8, 9, and 10 of IEEE Standard 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations".

The results of testing on the SFPIS are included in Westinghouse documents EQ-QR-269 and WNA-TR-03149-GEN (proprietary).

b) **Information describing the evaluation of the sensor electronics design, the vibration test method, test results, the forces and their frequency ranges and directions applied to the sensor applicable to its successful tests, demonstrating that the testing provides an appropriate means to demonstrate reliability of the sensor electronics under the effects of high vibration.**

Response:

The active electronic components of the SFPIS are firmly mounted inside NEMA-4X housings. These housings are mounted to a seismically qualified support / structure and will not be subject to additional shock or vibration forces outside of those for seismic. Therefore, no additional vibration testing is required beyond Seismic Qualification Requirements defined in IEEE 344-2004.

The Westinghouse SFPIS's equipment seismic adequacy is demonstrated based on the guidance in Sections 7, 8, 9, and 10 of IEEE Standard 344-2004, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations".

The results of testing on the SFPIS are included in Westinghouse documents EQ-QR-269 and WNA-TR-03149-GEN (proprietary).

RAI #8

Please provide analysis of the seismic testing results and show that the instrument (including wireless technology) performance reliability, following exposure to simulated seismic conditions representative of the environment anticipated for the SFP structures at CPNPP has been adequately demonstrated. Include information describing the design inputs and methodology used in any analyses of the mountings of electronic equipment onto plant structures, as requested in RAI #4 above.

Response:

The Westinghouse SFPIS, including the four pool-side brackets, is qualified as Seismic Category I per IEEE Std 344-2004. The testing and analysis demonstrate that the SFPIS meets the seismic performance requirements of Westinghouse design specification WNA-DS-02957-GEN (proprietary). The Required Response Spectra (RRS) for this program includes the 10% margin recommended by IEEE Std 323-2003. The seismic test and analysis results are documented in the proprietary Westinghouse test reports, EQ-QR-269 and WNA-TR-03149-GEN (proprietary). Even though the Westinghouse SFPIS is qualified to Seismic Category I, as noted in the Response to RAI #3, the system as a whole (e.g., display units, transmitter units, conduit routing) is considered Seismic Category II.

Comanche Peak is not utilizing any wireless technology for the spent fuel pool level measurement application; therefore, no information will be provided for this feature.

RAI #9

Please provide the NRC staff with the final configuration of the power supply source for each channel so that the staff may conclude that the two channels are independent from a power supply assignment perspective.

Response:

Each SFPIS channel of equipment has an independent power supply and an independent UPS with 24V battery backup. The SFP level can be monitored for a minimum of 3 days under station blackout conditions with battery power only.

The primary and backup level instruments in each pool receive normal power from dedicated breakers in separate Class Non-1E lighting panels, AB20 and AB19. These lighting panels are fed from different buses, independent back to the 480V switchgear crossties, reducing the occasions when both are de-energized at the same time. See below.

CHANNEL	NORMAL PWR	480V MCC	480V SWGR
X-01 Primary Loop	AB20	MCC XB1-3	480V SWGR 1B1/SWGR 2B1
X-01 Backup Loop	AB19	MCC XB3-4	480V SWGR 1B3/SWGR 2B3
X-02 Primary Loop	AB20	MCC XB1-3	480V SWGR 1B1/SWGR 2B1
X-02 Backup Loop	AB19	MCC XB3-4	480V SWGR 1B3/SWGR 2B3

If power is not restored to the normal power sources before batteries are depleted, all four SFP level instruments can be powered from either Class 1E Train A lighting panel EAB1 or Class 1E Train B lighting panel EAB2, using the bulkhead connector in each SFPLIS remote display panel. NOTE: EAB1 or EAB2 are included in the panels to be supplied by a portable generator as part of the mitigating strategies in response to NRC Order EA-12-049.

RAI #10 (This information was previously requested as RAI-6a in the NRC letter dated June 7, 2013)

Please provide a description of the electrical AC power sources and capacities for the primary and backup channels.

Response:

Westinghouse power consumption calculation WNA-CN-00300-GEN demonstrates the UPS power supply requires 1.4A / 120VAC (Input) and that a fully charged battery in this configuration will last greater than 3 days.

Each remote display panel, which powers the UPS and 4-20mA loop, receives 20A /120VAC from a dedicated breaker in a local lighting panel. Refer to RAI No. 9 for configuration of power sources.

RAI #11

Please provide the results of the calculation depicting the battery backup duty cycle requirements demonstrating that its capacity is sufficient to maintain the level indication function until offsite resource availability is reasonably assured.

Response:

The power consumption calculation (WNA-CN-00300-GEN) demonstrates that the SFPIS will last greater than 3 days from a fully charged battery after AC power loss. The calculations include design and aging margin. CPNPP Site Acceptance Test (PPT-TP-14A-001) verified the installed UPS batteries function longer than 3 days.

RAI #12 (This information was previously requested as RAI-7 in the NRC letter dated June 7, 2013)

Please provide the following:

a) **An estimate of the expected instrument channel accuracy performance under both (a) normal SFP level conditions (approximately Level 1 or higher) and at the BDB conditions (i.e., radiation, temperature, humidity, post-seismic and post-shock conditions) that would be present if the SFP level were at the Level 2 and Level 3 datum points.**

Response:

The channel accuracy for each SFPIS instrument channel is ± 3 inches for the full level measurement range. This covers the normal SFP surface level or higher to within six inches of the fuel assembly under both normal and BDB conditions. More details regarding the requirements on measurement accuracy are defined in the Westinghouse proprietary design specification document WNA-DS-02957-GEN and the proprietary channel accuracy calculation document, WNA-CN-00301-GEN.

Westinghouse performed bounding radiological analysis & testing which qualified the non-metallic radiation sensitive SFPLIS components located within the SFP area to meet the 100 hour (freshly discharged) fuel radiological conditions with boiling water and/or steam environment and a concentrated borated water environment. The SFP area radiation dose to the radiation sensitive components is based on a dose rate located 1 foot above the fuel at approximately 7E03 R/hr gamma and conservatively applied to the general area above the pool for a TID of 1E07 Rads gamma. For general area beyond design basis conditions, this represents a worst-case assumption that water level remains at Level 3 as defined in NEI 12-02 & EA-12-051, for more than one week.

The TID dose results bounds the CPNPP SFP area configuration and the applicable radiation sensitive Wide Range SFPLIS component locations.

b) **A description of the methodology that will be used for determining the maximum allowed deviation from the instrument channel design accuracy that will be employed under normal operating conditions as an acceptance criterion for a calibration procedure to flag to operators and to technicians that the channel requires adjustment to within the normal condition design accuracy.**

Response:

Periodic recording of SFP level readings during normal operating conditions, using the SFPIS instrumentation, will be included in Operator rounds to assist in early detection of any "off normal" readings which may indicate channel adjustment is required.

The channel accuracy requirements are identified in WNA-DS-02957-GEN (proprietary) and demonstrated by the channel accuracy calculation, WNA-CN-00301-GEN (proprietary). Both SFP primary and backup redundant sensor electronics require periodic calibration verification to check that the channel's measurement performance is within the specified tolerance (± 3 inches). If the difference is larger than the allowable tolerance during the verification process, an electronic output verification/calibration will be required. If the electronic output verification/calibration does not restore the performance, a calibration adjustment will be required.

The electronic output verification/calibration will verify electronics are working properly using simulated probe signals.

The calibration adjustment is performed to restore level measurement accuracy be within the acceptance criteria at 0%, 25%, 50%, 75%, and 100% points of the full span.

The calibration acceptance criteria and procedures are defined in the proprietary Westinghouse procedure WNA-TP-04709-GEN.

The Westinghouse proprietary documents described above can be made available upon request.

RAI #13 (This information was previously requested as RAI-8 in the NRC letter dated June 7, 2013)

Please provide the following:

a) **A description of the capability and provisions the proposed level sensing equipment will have to enable periodic testing and calibration, including how this capability enables the equipment to be tested in-situ.**

Response:

The calibration verification is performed by simulating a change in SFP level through the use of a tool designed specifically in conjunction with the fixed pool-side bracket design. If the calibration verification indicates that the channel being checked is operating out of specification or an anomaly is observed, an electronic output verification/calibration is performed on the level sensor electronics outside of the SFP area. If the electronic output verification/calibration does not restore performance, a calibration adjustment will need to be performed. The calibration adjustment uses a portable test kit that attaches at the sensor electronics mounting, allowing the full calibration to be performed outside of the spent fuel pool area without removing installed SFPIS components from the SFP area.

The test kit will consist of equipment specifically paired with the installed equipment in order to properly verify calibration of the sensor electronics.

The calibration verification, electronic output verification/calibration, and the calibration adjustment are defined in the Westinghouse procedure WNA-TP-04709-GEN (proprietary).

b) **A description of how such testing and calibration will enable the conduct of regular channel checks of each independent channel against the other, and against any other permanently-installed SFP level instrumentation.**

Response:

The SFP level measurement instrumentation system is not safety related therefore not subject to the channel check requirements defined in IEEE 338-1987 for class 1E system. However, the SFP level indications will be subject to periodic recording during Operator rounds with appropriate qualitative acceptance criteria. Readings of the primary and backup level indications in each pool which fall outside the established criteria will be identified in the CPNPP Corrective Action Program for resolution. The independent channels are checked against each other, consistent with their shared accuracy and post-beyond design basis event function. Comparison to existing permanently installed SFP level instrumentation would add little value unless independent channel checks indicated a disparity between readings.

c) **A description of how functional checks will be performed, and the frequency at which they will be conducted. Describe how calibration tests will be performed, and the frequency at which they will be conducted. Provide a discussion as to how these surveillances will be incorporated into the plant surveillance program.**

Response:

The SFPIS calibration verification process is described briefly by part a) above and in more detail in the Westinghouse proprietary document, WNA-TP-04709-GEN. Plant personnel will perform these periodic calibration verification checks on each SFPIS channel based on the plant maintenance procedure. The periodic calibration verification will be performed within 60 days of a planned refueling outage considering normal testing scheduling allowances (e.g., 25%). This calibration check is not required to be performed more than once per 12 months on any individual SFPIS channel. Calibration verification will be included in the site preventive maintenance (PM) program; since the SFPIS is not a Technical Specification requirement, these activities will not be included in the plant surveillance program.

d) **A description of what preventive maintenance tasks are required to be performed during normal operation, and the planned maximum surveillance interval that is necessary to ensure that the channels are fully conditioned to accurately and reliably perform their functions when needed.**

Response:

The periodic calibration verification check will be performed within 60 days of a planned refueling outage considering normal testing scheduling allowances (e.g., 25%). This calibration check is not required to be performed more than once per 12 months.

Additionally, at the time of the calibration verification check, the probe will be inspected to ensure no frays or nicks have occurred since the last verification check and to remove any significant accumulation of boron. These calibration and inspection requirements are consistent with the guidance provided in NEI 12-02 section 4.3. Additionally, at the time of the calibration verification check, the probe will be inspected for boron buildup and actions initiated to remove any visible accumulation. At a periodicity consistent with similarly scheduled SFP activities, the probe and weight will be inspected to ensure no frays, nicks or corrosion have occurred since the last inspection and that the probe is hanging freely with no external interferences. As noted in the response to item (c), these activities will be included in the site preventive maintenance program not the plant surveillance program.

RAI #14

Please provide the following:

a) **The specific location for each of the primary and backup instrument channel displays.**

Response:

See Response to RAI # 14(b) below.

b) **For any SFP level instrumentation displays located outside the MCR, please describe the evaluation used to validate that the display location can be accessed without unreasonable delay following a BDB event. Include the time available for personnel to access the display as credited in the evaluation, as well as the actual time (e.g., based on walk-throughs) that it will take for personnel to access the display. Additionally, please include a description of the radiological and environmental conditions on the paths personnel might take. Describe whether the display location remains habitable for radiological, heat and humidity, and other environmental conditions following a BDB event. Describe whether personnel are continuously stationed at the display or monitor the display periodically.**

Response:

The primary and backup remote level display panels for both pools are installed near the Auxiliary building corridor. The location and arrangement was chosen for the following reasons:

- The panels are grouped together at Operations request to allow both pool levels to be easily monitored.
- Installation near the Auxiliary building 852' corridor is easily accessible within 1.25 minutes for Control Room personnel through the rear exit of the Control Building 852' elevation.
- The Auxiliary building corridor also provides easy access to 120VAC power for the display panels UPS from nearby lighting panels AB19 and AB20.

Location of the remote display panels in room X-241 are approximately 50 feet from the rear exit of the Control Building. After a BDB event the Control Building rear door would be a standard egress and ingress for Operations personnel. See Attachment 2 for SFPLIS Equipment Location drawings.

RAI #15 (The staff previously requested this information as RAI-10 in NRC letter dated June 7, 2013. However, based on feedback from licensees, the staff revised this RAI as follows:)

Please provide a list of the procedures addressing operation (both normal and abnormal response), calibration, test, maintenance, and inspection procedures that will be developed for use of the spent SFP instrumentation. The licensee is requested to include a brief description of the specific technical objectives to be achieved within each procedure.

Response:

The following list of documents will be developed by CPNPP:

1. For NORMAL operating conditions, procedure OWI-104 addresses Operations log keeping, including primary and backup channel deviation criteria.
2. For ABNORMAL operating conditions, procedure(s) ECA0.0A/B "Loss of All AC Power" will provide for any actions during loss of power events.
3. A new procedure INC-4876X will be developed to address:
    a. Calibration/verification requirements
    b. Replacement (if required)
4. The site preventive maintenance program will specify the frequency of the required calibration activities and include.
    a. Inspection/cleaning

The following documents have been developed by Westinghouse:

5. WNA-OG-00127-GEN, Spent Fuel Pool Instrumentation System Technical Manual, contains instructions for installation, normal operation, abnormal response/troubleshooting, cleaning, calibration, maintenance, spare parts, and special tools for the SPFIS as well as the major components of the system.
6. WEC WNA-TP-04709-GEN, Spent Fuel Pool Instrumentation System Calibration Procedure, contains the calibration and test procedures, the periodic calibration verification checks, and periodic maintenance checks for the probe. This procedure ensures that the SFPIS will retain its accuracy as defined by the design specification document WNA-DS-02957-GEN, the NRC order and NEI guidance as clarified by the interim staff guidance (JLD-ISG-2012-03).

RAI #16 (This information was previously requested as RAI-11 in NRC letter dated June 7, 2013)

Please provide the following:

a) **Further information describing the maintenance and testing program the licensee will establish and implement to ensure that regular testing and calibration is performed and verified by inspection and audit to demonstrate conformance with design and system readiness requirements. Include a description of your plans for ensuring that necessary channel checks, functional tests, periodic calibration, and maintenance will be conducted for the level measurement system and its supporting equipment.**

Response:

The maintenance and testing program will ensure that regular testing and calibration is performed and verified. Calibration and testing for the instruments will be based on Westinghouse "Spent Fuel Pool Instrumentation System Calibration Procedure", WNA-TP-04709-GEN as adapted to specific site procedures.

Site specific procedures will define the periodicity for Operator rounds to record the primary and backup instrument channel indications. The periodic testing and inspection of the installed instrument channel will be scheduled and tracked within the site Preventative Maintenance (PM) program.

b) **A description of the in-situ calibration process at the SFP location that will result in the channel calibration being maintained at its design accuracy.**

Response:

The calibration verification is performed by simulating a change in SFP level through the use of a tool for the fixed-type poolside mounting bracket. If the difference is larger than the allowable tolerance during this verification, an electronic output verification/calibration is required. This electronic output verification/calibration verifies that the electronics are working properly using simulated probe signals.

If the electronic output verification/calibration does not restore the performance, a calibration adjustment will be required to restore and verify level measurement accuracy at 5 points along the full span of the probe. This adjustment is performed outside of the spent fuel pool area using a calibration kit and does not require removal of components from the SFP pool or area.

The calibration verification, electronic output verification/calibration, and the calibration adjustment are defined in the proprietary Westinghouse procedure WNA-TP-04709-GEN and will be implemented by site procedure INC-4876X.

c) A description of what compensatory actions are planned in the event that the non-functioning instrument channel cannot be restored to functional status within 90 days.

Response:

In the unlikely event that a non-functioning instrument channel cannot be returned to service within the 90 day period, any compensatory actions will be identified in the corrective action program. For example, enhanced monitoring through operator rounds could be performed to compare the available instrument channel indications to existing SFP level instrumentation.

MILESTONE SCHEDULE

Milestone	Original Target Completion Date	Activity Status	Target Completion Date Changes
Submit 60-day progress report	10/2012	Complete	
Submit overall integrated plan	2/2013	Complete	
Submit six-month updates			
Update 1	8/2013	Complete	
Update 2	2/2014	Complete	
Update 3	8/2014	Complete	
Request for Additional Information			
Submit RAI response to Reference 11	7/2013	Complete	
Submit RAI response to Reference 9	5/2014*	Complete	4Q2014
Commence Engineering and Design	1Q2013	Complete	
Complete Design	2Q2014	Complete	
Receipt of SFP instruments	2Q2014	Complete	
Complete SFP Instrumentation Procedures and Training	3Q2014	Complete	4Q2014**
SFP Instruments Operational	4Q2014	Complete	

* The response to Reference 9 is discussed in the section above "RESPONSES TO REQUEST FOR ADDITIONAL INFORMATION IN NRC INTERIM STAFF EVALUATION".

** See section "PROGRAM FEATURES" which discusses SFP Instrumentation Procedures and Training in further detail.

ORDER EA-12-051 COMPLIANCE ELEMENTS SUMMARY

The elements identified below for CPNPP Units 1 and 2, as well as the Site response submittal (Reference 5), the 6-Month Status Reports (Reference(s) 6, 7, and 8), and any additional docketed correspondence, demonstrate compliance with Order EA-12-051. Also, responses to the NRC Requests for Additional information provide additional details related to the elements below.

Reference 15 requested relaxation of the schedule requirements for completion of full implementation for CPNPP Unit 1 as prescribed in Section IV.A.2 of NRC Order EA-12-049 from the fall of 2014 to the spring of 2016. The NRC granted the request for schedule relief in Reference 16. Certain activities related to NRC Order EA-12-051 interface with NRC Order EA-12-049 "Order to Modify Licenses with Regard to Requirements for Mitigating Strategies for Beyond Design Basis External Events". These interface activities with NRC Order EA-12-049 will be implemented consistent with implementation dates for NRC Order EA-12-049. The implementation dates for NRC Order EA-12-049 for CPNPP Units 1 and 2 are spring of 2016 and fall of 2015 respectively.

IDENTIFICATION OF LEVELS OF REQUIRED MONITORING

CPNPP Units 1 and 2 has identified the three required levels for monitoring SFP level in compliance with Order EA-12-051. As noted in the summary section above, how the SFP level is used will be addressed as part of NRC Order EA-12-049 implementation.

INSTRUMENT DESIGNED FEATURES

The design of the instruments installed at CPNPP Units 1 and 2 comply with the requirements specified in the order and described in NEI 12-02 "Industry Guidance for Compliance with NRC Order EA-12-051". The instruments have been installed in accordance with the station design control process.

The instruments have been arranged to provide reasonable protection against missiles. The instruments have been mounted to retain design configuration during and following the maximum expected ground motion. The instruments will be reliable during expected environmental and radiological conditions when the SFP is at saturation for extended periods. The instruments are independent of each other and have separate and diverse power supplies The instruments will maintain their designed accuracy following a power interruption and are designed to allow for routine testing and calibration.

The instrument display is readily accessible during postulated events and allows for SFP level information to be promptly available to decision makers.

PROGRAM FEATURES

Operations has been trained on the SFP Level Instrumentation modification. Site processes (e.g., Operations procedure OWI-104-19 and Operations Shift Orders) are being used to routinely monitor SFP Level and to assure appropriate actions are taken for non-functioning channel(s) (i.e., within 24 hours, 72 hours, and 90 days). The original equipment manufacturer (Westinghouse) will provide necessary support personnel for testing and calibration of SFP Instrumentation until such time that CPNPP site personnel (Maintenance I&C) are trained in accordance with the Systematic Approach to Training (SAT) process.

In the unlikely event of nonfunctioning SFPI channel(s), replacement activities will be performed by original equipment manufacturer personnel (Westinghouse) in accordance with original manufacturer/supplier requirements (per work order instructions) until such time that CPNPP has trained and qualified staff available to support replacement activities. The CPNPP procedure for SFPI maintenance and calibration is ready for issuance and will be validated during Maintenance I&C training.

Site processes (Preventative Maintenance (PMs)) have been established to ensure the instruments are maintained at their design accuracy.

The CPNPP procedure to address maintenance and calibration and the associated training are expected to be effective prior to implementation of NRC Order EA-12-049 for Unit 2 in the fall of 2015. Until such time, the CPNPP site processes described above have implemented programmatic requirements for NRC Order EA-12-051 (documented in Condition Report (CR) 2014-011814).

CPNPP currently plans to address NRC Order EA-12-049 (FLEX) and NRC Order EA-12-051 (SFPI) in one Fukushima program document. Some of the site processes described above may transition to new processes upon final issuance of the Fukushima program document.

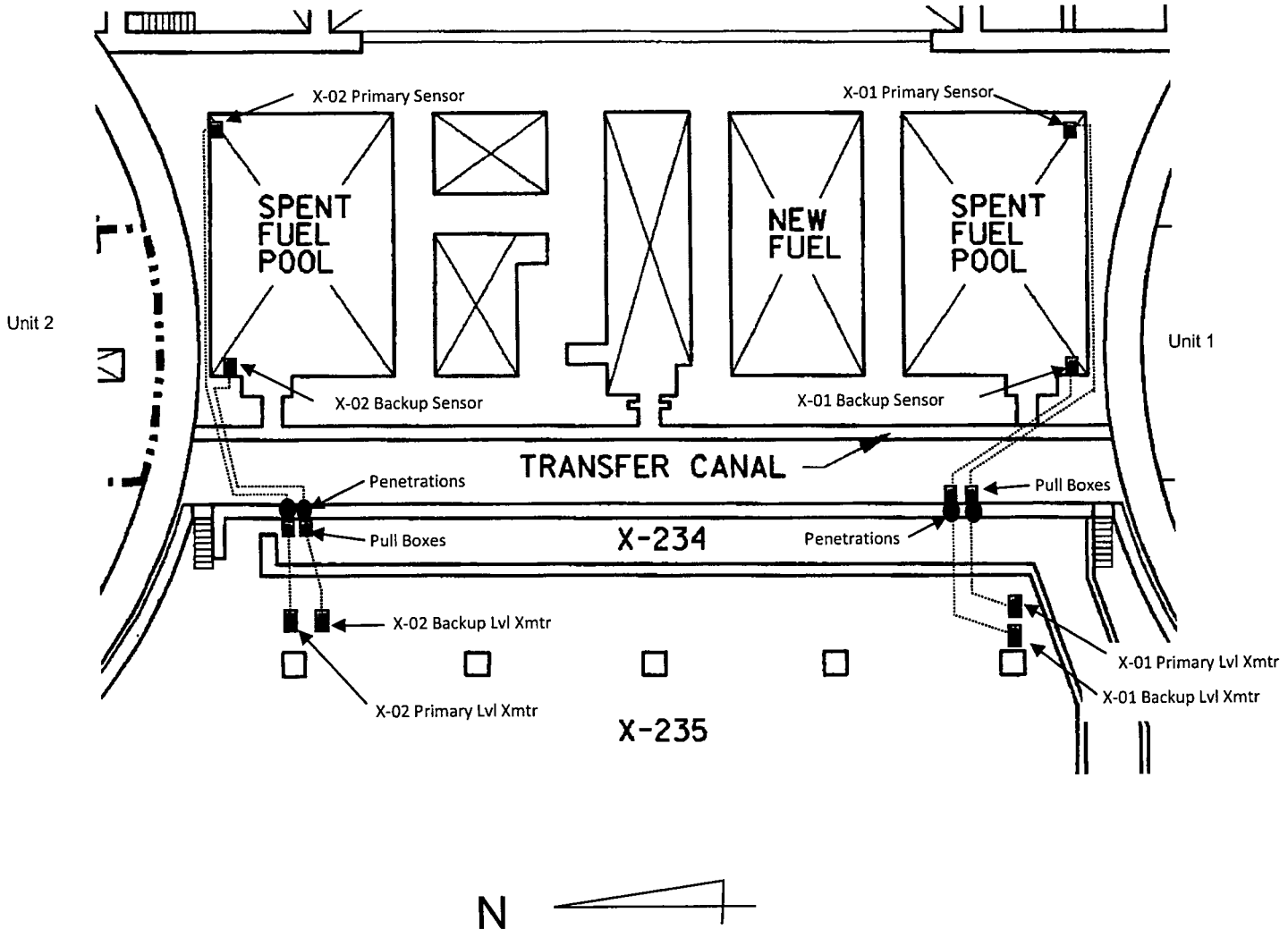
REFERENCES

1. NRC Order Number EA-12-051, Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, dated March 12, 2012
2. NRC Interim Staff Guidance JLD-ISG-2012-03, Compliance with Order EA-12-051, Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation, Revision 0, dated August 29, 2012.
3. 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.
4. Luminant Generation Company LLC Letter TXX-12156, Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated October 25, 2012.
5. Luminant Generation Company LLC Letter TXX-13040, Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051), dated February 28, 2013
6. Luminant Generation Company LLC Letter TXX-13130, First Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051) (TAC NOS. MF0862 AND MF0863), dated August 28, 2013
7. Luminant Generation Company LLC Letter TXX-14026, Second Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051) (TAC NOS. MF0862 AND MF0863), dated February 27, 2014
8. Luminant Generation Company LLC Letter TXX-14105, Second Six-Month Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation (Order Number EA-12-051) (TAC NOS. MF0862 AND MF0863), dated August 28, 2014
9. NRC Letter to Luminant Generation Company LLC, Comanche Peak Nuclear Power Plant, Units 1 and 2 - Interim Staff Evaluation and Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation (TAC NOS. MF0862 and MF0863) dated November 4, 2013
10. NRC Letter to Luminant Generation Company LLC, Comanche Peak Nuclear Power Plant, Units 1 and 2 - Correction to Date related to Interim Staff Evaluation and Request for Additional Information Regarding the Overall Integrated Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation (TAC NOS. MF0862 and MF0863) dated November 19, 2013
11. NRC Letter to Luminant Generation Company LLC, Comanche Peak Nuclear Power Plant, Units 1 and 2 -Request For Additional Information Re: Overall Integrated Plan In Response To Order EA-12-051, "Reliable Spent Fuel Pool Instrumentation" (TAC Nos. MF0862 And MF0863), dated June 7, 2013
12. NRC letter to Operating Reactor Licensees, "Nuclear Regulatory Commission Audits of Licensee Responses to Reliable Spent Fuel Pool Instrumentation Order EA-12-051, dated March 26, 2014
13. Luminant Generation Company LLC Letter TXX-13103, Response to Request for Additional Information Regarding Overall Integrated Plan in Response to March 12, 2012, Commission Order to Modify License with Regard to Reliable Spent Fuel Pool Implementation (Order Number EA-12-051), dated July 3, 2013
14. Luminant Generation Company LLC Letter TXX-13170, Comanche Peak Nuclear Power Plant, Docket Nos. 50-445 AND 50-446, Response to NRC Interim Staff Evaluation and Request for Additional Information Regarding the Overall Implementation Plan for Implementation of Order EA-12-051, Reliable Spent Fuel Pool Instrumentation (TAC NOS. MF0862 AND MF0863), dated November 19, 2013

15. Luminant Generation Company LLC Letter TXX-14023, dated February 12, 2014, Request for Schedule Relaxation for the March 12, 2012, Commission Order Modifying Licenses with Regard to Requirements For Mitigation Strategies For Beyond-Design-Basis External Events (Order Number EA-12-049) (TAC NO. MF0860), dated February 12, 2014 (ML14055A330)
16. NRC Letter dated April 14, 2014, CPNPP, Unit 1 Relaxation of Certain Schedule Requirements for Order EA-12-049 "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events" (ML14071A439)

CPNPP Spent Fuel Pool Level Instrumentation Equipment Locations

SFPLIS Equipment Locations- SFP Area



CPNPP Spent Fuel Pool Level Instrumentation Equipment Locations

SFPLIS Equipment Locations