



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 7, 2013

Mr. Rafael Flores
Senior Vice President and
Chief Nuclear Officer
Attention: Regulatory Affairs
Luminant Generation Company LLC
P.O. Box 1002
Glen Rose, TX 76043

SUBJECT: 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)

Dear Mr. Flores:

By letter dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13071A344), Luminant Generation Company LLC (Luminant, the licensee) submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012, U.S. Nuclear Regulatory Commission (NRC, Commission) Order modifying licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (Order Number EA-12-051; ADAMS Accession No. ML12054A679) for the Comanche Peak Nuclear Power Plant, Units 1 and 2. The NRC staff endorsed Nuclear Energy Institute (NEI) 12-02, "Industry Guidance for Compliance with U.S. Nuclear Regulatory Commission (NRC) Order EA-12-051, To Modify Licenses with Regard to Reliable SFP Instrumentation," Revision 1, dated August 2012 (ADAMS Accession No. ML12240A307), with exceptions as documented in Interim Staff Guidance (ISG) 2012-03, "Compliance with Order EA-12-051, Reliable SFP Instrumentation," Revision 0, dated August 29, 2012 (ADAMS Accession No. ML12221A339).

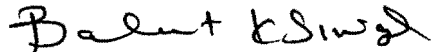
The NRC staff has determined that additional information, as requested in the enclosure, is needed to complete its review. The draft request for additional information (RAI) was transmitted to Mr. Tim Hope of Luminant via e-mail on May 2, 2013, with a request to respond within 30 days from the date of the e-mail. Mr. Carl Corbin of Luminant confirmed that an RAI clarification call is not needed and agreed to provide the response as requested. However, since there was a delay in transmitting the formal RAIs, Luminant is requested to provide the response by June 21, 2013. If any part of the requested information is not available by June 21, 2013, please provide a date by which the information will be provided.

R. Flores

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If you have any questions regarding this request, please contact me at 301-415-3016 or via e-mail at Balwant.singal@nrc.gov.

Sincerely,



Balwant K. Singal, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-445 and 50-446

Enclosure:
As stated

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION
OVERALL INTEGRATED PLAN IN RESPONSE TO
ORDER EA-12-051, "RELIABLE SPENT FUEL POOL INSTRUMENTATION"
LUMINANT GENERATION COMPANY LLC
COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 1 AND 2
DOCKET NOS. 50-445 AND 50-446

1.0 Introduction

By letter dated February 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13071A344), Luminant Generation Company, LLC (Luminant, the licensee), submitted an Overall Integrated Plan (OIP) in response to the March 12, 2012, U.S. Nuclear Regulatory Commission (NRC, Commission) Order modifying licenses with regard to requirements for Reliable Spent Fuel Pool (SFP) Instrumentation (Order Number EA-12-051; ADAMS Accession No. ML12054A679) for the Comanche Peak Nuclear Plant (CPNPP), Units 1 and 2. The NRC staff endorsed Nuclear Energy Institute (NEI) 12-02, "Industry Guidance for Compliance with U.S. Nuclear Regulatory Commission (NRC) Order EA-12-051, To Modify Licenses with Regard to Reliable SFP Instrumentation," Revision 1, dated August 2012 (ADAMS Accession No. ML12240A307), with exceptions as documented in Interim Staff Guidance (ISG) 2012-03, "Compliance with Order EA-12-051, Reliable SFP Instrumentation," Revision 0, dated August 29, 2012 (ADAMS Accession No. ML12221A339).

The NRC staff has reviewed the licensee's letter dated February 28, 2013, and determined that the following request for additional information (RAI) is needed to complete its technical review. Please provide the response to the following RAIs.

2.0 Levels of Required Monitoring

The OIP states in part, that

1. **Level adequate to support operation of the normal fuel pool cooling system** – Indicated level on either the primary or backup instrument channel of 22 feet 1.25 inches above the top of the fuel storage racks plus the accuracy of the SFP level instrument, which is to be determined. This level aligns with the LO-LO level process setpoint that trips the fuel cooling pump as described in Comanche Peak Final Safety Analysis Report (FSAR) Section 9.1.3.2 (Reference 5).
2. **Level adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck** – Indicated level on either the primary or backup instrument channel of greater than 10 feet (\pm 1 foot) above the top of the fuel storage racks based on

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Reference 2 and 3. This monitoring level ensures there is an adequate water level to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck.

3. **Level where fuel remains covered** – Indicated level on either the primary or backup instrument channel of greater than 1 foot above the top of the fuel storage racks plus the accuracy of the SFP level instrument channel, which is to be determined. This monitoring level assures that there is adequate water level above the stored fuel seated in the rack.

In addition, under section for “Instruments,” the OIP states, in part, that

The primary and backup instrument channels will provide continuous level indication over a range of 23 feet 9.25 inches, from 12 inches above the top of the fuel storage racks (plant level 835 feet 2.75 inches) to the high pool level elevation (plant elevation 859 feet).

RAI-1

Please provide the following:

- a) The specific functional reasons for identification of the elevations within the SFP as levels 1, 2, and 3. For level 1, please specify how the identified location represents the HIGHER of the two points described in the NEI 12-02 guidance for this level.
- b) A clearly labeled sketch depicting the elevation view of the proposed typical mounting arrangement for the portions of instrument channel consisting of permanent measurement channel equipment (e.g., fixed level sensors and/or stilling wells, and mounting brackets). Please indicate on this sketch the datum values representing Levels 1, 2, and 3 as well as the top of the fuel. The sketch should indicate the portion of the level sensor measurement range that is sensitive to measurement of the fuel pool level, with respect to the Levels 1, 2, and 3 datum points.

3.0 Instrumentation Design Features

3.1 Arrangement

The OIP states, in part, that

The preliminary locations of the primary and backup instrument sensing components are at the plant southeast and southwest corners of SFP 1 (X-01) and at the plant northeast and northwest corners of SFP 2 (X-02). The design for installation will include physical separation of the two sensors, separate extension cables from the electronics to the sensors, routing all cables in separate conduit / trays, separate UPS [uninterruptible power supply] power

supplied from different ac [alternating current] sources, and seismically qualified mounting with physical separation of both the level sensing and indications.

The final location of the primary and backup system mounting brackets will be determined during the design phase with consideration of power availability and separation requirements to protect against missiles.

The level sensing electronics for both primary and backup systems will be located in the shared auxiliary building, compliant with Reference 2 and Reference 3 for separation and accessibility. The primary system indicator will be located in the vicinity of the control room. The backup system indicators will be located in accessible locations.

RAI-2

Please provide a clearly labeled sketch or marked-up plant drawing of the plan view of the SFP area, depicting the SFP inside dimensions, the planned locations/placement of the primary and back-up SFP level sensor, and the proposed routing of the cables that will extend from the sensors toward the location of the read-out/display device.

3.2 Mounting

The OIP states, in part, that

The mounting of both primary and backup system will be installed to maintain its integrity during and following a design basis seismic event. All locations will be reviewed for two-over-one seismic interference.

RAI-3

Please provide the following:

- a) The design criteria that will be used to estimate the total loading on the mounting device(s), including static weight and dynamic loads. Please describe the methodology that will be used to estimate the total loading, inclusive of design basis maximum seismic loads and the hydrodynamic loads that could result from pool sloshing or other effects that could accompany such seismic forces.
- b) A description of the manner in which the level sensor (and stilling well, if appropriate) will be attached to the refueling floor and/or other support structures for each planned point of attachment of the probe assembly. Indicate in a schematic the portions of the level sensor that will serve as points of attachment for mechanical/mounting or electrical connections.
- c) A description of the manner by which the mechanical connections will attach the level instrument to permanent spent fuel pool structures so as to support the level sensor assembly.

3.3 Qualification

The OIP states, in part, that

Reliability of both instrument channels will be demonstrated via an appropriate combination of design, analyses, operating experience, and/or testing of channel components for the following sets of parameters...

The normal operational, event and post-event for temperature, humidity, and radiation will be addressed for no fewer than seven days post-event or until off-site resources can be deployed by mitigating strategies resulting from the NRC issued Order EA-12-049, "*Issuance of Order to Modify Licenses with Regard to Requirements for Mitigating Strategies for Beyond Design-Basis External Events,*" ...

The instrument channel reliability will be demonstrated via an appropriate combination of design, analysis, operating experience, and/or testing of channel components for the effects of shock and vibration. Demonstration of shock and vibration will be consistent with the guidelines in Reference 2 and Reference 3.

Demonstration of seismic adequacy will be achieved using one or more of the following methods:

- (1) demonstration of seismic motion consistent with that of existing design basis loads at the installed location;
- (2) substantial history of operational reliability in environments with significant vibration, such as for portable hand-held devices or transportation applications. Such a vibration design envelope will be inclusive of the effects of seismic motion imparted to the components proposed at the location of installation;
- (3) adequacy of seismic design and installation is demonstrated based on the guidance in Sections 7, 8, 9, and 10 of IEEE [Institute of Electrical and Electronics Engineers] Standard 344-2004, "*IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations,*" (Reference 7) or a substantially similar industrial standard;
- (4) demonstration that proposed devices are substantially similar in design to models that have been previously tested for seismic effects in excess of the plant design basis at the location where the instrument is to be installed (g-levels and frequency ranges); or
- (5) seismic qualification using seismic motion consistent with that of existing design basis loading at the installation location.

RAI-4

Please provide the following:

- a) A description of the specific method or combination of methods you intend to apply to demonstrate the reliability of the permanently installed equipment under beyond-design-basis ambient temperature, humidity, shock, vibration, and radiation conditions.
- b) A description of the testing and/or analyses that will be conducted to provide assurance that the equipment will perform reliably under the worst-case credible design basis loading at the location where the equipment will be mounted. Include a discussion of this seismic reliability demonstration as it applies to a) the level sensor mounted in the SFP area, and b) any control boxes, electronics, or read-out and re-transmitting devices that will be employed to convey the level information from the level sensor to the plant operators or emergency responders.
- c) A description of the specific method or combination of methods that will be used to confirm the reliability of the permanently installed equipment following seismic conditions to maintain its required accuracy.

3.4 Independence

The OIP states, in part, that

The backup instrument system will be redundant to and independent of the primary instrument system.

Independence of the two systems includes: location, mounting, power sources, power and signal wiring, and indications, to prevent any failure of one system from affecting the other system.

RAI-5

Please provide the following:

- a) A description of how the two channels of the proposed level measurement system meet this requirement so that the potential for a common-cause event to adversely affect both channels is precluded.
- b) Further information on how each level measurement system, consisting of level sensor electronics, cabling, and readout devices will be designed and installed to address independence through the application and selection of independent power sources, the use of physical and spatial separation, independence of signals sent to the location(s) of the readout devices, and the independence of the displays.

3.5 Power Supplies

The OIP states, in part, that

An AC [alternating current] source will be selected for each system's 24-Vdc [Volts direct current] UPS, with power cables, with power cables routed separately through existing or new tray / conduit and presentations.

Both channels will be powered by independent batteries following a loss-of-AC power. The minimum battery life will be 72 hours. The 72 hour battery life is sufficient amount of time for an alternate source of power to be provided by the plant-specific procedures to address Reference 6. Each channel will include an externally accessible bulkhead connector and a transfer switch for connection of an alternate power source.

RAI-6

Please provide the following:

- a) A description of the electrical AC power sources and capacities for the primary and backup channels.
- b) The document and/or the procedure that addresses the actions "following a loss-of-AC power."
- c) If the level measurement channels are to be powered through a battery system (either directly or through an UPS, please provide the design criteria that will be applied to size the battery in a manner that ensures, with margin, that the channel will be available to run reliably and continuously following the onset of the beyond-design-basis event for the minimum duration needed, consistent with the plant FLEX Program plans.

3.6 Accuracy

The OIP states, in part, that

Instrument channels will be designed such that they will maintain their specified accuracy without recalibration following a power interruption or change in power source. The accuracy will be within the resolution requirements of Reference 2, Figure 1. The instrument accuracy will be sufficient to allow personnel using plant procedures to determine when the water level reaches levels 1, 2, and 3 without conflicting or ambiguous indication.

RAI-7

Please provide the following:

- a) An estimate of the expected instrument channel accuracy performance under both (1) normal SFP level conditions (approximately level 1 or higher) and (2) at the beyond-design-basis 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.
- 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.

3.7 Testing

OIP states, in part, that

Instrument channel design will provide for routine testing and calibration consistent with Reference 2 and Reference 3.

RAI-8

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.
- 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 SPF level instrumentation.
- c) A description how functional checks will be performed, and the frequency at which they will be conducted. Please describe how calibration tests will be performed, and the frequency at which they will be conducted. Also, a discussion as to how these surveillances will be incorporated into the plant surveillance program.
- d) A description what preventative 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.

3.8 Display

The OIP states, in part, that

The primary system indicator will be located in the vicinity of the control room. The backup system indicators will be located in accessible locations. The locations will allow for reading of the indicators following an event. The display will provide continuous indication of the SFP water level and will be consistent with the guidelines of Reference 2 and Reference 3.

RAI-9

Please provide the following:

- a) The specific location for the primary and backup instrument channel display.
- b) If the primary or backup display location is other than the main control room, then provide justification for prompt accessibility to displays including primary and alternate route evaluation, habitability at display location(s), continual resource availability for personnel responsible to promptly read displays, and provisions for communications with decision makers for the various SFP drain down scenarios and external events.
- c) The reasons justifying why the locations selected enable the information from these instruments to be considered "promptly accessible" to various drain-down scenarios and external events.

4.0 Program Features

4.1 Procedures

The OIP states, in part, that

Procedures will be developed using guidelines and vendor instructions to address the maintenance, operation, and abnormal response issues associated with the new SFP level instrumentation.

FLEX Support Guidelines will address strategy to ensure SFP water makeup is initiated at an appropriate time consistent with implementation of NEI 12-06, "*Diverse and Flexible Coping Strategies (FLEX) Implementation Guide.*" (Reference 8).

RAI-10

Please provide a description of the standards, guidelines and/or criteria that will be utilized to develop procedures for inspection, maintenance, repair, operation, abnormal response, and

administrative controls associated with the SFP level instrumentation, as well as storage and installation of portable instruments.

4.2 Testing and Calibration

The OIP states, in part, that

Processes will be established and maintained for scheduling and implementing necessary testing and calibration of the primary and backup SFP level instrument channels to maintain the instrument channels at the design accuracy. Testing and calibration of the instrumentation will be consistent with vendor recommendations and other documented basis as appropriate.

RAI-11

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. Please 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.
- b) A description of how the guidance in NEI 12-02 Section 4.3 regarding compensatory actions for one or both non-functioning channels will be addressed. Please include a description of what compensatory actions are planned in the event that one of the instrument channels cannot be restored to functional status within 90 days.

R. Flores

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If you have any questions regarding this request, please contact me at 301-415-3016 or via e-mail at Balwant.singal@nrc.gov.

Sincerely,

/RA/

Balwant K. Singal, Senior Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-445 and 50-446

Enclosure:
As stated

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*memo dated 4/29/13

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