UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, DC 20555 - 0001

April 26, 2013

Mr. R. W. Borchardt
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: CHAPTERS 4, 13, 15, 16, 17, AND 19 OF THE SAFETY EVALUATION REPORT WITH OPEN ITEMS FOR THE COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4, US-APWR REFERENCE COMBINED LICENSE APPLICATION

Dear Mr. Borchardt:

During the 603rd meeting of the Advisory Committee on Reactor Safeguards, April 11-12, 2013, we met with representatives of the NRC staff and Luminant Generation Company, LLC (Luminant) to review the following chapters of the Safety Evaluation Report (SER) with Open Items associated with the Comanche Peak Nuclear Power Plant, Units 3 and 4, reference combined license (COL) application for the United States Advanced Pressurized Water Reactor (US-APWR) design:

- Chapter 4, "Reactor"
- Chapter 13, "Conduct of Operations"
- Chapter 15, "Transient and Accident Analyses"
- Chapter 16, "Technical Specifications"
- Chapter 17, "Quality Assurance and Reliability Assurance"
- Chapter 19, "Probabilistic Risk Assessment and Severe Accident Evaluation"

Our US-APWR Subcommittee also reviewed these chapters during meetings on July 9-10, 2012; September 20, 2012; October 18-19, 2012; and February 21-22, 2013. Features of the Comanche Peak site and technical aspects of the plant-specific systems, as well as the open items identified in each of these SER chapters were discussed at those meetings. We also had the benefit of the documents referenced.

CONCLUSIONS AND RECOMMENDATIONS

1. We have not identified any additional issues in SER Chapters 4, 13, 15, 16, 17, and 19 that would preclude issuance of the combined license for Comanche Peak, Units 3 and 4.

2. Based on our review of these chapters, we recommend the following:

- The staff should evaluate whether the planned minimum shift crew composition with one Shift Technical Advisor and one Radiation Protection Technician shared between Units 3 and 4 is adequate to effectively manage the response to site-wide events that affect both units.

- The staff should conduct a comprehensive audit to confirm that all technical elements of the full-scope, plant-specific probabilistic risk assessment (PRA) that is required before fuel load have received an independent peer review in accordance with Regulatory Guide (RG) 1.200, before that PRA is used to support any risk-informed licensing applications and operational programs.

3. We plan to review the staff's resolution of the open items in SER Chapters 13, 16, and 19 during future meetings. Analyses described in Chapters 15 and 19 are affected by the design and operation of systems discussed in SER chapters that we have not yet reviewed. We will comment on safety implications of any system interactions in future interim letters and in our final report.

BACKGROUND

Luminant submitted its application for a COL for Comanche Peak Nuclear Power Plant, Units 3 and 4, on September 19, 2008. This is the reference COL application for the US-APWR design. Revision 1 of the Final Safety Analysis Report (FSAR) was submitted on November 20, 2009; Revision 2 on June 28, 2011; and Revision 3 on June 28, 2012.

We have agreed to review the SER on a chapter-by-chapter basis to identify technical issues that may merit further consideration by the staff. This process aids the resolution of concerns and facilitates timely completion of the review. SER Chapters 4, 16, 17, and 19 address FSAR Revision 3. SER Chapter 13 addresses FSAR Revision 1, and Chapter 15 addresses FSAR Revision 2. Consequently, our review of SER Chapters 13 and 15 does not account for updates to the site-specific information in Revision 3 of the FSAR. SER Chapters 4, 15, and 17 do not contain any site-specific open items.

DISCUSSION

We have not identified any additional issues in these SER chapters that would preclude issuance of the COL for Comanche Peak, Units 3 and 4. We plan to review the resolution of the open items identified in SER Chapters 13, 16, and 19 during future meetings.

For this interim report, we note the following observations and recommendations on selected topics that are addressed in these chapters.

Chapter 13: Conduct of Operations

The FSAR indicates that the minimum combined shift crew composition during power operation at Units 3 and 4 will include:

- Three Senior Reactor Operators (SROs), one of whom is the Shift Manager
- One Shift Technical Advisor
- One Radiation Protection Technician

The Shift Manager, Shift Technical Advisor, and Radiation Protection Technician each have shared responsibilities for Unit 3 and Unit 4.

This staffing plan provides limited coverage for specialized technical disciplines that would be needed during events that affect both units simultaneously. For example, the Shift Manager is responsible for coordinating all site-wide activities until the Technical Support Center is activated. This leaves each unit with one dedicated SRO to supervise its operational responses. The attention of the single Shift Technical Advisor would then be divided between monitoring the event progression at both units, which may be evolving differently, and advising each unit SRO accordingly. The single Radiation Protection Technician would also have similar divided responsibilities for monitoring personnel doses and controlling access to different plant areas, depending on the event mitigation requirements at each unit.

These divided responsibilities could inappropriately weaken the effectiveness of these specialized technical personnel during complex events that require careful attention to evolving conditions at each unit. The staff should evaluate whether the planned minimum shift crew composition is adequate to effectively manage the response to site-wide events that affect both units.

Chapter 19: Probabilistic Risk Assessment and Severe Accident Evaluation

Luminant has indicated that the Technical Specifications Limiting Conditions for Operation (LCO) completion times and Surveillance Requirement (SR) frequencies that are specified in Chapter 16 of the US-APWR Design Control Document (DCD) will be adopted for issuance of the COL, supplemented by LCO and SR specifications for the plant-specific ultimate heat sink. Luminant has also indicated that Comanche Peak Units 3 and 4 will adopt Risk-Managed Technical Specifications (RMTS) and a risk-informed Surveillance Frequency Control Program (SFCP) after the COL is issued and before initial fuel loading.

The US-APWR design certification PRA has not been subjected to a formal independent peer review against the technical attributes in RG 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," and the ASME/ANS Standard for PRA. We performed a limited review of selected elements of the design certification PRA models, supporting analyses, and data. That review raised a number of questions about the completeness and level of detail in the PRA models. A few specific examples were discussed with the staff and Luminant during our US-APWR subcommittee meetings. The SER with open items for DCD Chapter 19 has concluded that the current design certification PRA is not adequate to support certain risk-informed applications during plant operation, such as RMTS. We concur with that conclusion.

The level of detail in the design certification PRA is also not adequate to provide meaningful information about the risk importance of non-safety related structures, systems, and components (SSCs) that are currently listed at a very high level in the US-APWR Design Reliability Assurance Program (DRAP). For example, the PRA includes only a single basic event for the entire main feedwater system. The list of SSCs in the DRAP correspondingly contains only one entry for "main feedwater system." Neither the PRA nor the DRAP identifies specific SSCs in the main feedwater system or in any support systems that are required for main feedwater operation (e.g., AC power, DC power, cooling water, instrument air, ventilation, etc.).

Reviews of the design certification PRA are not relevant for conclusions regarding technical adequacy of the full-scope, plant-specific PRA that is required before fuel load, because of recognized limitations in the preliminary models and analyses in the design certification PRA. According to COL Action Item 19.3(1), the design certification PRA will need to be updated (e.g., to address site-specific information) and upgraded to industry standards by the COL licensee to achieve the technical adequacy that is required to support risk-informed applications. Luminant has indicated that the level of detail that is necessary to support risk-informed applications and to better identify specific risk-important non-safety related SSCs will be added during the PRA upgrades between the time of COL issuance and initial fuel loading.

According to RG 1.200, a PRA that is used to support risk-informed licensing applications should receive a formal independent peer review against the technical attributes in the ASME / ANS Standard and should meet the technical requirements for Capability Category II in that Standard. The staff should conduct a comprehensive audit to confirm that all elements of the plant-specific PRA receive a thorough independent review.

Analyses that are described in FSAR Chapters 15 and 19 are affected by the design and operation of systems which are discussed in other chapters that we have not yet reviewed. We will comment on safety implications of any system interactions in future interim letters and in our final report.

Sincerely,

/RA/

J. Sam Armijo
Chairman

REFERENCES

1. Comanche Peak Nuclear Power Plant, Units 3 and 4 – FSAR Chapter 4, “Reactor,” (ML12202A989), dated June 28, 2012.

2. Comanche Peak Nuclear Power Plant, Units 3 and 4 – FSAR Chapter 13, “Conduct of Operations,” (ML12202A998), dated June 28, 2012.

3. Comanche Peak Nuclear Power Plant, Units 3 and 4 – FSAR Chapter 15, “Transient and Accident Analyses,” (ML12202B001), dated June 28, 2012.

4. Comanche Peak Nuclear Power Plant, Units 3 and 4 – FSAR Chapter 16, “Technical Specifications,” (ML12202B002), dated June 28, 2012.

5. Comanche Peak Nuclear Power Plant, Units 3 and 4 – FSAR Chapter 17, “Quality Assurance and Reliability Assurance,” (ML12202B003), dated June 28, 2012.

6. Comanche Peak Nuclear Power Plant, Units 3 and 4 – FSAR Chapter 19, “Probabilistic Risk Assessment and Severe Accident Evaluation,” (ML12202B006), dated June 28, 2012.

7. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Mitigative Strategies Report (LOLA), (ML12201B440), dated June 28, 2012.

8. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 4 “Reactor,” Safety Evaluation (ML12227A505), dated October 17, 2012.

9. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 13, “Conduct of Operations,” Safety Evaluation (ML113490069), dated December 22, 2011.

10. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 15, “Transient and Accident Analyses,” Safety Evaluation (ML12153A312), dated June 25, 2012.

11. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 16, “Technical Specifications,” Safety Evaluation (ML12355A211), dated February 14, 2013.

12. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 17, “Quality Assurance and Reliability Assurance,” Safety Evaluation (ML12341A121), dated January 4, 2013.

13. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 19 , “Probabilistic Risk Assessment and Severe Accident Evaluation,” Safety Evaluation (ML13015A580), dated February 6, 2013.

14. Comanche Peak Nuclear Power Plant, Units 3 and 4 - Mitigative Strategies Report for Loss of Large Areas (LOLA) of the Plant due to Explosions or Fires, Safety Evaluation (ML12326A699), dated February 26, 2013.

3. Comanche Peak Nuclear Power Plant, Units 3 and 4 – FSAR Chapter 15, "Transient and Accident Analyses," (ML12202B001), dated June 28, 2012.

4. Comanche Peak Nuclear Power Plant, Units 3 and 4 – FSAR Chapter 16, "Technical Specifications," (ML12202B002), dated June 28, 2012.

5. Comanche Peak Nuclear Power Plant, Units 3 and 4 – FSAR Chapter 17, "Quality Assurance and Reliability Assurance," (ML12202B003), dated June 28, 2012.

6. Comanche Peak Nuclear Power Plant, Units 3 and 4 – FSAR Chapter 19, "Probabilistic Risk Assessment and Severe Accident Evaluation," (ML12202B006), dated June 28, 2012.

7. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Mitigative Strategies Report (LOLA), (ML12201B440), dated June 28, 2012.

8. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 4 "Reactor," Safety Evaluation (ML12227A505), dated October 17, 2012.

9. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 13, "Conduct of Operations," Safety Evaluation (ML113490069), dated December 22, 2011.

10. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 15, "Transient and Accident Analyses," Safety Evaluation (ML12153A312), dated June 25, 2012.

11. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 16, "Technical Specifications," Safety Evaluation (ML12355A211), dated February 14, 2013.

12. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 17, "Quality Assurance and Reliability Assurance," Safety Evaluation (ML12341A121), dated January 4, 2013.

13. Comanche Peak Nuclear Power Plant, Units 3 and 4 – Safety Evaluation Report with Open Items for Chapter 19 , "Probabilistic Risk Assessment and Severe Accident Evaluation," Safety Evaluation (ML13015A580), dated February 6, 2013.

14. Comanche Peak Nuclear Power Plant, Units 3 and 4 - Mitigative Strategies Report for Loss of Large Areas (LOLA) of the Plant due to Explosions or Fires, Safety Evaluation (ML12326A699), dated February 26, 2013.

Accession No: **ML13115A904** **Publicly Available** **Y** **Sensitive** **N**
Viewing Rights: ☒ NRC Users or ☐ ACRS Only or ☐ See Restricted distribution

OFFICE	ACRS	SUNSI Review	ACRS	ACRS	ACRS
NAME	GShukla	GShukla	CSantos	EMHackett	EMH for JSA
DATE	04/26/13	04/26/13	04/26/13	04/26/13	04/26/13

OFFICIAL RECORD COPY