

## PMComanchePeakPEm Resource

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**Sent:** Monday, December 13, 2010 3:32 PM  
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**Cc:** ComanchePeakCOL Resource; Takacs, Michael  
**Subject:** Comanche Peak RCOL Chapter 13, Section 13.6 - RAI Number 194  
**Attachments:** RAI 5203 (RAI 194).docx

The NRC staff has identified that additional information is needed to continue its review of the combined license application. The NRC staff's request for additional information (RAI) is contained in the attachment. Luminant is requested to inform the NRC staff if a conference call is needed.

The response to this RAI is due within **35** calendar days of December 13, 2010.

Note: If changes are needed to the safety analysis report, the NRC staff requests that the RAI response include the proposed changes.

thanks,

Stephen Monarque  
U. S. Nuclear Regulatory Commission  
NRO/DNRL/NMIP  
301-415-1544

**Hearing Identifier:** ComanchePeak\_COL\_Public  
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**Options**

**Priority:** Standard

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**Recipients Received:**

RAI Number 194

12/13/2010

Comanche Peak Units 3 and 4  
Luminant Generation Company, LLC.  
Docket No. 52-034 and 52-035

SRP Section: 13.06.01 - Physical Security - Combined License  
Application Section: Parts 1, 2, 8, and 10 and Referenced Technical Reports

QUESTIONS for Reactor Security Rulemaking and Licensing Branch (NSIR/DSP/RSRLB)

13.06.01-52

**(U)** Part 2, FSAR, Section 13.6 Security (Pages 13.6-1 to 13.6-4), MHI Technical Report (TR) UAP-SGI-08002, "US-APWR Technical Report – High Assurance Evaluation Assessment," Revision 2, dated October 2010, Section 4.4.2 to 4.4.8 (Pages 15 – 30): Confirm whether the revision of MHI TR UAP-SGI-08002 provides the following information on the management process and analysis results that identified target sets groups (TSG), based on the standard US-APWR design and site specific conditions:

- a. **(U)** Provide the technical bases for applying the criteria of greater than 8-hours as a threshold for core damage or the loss of spent fuel pool cooling in selecting TSG identified in Table 4.1. Justify how this technical report meets the requirement of 10 CFR 73.55(b)(3) that the physical protection program must be designed to prevent significant core damage and spent fuel sabotage. This regulation does not establish constraints based on duration to core damage and excluded TSG, which would be unprotected to prevent the adversaries capabilities of the design basis threat (DBT) to initiate the sequence of events for radiological sabotage.
- b. **(U)** Clearly describe the site specific assumptions and capabilities credited (e.g., operator actions for security and safety, emergency response, etc.) and their reliability and availability for providing security for plant operations personnel to prevent the sequences of each TSG, that applied the threshold of greater than 8 hours in Table 4.1.
- c. **(U)** Describe how defense-in-depth is provided to address uncertainties associated with the integrated safety and security responses to achieve a high assurance of protection that prevents the DBT of radiological sabotage from achieving core damage.
- d. **(U)** Clarify whether the proposed physical protection system (i.e., detection, assessment, communications, delays and interdiction) includes protection of each TSG identified, including those identified as greater than 8-hour threshold to core damage. The response to this question should demonstrate compliance with 10 CFR 73.55(b)(3) (i.e., prevent core damage and spent fuel sabotage with defense-in-depth).

- e. **(U)** Confirm whether the revision of MHI TR UAP-SGI-08002, Section 4.3.2 and Appendix A, Section 3.0 provides descriptions intended to address this issue identified and documented from NRC licensing site audit (NRC Audit Report dated October 5, 2010, ML101680301).
- f. **(U)** Describe how the target set identification process and results addressed credible operator actions during security events (e.g., hostile environment, uncertainties, etc.), evaluation of main steam system functions, considerations of cables and instrumentation and controls, considerations of common equipment, and selected initiating events that potentially cause multiple loss of safety-functions or target set elements in identifying a complete and accurate list of target sets.
- g. **(U)** Confirm whether the revision of MHI TR UAP-SGI-08002, Table 4.1, Sections 4.4.3, 4.4.4, 4.4.6, 4.4.7, 4.6, 4.7, and Tables 4-6 and 4-7 provides descriptions intended to address this same issue identified from NRC licensing site audit (NRC Audit Report dated October 5, 2010, ML101680301).

**(U) Regulatory Basis:** Subpart C of Title 10 CFR Part 52, § 52.79(a)(35)(i), (ii), and (iv) requires that the Combined license (COL) applicant submit information in the COL application that discusses how the applicant will meet the requirements of 10 CFR 73 and describes the implementation of the physical security and safeguards contingency plans. Title 10 CFR 73.55(b)(3) requires the applicant design the physical protection program to prevent significant core damage and spent fuel sabotage with assurance of the capabilities to detect, assess, interdict, and neutralize the DBT, and maintain at all times such capabilities with defense-in-depth. Title 10 CFR 73.55(b)(4) requires the applicant to analyze and identify site specific conditions, including target sets, that may affect the specific measures needed to implement the requirements of 10 CFR 73 and account for conditions in the design of the physical protection program. Target sets must be complete and accurate to describe what must be protected for meeting performance requirements of Title 10 CFR 73.55(2), which requires protection against the DBT of radiological sabotage as stated in § 73.1.

The COL applicant incorporated by reference MHI TR UAP-SGI-08002, "High Assurance Evaluation Assessment," Revision 2, that identifies the standard target sets based on the US-APWR design for the COL applicant. The technical report identified TSGs, including an application of an 8-hour threshold on the durations to core damage and loss of spent fuel pool cooling, without providing the technical bases on how this impacts the assurance of adequate protection against the DBT for radiological sabotage, the requirements for the design of the physical protection program, and prevents the occurrence of radiological sabotage. Additional information is needed to clarify how operator actions are credited, in the technical bases, for applying the 8-hour threshold and providing high assurance of protection against core damage and spent fuel sabotage (i.e., if the TSG is not selected) and how the plant will provide security for the environment to allow mitigating actions as are provided for defense-in-depth. The proposed approach of excluding identified TSG based on a time criteria to core damage exceeding greater than 8 hours adds additional constraints to core damage not allowed by the regulatory requirement 10 CFR 73.55(b)(3). The applicant's decision to exclude TSG identified, as not considered to be protected against the DBT, does not provide a high assurance of protection against the DBT for radiological sabotage.

(U) Part 2, FSAR, Section 13.6.2.1 (Page 13.6-2), MHI TR UAP-SGI-08002, "US-APWR Technical Report - High Assurance Evaluation Assessment," Revision 1, Section 5.2, Physical Security Design Features and Systems (Page 32), Part 8, Physical Security Plan, Section 11.2.3 (Page 11) and Section 5.1 and 5.2, US-APWR Standard Plant Design Features and Penetrations through Standard Plant Vital Area Walls (Pages 29-33): Provide the following information below on the docket.

- a. **(U)** Describe how the blast analyses performed in (MHI UAP-SGI-10001, "Blast Analysis for the Standard Plant," UAP-SGI-10002, "Large Blast Analysis for the Comanche Peak Units 3 and 4," and/or UAP-SGI-10003, "Small Blast Analysis for the Comanche Peak Units 3 and 4") considered the blast effects on non-structural elements (e.g., doors, windows, equipment hatches, missile doors, or other penetrations) and addressed the potential blast effects on vital equipment and elements of target sets from DBT vehicle bomb threats. Provide summary, key assumptions, and results from analyses of the blast effect on non-structural elements. Clarify whether the effects are also acceptable for elements of all TSGs identified (selected and not selected) in UAP-SGI-08002. Note: Revision to MHI TR UAP-SGI-08002 did not appear to provide descriptions intended to address this subject.
- b. **(U)** In addition, describe how these analyses also bound the DBT waterborne explosive threats to support the conclusions in Section 11.2.3, Waterborne Threat Measures, of the Physical Security Plan (i.e., Part 8 of the COLA) that the explosives effects are acceptable for vital equipment to perform its intended functions. Otherwise, state clearly whether the planned plant location from waterways precludes the need to consider waterborne threat.
- c. **(U)** Re-evaluate analyses in UAP-SGI-10004, "Comparison of the PS/B Wall to Sandia Report SAND77-0777, to include available methods for applying hand carried explosives within the adversarial characteristics, that will ensure the credited delay times provided by walls and structural members of the nuclear island are bounding. Confirm whether the revision in MHI TR UAP-SGI-08002, Section 5.1 provides descriptions intended to address this issue identified from the NRC licensing site audit (NRC Audit Report dated October 5, 2010).

**(U) Regulatory Basis:** Subpart C of Title 10 CFR Part 52, § 52.79(a)(35)(i), (ii), and (iv) requires that the Combined license (COL) applicant submit information in the COL application that discusses how the applicant will meet the requirements of 10 CFR 73 and describes the implementation of the physical security and safeguards contingency plans. Title 10 CFR 73.55(2) requires protection against the DBT of radiological sabotage, as stated in § 73.1. Title 10 CFR 73.55(b)(3)(i) requires the applicant to ensure that the capabilities to detect, assess, interdict, and neutralize the DBT are maintained at all times. Title 10 CFR 73.55(3)(ii) and 73.55(b)(4) requires applicant to provide defense-in-depth and to analyze and identify site specific conditions, including target sets, that may affect the specific measures needed to implement the requirements of 10 CFR 73 and account for conditions in the design of the physical protection program.

**(U)** The blast analyses for the standard plant supports the minimum safe stand-off distances indicated in MHI TR UAP-SGI-08002, and it is incorporated by reference to provide the design and licensing bases for the physical protection features that will guard against the DBT vehicle explosive threats. The applicant referenced MHI technical reports UAP-SGI-10001, "Blast Analysis for the Standard Plant," UAP-SGI-10002, "Large Blast Analysis for the Comanche Peak Units 3 and 4," Revision 1, and UAP-SGI-10003, "Small Blast Analysis for the Comanche Peak Units 3 and 4," Revision 0, that documents the analyses of vehicle bomb threats. The blast analyses did not address blast effects on non-structural elements. Also, the staff identified that the waterborne bomb threats has not been analyzed or documented to support the conclusion in Part 8, Section 11.2.3 of the Physical Security Plan in Part 8 of the COLA.

**(U)** The evaluations documented in UAP-SGI-10004 did not adequately bound or consider available methods (e.g., use of shape and cutting explosive charges) that could reduce time required to defeat physical barriers provided by structural members of the nuclear island. Reasonable and conservative assumptions are needed for delay times provided by structural members in the design and licensing bases of a physical protection system that provides a high assurance of protection. This RAI addresses the technical subjects reviewed and issues identified in NRC licensing audit conducted on May 10-13, 2010 (Audit summary is documented in ML101680301).

13.06.01-54

**(U)** Design Bases for Physical Protection Systems within the Scope of the RCOLA: Confirm whether the revision of MHI TR UAP-SGI-08002, Sections 5.1.2, 5.1.3, 5.2.1, 5.2.2, 5.2.4.1, 5.2.5, 5.2.6, 5.3, and Appendix A, Sections 2.2.1, 2.2.2, 2.2.3, 2.2.4, and 2.2.6 provides descriptions intended to address the following issue identified and documented from NRC licensing site audit (NRC Audit Report dated October 5, 2010, ML101680301):

Describe the design and performance requirements, including configurations and interfacing systems, for physical protection systems (e.g., access controls, interior and exterior intrusion detection and assessment system design and interface, configuration of protected area delay and detection and VBS, etc.) in sufficient detail to allow detailed designs that incorporates the performance requirements and intended functions credited as design and licensing bases for meeting performance and prescriptive requirements of 10 CFR 73.

**(U)** Regulatory Basis: Subpart C of Title 10 CFR Part 52, § 52.79(a)(35)(i), (ii), and (iv) requires that the Combined license (COL) applicant submit information in the COL application that discusses how the applicant will meet the requirements of 10 CFR 73 and describes the implementation of the physical security plan and safeguards contingency plan. Title 10 CFR 73.55(2) requires protection against the DBT of radiological sabotage as stated in § 73.1. Title 10 CFR 73.55(b)(3)(i) requires applicant to ensure that the capabilities to detect, assess, interdict, and neutralize the DBT and maintain at all time such capabilities. Title 10 CFR 73.55(3)(ii) and 73.55(b)(4) require applicant to provide defense-in-depth, and to analyze and identify site specific conditions, including target sets, that may affect the specific measures needed to implement the requirements of 10 CFR 73 and account for conditions in the design of

the physical protection program. Title 10 CFR 52.80(a) requires the application to contain information for ITA and criteria necessary and sufficient to provide reasonable assurance that the facility has been constructed and will operate in conformity with the combined license, the provisions of the Act, and the Commission's rules and regulations.

**(U)** During the licensing audit conducted May 10-13, 2010 (Audit summary is documented in ML101680301), the staff reviewed supporting documents on the design of physical protection systems (i.e., intrusion detection, Protected Area (PA) camera and video, PA fence and nuisance fence, security access control, security communications, security computer, security lighting, security power, vehicle barrier system). The NRC staff noted that these documents contained details of design bases for the physical protection systems, including references to industry standards or guidance (e.g., IEEE, NFPA, GSA, etc) for the physical protection systems described in the COLA (and DC). However, the applicant has not submitted sufficient and appropriate details of designs, configurations, and interfacing systems for physical protection systems (e.g., access controls, interior and exterior intrusion detection and assessment system design and interface, configuration of protected area delay and detection and VBS, etc.) on the docket. The information on design and intended functions or performances and the reliability and availability of a physical protection system to protect against the DBT is required on the docket for demonstrating or supporting the applicant's conclusion of a high assurance of adequate protection against the DBT for radiological sabotage. The level of detail for the design (including locations, configurations, and interfaces) of physical protection systems should conform to guidance in Regulatory Guide 1.206.

Design and performance requirements must be in sufficient detail to establish acceptance criteria for verification through ITA. The applicant's plan to provide supplemental information addresses the level of detail in MHI TR UAP-SGI-08002 or Part 8 site specific information. This RAI addresses the technical subject reviewed and issues identified during the licensing audit conducted on May 10-13, 2010 (Audit summary is documented in ML101680301).

13.06.01-55

**(U)** Defense-in-Depth of Physical Protection System (Delays and Response): Confirm whether the revision of MHI TR UAP-SGI-08002, Sections 6.1, 6.2, Figures 8-5 and 8-5, Figure A2 through A2-13, Figures S-3-1 through S-5A-3 (Scenarios 3 through 5A), and Appendix A Sections 1.0, 2.0, 4.0, 5.0 and Scenario 1 through 9, including 4A and 5A, provides descriptions and information on the docket that addresses the following issue identified during the NRC licensing site audit (NRC Audit Report dated October 5, 2010, ML101680301):

- a. **(U)** Describe defense-in-depth for security response (internal and/or external) by addressing uncertainties and additional pathways not currently considered in postulated pathways and scenarios. Specifically, evaluate and describe the defense-in-depth protection that includes pathways (and scenarios) which bounds explosive breaching of structural walls or other penetrations and ascending/descending available internal or external vertical pathways (e.g., ventilation ducts, utility/maintenance tunnels, and elevator shafts, etc.), that are other than normally access pathways (i.e., doorways and stairs) to provide assurance that the internal and external security responses planned will provide

the defense-in-depth protection that reasonably bounds all credible pathways within the DBT adversarial characteristics and capabilities.

- b. **(U)** Analyze fully and document the defense-in-depth protection for the reliability and availability of opportunities for security responders to interdict and neutralize adversaries to deny access at the nuclear island and structures along all credible pathways between PA and plant structures. Specifically address the pathways using a structure [intentionally not stated] between the PA and nuclear island that provides cover and concealment and a direct access to the exterior wall of a vital area containing safety functions and controls. Indicate how opportunities to interdict or neutralize adversaries will be integrated with physical protection systems into the current configuration for pre-deployed security responders described in Appendix A of UAP-SGI-08002, who will provide a physical protection system designed to achieve a high assurance of protection against the DBT.
- c. **(U)** Describe the engineered systems required and credited for detection, assessments, and proposed defensive positions (e.g., BRE or BBRE) to enable and provide opportunities for protected security responders to interdict and neutralize adversaries at the perimeter of the nuclear island and structures. Describe the reliability and availability of overlapping fields of fire to provide adequate coverage of pathways and the perimeter of the nuclear island and structures for interdiction and neutralization of adversarial tasks (e.g., interrupt adversarial tasks explosive breach walls or penetrations, ascending of walls, etc.) or neutralization of adversaries. The response to this question should demonstrate a defense-in-depth in protection.
- d. **(U)** Describe the deployment of all armed responders and armed security officers described in Section 18, "Response Requirements," of the PSP (Page 28), Part 8 of the COL application. Provide information supporting the planned deployment of responders for a high assurance of protection in the representations of protection for the CPNPP, Units 3 and 4 found in Appendix A of UAP-SGI-080002. Describe the integration of engineered physical protection systems provided to protect responders, including delays of adversaries by design, and opportunities to interdict and neutralize adversaries. Describe clearly the technical bases for how the numbers of responders indicated in Section 18 provides adequate protection and defense-in-depth.
- e. **(U)** Describe how task times (initiation of alarm, assessment of threat, and communications to sector or zone of intrusion, task time required to acquire target) and the available windows of opportunities to engage adversaries to demonstrate that the planned configuration of BRE/BBRE currently described in Appendix A provides the reliability and availability of security responders needed to interdict or neutralize adversaries between the PA and structures (i.e., prior to cover and concealment or loss of lines of sight). Describe the assumptions of reliability and availability of security responders to interdict or neutralize adversaries, based on: (1) assumptions of maximum distance of fire (indicated in UAP-SGI-080002), (2) analyzed response task times, (3) expected results from standard training and qualification and maintaining proficiency in use of weapons (i.e., Training and Qualification Plan – Part 8 of the COLA), (4) assumed adversarial travel time, and (5) the resulting windows of opportunities (time and



lines of sight) for security responders from the BRE/BBRE configuration indicated in Appendix A of UAP-SGI-08002.

**(U) Regulatory Basis:** Subpart C of Title 10 CFR Part 52, § 52.79(a)(35)(i), (ii), and (iv) requires that the COL applicant submit information in the COL application that discusses how the COL applicant will meet the requirements of 10 CFR 73 and describes the implementation of the physical security plan and safeguards contingency plan. Title 10 CFR 73.55(2) requires protection against the DBT of radiological sabotage as stated in § 73.1. Title 10 CFR 73.55(b)(3)(i) requires applicant to ensure that the capabilities to detect, assess, interdict, and neutralize the DBT and maintain at all time such capabilities. Title 10 CFR 73.55(3)(ii) and 73.55(b)(4) requires applicant to provide defense-in-depth, and to analyze and identify site specific conditions, including target sets, that may affect the specific measures needed to implement the requirements of 10 CFR 73 and account for conditions in the design of the physical protection program. Title 10 CFR 52.80(a) requires the application to contain information for ITA and criteria necessary and sufficient to provide reasonable assurance that the facility has been constructed and will operate in conformity with the combined license, the provisions of the Atomic Energy Act, and the Commission's rules and regulations.

**(U)** During the licensing audit conducted May 10-13, 2010 (Audit summary is documented in ML10168030), the staff noted that the planned internal response (e.g., initial response and plans for re-deployment) and design of engineered delays and barriers within the nuclear island was reasonably well planned and described based on locations of target sets for core damage of the US-APWR standard design and the postulated pathways and scenarios analyzed. However, the staff identified the following issues: (a) the defense-in-depth of response (internal and/or external) did not consider or address uncertainties outside of the postulated pathways and scenarios analyzed. The analyses did not consider pathways and scenarios that include explosive breaching of structural walls or other penetrations and ascending/descending available internal or external horizontal or vertical pathways (e.g., walls, ventilation ducts, utility/maintenance tunnels, and elevator shafts) that are other than normal access pathways. Also, the analyses did not reasonably bound all credible scenarios within the DBT adversarial characteristics and capabilities; (b) the defense-in-depth or layered protection for the reliability and availability for security responders to interdict to deny access at the nuclear island and structures has not been fully analyzed and/or documented for all credible pathways and scenarios; (c) the descriptions of engineered systems required and credited for detection, assessments, and proposed defensive positions (or BRE/BBRE) to enable and provide opportunities for protected security responders with overlapping fields of fire for reliability and availability of interdictions at the boundaries of the nuclear island and structures are not documented for a layered protection; and (d) the plans for deploying armed security officers, along with required engineered physical protection system to interdict adversaries, has not adequately described its reliability and availability in the information currently on the docket. The current information provided on the docket does not support the applicant's conclusions that the representation of security posture described in the COLA adequately addressed defense-in-depth or provide a high assurance of adequate protection against the DBT for radiological sabotage.

**(U)** The staff also noted that the applicant applied NEI 05-05 guidance for force-on-force exercise as licensing assumptions for the capabilities of security responders to acquire and neutralize moving target under naturally occurring or adversaries initiated

environmental conditions, for the maximum distance indicated in Appendix A of MHI UAP-SGI-08002. The assumptions require a high standard for initial training and qualification and continued training by security responders to maintain proficiency with weapons to perform in accordance assumptions of NEI 05-05, and must address and these uncertainties in the defense-in-depth evaluation.

13.06.01-56

**(U)** Part 2, FSAR Chapter 1.0, Section 1.9(1) Conformance with Regulatory Guide (Page 1.9-3): Identify Division 5 regulatory guidance that will be applied to meet regulatory requirements of 10 CFR 73 in Table 1.9 (e.g., RG 5.7, 5.44, 5.66, 5.69, 5.75, 5.76, etc.).

**(U)**Regulatory Basis: Subpart C of Title 10 CFR Part 52, § 52.79(a)(35)(i), (ii), and (iv) requires that the COL applicant submit information in the COL application that discusses how the COL applicant will meet the requirements of 10 CFR 73 and describes the implementation of the physical security plan and safeguards contingency plan. Title 10 CFR 73.55(b)(3)(i) requires applicant to ensure that the capabilities to detect, assess, interdict, and neutralize the DBT are maintained at all times. Regulatory guide (RG) 1.206 provides guidance on the format and content for COL applications, whose conformance, provides an acceptable method for meeting requirements of content of application. RG 5.69 provides detail descriptions for adversarial characteristics for the DBT that the applicant must protect with high assurance to meet performance requirements of 10 CFR 73.55(b). Other Division 5 regulatory guides, as referenced by the applicant, provides methods in whole or parts to meet requirements of 10 CFR 73, and are identified in security specific sections of the COL (Part 2 and Part 8). For completeness and accuracy, appropriate Division 5 regulatory guides should be identified in Section 1.9, along with other regulatory guides. RG 1.206 provides a method for meeting requirements for 10 CFR 52.77, "Content of applications; general information."