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Ref. # 10 CFR 52

February 27, 2012

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555
ATTN: David B. Matthews, Director
Division of New Reactor Licensing

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4
DOCKET NUMBERS 52-034 AND 52-035
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 6124 (SECTION 9.4.5), 6159 (SECTION 3.11), 6222 (SECTION 3.9.6), AND 6265 (SECTION 14.3.7)

Dear Sir:

Luminant Generation Company LLC (Luminant) submits herein the response to Requests for Additional Information (RAIs) No. 6124 (CP RAI #243), 6159 (CP RAI #239), 6222 (CP RAI #244), and 6265 (CP RAI #245) for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. The RAIs address the ultimate heat sink ventilation system, the environmental qualification program, and inservice testing.

The response to Question 03.09.06-22 in RAI No. 6222 is not included in this submittal because it is dependent on the response to US-APWR Design Control Document RAI 801-5897, which is still pending. Luminant expects to submit the response to Question 03.09.06-22 by March 30, 2012.

Should you have any questions regarding these responses, please contact Don Woodlan (254-897-6887, Donald.Woodlan@luminant.com) or me.

There are no commitments in this letter.

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

Executed on February 27, 2012.

Sincerely,

Luminant Generation Company LLC

Donald R. Woodlan for

Rafael Flores

D090

Attachments: 1. Response to Request for Additional Information No. 6124 (CP RAI #243)
2. Response to Request for Additional Information No. 6159 (CP RAI #239)
3. Response to Request for Additional Information No. 6222 (CP RAI #244)
4. Response to Request for Additional Information No. 6265 (CP RAI #245)

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Attachment 1

Response to Request for Additional Information No. 6124 (CP RAI #243)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6124 (CP RAI #243)

SRP SECTION: 09.04.05 - Engineered Safety Feature Ventilation System

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

DATE OF RAI ISSUE: 12/14/2011

QUESTION NO.: 09.04.05-19

This is a follow-up RAI to RAI Letter No. 123 (3232), Question No. 09.04.05-12 and RAI Letter No. 213 (5585),Question No. 09.04.05-14.

The applicant's response to Part (1) of RAI No. 5585, Question No. 09.04.05-14 resulted in FSAR subsection 9.4.5.4.6 documenting the requisite factory testing of the dampers.

In response to part (2), the applicant amended ITAAC Table A.2-2, "UHS ESW Pump House Ventilation System Equipment Characteristics" with a note that indicates that the backdraft dampers are passive components that have the safety function to open in the direction of airflow and to close by counterbalance when no air flow is present. The staff found both of these FSAR changes acceptable and verified that Revision 2 of the FSAR included both changes. However, the applicant did not amend ITAAC Table A.2-1, "UHS ESW Pump House Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria" to include verification of this safety function as requested by the staff in Question No. 09.04.05-14. That is, the staff believes that demonstrating the operational capability of the installed safety related backdraft dampers to open fully upon exhaust fan induced flow and to fully close after exhaust fan shut down is essential to maintaining the ESW Pump House room within design basis limits. More specifically, this damper operational capability is as fundamental to system operability as are the exhaust fans and the unit heaters whose active safety functions are verified in ITAAC Item 5.b of Table A.2-1.

As such, the staff requests that the applicant add a line Item to Table A.2-1 demonstrate the operational capability of the installed safety related backdraft dampers.

ANSWER:

A new ITAAC item 5.c has been added to COLA Part 10 Table A.2-1 to demonstrate the operational capability of the installed safety-related backdraft dampers and FSAR Subsection 14.2.12.1.114 has been revised to address the test method and acceptance criteria.

Impact on R-COLA

See attached marked-up FSAR Revision 2 page 14.2-7 and COLA Part 10 Revision 2 pages 23, 25, 27 and 28. Pages 27 and 28 were also revised to correctly identify the damper tag numbers.

Impact on S-COLA

This response is considered standard.

Impact on DCD

None.

3. Test instrumentation is available and calibrated.

4. Required support systems are available.

C. Test Method

1. Simulate interlock signals for each exhaust fan and unit heater and verify operation and annunciation.

2. Verify that alarms and status indications are functional.

3. Verify design airflow.

4. Verify position of the backdraft dampers with the ventilation system operating and not operating. RCOL2_09.04.05-19

D. Acceptance Criteria

1. UHS ESW pump house ventilation system operates on the proper signal (see Subsection 9.4.5).

2. All alarms annunciate properly.

3. The backdraft dampers are closed with no airflow and open with airflow under normal and emergency conditions. RCOL2_09.04.05-19

14.2.13 Combined License Information

Replace the content of DCD Subsection 14.2.13 with the following.

14.2(1) *Deleted from the DCD.*

CP COL 14.2(2) ***14.2(2)*** *Organization and staffing*

This COL item is addressed in Subsection 14.2.2.

14.2(3) *Deleted from the DCD.*

14.2(4) *Deleted from the DCD.*

14.2(5) *Deleted from the DCD.*

14.2(6) *Deleted from the DCD.*

CP COL 14.2(7) ***14.2(7)*** *Initial test program schedule and cross-reference of test abstracts with*
STD COL 14.2(7) *ITAAC*

5.c The UHS ESW pump house ventilation system backdraft dampers identified in Table A.2-2 as having a safety function perform a safety function to change position as indicated in the table.

RCOL2_09.04.05-19

6. Displays of the parameters identified in Table A.2-3 are provided in the MCR.

7. Displays and controls identified in Table A.2-3 are provided in the RSC.

A.2.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table A.2-1 specifies the ITAAC for the UHS ESW pump house ventilation system.

Appendix A.2

Table A.2-1 (Sheet 2 of 3)
UHS ESW Pump House Ventilation System
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria	
3.b. Separation is provided between redundant divisions of UHS ESW pump house ventilation system Class 1E cables, and between Class 1E cables and non-Class 1E cable.	3.b Inspections of the as-built Class 1E divisional cables will be performed.	3.b Physical separation or electrical isolation is provided in accordance with RG 1.75 between the redundant divisions of the as-built UHS ESW pump house ventilation system Class 1E cables and between Class 1E cables and non-Class 1E cables.	
4. The UHS ESW pump house ventilation system provides ~~ventilation air~~ heated air via unit heaters and cooled air via exhaust fansto maintain area temperature within design limits in the UHS ESW pump houses during all plant operating conditions including normal plant operations, abnormal and accident conditions of the plant.	4. Tests and analyses of the as-built UHS ESW pump house ventilation system will be performed for all four divisions.	4. A report exists and concludes that the as-built UHS ESW pump house ventilation system is capable of providing ~~ventilation air~~heated air via unit heaters and cooled air via exhaust fans to maintain area temperature within design limits in the UHS ESW pump houses during all plant operating conditions including normal plant operations, abnormal and accident conditions of the plant with outside ambient design temperature condition (i.e. -5°F - 115 °F).	RCOL2_09 .04.05-24
5.a. Controls are provided in the MCR to start and stop the UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-3.	5.a. Tests will be performed on the as-built exhaust fans and unit heaters identified in Table A.2-3 using controls in the as-built MCR.	5.a Controls exist in the as-built MCR to start and stop the as-built UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-3.	
5.b. The UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-2 as having PSMS control, perform as active safety function after receiving a signal from PSMS.	5.b. Tests will be performed on the as-built UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-2 as having PSMS using simulated signals.	5.b. The as-built UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-2 as having PSMS control, perform an active safety function identified in the table after receiving a simulated signal.	
5.c. The UHS ESW pump house ventilation system backdraft dampers identified in Table A.2-2 as having a safety function perform a safety function to change position as indicated in the table.	5.c. Tests of the as-built UHS ESW pump house ventilation system backdraft dampers identified in Table A.2-2 as having a safety function will be performed.	5.c. Each as-built UHS ESW pump house ventilation system backdraft damper identified in Table A.2-2 as having a safety function changes position as indicated in the table under design conditions.	RCOL2_09 .04.05-19
6. Displays of the parameters identified in Table A.2-3 are provided in the MCR.	6. Inspections will be performed for retrievability of displays identified in Table A.2-3 in the as-built MCR.	6. Displays identified in Table A.2-3 can be retrieved in the as-built MCR.	

Table A.2-2 (Sheet 1 of 2)
UHS ESW Pump House Ventilation System Equipment Characteristics

Equipment Name	Tag No.	ASME Code Section III Class	Seismic Category I	Remotely Operated Damper	Class 1E/ Qual. For Harsh Envir.	PSMS Control	Active Safety Function	Loss of Motive Power Position
ESW Pump Room Exhaust Fan	VRS-MFN-601A,B,C,D	-	Yes	-	Yes/No	High Temperature	Start	-
UHS Transfer Pump Room Exhaust Fan	VRS-MFN-602A,B,C,D	-	Yes	-	Yes/No	High Temperature	Start	-
ESW Pump Room Unit Heater	VRS-MEH-601A,B,C,D, VRS-MEH-602A,B,C,D	-	Yes	-	Yes/No	Low Temperature	Start	-
UHS Transfer Pump Room Unit Heater	VRS-MEH-603A,B,C,D	-	Yes	-	Yes/No	Low Temperature	Start	-
ESW Pump Room Temperature switch	VRS-TS-803,804,805,806 VRS-TS-823,824,825,826 VRS-TS-843,844,845,846 VRS-TS-863,864,865,866	-	Yes	-	Yes/No	-	-	-
UHS Transfer Pump Room Temperature switch	VRS-TS-812,813,814,815 VRS-TS-832,833,834,835 VRS-TS-852,853,854,855 VRS-TS-872,873,874,875	-	Yes	-	Yes/No	-	-	-
ESW Pump Room Air Intake Gravity Type Backdraft Damper	VRS-~~BDD~~OTD-601 A,B,C,D	-	Yes	-	No/No	-	(1)	-
ESW Pump Room Air Discharge Gravity Type Backdraft Damper	VRS-~~BDD~~OTD-602 A,B,C,D	-	Yes	-	No/No	-	(1)	-

RCOL2_09.04.05-19

RCOL2_09.04.05-19

Appendix A.2

Table A.2-2 (Sheet 2 of 2)
UHS ESW Pump House Ventilation System Equipment Characteristics

Equipment Name	Tag No.	ASME Code Section III Class	Seismic Category I	Remotely Operated Damper	Class 1E/ Qual. For Harsh Envir.	PSMS Control	Active Safety Function	Loss of Motive Power Position	
UHS Transfer Pump Room Air Intake Gravity Type Backdraft Damper	VRS-~~BDD~~OTD-603 A,B,C,D	-	Yes	-	No/No	-	(1)	-	RCOL2_09 .04.05-19
UHS Transfer Pump Air Discharge Gravity Type Backdraft Dampers	VRS-~~BDD~~OTD-604 A,B,C,D	-	Yes	-	No/No	-	(1)	-	RCOL2_09 .04.05-19

(1) The backdraft dampers ~~are passive components that~~ have the safety functions to open in the direction of airflow and close by counterbalance when no air flow is present. RCOL2_09 .04.05-19

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6124 (CP RAI #243)

SRP SECTION: 09.04.05 - Engineered Safety Feature Ventilation System

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

DATE OF RAI ISSUE: 12/14/2011

QUESTION NO.: 09.04.05-20

RCOLA Revision 2 FSAR subsection 9.4.5 (page 9.4-2), states: "Delete the third paragraph and insert the following text to the end of the list of ESF ventilation systems in first paragraph of DCD Subsection 9.4.5.

• UHS ESW Pump House Ventilation System"

The staff notes that the US-APWR DCD third paragraph reads "*The ESF ventilation system complies with 10 CFR 50, Appendix A, GDC 2,4, and 60.*" The staff believes the last paragraph of 9.4.5 which reads "*The COL Applicant is to provide a system information and flow diagram of ESW pump area ventilation system if the ESW pump area requires the ventilation system.*" is the correct paragraph to be deleted.

The staff requests that the applicant provide additional information and amend the RCOLA FSAR, as necessary.

ANSWER:

FSAR Subsection 9.4.5 has been revised to reference the correct paragraph of DCD Subsection 9.4.5.

Impact on R-COLA

See attached marked-up FSAR Revision 2 page 9.4-2

Impact on S-COLA

None; this response is site-specific.

Impact on DCD

None.

Replace the second sentence of the second paragraph in DCD Subsection 9.4.3.2.2 with the following.

Each air handling unit consists of, in the direction of airflow, a low efficiency prefilter, a high efficiency filter, a chilled water cooling coil, a supply fan, and associated controls.

9.4.3.2.3 Main Steam/Feedwater Piping Area HVAC System

STD COL 9.4(4) Replace the second sentence of the first paragraph in DCD Subsection 9.4.3.2.3 with the following.

The capacity of cooling and heating coils that are affected by site specific conditions is shown in Table 9.4-201.

9.4.3.2.4 Technical Support Center HVAC System

STD COL 9.4(4) Replace the second sentence of the first paragraph in DCD Subsection 9.4.3.2.4 with the following.

The capacity of cooling and heating coils that are affected by site specific conditions is shown in Table 9.4-201.

9.4.5 Engineered Safety Feature Ventilation System

CP COL 9.4(6) Delete the ~~third~~last paragraph and insert the following text to the end of the list of ESF ventilation systems in first paragraph of DCD Subsection 9.4.5. | RCOL2_09.04.05-20

- UHS ESW Pump House Ventilation System

CP COL 9.4(6) Add the following new subsection after DCD Subsection 9.4.5.1.1.5.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6124 (CP RAI #243)

SRP SECTION: 09.04.05 - Engineered Safety Feature Ventilation System

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

DATE OF RAI ISSUE: 12/14/2011

QUESTION NO.: 09.04.05-21

The staff notes that Revision 2 FSAR Figure 9.4-203 "UHS ESW Pump House Ventilation Systems Flow Diagram" has a "STD COL 9.2(6)" identifier. In Revision 1 of the RCOLA FSAR, Figure 9.4-201 (changed to Figure 9.4-203 in Revision 2) was tagged with a "CP COL 9.4(6)" identifier. The staff believes this is a typographical error that warrants correction as it is doubtful that "STD COL 9.2(6)" could apply to this drawing.

The staff believes that "STD COL 9.4(6)" is the appropriate tag for FSAR Figure 9.4-203. The staff requests the applicant provide a response about this issue and requests that the RCOL applicant amend the FSAR as necessary.

ANSWER:

FSAR Revision 2 Figures 9.4-201 and 9.4-202 were deleted in FSAR Revision 2 Update Tracking Report Revision 0 submitted on December 20, 2011 (ML12012A101 and ML12012A140), and Figure 9.4-203 was renumbered as Figure 9.4-201. The left margin notation on FSAR Revision 2 Figure 9.4-201, "UHS ESW Pump House Ventilation Systems Flow Diagram," has been corrected to read "STD COL 9.4(6)."

Impact on R-COLA

See attached marked-up FSAR Revision 2 page 9.4-20.

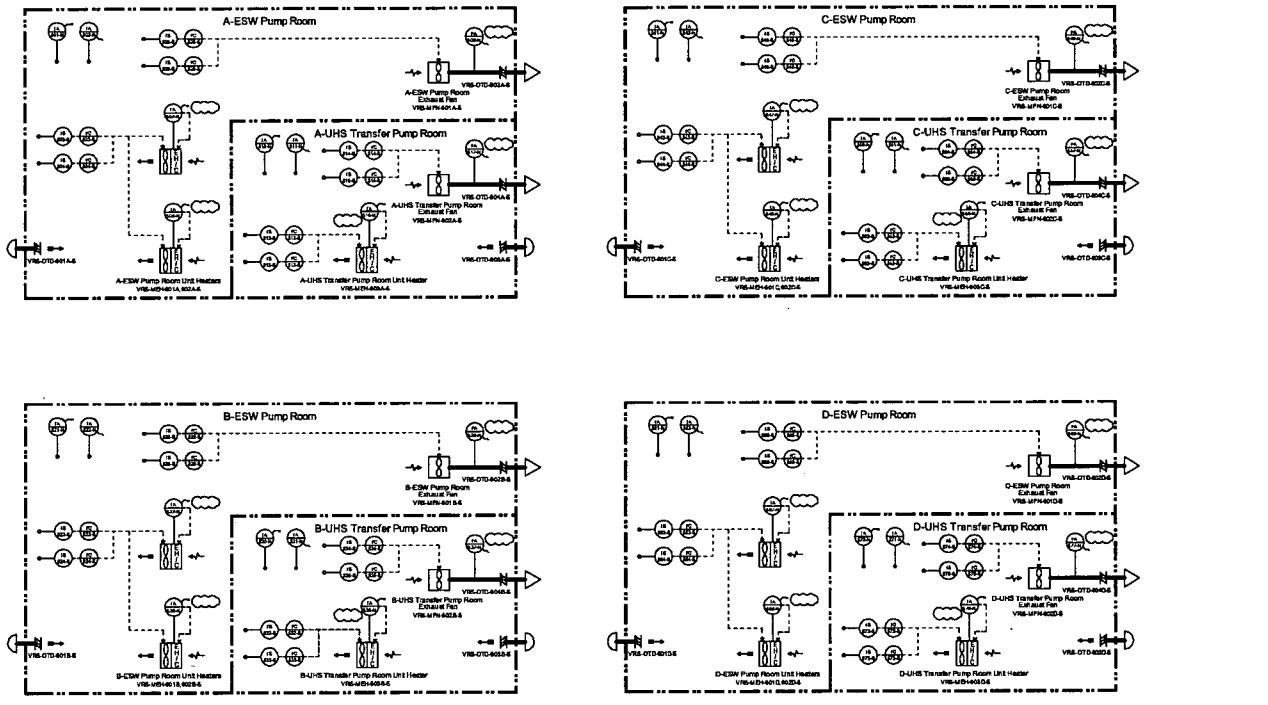
Impact on S-COLA

None; this response is site-specific.

Impact on DCD

None.

RCOL2_14.0
3.07-34
RCOL2_09.0
4.05-22
RCOL2_09.0
4.05-25



NOTE
1. ALL SAFETY-RELATED FANS, DAMPERS, HEATERS AND INSTRUMENTATION IN THIS SHEET ARE DESIGNATED IN ACCORDANCE WITH SEISMIC CATEGORY I.
2. BACKDRAFT DAMPERS ARE MOUNTED IN THE WALL OPENING.
3. THERE IS NO DUCTWORK IN THE VENTILATION SYSTEMS.
4. EXHAUST FANS ARE WALL-MOUNTED.
5. THE NON-SAFETY RELATED INSTRUMENTATION IS SEISMIC CATEGORY II.

REMARK
PLANT DESIGNATION OF EQUIPMENT AND VALVE NUMBERS ARE OMITTED IN THIS DRAWING.

STD COL 9.24(6)

Figure 9.4-2031 UHS ESW Pump House Ventilation Systems Flow Diagram

CTS-01380
RCOL2_09.0
4.05-21

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6124 (CP RAI #243)

SRP SECTION: 09.04.05 - Engineered Safety Feature Ventilation System

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

DATE OF RAI ISSUE: 12/14/2011

QUESTION NO.: 09.04.05-22

This is a follow-up RAI to RAI 3232, Question No. 09.04.05-3. The applicant responded:

"All ventilation system equipment and components are classified as equipment class 3, seismic category I. There is no seismic classification break needed. A note has been added to FSAR Figure 9.4-201 stating that all UHS ESW Pump House Ventilation System equipment and components (fans, heaters, dampers) are seismic category I."

The staff notes that Note 1 of FSAR Figure 9.4-203 (i.e. changed to 9.4-203 with Revision 2 of FSAR from 9.4-201) does not address the seismic category of instrumentation (e.g. flow switches, temperature switches) attached to the unit heaters and exhaust fans. Nor does the Note address the seismic classification of the detached temperature switches and temperature controllers contained within the pump rooms. The staff notes that FSAR Table 3.2-201 also fails to address the seismic classification of the UHS ESW Pump House Ventilation System's instrumentation. The staff also notes that Revision 2 FSAR Figure 9.4-203 "dropped" the display of the MCR alarms discussed in FSAR subsection 9.4.5.5.6. These high and low area temperature alarms were previously displayed in Figure 9.4-201 (Revision 1 of RCOLA)

The staff requests the applicant provide additional information about these issues and amend FSAR Figure 9.4-203 and FSAR Table 3.2-201 to remove these technical deficiencies from the FSAR.

ANSWER:

The response to Question 09.04.05-3 is correct. The fans, heaters, and dampers are all safety-related components and are Seismic Category I. The ventilation system has safety-related and non-safety related instruments associated with the HVAC system components. The safety-related instrumentation is Seismic Category I and the non-safety related instrumentation is Seismic Category II.

Figure 9.4-201, "UHS ESW Pump House Ventilation Systems Flow Diagram," has been revised to designate safety-related and non-safety related instrumentation as shown in the figures in DCD

Section 1.7. Note 1 and Note 5 of Figure 9.4-201 show that safety-related components and instruments are Seismic Category I and non-safety related instruments are Seismic Category II.

FSAR Table 3.2-201 provides a list of mechanical and fluid systems, components, and equipment and their designated seismic category along with the equipment class, and design codes and standards as stated in DCD Subsection 3.2.1.2. In addition, the quantity and types of process instrumentation provided assure the safe and orderly operation of all systems over the full design range of the plant and these systems are described in their respective sections of Chapters 6, 7, 8, 9, 10, 11, and 12, as described in DCD Subsection 3.1.2.4.1. The FSAR incorporates this subsection of the DCD by reference. As such, the instrumentation associated with safety-related systems, components, and equipment is not within the scope of FSAR Table 3.2-201 and is generally not listed therein.

Impact on R-COLA

See attached marked-up FSAR Revision 2 page 9.4-20.

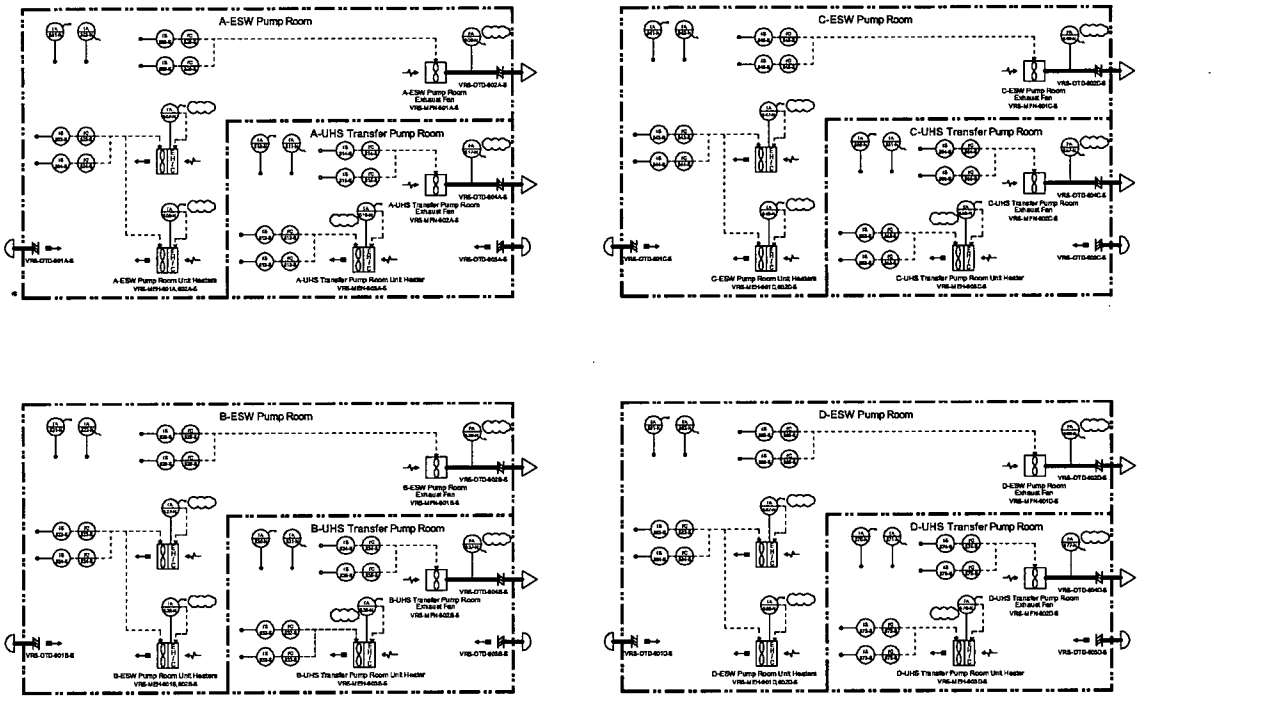
Impact on S-COLA

This response is standard.

Impact on DCD

None.

RCOL2_14.0
3.07-34
RCOL2_09.0
4.05-22
RCOL2_09.0
4.05-25



STD COL 9.24(6)

Figure 9.4-2031 UHS ESW Pump House Ventilation Systems Flow Diagram

CTS-01380
RCOL2_09.0
4.05-21

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6124 (CP RAI #243)

SRP SECTION: 09.04.05 - Engineered Safety Feature Ventilation System

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

DATE OF RAI ISSUE: 12/14/2011

QUESTION NO.: 09.04.05-23

This is a follow-up RAI to RAI Letter Number 123 (3232), Question No. 09.04.05-5 and RAI No. 5585, Question No. 09.04.05-17.

In the response to Question 09.04.05-5 the applicant wrote "*The access door is set at a sill height of 6" and is required to be structurally designed for the static head of flood waters that may accumulate above the sill height before being drained away by the floor drains.*" The applicant committed to describe the flooding event evaluation in a new FSAR Subsection 3.4.1.5.3 and to show the details of the floor drain and sill design in FSAR Figure 3.8-209 or related FSAR Section 3.8 figures in a future FSAR Update Tracking Report.

In the response to Question 09.04.05-17, the applicant indicated that "CPNPP Units 3 and 4 had been evaluated for internal flood protection for site-specific structures. The evaluation concluded that postulated internal flooding due to events including MELB and fire suppression activities cannot adversely affect safe plant operations or the ability of the plant to achieve and maintain a safe shutdown condition. Floor drains are provided in the ESW pump rooms and UHS transfer pump rooms to allow internal flood waters to drain to the basin below. The applicant committed to amend FSAR 3.4.1.3, subsection 9.4.5.3.6, Figure 3.8-208 and Figure 3.8-209 with the relevant facts from the evaluation. The staff has verified that Revision 2 of the COLA FSAR contains these changes.

In the latter response, the staff notes that there was neither a discussion of the structural design of the access door nor of the door sill height between the ESW pump room and the UHS transfer pump room. Nor was there a discussion in the response, of the internal flood protection evaluation findings with respect to the required floor drain sizing and the maximum internal flood water height, that prevent these other design details from being a factor in the evaluation's conclusions. The staff believes that the minimum floor drain sizing to prevent cross divisional flooding should be captured in FSAR 3.4.1.3, subsection 9.4.5.3.6, Figure 3.8-208 and Figure 3.8-209.

As such, the staff requests to review the applicant's technical evaluation of the internal flood analysis. The applicant's evaluation can be made available to the staff either: through a formal audit, the electronic reading room, or by submittal to the staff as a Technical Report.

ANSWER:

A study was conducted to evaluate the potential for internal flooding in site-specific structures. The study concluded that although significant means are provided in the ESW pump houses to avoid equipment failure and loss of system functionality, complete flooding of any one ESW train does not affect the safety function of the ESW system. The ESW system is comprised of four independent trains and only two are required for safe operation and shut-down of the plant. This allows one train to be temporarily out of service for maintenance and potentially one train lost due to internal flooding, and still ensure the safety capability of the system.

Although loss of one ESW train does not compromise the safety function of the system, internal flooding protection is provided to preclude equipment loss and maintain maximum operability of the plant, in alignment with the defense in depth approach. The internal flooding study also concludes that water-tight doors are not required and will not be used in any site-specific structures. Further, door sill heights will be nominal and are not required for flood protection or inter-divisional flood containment. This position supersedes all previous correspondence which required door sill heights.

The current design will use a floor drainage system in the ESW pump rooms and the UHS transfer pump rooms with sufficient capacity to allow potential internal flood water to quickly drain to the basins below. While the detailed design for the UHSRS is not complete, an evaluation in accordance with DCD Subsection 3.6.2.1.3.3 leakage crack criteria has determined that the maximum expected flooding rate is on the order of 1800 gpm in the ESW pump room. The study determined that the drainage volume will be sufficient to allow no standing water above the minimum equipment elevation height of 1 foot in the ESW pump room and the adjoining UHS transfer pump room. With the required drainage system in place, door sills are not necessary, as all potential flood water will drain to the basins regardless of the source from which the flood water originates (MELB or fire suppression activities).

Attachment

Comanche Peak Units 3 and 4 Internal Flooding Study for Site-Specific Structures, Revision 0

Impact on R-COLA

None.

Impact on S-COLA

This response is considered standard.

Impact on DCD

None.

URS

510 Carnegie Center
Princeton, NJ 08540

MHI USAPWR
COMANCHE PEAK UNITS 3 and 4

INTERNAL FLOODING STUDY

FOR

SITE-SPECIFIC STRUCTURES

FOR

Luminant

NUCLEAR SAFETY RELATED

PREPARER (N.B. DeNude)		Date 2/17/11
REVIEWER (L. Liberatore)		Date 2/17/11
REVIEWER (D. Fong)	D Fong	Date 2/17/11
REVIEWER (J. Yuen)	John Yuen	Date 02/17/11
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APPROVED BY (G. Stark)		Date 2/17/11

Study No. 29427-FLD-29-05-100-001
P.O. No. MNP-0019 Rev. o (WP 78)
REVISION 0

TABLE OF CONTENTS

ACRONYMS

DCD	Design Control Document
ESW	Essential Service Water
ESWPT	Essential Service Water Pipe Tunnel
ESWS	Essential Service Water System
GTG	Gas Turbine Generator
HVAC	Heating, Ventilation and Air Conditioning
LOOP	Loss of Offsite Power
MELB	Moderate Energy Line Break
PS/B	Power Source Building
PSFSV	Power Source Fuel Storage Vault
SSC	Systems, Structures and Components
UHS	Ultimate Heat Sink
UHSRS	Ultimate Heat Sink Related Structure

1.0 Purpose

MHI US-APWR Design Control Document (DCD) (Reference 1) Subsection 3.4.1.3 "Flood Protection from Internal Sources" describes accommodations made for flooding from internal water sources. These sources include the following:

- Earthquakes
- Pipe breaks and cracks
- Fire fighting operations
- Pump mechanical seal failures

Internal flooding that can result from any initiating event described above shall not cause the loss of any required function that is necessary to ensure:

(1) Safe plant shutdown
(2) Core cooling capability consistent with the minimum requirements of Appendix A of 10CFR50
(3) The capability to maintain off-site radiological consequences below the guideline exposures of 10CFR100
(4) Habitability of the Control Room
(5) Access to areas requiring local actuation of equipment required to achieve or maintain the conditions set fourth in the preceding items (1), (2), (3) and (4).

DCD Subsection 3.4.1.5 "Evaluation of Internal Flooding" states that the following steps outline the internal flood evaluation process:

(1) Identification of components required to maintain functionality during a flood event.
(2) Identification of flood sources and flow paths relative to the identified components.
(3) Risk assessment for components affected by a flood event.
(4) Failure mode and effects analysis for components affected by a flood event.
(5) Determination of appropriate actions to preclude impact to component safety functions.

DCD Subsections 3.4.1.3 and 3.4.1.5, and Appendix 3K "Components Protected from Internal Flooding" specifically address internal flooding as it relates to standard plant structures, systems and components (SSCs).

The purpose of this Study Report is to evaluate internal flooding hazards in site-specific structures in accordance with the guidelines established in the DCD as noted above.

2.0 Scope

The scope of this study covers site-specific SSCs that provide safety-related functions or whose postulated failure due to internal flooding could adversely affect the ability of the plant to achieve and maintain a safe shutdown condition. The SSCs of concern are associated with the following three (3) site-specific structures:

- Ultimate Heat Sink Related Structure (UHSRS)
- Essential Service Water Pipe Tunnel (ESWPT)
- Power Source Fuel Storage Vault (PSFSV)

All other site-specific structures (e.g., warehouses, maintenance shops, training facilities, storage areas including any on-site radwaste storage facilities, administrative offices, security and communication facilities) are non safety-related. By design, their postulated failure due to internal flooding or other postulated events cannot adversely affect safety-related SSCs or required functions.

Descriptions of the three (3) site-specific structures follow:

2.1 UHSRS

The UHSRS serves the Ultimate Heat Sink (UHS). The UHSRS is a Seismic Category I structure, which consists of a cooling tower enclosure, UHS ESW pump house and UHS basin. There are four (4) UHSRSs for each CP Unit, each of which is separated from the other by a minimum 4 inch expansion joint. Each UHSRS houses a separate and independent safety-related Essential Service Water System (ESWS) cooling train consisting of an Essential Service Water (ESW) pump, associated valves and piping, a UHS cooling water basin, a mechanical draft cooling tower, with heating and ventilation provisions. Each UHSRS also houses a transfer pump and associated valves and piping, the transfer system is located in a separate room with 3-hour fire rated barriers within the ESW pump house. The ESW and transfer systems utilize Equipment Class 3, Seismic Category I vertical, centrifugal pumps which take suction from the basins. These basins serve as the storage volume for the system's water inventory. See CPNPP FSAR Figures 3.8-201 and 3.8-206 through 211 for additional details (Reference 2).

The UHS transfer pumps and the ESW pumps that utilize each of the basins are powered by different Class 1E buses (e.g., for basin A, the ESW pump is powered from bus A, and the UHS transfer pump is powered from bus C or D, depending on manual breaker alignment). The exhaust fan for the ESW pump room is powered by the same Class 1E power source serving the ESW pump motor and the exhaust fan for the transfer pump room is powered by the same Class 1E power source serving the transfer pump motor. The ventilation systems and components that serve the UHS ESWS are classified as safety-related, Equipment Class 3, Seismic Category I. They are capable of performing their safety function under design basis accident conditions, including loss of coolant accident (LOCA), coincident with a loss of offsite power (LOOP).

The ESW pump discharge and return piping utilize the ESWPT (See Subsection 2.2 below). The transfer pump discharge design includes two (2) redundant, Equipment Class 3, Seismic Category I headers, which provide for the transfer of water between the 4 basins as necessary. The ESW suction and discharge headers are routed through the UHSRS to the ESWPT. The transfer pipes are routed through the UHSRS to the ESWPT. The transfer piping is provided with motor operated valves. The design precludes loss via backflow as well as water loss due to siphon effects following a postulated pipe failure. This design also maintains the capability of transferring water from one basin to any other basin in the event of loss of one header due to a postulated pipe failure. This also assures that the individual basin inventories will not be adversely affected, and prevents the non-operating basins from freezing in cold ambient conditions.

The UHSRS is also served by the Fire Protection System. The fire protection main that supplies the wet-pipe sprinkler system, standpipes, hydrants and hose stations is located outside the UHSRS. Each of the four (4) UHSRS areas is served by a separate pipe that supplies the fire suppression systems inside each area. Only the ESW Pump House is provided with fire protection water. The design of the fire protection system piping assures that fire suppression actions or a postulated pipe failure inside a specific area of the UHSRS cannot communicate with or adversely affect adjacent areas of the UHSRS. Each ESW Pump House contains floor drains in the ESW pump room and transfer pump room to prevent flooding within the pump house from fire protection water or the postulated ESW pipe failure (MELB), thereby preventing adverse affects on equipment in these areas.

2.2 ESWPT

The ESWPT is an underground reinforced concrete structure and is designated as a Seismic Category I structure. The ESWPT houses ESW and transfer piping and serves as the conduit between the UHSRS and the nuclear island. The ESWPT also includes provisions to be used for routing the electrical power and the instrumentation and control cables, trays and conduits used by the UHSRS. The tunnels are constructed with reinforced concrete walls, floor and ceiling which provide a 3-hour fire rated barrier. The arrangement will also satisfy electrical and fire protection separation design criteria. Penetrations and openings are sealed as necessary to ensure that adjacent areas are protected from postulated flooding conditions inside the ESWPT.

The ESWPT consists of 4 separate and independent tunnels. Each tunnel has internal dimensions of 10'-0" wide and 14'-8" high. The tunnels run from the UHSRS to the nuclear island, and they are designed to provide divisional separation, ensuring no communication between divisions. Each of the 4 tunnels contains a 24" diameter ESWS supply header and a 24" diameter ESWS return header. Divisional separation assures that internal flooding events cannot adversely affect site-specific SSCs from performing required safety-related functions following a postulated internal flooding event in accordance with the single failure criterion. See CPNPP FSAR Figures 3.8-201 through 206, 3.8-209, 3.8-211, and 3.8-213 for additional details (Reference 2).

2.3 PSFSV

The PSFSV houses the large fuel oil storage tanks which supply the on-site nuclear safety-related AC power system's gas turbine generators (GTGs), and the non safety-related Alternate AC power system's GTG in the adjacent Power Source Building (PS/B). The PSFSV is divided into three (3) separate and independent areas. Each of these areas contains a Fuel Storage Tank, two (2) transfer pumps, associated piping and power and instrumentation cables. Fire Protection piping is part of a dry pipe sprinkler system and is the only source of water in the compartments.

Each tank has a capacity of 119,000 gallons of fuel, and is 20 feet in diameter. Each of the six (6) GTG fuel oil tanks serving Units 3 and 4 are located in separate, reinforced concrete Seismic Category I, and missile protected underground compartments. The top of floor elevation of these pit areas are 21.25 feet below the floor elevation of the access tunnel and designed to contain spills up to and including the entire inventory of the tank.

The PSFSV includes liquid and vapor detection and a water fire suppression system. The Fire Protection piping inside the vaults utilizes a dry pipe system, which normally contains no water. See CPNPP FSAR Figures 3.8-212 through 214 for additional details. (Reference 2).

3.0 Design Inputs Subject to Verification

The following design assumptions were considered in this internal flooding Study Report. These assumptions must be confirmed to be correct and reflected in the final design to assure that the conclusions presented in this report remain valid.

1. The internal flooding hazards addressed in DCD Section 3.4 for the areas within US-APWR structures are unaffected by the final design of site-specific SSCs.
2. The ESWPT design will include sumps with remote level indication/alarm capability in the Main Control Room, as necessary.
3. The PSFSV and UHSRS design will satisfy applicable fire protection requirements, which include vapor and liquid detection in accordance with NFPA 30.
4. The PSFSV design will include sumps with remote level indication/alarm capability in the Main Control Room, as necessary. The design will assure that flooding of adjacent areas via the sumps and drainage systems cannot occur.
5. The UHSRS pump house floor will drain directly to the UHSRS respective basin. Adequate drainage capability will be provided to ensure no water is allowed to accumulate on the floor areas. This will be accomplished through the use of grating sections and floor grading of the UHSRS floor or alternative drainage methods. The details of drainage in the UHSRS will be addressed in the design.
6. Safety-related electrical and mechanical equipment, including cable and wiring within the ESWPT, PSFSV and UHSRS will be qualified for the appropriate environmental and service conditions, as necessary.
7. Class 1E electrical cable and wiring configurations in the UHSRS, the ESWPT and the PSFSV will be designed to comply with applicable electrical separation and fire protection criteria. The design will assure that the affected system will remain capable of performing required functions given the postulated failure(s).
8. The design of the ESWPT and other enclosed spaces serving the ESW and transfer piping will include sumps with level indication/alarm in the Main Control Room, as necessary.
9. The need for ventilation and heating inside the ESWPT, which is a confined space with limited access, will be addressed in the design.
10. The details of ventilation and heating design inside the PSFSV, which is a confined space, will be addressed in the design.
11. The need for lighting and electrical services provisions in the ESWPT and other enclosed spaces will be addressed in the design.
12. The need for freeze protection in the ESWPT and other enclosed spaces will be addressed in the design.
13. Fire Protection system design including detection and suppression features for inside the ESWPT, which is a confined space with limited access, will be addressed in the design.

4.0 Discussion

4.1 UHSRS

As described in Section 2.1, the UHSRS houses the ESW and transfer pumps. The ESW pumps are rated at 13,000 gpm with a design pressure and temperature of 150 psig and 140°F, respectively. The UHS transfer pumps are rated at 800 gpm, with a design pressure and temperature of 100 psig and 140°F, respectively.

DCD Section 3.6.1.1 "Design Basis" states:

> "Moderate-energy fluid systems are defined to be those systems or portion of systems that, during normal plant conditions are either in operation or maintained pressurized (above atmospheric pressure) under conditions where both of the following are met:
>
> a. Maximum operating temperature is 200°F or less.
> b. Maximum operating pressure is 275 psig or less."

The operating conditions of the ESW and Transfer Systems are significantly below the maximum operating design pressures and temperatures. Accordingly, these systems are designated as "moderate energy" and subject to Moderate Energy Line Break (MELB) criteria.

DCD Section 3.6.2.1.3.3 "Leakage Cracks" includes the following:

> "Leakage cracks are not postulated in 1-inch nominal diameter and smaller piping.
>
> Leakage cracks are postulated in those circumferential directions that result in the most severe environmental, spray wetting, and flooding consequences.
>
> Fluid flow from leakage cracks is based on a circular orifice with a cross-sectional area equal to that of a rectangle one-half the pipe inside diameter in length and one-half the pipe wall thickness in width. The flow from the crack opening is assumed to result in an environment that wets all unprotected components within the compartment, with consequent flooding in the compartment and communicating compartments based on conservatively estimated time period to effect corrective actions."

For this Study Report a postulated MELB in the 24-inch ESW pump discharge piping is the bounding pipe failure. [Note that the UHSRS is provided with a wet pipe sprinkler system as well as manual hose stations. DCD FSAR Section DCD 3.4.1.3 "Flood Protection from Internal Sources" states that in evaluating the flooding effects from fire fighting operations, water discharged from only fire hose stations is assumed. Fire fighting operations are conducted by plant personnel and the Control Room operators are aware of the fire, its severity and the effectiveness of fire fighting operations. In addition, the equipment affected by the fire and the fire fighting operations would be inoperable. While the actual volume of water discharged during a fire fighting event

might exceed that experienced during a postulated MELB, the MELB is considered to be the bounding failure.] Refer to R-COLA Section 3.6.1.3, "Postulated Failures Associated with Site-Specific Piping" for additional information.

Seal failures are not considered consistent with the criteria established in DCD FSAR Section 3.4.1.3.

DCD Paragraph 3.6.1.1.H states:

> "Where the postulated piping failure is assumed to occur in one of two or more redundant trains of a dual-purpose moderate-energy essential system (e.g., one required to operate during normal plant conditions as well as to shut down the reactor and mitigate the consequences of the postulated piping failure), single active failures of components in the other train or trains of that system or other systems necessary to mitigate the consequences of the piping failure and shut down the reactor need not be assumed, provided the systems are designed to seismic Category I standards, are powered from both offsite and onsite sources, and are constructed, operated, and inspected to quality assurance, testing, and ISI standards appropriate for nuclear safety systems." (Reference 1)

The ESWS and the Transfer System are dual-purpose systems. As such, an additional single failure is not postulated in a redundant train. Consequently, a postulated MELB in any section of piping will only initiate a limited-leakage flooding event (a thru-wall pipe crack) within the affected UHSRS compartment. The postulated MELB will have localized flooding and spray effects.

Internal flood protection for the UHSRS is provided from divisional separation of independent trains, which will not communicate from one train to another. This separation will be maintained through the use of adequately sized floor drains, in the form of grated areas designed into the floor or alternative drainage methods. The drains will be sized to sufficiently prevent standing water in the UHSRS areas, with accumulated water draining down to the respective UHSRS basin. Watertight doors are not required and nominal sill heights (thresholds) for doors are permitted since no flood water will be allowed to accumulate on the floors. This minimizes the potential for transfer of water from one area to another. Since the source of the flood water from a potential MELB is from the basin, the capacity of each UHSRS basin is sufficiently large to contain the volume of water generated by a MELB.

Since each area of the UHSRS is isolated from adjacent areas, flooding of one area due to a postulated MELB adversely affects only one (1) out of four (4) redundant ESW trains. A postulated MELB within one area (or UHSRS) will not prevent the performance of required safety-related functions in the other three UHSRS's in accordance with the single failure criterion.

The ESW pump discharge piping utilizes the ESWPT, described below. The transfer pumps discharge to two (2) redundant Seismic Category I, Equipment Class 3 headers which allow the transfer pumps to transfer water between the 4 basins as necessary. These transfer discharge headers are routed outside through the UHSRS and utilize the ESWPT. They are designed to preclude loss via backflow as well as siphon loss. This assures that the individual basin inventories will not be adversely affected.

4.2 ESWPT

Postulated internal flooding events within the ESWPT are limited to MELB failure considerations. Given the design and large internal volumes of the tunnels, flooding resulting from a single limited-leakage MELB will be confined within the effected tunnel.

Electrical cable or wiring within the ESWPT tunnels will be qualified to the appropriate environmental and service conditions. They will be capable of performing required functions. Piping systems will not be adversely affected by the MELB. The pipe tunnels are isolated at both ends, and from each other, consequently a postulated flooding event will be contained within the respective tunnel.

Local sumps will be provided in the ESWPT. These sumps will include remote level indication/alarm in the Main Control Room.

4.3 PSFSV

The PSFSV is configured with independent compartments for the fuel oil storage. Each compartment of the PSFSV that contains a fuel oil storage tank is independent and separated from adjacent compartments by three-hour fire rated barriers.

Each fuel oil storage tank is located in an enclosure that is designed to contain fuel oil spills up to and including the entire inventory of the tank.

Fire Protection piping in this area utilizes a dry pipe system which normally contains no water. When pressurized, the system will operate below 160 psig. Flooding due to operation of the fire suppression system would be contained within the respective compartment. The design assures that postulated internal flooding events cannot adversely affect the adjacent PS/B, the other PSFSVs or their required functions.

There are provisions for removing safely any fluids accumulated in each PSFSV, for the protection of the environment.

5.0 Conclusions and Recommendations

Flooding in each of the areas described in this study report was evaluated for its respective consequence to safe plant operation and shut-down capabilities. Postulated internal flooding due to events including MELB and fire suppression activities cannot adversely affect safe plant operations or the ability of the plant to achieve and maintain a safe shutdown condition, if necessary, in accordance with the single failure criterion.

While postulated flooding events could impact individual trains within a prescribed area, such events do not adversely affect the ability of the systems to perform required functions stated in Section 1.0 based upon divisional separation. Operator action upon indication of internal flooding will serve to minimize the impact to equipment and system availability.

It should be emphasized that the CPNPP site-specific structures described in this Study Report are not subject to common-cause failures associated with postulated internal flooding events due to the divisional separation provided by the design. Divisional

separation assures that despite the adverse affects associated with the postulated MELBs or fire suppression activities, site-specific SSCs remain capable of performing required safety-related functions following a postulated internal flooding event in accordance with the single failure criterion.

As noted in Section 3.0, the design of the CPNPP site-specific SSCs continues to evolve. Many design options can be implemented without introducing an unacceptable internal flooding hazard provided that divisional separation is not adversely affected by future design and operational activities.

It should also be noted that while internal flooding of the CPNPP site-specific structures can be accommodated, there are other related design bases that must be considered (e.g. ensuring adequate inventory in the UHS basins). The need to detect and mitigate internal flooding events in a timely and effective manner is essential in assuring the ability of the effected SSCs to perform required functions.

7.0 References

1. MAUP-DC001, Revsion 2, October 2009; Design Control Document for the US-APWR
2. Comanche Peak NPP, Units 3 & 4 COL Application Part 2, FSAR

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6124 (CP RAI #243)

SRP SECTION: 09.04.05 - Engineered Safety Feature Ventilation System

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

DATE OF RAI ISSUE: 12/14/2011

QUESTION NO.: 09.04.05-24

This is a follow-up to RAI to RAI No. 3232, Question No. 09.04.05-12 and RAI No. 5585, Question No. 09.04.05-15.

The staff believes the words for the "Design Commitment" and "Acceptance Criteria" of ITAAC Table A.2-1 of Item 4 should be modified to put equal emphasis on the ventilation "cooling" function of the exhaust fans and the heating function of the unit heaters. Therefore, the staff requests that the wording of ITAAC Table A.2-1 of Item 4 be made more precise.

In addition, the staff notes that the first paragraph of Revision 2 FSAR subsection 9.4.5.1.1.6 reads:

"The UHS ESW pump house ventilation system provides and maintains the proper environmental conditions within the required temperature range of 40°F – 120°F to support the operation of the instrumentation and control equipment and components in the individual UHS ESW pump houses during a design basis accident and LOOP. The ventilation system is designed based on the outside ambient design temperature conditions (-5°F – 115°F) using 100-year return period temperature values."

In contrast ITAAC Table A.2-1 of Item 4 reads:

"A report exists and concludes that the as-built UHS ESW pump house ventilation system is capable of providing ventilation air to maintain area temperature within design limits in the UHS ESW pump houses during normal operations, abnormal and accident conditions of the plant with outside ambient design temperature condition (i.e. -5°F – 115 °F)."

The staff believes that to ensure consistency and to remove ambiguity from the RCOLA, the operational phase of normal operations should be added to the domain of subsection 9.4.5.1.1.6 to make it clear that the UHS ESW pump house ventilation system is not a standby system that only runs during accident scenarios. The staff requests that the applicant make these or similar changes to improve the clarity and consistency of the RCOLA.

ANSWER:

FSAR Subsection 9.4.5.1.1.6 has been revised to include normal operations and to improve clarity. ITAAC Table A.2-1 item 4 has been revised to specify the cooling function of the exhaust fans and heating function of the unit heater.

Impact on R-COLA

See attached marked-up FSAR Revision 2 page 9.4-3 and COLA Part 10 Revision 2 pages 22 and 25.

Impact on S-COLA

This response is considered standard.

Impact on DCD

None.

9.4.5.1.1.6 UHS ESW Pump House Ventilation System

The UHS ESW pump house ventilation system provides and maintains the proper environmental conditions within the required temperature range of 40°F – 120°F to support the operation of the instrumentation and control equipment and components in the individual UHS ESW pump houses during normal operations, a design basis accident and LOOP. The ventilation system is designed based on the outside ambient design temperature conditions (-5°F – 115°F) using 100-year return period temperature values. RCOL2_09.04.05-24

The ESWP is installed at a location in the pump house where cooling air is adequately being circulated for cooling the ESWP motor.

9.4.5.2.2 Class 1E Electrical Room HVAC System

STD COL 9.4(4) Replace the ~~first and the~~ second sentence of the first paragraph in DCD Subsection 9.4.5.2.2 with the following. CTS-01379

~~The Class 1E electrical room HVAC system is shown in Figure 9.4-202 and system equipment design data is presented in Table 9.4.5-1.~~ The capacity of heating coils that are affected by site specific conditions is shown in Table 9.4-201. CTS-01379

9.4.5.2.3 Safeguard Component Area HVAC System

CP COL 9.4(4) Replace the third sentence of the second paragraph in DCD Subsection 9.4.5.2.3 with the following.

The capacity of heating coils that are affected by site specific conditions is shown in Table 9.4-201.

9.4.5.2.4 Emergency Feedwater Pump Area HVAC System

STD COL 9.4(4) Replace the fourth sentence of the second paragraph in DCD Subsection 9.4.5.2.4 with the following.

PART 10 - APPENDIX A.2

UHS ESW PUMP HOUSE VENTILATION SYSTEM

A.2.1 Design Description

The UHS ESW pump house ventilation system provides and maintains area design temperature limits in the UHS ESW pump houses during all plant operating, abnormal and accident conditions.

The UHS ESW pump house ventilation system is located within the UHS related structure.

There are four separate and independent UHS ESW pump houses and each has its own ventilation system.

1.a The functional arrangement of the UHS ESW pump house ventilation system is as described in the Design Description of Section A.2.1 and as shown in Figure A.2-1

1.b Each mechanical division of the UHS ESW pump house ventilation system (Division A, B, C & D) is physically separated from the other divisions so as not to preclude accomplishment of the safety function.

2. The seismic Category I equipment, identified in Table A.2-2, can withstand seismic design basis loads without loss of safety function.

3.a Class 1E equipment identified in Table A.2-2 is powered from its respective Class 1E division.

3.b. Separation is provided between redundant divisions of UHS ESW pump house ventilation system Class 1E cables, and between Class 1E cables and non-Class 1E cable.

4. The UHS ESW pump house ventilation system provides ~~ventilation air~~heated air via unit heaters and cooled air via exhaust fans to maintain area temperature within design limits in the UHS ESW pump houses during all plant operating conditions including normal plant operations, abnormal and accident conditions of the plant. RCOL2_09.04.05-24 RCOL2_09.04.05-24

5.a. Controls are provided in the MCR to start and stop the UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-3.

5.b. The UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-2 as having PSMS control, perform as active safety function after receiving a signal from PSMS.

Appendix A.2

Table A.2-1 (Sheet 2 of 3)
UHS ESW Pump House Ventilation System
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
3.b. Separation is provided between redundant divisions of UHS ESW pump house ventilation system Class 1E cables, and between Class 1E cables and non-Class 1E cable.	3.b Inspections of the as-built Class 1E divisional cables will be performed.	3.b Physical separation or electrical isolation is provided in accordance with RG 1.75 between the redundant divisions of the as-built UHS ESW pump house ventilation system Class 1E cables and between Class 1E cables and non-Class 1E cables.
4. The UHS ESW pump house ventilation system provides ~~ventilation air~~ heated air via unit heaters and cooled air via exhaust fansto maintain area temperature within design limits in the UHS ESW pump houses during all plant operating conditions including normal plant operations, abnormal and accident conditions of the plant.	4. Tests and analyses of the as-built UHS ESW pump house ventilation system will be performed for all four divisions.	4. A report exists and concludes that the as-built UHS ESW pump house ventilation system is capable of providing ~~ventilation air~~heated air via unit heaters and cooled air via exhaust fans to maintain area temperature within design limits in the UHS ESW pump houses during all plant operating conditions including normal plant operations, abnormal and accident conditions of the plant with outside ambient design temperature condition (i.e. -5°F - 115 °F). RCOL2_09 .04.05-24
5.a. Controls are provided in the MCR to start and stop the UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-3.	5.a. Tests will be performed on the as-built exhaust fans and unit heaters identified in Table A.2-3 using controls in the as-built MCR.	5.a Controls exist in the as-built MCR to start and stop the as-built UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-3.
5.b. The UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-2 as having PSMS control, perform as active safety function after receiving a signal from PSMS.	5.b. Tests will be performed on the as-built UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-2 as having PSMS using simulated signals.	5.b. The as-built UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-2 as having PSMS control, perform an active safety function identified in the table after receiving a simulated signal.
5.c. The UHS ESW pump house ventilation system backdraft dampers identified in Table A.2-2 as having a safety function perform a safety function to change position as indicated in the table.	5.c. Tests of the as-built UHS ESW pump house ventilation system backdraft dampers identified in Table A.2-2 as having a safety function will be performed.	5.c. Each as-built UHS ESW pump house ventilation system backdraft damper identified in Table A.2-2 as having a safety function changes position as indicated in the table under design conditions. RCOL2_09 .04.05-19
6. Displays of the parameters identified in Table A.2-3 are provided in the MCR.	6. Inspections will be performed for retrievability of displays identified in Table A.2-3 in the as-built MCR.	6. Displays identified in Table A.2-3 can be retrieved in the as-built MCR.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6124 (CP RAI #243)

SRP SECTION: 09.04.05 - Engineered Safety Feature Ventilation System

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

DATE OF RAI ISSUE: 12/14/2011

QUESTION NO.: 09.04.05-25

This is a follow-up RAI to RAI Letter Number 123 (3232), Question No. 09.04.05-10 and RAI Letter No. 213 (5585), Question No. 09.04.05-18.

The applicant in its response to Question 09.04.05-18, (5) stated that Figure 9.4-201 has been revised to indicate that the temperature controllers are part of the plant control system. The staff notes that Figure 9.4-201 (COLA FSAR Revision 1) became Figure 9.4-203 (COLA FSAR Revision 2). The staff notes that Figure 9.4-203 does not contain any notation to indicate that the temperature controllers are part of the plant control system. The staff requests that the applicant amend COLA Revision 2 FSAR, Figure 9.4-203 to demarcate the change of system status for these temperature controllers. In addition, the applicant is requested to create an ITAAC and Chapter 7 supplement for the Plant Control System, since the addition of these safety related temperature controllers to the Plant Control System are not incorporated by reference to the US-APWR DCD.

ANSWER:

The functions indicated by the symbol for an instrument in the main control room and remote shutdown console (a circle with a horizontal line across the center) in DCD Figure 1.7-4 are accomplished by the safety-related protection and safety monitoring system (PSMS) and the non-safety related plant control and monitoring system (PCMS). The same approach is used in the FSAR. In the response to Question 09.04.05-18, the wording "plant control system" means the PSMS and PCMS. The general description of the overall I&C system, including PSMS and PCMS, is summarized in DCD Section 7.1, which is incorporated by reference in the FSAR. Therefore, there is no need for a Chapter 7 supplement in the FSAR for the "plant control system."

As described in the response to Question 09.04.05-18, the temperature controllers are located in series with the respective temperature switches, as shown on FSAR Figure 9.4-201, and are part of the PSMS. ITAAC Table A.2-1 item 5.b confirms that the UHS ESW pump house ventilation system exhaust fans and unit heaters perform an active safety function after receiving a signal from PSMS. Therefore, a new ITAAC item is not necessary.

Impact on R-COLA

None.

Impact on S-COLA

This response is considered standard.

Impact on DCD

None.

Attachment 2

Response to Request for Additional Information No. 6159 (CP RAI #239)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6159 (CP RAI #239)

SRP SECTION: 03.11 - Environmental Qualification of Mechanical and Electrical Equipment

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

DATE OF RAI ISSUE: 11/10/2011

QUESTION NO.: 03.11-18

This is a follow-up to RAI 73-2765, Question 3.11-1.

Comanche Peak FSAR Section 3.11 incorporates by reference the provisions in the US-APWR DCD for the design process for the environmental qualification (EQ) of mechanical equipment at Comanche Peak Units 3 and 4. In RAI 03.11-1, the NRC staff requested that the Comanche Peak COL applicant describe the implementation of the design process specified in the US-APWR DCD. The staff also requested that the COL applicant state when design and procurement specifications would be available onsite for NRC review. In its response to RAI 03.11-1, the Comanche Peak COL applicant stated that the implementation of the US-APWR design process for the EQ of mechanical equipment, including the application of ASME Standard QME-1-2007, "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants," is described in MUAP-08015, Revision 1, "US-APWR Equipment Environmental Qualification Program." The applicant stated that the design and procurement specifications, including the EQ requirements for mechanical equipment, will be developed and available on-site during the detailed design and procurement stages prior to equipment procurement. As required in 10 CFR 52.79(a)(11), the COL application must provide a description of the programs and their implementation, necessary to ensure that the systems and components meet the requirements of the ASME *Boiler and Pressure Vessel Code* and the ASME *Code for Operation and Maintenance of Nuclear Power Plants* in accordance with 10 CFR 50.55a. The NRC staff requests that the Comanche Peak COL applicant provide a schedule for the availability of a sample of EQ specifications for mechanical equipment to be used at Comanche Peak Units 3 and 4 for audit by the NRC staff in support of its review of the Comanche Peak COL application.

ANSWER:

An engineering/procurement/construction (EPC) contract will be executed after issuance of the COL. The date that project-specific design and procurement specifications will be available is unknown, but for planning purposes it is assumed that these documents will be available onsite for NRC review approximately 6 to 12 months after the issuance of the EPC contract. A US-APWR project is

implemented in phases (feasibility, licensing, design/analysis, procurement, construction, startup, and operations). Technical Report MUAP-08015 describes the equipment qualification program that applies to these phases. The detailed steps needed for implementation will not occur until after an EPC contract is executed.

The specific requirements and programmatic application for the EQ program, captured from applicable industry and regulatory codes and guides, are delineated in MUAP-08015. While procurement specifications are not yet developed, they will contain the following items, as applicable:

- Applicable EQ parameters for harsh or mild environments (see MUAP-08015, Chapter 4 for a list of parameters and allowable/required margins). This includes attributes such as operating and accident temperature ranges and radiation levels, qualification testing requirements typical of an equipment supplier, qualified life requirements, expectations for equipment suppliers to provide a list of components that need to be replaced periodically in order to maintain qualification, records and documentation requirements for the equipment vendor, etc.

- Applicable seismic parameters

- Applicable operating time for certain SSCs subject to harsh environment operability limitations

- Acceptable methods of qualification (test, analysis, commercial grade dedication, etc.) for each listed attribute or parameter and appropriate QA requirements

- Acceptable types of documentation to be supplied to document qualification.

- Other issues pertinent to the preparation of these specifications address shipping, storage, installation and spare parts requirements.

During the design and procurement phases of a project, the project EQ organization works with the design and procurement personnel to verify that EQ and seismic requirements are 1) properly identified, 2) that acceptable qualification processes are identified, 3) that qualification requirements and processes are detailed in procurement documents (specifications, receipt procedures, warehouse procedures, SSC project tracking, etc.) and 4) appropriate portions of this information are provided to the licensee to facilitate future qualified spare parts replacement.

Impact on R-COLA

See attached marked-up FSAR Revision 2 pages 3.11-2 and 3.11-3.

Impact on S-COLA

This response is considered standard.

Impact on DCD

None.

3.11.1.1 Equipment Identification

STD COL 3.11(5) Replace the last sentence of the first paragraph in DCD Subsection 3.11.1.1 with the following.

Table 3D-201 identifies site-specific electrical and mechanical equipment locations and environmental conditions (both normal and accident) to be addressed in the EQ program. This table lists information on site-specific safety-related equipment and non-safety-related equipment which is important to safety. The provisions in the US-APWR DCD for the environmental qualification of mechanical equipment are applied to the plant-specific systems. This list forms the basis for the operational Equipment Qualification Master Equipment List (EQMEL), which will be prepared in conjunction with work activities authorized by an engineering/procurement/construction (EPC) contract. R-COL2_03.11-19

3.11.1.2 Definition of Environmental Conditions

STD COL 3.11(9) Replace the fourth sentence of the first paragraph in DCD Subsection 3.11.1.2 with the following.

Plant-specific EQ parameters are documented in the corresponding equipment specifications, drawings, procedures, instructions, and qualification packages. When procurement specifications are developed they will contain, as applicable, the following items: RCOL2_03.11-18

- Applicable EQ parameters for harsh or mild environments (see MUAP-08015, Chapter 4 for a list of parameters and allowable/required margins). This includes attributes such as operating and accident temperature ranges and radiation levels, qualification testing requirements typical of an equipment supplier, qualified life requirements, expectations for equipment suppliers to provide a list of components that need to be replaced periodically in order to maintain qualification, records and documentation requirements for the equipment vendor, etc.
- Applicable seismic parameters
- Applicable operating time for certain SSCs subject to harsh environment operability limitations

- Acceptable methods of qualification (test, analysis, commercial grade dedication, etc.) for each listed attribute or parameter and appropriate QA requirements

- Acceptable types of documentation to be supplied to document qualification

- Other issues pertinent to the preparation of these specifications address shipping, storage, installation and spare parts requirements.

RCOL2_03.11-18

3.11.3 Qualification Test Results

STD COL 3.11(2) Replace the fifth paragraph in DCD Subsection 3.11.3 with the following.

Test results for electrical and mechanical equipment are maintained with the project records as auditable files. Such records are maintained from the time of initial receipt through the entire period during which the subject equipment remains installed in the plant or is stored for future use. Documentation for the qualification of safety-related equipment and non-safety-related equipment, which is important to safety, is ultimately the responsibility of the COL Applicant who, later as the licensee, maintains a complete set of EQ records. The EQ records are maintained for the life of plant to fulfill the records retention requirements delineated in 10 CFR 50.49 (Reference 3.11-2) and in compliance with the QAP described in Chapter 17.

3.11.4 Loss of Ventilation

STD COL 3.11(6) Replace the second paragraph in DCD Subsection 3.11.4 with the following.

Site-specific electrical and mechanical equipment (including instrumentation and control and certain accident monitoring equipment), subject to environmental stress associated with loss of ventilation or other environmental control systems including heat tracing, heating, and air conditioning, is qualified using the process described in MUAP-08015 (Reference 3.11-3).

3.11.5 Estimated Chemical and Radiation Environment

STD COL 3.11(7) Replace paragraph in DCD, Subsection 3.11.5 with the following.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6159 (CP RAI #239)

SRP SECTION: 03.11 - Environmental Qualification of Mechanical and Electrical Equipment

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

DATE OF RAI ISSUE: 11/10/2011

QUESTION NO.: 03.11-19

This is a follow-up to RAI 73-2765, Question 3.11-2.

Comanche Peak FSAR Section 3.11 incorporates by reference the provisions in the US-APWR DCD in describing the operational program for environmental qualification of mechanical equipment at Comanche Peak. In RAI 03.11-2, the NRC staff requested that the Comanche Peak COL applicant fully describe the operational program for environmental qualification of mechanical equipment per the guidance in Commission paper SECY-05-0197 and RG 1.206. In its response to RAI 03.11-2, the Comanche Peak COL applicant stated that the US-APWR EQ program and its interface with the Operational Equipment Qualification Program are described in MUAP-08015. As a supplement to RAI 03.11-2, the NRC staff requests that the Comanche Peak COL applicant describe the transition from the initial EQ program to the EQ program to be implemented during plant operation. In particular, the NRC staff requests that the applicant specify where the following aspects of an acceptable description of the EQ operational program are provided in its FSAR:

(1) A provision that the documentation necessary to support the continued qualification of the equipment installed in the plant that is within the EQ Program scope will be available in accordance with 10 CFR 50, Appendix A.

(2) A description of the EQ Master Equipment List (EQMEL) that identifies the electrical and mechanical equipment that must be environmentally qualified for use in a harsh environment.

(3) A description of the control of revisions to the EQ files and EQMEL.

(4) Provisions that the operational aspect of the EQ Program will include:
   a. evaluation of EQ results for design life to establish activities to support continued EQ;
   b. determination of surveillance and preventive maintenance activities based on EQ results;
   c. consideration of EQ maintenance recommendations from equipment vendors;
   d. evaluation of operating experience in developing surveillance and preventive maintenance activities for specific equipment;

e. development of plant procedures that specify individual equipment identification, appropriate references, installation requirements, surveillance and maintenance requirements, post-maintenance testing requirements, condition monitoring requirements, replacement part identification, and applicable design changes and modifications;
f. development of plant procedures for reviewing equipment performance and EQ operational activities, and for trending the results to incorporate lessons learned through appropriate modifications to the EQ operational program; and

g. development of plant procedures for the control and maintenance of EQ records.

ANSWER:

FSAR Section 3.11 describes the construction and operational EQ programs by incorporating Technical Report MUAP-08015 and DCD Revision 3 Tier 2 Section 3.11 by reference, which state in part:

> The implementation of the US-APWR EQ Program is described in MHI Technical Report MUAP-08015 titled, *US-APWR Equipment Qualification Program* issued as a separate report (Reference 3.11-3).
>
> The Technical Report describes the EQ Program applicable to each licensed US-APWR. The Report describes the EQ process and its implementation during the design, procurement, construction, startup, and turnover phases of a US-APWR plant project. It identifies the various qualification programs, procedures, and policies that MHI and the applicable Architect/Engineer/Constructor implements in conjunction with the delivery of a US-APWR plant. The Report discusses the application of the EQ Program to both domestic and international suppliers, of the electrical and mechanical equipment described in Appendix 3D. The EQ Program, quality assurance, record keeping, and associated programmatic interfaces is described to facilitate implementation of the post turnover EQ Program by the licensee.
>
> The US-APWR EQ Program is generic to all US-APWRs and is, in turn, implemented for each specific plant licensed. This EQ process is illustrated in Figure 3.11-1. The implementation of the US-APWR EQ Program follows distinct phases. The EQ Program is defined herein and is, in turn, implemented during a specific plant's design, procurement, construction, startup, and operational phases. The reason for this sequence is that the programmatic responsibilities shift as a specific plant is designed and constructed. At the onset of a project, the EQ Program is the responsibility of the plant vendor. The program is implemented by the vendor and the project architect/ engineer during the design phases. At this point, the required environmental parameters, listed above, are finalized by analysis. These parameters are then factored into equipment procurement specifications, where applicable, during the procurement phase. In some cases, the equipment is qualified by testing or other means. Compliance with EQ requirements is documented and this information is assembled as the project progresses. The EQ Program continues during the construction and startup phases (i.e., additional testing and analysis) and as the plant is nearing completion, the EQ Program responsibilities, including the assembled documentation, is transferred to the plant owner. This information is reviewed by the NRC and the demonstration of satisfactory compliance with EQ requirements

is a condition for obtaining the plant-operating license. The plant owner is responsible for maintaining the EQ Program for the operating life of the plant.

The EQ process is subject to regulatory oversight during the construction, startup and early operational phases as evidenced by NRC Inspection Procedures (IP) Attachment 65001.E, "Inspection of the ITAAC-Related Qualification Program," which is the section of the ITACC related to the Qualification Program and IP 51080, "Part 52, Environmental Qualification (EQ) under 10 CFR 50.49."

Chapter 11 of MUAP-08015 describes the Operational EQ Program in broad terms and the Operational EQ Program will include the aspects identified in this question and others. This response is intended to provide the appropriate level of detail required for a high level licensing document. The activities associated with the Operational EQ Program are implemented as part of the overall implementation of operational programs as described in FSAR Table 13.4-201.

(1) The documentation of EQ program activities is addressed in Section 11.0 of MUAP-08015 and the retention of this documentation is discussed with the QA requirements in Section 11.1. In addition, FSAR Section 3.11 directly addresses maintaining EQ records for the life of the plant. FSAR Subsection 3.11.3 addresses the maintenance of auditable files.

(2) The US-APWR EQ program generates and maintains a list of equipment located in harsh and mild environments as described in MUAP-08015 and Appendix 3D of the US-APWR DCD. This list forms the basis for the operational EQ program EQMEL, which will be prepared in conjunction with work activities authorized by an engineering/procurement/construction (EPC) contract. FSAR Subsection 3.11.3 states that the COL applicant maintains a complete set of EQ records.

(3) The EQ files and the EQ equipment list are controlled per plant procedures and the QA program as noted in (1) above.

(4) Operational aspects of the EQ program include:

a. Design life is discussed throughout most sections of MUAP-08015. Section 11.0 states that the Operational EQ Program is responsible for all aspects of the continuing EQ program including programmatic aspects such as aging. This would include the evaluation of design life.

b. Section 11.1 of MUAP-08015 states that procedures and instructions will be developed as part of the Operational EQ Program and will include maintenance, test, inspection and surveillance requirements.

c. MUAP-08015 describes the flow of project activity from design, procurement, construction, and testing to operations. This includes maintenance recommendations from equipment vendors. The transition from a Project EQ Program to an Operational EQ Program is described in MUAP-08015 in Chapters 9 (Equipment Qualification Implementation), Chapter 10 (EQ Program Transfer to US Utility (Licensee) and PEQP Closeout), and Chapter 11 (General Description of Utility (Licensee) Operating Equipment Qualification Program).

d. FSAR Subsections 13.1.1.2.1 and 13.5.1.2 discuss the use of operating experience in all operation activities which will include surveillance and preventive maintenance. Both industry operating experience and the Corrective Action Program are considered.

e. The development of plant procedures to cover all applicable aspects of the EQ program are within the scope of Sections 11.0 and 11.1 of MUAP-08015 and further addressed by the responses to items (1), (2), (3), (4)a, (4)b, (4)c, and (4)d above.

f. See the response to (4)d above.

g. See the responses to (1), (2) and (3) above.

CPNPP Units 1 and 2 have been operating since 1990 and 1993 with an EQ program that has been inspected by the NRC numerous times. CPNPP Procedure ECE-225, "Environmental Qualification Program," delineates the responsibilities and coordinates the activities associated with the environmental and seismic Category I qualification of equipment. Lower-tier procedures are used to implement ECE-225.

The CPNPP Unit 1 and 2 EQ Program encompasses both the environmental and seismic Category I equipment requiring qualification with controls to assure that activities in areas such as design, procurement, corrective action, training, or maintenance are conducted in a fashion which documents and maintains the environmental and/or seismic qualification of plant equipment. The program provides for the accumulation and evaluation of vendor qualification reports, supporting calculations, walk down data and Industry Operating Experience Reports (such as NRC Bulletins and Notices), the establishment of qualified equipment maintenance schedules, and the consolidation of the resulting documentation into the Environmental and/or Seismic Equipment Qualification Summary Packages. The qualification of equipment/components may also be documented by the EQ Summary Packages and open EQ Program Impact Log items. The EQMEL was incorporated into and is currently a subset of the Master Equipment List (STA-309).

Luminant expects that the existing EQ program will be expanded to include Units 3 and 4 or that a very similar but separate EQ program will be developed for the new units based on the operating experience gained with Units 1 and 2.

Impact on R-COLA

See attached marked-up FSAR Revision 2 page 3.11-2.

Impact on S-COLA

None; this response is site-specific.

Impact on DCD

None.

3.11.1.1 Equipment Identification

STD COL 3.11(5) Replace the last sentence of the first paragraph in DCD Subsection 3.11.1.1 with the following.

Table 3D-201 identifies site-specific electrical and mechanical equipment locations and environmental conditions (both normal and accident) to be addressed in the EQ program. This table lists information on site-specific safety-related equipment and non-safety-related equipment which is important to safety. The provisions in the US-APWR DCD for the environmental qualification of mechanical equipment are applied to the plant-specific systems. This list forms the basis for the operational Equipment Qualification Master Equipment List (EQMEL), which will be prepared in conjunction with work activities authorized by an engineering/procurement/construction (EPC) contract. R-COL2_03.11-19

3.11.1.2 Definition of Environmental Conditions

STD COL 3.11(9) Replace the fourth sentence of the first paragraph in DCD Subsection 3.11.1.2 with the following.

Plant-specific EQ parameters are documented in the corresponding equipment specifications, drawings, procedures, instructions, and qualification packages. When procurement specifications are developed they will contain, as applicable, the following items: RCOL2_03.11-18

- Applicable EQ parameters for harsh or mild environments (see MUAP-08015, Chapter 4 for a list of parameters and allowable/required margins). This includes attributes such as operating and accident temperature ranges and radiation levels, qualification testing requirements typical of an equipment supplier, qualified life requirements, expectations for equipment suppliers to provide a list of components that need to be replaced periodically in order to maintain qualification, records and documentation requirements for the equipment vendor, etc.
- Applicable seismic parameters
- Applicable operating time for certain SSCs subject to harsh environment operability limitations

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6159 (CP RAI #239)

SRP SECTION: 03.11 - Environmental Qualification of Mechanical and Electrical Equipment

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

DATE OF RAI ISSUE: 11/10/2011

QUESTION NO.: 03.11-20

This is a follow-up to RAI 73-2765, Question 3.11-11.

Part 10, "ITAAC and Proposed License Conditions," of the Comanche Peak COL application states that the implementation of operational programs identified in Table 13.4-201 by the milestones indicated in the table is a potential license condition. The applicant states that some of these programs may be adequately controlled by other methods such as the regulations, the technical specifications, or a commitment tracking system, and will not need to be addressed in a license condition. The guidance in RG 1.206, Section C.IV.4.3 states that the COL should contain a license condition for the licensee to submit to the NRC a schedule, 12 months after issuance of the COL that supports planning for and conduct of NRC inspections of operational programs. RG 1.206 also states that the license condition should specify that the schedule will be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the operational programs in the applicable FSAR table have been fully implemented or the plant has been placed in commercial service, whichever comes first. In RAI 03.11-11, the NRC staff requested that the Comanche Peak COL applicant discuss the plans to develop license conditions for operational program implementation consistent with the guidance in RG 1.206 and Commission paper SECY-05-0197. In its response to RAI 03.11-11, the Comanche Peak COL applicant stated that a proposed license condition to address operational programs is provided in Part 10 of the COL application. The proposed license condition in the RAI response stated that the licensee shall implement the programs or portions of programs identified in the table in Part 10 of the Comanche Peak FSAR (such as the EQ program) on or before the associated milestones (prior to initial fuel load for the EQ program). As a supplement to RAI 03.11-11, the NRC staff requests that the Comanche Peak COL applicant describe its plans to address operational program implementation consistent with RG 1.206 and Commission paper SECY-05-0197.

ANSWER:

In the response to RAI No. 6123 (CP RAI #238) Question 13.06.06-2 submitted on December 12, 2011 (ML11348A055), Luminant added the following proposed License Conditions to COLA Part 10:

> 2.D(12) Operation Program Implementation Schedules
>
> The Licensee shall submit to the Director of NRO, a schedule, no later than 12 months after issuance of the COL or at the start of construction as defined in 10 CFR 50.10(a), whichever is later, that supports planning for and conduct of NRC inspections of operational programs listed in FSAR Table 13.4-201 with the exception of the Fitness for Duty program. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter for each applicable operational program until either the operational program has been fully implemented or the plant has been placed in commercial service, whichever comes first.
>
> The Licensee shall submit to the Director of NRO, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of the Fitness for Duty program listed in FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the Fitness for Duty program has been fully implemented or the plant has been placed in commercial service, whichever comes first.

These proposed license conditions are similar to the approach for the ITAAC schedule required in 10 CFR 52.99(a), the Model COL discussed by the NRC and Design Centered Working Groups (DCWGs) on February 26, 2011, and RG 1.206, Page C.IV.4-.3. The Fitness for Duty program has been singled out because parts of the program are implemented prior to construction activities commencing.

Impact on R-COLA

None.

Impact on S-COLA

None; this response is site-specific.

Impact on DCD

None.

Attachment 3

Response to Request for Additional Information No. 6222 (CP RAI #244)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6222 (CP RAI #244)

SRP SECTION: 03.09.06 - Functional Design Qualification and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

DATE OF RAI ISSUE: 12/14/2011

QUESTION NO.: 03.09.06-21

As a supplement to RAI 2772, question 03.09.06-1, the NRC staff requested, in RAI 6027, question 03.09.06-13, that the Comanche Peak COL applicant discuss the implementation of the provisions in the US-APWR Design Control Document (DCD) for the functional design and qualification of pumps, valves, and dynamic restraints. For example, the staff requested that the Comanche Peak COL applicant address its application of ASME QME-1-2007, "Qualification of Active Mechanical Equipment used in Nuclear Power Plants," as accepted in Revision 3 to NRC Regulatory Guide (RG) 1.100, "Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants," consistent with the US-APWR DCD. The staff noted that it routinely audits COL applicants regarding their inservice testing (IST) program as part of the COL application review. Therefore, the staff requested that the Comanche Peak COL applicant provide a schedule for the availability of a sample of design and procurement specifications for pumps, valves, and dynamic restraints for audit by the NRC staff.

In its response to RAI 6027, question 03.09.06-13, the Comanche Peak COL applicant stated in its submittal dated November 7, 2011, that the US-APWR DCD is being revised to specify that the functional design and qualification of pumps, valves, and dynamic restraints will be performed in accordance with ASME QME-1-2007 as accepted in Revision 3 to RG 1.100. In that the FSAR incorporates the DCD by reference, the Comanche Peak COL applicant stated that it will apply ASME QME-1-2007 for the design and qualification of pumps, valves, and dynamic restraints for Comanche Peak Units 3 and 4. However, the Comanche Peak COL applicant stated that the design and procurement specifications for pumps, valves, and dynamic restraints for the site-specific design might not be available for audit by the NRC staff prior to COL issuance.

The NRC staff considers the planned revision to the US-APWR DCD to specify the use of ASME QME-1-2007 as accepted in Revision 3 to RG 1.100 for the functional design and qualification of pumps, valves, and dynamic restraints to be acceptable for reference in the Comanche Peak FSAR.

The NRC regulations in 10 CFR 52.79(a)(11) require COL applicants to provide a description of the programs and their implementation necessary to ensure that systems and components meet the

requirements of the ASME *Boiler and Pressure Vessel Code* and the ASME *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code) in accordance with 10 CFR 50.55a. In performing its evaluation of the description and implementation of the IST program as required in 10 CFR 52.79(a)(11) for previous COL applications, the NRC staff has reviewed the description of the IST program provided in the COL application together with the incorporation by reference of the Design Certification DCD, and conducted an audit of a sample of design and procurement specifications for pumps, valves, and dynamic restraints to be used at the applicable nuclear power plant.

As a supplement to RAI 6027 question 03.09.06-13, the NRC staff requests that the Comanche Peak COL applicant provide information (either in sample design and procurement specifications or in the Comanche Peak FSAR) that specifies the implementation of the IST program sufficient for the NRC staff to make a finding regarding compliance with 10 CFR 52.79(a)(11). For example, the information to be provided with respect to implementation of the IST program for valves should include a description of the following:

(1) Design, qualification, testing, inspection, surveillance, and documentation requirements;
(2) Codes and standards to be applied and their justification;
(3) Regulatory guides and Code cases to be applied;
(4) Design life requirements for valve, actuator, and internal parts;
(5) Design-basis differential pressure and flow calculation methodology;
(6) Valve design, qualification, and application requirements (including Joint Owners Group program scope, fluid conditions and ambient temperature);
(7) Valve seating surface design, qualification and inspection requirements;
(8) Design, qualification, and inspection requirements for valve internal parts, dimensions, and clearances;
(9) Valve thrust and torque operating requirement methodology and assumptions;
(10) Actuator design, qualification, testing, and sizing methodology requirements;
(11) Power supply design requirements such as AC/DC for motor actuators, degraded voltage, ambient temperature effects, battery life, and thermal overload devices;
(12) Valve stem and actuator gear lubricants and lubrication requirements;
(13) Stem Friction Coefficient design, qualification, and surveillance requirements;
(14) Weak link design, qualification, and surveillance methodology requirements;
(15) Environmental qualification methodology and qualification report requirements;
(16) Design, qualification, surveillance, and replacement requirements for non-metallic parts;
(17) Periodic verification and condition monitoring requirements;
(18) Flow-induced vibration surveillance requirements;
(19) Special case valve requirements not specifically addressed in QME-1 (such as squib valves); and
(20) Responsibilities of valve vendor and licensee for design, qualification, testing, and documentation.

ANSWER:

An engineering/procurement/construction (EPC) contract is expected to be executed after issuance of the COL. The date that project-specific design and procurement specifications will be available is unknown, but for planning purposes it is assumed that these documents will be available for NRC review approximately 6 to 12 months after the issuance of the EPC contract. Because sample design and procurement specifications are not available for audit by the NRC, additional text is being provided in the next FSAR revision which describes the implementation of the IST program by identifying the anticipated content of those specifications. This additional information is intended to sufficiently describe the IST program to allow the NRC to make a finding regarding compliance with 10 CFR 52.79(a)(11).

Impact on R-COLA

See attached marked-up FSAR Revision 2 pages 3.9-2 and 3.9-3.

Impact on S-COLA

This response is considered standard.

Impact on DCD

None.

The design specification for snubbers installed in harsh service conditions (e.g., high humidity, temperature, radiation levels) is evaluated for the projected life of the snubber to assure snubber functionality including snubber materials (e.g., lubricants, hydraulic fluids, seals).

3.9.6 Functional Design, Qualification, and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints

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STD COL 3.9(8) ~~Replace the second sentence of the third paragraph in DCD Subsection 3.9.6 with the following.~~Replace the fourth paragraph from the end of DCD Subsection 3.9.6 with the following. RCOL2_03.09.06-15

~~The inservice testing (IST) program for pumps, valves, and dynamic restraints is administratively controlled to ensure that the equipment will be capable of performing its safety function throughout the life of the plant.~~The US-APWR utilizes the ASME OM Code, 2004 Edition through the 2006 Addenda (or the optional ASME Code Cases listed in NRC RG 1.192 that is incorporated by reference in paragraph (b) of 10 CFR 50.55a, subject to the applicable limitations and modifications) (Reference 3.9-13) for developing the IST Program for ASME Code, Section III, Class 1, 2 and 3 safety-related pumps, valves and dynamic restraints in US-APWR Subsection 3.9.6. The inservice testing (IST) program for pumps, valves, and dynamic restraints including the ASME OM Code edition and addenda to be used for the IST program is administratively controlled to ensure that the equipment will be capable of performing its safety function throughout the life of the plant.

Additional details are provided for each component or group of components within the scope of the IST program. For example, some of the information that is incorporated in project documents such as the System Design Packages, System Descriptions, Procurement Specifications, System Requirement Documents, etc. includes: RCOL2_03.06-21

- Equipment design, qualification, testing, inspection, surveillance, and documentation requirements
- Codes and standards to be applied, and their justification
- Regulatory guides and Code cases to be applied
- Equipment design life requirements
- Equipment design-basis calculation methodology

- Application requirements such as fluid conditions, ambient temperatures, etc. Special design requirements such as valve seat types and materials, valve stem friction limitations and materials, snubber types or pump types and materials, operating requirements methodology and assumptions such as valve thrust and torque requirement or pump flow and head requirement. RCOL2_03.06-21
- Equipment sizing and testing methodology requirements
- Power supply design requirements, degraded voltage, ambient temperature effects, battery life, and thermal overload devices
- Lubricants and lubrication requirements
- Weak link design, qualification, and surveillance methodology requirements
- Environmental qualification methodology and qualification report requirements
- Design, qualification, surveillance, and replacement requirements for non-metallic parts
- Periodic verification and condition monitoring requirements
- Responsibilities of vendor and licensee for design, qualification, testing, and documentation

The descriptions and items identified in this section are intended to be a general outline only. They are not all inclusive but are intended to be representative of various elements of the IST program.

STD COL 3.9(6) The IST program, including pumps, valves and dynamic restraints, will be developed and implemented per the milestone schedule provided in Table 13.4-201 for the Inservice Testing Program.

3.9.6.2 IST Program for Pumps

STD COL 3.9(11) Replace the ~~third~~seventh paragraph in DCD Subsection 3.9.6.2 with the following. DCD_03.09.06-53

The site-specific safety-related pump IST parameters and frequencies are provided in Table 3.9-202.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6222 (CP RAI #244)

SRP SECTION: 03.09.06 - Functional Design Qualification and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

DATE OF RAI ISSUE: 12/14/2011

QUESTION NO.: 03.09.06-23

As a supplement to RAI 2772 question 03.09.06-12, the NRC staff requested in RAI 6027 question 03.09.06-20 that the Comanche Peak COL applicant clarifies its plans regarding license conditions for operational programs and their milestones with planned changes to the Comanche Peak COL application in support of its RAI response. In addition, the staff requested that the Comanche Peak COL applicant include a note in FSAR Table 13.4-201 for the milestone of full implementation of the IST program after generator on-line on nuclear heat specifying that appropriate portions of the IST program will be implemented as necessary to support the system operability requirements of the technical specifications.

In its response to RAI 6027 question 03.09.06-20, the Comanche Peak COL applicant stated that it planned to provide a regulatory commitment in lieu of a proposed license condition to address the schedule for implementing the operational programs for Comanche Peak Units 3 and 4. The Comanche Peak COL applicant also provided a planned revision to FSAR Table 13.4-201 to clarify the IST implementation milestone.

The Comanche Peak COL applicant indicated during a telephone conference on November 30, 2011, its intent to provide a proposed license condition to address the schedule for implementing the operational programs for Comanche Peak Units 3 and 4 in response to RAI 03.11-20.

As a supplement to RAI 6027 question 03.09.06-20, the NRC staff requests that the Comanche Peak COL applicant clarify its RAI response by referencing its action planned in response to RAI 03.11-20. The staff also requests that the Comanche Peak COL applicant clarify the planned revision to FSAR Table 13.4-201 for an acceptable milestone for implementation of the IST program to specify "appropriate" portions rather than "acceptance" portions of the program.

ANSWER:

In response to RAI No. 6123 (CP RAI #238) Question 13.06.06-2 submitted on December 12, 2011 (ML11348A055), Luminant added the following proposed License Conditions to COLA Part 10.

> The Licensee shall submit to the Director of NRO, a schedule, no later than 12 months after issuance of the COL or at the start of construction as defined in 10 CFR 50.10(a), whichever is later, that supports planning for and conduct of NRC inspections of operational programs listed in FSAR Table 13.4-201 with the exception of the Fitness for Duty program. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter for each applicable operational program until either the operational program has been fully implemented or the plant has been placed in commercial service, whichever comes first.
>
> The Licensee shall submit to the Director of NRO, a schedule, no later than 12 months after issuance of the COL, that supports planning for and conduct of NRC inspections of the Fitness for Duty program listed in FSAR Table 13.4-201. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until either the Fitness for Duty program has been fully implemented or the plant has been placed in commercial service, whichever comes first.

These proposed license conditions are similar to the approach for the ITAAC schedule required in 10 CFR 52.99(a), the Model COL, which was discussed by the NRC and DCWGs on February 26, 2011, and RG 1.206, Page C.IV.4-.3. The Fitness for Duty program has been singled out because parts of the program are implemented prior to construction activities commencing.

Table 13.4-201 has been revised as requested.

Impact on R-COLA

See attachment marked-up FSAR Revision 2 pages 13.4-3 and 13.4-12.

Impact on S-COLA

None; this response is site-specific.

Impact on DCD

None.

CP COL 13.4(1)

Table 13.4-201 (Sheet 2 of 11)

Operational Programs Required by NRC Regulation and Program Implementation

Item	Program Title	Program Source (Required By)	FSAR (SRP) Section	Implementation	
				Milestone	Requirement
2.	Inservice Testing Program (1)	10 CFR 50.55a(f) 10 CFR 50, Appendix A	3.9.6 5.2.4	After generator on-line on nuclear heat (1)	10 CFR 50.55a(f) ASME OM Code
	• Primary-to-Secondary Leakage Monitoring Program	10 CFR 50.55a(b)(2)(iii)	5.4.2.2	~~After steam generator on-line nuclear heat~~After generator on-line on nuclear heat(1)	License Condition
	• Highly Radioactive Fluid Systems Outside Containment Monitoring Program	10 CFR 50.34.f(2)(xxvi)	Part 4 Technical Specification Subsection 5.5.2	After generator on-line on nuclear heat(1)	License Condition
3.	Environmental Qualification Program	10 CFR 50.49(a)	3.11	Prior to Initial fuel load	License Condition
4.	Preservice Inspection Program	10 CFR 50.55a(g)	5.2.4 6.6	Completion prior to initial plant start-up	10 CFR 50.55a(g) ASME Code Section XI IWB-2200(a)
	• Steam Generator Tube Preservice Inspection	10 CFR 50.55a(g)	5.4.2.2	Prior to initial entry into Mode 4, Hot Shutdown	10 CFR 50.55a(g) ASME Code Section XI IWB-2200(c)
5.	Reactor Vessel Material Surveillance Program	10 CFR 50.60 10 CFR 50, Appendix H	5.3.1	Prior to initial criticality	License Condition

CP COL 13.4(2)

RCOL2_03.09.06-23
RCOL2_03.09.06-20
RCOL2_03.09.06-20
RCOL2_03.09.06-20

CP COL 13.4(1)

Table 13.4-201 (Sheet 11 of 11)

Operational Programs Required by NRC Regulation and Program Implementation

Item	Program Title	Program Source (Required By)	FSAR (SRP) Section	Implementation	
				Milestone	Requirement
22.	Special Nuclear Material Control and Accounting Program	10 CFR 74 Subpart B (§§ 74.11 - 74.19, excluding 74.17)	13.5.2.2	Prior to receipt of special nuclear material	License Condition

(1) Inservice Testing Program will be fully implemented by generator on line on nuclear heat. Appropriate portions of the program are implemented as necessary to support the system operability requirements of the Technical Specifications.

RCOL2_03.09.06-20
RCOL2_03.09.06-23

Attachment 4

Response to Request for Additional Information No. 6265 (CP RAI #245)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

RAI NO.: 6265 (CP RAI #245)

SRP SECTION: 14.03.07 - Plant Systems - Inspections, Tests, Analyses, and Acceptance Criteria

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects) (SPCV)

DATE OF RAI ISSUE: 1/31/2012

QUESTION NO.: 14.03.07-37

This is a follow-up RAI question to RAI No. 5755 (Comanche Peak RAI Letter Number 220), Question 14.03.07-34.

The applicant's response to Question 14.03.07-34, dated June 23, 2011 failed to address the Seismic classification of the alarm room temperature switches (e.g. for the "C" pump house TS-850-N, TS-851-N, TS-841-N and TS-842-N). These temperature switches must also be Seismic Category II if mounted in the vicinity of safety related equipment. The staff found the rest of the applicant's response Question 14.03.07-34 to be acceptable.

As such, the staff requests that the applicant provide additional information in the COL FSAR about the seismic classification of these alarm room temperature switches.

ANSWER:

In the response to RAI No. 6124 (CP RAI #243), enclosed in the letter with this response, Luminant revised FSAR Figure 9.4-201 to state in Note 5 that the non-safety related instrumentation identified in the figure is classified as Seismic Category II.

Note that FSAR Revision 2 Figures 9.4-201 and 9.4-202 were deleted in FSAR Revision 2 Update Tracking Report Revision 0 submitted on December 20, 2011 (ML12012A101 and ML12012A140), and Figure 9.4-203 was renumbered as Figure 9.4-201.

Impact on R-COLA

None.

Impact on S-COLA

This response is standard.

Impact on DCD

None.