PMComanchePeakPEm Resource

From:	Conly, John [John.Conly@luminant.com]
Sent:	Wednesday, October 06, 2010 2:41 PM
To:	Aitken, Diane; Bell, Russ; Biggins, James; Bird, Bobby; Borsh, Gina; Buschbaum, Denny; Bywater, Russell; Caldwell, Jan; Carver, Ronald; Certrec; Ciocco, Jeff; Clouser, Tim; Collins, Elmo; Conly, John; Cosentino, Carolyn; Degeyter, Brock; Evans, Todd; Flores, Rafael; Frantz, Steve; Goldin, Laura; Hamzehee, Hossein; Ishida, Mutsumi; Johnson, Michael; Kawanago, Shinji; Keithline, Kimberley; Kellenberger, Nick; Koenig, Allan; Kramer, John; Lucas, Mitch; Madden, Fred; Matthews, David; Matthews, Tim; Monarque, Stephen; Monts, Ashley; Moore, Bill; ComanchePeakCOL Resource; Onozuka, Masanori; Paulson, Keith; Plisco, Loren; Reible, Robert; Rund, Jon; Simmons, Jeff; Singal, Balwant; Sirirat, Nan; Takacs, Michael; Tapia, Joe; Tindell, Brian; Turner, Bruce; Volkening, David; Vrahoretis, Susan; Williamson, Alicia; Willingham, Michael; Woodlan, Don; Yeager, Diane
Cc:	Hill, Craig
Subject:	Luminant Submitted Three Letters to NRC
Attachments:	TXNB-10067 RAI 174, 175, 176.pdf; TXNB-10068 RAI 171 Supp.pdf; TXNB-10069 RAI 172.pdf

Luminant has submitted the following three letters to the NRC:

TXNB-10067, which answers the single question in each of RAI #174, #175, and #176

TXNB-10068, which provides a supplemental figure for the earlier response to RAI #171

TXNB-10069, which answers all four questions in RAI #172

If there are any questions regarding these submittals, please contact me or contact Don Woodlan (254-897-6887, Donald.Woodlan@luminant.com)

Thanks,

John Conly

Luminant
COLA Project Manager
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Hearing Identifier: ComanchePeak_COL_Public
Email Number: 1115

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Subject: Luminant Submitted Three Letters to NRC
Sent Date: 10/6/2010 2:40:52 PM
Received Date: 10/6/2010 2:41:11 PM
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MESSAGE	1098	10/6/2010 2:41:11 PM
TXNB-10067 RAI 174, 175, 176.pdf	553418	
TXNB-10068 RAI 171 Supp.pdf	213054	
TXNB-10069 RAI 172.pdf	342247	

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Ref. # 10 CFR 52

October 6, 2010

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. 5004, 5005, AND 5029

Dear Sir:

Luminant Generation Company LLC (Luminant) submits herein the response to Request for Additional Information (RAI) No. 5004, 5005, and 5029 for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. These RAIs involve Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC).

Should you have any questions regarding this response, 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 October 6, 2010.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

Rafael Flores

Attachments: 1. Response to Request for Additional Information No. 5004 (CP RAI #174)
2. Response to Request for Additional Information No. 5005 (CP RAI #175)
3. Response to Request for Additional Information No. 5029 (CP RAI #176)

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Attachment 1

Response to Request for Additional Information No. 5004 (CP RAI #174)

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.: 5004 (CP RAI #174)

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

QUESTIONS for Technical Specification Branch (CTSB)

DATE OF RAI ISSUE: 9/2/2010

QUESTION NO.: 14.03.07-29

The regulatory basis for this question is 10 CFR 50.70 and 10 CFR 50, Appendix B, Criterion III, Design Control.

Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Item 7 in Table A.1-1

In a previous RAI question (RAI Number 81 (3293), Question 14.03.07-5 (13063)), the staff stated that the phrase "heat removal capability transferred design heat load" referred to in the Design Commitment and AC was confusing, and requested the applicant to: (1) indicate what system removes the design heat load from the Emergency Service Water System (ESWS), (2) indicate that that system has the heat removal capability to transfer the design heat load from the ESWS, and (3) revise the nebulous term "adequate" referred to in both the Design Commitment and the AC. The applicant in its response addressed the changes requested by revising the (a) Design Commitment to state that the Ultimate Heat Sink (UHS) components referred to in Table A.1-2 are capable of removing the maximum heat load transferred from the ESWS, (b) Inspections, tests, analyses (ITA) by performing an inspection for the existence of a report, and (c) the AC by continuing to the refer to "adequate" heat removal capability of the UHS from ESWS while maintaining a UHS outlet temperature of 95 degrees Fahrenheit. The staff does not agree that the applicant has fully addressed its requested changes. The staff requests the applicant to make these further changes: (i) the ITA should be the performance of "tests and analyses" not the performance of an "inspection" to determine the heat removal capability of the UHS, and (ii) the AC should be changed to state that analyses and/or test reports exist and conclude that the UHS removes the maximum design heat load of the ESWS while maintaining an outlet temperature of 95 degrees Fahrenheit without using the term "adequate" to refer its heat removal capability.

ANSWER:

The ITA and AC for ITAAC Item 7 in Table A.1-1 have been revised as suggested by the NRC. The ITA has been revised to state that a combination of tests and analyses will be performed to determine the heat removal capability of the as-built UHS system. The AC has been clarified to state that a report exists and concludes that the UHS removes the maximum design heat load of the ESWS while maintaining an outlet temperature of 95 degrees Fahrenheit. This language is chosen to be consistent with the DCD Tier 1 ITAAC.

Luminant has made similar changes to Table A.1-1 Item 5.b.ii and Table A.3-1 Items 5.a and 5.b.

Impact on R-COLA

See attached marked-up COLA Part 10 Revision 1 pages 13, 14, and 32.

Impact on DCD

None.

Appendix A.1

Table A.1-1 (Sheet 3 of 6)

Ultimate Heat Sink System and Essential Service Water System (Portions Outside the Scope of the Certified Design) Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria	
4.a The ASME Code Section III components, identified in Table A.1-2, retain their pressure boundary integrity at their design pressure.	4.a A hydrostatic test will be performed on the as-built components required by the ASME Code Section III to be hydrostatically tested.	4.a The results of the hydrostatic test of the as-built components identified in Table A.1-2 as ASME Code Section III conform to the requirements of the ASME Code Section III.	
4.b The ASME Code Section III piping, identified in FSAR Table 3.2-201, retains its pressure boundary integrity at its design pressure.	4.b A hydrostatic test will be performed on the as-built piping required by the ASME Code Section III to be hydrostatically tested.	4.b The results of the hydrostatic test of the as-built piping identified in FSAR Table 3.2-201 as ASME Code Section III conform to the requirements of the ASME Code Section III.	
5.a The seismic category I equipment, identified in Table A.1-2, ~~can~~is designed to withstand seismic design basis loads without loss of safety function.	5.a.i Inspections will be performed to verify that the seismic category I as-built equipment identified in Table A.1-2 is installed in the location identified in FSAR Table 3.2-201.	5.a.i The seismic category I as-built equipment identified in Table A.1-2 is installed in the location identified in FSAR Table 3.2-201.	RCOL2_14.03.03-3
	5.a.ii Type tests and/or analyses of the seismic category I equipment will be performed.	5.a.ii The results of the type tests and/or analyses conclude that the seismic category I equipment can withstand seismic design basis loads without loss of safety function.	
	5.a.iii Inspections will be performed on the as-built equipment including anchorage.	5.a.iii The as-built equipment including anchorage is seismically bounded by the tested or analyzed conditions.	
5.b Each of the seismic category piping, including supports, identified in FSAR Table 3.2-201, is designed to withstand combined normal and seismic design basis loads without a loss of its ~~functional capability~~safety function.	5.b.i Inspections will be performed to verify that~~on~~ the as-built seismic Category I piping, including supports, identified in FSAR Table 3.2-201 are supported by a seismic Category I structure(s).	5.b.i Report(s) document that ~~E~~each of the as-built seismic ~~c~~Category I piping, including supports, identified in FSAR Table 3.2-201 ~~meets the~~is supported by a seismic ~~c~~Category I structure(s)~~requirements~~.	RCOL2_14.03.03-4
	5.b.ii Inspections and analysis to verify that the as-built piping, including supports identified in FSAR Table 3.2-201 can withstand combined normal and seismic design basis loads without a loss of its safety function will be performed.	5.b.ii A report exists and concludes that each of the as-built seismic Category I piping, including supports, identified in FSAR Table 3.2-201 can withstand combined normal and seismic design basis loads without a loss of its safety function.	RCOL2_14.03.07-29

Appendix A.1

Table A.1-1 (Sheet 4 of 6)

Ultimate Heat Sink System and Essential Service Water System (Portions Outside the Scope of the Certified Design) Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria	
6.a The Class 1E components, identified in Table A.1-2, are powered from their respective Class 1E division.	6.a Tests will be performed on the as-built system by providing a simulated test signal only in ~~each~~ the Class 1E division under test.	6.a The simulated test signal exists at the as-built Class 1E equipment identified in Table A.1-2 under test in the as-built system	RCOL2_14.03.07-22
6.b Separation is provided between Class 1E divisions, and between Class 1E divisions and non-Class 1E cable.	6.b Inspections of the as-built Class 1E divisional cables ~~and raceways~~ will be ~~conducted~~performed.	6.b ~~The as-built Class 1E electrical cables with only one division are routed in raceways assigned to the same division. There are no other safety division electrical cables in a raceway assigned to a different division.~~Physical separation or electrical isolation is provided between the as-built cables of Class 1E divisions and between Class 1E divisions and non-Class 1E cables.	RCOL2_14.03.07-4
7. ~~The system provides adequate heat removal capability transferred design heat load from the ESWS.~~The UHS system is capable of removing the maximum design heat load transferred from the ESWS.	7. ~~Tests and analyses of the as-built system will be performed.~~Tests and analyses to determine the heat removal capability of the as-built UHS system will be performed.	7. ~~A report exists and concludes that the as-built system provides adequate heat removal capability transferred design heat load~~A report exists and concludes that the as-built UHS system removes the maximum design heat load transferred from the ESWS while maintaining a UHS outlet temperature ≤ 95°F..	RCOL2_14.03.07-5 RCOL2_14.03.07-29
8. Controls exist in the MCR to open and close the remotely operated valves identified in Table A.1-2.	8. Tests will be performed on the as-built remotely operated valves listed in Table A.1-2 using controls in the MCR.	8. Controls in the MCR operate to open and close the as-built remotely operated valves listed in Table A.1-2.	
9.a The remotely operated valves, identified in Table A.1-2 to perform an active safety-related, function to change position as indicated in the table.	9.a.i Tests or type tests of the valves will be performed that demonstrate the capability of the valve to operate under its design conditions.	9.a.i Each valve changes position as indicated in Table A.1-2 under design conditions.	
	9.a.ii Tests of the as-built valves will be performed under pre-operational flow, differential pressure, and temperature conditions.	9.a.ii Each as-built valve changes position as indicated in Table A.1-2 under pre-operational test conditions.	

Appendix A.3

Table A.3-1 (Sheet 2 of 3)
UHSRS, ESWPT and PSFSV Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria	
5.a Flood barriers of the UHSRS, ESWPT and PSFSV are installed ~~up to the finished plant grade level to protect against water seepage~~consistent with the design bases for flood protection.	5.a ~~An inspection of the as-built flood barriers will be performed.~~An inspection of the as-built flood barriers will be performed.	5.a ~~he as-built flood barriers are installed up to the finished plant grade level for the UHSRS, ESWPT and PSFSV to protect against water seepage~~A report exists and concludes that the as-built flood barriers of the UHSRS, ESWPT, and PSFSV are installed consistent with the design bases for flood protection..	RCOL2_14.03.07-17 RCOL2_14.03.07-29
5.b Flood doors and flood barriers penetrations of the UHSRS, ESWPT and PSFSV are provided consistent with the design bases for flood protection~~with flood protection features~~.	5.b ~~Inspections of the as-built flood doors and flood penetrations will be performed.~~An inspection of the as-built flood doors and flood penetrations will be performed.	5.b ~~For the UHSRS, ESWPT and PSFSV, the as-built flood doors and flood barrier penetrations are provided with flood protection features to protect against water seepage .~~A report exists and concludes that the as-built flood doors and flood barriers penetrations of the UHSRS, ESWPT and PSFSV are provided consistent with the design bases for flood protection.	RCOL2_14.03.07-18 RCOL2_14.03.07-29
6. Penetrations in the external walls, including those up to the subgrade level if necessary, of the UHSRS, ESWPT and PSFSV are ~~provided with flood protection features below~~sealed up to the external flood level.	6. An inspection will be performed to verify that ~~the flood protection features~~ of the as-built penetrations in the external walls of the UHSRS, ESWPT and PSFSV ~~exist below~~are sealed up to the external flood level.	6. The as-built penetrations in the external walls, including those up to the subgrade level if necessary, of the UHSRS, ESWPT and PSFSV are ~~provided with flood protection features below~~sealed up to the external flood level.	RCOL2_14.03.07-12
7. Redundant safe shutdown components and associated electrical divisions of the UHSRS, ESWPT and PSFSV are separated by 3-hour rated fire barriers to preserve the capability to safely shutdown the plant following a fire. The 3-hour rated fire barriers are placed as required by the FHA.	7. An inspection of the as-built fire barriers will be performed.	7. Redundant safe shutdown components and associated electrical divisions of the as-built UHSRS, ESWPT and PSFSV are separated by 3-hour rated fire barriers to preserve the capability to safely shutdown the plant following a fire. The 3-hour rated as-built fire barriers are placed as required by the FHA.	

Attachment 2

Response to Request for Additional Information No. 5005 (CP RAI #175)

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.: 5005 (CP RAI #175)

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

QUESTIONS for Technical Specification Branch (CTSB)

DATE OF RAI ISSUE: 9/2/2010

QUESTION NO.: 14.03.07-30

The regulatory basis is for this question is 10 CFR 50.70 and 10 CFR 50, Appendix B, Criterion III, Design Control.

Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Items 11 and 12 in Table A.1-1

The staff requested the applicant to revise ITAAC Items 11 and 12 and also Table A.1-3 in RAI question (RAI Number 81 (3293), Question 14.03.07-7 (13065)). The applicant in its response, dated November 13, 2009, made the following revisions: (a) ITAAC 11 in Table A.1-1 was revised to state that the Main Control Room (MCR) alarms and displays in Table A.1-3 can be retrieved, (b) ITAAC 12 in Table A.1-1 was revised to state that Remote Shutdown Console (RSC) alarms, displays, and controls identified in Table A.1-3 exist, and (c) Table A.1-3 was revised to correctly indicate all control functions, alarms, and displays in MCR and on RSC. The staff agreed with the majority of the applicant's response, but the staff did not agree with the following: (i) that MCR controls, displays, and alarms can be retrieved, and that RSC controls, displays, and alarms only exist, and (ii) inspections are being used to verify the proper functioning of controls. The staff requests that ITAAC Item 12 be revised to state that RSC controls, displays, and alarms can be retrieved at the RSC, and that both ITAAC Items 11 and 12 should be revised to require the performance of a combination of tests and inspections because inspections alone cannot verify the operation of controls.

ANSWER:

ITAAC Item 12 has been separated into two ITAAC, 12.a and 12.b. The DC for ITAAC Item 12.a has been revised to state that the RSC alarms and displays identified in Table A.1-3 can be retrieved on the RSC. The DC for ITAAC Item 12.b states that controls on the RSC operate the as-built pumps, fans, and valves identified in Table A.1-3. The ITA for ITAAC Item 12 has been separated to state that (a) inspection of the as-built alarms and displays will be performed, and (b) that tests will be performed on the RSC controls identified in Table A.1-3. Separate AC has been added for the tests in item 12b consistent with those for the MCR functions in ITAAC Items 8 and 10.a. This method is consistent with the latest DCD Tier 1 ITAAC.

Luminant has made similar changes to Table A.2-1 Item 7.

The DC for ITAAC Item 11 in Table A.1-1 does not specify control functions in the MCR. Instead the MCR control functions for the equipment identified in Table A.1-2 and repeated in Table A.1-3 are tested through ITAAC Items 8 and 10.a in Table A.1-1. This is consistent with the latest DCD Tier 1 ITAAC.

Impact on R-COLA

See attached marked-up COLA Part 10 Revision 1 pages15 and 23.

Impact on DCD

None.

Appendix A.1

Table A.1-1 (Sheet 5 of 6)

Ultimate Heat Sink System and Essential Service Water System (Portions Outside the Scope of the Certified Design) Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria	
9.b The valves identified in Table A.1-2 as having PSMS control perform an active safety function after receiving a signal from PSMS.~~Upon the receipt of ECCS actuation signal or UHS basin low water level signal, the blowdown control valve closes automatically.~~	9.b Tests will be performed on the as-built valves in Table A.1-2 using a simulated test signal.	9.b The as-built valves identified in Table A.1-2 as having PSMS control perform the active function identified in the table after receiving a simulated signal.~~Upon the receipt of a simulated test signal, the as-built blowdown control valve closes automatically.~~	RCOL2_14.03.07-6
9.c After loss of motive power, the remotely operated valves, identified in Table A.1-2, assume the indicated loss of motive power position.	9.c Tests of the as-built valves will be performed under the conditions of loss of motive power.	9.c Upon loss of motive power, each as-built remotely operated valve identified in Table A.1 -2 assumes the indicated loss of motive power position.	
10.a Controls exist in the MCR to start and stop the pumps and fans identified in Table A.1-3.	10.a Tests will be performed on the as-built pumps and fans in Table A.1-3 using controls in the MCR.	10.a Controls in the MCR operate to start and stop the as-built pumps and fans listed in Table A.1-3.	
10.b The pumps and fans identified in Table A.1-2~~3~~ ~~start after receiving a signal.~~ as having PSMS control perform as active safety function after receiving a signal from PSMS.	10.b Tests will be performed on the as-built pumps in Table A.1-2 using simulated signal.	10.b The as-built pump and fan identified in Table A.1 -2~~3~~ ~~start~~ as having PSMS control perform the active function identified in the table after receiving a simulated signal.	RCOL2_14.03.07-6
11. MCR alarms and ~~D~~displays of the parameters identified in Table A.1-3 can be retrieved in the MCR.	11. Inspections will be performed for retrievability of the UHS system parameters in the as-built MCR.	11. ~~The~~MCR alarms and displays identified in Table A.1-3 can be retrieved in the as-built MCR.	RCOL2_14.03.07-7
12.a ~~Remote shutdown console (RSC) displays and/or controls provided for the system are identified in Table A.1-3 .~~RCS alarms and displays of the parameters identified in Table A.1-3 can be retrieved on the RSC.	12.a ~~Inspections will be performed on the as-built RSC displays and/or controls for the system.~~Inspections will be performed for retrievability of the UHS and ESWS alarms and displays identified in Table A.1-3 on the as-built RSC.	12.a ~~Displays and/or controls exist on the as-built RSC as identified in Table A.1-3.~~Alarms and displays identified in Table A.1-3 can be retrieved on the as-built RSC.	RCOL2_14.03.07-7 RCOL2_14.03.07-30
12.b Controls on the RSC operate the as-built pumps, fans and valves identified in Table A.1-3.	12.b Tests will be performed on the as-built pumps, fans and valves identified in Table A.1-3 using controls on the asbuilt RSC.	12.b Controls on the RSC operate to open and close the as-built remotely operated valves and to start and stop the as-built pumps and fans identified in Table A.1-3.	
13. Each UHS basin has a volume to satisfy the thirty day cooling water supply criteria.	13. Inspections will be performed to verify the as-built UHS basins include sufficient volume of water.	13. The water volume of the each as-built UHS basin is greater than or equal to 3.12 x 10^6 gallons.	RCOL2_14.03.07-8

Appendix A.2

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

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria	
4. The UHS ESW pump house ventilation system ~~provides and~~ maintains area design temperature limits ~~the proper environmental conditions with~~in the respective room.	4. Tests and analyses of the as-built UHS ESW pump house ventilation system will be performed for all four divisions.	4. The as-built UHS ESW pump house ventilation system ~~provides and maintains the proper environmental conditions~~is capable of maintaining area design temperature limits within the respective room ~~by the exhaust fan and/or unit heater operation~~.	RCOL2_14.03 07-1 RCOL2 14.03 07-15
5.a. Controls exist 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 ~~operate~~ to start and stop the as-built UHS ESW pump house ventilation system exhaust fan and unit heaters identified in Table A.2-3.	RCOL2_14.03. 07-16
5.b. The UHS ESW pump house ventilation system exhaust fans and unit heaters units identified in Table A.2-2~~3~~ as having PSMS control, perform as active safety function~~start~~ after receiving a signal from PSMS.	5.b. Tests of the as-built UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-2 will be performed using real or simulated signals.	5.b. The as-built UHS ESW pump house ventilation system exhaust fans and unit heaters identified in Table A.2-2~~3~~ as having PSMS control, perform an active safety function identified in the table ~~start~~ after receiving a simulated signal.	RCOL2_14.03. 07-6
6. MCR alarms and ~~D~~displays of the ~~UHS ESW pump house ventilation system~~ parameters identified in Table A.2-3 can be retrieved in the MCR.	6. Inspections will be performed for retrievability of the as-built UHS ESW pump house ventilation system parameters in the as-built MCR.	6. ~~The~~MCR alarms and displays identified in Table A.2-3 can be retrieved in the as-built MCR.	RCOL2_14.03. 07-7
7.a ~~Remote shutdown console (RSC) displays and/or controls provided for the UHS ESW pump house ventilation system are identified in Table A.2-3.~~RCS displays of the parameters identified in Table A.2-3 can be retrieved on the RSC.	7.a ~~Inspections will be performed on the as-built RSC displays and/or controls for the as-built UHS ESW pump house ventilation system.~~Inspections will be performed for retrievability of the displays identified in Table A.2-3 on the as-built RSC.	7.a ~~The displays and/or controls exist on the as-built RSC as identified in Table A.2-3.~~Displays identified in Table A.2-3 can be retrieved on the as-built RSC.	RCOL2_14.3.07-30
7.b Controls on the RSC operate the as-built fans and heaters identified in Table A.2-3.	7.b Tests will be performed on the as-built fans and heaters identified in Table A.2- 3 using controls on the as-built RSC.	7.b Controls on the RSC operate to energize and deenergize the as-built heaters and to start and stop the asbuilt fans identified in Table A.2-3.	

Attachment 3

Response to Request for Additional Information No. 5029 (CP RAI #176)

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.: 5029 (CP RAI #176)

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

QUESTIONS for Technical Specification Branch (CTSB)

DATE OF RAI ISSUE: 9/2/2010

QUESTION NO.: 14.03.07-31

Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Item 6.a in Table A.1-1

The regulatory basis for this question is 10 CFR 50.70 and 10 CFR 50, Appendix B, Criterion III, Design Control.

The NRC staff had requested the applicant to revise this ITAAC because the ITAAC is concerned with powering the equipment in Table A.1-2 by certain Class 1E divisions; however, the ultimate heat sink basin blowdown control valves in Table A.1-2 are not categorized according to their respective Class 1E division. The applicant in its response indicated that the valves in question are numbered the same as their respective instrument controllers, and that Figure A.1-1 indicates that the valves are aligned downstream of the respective ESW pumps, which have division designations. While the NRC staff understands the position taken by the applicant, the staff requests the applicant explain why these hydraulically controlled valves are classified by a Class 1E designation.

ANSWER:

The safety function of the blowdown valve is to isolate essential service water blowdown to prevent the loss of the UHS basin water inventory upon receipt of a low basin water level signal or emergency core cooling system actuation signal. To fully address the functions displayed on Table A.1-2, the valves as depicted on Table A.1-2 include both the valves and the controls for the valves.

A solenoid valve actuates to operate the pneumatic actuator for the blowdown control valve. Upon receiving the low basin water level signal, emergency core cooling system actuation signal, or upon loss of power, the solenoid valve vents the air supply from the actuator, which allows the control valve to shut and preserve basin water level. The blowdown control valve is a fail close valve so that failure of the air supply system or that of the valve itself brings it to its closed position. The LOOP sequence (or blackout sequence) signal also actuates the solenoid valve to close the blowdown control valve. The solenoid valve, control circuit, and circuit power supply are classified as Class 1E to assure valve closure upon demand. As such, it is appropriate to reflect this Class 1E designation in Table A.1-2.

Impact on R-COLA

None.

Impact on DCD

None.

Luminant

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CP-201001346
Log # TXNB-10068

Ref. # 10 CFR 52

October 6, 2010

U. S. Nuclear Regulatory Commission
Document Control Desk
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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
SUPPLEMENTAL INFORMATION FOR THE RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 4760

Dear Sir:

Luminant Generation Company LLC (Luminant) submits herein supplemental information for the response to Request for Additional Information (RAI) No. 4760 for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. The RAI involves the affect of the Squaw Creek Reservoir slope on the SSI analysis and the stability of Unit 3 ultimate heat sink structures.

Should you have any questions regarding this supplemental response, 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 October 6, 2010.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

Attachment: Supplemental Response to Request for Additional Information No. 4760 (CP RAI #171)

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SUPPLEMENTAL 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.: 4760 (CP RAI #171)

SRP SECTION: 03.07.02 – Seismic System Analysis

QUESTIONS for Structural Engineering Branch 1 (AP1000/EPR Projects) (SEB1)

DATE OF RAI ISSUE: 7/12/2010

QUESTION NO.: 03.07.02-17

This request for additional information (RAI) is necessary for the staff to determine if the application meets the requirements of 10 CFR Part 50, Appendix A, General Design Criteria 2; 10 CFR Part 50 Appendix S; and 10 CFR Part 100; as well as the guidance in NUREG-0800, 'Standard Review Plan for the Review of Safety Analysis for Nuclear Power Plants,' Chapter 3.7.2, 'Seismic Design Parameters.'

In the response to RAI 22 (2929) question 02.05.04-9, the applicant indicated that the soil-structure interaction (SSI) calculation is bounding and is based upon the calculations using one surface foundation (no-fill) case and four embedded foundation cases. For the embedded foundation cases, it is believed that SSI analyses are based on the half-space assumption of horizontal soil layers extending to infinity in all directions. However, the applicant did not specifically discuss the validation of the half-space assumption for the power block structures setting back from the top of the Squaw Creek reservoir slopes about 150 feet.

The applicant is requested to discuss the potential impact of the nearby slopes indicated in the site profiles on the computed SSI responses to ensure that the computed seismic responses will not be under-estimated at some frequencies of interest.

Specifically, the staff would like to know how the Squaw Creek Reservoir slope may affect the SSI analysis and the stability of Unit 3 ultimate heat sink (UHS) structures, which are located near the reservoir slope, as shown in FSAR Figure 2.1-201.

Also, explain how the retaining wall (as shown in figure 2.5.5-206 of the FSAR) was considered in the UHS SSI analysis. Determine whether failure of the wall would affect the lateral stability of the UHS safety-related structure.

References:

Luminant's Final Responses to Requests for Additional Information No. 2929; Log No. TXNB-09059; dated October 28, 2009; ML093080096.

Luminant's Final Responses to Requests for Additional Information No. 2929; Log No. TXNB-09042; dated September 10, 2009; ML092580684.

SUPPLEMENTAL INFORMATION:

In the response to this question (ML102290040), Figure 1 presented the in-structure response spectra (ISRS) obtained from the SSI analyses of the UHSRS basin foundation slab, for the best estimate and lower bound no-fill cases and for the embedded cases (lower bound separated, best estimate separated, upper bound separated, and high bound separated), together with the horizontal input design response spectra for the 0.1 Hz to 50 Hz frequency range.

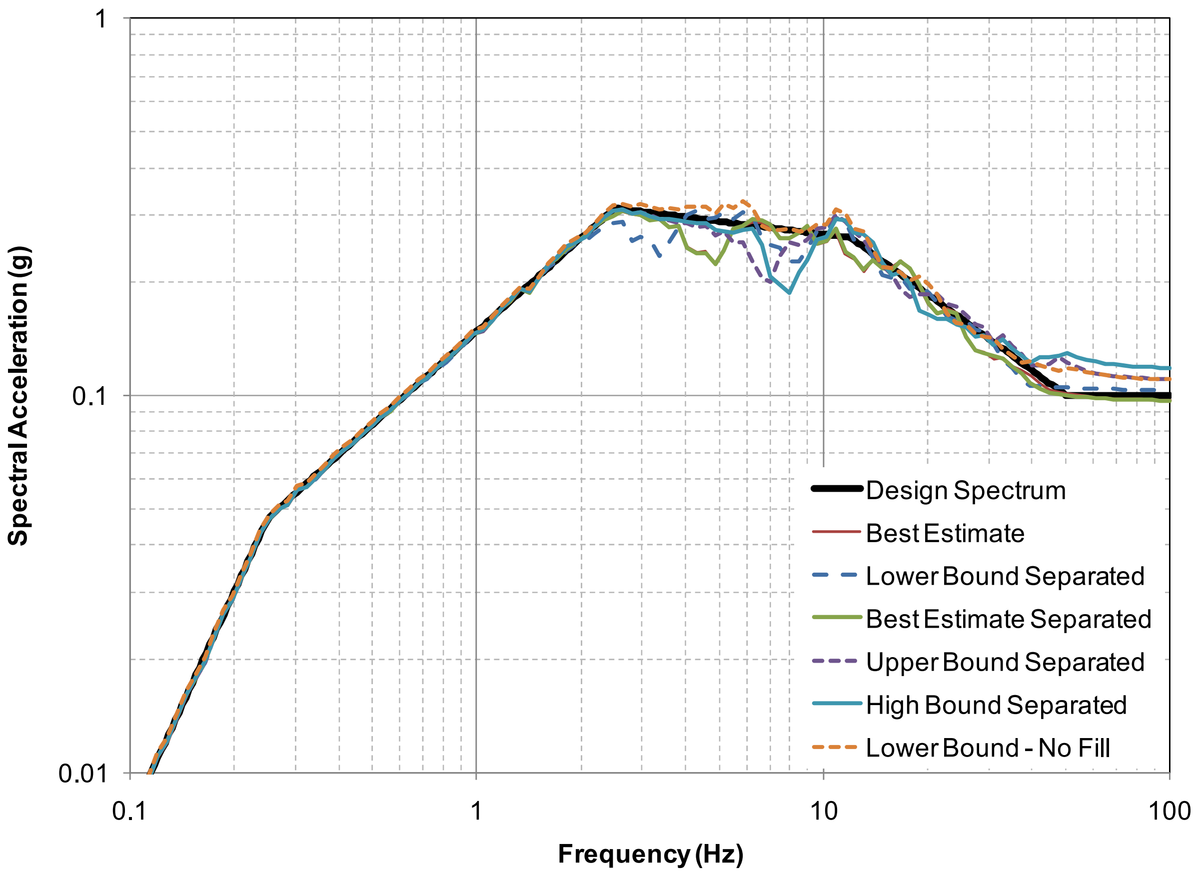
The revised Figure 1 presented below includes data for the 50 Hz to 100 Hz range as requested by the NRC staff. Figure 1 shows that the SSI effects on the seismic response of the UHSRS are small. Since variations in surface geometry and properties of the limestone would affect the soil support and the response is shown to be insensitive to the variation in soil support conditions, responses of the UHSRS are not considered to be sensitive to variations in the surface geometry or properties of the limestone due to the presence of the reservoir. Therefore, the presence of the reservoir slope does not impact the SSI results and the use of a horizontally infinite half-space. Further, the consideration of a broad range of embedment conditions ensures that the ISRS results and the design of the UHSRS envelope the actual site conditions.

Impact on R-COLA

None.

Impact on DCD

None.


1
0.1
0.01
Spectral Acceleration (g)
0.1
1
10
100
Frequency (Hz)
Design Spectrum
Best Estimate
Lower Bound Separated
Best Estimate Separated
Upper Bound Separated
High Bound Separated
Lower Bound - No Fill

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Ref. # 10 CFR 52

October 6, 2010

U. S. Nuclear Regulatory Commission
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SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4
DOCKET NUMBERS 52-034 AND 52-035
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 4678

Dear Sir:

Luminant Generation Company LLC (Luminant) submits herein the response to Request for Additional Information (RAI) No. 4678 (CP RAI #172) for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4. The RAI involves the design of the safety-related ventilation systems.

Should you have any questions regarding this supplemental response, 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 October 6, 2010.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

Rafael Flores

Attachment: Response to Request for Additional Information No. 4678 (CP RAI #172)

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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.: 4678 (CP RAI #172)

SRP SECTION: 06.04 – Control Room Habitability System

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

DATE OF RAI ISSUE: 7/28/2010

QUESTION NO.: 06.04-8

This is a follow-up to RAI 3451 (RAI No 77) Question No. 06.04-6.

Part I

The NRC staff requested that in responding to Question No. 06.04-6 and revising the FSAR, that the applicant establishes a consistency with the following regulatory positions:

Regulatory Position C.5 "Emergency Planning" of Regulatory Guide 1.78;
Regulatory Position 2.5 "Hazardous Chemicals" of Regulatory Guide 1.196;
Regulatory Position 2.2.1 "Comparison of System Design, Configuration, and
Operation with the Licensing Bases" of Regulatory Guide 1.196; and
Regulatory Position 2.7.1 Periodic Evaluations and Maintenance of Regulatory Guide 1.196.

In its response, the applicant stated:

> "…The FSAR 6.4 commitment to RG 1.196 and RG 1.78 includes commitments to all applicable regulatory positions contained therein, including regulatory positions 2.5, 2.2.1, 2.7.1 of RG 1.196 and C.5 of RG 1.78 and any periodic survey recommendations.
>
> As such, these positions will be addressed by Operating and Emergency Operating Procedures, as appropriate, per COLA FSAR 13.5.2.1."

The level of detail provided is not sufficient to make a safety finding. For example, the reference to RG 1.196 is not invoked in any other part of the US-APWR DCD, Revision 2. A short description is needed in the COLA FSAR explaining how the procedures and training will address the noted regulatory positions. The staff requests that the COL applicant amend the FSAR to provide a short description of how the training and procedure will address these regulatory positions.

Part II

The staff closed RAI 3451 (RAI No. 77) Question No. 06.04-6 with the following request for additional information: "*Please include a discussion any arrangements that will be in place for notification of the control room when a release has occurred.*"

The applicant did not respond to this part of the staff's request for additional information in its RAI response. The staff again requests that the COL applicant provide this information.

ANSWER:

Part I

Procedures and training will be developed consistent with the following regulatory positions of RG 1.78 and 1.196 as follows:

RG 1.78, Revision 1 (12/2001)   Regulatory Position C.5

Position C.5 states:

> The licensee should have written emergency procedures to be initiated in the event of a hazardous chemical release within or near the plant. These procedures should address both maximum concentration accidents and maximum concentration-duration accidents and should identify the most probable chemical releases at the station. Methods of detecting the event by station personnel, both during normal workday operation and during minimum staffing periods (late night and weekend shift staffing), should be discussed. Special instrumentation that has been provided for the detection of hazardous chemical releases should be described; the description should include the action initiated by the detecting instrument and the level at which this action is initiated. The emergency procedures should describe the isolation of the control room, the use of protective breathing apparatus or other protective measures, and maintenance of the plant in a safe condition, including the capability for an orderly shut down or scram. Criteria and procedures for evacuating nonessential personnel from the station should also be described.
>
> The emergency planning should include training emergency planning personnel on the use of instruments. It should also include periodic drills on the procedure.
>
> Arrangements should be made with Federal, State, and local agencies or other cognizant organizations for the prompt notification of the nuclear power plant when accidents involving hazardous chemicals have occurred within 5 miles of the plant.

How the CPNPP procedures and training will address the noted regulatory position:

In the response to RAI No. 3451 (CP RAI #77) Question 06.04-5 (ML093510531), FSAR page 6.4-3 was revised to state that all control room concentrations are shown to be below the IDLH limits, such that no procedures are required for operator action to don respirators or isolate the control room to address any of the hazardous chemical releases analyzed for the FSAR. Likewise, FSAR Subsection 6.4.6 states that no special instrumentation is required to detect the release of hazardous chemicals in the vicinity of CPNPP Units 3 and 4 because releases are below the IDLH. However, FSAR Subsection 13.2.1.1.3 has been revised to require operator training for toxic gas releases.

Procedures to address abnormal plant conditions and to implement Emergency Action Levels are developed as described in FSAR Subsection 13.5.2 and address the range of actions necessary to address the event of concern. The Emergency Plan is developed per NEI 99-01, which includes Emergency Action Levels to address a toxic gas release (e.g., see EAL HU3 and HA3 in NEI 99-01 Revision 5). A toxic gas release is within the scope of procedures addressed by FSAR Subsection 13.5.2. Training is addressed in the CPNPP Emergency Plan and in FSAR Section 13.2. FSAR page 6.4-3 has been revised to identify where these procedure and training are addressed in the FSAR.

Both Hood County and Somervell County have requirements that CPNPP be notified when accidents involving hazardous chemicals have occurred within 5 miles of the plant.

RG 1.196, Revision 1 (1/2007) Regulatory Position 2.2.1

Position 2.2.1 states:

> Licensees should compare the design, configuration, and operation of their CRHSs and the systems that are in adjacent areas and could interact with the CRE to their licensing bases to ensure consistency.

How the CPNPP procedures and training will address the noted regulatory position:

Tier 1 Section 2.7.5.1.2 (Table 2.7.5.1-3) has ITAAC that address CRE integrity and verify the functional arrangement of the MCR HVAC equipment and systems in adjacent areas with the design description. Additional FSAR changes are not required because Tier 1 has been incorporated by reference. Verification of systems in adjacent areas is achieved through confirmation of air in-leakage rates, as discussed for RG 1.196 Position 2.2.2 below.

RG 1.196, Revision 1 (1/2007) Regulatory Position 2.2.2

Position 2.2.2 states:

> The conditions that exist in the areas adjacent to the CRE influence the performance of the CRHSs. Although these systems might not be expected to operate during an emergency, during a loss of offsite power (LOOP), or with a single failure, in-leakage may be increased if they do operate. Potential interactions between the CRHSs and adjacent areas that may increase the transfer of contaminants into the CRE should be identified.

How the CPNPP procedures and training will address the noted regulatory position:

The CRE is potentially impacted by the HVAC equipment and systems in areas adjacent to the MCR. This potential impact would take the form of an unacceptable value of in-leakage into the MCR during or after a plant event. DCD Tier 2 Subsection 14.2.12.1.101 describes the pre-operational test for the MCR HVAC system. This test includes verifying air in-leakage per RG 1.196 and ASTM E-741-00 (Section C, Item 6). This testing confirms the functional arrangement of the HVAC equipment and systems in the areas adjacent to the MCR. FSAR page 6.4-3 has been revised to reference the ITAAC and test procedure that addresses these positions.

RG 1.196, Revision 1 (1/2007)   Regulatory Position 2.5

Position 2.5 states:

> The NRC Staff recommends periodic surveys of stationary and mobile sources of hazardous chemicals in the vicinity of the plant site at least once every 3 years and an annual onsite survey of hazardous chemical sources.

How the CPNPP procedures and training will address the noted regulatory position:

FSAR Subsection 6.4.4.2 has been revised to address this requirement.

RG 1.196, Revision 1 (1/2007)   Regulatory Position 2.7.1

Position 2.7.1 states:

> Periodic assessments of the CRHS's material condition, configuration controls, safety analyses, and operating and maintenance procedures should be performed. CRHS programs should assess the system and material conditions as described in Section 9.3.1, "System Material Condition," of NEI 99-03 (Ref. 1).

How the CPNPP procedures and training will address the noted regulatory position:

FSAR Subsection 13.5.2.2 has been revised to address periodic assessment of the CRHS material condition, configuration controls, safety analyses and operating and maintenance procedures in accordance with the guidance in RG 1.196.

Part II

The local emergency plans, which are included in Part 5 of the COLA, include provisions to notify the public, and especially those members of the public that would be directly affected, of abnormal conditions in the community. Luminant has worked with the local communities in the development of these local plans, and conditions such as a release of hazardous material would be within the scope of the plans. Within the plant, it is part of the training provided to all plant employees to inform the control room of any abnormal or adverse condition that occurs.

Both Hood County and Somervell County require prompt notification of CPNPP of any accidents involving hazardous chemicals that have occurred within five miles of the plant. The Unit 3 and 4 control rooms interface with the Unit 1 and 2 control room as described in FSAR Subsection 13.3.2 via the Emergency Plans and would keep each other informed if a toxic gas event were to occur.

Impact on R-COLA

See attached marked-up FSAR Revision 1 pages 6.4-3, 13.2-2, and 13.5-7.

Impact on DCD

None.

will exceed the IDLH (10 ppm) at about 2.5 minutes, remain elevated until approximately 7 minutes, and then start decreasing slowly on a scale based on the volume and ventilation rates in the MCR.

For Class F stability and the worst case sensitivity analysis conditions of an intake height of 0 m, solar radiation of 1150 W/m^2, a wind speed of 6 m/s, air and ground temperature of 115 °F, and cloud cover of 0 tenths, the concentration in the MCR reaches the human detection threshold for chlorine (0.08 ppm) at approximately 0.25 minutes and reaches the maximum concentration (8.0 ppm) in approximately 16 minutes. RCOL2_06.04-9

RG 1.78 states that it is expected that a control room operator will don a respirator and protective clothing, or take other mitigating action within two minutes after detection. ~~The concentration in the MCR reaches the human detection threshold for chlorine (3.5 ppm) at approximately 9 minutes and reaches the maximum concentration (5.7 ppm) in approximately 13 minutes.~~ Also during a toxic gas emergency, the control room operators have the option of manually actuating the emergency isolation mode of the MCR HVAC System. RCOL2_06.04-9

All of the FSAR Table 2.2-214 assumed chemical releases were analyzed with the HABIT code, and produce maximum control room concentration values well below the IDLH. Therefore, there will be no procedure requiring operator action, either donning respirators and protective clothing or manually isolating the control room HVAC System. Both of these response actions will be considered at the discretion of the operators in the event of a toxic gas release. The CPNPP Units 3 and 4 Emergency Plan includes provisions for maintaining self-contained breathing apparatuses (SCBAs) in the control room. A toxic gas release is within the scope of procedures addressed by FSAR Subsection 13.5.2. Training is addressed in the CPNPP Emergency Plan and in Subsection 13.2 of the FSAR. RCOL2_06.04-5 RCOL2_06.04-8

Periodic surveys are conducted for onsite chemicals annually and for offsite at least once every three years for stationary and mobile sources of hazardous chemicals within a five mile radius of the plant in accordance with Regulatory Guide 1.196 Regulatory Position 2.5. In addition, prior to use, chemicals and chemicals of potential impact (halogenated gas or liquid products to be purchased in quantities of 100 pounds or greater) require a Control Room Habitability assessment. Procedures to implement these periodic surveys and chemical evaluations are developed per Subsection 13.5.2.2. RCOL2_06.04-1 RCOL2_06.04-8

ITAAC (Tier 1 Section 2.7.5.1.2) and pre-operational tests (Tier 2 Subsection 14.2.12.1.101) address CRE integrity and verify the functional arrangement of MCR HVAC equipment and systems in adjacent areas with the design description, in accordance with RG 1.196. Operating and maintenance procedures as mentioned in FSAR Section 13.5 address periodic assessment of the CRHS's material condition, configuration controls, safety analyses and operating and maintenance procedures in accordance with the guidance in RG 1.196.

provided by ACAD 08-001, "The Process for Initial Accrediation of Training in the Nuclear Power Industry." FSAR Figure 13.1-205 depicts anticipated milestone dates to support initial fuel load. RCOL2_13.01.01-3

13.2.1.1.1 Licensed Plant Staff Training Program

Replace the content of DCD Subsection 13.2.1.1.1 with the following.

The content of this subsection is discussed above.

13.2.1.1.2 Non-Licensed Plant Staff Training Program (to be verified during construction)

Replace the content of DCD Subsection 13.2.1.1.2 with the following.

The content of this subsection is discussed above.

Add the following Subsection after DCD Subsection 13.2.1.1.2.

13.2.1.1.3 Hazards Awareness Training

Workers and operators will receive initial and annual refresher training for protection from chemical hazards and confined space entry in accordance with 29 CFR 1910. As part of this training, operators receive training for response to toxic gas release events. RCOL2_06.04.-8

13.2.1.2 Coordination with Preoperational Tests and Fuel Loading

Replace the content of DCD Subsection 13.2.1.2 with the following.

The content of this subsection is discussed above.

13.2.2 Applicable Nuclear Regulatory Commission Documents

Replace the content of DCD Subsection 13.2.2 with the following.

The content of this subsection is discussed above.

13.2.3 Combined License Information

Replace the content of DCD Subsection 13.2.3 with the following.

STD COL 13.2(1) ***13.2(1)*** *Training program*
This COL item is addressed in Section 13.2.

STD COL 13.2(2) ***13.2(2)*** *Training programs for reactor operators.*
This COL item is addressed in Section 13.2.

STD COL 13.2(3) ***13.2(3)*** *Training programs for non-licensed plant staff*
This COL item is addressed in Section 13.2.

as appropriate, to vital areas within the station. Information concerning specific design features and administrative provisions of the security plan is accorded limited distribution on a need-to-know basis.

- Procedures address periodic assessment of the Control Room Habitability System's material condition, configuration controls, safety analyses and operating and maintenance procedures in accordance with the guidance in RG 1.196. RCOL2_06.04-8

13.5.3 Combined License Information

Replace the content of DCD Subsection 13.5.3 with the following.

STD COL 13.5(1) ***13.5(1)*** *Administrative procedures*
This COL item is addressed in Subsection 13.5 through 13.5.1.2.

13.5(2) *Deleted from the DCD.*

STD COL 13.5(3) ***13.5(3)*** *Procedures performed by licensed operators in the control room*
This COL item is addressed in Subsection 13.5.2 and 13.5.2.1.

STD COL 13.5(4) ***13.5(4)*** *Different classifications of procedures*
This COL item is addressed in Subsection 13.5.2 and 13.5.2.1.

STD COL 13.5(5) ***13.5(5)*** *Program for developing operating procedures*
This COL item is addressed in Subsection 13.5.2 and 13.5.2.1.

STD COL 13.5(6) ***13.5(6)*** *Program for developing and implementing emergency operating procedures*
This COL item is addressed in Subsection 13.5.2 and 13.5.2.1.

STD COL 13.5(7) ***13.5(7)*** *Classifications of maintenance and other operating procedures*
This COL item is addressed in Subsection 13.5.2.2.

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.: 4678 (CP RAI #172)

SRP SECTION: 06.04 – Control Room Habitability System

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

DATE OF RAI ISSUE: 7/28/2010

QUESTION NO.: 06.04-9

1. Credit being taken for the chemical hazard calculation to support the statement as described in Sec. 6.4.4.2 of COLA Part 2. FSAR

Do any of the calculations credit design features, such as an elevated control room intake, to keep the chemical concentration in the control room below the IDLH (Immediately Dangerous to Life and Health) levels? If so, provide a description in the FSAR of design features credited in the design basis analysis.

2. Justification of HABIT input data – solar radiation and air and ground temperatures

Justify the data used in HABIT analysis, specifically, the solar radiation that will represent the site, while air and ground temperatures, to be consistent with the temperature as shown in the site characteristics table (FSAR Table 2.0-1R).

3. Demonstration of conservatism for the selection of Pasquill stability class and wind speed in the HABIT analysis

FSAR Sec. 6.4.4.2 states that the meteorological condition assumed for the analysis is conservatively set at G stability and 2.5 m/s wind speed. Provide HABIT run results to demonstrate that the selected data set is conservative.

4. Demonstration of peak chemical concentration in main control room obtained from HABIT run for all chemical release hazards under analysis.

FSAR Sec. 6.4.6 concludes that no instrumentation to detect and alarm is required. This conclusion is based on the HABIT run that no hazardous chemical concentrations will exceed the IDLH. To demonstrate that the IDLH has not been exceeded, it is important to verify that the HABIT calculation has not terminated before the peak concentration has occurred. Please verify that the HABIT calculations show the concentration has peaked and is decreasing (or has leveled-off) before the calculation has terminated. Provide the numeric output of the portion of HABIT run that demonstrates the peak chemical concentration in main control room has been calculated.

ANSWER:

Introduction

A sensitivity analysis was performed to justify and show the effects of changes to the original most-limiting analysis described in FSAR Subsection 6.4.4.2. The sensitivity analysis considered changes in control room intake height (14.3 m vs. 0 m), solar radiation values (600 W/m² vs. 1150 W/m²), stability class (E, F, or G), wind speed (1 m/s to 6 m/s, with 6 m/s used as a conservatively higher wind speed than the RG 1.78 95% worst meteorology value based on the joint frequency distribution), air and ground temperatures (77°F, 100°F, 115°F), and cloud cover (0 – 10, in tenths). These sensitivity analysis HABIT runs were performed changing one variable at a time.

As shown in Table 06.04-9-1, Class F stability corresponds to the RG 1.78 95% worst-case meteorology. Accordingly, new HABIT code runs were developed to show the cumulative effect of the worst case variables. The worst-case variables utilized in this analysis for the stability Class F were an intake height of 0 m, solar radiation of 1150 W/m², wind speed of 6 m/s, air and ground temperature of 115°F, and cloud cover of 0 tenths. All results were below the applicable IDLH.

The original HABIT analysis results outlined in FSAR Subsection 6.4.4.2 have been revised to reflect the new HABIT analysis results with Class F stability (per RG 1.78 as discussed in Item 3 below) and the most conservative parameters identified from the sensitivity analysis.

Specific Responses

1. The only design feature used in the original analyses described in FSAR Subsection 6.4.4.2 was a control room intake height of 14.3 m. The control room concentration with this intake height was below its limiting values (IDLH). A HABIT sensitivity analysis comparison was performed with a change in intake height from 14.3 m to 0 m (the same as the assumed release height). The results showed that there is a small increase in concentration, but the concentrations are still well below the limiting values (IDLH). Therefore, the original analyses do not rely on any design features to meet a value less than the limit.

2. The original HABIT analyses in the FSAR used a solar radiation value of 600 W/m^2 for the CPNPP site. The sensitivity analysis comparison referred to above was performed using solar radiation values ranging from 600 W/m^2 to 1150 W/m^2 and showed no significant deviation from the original analyses results. The HABIT sensitivity analysis utilized the DCD 0% exceedance maximum dry bulb temperature of 115°F as a worst-case temperature scenario. The temperature of 115°F is shown in DCD Table 2.0-1 Sheet 1 and in FSAR Table 2.0-1R Sheet 2.

3. The HABIT sensitivity analysis compared results at Classes E, F and G stability and demonstrated that the use of Class G stability is the most conservative. However, as Class G stability occurs less than 5% of the time at the CPNPP site (see Table 06.04-9-1 below), Class F stability is utilized in the HABIT sensitivity analysis per Appendix A of RG 1.78. HABIT sensitivity analyses for Class F stability and a range of wind speeds from 1 m/s to 6 m/s was performed to determine the worst wind speed. A summary of these results are located in Figure 06.04-9-1, which are the results from CHEM (a determination of the chemical concentration inside the control room) and Figure 06.04-9-2, which are the results from EXTRAN (a calculation of the chemical concentration outside the control room at the air intake). The worst-case wind speed was 6 m/s as shown in Figures 06.04-9-1 and 06.04-9-2, below.

4. The new HABIT CHEM analysis results demonstrate that the calculation is asymptotically approaching a maximum for the worst case 6 m/s wind speed (see Figure 06.04-9-1). For lower wind speeds with lower calculated control room concentration curves that have not peaked, the

results are analyzed in terms of the 0.08 ppm odor threshold (from NUREG/CR-6624) for chlorine. In each case, the time between the 0.08 ppm odor threshold limit and the calculated highest concentration is well in excess of the RG 1.78 value of 2 minutes to don SCBAs. As the IDLH value for chlorine is 10 ppm, there is no threat to CRH.

All results of the original and new sensitivity analyses were acceptable. FSAR Subsection 6.4.4.2 has been revised to reflect the new analysis results with Class F stability and the most conservative parameters identified from the sensitivity analyses.

Impact on R-COLA

See attached marked-up FSAR Revision 1 pages 6.4-2 and 6.4-3.

Impact on DCD

None.

Table 06.04-9-1. Total Hours in Each Stability Class

Year	Class A	Class B	Class C	Class D	Class E	Class F	Class G
2001 - 2006	657	576	660	4088	2023	490	261
Percent in Class	7.5	6.6	7.5	46.7	23.1	5.6	3.0

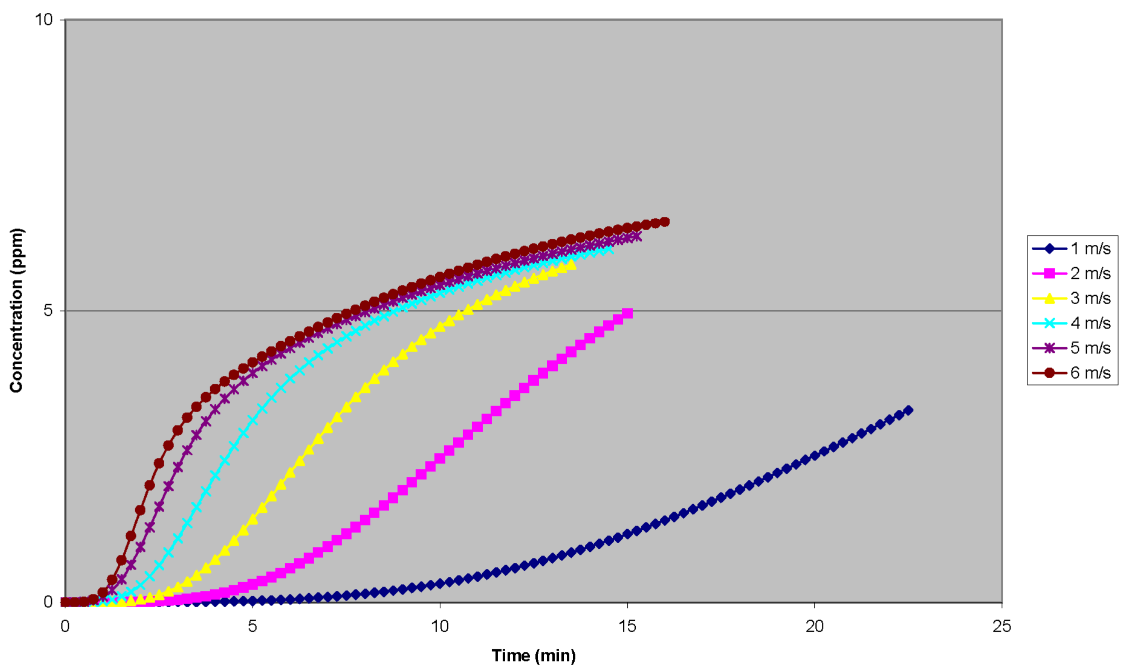

Figure 06.04-9-1. Chlorine Release - CHEM Results (Concentration inside Control Room)

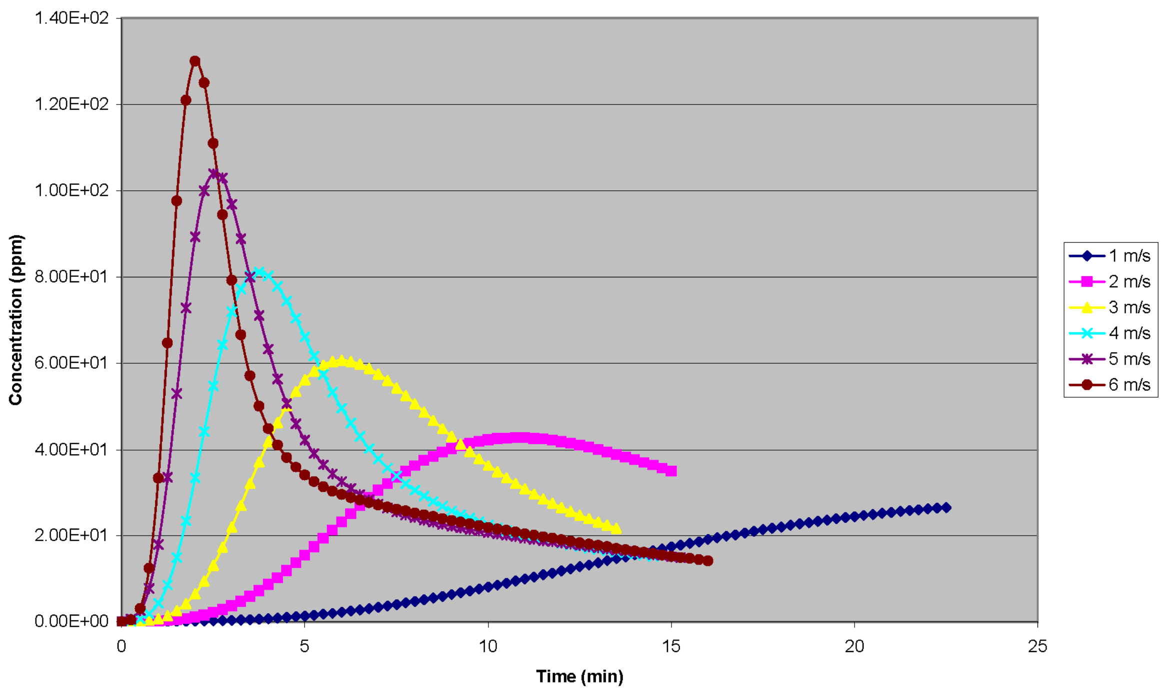

Figure 06.04-9-2. Chlorine Release - EXTRAN Results (Concentration outside Control Room at Air Intake)

requirements of RG 1.78. Chemicals, including chemicals in Comanche Peak Nuclear Power Plant (CPNPP) Units 1 and 2, are identified and screened as described in Subsection 2.2.3.1.3.

Several hazardous chemicals exceed the screening criteria provided in RG 1.78 and an analysis is required to determine control room concentrations. Toxic chemicals that do not meet RG 1.78 screening criteria are identified in Table 2.2-214, and calculated ~~maximun~~maximum control room concentrations of each chemical are also described in Table 2.2-214. Using conservative assumptions and input data for chemical source term, CPNPP Units 3 and 4 control room parameters, site characteristics, and meteorology inputs, postulated chemical releases are analyzed for maximum value concentration to the MCR using the HABIT code, version 1.1. RG 1.78 specifies the use of HABIT 1.1 software for evaluating control room habitability. HABIT software includes modules that evaluate radiological and toxic chemical transport and exposure. For this analysis of chemical release concentrations, EXTRAN, and CHEM modules are utilized in the code. EXTRAN models toxic chemical transport from the selected release point to the heating, ventilation, and air conditioning (HVAC) intake for the MCR. CHEM is then applied by HABIT to model chemical exposure to control room personnel, based on EXTRAN output and MCR design parameters. RCOL2_06.04-9

The meteorological conditions assumed for these cases ~~are conservatively~~were initially set at G stability and 2.5 m/s wind speed, ~~or slightly~~ which is more extreme than 95th percentile for the CPNPP site. The 2.5 m/s wind speed is higher than would be expected for G stability but is conservative in that it introduces the chemical gas into the intakes faster than at lower speeds. The analyses are thus bounding. Lower concentrations are calculated on average using F stability and ~~1 m/s wind speed~~results for a range of wind speeds and worst case conditions are also presented below as a sensitivity analysis. RCOL2_06.04-9 RCOL2_06.04-9

The HABIT-based analysis determines the peak concentration in the MCR and compares this level to the RG 1.78 criterion, the specific chemical listed immediately dangerous to life and health (IDLH). In the cases that were analyzed, all postulated releases led to concentrations that are well below the IDLH level. Values of IDLH for various chemicals are found in NUREG/CR-6624 (Reference 6.4-201).

The most limiting case, or the one that leads to the highest control room concentration relative to the IDLH, is the tanker truck release of chlorine on Highway FM 56, at a distance of closest approach to CPNPP Units 3 and 4 MCR intake of 1.4 miles. Chlorine is used for this case because it is one of the most hazardous Department of Transportation approved chemicals, and bounds other chemicals by toxicity, dispersibility, and quantity that may use public transportation such as Highway FM 56. Using the methodology prescribed by RG 1.78, the HABIT initial analysis for G stability and 2.5 m/s wind speed showed MCR concentration remains below 5.7 ppm at equilibrium in the MCR. This concentration (5.7ppm) is less than the IDLH concentration for chlorine (10 ppm). The concentration at the MCR HVAC intakes, that is the concentration of outside, RCOL2_06.04-9 will exceed the IDLH (10 ppm) at about 2.5 minutes, remain elevated until approximately 7 minutes, and then start decreasing slowly on a scale based on the volume and ventilation rates in the MCR.

For Class F stability and the worst case sensitivity analysis conditions of an intake height of 0 m, solar radiation of 1150 W/m^2, a wind speed of 6 m/s, air and ground temperature of 115 °F, and cloud cover of 0 tenths, the concentration in the MCR reaches the human detection threshold for chlorine (0.08 ppm) at approximately 0.25 minutes and reaches the maximum concentration (8.0 ppm) in approximately 16 minutes. RCOL2_06.04-9

RG 1.78 states that it is expected that a control room operator will don a respirator and protective clothing, or take other mitigating action within two minutes after detection. ~~The concentration in the MCR reaches the human detection threshold for chlorine (3.5 ppm) at approximately 9 minutes and reaches the maximum concentration (5.7 ppm) in approximately 13 minutes.~~ Also during a toxic gas emergency, the control room operators have the option of manually actuating the emergency isolation mode of the MCR HVAC System. RCOL2_06.04-9

All of the FSAR Table 2.2-214 assumed chemical releases were analyzed with the HABIT code, and produce maximum control room concentration values well below the IDLH. Therefore, there will be no procedure requiring operator action, either donning respirators and protective clothing or manually isolating the control room HVAC System. Both of these response actions will be considered at the discretion of the operators in the event of a toxic gas release. The CPNPP Units 3 and 4 Emergency Plan includes provisions for maintaining self-contained breathing apparatuses (SCBAs) in the control room. A toxic gas release is within the scope of procedures addressed by FSAR Subsection 13.5.2. Training is addressed in the CPNPP Emergency Plan and in Subsection 13.2 of the FSAR. RCOL2_06.04-5 RCOL2_06.04-8

Periodic surveys are conducted for onsite chemicals annually and for offsite at least once every three years for stationary and mobile sources of hazardous chemicals within a five mile radius of the plant in accordance with Regulatory Guide 1.196 Regulatory Position 2.5. In addition, prior to use, chemicals and chemicals of potential impact (halogenated gas or liquid products to be purchased in quantities of 100 pounds or greater) require a Control Room Habitability assessment. Procedures to implement these periodic surveys and chemical evaluations are developed per Subsection 13.5.2.2. RCOL2_06.04-1 RCOL2_06.04-8

ITAAC (Tier 1 Section 2.7.5.1.2) and pre-operational tests (Tier 2 Subsection 14.2.12.1.101) address CRE integrity and verify the functional arrangement of MCR HVAC equipment and systems in adjacent areas with the design description, in accordance with RG 1.196. Operating and maintenance procedures as mentioned in FSAR Section 13.5 address periodic assessment of the CRHS's material condition, configuration controls, safety analyses and operating and maintenance procedures in accordance with the guidance in RG 1.196.

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.: 4678 (CP RAI #172)

SRP SECTION: 06.04 – Control Room Habitability System

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

DATE OF RAI ISSUE: 7/28/2010

QUESTION NO.: 06.04-10

New follow-up RAI

This is a follow-up RAI to RAI 3451 (RAI Number 77) Question No. 06.04-4 and consists of three Parts:

Part I

The EXTRAN inputs cite a MCR height of 14.3 meters (i.e. 46.9 feet). The staff's review of US-APWR DCD Revision 2 Figure 6.4-5 and Figure 6.4-6 indicates that the Main Control Room fresh air intakes are at an elevation of between 50'2" and 65'0". The staff requests additional information that explains this apparent mismatch of EXTRAN input from information contained in the DCD. Either the DCD should be amended or the information used in the EXTRAN analysis should be amended to correct this perceived mismatch.

Part II

The staff notes that the applicant used an EXTRAN input parameter of 25ºC for the Storage and Air Temperature. The regulatory position of 3.3 "Atmospheric Dispersion" from Regulatory Guide 1.78 Revision 1 reads that

> "Irrespective of the dispersion model or the analysis tool used, the value of the atmospheric dilution factor between the release point and the control room that is used in the analysis should be that value that is exceeded only 5% of the time."

The staff's review of Revision 1 of the applicant's COLA FSAR Chapter 2 does not support the applicant's decision to use 25ºC (77ºF) as the value for the Storage and Air Temperature. Please verify that 25 C is the 5% exceedance value.

Part III

The staff notes that the applicant's answer to RAI 3451 (RAI No. 77) Question No. 06.04-4 includes two different flow rates into the control room envelope (CRE).

Intake Flow rate: 1,800 cfm (0.8495 m^3/second)
Additional Infiltration Rate: 120 cfm (0.05663 m^3/second).

The staff notes that the 120 cfm flow rate value corresponds to a pressurized CRE in response to radiological control event. Explain why this in-leakage value would correct or be conservative for use in a toxic gas accident response and justify the values selected. If you are crediting of assuming some sort of operator action, please explain what would direct the operators to take such action.

ANSWER:

Part I

The value of 46.9 feet was utilized as a bounding value and does not directly correspond to any physical property.

DCD Figure 6.4-6 indicates the position of the MCR fresh air intake duct penetrating the reactor building wall at an elevation between 50'-2" and 65'-0". The MCR fresh air intakes are equipped with missile shields to protect them from tornado missiles. The bottom of the missile shield is located at an elevation of 48.3 ft. The elevation of the MCR fresh air intake specified as an input of the EXTRAN and CHEM is 46.9 ft including an additional conservatism because the lower the elevation of the MCR fresh air intake, the more conservative the EXTRAN and CHEM analysis are. The new sensitivity analyses referred to in the response to Question 06.04-9 above was performed for the most conservative height of 0 ft. The results show that the small changes are still well within the IDLH threshold. The sensitivity analysis representing the most conservative set of conditions, as described in the response to Question 06.04-9, has been included in the amended calculation.

Part II

The value of 25°C (77°F), used in the original HABIT calculation, is the US-APWR 1% exceedance coincident wet bulb temperature (DCD Table 2.0-1, Sheet 1). The new sensitivity analyses referred to in the response to Question 06.04-9 utilized a higher ground temperature of 115°F, which is the DCD 0% exceedance dry bulb temperature, to calculate the most conservative concentrations for CPNPP Units 3 and 4. The sensitivity analysis comparison results obtained with 0% exceedance dry bulb temperature yield slightly higher concentrations inside the control room compared with the other temperatures. Hence, the 0% exceedance dry bulb value is the most conservative value for the air and ground temperature. The results of this sensitivity analysis demonstrate that the resulting MCR concentrations are acceptable.

Part III

The in-leakage flow rate of 120 cfm was utilized as the worst case additional in-leakage flow rate and was added to the unfiltered bypass flow. Thus, the worst-case condition of maximum intake airflow (1800 cfm intake airflow rate plus 120 cfm infiltration rate) as in-leakage (for any mode) was utilized. These values are consistent with the worst case accident flow rates in DCD Chapter 15, Table 15.6.5-5. No operator action is credited.

Impact on R-COLA

None.

Impact on DCD

None.

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.: 4678 (CP RAI #172)

SRP SECTION: 06.04 – Control Room Habitability System

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

DATE OF RAI ISSUE: 7/28/2010

QUESTION NO.: 06.04-11

This is a follow-up RAI to RAI No. 3968 (RAI No. 25) Question 06.04-7 and consists of two Parts:

Part I

The staff found that the applicant's response to Question 06.04-7 includes an analysis of the CRE asphyxiation hazard (i.e. toxic gas) from the refrigerant charge only. However, the potential for toxic chemicals in the refrigerant oil was not addressed. The staff requests that the COL applicant amend its response to reflect this threat to the CRE habitability from the aspect of a toxic gas hazard to the Control Room operators.

Part II

The staff notes that the applicant's response implies that the US-APWR DCD design will include; (1) a dedicated ventilation purge exhaust system to remove a massive freon/refrigerant oil dump directly to the room from the housed chiller; and (2) pressure relief device to safely relieve pressure buildup due to a fire or other abnormal conditions and the relief discharge is piped outside the system. The applicant implies that both the non-essential chillers in the Auxiliary Building and the essential chillers in the Power Source Building will have these dedicated systems. However in US-APWR DCD RAI No. 338-2325 Question No. 06.04-6, the DCD applicant, MHI, only commits to add these plant design enhancements for the non-essential chillers of the Auxiliary Building. As such, the COL applicant's response is in error with this implication. The staff requests that the COL applicant provide an amended response to correct this error and address the staff's concerns about public health and safety from a massive refrigerant release laced with refrigerant oil.

The staff notes that Revision 2 of the US-APWR DCD failed to include the committed to changes of DCD RAI No. 338-2325 Question No. 06.04-6.

ANSWER:

Part I

The typically-used refrigerant (R-134a) uses R-134a PAG (Polyalkylene Glycol) Oil Charge. The MSDS shows "None Known" for any hazardous exposure limits and "Not Determined" for vapor pressure for this chemical. Hence it was screened out for the control room habitability analysis and the response does not require amendment.

Part II

The inconsistency between the COLA response regarding both non-essential and essential chillers and the DCD response regarding only non-essential chillers was resolved by the response to DCD RAI No. 559-4387 Question 06.04-13 (ML101450208), which addresses the essential chillers.

The response to DCD RAI No. 338-2325 Question 06.04-6 (ML091700682) was revised in the response to DCD RAI No. 559-4387 Question 06.04-13 (ML101450208). The response to Question 06.04-13 states that the equipment rooms in the Power Source Building (containing the essential chiller units) and in the Auxiliary Building (containing the non-essential chiller units) are serviced by the Auxiliary Building HVAC system, which is a once-through system. The response also states that the essential chilled water system and non-essential chilled water system are protected by a pressure-relief device to safely relieve pressure buildup. In the response, the DCD applicant committed to revise DCD Subsections 9.2.7.2.1 and 9.2.7.2.2 to reflect the response to Question 06.04-13.

Luminant hereby amends the response to RAI No. 3968 (RAI CP #125) Question 06.04-7 (ML100550345) to be consistent with the response to DCD Question 06.04-13, in order to address public health and safety concerns from a massive refrigerant release laced with refrigerant oil. The last paragraph of the response to Question 06.04-7 is replaced by the following:

> The refrigerant sources nearest the control room envelope of sufficient quantity to be considered a potential personnel safety concern are in the Power Source Buildings where the essential chillers are located and in the Auxiliary Building where the non-essential chillers are located. Both the essential and non-essential chillers are remote from the Main Control Room. There are also several structural barriers between the chiller units and the Main Control Room which would impede any refrigerant flow toward the Main Control Room Envelope and its supply air inlets. Tight-fitting doors are provided in the chiller unit rooms to minimize the possibility of released refrigerant to pass through the door and reach the MCR or other safety-related facilities. The rooms containing the chiller units are designed in accordance with ANSI/ASHRAE Standard 15, "Safety Standard for Refrigeration Systems." The auxiliary building HVAC system is a once-through system and serves these rooms to exhaust any accumulation of refrigerant due to leaks or a line rupture of the system. Each chiller room has a refrigerant detector that actuates an alarm in the MCR. The chillers are also designed in accordance with ANSI/ASHRAE Standard 15. The refrigeration system is protected by a pressure-relief device to safely relief pressure buildup due to a fire or other abnormal conditions and the relief discharge is piped to the outside of the building. The pressure relief for the chiller rooms and the exterior fresh air intake are designed to prevent refrigerant re-entry into any building, especially the Main Control Room, thereby eliminating an asphyxiation hazard associated with the refrigerant. The typically-used refrigerant (R-134a) uses R-134a PAG (Polyalkylene Glycol) Oil Charge. The MSDS shows "None Known" for any hazardous exposure limits and "Not Determined" for vapor pressure for this chemical. Therefore, the refrigerant oil is not considered hazardous because it is screened out in the control room habitability analysis. As above, these systems are designed to ensure public health and safety from a massive refrigerant release laced with refrigerant oil.

Impact on R-COLA

None.

Impact on DCD

None.