



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

February 16, 2011

EA-10-144

Rafael Flores, Senior Vice President
and Chief Nuclear Officer
Luminant Generation Company LLC
Comanche Peak Nuclear Power Plant
P.O. Box 1002
Glen Rose, TX 76043

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, NRC INSPECTION
REPORT 05000445/2011009; 05000446/2011009, FINAL SIGNIFICANCE
DETERMINATION FOR A PRELIMINARY WHITE FINDING

Dear Mr. Flores:

This letter provides you the final results of our significance determination of the preliminary White finding identified in NRC Inspection Report 05000445/2010006; 05000446/2010006 (ADAMS accession number ML103230122) dated November 19, 2010. The inspection finding was preliminarily characterized as White (i.e., a finding with low to moderate safety significance) using Manual Chapter 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria." This preliminary White finding, and associated apparent violation of NRC requirements, involved the failure of Comanche Peak Nuclear Power Plant personnel to evaluate and then incorporate relevant operating experience information into station instructions, procedures, or drawings. This resulted in a condition where failure of the condensate storage tank diaphragm could block the suction to the auxiliary feedwater pumps.

At your request, a regulatory conference was held on January 13, 2011, to further discuss your views on this issue. A copy of the presentation you provided at this meeting is attached to the Regulatory Conference Meeting Summary dated January 18, 2011 (ADAMS accession number ML110190800). During the meeting your staff described your assessment of the significance of the finding, and the corrective actions taken to resolve it, including the root cause evaluation of the finding. Specifically, along with other actions, you revised the procedures regarding the use of operating experience, provided training to engineering personnel to emphasize expectations regarding the use of operating experience to ensure that this information is entered into your corrective action program and incorporated appropriately into station procedures, and performed a historical review of operating experience received within the last five years. In addition, you conducted extensive testing to establish how the condensate storage tank diaphragm would perform under various conditions. These activities provided insight into the stresses placed on this component during normal plant operation and accident conditions.

After considering the information you provided during the regulatory conference, the NRC has concluded that adjustments to the original assumptions used in the Phase 3 significance determination analysis were appropriate. Specifically, the failure probability of the diaphragm was originally assumed to be 1 percent and was adjusted to 0.1 percent. In addition, it was assumed that the probability that all three auxiliary feedwater pumps would be lost under these circumstances was 25 percent and was revised to 15 percent. Also, the exposure time was adjusted from 90 days to 99 days to account for the date that nitrogen was secured to the condensate storage tank. These adjustments are described in the revised Phase 3 significance determination analysis (Enclosure). For reference, the original Phase 3 significance determination analysis was included in NRC inspection report 05000445/2010006; 05000446/2010006. Based on the revised Phase 3 analysis, the NRC has concluded the significance of the inspection finding is appropriately characterized as Green (i.e., a finding of very low safety significance).

The NRC has also determined that the failure to evaluate and then incorporate relevant operating experience information into station instructions, procedures, or drawings is a violation of 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings. The circumstances surrounding the violation are described in detail in NRC inspection report 05000445/2010006; 05000446/2010006. This violation is being treated as a Noncited Violation (NCV), consistent with the NRC Enforcement Policy. Therefore, no response to this letter is necessary.

However, if you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this letter, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, Region IV, 612 E. Lamar Blvd, Suite 400, Arlington, Texas, 76011-4125; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Comanche Peak. In addition, if you disagree with the crosscutting aspect assigned to this finding, you should provide a response within 30 days of the date of this inspection letter, with the basis for your disagreement, to the Regional Administrator, Region IV, and the NRC Resident Inspector at the Comanche Peak Nuclear Power Plant.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS) accessible from the NRC web site at www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

Sincerely,

/RA/

Anton Vegel, Director
Division of Reactor Safety

Luminant Generation Company LLC
EA-10-144

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Dockets: 50-445; 50-446
Licenses: NPF-87; NPF-89

cc:

Mr. Fred W. Madden, Director
Oversight and Regulatory Affairs
Luminant Generation Company LLC
P.O. Box 1002
Glen Rose, TX 76043

Timothy P. Matthews, Esq
Morgan Lewis
1111 Pennsylvania Avenue, NW
Washington, DC 20004

County Judge
P.O. Box 851
Glen Rose, TX 76043

Mr. Richard A. Ratliff, Chief
Bureau of Radiation Control
Texas Department of Health
P.O. Box 149347, Mail Code 2835
Austin, TX 78714-9347

Environmental and Natural
Resources Policy Director
Office of the Governor
P.O. Box 12428
Austin, TX 78711-3189

Honorable Walter Maynard
County Judge
P.O. Box 851
Glen Rose, TX 76043

Mr. Brian Almon
Public Utility Commission
William B. Travis Building
P.O. Box 13326
Austin, TX 78711-3326

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Ms. Susan M. Jablonski
Office of Permitting, Remediation
and Registration
Texas Commission on
Environmental Quality
MC-122
P.O. Box 13087
Austin, TX 78711-3087

Anthony Jones
Chief Boiler Inspector
Texas Department of Licensing
And Regulation
Boiler Division
E.O. Thompson State Office Building
P.O. Box 12157
Austin, TX 78711

Chief, Technological Hazards
Branch
FEMA Region VI
800 North Loop 288
Federal Regional Center
Denton, TX 76209

Electronic distribution by RIV:

- Regional Administrator (Elmo.Collins@nrc.gov)
- Deputy Regional Administrator (Art.Howell@nrc.gov)
- DRP Director (Kriss.Kennedy@nrc.gov)
- DRP Deputy Director (Troy.Pruett@nrc.gov)
- DRS Director (Anton.Vegel@nrc.gov)
- Senior Resident Inspector (John.Kramer@nrc.gov)
- Resident Inspector (Brian.Tindell@nrc.gov)
- Branch Chief, DRP/A (Wayne.Walker.nrc.gov)
- Senior Project Engineer, DRP/A (David.Proulx@nrc.gov)
- Project Engineer, DRP/A (Nicholas.Hernandez@nrc.gov)
- Project Engineer, DRP/A (Laura.Micewski@nrc.gov)
- CP Administrative Assistant (Sue.Sanner@nrc.gov)
- Public Affairs Officer (Victor.Dricks@nrc.gov)
- Public Affairs Officer (Lara.Uselding@nrc.gov)
- Project Manager (Balwant.Singal@nrc.gov)
- Branch Chief, DRS/TSB (Michael.Hay@nrc.gov)
- RITS Coordinator (Marisa.Herrera@nrc.gov)
- Regional Counsel (Karla.Fuller@nrc.gov)
- Congressional Affairs Officer (Jenny.Weil@nrc.gov)
- OEMail Resource
- R4Enforcement Resource

Inspection Reports/MidCycle and EOC Letters to the following:
ROPreports

Only inspection reports to the following:
OEDO RIV Coordinator (James.Trapp@nrc.gov)
DRS/TSB STA (Dale.Powers@nrc.gov)

File located: S:\DRS\REPORTS\CP Green Letter 2-16-2011-rml.docx

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Publicly Avail	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Sensitive	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Sens. Type Initials	rml
RIV/DRS-EB1	RIV/DRS-C:EB1	RIV/DRS-SRA	RIV/ACES	RIV/D:DRS	
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**Comanche Peak Unit 1
CST Bladder
Final SDP Phase 3 (Post Regulatory Conference)**

A regulatory conference was conducted on January 13, 2011, to discuss the significance of the performance deficiency involving the condition of the condensate storage tank bladder at the Comanche Peak Nuclear Plant, Unit 1. As a result of new information received at this conference, the analyst revised the original Phase 3 analysis.

**The original risk estimate was a delta-CDF of 1.28E-5/yr. (reduced to White per App. M)
The revised risk estimate is a delta-CDF of 9.83E-7/yr.**

In the original analysis, the analyst assumed that there was a 1% probability that the CST bladder would rip apart, sink, and block the AFW suction nozzles in response to an AFW actuation. The licensee performed testing on a scaled-down model of the CST. This testing demonstrated that the nitrogen bubble that existed under the center portion of the bladder for the entire 90-day exposure period would have almost certainly relieved to the annulus of the CST during a rapid drawdown of the tank's contents. This flow path of nitrogen would have followed a differential pressure that would have developed between the bubble and the annulus region of the tank as the water level was lowering. The volume of the bubble was more than sufficient to refill the annulus region of the tank for the entire range of the drawdown. The nitrogen gas would have relieved the stress on the bladder and have allowed it to unfold as designed. This information suggested that the original 1% bladder failure assumption was overly conservative. The analyst adjusted the failure probability to 0.1% to reflect an increased confidence that the bladder would have performed successfully in the event AFW been required during the exposure period.

If the bladder were to fail and block the AFW suction, two outcomes affecting risk were considered: a loss of the CST suction source (Damage State 1), and a more risk-significant situation where the AFW pumps would be lost as well because of overheating or direct damage from the ingestion of pieces of the bladder (Damage State 2). In the original analysis, the analyst assumed that there was a 25% probability that all of the AFW pumps would be lost in the event that the AFW suction were blocked. Based on information provided at the conference, the analyst adjusted this probability to 15%. This was primarily due to a reduction in the estimated probability that operators would start the turbine-driven pump and run to it failure following the failure of both of the motor-driven pumps. The failure rate for Damage State 1 was adjusted to $0.001(0.85) = 0.00085$. The failure rate for Damage State 2 was adjusted to $0.001(0.15) = 0.00015$.

The NRC report stated that nitrogen was secured to the CST on March 15, 2010. At the conference, the licensee listed March 4, 2010, as the date that nitrogen was secured, and therefore the date that the condition developed defining the beginning of the exposure period. The date of June 11, 2010, was confirmed as the date that the condition was alleviated. Therefore, the exposure period was changed from 90 to 99 days.

The following table from the original analysis was adjusted to reflect the changes discussed above:

Damage State	Probability of Failure	Delta-CDF	Adjusted Delta-CDF	Exposure Period Adjustment (99/365)
1 – loss of CST	0.00085	1.332E-3	1.132E-6	3.07E-7
2 – loss of AFW	0.00015	1.663E-2	2.494E-6	6.76E-7
Total Internal Delta- CDF				9.83E-7/yr.

The contribution of external events, as in the case of the original analysis, was not consequential.

Therefore, the revised delta-CDF of the performance deficiency is 9.83E-7/yr.

The analyst identified several conservatisms that could be addressed in the analysis, but the above result did not require further refinement. Additionally, the range of uncertainty in the assumptions was exceptionally large in this analysis. The analyst used judgment to conclude that the majority of the uncertainty would tend to lower the risk estimate, perhaps as much as another order of magnitude. The details of this consideration are discussed below. Therefore, the analyst recommended that the performance deficiency be assigned a Green significance.

There are three assumptions that have bounding characteristics:

1. The phenomenon of the bladder ripping, sinking, and blocking the AFW suction contains several necessary elements that would each have a low probability of occurrence. The nitrogen in the bubble would have to become trapped in some unforeseen way and fail to migrate to the tank annulus, the floaters would have to become dislodged, the bladder would have to rip high enough in the tank and sink fast enough to have a significant effect on the AFW function, and the strips of detached bladder fabric would have to fall in the right location and be drawn up into both of the AFW suction. A qualitative consideration of this combination of events suggests that the assumed failure probability of 1.0E-3 is highly bounding.
2. The assumed necessity to have 2 PORVs to achieve success for feed and bleed operations is potentially conservative. The licensee's analysis states only one PORV is needed.
3. The estimated failure probability for switching AFW suction to the service water system (7.7E-2) was generated by making assumptions for the relevant performance shaping factors. It is probability less likely that operators would fail in this evolution, even though it had not been previously performed, because the required elements are not complicated or time-consuming. Some of the actions, such as manipulating vent valves, would not necessarily need to be performed in an expeditious manner.