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CP-201000250
Log # TXNB-10012

Ref. # 10 CFR 52

February 24, 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. 4207

Dear Sir:

Luminant Generation Company LLC (Luminant) submits herein the response to Request for Additional Information No. 4207 for the Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4.

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 February 24, 2010.

Sincerely,

Luminant Generation Company LLC

Donald R. Woodlan for

Rafael Flores

Attachment: Response to Request for Additional Information No. 4207 (CP RAI #133)

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Electronic distribution w/attachment

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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.: 4207 (CP RAI #133)

SRP SECTION: 12.03-12.04 - Radiation Protection Design Features

QUESTIONS FOR Health Physics Branch (CHPB)

DATE OF RAI ISSUE: 1/21/2010

QUESTION NO.: 12.03-12.04-9

10 CFR 20.1101, 1301, 1302, NUREG-0800, 'Standard Review Plan,' Section 12.03-12.04

In RAI No. 3318 (RAI # 119), Question 12.03-12.04-8 (13150), the NRC staff asked the Applicant to change the combined license (COL) final safety analysis report (FSAR) to better define the as low as reasonably achievable (ALARA) program for construction workers.

The requirement of 10 CFR 20.1301(a)(1) is "The total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem (1 mSv) in a year," and 10 CFR 20.1101(b) requires exposure to members of the public be as low as reasonably achievable (ALARA). In response to the NRC staff's RAI, the Applicant noted that they would continually monitor construction worker dose during construction, they would take the actions appropriate to maintain exposure ALARA, and they would ensure protection of construction workers to radiation exposure from radiography sources and radioactive materials. However, since the Radiation Protection milestones described in COL FSAR Table 13.4-201 do not require any Radiation Protection program elements until the receipt of radioactive sources under the COL License, the NRC staff is unable to determine who has responsibility for monitoring and controlling cumulative construction worker dose resulting from activities of diverse licensees.

The Applicant is requested to update and revise COL FSAR Section 12.4 to describe how the Applicant will meet the requirements of § 20.1101, 1301 and 1302 to control, limit and monitor exposure to members of the public involved in the construction of CPNPP, Units 3 and 4.

ANSWER:

Before the CPNPP Units 3 and 4 Radiation Protection Program (RPP) is active, control of exposures due to diverse licensees is the responsibility of those licensees. For example, the licensee for CPNPP Units 1 and 2 will be responsible to ensure that construction workers for CPNPP Units 3 and 4 do not exceed the doses allowed by 10 CFR 20 and that their dose is ALARA. Likewise, the owners and licensees of sources such as those used for radiography will be responsible for exposures received as a

result of those sources. Once the applicable portions of the CPNPP Units 3 and 4 RPP are in place per Table 13.4-201, the dose to members of the public including the construction workers will be the responsibility of CPNPP Units 3 and 4 (which will monitor and control exposures directly per the RPP) for diverse sources and of the licensees for the diverse licenses (note that the licensees for the diverse licenses must continue to meet the requirements of their licenses).

NEI 07-03A, Section 12.5.4.6 requires:

> Individuals accessing the RCA or a posted area on an escorted basis, for whom occupational dose monitoring of external dose is not required in accordance with 10 CFR Part 20, are monitored either with an individual monitoring device worn by the individual or via an individual monitoring device worn by the escort.

Therefore, contractors that perform diverse activities holding licenses for their radioactive sources may choose to monitor their workers utilizing their own monitoring devices or, if allowed by their license and once the applicable portions of the CPNPP Units 3 and 4 RPP are in place, may rely upon monitoring devices provided by the CPNPP Health Physics Department . In either case, the doses for all workers are tracked and reported in accordance with the CPNPP RPP (refer to NEI 07-03A Section 12.5.4.7) once the applicable portions of the CPNPP Units 3 and 4 RPP are in place.

NEI 07-03A Section 12.5.4.7 states:

> Compliance is maintained with the requirements in 10 CFR 20.1201, 20.1202, 20.1203, and 20.1204, as they relate to demonstrating compliance with internal and external occupational dose limits contained in 10 CFR 20, Subpart C. Doses to adult workers are kept below the occupational dose limits in 10 CFR 20.1201. Doses to workers who are minors and declared pregnant workers are kept below the respective occupational dose limits in 10 CFR 20.1207 and 10 CFR 20.1208. Doses to members of the public are kept below public dose limits in 10 CFR 20.1301, which is demonstrated by complying with the requirements of 10 CFR 20.1302.

Luminant revised FSAR Subsection 12.2.1.1.10 in response to Question 12.02-1 [RAI No. 3509 (CP RAI #85), Luminant letter TXNB-09062 dated November 5, 2009 (ML093130124)] to address licensed sources containing byproduct, source, and special nuclear material. This subsection has been further revised to include language consistent with other facilities that have received a similar RAI.

Impact on R-COLA

See attached marked-up FSAR Rev 1 page 12.2-2.

Impact on S-COLA

None.

Impact on DCD

None.

the evaporation pond, based on the realistic source term of the Waste Monitor Tank and the decontamination factors from NUREG-0017. RCOL2_12.02-2

~~Any additional solid, liquid and gaseous radiation sources that are not identified in Subsection 12.2.1, including radiation sources used for instruments calibration or radiography, will be provided when such site specific information would become available in the procurement phase. These sources will be incorporated in the updated FSAR.~~Additionally, the site maintains contained sources of known isotope and activity containing byproduct, source, or special nuclear materials for use as calibration, check, or radiography sources. Example uses for these types of sources include systems security checks; equipment standardization and calibration; process control; gauging and quality assurance testing; teaching; and nuclear reactor operations. RCOL2_12.02-1

Licensed sources containing byproduct, source, and special nuclear materials that warrant shielding design consideration meet the applicable requirements of 10 CFR Parts 20, 30, 31, 32, 33, 34, 40, 50, and 70. A supplementary warning symbol is used in the presence of large sources of ionizing radiation consistent with the guidance in Regulatory Issue Summary (RIS) 2007-03. Sources maintained on site are shielded to keep personnel exposure ALARA. Sources brought on-site by contractors for activities such as the servicing or calibration of plant instrumentation or the performance of radiography are maintained and used in accordance with the provisions of the licensed utility group or contractor. If these sources must be maintained on site, designated plant personnel approve the storage location and identify appropriate measures for maintaining security and personnel protection. RCOL2_12.03-12.04-9 RCOL2_12.02-1

Specific details regarding the isotope, quantity, form and use of these sources are maintained onsite following their procurement. The following minimum information is maintained:

- Isotopic concentration
- Location on site
- Source strength, form, and geometry (as applicable)
- Description of the use

Written procedures based upon the Radiation Protection Program govern the procurement, receipt, inventory, labeling, leak testing, surveillance, control, transfer, disposal, storage, issuance, and use of these sources. Additionally, these procedures comply with 10 CFR Parts 19 and 20 to assure that occupational doses associated with the control and use of these materials are maintained ALARA.

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.: 4207 (CP RAI #133)

SRP SECTION: 12.03-12.04 - Radiation Protection Design Features

QUESTIONS FOR Health Physics Branch (CHPB)

DATE OF RAI ISSUE: 1/21/2010

QUESTION NO.: 12.03-12.04-10

10 CFR 20.1101, 1301, 1302, NUREG-0800, SRP Section 12.03-12.04

In RAI No. 3318 (RAI# 119), Question 12.03-12.04-5 (13147), the NRC staff asked the Applicant to change the combined license (COL) final safety analysis report (FSAR) to better define the sources of radiation exposure to the construction workers, and to clarify the placement of area monitoring dosimetry used to monitor construction worker exposure.

In response to the NRC staff's RAI, the Applicant noted that they would keep construction worker exposures less than 2 mrem/hr in accordance with the current Radiation Protection Program, STA 650 "General Health Physics Plan" and that monitoring construction worker exposure is unnecessary because limiting construction worker exposure to 2 mrem/hr is as low as reasonably achievable (ALARA). However, controlling construction worker to exposure to dose rates less than 2 mrem/hr does not address § 20.1301(a)(1), which limits doses to members of the public to 100 mrem (1 milli Sv) in a year, nor does it address the requirements of § 20.1101(b), which requires exposure to members of the public be ALARA. The Applicant further noted that construction worker dose will be maintained ALARA in accordance with the Radiation Protection Milestones noted in COL FSAR Table 13.4-201. However, prior to fuel receipt, Table 13.4-201 only requires those Radiation Protection program elements necessary to support COL Licensee receipt of sources. Since the location of the exposure monitoring TLDs are not adequately described in the COL FSAR, the NRC staff is unable to determine that the Applicant is meeting the requirements of § 20.1302(a) to perform surveys sufficient to demonstrate that exposure to members of the public meet the public dose limits of §20.1301(a)(1). Additionally, based on the available information, the NRC staff is unable to determine that the provisions of STA 650 adequately address the requirements of § 20.1101(b) to maintain construction worker radiation exposure ALARA, and § 20.1301(a)(1), which limits doses to members of the public to 100 mrem.

The Applicant is requested to update and revise COL FSAR Section 12.4 to describe how the Applicant will meet the requirements of § 20.1101, 1301 and 1302 to control, limit and monitor exposure to members of the public involved in the construction of CPNPP Units 3 and 4.

ANSWER:

The question indicates that in the Luminant response to Question 12.03-12.04-5 [RAI No. 3318 (CP RAI #119), Luminant letter TXNB-09068 dated November 16, 2009 (ML093230229)], the Applicant noted that monitoring construction worker exposure is unnecessary because limiting construction worker exposure to 2 mrem/hr is as low as reasonably achievable (ALARA). The Luminant response referred to FSAR Subsection 12.4.1.9.2.1, which had been previously revised to state:

> All of these areas will be maintained at the fence area boundary with dose rates <2 mrem/hr in accordance with the current site Radiation Protection Program entitled "General Health Physics Plan" STA-650... As a result, and considering that the dose rates will be maintained <2 mrem/hr at the source fence boundary, the construction worker will not be affected by any of these other direct radiation sources.

During the Health Physics Safety Site Visit conducted in July 2009, the reviewer requested Luminant to identify all potential direct radiation sources and distances to Unit 3 and 4 construction worker activities. The intent of this subsection was to identify all direct radiation sources existing on the site, including areas associated with the operating Units 1 and 2, which could potentially affect construction workers and that ALARA would be applied to ensure worker exposures are minimal. The subsection was also revised to identify the following:

> Other direct radiation sources could potentially affect construction workers at the proposed CPNPP Units 3 and 4 site locations and the modification to the existing Sanitary Sewage Treatment Facility. These other direct radiation sources include the existing Warehouse C Dry Active Waste and Fixed Contamination Tool area, the planned Outage Laydown Area east of the CPNPP Units 1 and 2 Fuel Building, and the existing Storage Level "D" Zone where Class B and C radioactive waste is stored.

Luminant did not state that monitoring of these workers was unnecessary, nor that the Radiation Protection Program (RPP) STA-650 currently existing for Units 1 and 2 that meets 10 CFR 20.1101, 20.1301 and 20.1302 would not be employed for construction workers accessing these direct radiation source areas. Construction workers performing activities in any of the Unit 1 or 2 areas delineated in Subsection 12.4.1.9.2.1 will be working under the authority of the Units 1 and 2 RPP, including an approved Radiation Work Permit (RWP) when required by the CPNPP Units 1 and 2 RPP STA-650. As stated in Subsection 12.4.1.9.2.1, these other direct radiation sources are located thousands of feet away from the proposed Units 3 and 4 construction site. The RPP for CPNPP Units 3 and 4 will be implemented in accordance with milestone schedule provided in Table 13.4-201. Prior to achieving these milestones, any construction worker performing activities in these direct radiation sources identified in Subsection 12.4.1.9.2.1 will perform those activities under the auspices of the CPNPP Units 1 and 2 RPP STA-650. Further, Section 12.5 states that the operational radiation protection program will be re-written to apply to all four CPNPP units and to conform with the approved NEI templates (NEI 07-03A and NEI 07-08) before receipt of radioactive material in Unit 3 in accordance with FSAR Table 13.4-201.

FSAR Subsection 12.4.1.9.2.1 has been revised to clarify that the CPNPP Units 1 and 2 RPP will be used in controlling and monitoring construction worker access to these direct radiation source areas.

Impact on R-COLA

See attached marked-up FSAR Rev 1 pages 12.4-2 and 12.4-3.

Impact on S-COLA

None.

Impact on DCD

None.

12.4.1.9.2 Radiation Sources

Workers constructing CPNPP Units 3 and 4 could be exposed to direct radiation and to gaseous and liquid radioactive effluents emanating from the routine operation of CPNPP Units 1 and 2 as described in the following paragraphs.

12.4.1.9.2.1 Direct Radiation

The refueling water storage tanks are the principal contained sources that could contribute to direct radiation exposure at the construction site. This source is not significant at CPNPP because a 2 ft.-6 in. thick concrete wall is used instead of a thin steel shell wall for the refueling water storage tanks. CPNPP Units 1 and 2 do not have an independent spent fuel storage installation (ISFSI); therefore, this source of direct radiation is not considered. In general, the dose rate at the ISFSI protected area fence would be below 5 mrem/hr. The radiation intensity from the ISFSI decreases with distance from the source, varying as the inverse square of the distance. For a point source, the following relation expresses the inverse square spreading effect:

$$\phi = \frac{S}{4\pi R^2}$$

Where ϕ is the intensity at a surface of a sphere of radius R, and S is the source strength. The energy twice as far from the source is spread over 4 times the area; therefore, it has one-fourth the intensity. Any point source that spreads its influence equally in all directions without limits to its range would obey the inverse square law. The distance from the CPNPP Units 3 and 4 construction area to any potential ISFSI site is well over 1000 ft. For conservatism, a distance of 1000 ft is assumed. Neglecting attenuation in the air and applying the inverse square relation, a 5 mrem/hr dose rate within the confines of the ISFSI (at an assumed distance of 1 ft from the source) is reduced to 5.0E-06 mrem/hr at 1000 ft from the ISFSI facility. Considering an exposure period of 2500 hr/yr, the annual dose to a construction worker from direct radiation emanating from the ISFSI is 1.25E-02 mrem/yr.

Other direct radiation sources could potentially affect construction workers at the proposed CPNPP Units 3 and 4 site locations and the modification to the existing Sanitary Sewage Treatment Facility. These other direct radiation sources include the existing Warehouse C Dry Active Waste and Fixed Contamination Tool area, the planned Outage Laydown Area east of the CPNPP Units 1 and 2 Fuel Building, and the existing Storage Level "D" Zone where Class B and C radioactive waste is stored.

All of these areas will be maintained at the fence area boundary with dose rates <2 mrem/hr in accordance with the current site Radiation Protection Program entitled "General Health Physics Plan" STA-650. Construction workers performing activities in any of the Unit 1 and 2 areas delineated above will be working under the authority of the Units 1 and 2 Radiation Protection Program (which meets the requirements of 10CFR 20.1101, 20.1301 and 20.1302), including an approved Radiation Work Permit (RWP) when required by the

RCOL2_12.03-12.04-10

CPNPP Units 1 and 2 Radiation Protection Program, STA-650. Distances from these areas to the CPNPP Units 3 and 4 proposed construction area are much greater than 1000 feet. Distances between these facilities and a proposed modification to the Sanitary Sewage Treatment Facility to accommodate additional volume, range from approximately 1100 to 1600 feet. As a result, and considering that the dose rates will be maintained <2 mrem/hr at the source fence boundary, the construction worker will not be affected by any of these other direct radiation sources. RCOL2_12.0 3-12.04-10

The CPNPP site will be continually monitored during the construction period and appropriate actions will be taken as necessary to ensure that the construction workers are protected from radiation exposure. Use of radioactive materials and sources during construction, such as sources used in radiography, will be controlled and monitored to maintain construction worker doses ALARA. RCOL2_12.0 3-12.04-8

12.4.1.9.2.2 Gaseous Effluents

Some radioactive gaseous effluents are released on a batch basis from CPNPP Units 1 and 2 to the environment. Release pathways in this category include intentional discharges from the containment purge exhaust and the waste gas decay tanks via the plant vent stacks. Radioactive gaseous effluents are released continuously from CPNPP Units 1 and 2 to the environment from the fuel buildings, safeguards buildings, and auxiliary building (A/B) ventilation exhaust systems, and the condenser off-gas system via the plant vent stacks.

The CPNPP Units 1 and 2 annual releases for 2006 have been reported as 148 Ci of fission and activation gases, 4.23E-04 Ci of iodines, 0.00 Ci of particulates with half-lives greater than eight days, and 47 Ci of tritium (Reference 12.4-201). The annual releases for 2006 are higher than normal for the existing units (Reference 12.4-201).

12.4.1.9.2.3 Liquid Effluents

Effluents from the liquid waste disposal system introduce small amounts of radioactivity into Squaw Creek Reservoir and the low volume waste pond. The annual liquid radioactivity releases for 2006 have been reported as 5.9E-03 Ci of fission and activation products, 1522 Ci of tritium, and 0.54 Ci of dissolved and entrained gases (Reference 12.4-201). The annual releases for 2006 are typical for the existing units; however, the tritium production is dependent on fuel type, power production, and core power history.

12.4.1.9.3 Measured and Calculated Dose Rates

12.4.1.9.3.1 Direct Radiation

CPNPP Units 1 and 2 have a general area monitoring program that monitors various points inside the protected area. The limiting cumulative dose rate is 0.001 mrem/hr from the protected area fence thermoluminescent dosimeter readings for 2006. This dose rate bounds the CPNPP Units 3 and 4 construction