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Thank you,

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Comments on the
Draft Environmental Impact Statement for
Comanche Peak Nuclear Power Plant Units 3 & 4
NUREG-1943

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The description of the blowdown treatment facility (BDTF) (Section 3.2.2.2) is inadequate and leads to overly optimistic estimates of environmental impacts. By its footnote on page 3-12, the NRC staff acknowledges that it realizes that the BDTF design is unreliable. While the footnote might lead one to believe that the uncertainty about the BDTF is just one of many minor uncertainties encountered in preparing an environmental impact statement (EIS), the truth is quite different.

The BDTF is a part of the CPNPP units 3 & 4 design because much of the year cooling tower blowdown would have concentrations of total dissolved solids (TDS) and chloride that are too high to comply with current Lake Granbury water quality standards. As shown by Table 5-2, the TDS concentration in untreated blowdown would exceed the water quality standard almost any time the TDS in Lake Granbury exceeds its mean concentration (1012 mg/L). Other pollutants in untreated blowdown would also exceed regulatory criteria at times.

Section 3.2.2.2 reports that the BDTF would demineralize the blowdown by reverse osmosis and evaporate BDTF wastewater in a 128-ac evaporation pond. However, 128 ac for evaporation reported in Section 3.2.2.2 is a gross underestimate of the actual area that would be required to evaporate the quantity of water that would be produced by the BDTF if Luminant followed through with its commitment to discharge wastewater that did not exceed 2500 mg/L TDS. Evaporation pond details are not presented in the EIS. The reader must carefully review the applicant's responses to requests for additional information (cited in Section 3.5) to learn how the evaporation pond is supposed to work. The following describes problems with the evaporation pond as described.

Luminant estimates that they need to evaporate 5,200 gpm of reverse osmosis brine, about 7.5 million gallons per day (Mg/d). For estimating evaporation pond performance, Luminant assumed a 10-year average pan evaporation rate of 5.1 inches per month, and 182 evaporators in a 2364-ft by 2364-ft (128-acre) evaporation pond. Based on the average pan evaporation rate and Slimline Manufacturing LTD (Slimline)-provided sizing guidance for their Turbo-Mist evaporators, Luminant claims an evaporator efficiency of 35.7%. That is, they expect that over a long period of time, 35.7% of water pumped through the evaporators will be evaporated. To evaluate the reliability of the impacts that would result from the BDTF, one needs to examine Slimline information (http://www.turbomisters.com/downloadable-pdfs.php) and the results of research conducted at the Salton Sea by the U.S. Bureau of Reclamation (http://www.usbr.gov/lc/region/saltnsea/pdf_files/salincntrl/report.pdf). Review of these sources reveals several reasons that the Luminant's evaporation pond claims are not reliable.

The reasons are described below.

Locating 182 misters (evaporators) in 128 acres would reduce evaporator efficiency to the point that the system would fail to achieve an average evaporation rate of 7.5 Mg/d.

The Slimline evaporator web site offers several “suggested” or “sample” pond layouts (http://turbomister.com/downloadable-pdfs.php). The radial arrangements for up to 12 evaporators indicate that the units should be located on a 20-m-diameter island with the evaporators pointed outward. One drawing indicates that the perimeter fence should be located at least 200 m from the evaporators. If 200 m to the perimeter fence is required, 12 evaporators would require 44 acres, plus space for access roads and piping. In this case, the 128 acres for evaporation would only accommodate fewer than 40 evaporators. At this density, the evaporation pond would need to be 700 to 800 acres to accommodate 182 misters. Perhaps another 100-200 acres for access would be required for a total of 800 to 1000 acres.

The U.S. Bureau of Reclamation study of evaporators at the Salton Sea seems to be the only published report on evaporator efficiency relevant to the CPNPP situation. That study offers the following recommendations related to evaporator spacing:

> Based on experience gained in the operation of EES units at the test base, it would be necessary to space the devices at least 250 apart. The devices should be placed in long rows. A survey of operations at the Test Base yielded the conclusion that salt and/or mist from the evaporators can travel 1,300 feet. Therefore, the rows of evaporators should be placed at least 1,300 feet apart. The ideal configuration would be to place the units in long rows over a large pond. The system should be designed to shut down any time the winds exceed 10 miles per hour. Otherwise, the 1,300 feet will not be adequate. Determining drift characteristics at speed in excess of 10 miles per hour was not possible at the Test Base. The permits for the operation of the EES units limited operations to 10 miles and hour or less. Additional research into drift distances at higher speeds would be required before a large-scale system could be designed. However, increased drift distances would only translate into much larger pond sizes and row spacing.

The motivation for the spacing recommendations was the tendency for the evaporators foul with gypsum and other salts. The author noted that mist was often recirculated into the intake of the evaporators. The recirculated mist caused fouling of the motor and impeller blades. To prevent damage to the impellers, they found it necessary to pressure wash the evaporators inside and out “every couple days.” Using the Salton Sea study recommendation, each evaporator would need about 7.5 acres; and 182 evaporators would require 1,365 acres.

In addition to the area required, the Salton Sea report identifies other issues that make operational feasibility of the BDTF evaporation ponds questionable. The number of misters estimated by the applicant is based on an average pan evaporation rate of 5.1 inches per month. The Salton Sea report describes results of pan evaporation rates that were performed with brine of various concentrations. The report states that at a specific gravity of about 1.2, the evaporation rate is about 70% of the rate for pure water. At a specific gravity of 1.3, the

evaporation rate is about 60% of the rate for pure water. Because the Salton Sea Research project stopped pumping brine through evaporators when the specific gravity reached about 1.2, the level just before crystallization begins, it is reasonable to expect the evaporation rate during operation of the BDTF evaporation pond would be reduced to about 70% of the standard value. This implies that on average, the effective pan evaporation rate at CPNPP would be about 3.6 inches per month, 70% of the ten-year average reported by Luminant. This factor would increase the required number of misters (evaporators) from 182 to 260.

The Salton Sea Salinity Control Research Project report also provides important information about operational issues associated with evaporators processing concentrated brine. The report states that the pipes that carried brine were subject to significant gypsum fouling. The report's author suggested that the only way to avoid the problem would be to remove calcium before pumping through the system. The report states that because nozzles on the evaporators plugged with gypsum regularly, the nozzles had to be cleaned or replaced daily. The author noted that biological fouling was also a problem at the Salton Sea. Brine flies and larvae were continuously drawn into the intakes. To reduce plugging of the nozzles due to biological material, two inline filters were used. “The inline filters had to be cleaned numerous times per day to keep the units in operation at proper flow rates and pressures.” Because these fouling issues would substantially decrease the productivity of the evaporators, a system capable of evaporating 7.5 M/d would likely require many more than 260 evaporators to make up for those that are out of service for maintenance.

Evidently, there are strong reasons to believe that the applicant's estimate of 128 acres for the evaporation pond is a gross underestimate. The NRC staff should assure the reliability of estimates from the applicant as required by the Commission's regulations at 10 CFR 51.41 and 51.70(b).

The foregoing discussion is structured as though Luminant would compensate by poorer than expected evaporation pond performance by expanding it and adding more misters. Such a response would lead to larger land use and increases to the impacts that are related to land use. However, expanding the BDTF evaporation pond system, perhaps to more than two square miles, may not be the most attractive solution. For example, it would be much less expensive for Luminant to negotiate a permit from the State of Texas that would allow discharge of blowdown water with higher concentrations of TDS and chloride. Or, the State of Texas could even amend the water quality standard for Lake Granbury, from 2500 to 3000 mg/L for instance. Different reaches of the Brazos River have different water quality standards. While the Lake Granbury 2500-mg/L TDS limit is relatively high, there is no assurance the State of Texas wouldn't raise it further to help Luminant. The EIS does not evaluate the environmental impacts of such a change.

Another possibility might be to ship the brine off site for disposal by deep well injection rather than evaporating it on site. This option would require a large increase in shipments from the site. The EIS does not evaluate the environmental impacts of such an alternative.

The above options are certainly speculative, but each of them is more credible than the applicant's claim to be able to dispose of 7.5 Mg/d of water by operating 182 misters in a 128 acre evaporation pond. There are always uncertainties inherent in preparation of an EIS. The

correct way to deal with such uncertainties is to evaluate the foreseeable impacts of the possibilities and to modify the action to assure that unacceptable impacts do not result. In this case, the NRC has accepted the applicant's proposal as though it were feasible. Surely, the Commission has people on its staff with sufficient technical capabilities to evaluate the applicant's faulty proposal.

An important aspect of the NRC environmental decision is whether there is an alternative site that would be “environmentally preferable or obviously superior to the proposed CPNPP site.” In Section 10.5, the NRC Staff concludes that no alternative site would meet either of these criteria. Perhaps, this conclusion would not hold if the staff gave consideration to the full impacts of a realistic BDTF design. The ultimate reason for the BDTF is the existing poor water quality of the Brazos River at Lake Granbury. A site with better existing water quality would not need a BDTF to meet water quality standards, and would not involve the BDTF impacts that are necessary at Comanche Peak. The staff should prepare an honest assessment of the impacts likely to result from operation of a realistic BDTF, followed by a reassessment of its conclusions about alternative sites.