

October 24, 2006

Mr. Steve J. Redeker, Manager  
Plant Closure & Decommissioning  
Sacramento Municipal Utility District  
14440 Twin Cities Road  
Herald, CA 95638-9799

SUBJECT: RANCHO SECO NUCLEAR GENERATING STATION - REQUEST FOR  
ADDITIONAL INFORMATION RE: LICENSE TERMINATION PLAN  
(TAC NO. L52668)

Dear Mr. Redeker:

By letter dated April 12, 2006, Sacramento Municipal Utility District submitted a License Termination Plan (LTP) and an application to amend the license to incorporate a new license condition addressing the LTP for the Rancho Seco Nuclear Generating Station. The new license condition would document the date of the U.S. Nuclear Regulatory Commission (NRC) approval of the LTP and provide criteria to determine the need for NRC approval of changes to the approved LTP. The NRC staff has reviewed the information provided and has determined that additional information is required as identified in the enclosure.

If you have any questions on these matters, please contact me at: (301) 415-3017.

Sincerely,

**/RA/**

John B. Hickman, Project Manager  
Decommissioning and Uranium Recovery  
Licensing Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Federal and State Materials  
and Environmental Management Programs

Docket No.: 50-312

Enclosure: Request for Additional Information

cc w/encl.: Rancho Seco Service List

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ADDITIONAL INFORMATION RE: LICENSE TERMINATION PLAN  
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REQUEST FOR ADDITIONAL INFORMATION  
REGARDING THE LICENSE TERMINATION PLAN  
RANCHO SECO NUCLEAR GENERATING STATION  
DOCKET NO. 50-312

**General Issues**

1. Chapter 2, Section 2.1.4.3, page 2-4

The first sentence states that a formal site reconnaissance was not performed. However, in the next sentence it states that appropriate site reconnaissance has been performed. Explain the difference between a formal site reconnaissance and the appropriate site reconnaissance.

2. Chapter 2, Section 2.1.4.4, page 2-4

The term “observation” is used but not defined. Clarify what is meant by observation. What was observed? What constitutes an observation?

3. Chapter 2, Section 2.1.5.7.2, Discharge Canal Soil, page 2-13

Were other radionuclides, such as hard-to-detect radionuclides, analyzed for? Were attempts made to detect hard-to-detect radionuclides in this area? And if so, what were the results? Is the discharge Canal Soil area still contaminated as stated on page 2-11?

4. Chapter 2, Section 2.1.5.7.2, Depression Area Soil, page 2-13

The text indicates that you are sending the results to an off site vendor laboratory for the analysis for hard-to-detect radionuclides. However, on the next page, page 2-14, Table 2-4, two radionuclides, Co-60 and Cs-137, which are gamma emitters and not hard-to-detect radionuclides are reported. Were hard-to-detect radionuclides analyzed for? And if so, what were the results?

5. Chapter 2, Section 2.1.5.7.2, page 2-14, Remainder of the Non-Industrial Area

What were the “selected areas” outside of the Industrial Area?

6. Chapter 2, Section 2.1.10, page 2-24

The License Termination Plan (LTP) states, “There were periods of liquid effluent releases during operation of the plant where it was determined that calculated dose to a maximally exposed individual via the liquid effluent pathway exceeded the design objective level of 10 CFR 50, Appendix I. However, it was also determined that these liquid effluent releases did not exceed the concentration limits of 10 CFR 20 or the fuel cycle limit of 40 CFR 190. The dose from which has already been accounted for in accordance with the regulation governing radioactive effluent from power plants and no remediation is required.”

Enclosure

The assumptions used to determine the dose from the liquid effluent pathway differ from the assumptions used to determine the dose from residual radioactivity remaining in soils or structures. Provide a characterization and evaluation of the potentially affected area(s), and demonstrate compliance with 10 CFR 20 Subpart E.

7. Chapter 2, Section 2.1.5.7.2, pages 2-11 and 2-12

NUREG/CR 4286, which is referenced on page 2-12 in the LTP, states that background levels were reached 19 km from the plant. This was in Laguna Creek. The report also stated that elevated levels of contamination were detected in fish at least 8 km from the plant. Please demonstrate that these areas are in compliance with 10 CFR 20 Subpart E.

8. Chapter 2, Section 2.4.7, page 2-45

This section states, "Several areas of the site were specifically targeted for detailed sampling and surveys." Describe what areas were specifically targeted for detailed sampling and surveys and provide results.

9. Chapter 2, Section 2.4.7.1, page 2-46, Paragraph after last bullet on page

This section states, "The nuclide suite includes those nuclides and the suite is found in Chapter 6 of this LTP." This sentence is unclear. Please clarify.

10. Chapter 2, Table 2-15, page 2-47

Please provide more detailed information regarding the concentration(s). More specifically, what radiouclide(s) do these concentrations represent?

11. Chapter 2, Section 2.5.1, page 2-48

This paragraph is awkward. For example, it refers to a mean but provides a range. It discusses hard-to-detect analyses, but indicates Co-60 and Cs-137 which are gamma emitters and are easy to detect radionuclides. The paragraph raises the issue about hard-to-detect radionuclides, but provides no information or data about the presence of these radionuclides.

12. Chapter 2, Figure 2-14 to 2-21 (pages 2-73 thru 2-80)

There is no legend associated with these figures. There was a legend found on page 2-111 but it is not clear whether this legend applies to these figures. Please provide a legend or legends that represent all the figures in this chapter of the LTP.

13. Chapter 2, Table 2-17, page 2-49

This table cites structures with contamination levels below the derived concentration guideline levels (DCGL). Please provide a table that shows all structures with levels that are above the DCGL.

14. Chapter 2, Table 2-17, page 2-49

The maximum direct beta for exterior surfaces for the Bulk Waste Building was reported as  $6.99E+4$  dpm/100 cm<sup>2</sup>. On page 2-48, first sentence, next to last paragraph, it states that the gross beta DCGL for surfaces and structures is  $4.30 E+04$  dpm/100 cm<sup>2</sup>. The value reported in Table 2-17 exceeds the DCGL. This is not consistent with the title of the table. Please provide an explanation for this discrepancy and correct it, if necessary.

15. Chapter 2, Section 2.5.1.1, page 2-49

Please provide more detail on what constitutes a special area.

16. Chapter 2, Section 2.5.1.1, page 2-50

This section states, "Sample locations 10-16, 18, 26, and 28 in Figure 2-14 depict the Special Area sample locations in Table 2-18." Table 2-18 on page 2-50 identifies 7 locations. According to the number of locations that are shown on Figure 2-14, and depending on how 10-16 is defined, the number of sample locations could be as few as 4 locations or as many as 10 locations. There does not appear to be any consistency between what is shown in Table 2-18 and what is shown in Figure 2-14. Please correct this discrepancy.

17. Chapter 2, Table 2-19

Does the concentration in Table 2-19 for the Reactor Bioshield Core and Reactor Bioshield Core Rebar represent the average value of the six core samples or the highest value of the six core samples? It is not clear as to what the concentration for each sample represents.

18. Chapter 2, Section 2.6, page 2-58

"As previously stated, characterization data will be collected as necessary throughout the project. Results of future characterization sample analyses will be evaluated to determine the impact, if any, on the radionuclide identifies, nuclide fractions and the classification of structures, soils, and other site media."

Please provide a reference for "previously stated"

19. Chapter 2, Section 2.7, page 2-59, last sentence

"Furthermore, the current characterization data provide no indication that worker or public health will be adversely affected by the decommissioning."

The report does not make any comparison of health studies of workers or the public with the characterization data. Also, what is meant by adverse? What endpoint was being measured? It is suggested that this statement be removed or revised.

20. Chapter 3, Section 3.2.2 (last sentence) page 3-4

This section states, "No significant activity was found below the concrete floor." Please define quantitatively what is meant by "no significant activity." What would be considered significant?

21. Chapter 3, Section 3.2.4.3, page 3-5

This section states, "Exterior dose rates were 0.2 mrem/hr or less except for a hot spot at the pressurizer bottom where the surge line exits the vessel. To ensure 49 CFR 173.441 radiation limits were met, a carbon steel shielding cover was placed over the surge line and welded to the exterior of the vessel reducing the contact dose rate to less than 200 mrem/hr." What was the dose rate from the hot spot? Why did you elect to shield rather than decontaminate or remediate?

22. Chapter 3, Section 3.3.5 (last bullet) page 3-10

This section states, "Upon completion of the Final Status Survey (FSS), the area is placed under periodic routine survey by Radiation Protection to ensure no re-contamination occurs. If re-contamination is identified, an investigation will be initiated that would result in corrective actions up to and including re-performance of the FSS for that area." What would constitute re-contamination?

23. Chapter 4, Section 4.4.3.1, page 4-6

This section states, "The characterization data for concrete surfaces at the Rancho Seco facility indicates that a major fraction of the contamination occurs in the top 10 millimeters of the concrete." However, on page 2-46, third bullet, it states, "The results of the sampling provided strong evidence that contamination penetrated deeply into some cracks associated with the concrete." It further states, "The results of the characterization contributed significantly to the decision to remove the concrete from the Containment structure down to the plate liner." Please provide clarification and expand the discussion in this area and support the statements with additional data.

24. Chapter 4, Section 4.4.4.1, page 4-7

This section states, "For the evaluation, the truck container is assumed to carry 13.5 m<sup>3</sup> of concrete per shipment based on the NUREG 1757, Volume 2 guidance contained in Table 4.1." The parameter value referenced in Table 4-1 for Waste Shipment Volume ( $V_{\text{ship}}$ ) is 13.6 m<sup>3</sup> per shipment. Also, the reference used in this table is not consistent with the reference stated on page 4-7. Although the difference in values is only 0.1 m<sup>3</sup>, this could have a significant impact on the volume if there are a lot of shipments made during the decommissioning. Please correct this discrepancy.

25. Chapter 4, Section 4.4.4.6, page 4-9

This section discusses the excavation of 52, 972 cubic feet of soil. However, Section 3, "Identification of Remaining Decommissioning Activities" does not discuss or mention soil excavation. Please correct this discrepancy.

26. Chapter 5, Section 5.3.6.3.2, page 5-29

Why is the default pipe length 3 meters? Please provide a technical basis for this statement.

27. Chapter 5, Section 5.4.3.4.3, page 5-43

This section states, "For scan surveys, gross beta measurements appear to be a practical method, under certain conditions, in situ gamma spectroscopy may be a reasonable method for replacing beta scan surveys." Under what conditions would in situ spectroscopy be acceptable? Please describe these conditions.

28. Chapter 5, Section 5.8.2.4.1, page 5-57

This section mentions quality control for exposure rate measurements. However, Table 5-11 (pages 5-36 and 5-37) and Table 5-12 (page 5-38) do not show any exposure rate instruments. Please provide an explanation for this discrepancy.

### **DCGL Issues**

#### **Structural Surface DCGLs**

1. Page 6-24 of LTP of Section 6.6.3.2 "Derivation of Single Nuclide DCGL Values"

An incorrect DTBD document is referenced when describing the development of the results of structural DCGLs and DCF values listed in Table 6-9.

The reference should be changed to DTBD-04-004 "DCGLs for RSNGS Structural Surfaces."

#### **Bulk Material DCGLs**

2. Page 6-27 of the LTP, Table 6-10

The DCGL value for Pu-239 is listed as 1.23E+02 pCi/g, but in the DTBD-05-005 "DCGLs for RSNGS Activated and Volumetrically Contamination Bulk Materials," Table 6-1, the DCGL value for Pu-239 is listed as 2.96E+02 pCi/g. The DCGL detailed analysis provided for NRC review supports the DCGL value of 2.96E+02 pCi/g listed in the DTBD-05-005.

Provide justification and/or clarification for the different DCGL values for Pu-239 and revise the DCGL value, as appropriate.

#### **DCGLs from Alternate Resident Farmer Scenario**

3. Page 6-44 of the LTP, Table 6-19

The total dose listed in the table for 50 years following license termination is 11.6E+01 mrem/y. Adding the listed values for the detected nuclide dose (1.07E+01 mrem/y) and the discounted nuclide potential dose (9.50E-01 mrem/y) at 50 years, the total should be 1.165E+01 mrem/y.

Provide clarification of results and revise the total dose listed in Table 6-19, as appropriate.



4. DTBD-05-001, "Comparison of Dose Impacts from Alternative Scenarios," section 6.3.3

The "drinking water intake" parameter is listed as sensitive for the resident farmer scenario for discounted radionuclides. In the LTP, page 6-42, section 6.8.2.3.2, instead of the "drinking water intake" being identified as a sensitive parameter, the "depth of soil mixing layer" parameter is identified as sensitive. The sensitivity analysis provided for NRC review demonstrates that the "depth of soil mixing layer" parameter is sensitive and the "drinking water intake" parameter is insensitive. The assigned value for the "depth of soil mixing layer" parameter based on the sensitivity analysis is used as the input into the mathematical model to calculate dose.

Provide clarification on identifying the "drinking water intake" parameter as sensitive in the supporting documentation (DTBD-05-001).

5. LTP, section 6.8.2.3.2 and Appendix 6-Z and DTBD-05-001, section 6.3.3

Under the resident farmer scenario for discounted radionuclides, the "contaminated zone erosion rate" parameter is identified as sensitive in the LTP, section 6.8.2.3.2 as well as in the DTBD-05-001, section 6.3.3. The assigned value of  $7.59E-4$  m/y was used in the site-specific mathematical model for the contaminated zone erosion rate but for only the transuranics (electronic file DiscNuc RF Dose1. RAD). However, for the non-transuranics, the default value of  $1.0E-03$  m/y was used as input into the model (electronic file DiscNuc RF Dose2. RAD). Appendix 6-Z of the LTP lists the assigned values for sensitive parameters to be used in the site-specific mathematical model. The "contaminated zone erosion rate" assigned parameter value of  $7.59E-4$  m/y is listed in Appendix 6-Z.

Provide justification for using the default value for the contaminated zone erosion rate parameter for the non-transuranics when the parameter is clearly identified as sensitive in the sensitivity analysis. As appropriate, provide the revised DCF and DCGL values for this scenario.

#### Containment Building DCGLs

6. DTBD-05-007 "Containment Building DCGLs

The DTBD-05-007 "Containment Building DCGLs," is not referenced in the LTP. Suggest adding this reference since it provides the derivation of the DCGLs for the containment building.

7. Page 6-32 of the LTP, Table 6-12 and Table 6-2 of the DTBD-05-007

Page 6-32 of the LTP, Table 6-12 lists the DCF and DCGLs for the renovation/demolition scenario for the containment building. Table 6-2 of the DTBD-05-007 also lists the DCF and DCGLs values for the containment building. The DCF and DCGL values in these two tables should be the same for all radionuclides listed for consistency and clarification purposes. Some of the DCGL values appear to be slightly different due to numerical rounding in the presentation of results. The DCGL values are different for the following radionuclides: Na-22, Co-60, Sr-90, Tc-99, Sb-125, Cs-134, Cs-137, Eu-152, Eu-154, Eu-155, Np-237.

Provide justification for the differences in the DCGL values in the two tables. Provide the revised DCF and DCGLs for the containment building as appropriate.

### **Hydrology Issues**

1. Page 2-25, Section 2.2.1.1 Initial Site Investigation

For soil boring DH-23, please provide a boring log including geologic formation, their depths and the total depth of the soil boring DH-23.

2. Page 2-25, Section 2.2.1.2 Geotechnical Investigation for Proposed Evaporation Ponds

Please provide geologic cross-section(s) showing the subsurface geologic features and the groundwater level(s) indicating the hydraulic gradient(s).

3. Page 2-26, Section 2.2.1.3 2005 Update Investigation

Please provide drilling logs and construction details for the selected soil borings and monitoring wells.

Is it correct to assume that the chosen depth intervals of the screens for each well were separated by at least 35 feet? The word 'feet' is missing after the number 35 and it may be corrected.

4. Page 2-27, Section 2.2.2.1 Geology

In addition to describing the stratigraphy of the site, please provide geologic cross-sections and fence diagrams to better illustrate the subsurface geology and the geohydrologic parameters of the site.

Also, please provide geologic cross-section(s) indicating the subsurface geology for borings MW2, MW3, MW4, OW2 and OW3 (Page 2-28).

5. Page 2-28, Section 2.2.2.2 Hydrology

Please provide a map showing creeks, streams, rivers and other surface water drainage features along with flood elevations, flood and low flow values, and nearby flood gaging stations (also Section 8.5.4.1, Page 8-12).

Please provide 100-year flood plain map to support that the site would not be flooded during a 100-year storm event.

6. Page 2-28, Section 2.2.3 Hydrogeology

Please provide a figure suitable geologic cross-section(s) showing the eleven (11) borings which penetrated the groundwater for the purpose of illustrating the aquifer formation. Please indicate groundwater elevations, flow directions, hydraulic gradients and other geohydrologic parameters.

7. Page 2-29, Section 2.2.4.1 Groundwater Movement

Please show the calculations including the parameters used for the hydraulic gradient value of 0.0028 feet per foot.

Likewise, please show the calculations including the parameters used for the vertical upward gradient of 0.0028 feet per foot (Page 2-30).

Please show the calculations including the parameters used for the estimated hydraulic conductivity values obtained from the laboratory hydraulic conductivity tests and insitu packer permeability tests (Page 2-30).

8. Page 8-13, Section 8.5.4.2 Hydrogeology

The last paragraph states that "... the permeability of the site soils result in infiltration rates (from several hundred to several thousand years) that effectively preclude any radiological impact on the aquifer or the closest well to the site by the facility". Please provide calculations or data from publications to support this statement.