



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
SUPPORTING AMENDMENT NO. 114 TO FACILITY OPERATING LICENSE DPR-54
RANCHO SECO NUCLEAR GENERATING STATION, UNIT 1
DOCKET NO. 50-312

1.0 INTRODUCTION

By letters dated June 10, 1988 and January 11, 1989, the Sacramento Municipal Utility District (SMUD) proposed changes to the Technical Specifications (TS) for the Rancho Seco Nuclear Generating Station. These changes consist primarily of refinements to radioactive effluent technical specifications (RETS) which had been approved on March 17, 1988 by Amendment No. 98 to Facility Operating License No. DPR-54 for Rancho Seco. Other proposed changes consist of administrative modifications to maintain consistency in technical objective and format.

Amendment 98 had been issued to impose more stringent liquid effluent requirements on Rancho Seco to account for the arid environment in the vicinity of the plant. The initial Rancho Seco RETS were based on Standard TS which were developed for the typical nuclear plant which discharges liquid effluents into a large body of water to dilute and disperse the radioactivity. In the case of Rancho Seco, there is no large body of water to dilute plant discharges and the contribution to the offsite dose from radioactivity released from Rancho Seco is more significant than from the typical plant.

Design objectives which govern offsite liquid releases are listed in 10 CFR 50, Appendix I. Due to Rancho Seco's atypical environment, the standard RETS are not an appropriate model to control offsite dose limits to meet the design objectives as specified in Appendix I. The RETS specify a lower limit of detection (LLD) to be used during analysis for radioisotopes in discharge samples. The inputs to the calculation for determining offsite dose include concentration of all the radionuclides (in excess of LLD) in the water being discharged. At a typical plant, the contribution to the offsite dose from any nuclide whose concentration is less than the LLD, as specified in the standard RETS, would be insignificant. However, at Rancho Seco, it is possible to exceed the offsite dose limits as specified by Appendix I while discharging water in concentrations less than the detection capability (LLD) required by the standard RETS.

Amendment 98 lowered the required LLD for Rancho Seco effluents to a level which would ensure that any contribution to the offsite dose which is significant to the Appendix I guidelines would be detected. The objective of the revised Rancho Seco LLD (Amendment 98) was to enable the

plant to compute offsite doses resulting from liquid effluents to 50% of Appendix I guidelines based on pre-release samples and to 10% of Appendix I guidelines based on monthly composite samples (post-release). The Rancho Saco pre-release LLD's as specified by Amendment 98 are a factor of 25 less than the standard RETS requirements and post-release LLD's are a factor of 125 less than the standard. The analysis techniques associated with these significantly lower LLD's are extremely demanding and challenge the state of the art for "field" analysis. Based on approximately one year of experience, the licensee determined that the LLD's, specified in Amendment 98, for several of the radioisotopes were not practical to achieve in the "field." The proposed amendment would increase the required LLD's for several isotopes commensurate with achievable field analysis techniques. The LLD's for several radioisotopes which are easier to detect in the "field" were lowered to compensate for the raised LLD's of radioisotopes which are more difficult to detect. The overall objective for computing 50% (pre-release) and 10% (post-release) of Appendix I criteria is not changed.

2.0 EVALUATION

Amendment 98 listed the typical radioisotopes contained in nuclear power plant effluents and specified a LLD to be used for each during analyses of effluent samples. The value of each LLD was computed to provide assurance that the concentration of every radioisotope contained in each batch of waste water which could provide a mathematically significant contribution to the offsite dose calculation was detected. Radionuclide concentrations in each batch of waste water are used to determine the total radioactivity in that batch. The total radioactivity in each batch is converted, using the site specific offsite dose calculation manual, to offsite dose. A running total of the dose contributions from each waste water batch is maintained to control cumulative offsite dose to 3 millirem per year (Appendix I design objective).

The licensee's operating experience indicates that it is not practical to analyze waste water samples from onsite collection tanks (batch collection tanks) using the LLD's currently specified for 5 of the 16 radioisotopes listed in the technical specifications and used as inputs to the offsite dose calculation. The 5 radioisotopes, their current LLD's and the new LLD's proposed by the licensee are listed below.

isotope	Current LLD ($\mu\text{Ci/cc}$)	Proposed LLD ($\mu\text{Ci/cc}$)
Mo-99	2E-8	6E-8
Ce-144	2E-8	6E-8
Ba-140	2E-8	6E-8
Fe-59	4E-9	8E-9
Zn-65	4E-9	6E-9

The difference between the current LLD's and those proposed by the licensee equates to a quantity of radioisotopes released from the site which would be omitted from the dose computation of the annual offsite dose.

To compensate for the quantity of radioactivity released from the site and omitted from the dose computation if the revised LLD's are adopted, the licensee proposes to lower the currently specified LLD's for several isotopes and thus maintain the overall objective of the liquid effluent program, i.e., incorporate a sampling program with sufficient sensitivity to control liquid effluents to within 50 and 10 percent of the Appendix I guidelines.

The LLD's for 4 isotopes were decreased to compensate for the reduced sensitivity of the 5 isotopes which are difficult to detect. The 4 isotopes, their current LLD's and the new LLD's proposed by the licensee are listed below:

Isotope	Current LLD ($\mu\text{Ci/cc}$)	Proposed LLD ($\mu\text{Ci/cc}$)
Sr-89	3E-8	5E-9
Sr-90	3E-8	1E-9
Cs-134	4E-9	3E-9
Cs-137	4E-9	3E-9

Six isotopes were removed from the monthly composite sampling list. The six isotopes are :

Mo-99
Cs-135
Ce-141
Ce-144
Ba-140
H-3

Although excluded from the post-release composite sampling requirements, the six isotopes are included in the post-release offsite dose calculation based on their measured pre-release concentration or LLD. This is a conservative change and, as such, will not decrease the licensee's ability to meet the Appendix I dose objectives.

The staff agrees that the changes proposed by the licensee do not alter the overall sensitivity for calculating the cumulative offsite dose resulting from radioactive liquid effluents. The isotopes whose LLD's the licensee proposes to increase are not the predominant isotopes associated with power reactor waste water and are not significant in terms of contribution to offsite dose. If concentrations of these isotopes are in the LLD range, concentrations of the more predominant isotopes will be significantly higher. The overall impact on annual offsite dose from the less predominant isotopes in their LLD range will not be mathematically significant.

Based on our evaluation associated with Amendment 98 that concluded that the Rancho Seco RETS are adequate to regulate liquid effluents from the plant to within 10 CFR 50, Appendix I guidelines and the evaluation of changes requested by this proposed amendment, we conclude that changes to the LLD's as requested will not make a significant impact on the licensee's ability to regulate liquid effluents. Periodic monitoring of the offsite environment, as required by the technical specifications, will verify the adequacy of the liquid effluent program at Rancho Seco.

Specific changes associated with modifications to the LLD's involve the following sections of the revised technical specifications:

- Table 4.21-1,
- Specifications 4.21,
- Table 4.26-1 (LLD definition).

Additionally, the following sections of the technical specifications were changed to maintain technical consistency and improve format:

- Table 4.21 (previous tables 4.21-1 and 4.21-2 were combined)
- Surveillance requirements and bases of Specifications 4.21.1 and 4.21.2.

3.0 CONTACT WITH STATE OFFICIAL

The NRC staff has advised the Department of Health Services, State of California, of the proposed determination of no significant hazards consideration. No comments were received.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves changes in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, and in surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

5.0 CONCLUSION

We have concluded, based on the considerations discussed above, that (1) there is reasonable assurance that the health and safety of the public

will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to common defense and security or to the health and safety of the public.

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Dated: October 26, 1989