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Director
Nuclear Regulatory Affairs

June 27, 2011

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: **San Onofre Nuclear Generating Station, Units 2 and 3**
Docket Nos. 50-361 and 50-362
Extension of Lead Fuel Assembly Program for SONGS Unit 2 Cycle 17

Reference: 1. Letter from NRC (Hall) to SCE (Ridenoure) dated December 17, 2009, Units 2 and 3 – Temporary Exemption from the Requirements of 10 CFR Part 50, Section 50.46 and Appendix K for Lead Fuel Assemblies (TAC Nos. ME0602 and ME0603)," (ADAMS Accession Number ML090860415).

Dear Sir or Madam:

This letter is provided as an update of the status and plan for the San Onofre Nuclear Generating Station (SONGS) Lead Fuel Assembly (LFA) program and the Southern California Edison (SCE) plan to introduce additional LFAs in the SONGS Unit 2 Cycle 17 reactor core.

The Referenced letter provided Temporary Exemption from specific requirements of 10 CFR Part 50, Part 50.46 and Appendix K for Lead Fuel Assemblies. The temporary exemption allows up to sixteen LFAs with M5^{TM} alloy cladding manufactured by AREVA NP to be inserted into the SONGS Unit 2 reactor core or into the SONGS Unit 3 reactor core. Eight AREVA LFAs were loaded into the Unit 2 core during its Cycle 16 refueling outage. The exemption allows the LFAs to be used for up to three operating cycles.

In addition to the eight Unit 2 AREVA LFAs currently scheduled for their second cycle of operation in Unit 2 Cycle 17, Southern California Edison (SCE) plans to introduce eight additional fresh AREVA LFAs in the Unit 2 Cycle 17 reactor core, consistent with the referenced exemption.

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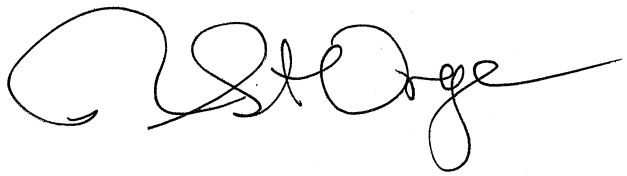
Additionally, eight fresh Westinghouse Modified Standard Design (MSD) LFAs are planned to be inserted in the Unit 2 Cycle 17 reactor core. The design of the Westinghouse LFAs is in accordance with 10 CFR 50.46 and Appendix K. Therefore, the Westinghouse MSD LFAs do not require an exemption. The additional AREVA and Westinghouse LFAs will bring the total number of LFAs in the Unit 2 Cycle 17 core to twenty-four.

The planned LFA implementation for Unit 2 Cycle 17 continues to meet SONGS 2 and 3 Technical Specifications. The additional sixteen LFAs are expected to reside in the core for up to a total of three cycles of operation (i.e., through Cycle 19). Enclosure 1 provides details of this plan.

Should you have any questions, or require additional information, please contact Ms. Linda T. Conklin at (949) 368-9443.

Sincerely,



Enclosure 1: Unit 2 Cycle 17 Lead Fuel Assembly Program

cc: E. E. Collins, Regional Administrator, NRC Region IV
R. Hall, NRC Project Manager, San Onofre Units 2 and 3
G. G. Warnick, NRC Senior Resident Inspector, San Onofre Units 2 and 3

ENCLOSURE 1

Unit 2 Cycle 17 Lead Fuel Assembly Program

Introduction

This document provides an update of the status of the San Onofre Nuclear Generating Station (SONGS) Lead Fuel Assembly (LFA) program and the Southern California Edison (SCE) plan to introduce additional LFAs in the SONGS Unit 2 Cycle 17 reactor core.

The SONGS Unit 2 or Unit 3 core consists of 217 fuel assemblies. Each fuel assembly consists of 236 fuel rods. The rods are arranged in a square 16 x 16 array (CE16). The fuel rods consist of slightly enriched uranium dioxide cylindrical ceramic pellets, encapsulated within a cylindrical Zircaloy, ZIRLO®, or M5™ tube.

Lead Fuel Assembly Program Summary

The goal of the LFA program is to provide an alternative fuel design to eliminate grid-to-rod fretting fuel failures. The use of LFAs enables the implementation of a more robust design to eliminate the grid to rod fretting fuel failures seen at SONGS. Eight AREVA LFAs with M5™ cladding were loaded into the SONGS Unit 2 core during its Cycle 16 refueling outage, and eight Westinghouse Modified Standard Design (MSD) LFAs were loaded into the SONGS Unit 3 core during its Cycle 16 refueling outage.

The end of cycle Unit 3 Cycle 15 post irradiation examination fuel inspections performed in November 2010, revealed grid-to-rod fretting failures in not only twice or thrice burned core peripheral fuel assemblies but also in once burned core peripheral assemblies. As such, SCE has decided to increase the number of LFAs in Unit 2 Cycle 17 (and possibly Unit 3 Cycle 17) to expand grid testing in order to minimize or eliminate grid-to-rod fretting.

In addition to the eight AREVA LFAs currently scheduled for a second cycle of operation in Unit 2 Cycle 17, SCE intends to introduce eight additional fresh AREVA LFAs and eight fresh Westinghouse MSD LFAs in Unit 2 Cycle 17. This will bring the total number of LFAs scheduled to be installed in Unit 2 Cycle 17 to twenty-four. Consistent with the Unit 2 Cycle 16 LFA plan, these 16 new LFAs are expected to reside in the core for up to three cycles of operation.

LFA Mechanical Design Description

The eight additional AREVA LFAs to be installed in Unit 2 Cycle 17 are mechanically identical to those described in Reference 2 and approved by the NRC in References 3 and 4. In Reference 3, the NRC approved a temporary exemption for the use of AREVA M5™ cladding for up to 16 AREVA fuel assemblies. SCE will remain compliant with that approval by adding these eight additional AREVA LFAs. SCE will also maintain compliance with the commitments approved by the NRC in Reference 4 for these eight additional AREVA LFAs.

The Westinghouse SONGS MSD LFAs is an evolutionary design to the current SONGS 16x16 standard design fuel. The MSD LFAs use ZIRLO® cladding material, consistent with the standard SONGS fuel. The MSD LFA design adds grid-to-rod fretting resistant features to the current SONGS standard design. The component areas that differ from SONGS standard design are the mid-grids, the top grid, the guide tubes and the upper end fitting.

The mid-grids were modified to adopt a vertical I-spring configuration on the outer strap in all perimeter cell locations. In addition, the contact lengths for the interior strap cantilever springs were increased. A straight strip Inconel top grid replaced the standard Zircaloy wavy grid to allow longer spring feature relaxation time. The modifications to the Upper End Fitting and changing guide thimble material to Stress-Relief Annealed (SRA) ZIRLO® were done to mitigate the effects of the increase in fuel assembly growth during irradiation.

LFA in Non-limiting Core Regions

SONGS Technical Specification (TS) 4.2.1 "Fuel Assemblies," states:

> *"The reactor shall contain 217 fuel assemblies. Each assembly shall consist of a matrix of Zircaloy or ZIRLO™ clad fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO_2) as fuel material. Integral or Discrete Burnable Absorber Rods may be used. They may include: borosilicate glass – Na_2O-B_2O_3-SiO_2 components, boron carbide – B_4C, zirconium boride – ZrB_2, gadolinium oxide – Gd_2O_3, erbium oxide – Er_2O_3. Limited substitutions of zirconium alloy (such as ZIRLO™ or Zircaloy) or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions."*

Per TS 4.2.1, SCE is will place all 24 LFAs in non-limiting core regions. As specified in Reference 4, non-limiting core regions are core locations where the peak integrated radial power peaking factor is 0.95 or less of the core maximum integrated radial power peaking factor at all times in core life. Therefore, the LFAs will not contain the limiting rod in the core and will have margin relative to the bounding peaking factors used in safety analyses. All LFAs will be explicitly modeled in the SONGS core physics models and their impact will be analyzed in the cycle-specific core physics calculations that support the reload analyses.

In Unit 2 Cycle 17 all LFAs will be placed exclusively on the core periphery. For subsequent cycles containing the LFAs, SCE will explicitly model and analyze the LFAs in the reload core physics analyses. In addition to being once or twice burned, the reload core design for these subsequent cycles will determine the physical placements

of the LFAs such that the LFAs will continue to operate at radial power peaking factors lower than the 0.95 criterion, thereby ensuring that the LFAs remain in non-limiting core regions.

Poolside LFA Examinations

Consistent with Reference 4, poolside LFA examinations to assess key performance measures will include, as a minimum, 4-face inspections of representative LFAs. Based on results of the inspection, the inspection scope may be expanded. Additional scope inspections could include, but are not limited to, additional visual inspections, oxide/crud lift-off measurements, fretting and diameter measurements, shoulder gap, assembly length and guide tube wear measurements. These inspections will be performed prior to re-use of the LFA for an additional cycle of operation.

References

1. SCE-9801-P-A, “Reload Analysis Methodology for the San Onofre Nuclear Generating Station Units 2 and 3”, June 1999 (proprietary).

2. Letter from SCE (Short) to NRC dated January 30, 2009, “Request for Temporary Exemption from the Provisions of 10 CFR 50.46 and 10 CFR 50, Appendix K for Lead Fuel Assemblies… [for] San Onofre Nuclear Generating Station, Units 2 and 3”, (ADAMS Accession Number ML090360738).

3. Letter from NRC (Hall) to SCE (Ridenoure) dated December 17, 2009, “SONGS, Units 2 and 3 – Temporary Exemption from the Requirements of 10 CFR Part 50, Section 50.46 and Appendix K for Lead Fuel Assemblies (TAC Nos. ME0602 and ME0603), (ADAMS Accession Number ML090860415).

4. Letter from NRC (Hall) to SCE (Ridenoure) dated December 15, 2009, “SONGS Units 2 and 3 – Issuance of Amendments Revising Technical Specification 5.7.1.5, “Core Operating Limits Report (COLR)” (TAC Nos. ME0604 and ME0605), (ADAMS Accession Number ML093220105).