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November 3, 2014

10 CFR 50.12

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Subject: **Docket No. 50-206, 50-361, 50-362, and 72-041**
Response to Request for Additional Information
Regarding Emergency Planning Exemption Request
San Onofre Nuclear Generating Station, Units 1, 2, 3 and ISFSI

Reference: (1) Letter from T. J. Palmisano (SCE) to the U.S. Nuclear Regulatory Commission (NRC) dated March 31, 2014; Subject: Docket Nos. 50-206, 50-361, 50-362, and 72-041, Emergency Planning Exemption Request, San Onofre Nuclear Generating Station, Units 1, 2, 3, and Independent Spent Fuel Storage Installation

(2) E-mail from T. J. Wengert (NRC) to A. L Sterdis (SCE) dated October 2, 2014; Subject: Draft Request for Additional Information (RAI) Re: Emergency Planning Exemption Request (TAC NOS 3835, 3836 and 3837), ADAMS Accession No. ML14286A025

Dear Sir or Madam:

By letter dated March 31, 2014 (Reference 1), Southern California Edison (SCE) submitted an exemption request from certain requirements of 10 CFR 50.47, "Emergency Plans," and 10 CFR Part 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," for San Onofre Nuclear Generating Station (SONGS) Units 1, 2, and 3, and the Independent Spent Fuel Storage Installation (ISFSI). Granting the exemptions requested is necessary to support review and approval of a Permanently Defueled Emergency Plan and associated Emergency Action Levels both of which are being addressed separately.

By e-mail dated October 2, 2014 (Reference 2), the NRC requested additional information related to the proposed exemption request. The response to the NRC request for additional information is contained in the Enclosure to this letter. The conclusions of the no significant hazards consideration and environmental considerations contained in Reference 1 are not affected by, and remain applicable to, this request for additional information.

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There are no new regulatory commitments in this submittal.

Should you have any questions, or require additional information, please contact Ms. Andrea Sterdis at (949) 368-9985.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 11/3/2014

Sincerely,

Enclosure: Response to NRC Request for Additional Information

cc: M. L. Dapas, Regional Administrator, NRC Region IV
T. J. Wengert, NRC Project Manager, SONGS Units 2 and 3
R. E. Lantz, NRC Region IV, San Onofre Units 2 and 3
G. G. Warnick, NRC Senior Resident Inspector, SONGS Units 2 and 3

ENCLOSURE

Response to NRC Request for Additional Information (RAI-016)

Regarding Emergency Planning Exemption Request

NRC Request for Additional Information

By e-mail dated October 2, 2014, the NRC provided a Request for Additional Information (RAI) regarding Southern California Edison's (SCE's) Emergency Planning exemption request dated March 31, 2014. The NRC RAI and the SCE response are provided below.

NRC RAI:

By letter dated March 31, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14092A332), as supplemented by letter dated September 9, 2014 (ADAMS Accession No. ML14258A003), Southern California Edison (SCE) requested exemptions from portions of Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR 50) for the San Onofre Nuclear Generating Station (SONGS) Units 1, 2 and 3 Radiological Emergency Response Plan. Specifically, SCE requested exemption from certain emergency plan (EP) requirements of 10 CFR 50.47(b), 10 CFR 50.47(c)(2), and Section IV to Appendix E of 10 CFR 50. The requested exemptions would allow SCE to reduce some emergency plan requirements and subsequently revise the SONGS Radiological Emergency Response Plan consistent with the permanently defueled condition of the reactors.

Based on the Nuclear Regulatory Commission (NRC) staff's review of SCE's EP exemption request submittals, a response to the following draft request for additional information (RAI) is required to facilitate completion of the staff's technical review. I am sending you this preliminary copy to give you an opportunity to ask clarifying questions if the request is not clear. This RAI will be made publicly available following your review.

RAI-016

Section 9.1.3 of the SONGS Updated Final Safety Analysis Report (UFSAR), Rev. 36, described that the spent fuel pool (SFP) cooling systems consisted of redundant pumps powered from Class IE power supplies, the SFP cooling system pumps could supply makeup to the pool from the seismically-qualified refueling water storage tank to the SFP, and the safety-related shutdown cooling system could be used for SFP cooling when not required by technical specifications for core cooling. The alignment with the NUREG-1738 Staff Decommissioning Assumptions and Industry Decommissioning Commitments related to the SFP cooling system provided by letter dated September 9, 2014, suggests that the described capabilities would not be maintained while fuel remains in the SFP. Please describe the minimum design criteria with respect to redundancy and quality of the SFP normal makeup and cooling systems (including essential supporting systems) that will be maintained during decommissioning while fuel remains in the SFP.

SCE Response:

1. OVERVIEW

Section 9.1.3 of the SONGS Updated Final Safety Analysis Report (UFSAR), Revision 37, describes the systems that provide Spent Fuel Pool (SFP) cooling and makeup. Since the last UFSAR submittal to NRC (Revision 36), SONGS has issued Revision 37 which is the current revision and is used in this response. The next UFSAR Revision submittal to NRC is required by May 2015 and is planned for January 2015.

Since cessation of operations at SONGS, the decay heat load is significantly lower due to the more than 33 months of decay time of the fuel. The current SFP heat load is less than 10% of the maximum design SFP heat load. The lower decay heat load and lower potential boundary dose consequences, as determined by the revised UFSAR Chapter 15 analysis as submitted to NRC on September 17, 2014, result in the elimination of requirements for safety-related cooling and makeup systems.

Section 2 of this response describes the changes that have been made to the Systems, Structures and Components (SSCs) that provide SFP cooling and makeup including principal design criteria for redundancy, electrical power supply, Quality Classification and Seismic design. These changes that support the transition to decontamination and dismantlement, have been implemented utilizing regulatory change processes including 10 CFR 50.59.

Section 3 of this response provides an overview of the SSCs that are being designed to provide SFP cooling while facilitating the retirement of the existing plant systems as part of decommissioning. Section 3 includes the design attributes for the SFP Island that will provide the cooling function. Design of the SFP Island is in progress with a forecast installation in early 2015. The design changes and installation activities are being controlled in compliance with standard design change processes including 10 CFR 50.59 and the commitment management process to the extent it impacts commitments. The NUREG-1738 Staff Decommissioning Assumptions (SDAs) and Industry Decommissioning Commitments (IDCs) are included in the SONGS UFSAR, and are thereby addressed in the design change processes.

The purpose of the SFP Island design is to allow retirement of systems that transfer heat from the SFPs to the current heat sink (the Pacific Ocean) as part of the decommissioning process. The SFP Island will remove heat from the SFPs using water-to-air heat exchangers (chillers to atmosphere).

Section 4 of this response provides an overview of the SSCs that are being designed to provide SFP makeup while facilitating the retirement of the existing plant systems as part of decommissioning. Section 4 includes the design

attributes for the SSCs providing SFP makeup during decommissioning. Design of the SFP makeup is in progress with a forecast installation in early 2015. The design changes and installation activities are being controlled in compliance with standard design change processes including 10 CFR 50.59 and the commitment management process to the extent it impacts commitments. The NUREG-1738 SDAs and IDCs are included in the SONGS UFSAR, and are thereby addressed in the design change processes.

2. Current SFP Cooling and Makeup Functions (post June 2013)

Due to the significant reduction in SFP heat load since final plant shutdown and the reduction in potential boundary dose consequences for the few remaining credible events, the SFP cooling and inventory makeup functional requirements are reduced. Changes have been made to the installed plant systems to support system retirement.

As stated in the NUREG-1738 Executive Summary, "....the staff's analyses and conclusions apply to decommissioning facilities with SFPs that meet the design and operational characteristics assumed in the risk analysis. These characteristics are identified in the study as industry decommissioning commitments (IDCs) and staff decommissioning assumptions (SDAs)." SCE provided confirmation that the intent of each of the IDCs and SDAs is met in the response to (MF3835) RAI-011, in the RAI responses submitted to NRC on September 9, 2014.

Changes made to the installed plant SFP cooling and inventory makeup systems have been controlled by appropriate design change processes, including 10 CFR 50.59.

a. Current SFP Cooling and Makeup Overviews

i. Current SFP Cooling

The SFP Cooling system for each SFP consists of two 100% capacity cooling loops, including one fuel pool cooling pump per loop, and one fuel pool heat exchanger per loop. The SFP Cooling Pumps are connected to a common suction header and a common return header. SFP water is circulated by the SFP Cooling Pumps through the SFP heat exchangers where it is cooled. The heat is rejected to the component cooling water system and then to the Pacific Ocean.

As noted in the NRC's RAI, the Shutdown Cooling System was capable of providing an additional method to cool the SFP when not required to perform other safety functions. The Shutdown Cooling

System has been removed from service in preparation for decontamination and dismantlement.

ii. Current SFP Makeup

Prior to permanent cessation of operations, there was one SFP Makeup Pump per unit, with a design capacity of 150 gpm. This pump previously took suction from the Refueling Water Storage Tank (RWST). The RWST has been removed from service in preparation for system retirement. Currently, makeup is provided from the Primary Plant Makeup Storage Tank through two Primary Makeup Tank Pumps with a flow capacity of approximately 160 gpm each.

b. Redundancy

i. Current SFP Cooling

As described in Section 2(a)(i), each unit has two 100% capacity cooling loops except for some common piping.

ii. Current SFP Makeup

There are two Primary Makeup Pumps providing makeup to each SFP, with a single Primary Plant Makeup Storage Tank per Unit. Makeup is also available from the opposite unit's SFP through the SFP purification piping. In addition to the normal makeup capabilities, there are additional makeup capabilities (mitigating strategies) described in detail in SCE's letter to the NRC dated October 6, 2014 (see response to RAI-010).

c. Electrical Power (configuration applies to current SFP cooling and makeup)

Currently, the plant's electrical distribution system powers the SFP cooling and makeup SSCs with 480V power fed from 4kV buses supplied by two offsite power sources and backed by an Emergency Diesel Generator (EDG). These electrical power sources for SFP cooling were previously classified as Class 1E during operations, and have been reclassified as non-Class 1E due to reduced functional requirements for the cooling and makeup systems. In addition, one EDG per unit has been removed from service in preparation for system retirement, decontamination and dismantling. One EDG per unit remains functional, with each EDG powering a separate train. The EDGs are capable of powering the opposite unit via an inter-unit cross-tie such that on-site backup power

remains available to both trains on both units, should one of the remaining EDGs become unavailable.

d. Seismic

i. Current SFP Cooling Seismic Design

The current SFP cooling system is classified as Seismic Category I.

ii. Current SFP Makeup Seismic Design

The Primary Plant Makeup Water Storage Tank is classified as Seismic Category I. The Primary Makeup Pumps, which have been re-purposed to provide SFP makeup are Seismic Category II.

e. Quality Class:

i. Current SFP Cooling

The existing SFP Cooling system has been re-classified as Quality Group D (not safety-related) and Quality Class III-AQ (i.e., augmented quality).

ii. Current SFP Makeup

The Primary Plant Makeup system is classified as Quality Class III and Quality Group D.

3. SFP Island Design

Due to the significant reduction in SFP heat load since final plant shutdown and the reduction in potential boundary dose consequences for the few remaining credible events, the SFP cooling functional requirements are reduced. Based on industry decommissioning experience, the use of independent non-plant systems for providing SFP cooling will reduce the potential for decommissioning activities to inadvertently damage installed plant SFP-related components which could result in a loss of SFP cooling or pool inventory. SONGS will design and install an independent SFP cooling and purification system. This SFP cooling and purification system is referred to as the SFP Island. To safely maintain SFP cooling, the SFP Island design includes features that support cooling function reliability including component redundancy, redundant power sources, and system cross-tie capabilities.

Decommissioning changes to the SFP cooling systems, including the installation of the SFP Island, are being controlled by existing design change processes,

including 10 CFR 50.59, and commitment management processes. Consistent with the response to (MF3835) RAI-011, in the RAI responses submitted to NRC on September 9, 2014, the NUREG-1738 SDAs and IDCs are included in the SONGS UFSAR, and are thereby addressed in the design change processes.

Figure RAI-016-01 provides the functional design of the SFP Island.

a. *SFP Island System Overview*

The design will include one primary loop per SFP. Each primary loop includes two 100% capacity pumps and a single heat exchanger. A spare heat exchanger is available for installation on either SFP.

There will be one secondary loop per SFP. Each secondary loop will consist of two 100% capacity pumps. To provide increased reliability, the chiller units on the secondary loops include excess capacity with the ability to cross-tie between each SFP's secondary loops.

b. *SFP Island Redundancy*

The SFP Island includes two 100% capacity primary loop pumps. One heat exchanger is available, with a spare heat exchanger available for installation in either SFP. The secondary loop provides two 100% capacity pumps and two chillers with excess capacity. Cross-tie capability is provided such that three chillers provide sufficient capability for both SFPs.

c. *SFP Island Electrical Power*

The SFP Island primary and secondary pumps, chillers, and other components will initially be powered from the existing plant electrical distribution system that have EDG backup power.

Planned modifications will subsequently support system retirement, decontamination and dismantlement. The planned modifications will power these components from the Decommissioning Power Ring System. This ring will be powered from offsite sources with a manual backup diesel generator. The transition to powering the SFP Island from the Decommissioning Power Ring System will not occur until a manual diesel back-up is available.

d. *SFP Island Seismic Design*

The SFP Island is not required to be designed to meet safety-related or seismic requirements. The SFP Island will be designed and installed such that the potential failure of any of its components (e.g., a suction or return

piping) during a seismic event will not damage safety-related SSCs (e.g., the spent fuel storage racks) nor have an effect on the SFP water inventory.

e. *SFP Island Quality Class*

The SFP Island is being designed to meet the same Quality Group and Quality Class as the existing configuration. The SFP Island will be Quality Group D and Quality Class III-AQ.

4. SFP Decommissioning-Phase Inventory Makeup Design

Due to the significant reduction in SFP heat load since the final plant shutdown, and the reduction in potential boundary dose consequences in the few remaining credible events, the SFP makeup functional requirements are reduced. Based on industry decommissioning experience, the use of independent systems for providing SFP cooling and inventory makeup, will reduce the potential for decommissioning activities to inadvertently damage installed plant SFP-related components which could result in a loss of SFP cooling or pool inventory. SONGS will modify existing equipment to provide independent SFP makeup capability during decommissioning. To ensure the SFP inventory makeup is maintained, the SFP Decommissioning-Phase Inventory Makeup design will include features that enhance makeup function reliability including redundancy, redundant power sources, and system cross-tie capabilities.

Decommissioning changes to the SFP inventory makeup systems are being controlled by appropriate design change processes, including 10 CFR 50.59, and commitment management processes. Consistent with the response to (MF3835) RAI-011, in the RAI responses submitted to NRC on September 9, 2014, the NUREG-1738 SDAs and IDCs are included in the SONGS UFSAR, and are thereby addressed in the design change processes.

Figure RAI-016-01 provides the functional design of the SFP Decommissioning-Phase Inventory Makeup System.

a. *SFP Decommissioning-Phase Makeup System Overview*

Normal SFP inventory makeup will include the use of "re-purposed" existing component cooling water makeup pumps (hereafter referred to as re-purposed SFP makeup pumps). There are two re-purposed SFP makeup pumps per unit providing 18 gpm each. An additional pump will be provided for rapid-fill purposes (300 gpm or larger). All three pumps will discharge into the existing installed plant SFP Cooling Pump suction piping.

Primary Plant Makeup Storage Tank will provide makeup water source.

b. *SFP Decommissioning-Phase Makeup Redundancy Design Features*

The three pumps provide redundant capability to provide makeup to the SFP. In addition, there are inter-unit cross-tie capabilities available via a hose connection.

The SFP Island design will include the capability to connect portable pumps to support the SFP mitigating strategies as described in detail in SCE's letter to the NRC dated October 6, 2014 (see response to RAI-010).

c. *SFP Decommissioning-Phase Makeup Electrical Power Source*

The SSCs providing the SFP Decommissioning-Phase makeup function will initially be powered from the existing installed plant electrical distribution system with EDG backup power.

Planned modifications will subsequently support system retirement, decontamination and dismantlement. The planned modifications will power these components from the Decommissioning Power Ring System. This ring will be powered from offsite sources with a manual backup diesel generator. The transition to powering the SFP Island from the Decommissioning Power Ring System will not occur until a manual diesel back-up is available.

d. *SFP Decommissioning-Phase Makeup System Seismic Design*

The re-purposed SFP makeup pumps and the Primary Plant Makeup Storage Tank are Seismic Class I. The rapid-refill pump will be normally isolated and therefore is not required to be seismically designed.

e. *SFP Decommissioning-Phase Makeup System Quality Class*

The re-purposed SFP makeup pumps were originally classified as Quality Group C, Quality Class II. As part of the system that will provide SFP inventory makeup during decommissioning, these pumps will be re-classified as Quality Group D, Quality Class III. The Primary Plant Makeup Storage Tank remains classified as Quality Class III. The rapid-fill pump will be classified as Quality Group D, Quality Class III.

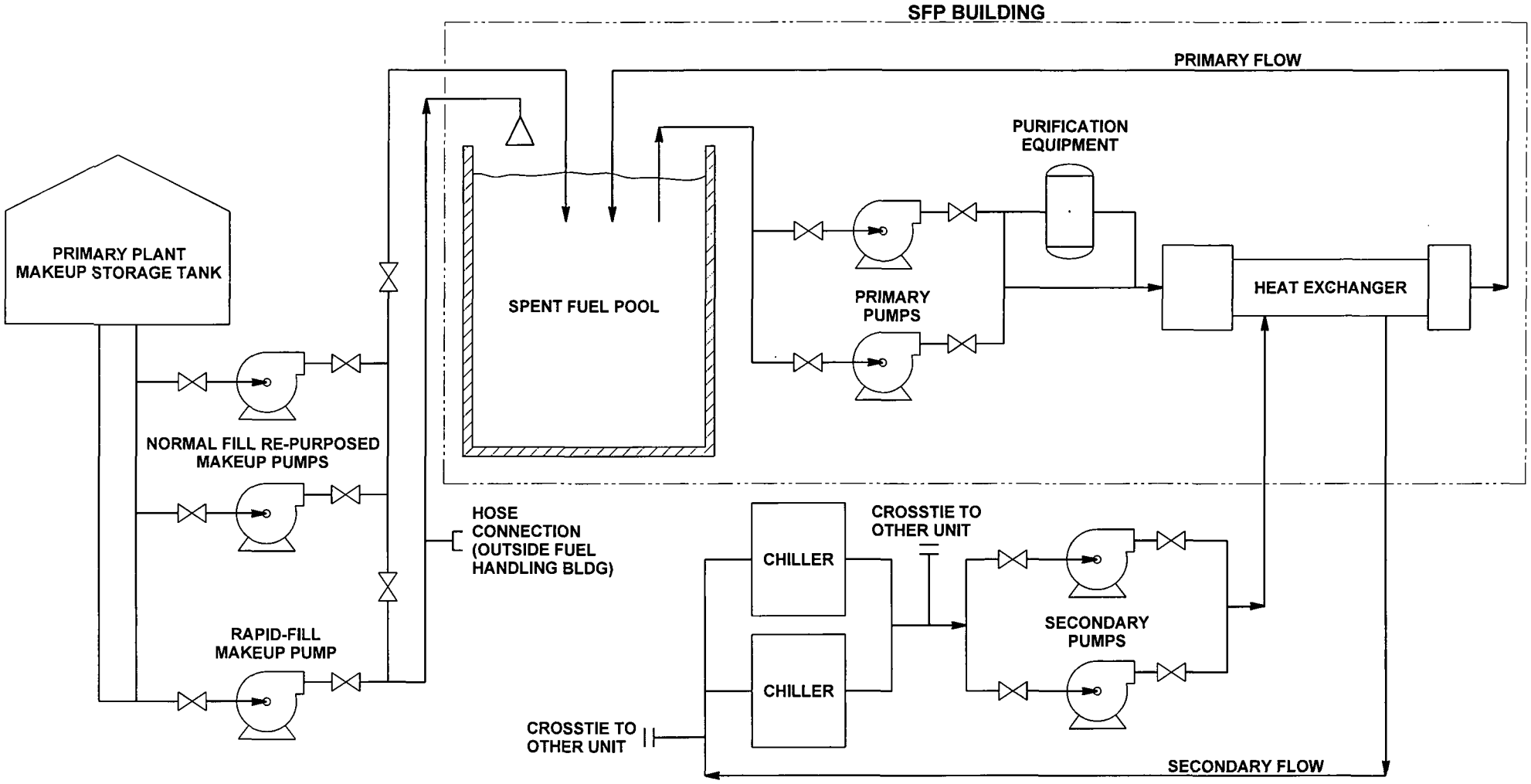
5. Conclusion

Due to the significant reduction in SFP heat load since final shutdown and the reduction in potential boundary dose consequences for the few remaining credible events, the SFP cooling and inventory makeup functional requirements are reduced. The requirements, based on plant operation, as described in

Section 9.1.3 of the SONGS UFSAR Revision 37 have been modified subsequent to permanent defueling of Units 2 and 3, and will be modified as described in the SFP Island and Inventory Makeup design overviews above to provide independent non-plant systems for SFP cooling and inventory makeup.

Based on industry decommissioning experience, the use of independent systems for providing SFP cooling and makeup, will reduce the potential for decommissioning activities to inadvertently damage SFP-related components which could result in a loss of SFP cooling or pool inventory. SONGS will design and install independent SFP cooling and inventory makeup systems, including an SFP Cooling Island concept to facilitate safe system retirement, decontamination and dismantling.

Decommissioning changes to the SFP cooling and SFP makeup systems are being controlled by appropriate regulatory processes, including 10 CFR 50.59, and commitment management processes. The NUREG-1738 SDAs and IDCs are included in the SONGS UFSAR, and are thereby addressed in the design change processes.



PROPOSED SPENT FUEL POOL COOLING AND INVENTORY MAKEUP (DECOMMISSIONING)

Figure RAI-016-01