

March 20, 2014

MEMORANDUM TO: Marc L. Dapas, Regional Administrator
Region IV

Eric J. Leeds, Director
Office of Nuclear Reactor Regulation

Glenn M. Tracy, Director
Office of New Reactors

FROM: Mark A. Satorius */RA/*
Executive Director for Operations

SUBJECT: REVIEW OF LESSONS LEARNED FROM THE SAN ONOFRE STEAM
GENERATOR TUBE DEGRADATION EVENT

The purpose of this memorandum is to provide direction for staff to evaluate lessons from the recent experiences related to the San Onofre Nuclear Generating Station (SONGS) steam generator tube degradation event and to identify and implement appropriate actions.

On January 31, 2012, SONGS Unit 3 experienced a tube leak in one of the two steam generators. During followup inspections, Southern California Edison discovered unexpected wear in both steam generators, including significant tube-to-tube wear in the free span areas of over 100 tubes. Testing results from Unit 2 also revealed two tubes with tube-to-tube wear similar to what was observed in Unit 3. For both Units 2 and 3, this was the first cycle of operation with new replacement steam generators.

An Augmented Inspection Team reviewed the steam generator tube leak and failures of multiple steam generator tubes during in-situ pressure testing to support an assessment of the risk of the degraded steam generator tubes during various accident conditions, including a main steam line break accident. Given the steam generator degradation at SONGS, the team conservatively estimated that an increase in large early release frequency attributable to the degraded tubes would be small (approximately 2.13×10^{-7} per year) and that, therefore, it was not significant from a safety perspective. In addition, the release resulted in an estimated dose to the public significantly less than 1 millirem (mrem), a value approximately 2 million times less than the 100-mrem annual dose limit.

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Despite the lack of actual public health consequences of the steam generator degradation and the white finding issued to the licensee for their performance deficiency, the event resulted in significant licensing and oversight activities and significant communication opportunities and challenges with both external stakeholders and the Commission.

This effort builds on insights and recommendations of the U.S. Nuclear Regulatory Commission's (NRC) SONGS Oversight Panel. The enclosed charter establishes the scope of review, relevant topics, roles and responsibilities, and deliverables for the review of lessons learned from the SONGS steam generator tube degradation event. The Office of Nuclear Reactor Regulation will have the overall lead for coordinating this effort and should provide a report to the Executive Director for Operations by December 22, 2014. In conducting the reviews, staff should seek and incorporate input from all appropriate stakeholders.

Understanding the lessons from this event, applying appropriate process improvements, and clearly communicating the outcomes to all NRC stakeholders will improve regulatory effectiveness and efficiency and meet the NRC's safety and security mission.

Enclosure:
As stated

cc: OGC
OI
OE

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**CHARTER FOR THE NUCLEAR REGULATORY COMMISSION
REVIEW OF LESSONS LEARNED FROM THE
SAN ONOFRE STEAM GENERATOR TUBE DEGRADATION EVENT**

Purpose

The objective of this charter is to define the scope of review topics, assignments, deliverables, and completion expectations.

Roles and Responsibilities

The Director of the Office of Nuclear Reactor Regulation (NRR) will have the overall responsibility to oversee the review process.

In overseeing this review, NRR shall:

- Perform the overall project management of the review.
- Establish interim milestones.
- Ensure interoffice coordination to protect against unnecessary overlap between individual subject areas.
- Keep the Executive Director for Operations (OEDO) and Commission informed of the review's progress.
- Present a comprehensive San Onofre Nuclear Generating Station (SONGS) Lessons Learned Report to the EDO by December 22, 2014.

For each topical area, the assigned lead office(s) shall: plan and conduct the review; seek and incorporate stakeholder input; identify findings; and outline planned actions to address the lessons learned. Each assigned support office shall provide support to the review area as directed by the lead office(s).

Topics for the Review of Lessons Learned

10 CFR 50.59 Process

During the inspection and technical review following the SONGS Unit 3 steam generator tube leak event, a number of issues were raised concerning the requirements and guidance of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59, "Changes, Tests and Experiments."

Enclosure

Items to Consider:

- (1) Does the 10 CFR 50.59 rule continue to be adequate for major or complex component replacements?
- (2) Does the agency need to provide additional 10 CFR 50.59 guidance and information to:
 - a. licensees for large or complex component replacements
 - b. inspectors for their review of 10 CFR 50.59 evaluations of large or complex component replacements
 - c. project managers for their review of 10 CFR 50.59 evaluations
- (3) Does the agency need to clarify the commonly used phrase “like-for-like replacement” with respect to 10 CFR 50.59?

Assigned to: NRR

Support from: Office of New Reactors (NRO), Office of Nuclear Regulatory Research (RES), Region IV, and Office of the General Counsel (OGC)

Deliverable: Input to SONGS Lessons Learned Report

Confirmatory Action Letter as a Regulatory Tool

During the inspection and technical review following the SONGS Unit 3 steam generator tube leak event, the staff issued a Confirmatory Action Letter (CAL). The contents of this CAL became the topic of legal proceedings before the Atomic Safety Licensing Board. The Board’s decision on whether the SONGS CAL constituted a de facto license amendment was later vacated by the Commission.

Items to Consider:

- (1) Did the staff’s actions in response to the event at SONGS call into question the appropriateness of the use of CALs as a regulatory tool?
- (2) Are changes needed to strengthen CAL guidance or implementation (e.g., when CALs are appropriate or not appropriate)?
- (3) Is additional formal communication needed to licensees from the NRC regarding future use of CALs?

Assigned to: NRR

Support from: Region IV, Office of Enforcement, and OGC

Deliverable: Input to SONGS Lessons Learned Report

Steam Generator Technical Review

During the inspection and technical review following the SONGS Unit 3 steam generator tube leak event, several issues were raised concerning the steam generator program, requirements of plant technical specifications, inspection practices, and technical issues related to the steam generator degradation mechanisms.

Items to Consider:

- (1) Does the agency need to provide additional Standard Review Plan guidance for steam generator designs for new reactors, steam generator replacements, or steam generator modifications?
- (2) Does the agency's steam generator program handle new steam generator degradation mechanisms effectively; if not, what modifications are needed?
- (3) In light of the new steam generator degradation mechanism, fluid elastic instability, does the steam generator program effectively account for this phenomenon going forward?
- (4) Does the agency or industry need additional standards or criteria for new steam generator designs or steam generator replacements?
- (5) Should enhancements to the agency's steam generator inspection procedures be made to address experience gained at SONGS?

Assigned to: NRR

Support from: NRO, RES, Region IV

Deliverable: Input to SONGS Lessons Learned Report

Organization/Roles and Responsibilities

During the inspection and technical review following the SONGS Unit 3 steam generator tube leak event, a number of issues were raised concerning internal organizational roles and responsibilities, the differentiation between inspection and licensing reviews, changes in signature authority, complications of review in parallel with investigations, organizational changes, internal communications, legal assistance, and the use of common Microsoft® SharePoint® sites. By contrast, the process used by the agency to manage Fort Calhoun's oversight under Inspection Manual Chapter 0350, "Oversight of Reactor Facilities in a Shutdown Condition Due to Significant Performance and/or Operational Concerns," was recently highlighted as an example of effective coordination of complex licensing and inspection issues.

Items to Consider:

- (1) Did the existing licensing and oversight processes help the staff respond with the appropriate priority to key events in the timeline (e.g., the Unit 3 steam generator tube leak, the Units 2 and 3 steam generator tube inspection results, and restart proposals for Unit 2 before the CAL and in response to the CAL)?
- (2) For technical issues involving both regional inspection and headquarters technical review, does the agency have appropriate guidance to determine the roles and responsibilities of each office and how the decisionmaking process should work?
- (3) Should there be a more concerted effort on the front end to gain alignment on scope of review and office lead?
- (4) Should there be guidance for Technical Evaluation Reviews?
- (5) For technical issues involving both regional inspection and headquarters technical review, is the agency's current approach and implementation of internal communications, especially at the middle and higher management levels, appropriate and effective?
- (6) During the SONGS followup, special projects organizations were established in NRR and Region IV, as well as a multiple-office oversight panel. One of the goals of the panel was to ensure consistent and clear communication. Were these organizational changes effective and what lessons can be learned for future high-profile and resource-intensive events?
- (7) During events that are high-profile and require involvement by multiple offices, are there lessons to be learned regarding internal communications such as the use of a common SharePoint site, establishment of review schedules, use of periodic group phone calls, use of periodic management briefings, etc.?
- (8) For technical reviews going on in parallel with investigations by the Office of Investigations (OI), are there lessons to be learned regarding internal coordination and communication?

Assigned to: NRR and Region IV

Support from: OEDO, NRO, RES, Office of Congressional Affairs (OCA), Office of the General Counsel, OI, Office of Public Affairs (OPA)

Deliverable: Input to SONGS Lessons Learned Report

Communication and External Interactions

There was significant external interest in SONGS during this period, including interest from State and local elected officials, the licensee, nongovernmental organizations, and public citizens. During the inspection and technical review following the SONGS Unit 3 steam

generator tube leak event, a number of issues were raised concerning the U.S. Nuclear Regulatory Commission's (NRC's) handling of communication to and from external stakeholders. This includes the NRC's use of public meetings, the NRC Web site, NRC blogs, and NRC press releases, as well as external stakeholder e-mails, letters, drop-in visits, and phone calls.

Items to Consider:

- (1) With the large interest and turnout during public meetings, have any lessons been learned about:
 - a. format
 - b. focus
 - c. timing
 - d. location
 - e. security
 - f. other logistics
- (2) Meetings with small groups of local stakeholders were planned to provide specific, targeted outreach in a more informal setting. Have any lessons been learned from this practice, including lessons about possible programmatic enhancements to encourage future consideration?
- (3) The staff used the NRC blog several times during the review of the licensee's restart readiness plan. Have any lessons been learned? Was this communication tool effective?
- (4) The staff dedicated significant resources to updating the internal Communication Plan and external SONGS Web site. Was this use of resources effective, was the information used, and have any lessons been learned for high-profile events going forward? Have any lessons been learned with respect to publicly posting technical information, including making sure it is accurate and determining if it could be misunderstood?
- (5) The staff received significant external correspondence, multiple Freedom of Information Act requests, and numerous congressional requests during the staff review. Have any lessons been learned from how these were processed and how the staff responded, and are there ways to enable a more efficient and effective staff response to these activities? For example, is better coordination needed when processing e-mails to ensure that lead and support office guidance is clear, including coordination between allegation coordinators, to minimize duplication of work?
- (6) The licensee arranged multiple weekly calls at different levels of management. Although this helped to keep NRC management informed, it also led to inconsistent messages and occasional confusion; have lessons been learned in this area?

- (7) Often, both the Commission and NRC staff were engaged in communication with external stakeholders. Can efficiencies be gained by coordinating communication efforts on high-profile events using both Commission and staff communication experts to achieve a unified agency message?

Assigned to: OEDO

Support from: NRO, NRR, Region IV, OCA, Office of the Commission, OGC, OPA, Office of Information Services, Office of the Secretary

Deliverable: Input to SONGS Lessons Learned Report

Commission Separation of Function Communication Challenges

During the review of the SONGS steam generator event, the Commission assumed an adjudicatory role. The staff's communication to the Commission on SONGS was required to meet ex parte communication restrictions.

Items to Consider:

- (1) Were there instances in which the separation of functions created communication challenges between the staff and Commission?
- (2) Is additional guidance to staff needed to help ensure common understanding of what information can and cannot be discussed with the Commission during adjudicatory processes?

Assigned to: OEDO and OGC

Support from: NRR and Region IV

Deliverable: Enhanced guidance for staff on Commission communication during adjudicatory processes

Inspection Manual Chapter (IMC) 0351, "Implementation of the Reactor Oversight Process at Reactor Facilities in an Extended Shutdown Condition for Reasons Other Than Significant Performance Problems"

IMC 0351 was developed to (1) establish guidance for Reactor Oversight Process implementation at plants in an extended shutdown condition for reasons other than significant performance problems and (2) ensure that the NRC communicates unified and consistent oversight in a clear and predictable manner to the licensee, public, and other stakeholders. Following the SONGS Unit 3 steam generator tube leak event, Region IV, with NRR concurrence, placed SONGS Units 2 and 3 in the IMC 0351 process.

Item to Consider:

- (1) Were any lessons learned from implementation of IMC 0351 at SONGS that could enhance future use of this manual chapter?

Assigned to: NRR

Support from: Region IV

Deliverable: Revision to IMC 0351 incorporating lessons learned from the SONGS event

Vendor Inspection

In response to the SONGS steam generator event, the NRC's Vendor Inspection Program conducted an inspection of Mitsubishi Heavy Industries to understand their root-cause analysis and the supporting corrective actions. NRO is currently conducting a broad review of lessons learned for the vendor inspection program and is developing an action plan for lessons learned about vendor oversight. The review of lessons learned will specifically consider the lessons from the SONGS event and will implement enhancements as appropriate.

Specific items under consideration are:

- (1) Did the SONGS steam generator degradation event expose any new or unique vendor lessons that the NRC's Vendor Inspection Program should take into account?
- (2) Should the NRC's Vendor Inspection Program be more focused on the design aspects of major plant modifications?

Assigned to: NRO

Support from: NRR and Region IV

Deliverable: Report on the NRC's Lessons Learned about Vendor Oversight

Completion of Review

Once all the above initiatives are complete and the SONGS Lessons Learned Report is issued to OEDO, OEDO will ticket and track appropriate actions to be taken as a result of these reviews and will consolidate all final review material for knowledge management purposes.