



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
ARLINGTON, TEXAS 76011-4125

MAR 22 2011

7.C [Redacted]

SUBJECT: CONCERNS YOU RAISED TO THE NUCLEAR REGULATORY COMMISSION (NRC) REGARDING THE SAN ONOFRE NUCLEAR GENERATING STATION

RE: ALLEGATION RIV-2010-A-0190

7.C Dear [Redacted]

The NRC has completed its follow up in response to the concerns you brought to our attention on November 16, 2010, regarding the San Onofre Nuclear Generating Station. Your concerns were related to [Redacted] for cleaning and inspecting busses and breakers, battery breaker bolt torque specifications, [Redacted] at San Onofre Nuclear Generating Station. The enclosure to this letter restates your concerns and describes the NRC's review and conclusions with regard to each concern.

Thank you for informing us of your concerns. Allegations are an important source of information in support of the NRC's safety mission. We take our safety responsibility to the public seriously and will continue to do so within the bounds of our lawful authority. We believe that our actions have been responsive to your concerns. If, however, new information is provided that suggests that our conclusions should be altered, we will re-evaluate that information to determine if an additional evaluation is indicated.

Should you have any additional questions, or if the NRC can be of further assistance, please contact Mr. Nicholas H. Taylor, Senior Allegations Coordinator, at the Region IV toll-free number 1-800-952-9677, extension 245, Monday - Friday between 8 a.m. and 4:30 p.m. Central time. Information in writing may be provided to the address in the letterhead.

Information in this record was deleted in accordance with the Freedom of Information Act, exemptions FOIA- [Redacted]

Sincerely,

Anton Vegel, Director  
Division of Reactor Safety

Enclosure: As stated

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

F/13

RESPONSE TO CONCERNS  
ALLEGATION RIV-2010-A-0190

The NRC staff conducted an independent inspection of Concerns 1, 3, 4 and 5 as listed in Allegation RIV-2010-A-0190. The NRC provided a response to your Concern 2 in a letter dated December 16, 2010. The NRC staff inspected this allegation by reviewing documents provided by you, reviewing documents obtained onsite, and conducting discussions with licensee staff knowledgeable in the areas of electrical maintenance, scheduling and work planning. The NRC was in the process of conducting an onsite inspection in the area of electrical maintenance and work planning at the time this allegation was received.

**Concern 1**

Sometime after 2008, the work packages for 125 Vdc bus/breaker cleaning and inspections were modified such that the line sides of the battery breakers were no longer de-energized. As a result, this preventive maintenance item no longer verified that the battery breaker line side bolts are properly torqued.

**NRC Response to Concern 1**

The inspector reviewed work order NRME 80049974, "DC Bus Clean/Inspect" for 125 Vdc distribution switchboard panel 3D4, performed in October, 2008; work order NRME 800141400, "2D2 - 125VDC Bus/Breaker Clean/Inspect," performed in November 2009; and work order NRME 800369795, "125VDC Bus Breaker Clean/Inspect," for dc distribution switchboard panel 3D3, performed in October 2010. Each work order performed similar maintenance activities, and the description of each work order indicates that the dc bus should be totally de-energized for complete cleaning and checking torque tightness of breaker bolted connections.

Work order NRME 80049974 contains explicit steps for tightening and checking torque values of battery breaker bolts. This work order uses drawing 32172, "One Line Diagram Class 1E 125V DC & 120 VAC Power System," Revision 11, to graphically depict the maintenance tagout boundary, which indicates the dc bus would be de-energized to allow access to the line-side breaker bolts. Page 43 of the work order provides a record of the torque values used on both line- and load-side connections, confirming that the breaker was de-energized and the tightness was checked for breaker 3D401 in October 2008.

Work order NRME 800141400, step 5.3.1 requires the verification of torque tightness of breaker bolted connections to the dc bus in accordance with Procedure SO123-I-4.59, "Wire/Cable Inspection." The inspector determined that in this work order, the referenced dc bus connection is on the load-side of the circuit breaker, not the line-side and no steps were written to check the line-side breaker connections. This work order uses drawing 30172, "One Line Diagram Class 1E 125V DC & 120 VAC Power System," Revision 16, to graphically depict the maintenance tagout boundary, which indicates that dc breaker 2D201 was tagged as part of the work boundary. This boundary would not de-energize the line-side connections of this breaker. The inspector concluded that the connections cannot be safely checked while energized. Consistent with this, the work order does not contain a record of torque value checks for the

line-side connections of breaker 2D201. Therefore, there is no evidence to show that the line side bolts of breaker 2D201 were checked in November 2009.

Work order NRME 800369795 has no explicit steps for checking the torque tightness of the battery breaker bolts. Under step 5.0, "Work Instructions," a note directs the performer to ensure all electrical connections are tightened in accordance with Procedure SO123-I-4.59. Step 5.2 of the work order directs the performer to clean and inspect panel S3.DCPS.3D3 in accordance with Procedure SO23-I-9.26, "Miscellaneous Low Voltage Bus Panel Inspection, Cleaning and Testing." The inspector noted that Procedure SO23-I-9.26 contains no explicit steps to check circuit breaker connection torque values. This work order uses drawing 32172, "One Line Diagram Class 1E 125V DC & 120 VAC Power System," Revision 13, to graphically depict the maintenance tagout boundary, which indicates that dc breaker 3D301 was tagged out as a boundary. This boundary would not de-energize the line-side connections of this breaker. This work order does not contain a record of torque value checks for the line-side of breaker 3D301. Therefore, there is no evidence to show that the line side bolts of breaker 3D301 were checked in October 2010.

The inspector discussed this observation with licensee staff. The staff agreed that the guidance in the work orders had changed over the period in review, and the procedures, as written, would not completely de-energize the battery breakers and, therefore, would not allow for verification of torque values for the breaker line-side bolted connections. The licensee generated Nuclear Notifications (b)(7)(C) to address the failure of the work order planning process to ensure the dc busses were totally de-energized, and torque tightness checks are included in activities affecting these components.

The NRC substantiated this concern. The inspector determined that this issue involved a minor violation of regulatory requirements. An additional example of this minor violation is discussed in the NRC's response to Concern 4. Specifically, contrary to 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," the work instructions for dc bus cleaning and inspections used since 2008 were inappropriate to the circumstances, in that, they did not ensure that all of the breaker connection bolts were tight. This issue was determined to be of minor significance in accordance with Inspection Manual Chapter 0612 because all of the affected breakers had been properly checked in 2008. Therefore, they had been checked tight within their three-outage frequency. This violation is documented in Nuclear Notification (b)(7)(C). Because it is a violation of minor significance, it will not be documented in an inspection report.

## Concern 2

Nuclear Notification (b)(7)(C) identified suspect connections on battery breakers 2D203 and 2D206. Three bolts exhibited slight motion when checked at full torque value. These instances were not tracked in the electrical component health report, as specified in Nuclear Notification (b)(7)(C).

### **NRC Response to Concern 2**

This concern was addressed in our December 16, 2010, letter to you.

### **Concern 3**

Work Order NRME 800369795 contains a technically incorrect step to perform thermography on dc vital bus panel 2D2, because that panel will be de-energized.

### **NRC Response to Concern 3**

The inspector reviewed work order NRME 800369795, "125VDC Bus Breaker Clean/Inspect," for dc distribution panel 3D3. Step 2.3.1 of this work order is listed under the references section, and does not explicitly require re-energizing panel 3D3 prior to thermography. The step requires test technicians to perform thermography after completion of cleaning and inspection of the panel using work order 800500220. Work orders NRME 800141400 and NRME 800049974 have similar steps and requirements to notify test technicians to perform thermographic inspections.

San Onofre Nuclear Generating Station has a thermography program to identify high resistance and loose electrical connections by looking for thermal hot spots. This program is defined in Station Procedure SO23-V-2.14, "Thermal Inspection of Plant Components." Station Procedure SO123-I-1.7, "MO Planning and Processing," states, in part, that work packages that disturb an electrical connection shall have post-maintenance testing or post-maintenance verification specified. This procedure applies to all work planned in the station work management system, identifies the requirements for planning and processing work orders and states, in part, that all work orders that disturb an electrical connection SHALL specify a Post Maintenance Test (PMT). Step 3.7 contains requirements that the disturbed electrical joint be electrically loaded for sufficient time to cause heating, and states that the joint SHALL have an infrared thermal scan as part of the PMT.

The NRC did not substantiate this concern. Specifically, the instructions for performing infrared thermographic inspections require the components to be energized and loaded. Referencing other work activity documents, such as additional procedures or work orders, in work instructions is an accepted practice.

**Concern 4**

There is no specific step to check the torque for battery breaker bolts in NRME 800369795 (clean and inspect dc switchboard 3D3).

**NRC Response to Concern 4**

The inspector reviewed work order NRME 800369795, "125VDC Bus Breaker Clean/Inspect," for dc distribution panel 3D3. The inspector noted that no explicit work steps for checking the torque tightness of the battery breaker bolts are present in this work order. This maintenance activity was performed in October 2010. The description block of the work order specifies that the dc bus be totally de-energized for complete cleaning and checking torque tightness of breaker bolted connections to the dc bus. The inspector reviewed drawing 32172, "One Line Diagram Class 1E 125V DC & 120 VAC Power System," Revision 13, which provided the maintenance tagout boundary for this activity. The inspector determined that the dc bus was not completely de-energized using the boundaries shown in the drawing.

Work order NRME 80049974, "DC Bus Clean/Inspect" for dc distribution switchboard panel 3D4 was reviewed by the inspector. This work order is similar in scope to work order NRME 800369795. This work order used drawing 32172, Revision 11, to provide the tagout boundaries for the maintenance activity. This drawing showed that the dc bus was de-energized. Step 2 of the work plan section for work order NRME 80049974 explicitly required and documented that the torque tightness was checked for the battery breaker bolts. This maintenance activity was performed in October, 2008.

The inspector discussed this observation with licensee staff. The staff agreed that the dc bus would not be completely de-energized using the references provided in work order NRME 800369795, and the breaker bolts would not have been checked to verify torque tightness as required by the work order description. The licensee generated Nuclear Notifications (b)(7)(C) (b)(7)(C) to address, in part, the (b)(7)(C) (b)(7)(C) to ensure the dc busses were totally de-energized, and torque tightness checks are included in maintenance activities affecting these components. The licensee (b)(7)(C) generated Nuclear Notification (b)(7)(C) to address the (b)(7)(C) (b)(7)(C) NRMEs 800369795, 800141400, and 80049974. The licensee generated Nuclear Notification (b)(7)(C) to address the failure to follow Station Procedure SO123-I-1.3, "Work Activity Guidelines," for failing to document an evaluation for potential impact of steps not completed or marked as not applicable.

The NRC substantiated this concern. The inspector determined that this issue is an additional example of the minor violation associated with Concern 1. Specifically, contrary to 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," this work instruction for dc bus cleaning and inspection was inappropriate to the circumstances, in that, it did not ensure that all of the breaker connection bolts were tight. This issue was determined to be of minor significance in accordance with Inspection Manual Chapter 0612 because the affected breakers had been properly checked in 2008. Therefore, they had been checked tight within (b)(7)(C) their three-outage-frequency. This example is documented in Nuclear Notifications (b)(7)(C) (b)(7)(C) / Because it is a violation of minor significance, it will not be documented in an inspection report.