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

AUG 29

1C (b)(7)(C)

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

RE: ALLEGATION RIV-2010-A-0202

7C Dea (b)(7)(C)

The NRC has completed its follow up in response to the concerns you brought to our attention on December 8, 2010, regarding the San Onofre Nuclear Generating Station. Your concerns were related to maintenance on four questionable cells from Battery 2B007, monitoring of grounds during maintenance, and methodology for measuring battery electrolyte specific gravity. 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 listed in the letterhead.

Sincerely,

Anton Vegel, Director
Division of Reactor Safety

Enclosure: As stated
CERTIFIED MAIL
RETURN RECEIPT REQUESTED

E/18

RESPONSE TO CONCERNS
ALLEGATION RIV-2010-A-0202

The NRC requested information from the licensee regarding the concerns identified as Allegation RIV-2010-A-0202 by letter January 14, 2011. The licensee provided a response to our request for information in a letter dated February 18, 2011. The NRC staff utilized this information, in part, to form our independent review of the concerns. The NRC's review also determined that the licensee performed a thorough review using individuals independent of the concern to perform their investigation.

The NRC determined that the licensee's investigation was of sufficient depth and scope, and that the individual conducting the investigation was independent of the organization affected by the concerns, and was properly trained and experienced in conducting investigations.

Concern 1

The licensee failed to properly evaluate the past operability of four questionable cells from Battery 2B007.

Licensee Response to Concern 1

On August 26, 2009, the licensee identified a red color on the negative battery plates in safety-related Battery 2B007 cells 15, 31, and 40 while performing Procedure S023-I-9-92, "Monthly - 1E 125VDC Battery Inspection," as part of Work Order 800310856. The licensee wrote Nuclear Notification (b)(7)(C) to document this condition. Nuclear Notification (b)(7)(C) was written to document a "red cell" condition on cell 43 of Battery 2B007, which was observed while performing a monthly surveillance on (b)(7)(C)

Work Order NPS 800397884 was issued to perform increased frequency surveillances and testing of the "red" cells until Battery 2B007 could be replaced. In evaluating the "red" cells, the licensee considered the information provided in NRC Information Notice 89-17 "Contaminated and Degraded Safety-Related Battery Cells," to evaluate operability. The licensee stated that the operability of Battery 2B007 was evaluated in August and again in October 2009. A prompt operability determination showed that with the "red" cells, Battery 2B007 would be able to perform its safety function and that it was operable because the voltage, specific gravity and electrolyte level readings from the increased surveillance did not show adverse trending and within the operability ranges when compared to other cells and visual inspection did not show any further degradation

The licensee described the red discoloration as being caused by electrolyte attacking the copper inserts inside the lead post inserts causing copper to deposit on the negative plates.

Battery 2B007 was replaced at the next opportunity, in June 2010, as part of Work Order 800326939.

Following battery replacement, the licensee conducted a service test on cell 15, which was considered to be the most degraded cell. The results showed that the capacity was sufficient to demonstrate past operability.

NRC Response to Concern 1

The NRC inspector reviewed the licensee's investigation results and independently reviewed the procedures, notifications, and test results. The inspector also reviewed the licensee's responses concerning the "red" cells and compared those actions to the actions described in NRC Information Notice 89-17.

The inspector assessed the actions taken by the licensee to monitor operability of Battery 2B007 with "red" cells. The inspector reviewed the information provided by the licensee, including Battery 2B007 test data for individual cell voltages of the "red" cells. For each of the "red" cells, the licensee increased the frequency of surveillances to ensure prompt operability determination remained valid. Nuclear Notification (b)(7)(C) was written to create the work order for this effort. Additional monitoring performed for the "red" cells included monitoring the battery bank terminal float voltage, individual cell voltages, specific gravity, temperature, and electrolyte levels. In addition, weekly inspections of the cell plates for any indication of degrading of the copper contamination and visual inspection of general appearance of the battery were conducted. The inspector determined that this monitoring was consistent with the guidance provided in NRC Information Notice 89-17. In particular, the NRC information notice identified that the concern with copper contamination of negative plates was a reduction in cell terminal voltage; since cell terminal voltage remained within acceptable limits, there was a reasonable expectation of operability.

Following the replacement of the battery, the licensee selected cell 15 for service testing to verify past operability, because it was the cell with most discoloration. The inspector independently reviewed the test procedure and result and concluded that the capacity was within operability and functionality ranges. The inspector determined that performing a service test was not required, either for the degraded cells or for the entire battery, but was a prudent action by the licensee. Performance of such a test cannot be done with the unit on line because of technical specifications requirements, so the test was performed during the next outage after the battery had been replaced. The inspector determined that it was reasonable to have tested only the most limiting cell.

Based on the inspector's independent review and evaluation, the NRC did not substantiate Concern 1. The inspector determined that the licensee had performed an adequate evaluation of the operability of Battery 2B007 because of the four questionable cells. The evaluation used appropriate technical information as a basis of concluding that with the degraded condition, Battery 2B007 remained capable of performing its safety function. The licensee included appropriate increased monitoring of the degraded condition in order to assure that any further degradation would be identified and evaluated for its impact on battery operability. The battery was replaced promptly to correct the degraded condition. Though not specifically required, the licensee conducted a service test on the most degraded cell to confirm past operability.

Concern 2

While replacing non-vital Charger 3B005 and testing non-vital Battery 3B010, Bus 3D5A was de-energized, however, associated Power Panels 3D5P1, 3D5P2, 3D5P3 and 3D5P4 were energized using a temporary power source. The licensee did not check for grounds on the loads supplied from these panels during the period with this maintenance configuration.

Concern 3

The licensee did not take prompt corrective actions to address Concern 2. Specifically, Nuclear Notification (b)(7)(C) documented the concern on (b)(7)(C) but no ground detection monitoring was performed until the maintenance was completed.

Concerns 2 and 3 are closely related, so they will be addressed together.

Licensee Response to Concerns 2 and 3

The licensee provided drawings showing the normal and temporary modification configuration for supplying 125Vdc power to Bus 3D5A. Bus 3D5 provides dc power to Bus 3D5A. Bus 3D5A in turn supplies normal 125Vdc power to Panels 3D5P1, 3D5P2, 3D5P3 and 3D5P4. Ground fault monitoring and detection instrumentation installed in Bus 3D5 was capable of monitoring all four 3D5P panels when electrically connected. Battery 3B011 and Charger 3B005S normally supply 125Vdc power to Bus 3D5A through Bus 3D5.

When testing Battery 3B010, the licensee implemented a temporary modification to power Bus 3D5A from swing Battery 3B010, which then powered Panels 3D5P1, 3D5P2, 3D5P3 and 3D5P4. Engineering Change Package 800517779 controlled the temporary modification. The licensee stated that ground fault monitoring was not considered in the change package, but circuit protection (fuses, breakers) was provided for the temporary power panels. This was implemented during Unit-3 outage while the plant was in a cold shutdown condition (Modes 5 and 6). The drawings also showed that there were no ground fault detectors or monitoring associated with Panels 3D5P1, 3D5P2, 3D5P3 and 3D5P4 while in this temporary configuration.

The licensee stated that Nuclear Notification (b)(7)(C), to document the need to provide a ground monitoring program for the temporary modification. Work Order NMO 800617196 was written on December 4, 2010, to perform ground checks on Panel 3D5A, but was not implemented by December 13, 2010, when the temporary modification was removed and the normal configuration was restored. In response to this concern, the licensee generated Nuclear Notification (b)(7)(C) to evaluate and determine the cause of failure to establish a temporary ground monitoring.

NRC Response to Concerns 2 and 3

The NRC inspector reviewed the licensee's investigation results and independently reviewed the configuration drawings, modification documents, procedures, and notifications

The inspector confirmed, from a review of the drawings, that in the normal configuration of supplying dc power to Bus 3D5A, ground detection and monitoring were provided through Bus 3D5. The inspector also confirmed that when the temporary power configuration removed Bus 3D5 as the power source for Panels 3D5P1, 3D5P2, 3D5P3, and 3D5P4-4, ground detection and monitoring were also removed.

The inspector reviewed Nuclear Notification (b)(7)(C) and Work Order NMO 800617196, which were written to provide periodic manual ground monitoring during the temporary modification, but the recommended actions were never implemented. In response to this concern, Nuclear Notification (b)(7)(C) was written to investigate why a recommended action to provide periodic and manual ground readings were not taken.

The inspector assessed the potential impact of having a theoretical ground on Panels 3D5P1, 3D5P2, 3D5P3, and 3D5P4 during the period when the panels were supplied with temporary power without ground monitoring. The inspector confirmed that the Unit 3 125Vdc distribution system was an ungrounded system. A single ground on an ungrounded system will not create a fault. To get a fault, a second ground would have to occur on the opposite phase. If the fault current was significant, protection would be provided to isolate the component by blowing fuses or tripping a breaker. By design, this protection would be expected to isolate the affected component and not impact the remaining loads.

None of the loads on Bus 3D5 and the associated panels are safety-related. The inspector assessed the loads receiving temporary power and assessed the potential impact of losing those loads, though unlikely, with the unit in Modes 5 and 6. The inspector noted that power to the Reserve Auxiliary 1 transformer protection circuit was powered from Panel 3D5P4. If power were lost to the Reserve Auxiliary 2 transformer protection circuit, automatic protection for the main source of offsite power under those plant conditions would be lost to Unit 3. However, loss of the protection circuit would not result in loss of offsite power through the Reserve Auxiliary 3 transformer. Loss of the protection circuit would mean that any condition (a coincident third problem) that would normally require the Reserve Auxiliary 4 transformer to be isolated by the protection circuit would not occur as intended. However, upstream breaker protection would be unaffected and should function to isolate this fault.

The inspector confirmed that, when the normal 125Vdc power configuration was restored, ground detection monitoring indicated that there were no grounds present. Also, there were no known impacts from not having ground detection available during the period in question. The inspector noted that there are no specific regulatory requirements to monitor Panels 3D5P1, 3D5P2, 3D5P3, and 3D5P4 during normal or maintenance configurations. Such monitoring would be considered a prudent practice. Therefore, the licensee had discretion to implement or not implement the recommended actions to monitor for grounds on Panels 3D5P1, 3D5P2, 3D5P3, and 3D5P4 that were documented in Notification 201158834.

Based on the NRC's independent review and evaluation, the NRC validated that, while replacing non-vital Charger 3B005 and testing non-vital Battery 3B010, Panels 3D5P1, 3D5P2, 3D5P3 and 3D5P4 were not checked for grounds and the licensee did not take prompt corrective actions to address Nuclear Notification (b)(7)(C) to provide ground detection monitoring. No violation of regulatory requirements was identified because no NRC regulations

apply to this situation.

Concern 4

Specific gravity measurements may not be compensated for temperature. Specifically, Nuclear Notification (b)(7)(C) documented that the digital hydrometers used to measure specific gravity in station batteries do not automatically compensate the measurement for temperature, and prompt action was not taken to address this concern.

Licensee Response to Concern 4

The licensee stated that Nuclear Notification (b)(7)(C) to evaluate external operating experience associated with the use of Anton Paar 35 N Portable Density/Specific Gravity/Concentration Meter Hydrometer, used at San Onofre Nuclear Generating Station to measure the specific gravity of the electrolyte in station batteries. Nuclear Notification (b)(7)(C) noted that this type of hydrometer does not automatically compensate for temperature when measuring specific gravity.

Based on their review, the licensee stated that Procedure S023-1-9-104, "Battery –Testing information," Revision 4, did not contain specific guidance to ensure that Anton Paar 35 N Portable Density/Specific Gravity/Concentration Meter Hydrometer would be set to automatically compensate the specific gravity reading for the temperature of the electrolyte. Also, the surveillance records did not contain sufficient documentation to show whether the temperature compensation was performed, either manually or by using the automatic feature. The licensee noted that manual temperature compensation could be performed using a table on Drawing 1814-AT658-M0001, "Appropriate Manual Temperature Correction Factors for Anton Paar Portable Density/Specific Gravity/Concentration Meter, Model DMA 35 N."

In response to this concern, the licensee issued Nuclear Notification (b)(7)(C) The licensee also stated that Nuclear Notification (b)(7)(C) was written to implement procedure changes to ensure that Anton Paar 35 N Portable Density/Specific Gravity/Concentration Meter Hydrometers are set in the automatic temperature compensation mode prior to making any measurement of specific gravity.

The licensee performed an assessment of the potential impact of this issue, assuming that temperature correction had not been performed. The licensee provided 3 years of specific gravity test results after manually compensating for temperature.

NRC Response to Concern 4

The NRC inspector reviewed the licensee's investigation results and independently reviewed the procedures, notifications, and surveillance test results.

The inspector reviewed Nuclear Notification (b)(7)(C) which documented the review of operating experience from Hope Creek Nuclear Generating Station concerning digital hydrometer, which did not automatically correct battery-specific gravity for temperature. This

operating experience was determined to be applicable to San Onofre Nuclear Generating Station because the licensee used the same measuring and test equipment that was discussed in the Hope Creek Nuclear Generating Station report. The inspector also noted that the Anton Paar 35N Portable Density/Specific Gravity/Concentration Meter Hydrometer had an automatic temperature compensation function, but a user would have to perform steps to enable that function prior to use.

Using 3 years of surveillance data, the inspector independently verified that the safety-related batteries had sufficient electrolyte specific gravity to remain operable. This check confirmed that each battery had specific gravity that was within technical specification limits, regardless of whether the recorded values had been temperature corrected or not. The inspector performed sample calculations to apply temperature corrections using the table from Drawing 1814-AT658-M001, the recorded specific gravity and temperature values documented in the surveillance tests.

The inspector confirmed that battery surveillance procedures were not adequate to ensure that specific gravity measurements of electrolyte were compensated for temperature, either manually or automatically using the installed temperature compensation function. The inspector noted that surveillance procedures that checked battery electrolyte specific gravity did not contain any discussion of temperature compensation, although steps were included to record electrolyte temperature.

The inspector concluded that Concern 4 was substantiated. Specifically, battery surveillance procedures were inadequate to ensure that specific gravity measurements included temperature compensation. Also, the licensee did not take prompt corrective action in response to Nuclear Notification (b)(7)(C)

Failure to compensate electrolyte-specific gravity measurements for temperature in safety-related batteries was a violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings." Because our review concluded that, during the last 3 years, this procedure problem did not impact the operability of station batteries this violation has minor safety significance, and will not be documented in an inspection report. This violation was entered into the licensee's corrective action process under Nuclear Notification (b)(7)(C)