San Onofre 2
4Q/2007 Plant Inspection Findings

Initiating Events

Significance: G Oct 11, 2007
Identified By: Self-Revealing
Item Type: FIN Finding
Ineffective Corrective Actions for Instrument Air Header Ruptures
The inspectors reviewed a self-revealing Green finding involving ineffective corrective actions taken in response to site and industry operating experience with instrument air header ruptures. Specifically, contrary to Section 6.2.3 of Procedure SO-123-I-1.42, “Maintenance Division Experience Report,” Revision 0, the licensee failed to implement corrective actions to prevent recurrence for an equipment failure with the potential to cause a significant plant transient, and failed to appropriately consider previous industry and plant experience similar to the event. Additionally, licensee personnel failed to properly evaluate and take corrective actions based on industry operating experience through 2006 involving improperly made soldered joints in instrument air systems. As a result, an additional failure of an improperly made instrument air header joint occurred at SONGS on June 20, 2007. The licensee entered this issue in their corrective action program as Action Request AR 070600867.

This finding was more than minor since it was associated with the equipment reliability attribute of the initiating events cornerstone and affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions. This finding required a Phase 2 analysis per the Manual Chapter 0609, “Significance Determination Process,” Phase 1 Worksheets since the loss of instrument air is a transient initiator resulting in the loss of the feedwater system which is part of the power conversion system which can be used to mitigate the consequences of an accident. Based on the results of the Phase 2 analysis and a subsequent Phase 3 analysis, the finding was determined to be of very low safety significance (Green) because of the availability of the diverse auxiliary feedwater system and the ability of the operators to depressurize the steam generators and utilize the condensate system for heat removal. These results were evaluated by a senior reactor analyst. This finding has a crosscutting aspect in the area of problem identification and resolution associated with operating experience in that the licensee failed to effectively implement changes to station processes, procedures, and equipment in response to operating experience involving improperly made instrument air system joints [P.2(b)].
Inspection Report# : 2007013 *(pdf)*

Significance: G Oct 11, 2007
Identified By: NRC
Item Type: NCV NonCited Violation
Failured to Follow Abnormal Operating Instruction in Response to a Loss of Instrument Air
The inspectors identified a Green noncited violation of Technical Specification 5.5.1.1 involving the failure to meet procedural requirements following a loss of instrument air. Specifically, operators failed to monitor nitrogen tank levels or take precautions for the possibility of oxygen-deficient areas in the plant following actuation of the low pressure backup nitrogen system. The licensee entered this issue in their corrective action program as Action Request AR 070700291.

This finding was more than minor since it was associated with the human performance attribute of the initiating events cornerstone and affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions. This finding required a Phase 2 analysis in accordance with the Manual Chapter 0609, “Significance Determination Process,” Phase 1 Worksheets since the loss of instrument air is a transient initiator resulting in the loss of the feedwater system which is part of the power conversion system which can be used to mitigate the consequences of an accident. Based on the results of the Phase 2 analysis, the finding was determined to be of very low safety significance because of the low likelihood of a complete loss of instrument air and the availability of the auxiliary feedwater system. The cause of this finding has a crosscutting aspect in the area of human performance associated with resources because licensee personnel were not adequately trained on the operation of the

low pressure nitrogen system to effectively implement the abnormal operating instruction [H.2(b)].
Inspection Report# : 2007013 *(pdf)*

Mitigating Systems

Significance: G Oct 11, 2007
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Inadequate Evaluation Results in CCW Pump Runout
A self-revealing, Green noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was identified when Unit 2 experienced a loss of instrument air due to the failure of a soldered joint. Specifically, the loss of instrument air resulted in component cooling water (CCW) Pump 024 being in a runout condition for approximately 75 minutes due to a previous system modification. The licensee entered this issue in their corrective action program as Action Requests AR 070700051 and 070600872.

This finding was greater than minor because it was associated with the mitigating systems cornerstone attribute of design control and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding did not affect the initiating events cornerstone functions of the component cooling water system because the condition would only have existed given a loss of instrument air initiator had already occurred. In accordance with NRC Inspection Manual Chapter 0609, Appendix A, Phase 1 Worksheet, "Significance Determination Process (SDP) Phase 1 Screening Worksheet for the Initiating Events, Mitigating Systems, and Barriers Cornerstones," this finding was determined to be of very low safety significance because the finding was a design deficiency confirmed not to result in a loss of operability per "Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment."
Inspection Report# : 2007013 *(pdf)*

Significance: G Oct 11, 2007
Identified By: Self-Revealing
Item Type: FIN Finding
Ineffective Corrective Actions for a Failed Control Room Annunciator
The inspectors reviewed a self-revealing Green finding involving the failure to take effective corrective actions for a failed control room annunciator. Specifically, after the annunciator for actuation of the backup nitrogen supply to the instrument air system failed to function on demand on several occasions from 1994 through 2007, the corrective actions taken by the licensee to restore the annunciator to service were inadequate and narrowly focused. The annunciator subsequently failed to function during the loss of instrument air event on June 20, 2007. The licensee entered this issue in their corrective action program as Action Request AR 070601250.

This finding was more than minor since it was associated with the human performance attribute of the initiating events cornerstone and affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions. This finding required a Phase 2 analysis in accordance with the Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheets since the loss of instrument air is a transient initiator resulting in the loss of the feedwater system which is part of the power conversion system which can be used to mitigate the consequences of an accident. Based on the results of the Phase 2 analysis, the finding was determined to be of very low safety significance because of the low likelihood of a complete loss of instrument air and the availability of the auxiliary feedwater system. This finding has a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program in that the licensee failed to thoroughly evaluate the failed annunciator such that the resolution appropriately addressed the causes [P.1(c)].
Inspection Report# : 2007013 *(pdf)*

Significance: G Oct 11, 2007
Identified By: NRC
Item Type: NCV NonCited Violation

Inadequate Procedure for Loss of Instrument Air
The inspectors identified a Green noncited violation of Technical Specification 5.5.1.1 involving the failure to maintain an adequate abnormal operating instruction for a loss of instrument air event. The licensee entered this issue in their corrective action program as Action Request AR 070801151.

This finding was more than minor because it was associated with the procedure quality attribute of the mitigating systems cornerstone and affected the cornerstone objective to ensure the availability, reliability and capability of systems that respond to initiating events, in that a less than adequate abnormal operating procedure could have prevented operators from promptly tripping the reactor, allowing conditions to continue to degrade and resulting in a demand on the reactor protection system. Using the Significance Determination Process Phase 1 Screening Worksheet in Appendix A of Inspection Manual Chapter 0609, the inspectors determined this finding had very low safety significance because it did not result in an actual loss of safety function per "Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment." This finding has a crosscutting aspect in the area of human performance associated with resources in that the licensee failed to provide operators with complete, accurate, and up-to-date procedures [H.2(c)].
Inspection Report# : 2007013 *(pdf)*

Significance:  Oct 11, 2007
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Simulator Incorrectly Modeled Plant Response to Loss of Instrument Air
A self-revealing, Green noncited violation of 10 CFR Part 55.46(c)(1) was identified involving the licensee's failure to incorporate a design change in modeling plant response for the plant-referenced simulator. Specifically, during operator training in the plant-referenced simulator, the controlled bleedoff valves for the reactor coolant pumps were modeled to fail closed on a loss of instrument air, whereas the valves in the plant remained open during an actual loss of instrument air event on June 20, 2007. The licensee entered this issue in their corrective action program as Action Requests AR 070600873 and 070900160.

This finding was greater than minor because it was associated with the mitigating systems cornerstone attribute of human performance and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors evaluated this finding using the Appendix I, "Licensed Operator Requalification Significance Determination Process" worksheets of Manual Chapter 0609 because the finding is a requalification training issue related to simulator fidelity. The finding is of very low safety significance because the discrepancy did not have an adverse impact on operator actions such that safety related equipment was made inoperable during normal operations or in response to a plant transient. This finding has a crosscutting aspect in the area of human performance associated with resources in that the licensee did not provide operators with adequate facilities and equipment for use in operator training [H.2(d)].
Inspection Report# : 2007013 *(pdf)*

Significance:  Oct 11, 2007
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Follow Procedure for an Impaired Annunciator
The inspectors identified a Green noncited violation of Technical Specification 5.5.1.1 involving the failure to meet procedural requirements governing impaired annunciators. Specifically, after the identification of a failed annunciator, operators did not enter the annunciator in the failed annunciator log or mark the affected annunciator window with an annunciator compensatory action flag. The licensee entered this issue in their corrective action program as Action Request AR 070700291.

This finding was more than minor since it was associated with the human performance attribute of the initiating events cornerstone and affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions. This finding required a Phase 2 analysis in accordance with the Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheets since the loss of instrument air is a transient initiator resulting in the loss of the feedwater system which is part of the power conversion system which can be used to mitigate the consequences of an accident. Based on the results of the Phase 2 analysis, the finding was determined to be of very low safety significance because of the low likelihood of a complete loss of instrument air and the

availability of the auxiliary feedwater system. This finding has a crosscutting aspect in the area of human performance associated with resources because the operators were not sufficiently trained to consistently implement the annunciator operating procedure [H.2(b)].
Inspection Report# : 2007013 *(pdf)*

Significance: G Oct 11, 2007
Identified By: Self-Revealing
Item Type: FIN Finding
Inadequate Implementation of Corrective Actions for Air Operated Valve Regulators
A Green self-revealing finding was identified associated with the failure of the reactor coolant pump controlled bleed off valve to shut during a loss of instrument air event. The licensee failed to adequately implement corrective actions from previously evaluated industry operating experience for new valve regulators that were installed in the unit. The licensee entered this issue in their corrective action program as Action Request AR 070600873.

The finding was greater than minor because it was associated with the mitigating systems cornerstone attribute of design control and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, the finding is determined to have very low safety significance because the condition only affected the mitigation systems cornerstone and it was confirmed not to result in loss of operability per "Part 9900, Technical guidance, Operability Determination Process for Operability and Functionality Assessment"
Inspection Report# : 2007013 *(pdf)*

Significance: G Sep 27, 2007
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Evaluate Operating Experience for Missing Nuts in 4kV Electrical Breakers
The inspectors identified a noncited violation of 10 CFR 50, Appendix B, Criterion V (Procedures) for the failure to follow requirements for evaluating applicable 4 kV breaker operating experience. Engineers had inappropriately determined that operating experience related to loose and/or missing mechanism operated cell components, dated 2003, was not applicable to San Onofre. Subsequently, a safety related 4 kV breaker (offsite power to 4 kV safety bus) malfunctioned because of a missing nut. In addition, following the breaker malfunction, the licensee's extent of condition review was initially untimely and lacked rigor. After NRC prompting, other loose and missing fastening nuts were identified. This issue was entered into the licensee's corrective action program as Action Request 070601194.

The finding was more than minor because it was associated with the equipment performance attribute of the mitigating systems cornerstone and it affected the cornerstone objective by reducing the availability, reliability, and capability of the electrical systems. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding had very low safety significance (Green) because it did not result in a loss of system safety function, a loss of a single train of safety equipment for greater than its technical specification allowed outage time, and did not screen as potentially risk significant due to seismic, flooding or severe weather initiating events. The cause of the finding had a cross-cutting aspect in the area of problem identification and resolution, corrective action program component (P.1(c)) because of the poor extent of condition evaluation.
Inspection Report# : 2007004 *(pdf)*

Significance: G Sep 27, 2007
Identified By: NRC
Item Type: NCV NonCited Violation
Main Feedwater Isolation Valve Hydraulic Leak due to Inadequte Maintenance Procedure
The inspectors identified a Green noncited violation of Technical Specification 5.5.1.1 (Procedures) for the failure of maintenance personnel to have adequate procedures in place to ensure a feedwater isolation valve hydraulic pump discharge filter housing was properly installed, causing a hydraulic oil leak that had to be emergently repaired. This issue was entered into the licensee's corrective action program as Action Request 070601194.

The finding was more than minor because it affected the procedure quality attribute of the mitigating systems cornerstone, and affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, “Significance Determination Process,” Phase 1 worksheet, the finding had very low safety significance (Green) because it did not result in an actual loss of system safety function, a loss of a single train of safety equipment for greater than its technical specification allowed outage time, and did not screen as potentially risk significant due to seismic, flooding, or severe weather initiating events. The cause of the finding has a cross-cutting aspect in the area of human performance associated with resources (H.2.(c)) because the licensee failed to ensure complete and accurate procedures were available and to assure the safe operation of a main feedwater isolation valve.
Inspection Report# : 2007004 *(pdf)*

Significance: G Jun 26, 2007
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Promptly Identify and Correct Gas Accumulation in the Units 2 and 3 Component Cooling Water Systems
The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action,” for the failure to promptly identify and correct the formation of gas pockets in the piping of the Units 2 and 3 component cooling water systems from March 8 to December 15, 2006 . This deficiency resulted in the Unit 3 Train B component cooling water system being inoperable for approximately eight days from December 8 to 15, 2007. This issue was entered into the licensee’s corrective action program as Action Requests 061001379 and 070500468.

This finding was determined to be more than minor because if left uncorrected it would become a more significant safety concern in that the operability of the Units 2 and 3 CCW systems would continue to be challenged by the accumulation of gas. The inspectors evaluated the issue using the Manual Chapter 0609, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," Phase 1 screening worksheet. The inspectors determined that a Phase 2 significance determination was required because both the mitigating systems and containment barriers cornerstones were affected. The inspectors performed a Phase 2 significance determination using the Risk-Informed Inspection Notebook for San Onofre Nuclear Generating Stations, Units 2 and 3, Revision 2.1. The finding was potentially greater than Green using these worksheets. The inspectors requested that a Region IV Senior Reactor Analyst perform a Phase 3 significance determination to provide a better estimation of overall risk significance. Based on the results of the Phase 3 analysis, the finding is determined to have very low safety significance (Green). The cause of the finding has a cross-cutting aspect in the area of problem identification and resolution associated with the corrective action program because the licensee failed to thoroughly evaluate the formation of gas in the Units 2 and 3 CCW systems to ensure that the cause and extent of condition were addressed in a timely manner.
Inspection Report# : 2007003 *(pdf)*

Significance: G Jun 26, 2007
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Promptly Correct Deficient Emergency Diesel Generator Potentiometers
The inspectors identified a Green noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, “Corrective Action,” for the failure to promptly correct a common cause problem associated with debris intrusion into potentiometers in the automatic voltage regulators of the emergency diesel generators. The licensee identified the root cause of the problem in September 2006, but failed to correct the problem before an additional failure on March 3, 2007. This issue was entered into the licensee’s corrective action program as Action Requests 060800603 and 070300161.

The finding was determined to be more than minor because it was associated with the equipment performance attribute of the mitigating systems cornerstone and it affected the cornerstone objective by reducing the availability, reliability, and capability of the emergency diesel generators. Using the Manual Chapter 0609, “Significance Determination Process,” Phase 1 worksheet, the finding was determined to have very low safety significance (Green) because it did not result in an actual loss of safety function for the affected system. The cause of the finding has a cross-cutting aspect in the area of problem identification and resolution associated with the corrective action program because the licensee failed to take appropriate corrective action to address the deficient emergency diesel generator

automatic voltage regulator potentiometers in a timely manner.
Inspection Report# : 2007003 *(pdf)*

Significance: G Jun 15, 2007
Identified By: NRC
Item Type: NCV NonCited Violation
Fire Separation in Fire Area 2/3-AC-50-29 Did Not Comply With Deviation Request.
A noncited violation of License Condition 2.C.(14), "Fire Protection," was identified for failure to ensure that redundant trains of safe shutdown equipment would remain free of fire damage in Fire Area 2-AC-50-29. Specifically, the cables for redundant trains of safe shutdown equipment in both units were not separated by at least 10 feet as described in Deviation Number 8, and they also failed to meet Section III.G.2 of Appendix R to 10 CFR 50. Four Train B cables in conduits were found to be located within 10 feet of the Train A switchgear room cooling units in both plants. The concern was that a single fire could cause loss of Train B 120V vital ac power and battery charger, as well as cause loss of Train A ac and dc power due to the loss of room cooling. This issue was entered into the corrective action program under Action Requests 070400873 and 070400998.

Failure to ensure that redundant trains of safe shutdown equipment would remain free of fire damage in accordance with the license basis was a performance deficiency. This finding was more than minor because it affected the protection against external factors attribute of the Mitigating Systems cornerstone. The significance of this finding was assessed using Appendix F of Manual Chapter 0609, "Fire Protection Significance Determination Process." This finding was categorized as a localized cable/component protection issue with high degradation rating. The evaluation of the potential fire sources and fire targets indicated that the finding had very low safety significance because none of the potential fire sources were expected to damage all four Train B cables or cause the loss of function in both trains.
Inspection Report# : 2007008 *(pdf)*

Significance: G Mar 31, 2007
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Follow an Abnormal Operating Instruction in Response to High Offsite Power Grid Voltage
The inspectors identified a Green NCV of Technical Specification 5.5.1.1 for the failure of operations personnel to enter and implement abnormal operating Instruction SO23-13-4, "Operation During Major System Disturbances," on multiple occasions from 2004 to 2006 to address high offsite power voltage. On November 22, 2006, the inspectors discovered through review of historical data that the action limit for high offsite grid voltage (234 kV) had been briefly exceeded multiple times since August 2004. The inspectors further identified that there was no provision in place to alert control room operators to take appropriate actions should the high grid voltage limit be reached. This issue was entered into the licensee's corrective action program as Action Request 061101250.

The finding was determined to be more than minor because if left uncorrected it could result in a more significant safety concern due to potential long-term degradation of vital equipment. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance (Green), because it did not result in a loss of safety function and did not affect the risk of external initiators. The finding has a crosscutting aspect in the area of human performance associated with resources, in that there was no provision in place to alert control room operators to take appropriate actions should the high grid voltage limit be reached.
Inspection Report# : 2007002 *(pdf)*

Barrier Integrity

Significance: G Feb 13, 2007
Identified By: NRC
Item Type: NCV NonCited Violation
Loss of Spent Fuel Pool Cooling due to Inadequate Temporary Ventilation Procedure
The inspectors identified a Green NCV of Technical Specification 5.5.1.1 for the failure of operations personnel to

have adequate procedures in place to establish temporary ventilation in the safety-related switchgear rooms when the normal ventilation system is out of service. This resulted in a loss of cooling to the Unit 2 spent fuel pool for approximately 68 minutes. This issue was entered into the licensee's corrective action program as Action Request 070200583.

The finding was determined to be more than minor because it affected the procedure quality attribute of the barrier integrity cornerstone, and affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. This finding cannot be evaluated by the significance determination process because Manual Chapter 0609, "Significance Determination Process," Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," and Appendix G, "Shutdown Operations Significance Determination Process," do not apply to the spent fuel pool. The resident inspectors in conjunction with the SRA performed a qualitative bounding evaluation. This finding is determined to be of very low safety significance by management review because radiation shielding was provided by the spent fuel pool water level, multiple sources of makeup water were available, and spent fuel pool temperature experienced only a nominal increase during the loss of spent fuel pool cooling. The cause of the finding has a crosscutting aspect in the area of human performance associated with resources in that procedural guidance was inadequate to ensure proper temporary ventilation was established in the safety-related switchgear rooms.
Inspection Report# : 2007002 *(pdf)*

Emergency Preparedness

Occupational Radiation Safety

Public Radiation Safety

Physical Protection

Although the NRC is actively overseeing the Security cornerstone, the Commission has decided that certain findings pertaining to security cornerstone will not be publicly available to ensure that potentially useful information is not provided to a possible adversary. Therefore, the cover letters to security inspection reports may be viewed.

Miscellaneous

Last modified : February 04, 2008