

# Palisades

## 1Q/2008 Plant Inspection Findings

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### Initiating Events

**Significance:**  Mar 31, 2008

Identified By: NRC

Item Type: FIN Finding

#### **Main Feed Pump trip due to Inadequate Configuration**

**Introduction:** A Green self-revealed finding occurred on January 13 when the 'B' Main Feed Pump failed. The failure occurred due to improper maintenance on the lube oil pump associated with the Main Feed Pump that resulted in a loss of lube oil flow and trip of the Main Feed Pump.

**Description:** On January 13, with the plant at 100% power, the 'B' Main Feed Pump tripped due to a loss of lube oil pressure. In accordance with Off- Normal Procedure ONP-12, Loss of main Feedwater, operators manually tripped the reactor. Following the trip, the licensee formed an incident response team to determine what caused the feed pump trip. The team identified that the drive coupling between the shaft driven lube oil pump and the feed pump failed causing a loss of lube oil pressure and subsequent Main Feed Pump trip. A root cause team determined that following maintenance in the fall 2007 outage, the pump coupling had been reassembled with insufficient engagement between the shaft coupling hub and outer sleeve. The lack of engagement resulted in rapid wear of the hub and coupling splines eventually leading to the coupling's failure.

The root cause team determined the improper reassembly resulted from use of an improper key between the drive shaft and the hub. The proper key includes a foot to limit the distance the hub can be slid up the shaft. The work instructions used for reassembly of the pump lacked sufficient detail to ensure the proper key was used. In addition, the key in use had either been modified during previous pump maintenance to remove the foot or a key without a foot was substituted for the correct key.

**Analysis:** The inspectors determined the failure to use the proper key in the Main Feed Pump was a performance deficiency that warranted a safety significance determination. The inspectors concluded that the finding was more than minor in accordance with Inspection Manual Chapter 0609 because the finding is associated with the reactor safety cornerstone objective of reducing the likelihood of an initiating event. Specifically, the improper pump assembly led to a partial loss of feed and subsequent plant trip. The inspectors reviewed the finding in accordance with Inspection Manual Chapter 0612. In accordance with the phase one screening checklist, because the finding did not affect a mitigating system in addition to being a transient initiator, the finding was of very low safety significance, i.e. Green. Since the finding occurred because the documentation of the key lacked sufficient detail to ensure proper assembly, the finding included a cross-cutting aspect in the area of Human Performance, Resources, Complete and Accurate Documentation (H.2(c)).

**Enforcement:** The finding does not represent a violation of NRC requirements. However, since it represents a failure to meet a self imposed requirement, the inspectors concluded the deficiency constituted a finding consistent with Section VI.A.1 of the NRC Enforcement Policy. Specifically, FP-WM-PLA-01, Work Order planning process, stipulates that task instructions should match the complexity of the activity commensurate with the qualifications of the workers. Contrary to this, the task instruction did not include sufficient detail to properly reassemble the Main Feed Pump lube oil pump coupling. Therefore, this finding is identified as Finding (FIN)-05000355/2008002-08, Improper Main Feed Pump Coupling Assembly. This issue is in the licensee's corrective action program as CR-PLP-2008-0151.

Inspection Report# : [2008002 \(pdf\)](#)

**Significance:**  Dec 31, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Comply with Operating Requirements Manual Restrictions on Heavy Load Movement**

NRC identified violations of Technical Specification (TS) 5.4.1 occurred on October 4, and October 13, 2007 when the licensee violated Operational Requirements Manuals limits on movement of heavy loads. On October 4, the licensee moved a heavy load in the Spent Fuel Pool (SFP) with irradiated fuel less than 30 days old in the SFP. On October 13, the licensee moved a heavy load in containment with pressurizer temperature greater than 225F. The licensee successfully landed the loads and entered the issues into the corrective action program.

The finding was more than minor because the failure to comply with the Operating Requirements Manual requirements affected the initiating event cornerstone objective of maintaining the availability and reliability of the primary coolant boundary and the SFP. The issue screened as green because no load drops occurred and the loads were suspended for a short time. The finding has a cross cutting aspect in the area of human performance, coordination of work activities

Inspection Report# : [2007007](#) (pdf)

**Significance:**  Jun 30, 2007

Identified By: Self-Revealing

Item Type: FIN Finding

### **Reactor Trip Caused by Human Performance Error**

A self-revealing finding was identified for the licensee's failure to follow work order instructions when performing maintenance on a main feedwater regulating valve position indicator. As a result, an automatic reactor trip occurred on a Reactor Protection System (RPS) actuation for steam generator low feedwater level. The licensee performed a cause analysis for the event and entered the event into their corrective action program.

The finding was more than minor because the failure to follow instructions caused an actual transient (i.e., reactor trip). This finding did not constitute a violation of NRC requirements and is considered very low safety significance (Green) since there was no impact on safety-related equipment or mitigation function and availability. The finding also has a cross-cutting aspect in the area of human performance, because the licensee failed to use adequate human error prevention techniques. (H.4(a))

Inspection Report# : [2007004](#) (pdf)

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## **Mitigating Systems**

**Significance:**  Mar 31, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Ensure Fire Door Was Closed**

**Introduction:** The inspectors identified a Green Non-Cited Violation (NCV) of License Condition 2.C.(3), Fire Protection, for failure to ensure a fire door between an emergency diesel generator room and a vital switchgear room was closed. This partially open door degraded the fire containment capability assumed in the fire hazards analysis.

**Description:** On January 8, 2008 while conducting a tour, the inspectors noted door 71, the fire door between the C bus safety-related switchgear room and the 1-1 Emergency Diesel Generator (EDG) room, open about two inches. The fire door is a three-hour door which separates Fire Area 4 from Fire Area 5. Although there is an auto-closure mechanism on the door, when the ventilation system cycles on, the door will not close without assistance. This known condition is stated on a sign which is affixed to the door which says: "Attention Varying Air Pressures Affect Door Closing Please Manually Close Door Completely." In this case, the door was found partially open, and the ventilation fan was running in the 1-1 EDG room, resulting in the door being held partially open. The inspector saw no one in the immediate vicinity and closed the door. The inspectors looked in the adjacent vital areas and found no one. The inspectors informed the operations shift of the issue and the shift initiated CR-PLP-2008-00075.

The investigation determined the last known entry was 12 minutes earlier by security personnel conducting fire tours for unrelated issues. The inspectors concluded the fire door was not closed and should have been closed in accordance with the licensee's fire hazards analysis to provide a three hour fire barrier between a 2400v vital bus and an emergency diesel generator.

Analysis: The failure of an automatic fire door to close and the failure to close the door is a performance deficiency that warrants a significance determination. The inspectors reviewed the minor examples in Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," and none were found which related to this issue. The finding is more than minor because it is associated with the protection against external factors (fires) attribute of the mitigating system cornerstone and affects the objective to maintain the reliability and capability of systems that respond to events to prevent undesirable consequences. In accordance with Inspection Manual Chapter 0609, Appendix F, "Fire Protection SSDP", the inspectors conducted a Phase I Significance Determination Process screening. The inspectors determined this finding was in the fire confinement category and the barrier was moderately degraded because the door was not latched and was partially open. The inspectors determined the finding was of very low safety significance (Green), because both fire areas had fully functional, automatic water-based fire suppression which provided adequate coverage in both rooms. No transient combustible loads were present in either room. The finding includes a cross-cutting aspect in the area of human performance in that human error prevention techniques (H.4(a)), in this case adequate self checking, were not effective in ensuring this door was closed after use.

Enforcement: Palisades License Condition 2.C.(3), Fire Protection, states, in part, that the licensee shall implement and maintain in effect all provisions of the approved fire protection program as described in the Updated Final Safety Analysis Report and approved in various Safety Evaluation Reports. Updated Final Safety Analysis Report chapter 9.6, "Fire Protection", states, in part, that building structures have been designed and arranged to prevent the spread of fire. The Updated Final Safety Analysis Report references the complete description of fire areas and barriers as being contained in the Fire Hazards Analysis Report. The Fire Hazards Analysis Report, revision 7, requires fire barrier protection between Fire Areas 4 and 5 with three-hour fire walls and three-hour doors. Contrary to this, on January 8, 2008 licensee personnel failed to assure that openings in the fire barrier walls were protected with doors with a rating equivalent to that of the barriers. Specifically, door 71 was partially open and unlatched which made the fire door inoperable and invalidated the 3 hour fire rating of the fire barrier. The corrective actions to restore compliance included immediately ensuring the door was properly closed and latched. Because the finding is of very low safety significance and has been entered into the licensee's corrective action process as CR-PLP-2008-00075, this violation is being treated as an NCV consistent with Section VI.A of the Enforcement Policy: NCV 05000255/2008002-01, "Failure to Ensure Fire Door Was Closed."

Inspection Report# : [2008002](#) (pdf)

**Significance:**  Mar 31, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Monitor the Feedwater System Under 10 CFR 50.65a(1)**

Introduction: The inspectors identified a Green Non-Cited Violation of 10 CFR 50.65(a)(1) for the failure to include a 'B' feed regulating valve deficiency to close during startup operations as a functional failure in the maintenance rule program. The inspectors noted that the failure would have placed the feedwater system into maintenance rule 10 CFR 50.65(a)(1) status in the fourth quarter of 2007. The failure to properly categorize the failure of the valve to close resulted in a delay in establishing appropriate system monitoring and goal setting to maintain system reliability.

Description: The inspectors reviewed the apparent cause for a plant transient that occurred on October 20, 2007. While the plant was in mode 2 at about 3% power following a refueling outage, the operations' staff attempted to transfer from auxiliary feedwater to main feedwater. When the B feed regulating valve, CV-0703, was un-isolated, primary coolant temperature dropped and steam generator level began to rise. Although CV-0703 was believed to be closed, it was partially open. Temperature dropped to within .3 degrees Fahrenheit of the minimum temperature for critical operations required by Technical Specification and Steam Generator level rose to 86%. The operations staff backed out of the procedure, isolated the valve, and took action to repair the valve.

The licensee determined that during the outage, maintenance testing on the valve positioner caused the bias spring to shift and offset the zero for the valve positioner. As a result, the valve remained partially open even though the control signal demanded a full close position. Even though the post maintenance test did not detect the condition the cause evaluation did not evaluate why the post maintenance test failed to detect this deficiency. In addition, the apparent cause determined that the condition did not affect any maintenance rule functions. The inspectors reviewed the maintenance rule scoping document and found the valve's closing function is listed in the scoping document. The inspectors provided this information to engineering and engineering wrote CR 2008-00562. On February 5, 2008, the inspectors reviewed the system health report of record dated July 11, 2007. The report identified there was 1 maintenance preventable functional failure in the previous 24 months; and established a performance criterion of <2

maintenance preventable functional failure in a 24 month period. One additional maintenance preventable functional failure would place the system in a(1) status. On February 27, 2008 the expert panel met and determined the failure of B feed regulation valve CV-0703 was a maintenance preventable functional failure. In addition, the panel reviewed this maintenance preventable functional failure and subsequent items and placed the system in a(1) status.

Analysis: The inspectors concluded that the failure to categorize the B feed regulating valve failure to close as a maintenance preventable functional failure was a performance deficiency and warranted an assessment in the Significance Determination Process. The inspectors determined that once the licensee included the valve's failure to close as a maintenance preventable functional failure, the system should have been placed in a(1). Because of the failure to properly categorizing the failure, the licensee delayed placement of the system into a(1) for several months. The issue is more than minor because, in accordance with Inspection Manual Chapter 0612, Appendix E, Examples of Minor Issues (example 7b) and Enforcement Manual section 8.1.11, Maintenance Rule a(1) and a(2) violations are not minor because they involve Systems, Structures and Components that have demonstrated some degraded performance or condition. The finding is of very low safety significance because there was no design deficiency, the finding did not represent an actual loss of a safety function, nor does this involve a risk significant system for mitigating fire, flood, seismic, or severe weather events. This finding also had cross-cutting aspects in the area of problem identification and resolution associated with the corrective action program (P.1(c)) because the licensee failed to thoroughly evaluate the cause and extent of condition of the failed feed regulating valve.

Enforcement: 10 CFR 50.65, "Maintenance Rule", paragraph a(1) states, in part, that the performance or condition of systems shall be monitored against established goals to provide reasonable assurance that the systems are capable of performing their intended functions. Paragraph a(2) of 10 CFR 50.65 requires, in part, that monitoring as specified in paragraph a(1) is not required where it has been demonstrated that the performance or condition of a system is being effectively controlled through the performance of appropriate preventive maintenance such that the system remains capable of performing its intended function. Contrary to the above, although the licensee had sufficient information on November 11, 2007 (the date the cause evaluation indicated the failure was not a maintenance preventable functional failure) to classify the failure to close as a maintenance preventable functional failure, the licensee failed to properly evaluate the system under the maintenance rule process. This resulted in a delay in monitoring performance of the main feedwater system to provide assurance that the maintenance on the system was effective in maintaining the system capable of performing its intended function. Specifically, the inspectors determined that the performance of the main feedwater system was such that it was necessary to monitor system performance against established goals under a(1) when an additional functional failure occurred for B feed regulating valve CV-0703. The licensee failed to place the system in a(1) and therefore failed to establish goals and/or monitor the performance of the system against such goals. The failure to establish goals and monitor feedwater system under a(1), is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy and is identified as NCV 05000255/2008002-02: Failure to Monitor the Feedwater System Under 10 CFR 50.65a(1) . This issue is in the licensee's corrective action program as CR-PLP-2008-00562. The licensee placed the system in a(1) status.

Inspection Report# : [2008002](#) (pdf)

**Significance:**  Mar 31, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate General Operating Procedure for Mode Transition**

Introduction: The inspectors identified a Green Non-Cited Violation (NCV) of Technical Specification (TS) 5.4.1 for the failure to have adequate procedure guidance for the general operating procedures for mode transition to power operations. Specifically, the general plant operating procedure for mode transition did not have adequate guidance to ensure the actions required by TS 3.0.4 were completed for a failure of a radiation monitor required by TS.

Description: On January 14, 2008 with the plant in mode 3, during startup inspection activities in the morning, the inspectors noted radiation monitor RIA-1805, a safety-related monitor, was listed on the Limiting Condition for Operation (LCO) board as being inoperable. RIA 1805 is one of four containment radiation monitors required by TS 3.3.3 (Function # 6 of table 3.3.3-1, applicable in modes 1-4). The monitors are part of engineered safety features and have a 2 out of 4 coincidence logic to actuate to isolate the containment based on high radiation. The inspectors questioned the operations team if the monitor was to be restored to operable prior to start-up or placed in trip (transition from mode 3 to mode 2) since TS 3.0.4, in general, required systems to be operable prior to an upward mode transition unless the actions entered allowed for unlimited period of time. The start-up was scheduled to occur within the hour. The operations shift indicated the issue had been reviewed by their on-site review committee, the

Plant Oversight Review Committee and signed off as acceptable in General Operating Procedure (GOP), GOP-2, "Mode 3> 525F to Mode 2", step 1.14. The rationale was that the channel could be placed in trip and once the channel was placed in trip, the plant could be operated for an unlimited period of time. The site assumed they had 7 days to place the unit in trip (the required completion time) and that it did not have to be completed prior to the mode ascension. The inspectors noted that since the action had not been taken (tripping the channel would change the coincidence logic from 2 out of 4 channels to 1 out of 3 channels to actuate the engineered safety features), the plant was still in a shutdown action statement. The required action has 7 days to be completed, but if it is not completed or the time is not met, the plant must be shutdown (action E of TS 3.3.3). Because of the inspectors' concerns, operations decided to complete the repair of the radiation channel. At 0532 the licensee declared RIA-1805 operable.

The reactor startup was delayed for reasons not related to RIA-1805; however, RIA-1805 failed again at 1303. After the other startup delays were resolved, with another operations shift in the control room, the reactor startup procedure was about to be started. The inspectors asked if they were planning to place the channel in trip or repair the channel prior to startup. The assistant operations manager indicated that the issue was previously reviewed by the Plant Oversight Review Committee and that there was no actual requirement to take the action which allows operations for an unlimited period of time prior to using TS 3.0.4a provision for mode transition. The inspectors discussed the issue with the shift manager as well. After discussing with plant management, the shift indicated they would place the channel in trip and then proceed with the startup. The shift determined the correct methodology for tripping the channel; tripped the channel at time 1423; and then proceeded with the start-up at 1426. The licensee wrote CR PLP-2008-00180 to address the issue.

The inspectors reviewed TS 3.0.4 and the basis for TS 3.0.4a and concluded that since the objective of TS 3.0.4 was to assure that adequate safety was maintained during mode ascension, the required actions must be completed prior to mode transition. While it would be optimum to have all equipment operable, TS 3.0.4a allows mode ascension if the actions to be entered allowed unlimited period of time. The basis says: "Compliance with the required Actions that permit continued operations of the plant for unlimited period of time in a mode or other specified condition provides an acceptable level of safety for continued operation." Since the action to change the coincidence from the engineered safety features actuation from 2 out of 3 (since one is failed) to 1 out of 3, is the item which provides the acceptable level of safety, the inspectors concluded until the licensee completed the required action, TS 3.0.4a was not satisfied. The inspectors concluded the licensee's assessment was not accurate.

The inspectors requested the assistance of the region and Nuclear Reactor Regulation for the TS interpretation for TS 3.0.4 a. The single item to be addressed: Do the associated actions which permit continued operation for an unlimited period of time (in this case placing the bistable in the trip condition for radiation monitor, RI 1805, pursuant to TS 3.3.3.3 Action A) need to be completed before the mode transition from mode 3 to mode 2 occurs; or can it be done anytime in the 7 day completion time? The group evaluated the TS and concurred in TIA -2008-002 which validated for mode ascension the actions that allow operating for an unlimited period of time (i.e. placing the instrument in the tripped condition) must be completed prior to the mode ascension. Otherwise the plant remains in a shutdown LCO and the TS 3.0.4a can not be applied. The team concluded that the licensee was not properly applying TS 3.0.4.

The inspectors concluded that the licensee's assessment, including their sign-off in GOP-2, step 1.14 was not appropriate; and that a mode transition would have been conducted with RIA 1805 inoperable if the inspectors had not intervened. The inspector's review of the procedure determined the guidance in the General Operating Procedure was not adequate to ensure the action, which subsequently allows unlimited operating time, was completed prior to mode transition.

Analysis: The inspectors determined the failure to have adequate procedures for mode transition to ensure compliance with technical specifications required a significance determination in accordance with the Inspection Manual Chapter 0609. The minor examples of Inspection Manual Chapter 0612 Appendix E were reviewed. Example k was pertinent and provided an example of a minor item where there were not programmatic concerns which could lead to worse errors if uncorrected. Since validation of compliance with TS 3.0.4 is not adequately captured and multiple groups reviewed the issue; the inspectors concluded this issue was programmatic. Therefore, the finding is more than minor because, if left uncorrected, the finding would become a more significant safety concern in that the licensee would have transitioned modes in a manner prohibited by technical specifications. The finding was considered to have very low safety significance (Green), because the correct actions were completed prior to mode transition based on the response to the inspector's concerns. The finding included a cross-cutting aspect in the area of human performance in that licensee did not adequately use conservative assumptions in decision-making to demonstrate the proposed action is safe (H.1(b)). Specifically, taking actions to restore systems to an operable status prior to mode transition is critical to conservative decision-making.

Enforcement: Technical Specification 5.4.1 requires, in part, that written procedures shall be established, implemented and maintained covering applicable procedures recommended in Appendix A of Regulatory Guide 1.33. Appendix A item 2a is an applicable written procedures for Hot Standby to Minimum Load (nuclear start-up). Procedure GOP-3, General Operating Procedure Mode 3 > 525 to Mode 2, revision 25 is the site's written procedure to conduct this evolution. Contrary to the above on January 14, 2008, the site's guidance for mode transition for review of TS 3.0.4 (specifically step 1.14) was not adequately maintained in that it did not provide adequate guidance to assess what actions need to be completed to ensure TS 3.0.4a could be applied. Because this finding was of very low safety significance, the finding was entered into the licensee's corrective action program as CR-PLP-2008-00180; this finding is being dispositioned as an NCV (NCV 0500255/2008002-03, Inadequate General Operating Procedure) consistent with Section VI.A of the NRC Enforcement Policy.

Inspection Report# : [2008002](#) (pdf)

**Significance:** 6 Mar 31, 2008

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

### **Failure to Comply with TS 3.8.4 B and C**

Introduction: A self revealing NCV of TS 3.8.4 B and C was identified for failing to recognize that battery cell parameters were not within Technical Specification (TS) limits and for failing to take actions in accordance with TS for an inoperable battery. Specifically, cell 43 of the right train safety-related battery (ED02,) was below technical specifications limits for individual cell voltage without recognition by the site staff. As a result, compensatory actions and a plant shutdown required by technical specifications were not completed as required.

Description: On December 27, 2007, during the performance of TS surveillance testing of the main station batteries, the float voltage of battery cell 43 on the right train station battery was below the allowable TS limit for this parameter. However, at the time of this discovery, the performer did not recognize that the as-found value fell below the specified TS battery cell limit. On December 28, 2007, during review of the surveillance data and discussion with members of the electrical maintenance department who had performed the surveillance, an on-duty senior reactor operator recognized the low reading for battery cell 43. The delay of over 24 hours in recognizing that battery cell 43 float voltage was below the TS limit for this parameter resulted in not meeting the TS completion time for required actions in accordance with TS 3.8.6.A and TS 3.8.6.B, that were applicable from the initial discovery time.

The required action to immediately declare the right train station battery inoperable was not met. Additionally, with the right train station battery inoperable, TS 3.8.4.B requires a verification that both the directly connected and cross-connected battery chargers are supplying power to the affected train with a completion time of 2 hours, and that the station battery be restored to operable status within 24 hours. This action was not completed in the two hours. With these required actions and associated completion times not met, the required actions of TS 3.8.4.C requiring Mode 3 entry in 6 hours was also not met.

The shift manager declared the battery inoperable after being informed of the condition of cell 43. The licensee completed the required actions of 3.8.4 B within two hours. The licensee replaced the cell and verified acceptable performance during a post maintenance test. The licensee determined the cause of the failure to recognize the surveillance failure was an inadequate pre-job brief.

Analysis: The inspectors determined that the failure of the site to initially recognize that battery cell 43 voltage was below the TS was within the licensee's ability to foresee and correct. The failure to take required actions in accordance with technical specifications was more than minor because the TS actions increase reliability of the Direct Current (DC) bus. Therefore, the finding impacted the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the objective to ensure availability, reliability and capability of the systems which respond to initiating events. The finding is of very low safety significance (Green), because the finding did not cause a loss of safety function for the right train battery. The finding includes a cross-cutting aspect in the area of human performance in that human error prevention techniques (H.4(a)), in this case a pre-job brief, were not effective in preventing the delay in notification of the senior reactor operators.

Enforcement: TS 3.8.4 Action B requires, in part, that in two hours an operable cross-connected and directly connected charger be connected to the affected DC bus when one power source battery is in operable. In addition TS 3.8.4 Action C requires the plant be placed in mode 3 in six hours when the required action and associated completion times are not met. Contrary to this, on December 28, 2008 with the right train battery (ED02) inoperable, both battery

chargers were not placed in service in two hours; and the plant was not placed in mode 3 within six hours. Once the shift manager became aware of the status of the battery, the licensee completed the required actions. The failure to take actions required by TS is being treated as a non-cited violation (NCV), consistent with Section VI.A.1 of the NRC Enforcement Policy and is identified as NCV 05000255/20008002-09: Failure to Comply with TS 3.8.4 B and C. This issue is in the licensee's corrective action program as CR-PLP-2007-06496. The licensee replaced cell 43 for battery ED02.

Inspection Report# : [2008002](#) (pdf)

**Significance:** 6 Mar 31, 2008

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

**Failure to Comply with TS 3.5.2 B and C**

**Introduction:** A self revealing non-cited violation (NCV) of TS 3.5.2 B and C was identified for the inability of an automatic valve in the Emergency Core Cooling System (ECCS), CV-3047, to reposition fully closed on an actuation signal. As a result, one train of ECCS was inoperable for longer than allowed by technical specifications.

**Description:** On November 26, 2007, CV-3047 (a normally closed, automatic valve which is opened periodically for safety injection tank operations; and which closes on safety system actuation) exceeded its stroke time to close during testing. CV-3047 is intended to close, along with other valves to ensure ECCS flow through the core is not bypassed in the event of a postulated loss of coolant accident. The valve was declared inoperable; and pending further troubleshooting, administrative controls were established with the intent to maintain CV-3047 closed in its safety position. The administrative action was to place a tag indicating the valve should not be opened. The site investigated possible actions to repair the valve, but believed that the radiation field was too high to repair the valve. They did not look at actions or activities to either verify the valve was closed locally or to verify no flow was occurring through the valve.

Subsequently, on December 18, 2007, during safety injection tank operations, investigation determined that CV-3047, although indicating closed, was not fully closed. TS Surveillance Requirements 3.5.2.2 and 3.5.2.5 require that each ECCS automatic valve in the flow path be verified to be in the correct position, and to actuate to the correct position, respectively. Since CV-3047 was not fully closed, it was incapable of meeting Surveillance Requirements 3.5.2.2 and 3.5.2.5. This rendered one train of ECCS inoperable. The licensee wrote a Condition Report (CR-PLP-2007-06351) and manually isolated the flow path to comply with TS. The licensee repaired the valve, successfully retested it, and restored the valve to service. The time the valve was partially open between November 26 and December 18, 2007, about 23 days, exceeded TS requirements of 72 hours.

**Analysis:** The inspectors determined the failure to ensure the valve was closed was within the licensee's ability to foresee and correct. The failure to take required actions in accordance with TS was more than minor because the finding impacted the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the objective to ensure availability, reliability and capability of the systems which respond to initiating events. More flow would bypass than core with the valve approximately 18% open than if the valve had been fully closed. The licensee performed analyses to determine the ECCS flow with the valve partially open. The bypass flow would not have prevented the ECCS safety function from being maintained based on current plant analysis. Therefore the finding was considered to have very low safety significance (Green). The finding included a cross-cutting aspect in the area of human performance in that licensee did not adequately coordinate work activities to address the impact of actions needed to ensure the valve was closed when the valve was declared inoperable. The consideration of using cameras, surveys, alternate methods for ensuring the valve was closed was not followed through on by the site team to ensure adequate equipment performance. (H.3(b)).

**Enforcement:** TS Surveillance Requirements 3.5.2.2 and 3.5.2.5 require, in part, that each ECCS automatic valve in the flow path be verified to be in the correct position, and to actuate to the correct position, respectively. Surveillance Requirement 3.0.1 states, in part, failure to meet a surveillance, shall be failure to meet the Limiting Condition for Operation (LCO). LCO for TS 3.5.2 requires two ECCS trains operable. TS 3.5.2 Action B requires, in part, that with one ECCS train inoperable, the inoperable train be restored to operable in 72 hours. In addition TS 3.5.2 Action C requires the plant to be placed in mode 3 in six hours when the required action and associated completion times are not met. Contrary to this, on November 29, 2007 with one train of ECCS inoperable, due to the inability of CV-3047 to meet the above surveillances with the valve not in its correct position, the train was not restored to service in 72 hours nor was the plant placed in mode 3 in the required time. The failure to take actions required by TS is being

treated as a Non-Cited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy and is identified as NCV 05000255/20008002-10: Failure to Comply with TS 3.5.2 B and C. This issue is in the licensee's corrective action program as CR-PLP-2007-06351. The licensee completed repairs to CV-3047.

Inspection Report# : [2008002](#) (pdf)

**Significance:**  Dec 31, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Inadequate Post Maintenance Testing for High Pressure Safety Injection Pumps**

The inspectors identified a Green Non-Cited Violation of 10 CFR 50 Appendix B, Criterion V, "Instructions, Procedures and Drawing" for failure by the licensee to follow procedural requirements for testing safety-related pumps after bearing replacement. Specifically, the licensee's post-maintenance testing plan and work order for both High Pressure Safety Injection (HPSI) pumps was not in accordance with the site's post-maintenance test (PMT) procedure, and did not have adequate re-tests for bearing replacement. Following identification, the licensee entered the item into their corrective action program and revised the post-maintenance testing for the pumps.

The finding was more than minor because, if left uncorrected, the issue would have become a more significant safety concern in the area of PMTs. The inspectors determined this finding did not result in a loss of function, because the HPSI pump bearings were adequately tested after the inspectors brought the issue to the licensee. Therefore, the finding was considered to be of very low safety significance

Inspection Report# : [2007007](#) (pdf)

**Significance:**  Dec 31, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Containment sump Debris Found during NRC Closeout**

The inspectors identified a Green NCV of 10 CFR 50 Appendix B, Criterion V, "Instructions, Procedures and Drawings" failure by the licensee to follow procedural requirements for closing out the containment sump. Specifically, the licensee failed to comply with the containment sump closeout procedure. After closeout by the site, the inspectors found metal debris of greater than 1/8" in the sump area. Following identification, the licensee entered the item into their corrective action program and removed all debris prior to mode 4 operations.

The finding was more than minor because, if left uncorrected, the issue would have become a more significant safety concern in the area of containment sump performance. The inspectors determined this finding did not result in a loss of function, because the sump was properly cleaned after the inspectors brought the issue to the licensee. Therefore, the finding was considered to be of very low safety significance (Green). The finding has a cross-cutting aspect in the area of human performance in that the licensee failed to effectively communicate expectations regarding procedural compliance and personnel following procedures. (H.4(b))

Inspection Report# : [2007007](#) (pdf)

**Significance:** SL-IV Dec 31, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Perform a 10 CFR 50.59 Evaluation for a Revised Dose Calculation**

The inspectors identified a Severity Level (SL) IV NCV of 10 CFR 50.59, "Changes, Tests, and Experiments" for the licensee's failure to perform a written evaluation prior to implementing a calculation change based on raising the acceptance criteria for back leakage from valves which leak containment activity. Specifically, the change of back leakage affected the post accident dose impact to control room operators and this was not evaluated in accordance with 10 CFR 50.59. The licensee entered the item into their corrective action program. After removing margin from other components, the licensee determined the change to acceptance criteria could be implemented without prior NRC approval.

The inspectors concluded this finding was more than minor since it impacted the NRC's ability to perform its regulatory function and if left uncorrected would have raised the dose to control room operators above the level requiring NRC approval. The inspectors concluded the original calculation would have required prior NRC approval. The issue screened as SL IV since the inspectors brought the issue to the attention of the licensee before plant start-up,

so there was no actual impact with the plant at power. In addition, the issue was not repetitive or willful. Therefore, it was of very low safety significance.

Inspection Report# : [2007007](#) (*pdf*)

**Significance:**  Dec 31, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inoperable Safety Systems Due to Improper Door Positioning**

NRC identified violations of Technical Specification 5.4.1 occurred on October 1, 2007; October 28, 2007 and November 19, 2007 due to licensee personnel failing to maintain doors in the proper configuration to support operability of TS required systems. The failure to maintain doors in the proper configuration resulted in unplanned entries into Limiting Conditions for Operation. After identification of the discrepant door status, the licensee restored each of the doors to the proper configuration to support operability.

The finding was more than minor because it impacted the mitigating event cornerstone objective of configuration control. The issue was not of more than very low safety significance due to the short duration the doors were improperly positioned. The finding had a cross cutting aspect in human performance error prevention techniques (H.4. (a))

Inspection Report# : [2007007](#) (*pdf*)

**Significance:**  Dec 12, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to establish correct Tech Spec Limits**

Green. The inspectors identified a Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" requirements. Specifically, the licensee failed to incorporate a number of uncertainties when calculating the technical specification (TS) limits for the emergency diesel generator (EDG) fuel oil volume. This resulted in a non-conservative TS value. Once identified by the inspectors, the licensee issued a standing order in the "SRO Shift Turnover Items Shift Checklist" to ensure that adequate margin existed for the EDG seven-day fuel oil requirement to account for the uncertainties and planned to address the issue further through their corrective action process.

Inspection Report# : [2007008](#) (*pdf*)

**Significance:**  Sep 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **Plant Radiation Monitors Not Fully Scoped into the Maintenance Rule**

The inspectors identified a Green NCV of 10 CFR 50.65(b)(2) because the licensee did not scope all plant radiation monitors used in site emergency operating procedures into the maintenance rule monitoring program. The licensee entered the item into their corrective action program and placed the radiation monitoring system in the a(1) status.

The finding was more than minor because it impacted the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. This finding was considered to have very low safety significance (Green) because the finding did not cause a loss of mitigation equipment functions and did not increase the likelihood of a fire or flooding event.

Inspection Report# : [2007006](#) (*pdf*)

**Significance:**  Sep 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **Inadequate Risk Assessment for Safety Injection Actuation Test**

The inspectors identified a Green NCV of 10 CFR Part 50.65(a)(4), because the licensee did not adequately assess and manage online risk while performing a safety injection system actuation test. Specifically, prior to performance of the

safety injection test, the inspectors identified that the test did not account for unavailability of a high pressure safety injection (HPSI) train. Accounting for the HPSI unavailability resulted in yellow risk. The licensee implemented appropriate risk mitigation actions prior to entering yellow risk. The licensee entered the item into their corrective action process and updated the risk assessment.

The finding was more than minor because it impacted the mitigating systems cornerstone objective to ensure availability of systems and the risk assessment failed to consider risk-significant systems, structures, components (i.e., high pressure safety injection pumps) which were unavailable during on-line maintenance. The inspectors concluded that the finding was of very low safety significance because the incremental core damage probability deficit was less than  $1 \times 10E-6$  (green) in accordance with IMC 0609, Appendix K. The finding included a cross-cutting aspect in the area of human performance, work controls, in that the licensee failed to incorporate appropriate risk insights when coordinating work activities.

Inspection Report# : [2007006](#) (pdf)

**Significance:** SL-IV Sep 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

#### **Failure to Perform a 10 CFR 50.59 Evaluation for a Temporary Modification for Augmented Cooling of SW**

The inspectors identified a severity level (SL) IV NCV of 10 CFR 50.59, "Changes, Tests, and Experiments" for the licensee's failure to perform a written evaluation prior to implementing a temporary modification to compensate for the absence of containment air cooler VHX-4. Specifically the modification adversely impacted the service water (SW) system and this was not evaluated in accordance with 10 CFR 50.59. The licensee entered the item into their corrective action process, added structural elements to minimize fouling of the service water system, evaluated the change in accordance with 10 CFR 50.59, and performed a written evaluation. The revised modification did not require prior NRC approval.

The inspectors concluded this finding was more than minor since it impacted the NRC's ability to perform its regulatory function and resulted in a condition which reduced the reliability of the SW system, a mitigating system. The inspectors concluded the original modification may have required prior NRC approval. The issue screened green in the phase 3 assessment for the equipment degradation and therefore was of very low safety significance, and therefore, SLIV. The finding has a cross-cutting aspect in the area of human performance in that the licensee failed to use conservative assumptions in decision making and failed to identify possible unintended consequences when implementing the augmented cooling for service water modification. (H.1.(b))

Inspection Report# : [2007006](#) (pdf)

**Significance:**  Sep 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

#### **AFW Pumps Inoperable Due to High Energy Line Breaks in the Turbine Building**

The inspectors identified a Green non-cited violation NCV of 10 CFR 50, Appendix B, Criteria III, "Design Control" for failing to adequately translate the design and licensing basis requirements into equipment specifications for the 8A and 8B Auxiliary Feedwater (AFW) pumps and controls. Specifically, the 8A and 8B pumps have a licensing basis to be operable during a High Energy Line Break (HELB) event in the turbine building; however, in some HELB scenarios the pumps would experience a harsh environment. The licensee did not qualify the pumps and associated equipment for a harsh environment. The licensee wrote a condition report and an operability recommendation (OPR) with compensatory actions to address the issue.

The finding was more than minor because it impacted the equipment performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of the AFW system to respond to initiating events. A phase 2 screening was required since the design qualification deficiency resulted in a loss of function for one train of AFW per Generic Letter 91-18. The SRA concluded in a phase 3 evaluation, which included external events, that the finding was of very low safety significance (Green).

Inspection Report# : [2007006](#) (pdf)

**Significance:**  Jun 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to preclude Water Hammer in HPSI Injection Piping**

The inspectors identified a Green NCV of 10 CFR 50 Appendix B, Criterion III for failing to control system parameters in the HPSI system injection lines to preclude water hammer from occurring during either routine or accident conditions. As a result, the injection lines experienced water hammer on multiple occasions. The licensee has entered the condition into the corrective action program and changed procedures to limit the potential for water hammer.

The inspectors concluded that the condition is more than minor, because if left uncorrected, the finding would become a more significant safety concern. Specifically, the cause of the water hammer would continue to worsen without additional action. Also, the periodic water hammering of the injection line could weaken piping supports. The finding included a cross-cutting aspect in the area of problem identification and resolution in that the licensee failed to thoroughly evaluate the problem such that the resolution addressed causes and the extent of condition prior to the NRC raising concerns. (P.1(c))

Inspection Report# : [2007004](#) (pdf)

**G**

**Significance:** Jun 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **Service Water Pump 7A Shaft Degraded**

The inspectors identified a Green NCV of 10 CFR 50 Appendix B, Criterion III for failing to establish adequate measures to ensure suitability of the application of the material for the 7A Service Water (SW) pump. Specifically the shaft for the A SW pump was constructed of carbon steel and was susceptible to wear due to sand and silt from the ultimate heat sink. The licensee has entered the condition into the corrective action program and has replaced the shaft with a stainless steel shaft.

The inspectors concluded that the condition is more than minor, because if left uncorrected the finding would become a more significant safety concern. Specifically, without prompting by the NRC, the wear on the 'A' SW pump shaft would have continued and would have reduced the margin of safety for the allowable stresses on the pump shaft. The finding was not of more than very low safety significance because in the current condition the 'A' SW pump remained operable, although degraded. The finding included a cross-cutting aspect in the area of problem identification and resolution in that the licensee failed to implement a corrective action program with a low threshold for identifying issues. (P.1(a))

Inspection Report# : [2007004](#) (pdf)

**G**

**Significance:** Jun 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **Defective Part Installed on 1-2 EDG**

A self-revealing NCV of 10 CFR 50, Appendix B, Criterion VIII, "Identification and Control of Materials, Parts and Components" was identified for failing to have adequate control measures to prevent the use of defective parts.

Specifically, a fuel leak developed due to failure of a defective part on the 1-2 emergency diesel generator (EDG) on February 22, 2007. In 2005, a snubber on the same EDG had failed in the same manner. The failed part has been replaced, and there are no other suspect snubbers in the diesel engines on site.

The inspectors concluded the finding was more than minor because the EDG was inoperable for greater than the Technical Specification allowed outage time. The finding was not of more than very low safety significance because, while the EDG was inoperable, it did not represent an actual loss of safety function for greater than the Technical Specification allowed outage time. In addition, the inspectors concluded this finding had an associated cross cutting aspect in the area of problem identification and resolution in that the licensee failed to thoroughly evaluate the 2005 snubber failure such that the resolution addressed the extent of condition. (P.1(c))

Inspection Report# : [2007004](#) (pdf)

**Significance:**  Sep 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **LPSI Check Valve Unseated**

A self-revealed finding and associated NCV of Technical Specification 5.4.1 was identified for failure by the licensee to follow procedural requirements. On May 13, 2007, the licensee failed to monitor for leakage across a Low Pressure Safety Injection (LPSI) check valve as required by procedure and a protective relief valve lifted. Following lifting of the relief valve, the licensee seated the check valve to prevent further back leakage and entered the deficiency onto their corrective action program.

In accordance with IMC 0612, the inspectors concluded that the issue was more than minor because the failure to limit pressure in the LPSI piping until a protective device actuated increased the likelihood of an initiating event. After consultation with the Senior Risk Analyst (SRA), the inspectors concluded that the finding was of very low safety significance because of the extremely low frequency of the Interfacing System Loss of Coolant Accident initiating event. This finding included a cross-cutting aspect in the area of human performance in that human error prevention techniques (H.4(a)) were not effective in preventing lifting of the relief valve.

Inspection Report# : [2007006](#) (*pdf*)

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## **Emergency Preparedness**

**Significance:**  Jun 30, 2007

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Properly Implement Approved EAL Scheme**

The inspectors identified a Green NCV of 10 CFR 50.47 for failure to properly implement approved Emergency Action Levels (EAL). As a result of the improper EAL implementation, site personnel responsible for EAL declarations could improperly classify some Alerts as Site Area Emergencies (SAEs). The licensee has provided training to site personnel regarding correct declaration of this EAL.

The inspectors determined that the licensee's failure to properly implement the EALs represented a performance deficiency that warranted a significance determination. The inspectors concluded that the finding affected the Emergency Preparedness Cornerstone objective for the attribute of Emergency Response Organization (ERO) readiness in that the licensee improperly implemented an EAL. In addition, the finding had a cross-cutting aspect in the area of human performance, resource component. Specifically, the training of personnel resulted in improperly classifying the drill scenario. (H.2.(b))

Inspection Report# : [2007004](#) (*pdf*)

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## **Occupational Radiation Safety**

**Significance:**  Mar 31, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Maintain Procedures for the Maintenance of PAPR Batteries**

Introduction: A Green NRC-identified finding of very low safety significance and associated Non-Cited Violation of 10 CFR 20.1703 was identified for the failure to maintain adequate written procedures regarding the storage, issuance, and maintenance of respiratory protection equipment.

Description: The reactor head O-ring was removed during the (1R19) refueling outage. This work was planned and controlled under Radiation Work Permit (RWP) 754, Refuel Project – Reactor Vessel Disassembly. The RWP required the use of respiratory protection, specifically, a powered air purifying respirator (PAPR), for this evolution. On September 9, 2007, the reactor head O-ring was removed, as planned. However, during the job evolution the

battery that supplied power to the PAPR failed while the respirator was being worn. The user immediately notified the radiation protection technician who replaced the battery, then the user continued to work. The second battery failed about one hour after it was placed in service. The second failure caused the worker to immediately exit the work area. The radiation protection technician observed that the worker exhibited signs of distress and took immediate actions to remove the PAPR quickly by tearing it down and away from the worker's head. The unordinary method of removal was required because of worker distress but contributed to the intake of radioactive material by the worker. The licensee performed an assessment of the worker's internal dose and verified the dose was well below regulatory limits.

The licensee performed an apparent cause evaluation and determined that the two failures of the PAPR were caused by incomplete charging of the batteries prior to being placed in service. The manufacturer of the battery charger provided instructions for battery maintenance, indicating that the battery should be charged for two times the length of the previous use. However, the licensee had not included this guidance in its procedures, training, or practice. Specifically, the licensee had not established a method to identify the length of time a battery was used or the length of time that the battery was charged. Additionally, the charger used by the licensee did not provide any indication whether the battery was fully charged.

The inspectors reviewed the corrective actions taken to prevent batteries from being issued before being completely charged. Specifically, the licensee's apparent cause evaluation recommended that the licensee purchase new chargers (dual rate chargers) and replace the older chargers used during the outage with the dual rate design. The dual rate chargers provided a light emitting diode to indicate that the battery is fully charged and ready for use. During the inspection, the inspectors observed most of the batteries were still being charged with the old style chargers after the corrective action was to have been completed. The inspectors informed the respiratory protection program owner of the corrective action and its scheduled completion date. The respiratory protection program owner removed all of old style chargers after validating this observation. Additionally, the licensee planned to revise respiratory protection procedures and training to prevent recurrence.

Analysis: The inspectors determined that this finding was a performance deficiency because licensees are required to adhere to the regulations contained in Subpart H of 10 CFR Part 20, which requires licensees to implement and maintain applicable respiratory protection procedures. The inspectors also determined that the performance deficiency was reasonably within the licensee's ability to foresee and correct. In accordance with NRC Inspection Manual Chapter 0612, the inspectors determined that the finding was more than minor because it impacted the equipment and instrumentation attribute of the Occupational Radiation Safety cornerstone and affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation, in that not providing adequate procedures for control of PAPR battery charging resulted in an unplanned exposure to radioactive material. The finding was assessed using the Occupational Radiation Safety Significance Determination Process and was determined to be of very low safety significance (Green) because it was not an As Low As Reasonably Achievable planning issue, there was no overexposure nor potential for overexposure, and the licensee's ability to assess dose was not compromised.

The inspectors did not identify a cross-cutting aspect associated with this finding.

Enforcement: Title 10 CFR 20.1703(c) requires, in part, that the licensee implement and maintain a respiratory protection program that includes written procedures regarding the storage, issuance, maintenance of respiratory protection equipment. Contrary to this, as of January 16, 2008, the licensee failed to maintain procedures regarding the charging and proper maintenance of PAPR batteries. Because the failure to comply with 10 CFR 20.1703(c) was of very low safety significance and was entered into the licensee's corrective action program as CR-PLP-2007-04149 and CR PLP-2008-00229, the violation is being treated as an NCV, (NCV 05000255/2008002-04: Failure to Maintain Procedures for the Maintenance of PAPR Batteries) consistent with Section VI.A of the NRC Enforcement Policy.

Inspection Report# : [2008002](#) (pdf)

**Significance:**  Mar 31, 2008

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

**Failure to Use, to the Extent Practical, Process or Other Engineering Controls to Control the Concentration of Radioactive Material in Air**

Introduction: A Green self revealed finding of very low safety significance and associated Non-Cited Violation (NCV) of 10 CFR 20.1701 was identified for failure to use, to the extent practical, process or other engineering

controls to control the concentration of radioactive material in air.

Description: The licensee experienced instances of elevated airborne radioactivity in the Containment Building during the Fall 2007 refueling outage (1R19). The cause for these conditions was attributed to known fuel element failures identified early in the operating cycle.

On September 9, 2007, the licensee shut-down the reactor for commencement of the planned refueling outage. The licensee monitored parameters of the reactor coolant system during the shutdown/cool-down process, including concentrations of key radionuclides. Radioactive noble gases were released to the containment atmosphere when the pressurizer manway was opened to support scheduled work. That activity created a short term condition where workers had difficulty leaving the radiologically controlled area (RCA) due to radioactive noble gases that would cling to the modesty clothing of the workers. Approximately 24 hours later, the licensee opened the steam generator manways to support scheduled work, which released more radioactive noble gases and later radioactive iodine to the containment atmosphere. When this event occurred, the licensee assessed the concentration of radioactive iodine in containment and assessed the impact on internal dose to workers. Additionally, the licensee expected that the installed engineering controls, which consisted of a charcoal filtered ventilation system, would remove the radioactive iodine from the atmosphere.

The duration of the elevated airborne radioactive iodine was much longer than anticipated by the licensee. The licensee's root cause evaluation determined that the charcoal media in the installed filtration system was depleted before the system was placed in service or shortly after the radioactive iodine was released to the containment atmosphere, thereby rendering the installed engineering controls ineffective. Prior to the outage, the licensee had elected not to replace the charcoal media within the installed plant equipment at the beginning of this refueling outage (1R19), as was performed during previous refueling outages. That decision was made after reviewing the results of a charcoal sample that was analyzed from the end of the previous refueling outage (1R18).

After the steam generator manways were removed, a local air filtration system was placed in service as prescribed during the As Low As Reasonably Achievable (ALARA) planning process. The filtration system was a high-efficiency particulate air filter and a charcoal bank to remove radioactive iodine. The filter system was intended to draw air from the steam generator and into to the plant removal system. However, the system components were installed backwards on the "A" steam generator. Instead of removing the radioactivity from the steam generator, the system effectively pushed unfiltered air out of the steam generator and into the containment atmosphere that created a localized increase in airborne radioactivity.

The prolonged, elevated airborne conditions that resulted from the exhaustion of the installed plant charcoal filtration units and the misalignment of the local high efficiency particulate air unit resulted in extended delays for workers as they attempted to leave the Radiation Controlled Area and attributed to small but measurable intakes of radioactive iodine (I-131) to several hundred workers during 1R19. The licensee performed an assessment of each worker's internal dose and verified that all doses were well below regulatory limits. The licensee was considering various actions to prevent reoccurrences for future outages based on root cause evaluation recommendations.

Analysis: The inspectors determined that this finding was a performance deficiency because the licensee failed to meet the requirements contained in Subpart H of 10 CFR Part 20 and because the deficiency was reasonably within the licensee's ability to foresee and correct. The finding was more than minor because it impacted the program and process attribute of the Occupational Radiation Safety cornerstone and affected the cornerstone objective of protecting worker health and safety from exposure to radiation, in that not implementing adequate engineering controls resulted in unplanned exposures to radioactive material. The finding was assessed using the Occupational Radiation Safety Significance Determination Process and was determined to be of very low safety significance (Green) because it was not an ALARA planning issue, there was no overexposure or potential for overexposure, and the licensee's ability to assess dose was not compromised.

As described above, the engineering controls that were planned to be used to control the concentration of radioactive material in air were either depleted soon after being placed in service or installed improperly. Consequently, the cause of this deficiency had a cross-cutting aspect in the area of Human Performance related to work control. Specifically, the licensee failed to plan and coordinate work activities with planned contingencies and compensatory actions. (H.3 (a))

Enforcement: Title 10 CFR 20.1701 requires that licensees use, to the extent practical, process or other engineering controls (e. g., containment, decontamination, or ventilation) to control the concentration of radioactive material in air. Contrary to this, between September 10-12, 2007, the licensee failed to implement effective engineering controls to

control the concentration of radioactive material in air. Because the failure to comply with 10 CFR 20.1701 was of very low safety significance and has been entered into the licensee's corrective action program as CR-PLP-2007-04002, the violation is being treated as an NCV (NCV 05000255/2008002-05: Failure to Use, to the Extent Practical, Process or Other Engineering Controls to Control the Concentration of Radioactive Material in Air) consistent with Section VI.A of the NRC Enforcement Policy.

Inspection Report# : [2008002](#) (pdf)

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## Public Radiation Safety

**Significance:**  Mar 31, 2008

Identified By: NRC

Item Type: NCV NonCited Violation

### **Failure to Control the Release of Radioactive Material**

Introduction: A Green self revealed finding of very low safety significance and associated Non-Cited Violation (NCV) of 10 CFR 20.1501 was identified for the failure to conduct an adequate radiological evaluation in the form of surveys of contaminated workers.

Description: On January 17, 2008, the NRC notified the licensee that radioactive material was identified on workers entering another NRC licensed facility. The workers indicated that they had last been employed at the Palisades refueling outage (1R19) in September 2007. That licensed facility identified six pairs of footwear and other personal items with contamination levels between 6,000 and 20,000 disintegrations per minute. Subsequent analysis identified that the contamination was iodine-131, a radionuclide with an 8-day half life, and was linked to work activities at the Palisades site. The affected materials were confiscated by the other licensee after identification.

Prior to the release of the workers from the site, Palisades' staff had also identified two occurrences of inadequate surveys that were performed during the refueling outage that had resulted in the inadvertent release of licensed radioactive material from the restricted area. The incidents occurred approximately one week before the workers left Palisades to work at the other NRC licensed facility (described above). The immediate corrective actions taken by the licensee for these two events included communications to all radiation protection technicians that reinforced procedural compliance and the proper survey techniques for the release of individuals alarming contamination monitors. Additionally, a radiation protection supervisor was assigned (dayshift and nightshift) to provide additional oversight at access control.

As described in Section 20S1.2, the licensee experienced elevated airborne radioactivity during the Fall 2007 refueling outage (1R19). The elevated airborne conditions resulted in low level intakes of radioactive material for numerous workers. Since the personal contamination monitors at the control points were not capable of differentiating any external contamination from the radioiodine intakes that caused them to alarm, the licensee relied on hand frisking to release the individuals and their personal items. The workers undergarments, shoes and socks were not independently surveyed and the licensee assumed that internal deposition of radioactive material was the only cause of the personal contamination monitor alarms. The requirement to perform manual surveys resulted in delays for workers as they attempted to leave the RCA and resulted in hundreds of worker being surveyed by radiation protection technicians using a pancake probe survey instrument, a technique also known as a hand frisk. The additional oversight provided by radiation protection supervisors was not fully effective because it did not provide adequate quality control that was warranted for the large number of personnel affected by the elevated airborne radioactivity. Consequently, contaminated personal items were released from the site undetected and were identified at another NRC licensed facility.

Analysis: The inspectors determined that this finding was a performance deficiency because licensees are required to adhere to the regulations of 10 CFR Part 20 and that the deficiency was reasonably within the licensee's ability to foresee and correct. The finding was more than minor because it impacted the program and process attribute of the Public Radiation Safety Cornerstone and affected the cornerstone objective to ensure adequate protection of public health and safety from exposure to radioactive material released into the public domain, in that inadequate surveys resulted in the failure to control radioactive material. The finding was assessed using Public Radiation Safety Significance Determination Process and was determined to be of very low safety significance (Green). The finding was not a transportation issue, and the radioactive material found offsite was of low activity and would not have

produced a dose to a member of the public in excess of 0.005 rem.

As described above, the actions required to survey the large number of workers that alarmed the personal contamination monitor overwhelmed the ability of the radiation protection staff to conduct effective hand frisks. Consequently, the cause of this deficiency had a cross-cutting aspect in the area of Human Performance. Specifically, the licensee failed to make risk-significant decisions using a systematic process, especially when faced with uncertain or unexpected plant conditions, to ensure safety is maintained. (H.1(a))

Enforcement: Title 10 CFR 20.1501 requires that each licensee make or cause to be made surveys that may be necessary for the licensee to comply with the regulations in Part 20 and that are reasonable under the circumstances to evaluate the extent of radiation levels, concentrations or quantities of radioactive materials, and the potential radiological hazards that could be present. Pursuant to 10 CFR 20.1003, survey means an evaluation of the radiological conditions and potential hazards incident to the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation.

Contrary to these requirements, on various dates in September 2007, the licensee did not perform adequate surveys to assure compliance with 10 CFR 20.1802, which requires that the licensee control and maintain constant surveillance of licensed material that is in a controlled area or unrestricted areas and that is not in storage. Specifically, between September 21, 2007, and September 30, 2007, licensee surveys of workers were not adequate to control licensed material from inadvertently being carried by the workers outside of the controlled and restricted areas of the site. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program (Condition Reports CR-PLP-2007-04338 and CR-PLP-2008-01180), this violation is being treated as an NCV (NCV 05000255/2008002-07, Failure to Control the Release of Radioactive Material), consistent with Section VI.A of the NRC Enforcement Policy:.

Inspection Report# : [2008002](#) (*pdf*)

**Significance:**  Jun 30, 2007

Identified By: Self-Revealing

Item Type: NCV NonCited Violation

#### **Failure to effectively survey slings before granting unconditional release from the RCA**

A self-revealed finding of very low safety significance and an associated violation of NRC requirements was identified for the failure to effectively survey slings before granting unconditional release from the Radiologically Controlled Area (RCA). This was first identified when a sling alarmed the PM-7 (portal radiation monitor) at the security building on October 13, 2006. A few days later, an individual working outside of the RCA became contaminated after handling a rigging/lifting sling. Extent of condition surveys identified 17 additional slings outside the RCA and/or Protected Area that alarmed the tool monitor. Radioactive material was also identified on two of these slings using a conventional hand-held frisker survey instrument.

The issue was more than minor because it was associated with the Program/Process attribute of the Public Radiation Safety Cornerstone and affected the cornerstone objective to ensure the adequate protection of the public domain as a result of routine civilian nuclear reactor operation. A Green NCV of 10 CFR 20.1501 was identified for the failure to adequately survey materials to evaluate the presence of radioactive material. The cause of this deficiency is a legacy issue and does not represent current licensee performance. Therefore, this deficiency does not have any cross-cutting aspects.

Inspection Report# : [2007004](#) (*pdf*)

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## **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.

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# Miscellaneous

Last modified : June 05, 2008