Saint Lucie 2
4Q/2014 Plant Inspection Findings

Initiating Events

Significance: G Mar 31, 2014
Identified By: NRC
Item Type: FIN Finding
Failure to Provide Detailed Work Instructions Resulted in Degraded Debris Filter System Performance and resulted in a Manual Reactor Trip
A self-revealing Green finding was identified for the licensee's failure to provide adequate work instructions. The maintenance work instructions for a debris filter system (DFS) backwash valve motor operator did not contain adequate details to ensure the motor operator was installed correctly. The incorrectly installed motor operator prevented the DFS from mitigating an influx of algae into the circulating water system and ultimately resulted in the need for operators to manually trip the reactor. The licensee entered this issue into the corrective action program (CAP) as action requests (ARs) 1878615 and 1911638. Corrective actions included properly installing the DFS backwash valve motor operator.

The performance deficiency was more than minor because it was associated with the equipment reliability attribute of the initiating events cornerstone and adversely affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operations. Specifically, the 1A2 DFS backwash valve was installed incorrectly in August 2012. This degraded the component's ability to mitigate an algae intrusion event on May 31, 2013, and resulted in a manual reactor trip. The finding was determined to be of very low safety significance (Green) based on Exhibit 1, Initiating Events Screening Questions, found in Inspection Manual Chapter 0609, Significance Determination Process, Appendix A, SDP for Findings At-Power (June 19, 2012). This was due to the fact that the finding did not cause a loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. The cause of this finding was associated with a cross-cutting aspect of providing complete and accurate documentation in the documentation component of the human performance area. Specifically, the licensee did not provide work instructions with enough detail to properly reinstall the1A2 backwash valve motor operator (H.7). (Section 4OA3.2)
Inspection Report# : 2014002 *(pdf)*

Significance: G Mar 13, 2014
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Failure to Follow Foreign Material Exclusion Requirements in Reactor Vessel Maintenance Procedures
A self-revealing non-cited violation (NCV) of Unit 2 Technical Specification 6.8.1.a was identified for the licensee's failure to follow the requirements in reactor vessel maintenance procedures, to exclude foreign material from the reactor coolant system (RCS) during refueling outage activities. The licensee entered the issue in the corrective action program as action request 1957565. Corrective actions included evaluation of the foreign object damage, and revision of foreign material exclusion (FME) controls in outage maintenance procedures.

The performance deficiency was more than minor because if left uncorrected, it had the potential to lead to more significant safety concerns. Specifically, the failure to follow FME controls in maintenance procedures had the potential to lead to the introduction of foreign material in the RCS, which could result in degradation of RCS

components, such as the fuel cladding, RCS pressure boundary cladding, and steam generator (SG) tubes. The inspectors screened this finding utilizing IMC 0609 Attachment 4, "Initial Characterization of Findings," dated June 19, 2012, and IMC 0609 Appendix A, "The Significance Determination Process for Findings at Power," dated June 19, 2012. The finding screened as Green using Exhibit 1, Section D, "Initiating Events Screening Questions," screening question 2, because the finding did not result in a condition where one or more SGs violated "accident leakage" performance criterion (i.e., did not involve degradation that would exceed the accident leakage performance criterion under design basis accident conditions). The inspectors determined this performance deficiency had a resources crosscutting aspect (H.1) in the human performance area, because the licensee's administrative procedure for FME practices, MA-AA-101-100, was inadequate to support nuclear safety, in that it allowed for a less conservative approach to FME in the reactor cavity.
Inspection Report# : 2014004 *(pdf)*

Significance: G Feb 07, 2014
Identified By: NRC
Item Type: NCV NonCited Violation
Inadequate Corrective Actions to Address Water Intrusion in the HCV-09-2A Relay Box
A self-revealing, green Non-Cited Violation (NCV) of 10 CFR Part 50 Appendix B, Criterion XVI, Corrective Action, was identified for the licensee's failure to correct an identified condition adverse to quality associated with the water intrusion into the HCV- 09-2A relay box. The licensee's failure to implement corrective actions to address previous water intrusion events was a performance deficiency. Specifically, the licensee failed to implement corrective actions to address previous water intrusion events, which resulted in the failure of HCV-09-2A, and a plant trip. This issue was documented in the licensee's corrective action program as CR 1920696. Immediate corrective actions included the restoration of HCV-09-2A to operable status and the inspection of other Main Feedwater Isolation Valve (MFIV) relay boxes.

This performance deficiency was more than minor because it was associated with the equipment performance attribute of the Initiating Events Cornerstone and it adversely affected the associated cornerstone objective of limiting the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. In accordance with the NRC inspection Manual Chapter 0609, Attachment 4, Initial Characterization of Findings, the finding was determined to be of very low safety significance (Green) because the finding did not result in a loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition. The finding had a cross-cutting aspect in the area of Problem Identification and Resolution, in the component of Evaluation, because the licensee failed to thoroughly evaluate issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance (P2). (Section 4OA2.a(3)(i))
Inspection Report# : 2014007 *(pdf)*

Mitigating Systems

Significance: G Jun 30, 2014
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to design the emergency diesel generators to operate under worst case environmental conditions
An NRC-identified non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, Design Control, was identified. The licensee's failure to translate design control measures to ensure operation of Unit 2 emergency diesel generators (EDGs) under worst-case environmental conditions was a performance deficiency. Specifically, since initial licensed operation in 1983, the licensee failed to ensure the Unit 2 EDGs were designed and built to operate

under worst case high wind conditions. As a result, sustained high winds from specific directions could have impacted EDG radiator performance resulting in the unavailability of both Unit 2 EDGs. Corrective actions included modification of the EDG building to allow EDG operation under all postulated high wind conditions.

The performance deficiency was more than minor because it affected the design control attribute of the mitigating system cornerstone, and affected the cornerstone objective of ensuring availability, reliability, and capability of systems that respond to initiating events. Specifically, the performance deficiency could have resulted in the inoperability of both Unit 2 EDGs during sustained high wind conditions. Using Table 2 of Inspection Manual Chapter (IMC) 0609.04, "Significance Determination Process Initial Characterization of Findings" dated June 19, 2012; the inspectors concluded the finding affected the mitigating system cornerstone. The inspectors evaluated the finding using IMC 0609, Appendix A, The Significance Determination Process for Findings At-Power, Exhibit 2, dated June 19, 2012. The finding was determined to require a detailed risk evaluation by an NRC senior reactor analyst since the finding represented a loss of function. The regional senior reactor analyst performed a Phase 3 SDP analysis for the finding. The EDG impact would only occur in response to a Loss of Offsite Power (LOOP). The analysis considered the impact of the finding on an independent LOOP, by calculating the likelihood that the site wind conditions, absent a Hurricane, would occur at the same time as an independent LOOP event. In addition, the coincident or dependent LOOP was considered, by assuming the hurricane winds would impact the EDGs and would occur with a hurricane induced LOOP. Wind data was taken from National Weather Service records at Palm Beach International airport, which is the closest station to have both wind speed and direction historical records to determine the likelihood for non-hurricane high winds. Hurricane frequency data was taken for the Landfalling Hurricane Probability Project for St Lucie County. The Conditional Core Damage Probability was determined through the use of the NRC's plant risk models. EDG recovery, because the winds would not be likely sustained (both speed and direction) for greater than 6 hours, and the ability to crosstie Unit 2 emergency power to Unit 1 were major factors in the outcome. The screening analysis resulted in a combined risk which, even with conservative assumptions, was low enough for the finding to be characterized as Green. A cross-cutting aspect was not assigned to the finding since the finding does not represent current licensee performance. The condition existed since original construction of the plant. (Section 4OA3.1)
Inspection Report# : 2014003 *(pdf)*

Significance: G Mar 17, 2014
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Follow Work Instructions During Installation of Unit 2 Vent Valve V3811
A self-revealing, non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," resulted from the licensee's failure to implement work order instructions to install Unit 2 safety-related vent valve V3811 in accordance with dimensions specified by the engineering design. The failure to implement the work order instructions was a performance deficiency that resulted in inoperability of the emergency core cooling system (ECCS) Class 1 pressure boundary due to a through-wall crack and self-revealing leak. The licensee entered the issue into the corrective action program (CAP) as action request (AR) 01980340 and completed corrective actions to repair the leak and install V3811 with the correct dimensions.

The performance deficiency was more than minor because it adversely impacted the operability of safety-related equipment that mitigates the consequences of a loss of coolant accident, and therefore, was associated with the equipment reliability 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. The inspectors screened the finding under the mitigating systems cornerstone using Attachment 4 (June 19, 2012) and Appendix A (June 19, 2012) of Inspection Manual Chapter 0609, "Significance Determination Process" (June 2, 2011). The inspectors determined the finding required a detailed risk evaluation because the finding was associated with a loss of high pressure safety injection (HPSI) system function and evaluated the condition using the significance determination process (SDP) module in the St. Lucie Unit 2 Standardized Plant Analysis Risk

(SPAR) model. The change in core damage frequency (CDF) was greater than the 1E-7 threshold and the issue was reviewed by a regional senior reactor analyst (SRA) to confirm the result and verify that external events contribution would not cause the results to increase above 1E-6. The SRA used the same St. Lucie Unit 2 SPAR model, and made the following adjustments: set the exposure time to 51 days (half of the entire period that Unit 2 was in an operating condition),

the safety injection tank (SIT) discharge check valve and the reactor coolant system (RCS) check valve were failed in the SPAR model (i.e., set to a value of 1.0), and common cause failure events were not increased since an extent of cause evaluation did not identify additional examples of the performance deficiency. The SRA confirmed the inspectors' conclusion that the issue was of very low risk significance (Green). The analyst determined that there was additional margin to the green-white threshold because: 1) the analysis assumed that the injection flows from the SIT and the high pressure injection system on one of four paths were completely failed when there would likely have been some injection flow under postulated break conditions, 2) the potential break size was limited to only a portion of the possible spectrum of small break loss of coolant accident (SBLOCA) sizes due to the physical size of the pipe, and 3) this issue was an isolated example, unlike other recent RCS leaks that have occurred in the industry which were of a repetitive and long-standing nature. The inspectors concluded the finding was associated with the cross-cutting aspect of procedural adherence (H.8) in the human performance area because maintenance personnel did not adhere to work order instructions concerning the dimensions of the vent valve assembly.

Inspection Report# : 2014005 *(pdf)*

Significance: G Feb 07, 2014
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Follow Seismic Restraining Procedures on Ladders Located Near Safety-Related Equipment
A green NRC identified non-cited violation (NCV) of Technical Specification 6.8.1, Procedures and Programs, was identified which requires that written procedures be established, implemented, and maintained covering activities referenced in NRC Regulatory Guide 1.33, Revision 2, dated February 1978. The licensee's failure to comply with procedures to seismically restrain ladders was a performance deficiency. Specifically, the licensee's procedures for seismic restraint of ladders: MA-AA-100- 1008, Station Housekeeping and Material Control; QI-13-PSL, Housekeeping and Cleanliness Controls Methods St. Lucie Plant; ADM-04.02, Industrial Safety Program; and ADM-27.11, Scaffold Control, were not implemented as written with regard to ladders that were installed near safety-related equipment. The inspectors identified three examples of ladders not seismically restrained in accordance with the licensee's procedures. Immediate corrective actions included completing a site-wide walkdown of the safety-related systems to identify and bring into procedural compliance any ladders that were not seismically restrained. This issue is documented in the licensee's corrective action program as Action Request (AR) 1935979 and 1933112.

The performance deficiency was determined to be more than minor because if left uncorrected the failure to comply with station procedures to ensure adequate restraining of seismically controlled ladders could lead to a more significant safety concern. Specifically, seismically unrestrained ladders could impact safety-related equipment during a design basis seismic event. Using Manual Chapter 0609.04, Significance Determination Process Initial Characterization of Findings Table 2 dated June 19, 2012, the finding was determined to affect the Mitigating Systems Cornerstone. The inspectors evaluated the risk of this finding using Manual Chapter 0609 Appendix A, Significance Determination Process for Findings At-Power, Exhibit 2- Mitigating Systems Screening questions. The inspectors determined that the finding was of very low safety significance because it did not represent an actual loss of safety function. The finding involved the cross-cutting area Problem Identification and Resolution, in the component of Resolution. Specifically licensee failed to take effective corrective actions to address issues in a timely manner commensurate with their safety significance (P3). (Section 4OA2.a(3)(ii))
Inspection Report# : 2014007 *(pdf)*

Barrier Integrity

Significance: G Feb 07, 2014
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Follow Refueling Operations Procedure Resulting in a Fuel Mishandling Event
A green self-revealing, Non-Cited Violation (NCV) of Technical Specification (TS) 6.8.1, Procedures and Programs, was identified which requires that written procedures be established, implemented, and maintained covering activities referenced in NRC Regulatory Guide 1.33, Revision 2, dated February 1978, including safety related activities carried out during operation of the reactor plant. The licensee's failure to comply with refueling procedure 0-NOP-67.05, Refueling Operations, was a performance deficiency. Specifically, the licensee's procedure for refueling operation, 0-NOP-67.05, Refueling Operations, was not implemented as written for conducting refueling operations resulting in a fuel mishandling event. This issue was documented in the licensee's corrective action program as condition report 1911660.

This performance deficiency was more than minor because it was associated with the human performance attribute of the Barrier Integrity Cornerstone and it adversely affected the associated cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding) protect the public from radionuclide releases caused by accidents or events. Specifically, failure to prevent fuel assemblies from contacting one another during refuel operations could fail to provide reasonable assurance that physical design barriers (fuel cladding) protect the public from radionuclide releases caused by accidents or events. The inspectors evaluated the risk of this finding using Manual Chapter 0609, Appendix G, Significance Determination Process for Shutdown Operations. The inspectors determined that the finding was of very low safety significance Green using IMC 0609, Appendix G, Figure 1, because it did not require a quantitative assessment as determined in IMC 0609, Appendix G, Attachment 1, Checklist 4. The finding involved a cross-cutting aspect of Human Performance, in the component of Teamwork. Specifically, individuals and work groups failed to communicate and coordinate their activities within and across organizational boundaries to ensure nuclear safety is maintained. (H.4) (Section 4OA2.a(3)(iii))
Inspection Report# : 2014007 *(pdf)*

Emergency Preparedness

Occupational Radiation Safety

Significance: G Mar 31, 2014
Identified By: NRC
Item Type: NCV NonCited Violation
Noncompliance with Barricading and Posting Requirements
A Green self-revealing non-cited violation (NCV) of 10 CFR 20.1501(a) and Technical Specification (TS) 6.12.1 was identified for failure to perform radiological surveys to ensure that the potential radiological hazards and extent of radiation levels were evaluated for an equipment transfer box being removed from the Unit 2 upper reactor cavity. This failure resulted in dose rates greater than 100 millirem per hour (mrem/hr) at 30 centimeters (cm) from a high efficiency particulate air (HEPA) vacuum cleaner, and was discovered by two workers who received electronic

dosimeter (ED) dose rate alarms of 108 and 84 mrem/hr when working near the HEPA vacuum cleaner. Dose rates of the HEPA vacuum cleaner were found to be 850 mrem/hr at 30 cm. Upon identification, the licensee posted and controlled access to the equipment transfer box and placed the HEPA vacuum cleaner into a shielded container. This condition has been placed into the licensee's CAP under ARs 01946341 and 01946351.

The finding was determined to be more than minor because it is associated with the Program and Process attribute of the Occupational Radiation Safety cornerstone, and adversely affected the cornerstone objective of ensuring adequate protection of worker health and safety from exposure to radiation, in that the workers were unnecessarily exposed to high radiation area conditions. The finding was evaluated in accordance with Inspection Manual Chapter (IMC) 0609, Appendix C (August 19, 2008), and was determined to be Green because it did not involve as low as reasonably achievable (ALARA) planning or work controls, was not an overexposure, did not present a substantial potential for an overexposure, and the ability to assess dose was not compromised. The inspectors determined that this issue had a field presence cross-cutting aspect in the human performance area (H.2) because supervisors did not oversee work activities by observing and reinforcing standards and expectations. (Section 2RS1)
Inspection Report# : 2014002 *(pdf)*

Public Radiation Safety

Security

Although the Security Cornerstone is included in the Reactor Oversight Process assessment program, the Commission has decided that specific information related to findings and performance indicators pertaining to the Security Cornerstone will not be publicly available to ensure that security information is not provided to a possible adversary. Other than the fact that a finding or performance indicator is Green or Greater-Than-Green, security related information will not be displayed on the public web page. Therefore, the cover letters to security inspection reports may be viewed.

Miscellaneous

Last modified : February 26, 2015