Columbia Generating Station
3Q/2010 Plant Inspection Findings

Initiating Events

Significance: G Dec 31, 2009
Identified By: Self-Revealing
Item Type: FIN Finding
Digital Electro-Hydraulic Leak Results in Reactor Scram
Green. The inspectors reviewed a self-revealing finding for the failure of the licensee to provide an adequate procedure for the installation of an o-ring in the digital electro-hydraulic system. Specifically, failure to provide the methods and details for the preparation, review, approval, and implementation of procedures contributed to the improper installation of an o-ring in the digital electro-hydraulic system. This improper installation resulted in a failure of the o-ring seal, a leak in the digital electro-hydraulic system, and a subsequent manual reactor scram. The licensee entered the issue into the corrective action program and conducted a root cause evaluation.

This finding was more than minor because it is an equipment performance issue that affected the Initiating Events Cornerstone objectives to limit the likelihood of those events that upset plant stability. Specifically, use of a less than adequate procedure during the installation of an o-ring in an accumulator lower block in the digital electro-hydraulic system resulted in a failure of the o-ring seal, a subsequent leak in the digital electro-hydraulic system, and a manual reactor scram due to a decreasing digital electro-hydraulic fluid inventory as indicated by a low low-level alarm for the digital electro-hydraulic tank (initiating event). The finding was of very low risk significance because the finding did not result in the loss of a safety function of a single train for greater than its technical specification allowed outage time. The cause of the finding is related to the crosscutting aspect of human performance with a resources component, because the licensee failed to provide adequate procedural requirements for o-ring installation work [H.2(c)](Section 4OA3.1).

Inspection Report# : 2009005 *(pdf)*

Mitigating Systems

Significance: G Jun 11, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Inadequate Assessment of Emergency Diesel Generator Air Filters During an Ashfall Event
Green. The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, “Design Control,” which requires, in part, “measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures and instructions. Further required, in part, is that design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.” Contrary to the above, the licensee failed to establish measures to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures and instructions. Specifically, prior to June 5, 2010, the licensee’s measures established to assure that applicable regulatory requirements and the design basis, relative to the licensing basis duration for a volcanic ashfall generated loss of offsite power was not correctly translated into specifications, drawings, procedures and instructions. Also, the licensee’s design control measures failed to verify or check the adequacy of design for the potential effects of volcanic ashfall loading on emergency diesel generator intake pre-filters and combustion air and room ventilation outside air supply filters, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. This finding was entered into the licensee’s corrective action program as condition reports 219289, 219342,

219362, 219363, 219364, 219365, 219388, and 219394.

The team determined that failing to properly incorporate the licensing basis for an ashfall event and an inadequate design analysis of emergency diesel generator intake combustion air and room cooling air filter loading during an ashfall event was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The team performed a Phase 1 screening, in accordance with Inspection Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," and determined that the finding was of very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee's revised calculation demonstrated that the emergency diesel generators would remain functional during the licensing basis ashfall generated two-hour duration loss of offsite power. This finding did not have a cross-cutting aspect because the most significant contributor did not reflect current licensee performance (Section 1R21.2.5).

Inspection Report# : 2010006 *(pdf)*

Significance: G Jun 11, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Inadequate Evaluation of Offsite Electrical Power Capability to Safety-Related Emergency Core Cooling System Equipment During a Design Basis Event with Offsite Power Available
Green. The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," which requires, in part, "design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program." Contrary to the above, the licensee failed to provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. Specifically, as of July 30, 2010, the licensee's design control measures failed to verify or check the adequacy of design voltages to safety-related emergency core cooling system equipment powered from the 4160 Vac, 480 Vac, 120 Vac, and 125 Vdc distribution systems during a loss-of-coolant accident with offsite power available. This finding was entered into the licensee's corrective action program as condition reports 219208, 219122, 219267, 219277, 219335, 219122, 219328, 219170, 220268, 220317, and 222419.
The team determined that the failure to verify and assure adequate voltages to safety-related emergency core cooling system equipment powered from the 4160 Vac, 480 Vac, 120 Vac, and 125 Vdc distribution systems during a design basis loss-of-coolant accident with offsite power available was a performance deficiency.

This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The team performed a Phase 1 screening, in accordance with Inspection Manual Chapter 0609.04, "Initial Screening and Characterization of Findings," determining that the finding was of very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. Specifically, the licensee's interim calculation and operability determination demonstrated the operability of offsite power during a loss-of-coolant accident with offsite power available, in that the emergency core cooling system components would be operable and able to perform their safety function. This finding did not have a cross-cutting aspect because the most significant contributor did not reflect current licensee performance (Section 1R21.2.11).

Inspection Report# : 2010006 *(pdf)*

Significance: G Jun 11, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Inappropriate Extension of Qualified Service Life of Agastat Relays
Green. The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control,"

which requires, in part, “design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. Where a test program is used to verify the adequacy of a specific design feature in lieu of other verifying or checking processes, it shall include suitable qualifications testing of a prototype unit under the most adverse design conditions.” Contrary to the above, the licensee failed to provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. Specifically, as of June 10, 2010, the licensee’s design control measures failed to verify or check the adequacy of design for the extension of qualified life for safety-related Tyco/Agastat E7000-series timing relays from 10 years to 40 years, by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program. The licensee did not perform suitable qualifications testing of a prototype unit under the most adverse design conditions. Specifically, the licensee did not follow their station procedures for extending the service life and changing preventive maintenance frequencies; did not account for some known modes of degradation; did not account for normal and abnormal operating conditions; and did not maintain a trending program to monitor for indication of impending end-of-life relay failures. This finding was entered into the licensee’s corrective action program as condition reports 218559, 219436, and 218799.

The team determined that extending the qualified life of safety-related Agastat E7000-series relays without having an adequate technical basis was a performance deficiency. This finding was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The team performed a Phase 1 screening, in accordance with Inspection Manual Chapter 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," and determined that the finding was of very low safety significance (Green) because it was a design or qualification deficiency confirmed not to result in loss of operability or functionality. Specifically, no relay failures had occurred beyond the recommended 10-year service life and this did not result in the failure of multiple redundant trains of safety-related equipment. This finding has a cross-cutting aspect in the area of problem identification and resolution because the licensee did not effectively incorporate pertinent industry operating experience into the preventive maintenance program for Agastat E7000-series relays. Specifically, Energy Northwest failed to incorporate industry operating experience and site guidance when they extended their relay replacement preventive maintenance tasks from 10 years to 40 years [P.2(b)] (Section 1R21.3.1).

Inspection Report# : 2010006 *(pdf)*

Significance: G Mar 27, 2010
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Maintain Reactor Core Isolation Cooling Turbine Bearing Oil Level in Accordance with the Applicable Operating Procedure Requirements
Green. The inspectors identified a noncited violation of Technical Specification 5.4.1.a for a failure to maintain reactor core isolation cooling turbine bearing oil level in the proper band in accordance with procedural requirements. Not documenting oil additions to the reactor core isolation cooling turbine per paragraph 8.0 of PPM 10.2.13, Approved Lubricants, caused a high oil level on the inboard and outboard bearing housings resulting in the reactor core isolation cooling system becoming inoperable on December 20, 2009. Corrective actions for this issue included restoring oil level in the green band and initiating interim actions at the prompting of the resident inspectors to maintain proper oil level.

This finding was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and because it affects the associated cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609, Phase 1 Initial Screening and Characterization of Findings,” the inspectors determined that the finding was of very low risk significance (Green) because failure to maintain the reactor core isolation cooling system oil level in the proper band did not result in the loss of a safety function of a single train for greater than its technical specification allowed outage time. In addition, the finding would not have likely affected other mitigating systems resulting in a total loss of their safety function. This finding has a cross-cutting aspect in the area of human performance with a work practices component [H.4.b] (Section 1R12).
Inspection Report# : 2010002 *(pdf)*

Significance: G Nov 21, 2009
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Promptly Correct an Adverse Trend in Keep Fill Pump Performance
Green. The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," which occurred when the licensee failed to promptly correct an identified condition adverse to quality. Specifically, in 1998, the licensee identified an inadequate design of the in keep fill pumps for the reactor core isolation cooling system and emergency core cooling system that resulted in repetitive unexpected failures of the pumps. Corrective actions for this condition adverse to quality had been repeatedly deferred since the condition was originally identified; no effective corrective actions had been taken as of September 2009. The licensee entered this issue into their corrective action program as Action Request/Condition Report 204768.

This performance deficiency was more than minor because it was associated with the equipment performance attribute of the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the team determined that this performance deficiency was of very low safety significance because it did not represent a loss of system safety function, did not represent the actual loss of safety function of a single train for greater than its technical specification allowed outage time, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The team determined that this finding had a crosscutting aspect in the resources component of the human performance area because the licensee failed to ensure that resources were available to minimize long-standing equipment issues [H.2 (a)].

Inspection Report# : 2009008 *(pdf)*

Significance: G Nov 21, 2009
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Ensure Suitability of Class 1E Electrical Components
Green. A noncited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was revealed on April 7, 2007, when overheating of a Class 1E power conditioning transformer resulted in a fire. The licensee determined that the failed transformer, which had been installed as part of a July 2000 design change, was of an inappropriate design for its application. The licensee replaced the transformer and entered this issue into their corrective action program as Action Request/Condition Report 204769.

This performance deficiency was more than minor because it was associated with the design control attribute of the mitigating systems cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Inspection Manual Chapter 0609.04, "Phase 1 – Initial Screening and Characterization of Findings," the team determined that this performance deficiency was of very low safety significance (Green) because it did not represent a loss of system safety function, did not represent the actual loss of safety function of a single train for greater than its technical specification allowed outage time, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The team determined that this performance deficiency did not have a crosscutting aspect because it was not indicative of current licensee performance.

Inspection Report# : 2009008 *(pdf)*

Significance: G Nov 21, 2009
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Follow Housekeeping Program Requirements
Green. The team identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to properly implement housekeeping procedures to control transient equipment and materials. Specifically, the inspectors identified loose maintenance carts in both the control room and

emergency diesel generator rooms, a large metal ramp in the emergency diesel generator room and improperly stored ladders the emergency core cooling system pump rooms. The licensee either secured or removed the equipment and entered this issue into their corrective action program as Action Request/Condition Report 204514.

The finding was more than minor because if left uncorrected, the programmatic deficiency could lead to a more significant safety concern. Using Inspection Manual Chapter 0609.04, “Phase 1 – Initial Screening and Characterization of Findings,” the finding was determined to have very low safety significance (Green) because it did not result in an actual loss of a system safety function, did not result in a loss of a single train of safety equipment for greater than its technical specification allowed outage time, did not involve the loss or degradation of equipment specifically designed to mitigate a seismic, flooding, or severe weather initiating event, and did not involve the total loss of any safety function that contributes to an external event initiated core damage accident sequence. This finding has a crosscutting aspect in the area of problem identification and resolution associated with the corrective action program area component because the licensee failed to have a low threshold for identifying deficient housekeeping issues [P.1(a)].

Inspection Report# : 2009008 *(pdf)*

Barrier Integrity

Significance: G Jun 26, 2010
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Failure to Translate Appropriate Acceptance Critereia
• Green. The inspectors reviewed a Green self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings” for Energy Northwest’s failure to include acceptance criteria appropriate to the circumstances in surveillance testing Procedure TSP-CREF-Z801, “Control Room Envelope Unfiltered In-leakage Tracer Gas Test,” Revision 2. Specifically, Energy Northwest personnel incorrectly documented a design bases unfiltered air in-leakage value as an administrative limit in the surveillance testing procedure. This led to a delay in declaring the control room emergency filtration system inoperable and a delay in the implementation of mitigating actions to protect control room occupants in the event of an accident. The violation has been placed in the licensee’s corrective action program and corrective actions are being implemented.

The performance deficiency is more than minor because it affects the procedure quality attribute of the Barrier Integrity Cornerstone for maintaining the radiological barrier functionality of the control room. This performance deficiency was of very low safety significance (Green) because the finding represented a degradation of only the radiological barrier function provided for the control room. Also, if left uncorrected, incorrectly documenting design bases acceptance criteria could lead to a more significant safety concern. Specifically, incorrectly documenting design bases acceptance criteria could lead personnel to rely on equipment to perform a specified safety function when it is incapable of doing so. This finding has a crosscutting aspect in the area of problem identification and resolution, self and independent assessments, in that the licensee failed to conduct self assessments that are of sufficient depth. Specifically, Energy Northwest focused too narrowly on the affect of licensing changes, in a 2007 self assessment, on the licensing organization instead of the impact of licensing changes to the organization as a whole [P.3.a] (Section 1R15).

Inspection Report# : 2010003 *(pdf)*

Significance: G Mar 27, 2010
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Failure to Provide Adequate Acceptance Criteria
Green. The inspectors reviewed a self revealing non-cited violation of Technical Specification 5.4.1a for a failure to provide procedures appropriate to the circumstance for rebuilding hydraulic control unit directional control valves. The failure to provide adequate instructions resulted in multiple control rod mis-positions at Columbia Generating

Station.

This finding is greater than minor because it is associated with the configuration control attribute of the Barrier Integrity cornerstone because it affects the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, failing to establish appropriate acceptance criteria for systems that control rod movement could lead to exceeding thermal safety limits. Using Inspection Manual Chapter 0609, “Phase 1 Initial Screening and Characterization of Findings,” this finding was determined to be of very low safety significance (Green) because it only affected the fuel barrier. The inspectors determined that since the inadequate procedure for evaluating the directional control valves had been in place more than 2 years in the past, the finding did not represent current plant performance. Therefore no cross cutting aspect was identified (Section 1R12).
Inspection Report# : 2010002 *(pdf)*

Emergency Preparedness

Significance: G Dec 31, 2009
Identified By: NRC
Item Type: NCV NonCited Violation
Failure to Classify a Notification of Unusual Event During a Toxic Gas Event
Green. The inspectors identified a noncited violation of 10 CFR 50.47(b)(4) for the failure to classify an emergency condition during a toxic gas event. The licensee’s failure to classify a Notification of Unusual Event on May 20, 2009, after being informed of toxic gas levels in the 422 foot elevation reactor core isolation cooling system room was identified as a performance deficiency.

This finding is more than minor because the failure to declare an emergency classification when conditions meet an emergency action level threshold may prevent adequate measures from being taken to protect the health and safety of licensee employees and the public. The finding is of very low safety significance because it was a performance deficiency occurring during an event which would have properly been classified as a Notification of Unusual Event. The licensee has entered this issue into their corrective action system as Action Request/Condition Report 00203804. This finding has been evaluated as having a crosscutting aspect of human performance, decision making, because the licensee did not make a safety-significant decision using a systematic process when faced with uncertain or unexpected plant conditions [H.1(a)] (Section 1EP5).

Inspection Report# : 2009005 *(pdf)*

Occupational Radiation Safety

Significance: G Dec 31, 2009
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Failure to Follow Radiation Protection Requirements
Green. The inspectors reviewed a self-revealing, noncited violation of Technical Specification 5.4.1.a resulting from a worker’s failure to follow radiation protection requirements. The worker failed to ensure he was on the correct radiation work permit, failed to use an electronic dosimeter designed for use in a high noise area, failed to follow instructions related to the travel path to the work area, failed to exit the radiologically controlled area when he received an unanticipated dose rate alarm, and failed to contact radiation protection personnel about the alarm. The licensee documented this occurrence in their corrective action program as Action Request 203711 and coached the worker.

The failure to follow radiation protection requirements is a performance deficiency. This finding is greater than minor

because it involved the program attribute of exposure control and affected the cornerstone objective in that the failure of the worker to follow procedural requirements resulted in the worker being unknowledgeable of the dose rates in areas entered. The inspectors used the Occupational Radiation Safety Significance Determination Process and determined the finding had very low safety significance because it was not: (1) an ALARA finding, (2) an overexposure, (3) a substantial potential for overexposure, or (4) an inability to assess dose. The finding had a crosscutting aspect in the area of human performance, work practices component, because the worker failed to use human error prevention techniques such as self and peer checking [H.4(a)]. (Section 2OS1)

Inspection Report# : 2009005 *(pdf)*

Significance: G Dec 31, 2009
Identified By: Self-Revealing
Item Type: NCV NonCited Violation
Failure to Notify Radiological Planning Personnel of a Work Plan Deviation
Green. The inspectors reviewed a self-revealing, noncited violation of Technical Specification 5.4.1.a resulting from a work group's deviation from an established work plan. The original dose estimate for the refurbishment of the containment recirculation air system and fan motor replacement was 4912 mrem. The actual dose accrued for the work was 7648 mrem. In response, the licensee documented this occurrence in the corrective action program as Action Request 197892 and the radiation protection manager conducted a briefing of the assembled project managers that reinforced the project managers' responsibilities associated with keeping doses ALARA.

This finding is greater than minor because it resulted in the actual collective dose of the work activity exceeding 5 person-rem (5000 person-mrem) and exceeding the planned, intended dose by more than 50 percent (similar to Manual Chapter 0612, Appendix E, Example 6.i). The inspectors used the Occupational Radiation Safety Significance Determination Process and determined the finding had very low safety significance because it was as low as reasonably achievable finding, but the licensee's three-year rolling average collective dose (139 person rem) was less than 240 person-rem/units. The finding had a crosscutting aspect in the area of human performance, work coordination component, because the licensee did not incorporate actions to address the impact of changes to the work scope and work groups did not cooperate with each other during activities in which interdepartmental coordination was necessary to assure plant and human performance [H.3(b)]. (Section 2OS2)

Inspection Report# : 2009005 *(pdf)*

Significance: G Dec 31, 2009
Identified By: NRC
Item Type: NCV NonCited Violation
Failure To Submit An Outage Job To The Senior Site ALARA Committee For Review
Green. The inspectors identified a noncited violation of Technical Specification 5.4.1.a because the licensee failed to submit an outage job to the Senior Site ALARA Committee for review. The original dose estimate for turbine building general access was 1300 mrem. The actual dose accrued for the work was 5228 mrem. The licensee documented this occurrence in their corrective action program as Action Request 209314, performed an apparent cause evaluation, and plans to clarify its implementing procedure.

This finding is greater than minor because it resulted in the actual collective dose of the work activity exceeding 5 person-rem (5000 person-mrem) and exceeding the planned, intended dose by more than 50 percent (similar to Manual Chapter 0612, Appendix E, Example 6.i). The inspectors used the Occupational Radiation Safety Significance Determination Process and determined the finding had very low safety significance because it was as low as reasonably achievable finding, but the licensee's three-year rolling average collective dose (139 person rem) was less than 240 person-rem/unit. The finding had a crosscutting aspect in the area of human performance, resources component, because the licensee did not implement complete, accurate, and up to-date procedures [H.2(c)]. (Section 2OS2)

Inspection Report# : 2009005 *(pdf)*

Public Radiation Safety

Physical Protection

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

Miscellaneous

Last modified : November 29, 2010