



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

July 27, 2011

Mr. M.E. Reddemann  
Chief Executive Officer  
Energy Northwest  
P.O. Box 968, Mail Drop 1023  
Richland, WA 99352-0968

Subject: COLUMBIA GENERATING STATION - NRC INTEGRATED INSPECTION  
REPORT 05000397/2011003

Dear Mr. Reddemann:

On June 25, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Columbia Generating Station. The enclosed integrated inspection report documents the inspection finding, which was discussed on June 30, 2011, with Mr. B. Sawatzke, Chief Nuclear Officer, and other members of your staff.

The inspections examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the NRC has identified one issue that was evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has determined that a violation is associated with this issue. However, because of the very low safety significance and because it was entered into your corrective action program, the NRC is treating this finding as a noncited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the violation or the significance of the noncited violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 612 E. Lamar Blvd, Suite 400, Arlington, Texas, 76011-4125; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one for cases where a response is not required, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at

Energy Northwest

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<http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

Sincerely,

*/RA/*

Wayne Walker, Chief  
Project Branch A  
Division of Reactor Projects

Docket: 50-397  
License: NPF-21

Enclosure:  
NRC Inspection Report 05000397/2011003  
w/Attachment: Supplemental Information

cc w/Enclosure: Distribution via ListManager

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SUNSI Rev Comp	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	ADAMS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Reviewer Initials	WCW
Publicly Avail	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Sensitive	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Sens. Type Init	WCW
SRI:DRP/A	RI:DRP/A	PE:DRP/A	SPE:DRP/A	C:DRS/EB1	
RCohen	MHayes	CHenderson	DProulx	TFarnholtz	
<b>E-Walker</b>	<b>E-Walker</b>	<b>/RA/</b>	<b>/RA/</b>	<b>/RA/BLatta for</b>	
07/24/2011	07/26/2011	07/25/2011	7/28/2011	7/20/2011	
C:DRS/EB2	AC:DRS/TSB	C:DRS/OB	C:DRS/PSB1	C:DRS/PSB2	
NO'Keefe	DPowers	MHaire	MHay	GWerner	
<b>/RA/</b>	<b>/RA/</b>	<b>/RA/COsterholz for</b>	<b>/RA/</b>	<b>/RA/</b>	
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7/26/2011					

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000397

License: NPF-21

Report: 05000397/2011003

Licensee: Energy Northwest

Facility: Columbia Generating Station

Location: Richland, WA

Dates: March 27 through June 25, 2011

Inspectors: R. Cohen, Senior Resident Inspector  
M. Hayes, Resident Inspector  
C. Graves, Health Physicist  
J. Drake, Senior Reactor Inspector

Approved By: W. Walker, Chief, Project Branch A  
Division of Reactor Projects

## SUMMARY OF FINDINGS

IR 05000397/2011003; 03/27/2011 – 06/25/2011; Columbia Generating Station, Integrated Resident and Regional Report; Refueling and Other Outage Activities

The report covered a 3-month period of inspection by resident inspectors and an announced baseline inspection by region-based inspectors. One Green noncited violation of significance was identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 0609, "Significance Determination Process." The cross-cutting aspect is determined using Inspection Manual Chapter 0310, "Components Within the Cross-Cutting Areas." Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

### **A. NRC-Identified Findings and Self-Revealing Findings**

Cornerstone: Initiating Events

The inspectors identified a noncited violation of Technical Specification 5.4.1.a for the licensee's failure to provide procedures appropriate to the circumstances to perform flood-up. Specifically, operators inadvertently drained 4000 gallons of water from the reactor pressure vessel during reactor cavity fill operations using Plant Procedure Manual SOP-CAVITY-FILL, "Reactor Cavity and Dryer Separator Pit Fill," Revision 10, because of inadequate procedural guidance. This issue was placed in the licensee's corrective action program as Action Requests 237779 and 238032.

The performance deficiency was more than minor because it affected the procedure quality attribute of the Initiating Events Cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown operations. The inspectors used Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations - Significance Determination Process" to evaluate the significance of the finding. The finding did not require a quantitative assessment because adequate mitigating equipment remained available and because the event did not result in a loss of more than 2 feet of inventory. Therefore, the finding screened as Green. The inspectors determined that this finding did not have a cross-cutting aspect because of inadequate corrective actions from a similar event that occurred greater than two years previously was not representative of current licensee performance (Section 1R20).

### **B. Licensee-Identified Violations**

None.

## REPORT DETAILS

### Summary of Plant Status

At the beginning of this inspection period, the plant was operating at 100 percent power. On April 2, 2011, operators shut down the unit for Refueling Outage R-20. The plant remained shutdown for the remainder of the inspection period.

### 1. REACTOR SAFETY

#### Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness

#### 1R04 Equipment Alignments (71111.04)

##### .1 Partial Walkdown

##### a. Inspection Scope

The inspectors performed a partial system walkdown of the following risk-significant system:

- June 6, 2011, Diesel generator 2

The inspectors selected this system based on its risk significance relative to the Reactor Safety Cornerstone at the time it was inspected. The inspectors attempted to identify any discrepancies that could affect the function of the system, therefore, potentially increasing risk. The inspectors reviewed applicable operating procedures, system diagrams, Updated Final Safety Analysis Report, technical specification requirements, administrative technical specifications, outstanding work orders, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also inspected accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one partial system walkdown sample as defined in Inspection Procedure 71111.04-05.

##### b. Findings

No findings were identified.

.2 Complete Walkdown

a. Inspection Scope

From June 6-10, 2011, the inspectors performed a complete system alignment inspection of the residual heat removal system B to verify the functional capability of the system. The inspectors selected this system because it was considered both safety significant and risk significant in the licensee's probabilistic risk assessment. The inspectors inspected the system to review mechanical and electrical equipment line ups, electrical power availability, system pressure and temperature indications, as appropriate, component labeling, component lubrication, component and equipment cooling, hangers and supports, operability of support systems, and to ensure that ancillary equipment or debris did not interfere with equipment operation. The inspectors reviewed a sample of past and outstanding work orders to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the corrective action program database to ensure that system equipment-alignment problems were being identified and appropriately resolved. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one complete system walkdown sample as defined in Inspection Procedure 71111.04-05.

b. Findings

No findings were identified.

.3 System Walkdown associated with Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems."

a. Inspection Scope

On June 6-10, 2011, the inspectors conducted a walkdown of residual heat removal system B piping in sufficient detail to reasonably assure the acceptability of the licensee's walkdowns (Temporary Instruction 2515/177, Section 04.02.d). The inspectors also verified that the information obtained during the licensee's walkdown was consistent with the items identified during the inspector's independent walkdown (Temporary Inspection 2515/177, Section 04.02.c.3).

In addition, the inspectors verified that the licensee had isometric drawings that describe the residual heat removal system B configurations and had acceptably confirmed the accuracy of the drawings (Temporary Instruction 2515/177, Section 04.02.a). The inspectors verified the following related to the isometric drawings:

- High point vents were identified
- High points that do not have vents were acceptably recognizable

- Other areas where gas can accumulate and potentially impact subject system operability, such as at orifices in horizontal pipes, isolated branch lines, heat exchangers, improperly sloped piping, and under closed valves, were acceptably described in the drawings or in referenced documentation
- Horizontal pipe centerline elevation deviations and pipe slopes in nominally horizontal lines that exceed specified criteria were identified
- All pipes and fittings were clearly shown
- The drawings were up-to-date with respect to recent hardware changes and any discrepancies between as-built configurations and the drawings were documented and entered into the corrective action program for resolution

The inspectors verified that piping and instrumentation diagrams accurately described the subject systems. They were up-to-date with respect to recent hardware changes and any discrepancies between as-built configurations. The isometric drawings and the piping and instrumentation diagrams were documented and entered into the corrective action program for resolution (Temporary Instruction 2515/177, Section 04.02.b).

Documents reviewed are listed in the attachment to this report. This inspection effort counts towards the completion of Temporary Instruction 2515/177 which will be closed in a later inspection report.

b. Findings

No findings of significance were identified.

**1R05 Fire Protection (71111.05)**

.1 Quarterly Fire Inspection Tours

a. Inspection Scope

The inspectors conducted fire protection walkdowns that were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- May 11, 2011, Fire area TG-1/2; turbine building 471 feet during welding activities on the nonsegregated bus
- May 17, 2011, Fire area R-7; RHR-P-2C
- May 18, 2011, Fire area DG-4; DG-1A diesel oil storage tank D-101
- June 14, 2011, Main transformer yard

The inspectors reviewed areas to assess if licensee personnel had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant; effectively maintained fire detection and suppression capability; maintained passive fire protection features in good material condition; and had implemented adequate compensatory measures for out of service, degraded, or inoperable fire protection equipment, systems, or features, in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to affect equipment that could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the attachment, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's corrective action program. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of four quarterly fire-protection inspection samples as defined in Inspection Procedure 71111.05-05.

b. Findings

No findings were identified.

**1R08 Inservice Inspection Activities (71111.08)**

From April 25 through June 16, 2011, the inspectors performed Inspection Procedure 71111.08, "Inservice Inspection Activities." Inspection Procedure 71111.08 requires a minimum sample size, for boiling water reactors, of one for Section 02.01. The inspectors fulfilled the requirements of Inspection Procedure 71111.08.

.1 Inspection Activities Other Than Steam Generator Tube Inspections, Pressurized Water Reactor Vessel Upper Head Penetration Inspections, Boric Acid Corrosion Control (71111.08-02.01)

a. Inspection Scope

This inspection assesses the effectiveness of the licensee's program for monitoring degradation of vital system boundaries. The inspection includes a review of the licensee's nondestructive examination and welding programs. The inspectors are to verify that inservice inspection and welding activities are performed in accordance with ASME Code, other regulatory requirements, and licensee commitments.

The inspectors observed five volumetric examinations and four surface examinations. The inspectors verified that each examiner held qualifications to perform each examination.

Examinations Observed

<u>SYSTEM</u>	<u>WELD DESCRIPTION</u>	<u>EXAMINATION TYPE</u>
Reactor Pressure Vessel	Sparger Bracket-95	Remote Visual (VT-3)
Reactor Pressure Vessel	Jet Pump 5 Retaining Fingers	Remote Visual (VT-3)
Reactor Pressure Vessel	N3-108-Inner Radius weld	Ultrasonic Examination
Reactor Pressure Vessel	Nozzle N6-C; Nozzle to vessel weld	Ultrasonic Examination
Low Pressure Core Spray	12LPCI(1)A-6	Ultrasonic Examination
Low Pressure Core Spray	16LPCS(1)-2/6LPCS(4)-2	Ultrasonic Examination
Low Pressure Core Spray	10LPCS(1)-1	Ultrasonic Examination
Low Pressure Core Spray	16LPCS(1)-2/6LPCS(4)-2	Magnetic Particle Examination
Reactor Pressure Vessel	Stab-Bracket-315	Penetrant Examination

The nondestructive examinations performed on low pressure core spray Weld 16LPCS (1)-2/6LPCS (4)-2 were to evaluate previously identified relevant indications. Cognizant licensee personnel stated that no growth in the relevant indications was observed and the indications were examined for acceptability of continued service.

The inspectors reviewed the film records for nine radiographic examinations. The inspectors verified that each examiner held qualifications to perform each examination.

Examination Records Reviewed

<u>SYSTEM</u>	<u>WELD DESCRIPTION</u>	<u>EXAMINATION TYPE</u>
Reactor Feedwater	FW-3	Radiographic
Reactor Feedwater	FW-4	Radiographic

Reactor Feedwater	FW-7A	Radiographic
Reactor Feedwater	FW-7B	Radiographic
Reactor Feedwater	XI-7E	Radiographic
Reactor Feedwater	XI-7D	Radiographic
Reactor Feedwater	FW-3B	Radiographic
Reactor Feedwater	XI-3B	Radiographic
Reactor Recirculation	XI-7 weld	Radiographic

No welding on reactor pressure boundary components was performed while the inspectors were on site. The inspectors examined the following welding that was performed on pressure boundary, risk significant systems.

<u>SYSTEM</u>	<u>WELD IDENTIFICATION</u>	<u>WELD TYPE</u>
Condensate	Condensate valve 650	Shielded Metal Arc Welding

The inspectors verified, by review, that the welding procedure specifications and the welders had been properly qualified in accordance with ASME Code, Section IX, requirements. The inspectors also verified, through observation and record review, that essential variables for the welding process were identified, recorded in the procedure qualification record, and formed the bases for qualification of the welding procedure specifications. Specific documents reviewed during this inspection are listed in the attachment.

These actions constitute completion of the requirements for Section 02.01.

b. Findings

No findings were identified.

.5 Identification and Resolution of Problems (71111.08-02.05)

a. Inspection Scope

The inspectors reviewed 30 condition reports which dealt with inservice inspection activities and found that the corrective actions for inservice inspection issues were appropriate. From this review the inspectors concluded that the licensee had an appropriate threshold for entering inservice inspection issues into the corrective action program and had procedures that direct a root cause evaluation when necessary. The

licensee also had an effective program for applying industry inservice inspection operating experience.

These actions constitute completion of the requirements of Section 02.05.

b. Findings

No findings were identified.

**1R12 Maintenance Effectiveness (71111.12)**

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk significant systems:

- June 22, 2011, Action Request/Condition Report 241447, ASME Parts Replaced Without ASME Plan
- June 24, 2011, Action Request/Condition Report 243296, Unexpected Half Scram

The inspectors reviewed events such as where ineffective equipment maintenance has resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- Implementing appropriate work practices
- Identifying and addressing common cause failures
- Scoping of systems in accordance with 10 CFR 50.65(b)
- Characterizing system reliability issues for performance
- Charging unavailability for performance
- Trending key parameters for condition monitoring
- Ensuring proper classification in accordance with 10 CFR 50.65(a)(1) or -(a)(2)
- Verifying appropriate performance criteria for structures, systems, and components classified as having an adequate demonstration of performance through preventive maintenance, as described in 10 CFR 50.65(a)(2), or as requiring the establishment of appropriate and adequate goals and corrective actions for systems classified as not having adequate performance, as described in 10 CFR 50.65(a)(1)

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the corrective action program with the appropriate significance characterization. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of two quarterly maintenance effectiveness samples as defined in Inspection Procedure 71111.12-05.

b. Findings

No findings were identified.

**1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)**

a. Inspection Scope

The inspectors reviewed licensee personnel's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- May 16, 2011, Yellow risk due to logic systems functional test

The inspectors selected these activities based on potential risk significance relative to the reactor safety cornerstones. As applicable for each activity, the inspectors verified that licensee personnel performed risk assessments as required by 10 CFR 50.65(a)(4) and that the assessments were accurate and complete. When licensee personnel performed emergent work, the inspectors verified that the licensee personnel promptly assessed and managed plant risk. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed the technical specification requirements and inspected portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one maintenance risk assessments and emergent work control inspection sample as defined in Inspection Procedure 71111.13-05.

b. Findings

No findings were identified.

## **1R15 Operability Evaluations (71111.15)**

### a. Inspection Scope

The inspectors reviewed the following issue:

- June 7, 2011, Action Request 240566, DG-Gen-DG1 Pole Repairs in 1991 Used Incorrect Weld Filler

The inspectors selected this potential operability issue based on the risk significance of the associated component and system. The inspectors evaluated the technical adequacy of the evaluation to ensure that technical specification operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the technical specifications and Updated Final Safety Analysis Report to the licensee personnel's evaluations to determine whether the component or system was operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined compliance with bounding limitations associated with the evaluation. Additionally, the inspectors also reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one operability evaluation inspection sample as defined in Inspection Procedure 71111.15-04

### b. Findings

No findings were identified.

## **1R18 Plant Modifications (71111.18)**

### Permanent Modifications

#### a. Inspection Scope

The inspectors reviewed key parameters associated with energy needs, materials, replacement components, timing, heat removal, control signals, equipment protection from hazards, operations, flow paths, pressure boundary, ventilation boundary, structural, process medium properties, licensing basis, and failure modes for the permanent modification identified as Engineering Change 09984.

The inspectors verified that modification preparation, staging, and implementation did not impair emergency/abnormal operating procedure actions, key safety functions, or operator response to loss of key safety functions; postmodification testing will maintain the plant in a safe configuration during testing by verifying that unintended system

interactions will not occur; systems, structures and components' performance characteristics still meet the design basis; the modification design assumptions were appropriate; the modification test acceptance criteria will be met; and licensee personnel identified and implemented appropriate corrective actions associated with permanent plant modifications. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one sample for permanent plant modifications as defined in Inspection Procedure 71111.18-05.

b. Findings

No findings were identified.

**1R19 Postmaintenance Testing (71111.19)**

a. Inspection Scope

The inspectors reviewed the following postmaintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- April 2, 2011, Work Order 01188901, Quad Voter Solenoid Replacement
- April 2, 2011, Work Order 01184204, MS-V-22-D Testing
- May 12, 2011, Work Order 01197391, Standby Service Water Loop A Operability Test
- June 22, 2011, Action Request/Condition Report 245223, RC 1 and 2 Half Isolations not Received as Expected During Post Maintenance Testing

The inspectors selected these activities based upon the structure, system, or component's ability to affect risk. The inspectors evaluated these activities for the following:

- The effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed
- Acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate

The inspectors evaluated the activities against the technical specifications, the Updated Final Safety Analysis Report, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with postmaintenance tests to determine whether the licensee was identifying problems and entering them in the

corrective action program and that the problems were being corrected commensurate with their importance to safety. Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of four postmaintenance testing inspection samples as defined in Inspection Procedure 71111.19-05.

b. Findings

No findings were identified.

**1R20 Refueling and Other Outage Activities (71111.20)**

a. Inspection Scope

The inspectors reviewed the outage safety plan and contingency plans for the refueling outage, conducted April 2 through June 25, 2011, to confirm that licensee personnel had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense in depth. During the refueling outage, the inspectors observed portions of the shutdown and cooldown processes and monitored licensee controls over the outage activities listed below.

- Configuration management, including maintenance of defense in depth, is commensurate with the outage safety plan for key safety functions and compliance with the applicable technical specifications when taking equipment out of service.
- Clearance activities, including confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing.
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication, accounting for instrument error.
- Status and configuration of electrical systems to ensure that technical specifications and outage safety-plan requirements were met, and controls over switchyard activities.
- Monitoring of decay heat removal processes, systems, and components.
- Verification that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system.
- Reactor water inventory controls, including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss.
- Controls over activities that could affect reactivity.

- Maintenance of secondary containment as required by the technical specifications.
- Refueling activities, including fuel handling and sipping to detect fuel assembly leakage.
- Licensee identification and resolution of problems related to refueling outage activities.

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of one refueling outage and other outage inspection sample as defined in Inspection Procedure 71111.20-05.

b. Findings

Introduction. The inspectors identified a noncited violation of Technical Specification 5.4.1.a for the licensee's failure to provide procedures appropriate to the circumstances to perform flood-up. Specifically, operators inadvertently drained 4000 gallons of water from the reactor pressure vessel during reactor cavity fill operations using Plant Procedure Manual SOP-CAVITY-FILL, "Reactor Cavity and Dryer Separator Pit Fill," Revision 10, because of inadequate procedure guidance.

Description. On April 11, 2011, while Columbia Generating Station was shutdown for a refueling outage, operators experienced an inadvertent loss of reactor coolant inventory when preparing to enter Mode 5. The reactor head was installed and operators were flooding-up the reactor pressure vessel. At the start of the flood-up of the reactor pressure vessel, the reactor head vent valves (MS-V-1 and -2) were open to support venting of the reactor pressure vessel in Mode 4. This configuration provided a path for water to flow from the reactor pressure vessel water head vent to the equipment drain sump in the drywell.

Personnel in the drywell identified a significant amount of water leakage into the under vessel sump from an unidentified source. The event was terminated when operators initiated a clearance order to close the reactor head vent valves. After further evaluation the licensee determined that reactor flood-up with the reactor head vent valves open resulted in the loss of inventory. The loss of reactor pressure vessel inventory was determined to be approximately 4,000 gallons or 19.2 inches of reactor vessel level.

The inspectors determined that the method by which the licensee maintained system configuration during reactor vessel flood-up was inadequate. Plant Procedure Manual 10.3.22, "Reactor Pressure Vessel Reassembly," Revision 29, failed to ensure that the reactor head vent valves were closed in preparation to flood the main steam lines. Additionally, on May 16-17, 2007, operators were performing a similar operation to flood-up the reactor pressure vessel cavity when an estimated 25,000 gallons of reactor coolant system water was inadvertently lost because the reactor vessel head vent valves

were open during vessel flood-up. This event was documented in Problem Evaluation Request 207-0211. This report determined that the apparent causes of the event was the failure to recognize plant configuration during flood-up operations and the potential flow path from the reactor pressure to the under vessel sump via the main steam line system. The licensee also improperly addressed the closing sequence of the reactor head vent valves through coordinating procedure steps in Plant Procedure Manual 10.3.22, "Reactor Pressure Valve Disassembly," Revision 33, and Plant Procedure Manual SOP-CAVITY-FILL, "Reactor Cavity and Dryer Separator Pit Fill," Revision 10. The licensee committed to revise procedures to preclude the creation of a drain path from the reactor pressure vessel head vents to the equipment drain sump.

Analysis. The performance deficiency was more than minor because it affected the procedure quality attribute of the Initiating Events Cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown operations. The inspectors used Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations - Significance Determination Process," to evaluate the significance of the finding. The finding did not require a quantitative assessment because adequate mitigating equipment remained available and because the event did not result in a loss of more than 2 feet of inventory. Therefore, the finding screened as Green. This finding did not have a cross-cutting aspect because the inadequate corrective actions from a similar event that occurred greater than two year previously was not representative of current licensee performance (Section 1R20).

Enforcement. Technical Specification 5.4.1.a states, in part, that written procedures recommended in Regulatory Guide 1.33, "Quality Assurance Program Requirements", Revision 2, shall be maintained covering activities such as refueling operations. Specifically, Section 4.a recommends procedures as appropriate for filling the reactor vessel during shutdown operations. Contrary to the above, from April 11-12, 2011, Energy Northwest performed reactor vessel flood-up operations using Plant Procedure Manual SOP-CAVITY-FILL, "Reactor Cavity and Dryer Separator Pit Fill," Revision 10 that was not adequate. It did not contain appropriate initial plant conditions prior to flood-up to verify that a reactor pressure vessel drain down path to the equipment drain sump did not exist. The licensee restored the proper system configuration, initiated a condition report to perform a cause evaluation of the issue, and assigned a corrective action to revise procedures in order to preclude recurrence in future outages. Because this finding was of very low safety significance (Green) and has been entered into the corrective action program (AR 238032), this violation is being treated as a noncited violation, consistent with Section 2.3.2 of the NRC Enforcement Policy: NCV 05000397/2011003-01, "Loss of Reactor Coolant System Inventory During Reactor Pressure Vessel Flood-up."

## 1R22 Surveillance Testing (71111.22)

### .1 Baseline Surveillance Inspection

#### a. Inspection Scope

The inspectors reviewed the Updated Final Safety Analysis Report, procedure requirements, and technical specifications to ensure that the surveillance activities listed below demonstrated that the systems, structures, and/or components tested were capable of performing their intended safety functions. The inspectors either witnessed or reviewed test data to verify that the significant surveillance test attributes were adequate to address the following:

- Preconditioning
- Evaluation of testing impact on the plant
- Acceptance criteria
- Test equipment
- Procedures
- Jumper/lifted lead controls
- Test data
- Testing frequency and method demonstrated technical specification operability
- Test equipment removal
- Restoration of plant systems
- Fulfillment of ASME Code requirements
- Updating of performance indicator data
- Engineering evaluations, root causes, and bases for returning tested systems, structures, and components not meeting the test acceptance criteria were correct
- Reference setting data
- Annunciators and alarms setpoints

The inspectors also verified that licensee personnel identified and implemented any needed corrective actions associated with the surveillance testing.

- May 3, 2011, Work Order 1179876, Low Pressure Core Spray Fill and Vent
- May 10, 2011, Work Order 01197669, Residual Heat Removal Loop A Operability Test
- May 11, 2011, Work Order 01198707, Low Pressure Core Spray Keep Fill Integrity Test

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of three surveillance testing inspection samples as defined in Inspection Procedure 71111.22-05.

b. Findings

No findings were identified.

.2 Surveillance Testing associated with Temporary Instruction 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems."

a. Inspection Scope

When reviewing the low pressure core spray system fill and vent. The inspectors verified that the procedures were acceptable for (1) testing the low pressure core spray system fill and vent with power operation, shutdown operation, maintenance, and subject system modifications; (2) void determination and elimination methods; and (3) post-event evaluation.

The inspectors reviewed the procedures used for conducting surveillances and determination of void volumes to ensure that the void criteria was satisfied and will be reasonably ensured to be satisfied until the next scheduled void surveillance (Temporary Instruction 2515/177, Section 04.03.a). The inspectors reviewed procedures used for filling and venting following conditions which may have introduced voids into the subject systems. The review verified that the procedures acceptably addressed testing for such voids and provided acceptable processes for their reduction or elimination (Temporary Instruction 2515/177, Section 04.03.b). Specifically, the inspectors verified that:

- Gas intrusion prevention, refill, venting, monitoring, trending, evaluation, and void correction activities were acceptably controlled by approved operating procedures (Temporary Instruction 2515/177, Section 04.03.c.1).
- Procedures ensured the system did not contain voids that may jeopardize operability (Temporary Instruction 2515/177, Section 04.03.c.2).
- Procedures established that void criteria were satisfied and will be reasonably ensured to be satisfied until the next scheduled void surveillance (Temporary Instruction 2515/177, Section 04.03.c.3).

- The licensee entered changes into the corrective action program as needed to ensure acceptable response to issues. In addition, the inspectors confirmed that a clear schedule for completion is included for corrective action program entries that have not been completed (Temporary Instruction 2515/177, Section 04.03.c.5).
- Procedures included independent verification that critical steps were completed (Temporary Instruction 2515/177, Section 04.03.c.6).

The inspectors verified the following with respect to surveillance and void detection:

- Specified surveillance frequencies were consistent with technical specification surveillance requirements (Temporary Instruction 2515/177, Section 04.03.d.1).
- Surveillance frequencies were stated or, when conducted more often than required by technical specifications, the process for their determination was described (Temporary Instruction 2515/177, Section 04.03.d.2).
- Surveillances methods were acceptably established to achieve the needed accuracy (Temporary Instruction 2515/177, Section 04.03.d.3).
- Surveillance procedures included up-to-date acceptance criteria (Temporary Instruction 2515/177, Section 04.03.d.4).
- Procedures included effective follow-up actions when acceptance criteria are exceeded or when trending indicates that criteria may be approached before the next scheduled surveillance (Temporary Instruction 2515/177, Section 04.03.d.5).
- Measured void volume uncertainty was considered when comparing test data to acceptance criteria (Temporary Instruction 2515/177, Section 04.03.d.6).
- Venting procedures and practices utilized criteria such as adequate venting durations and observing a steady stream of water (Temporary Instruction 2515/177, Section 04.03.d.7).
- An effective sequencing of void removal steps was followed to ensure that gas does not move into previously filled system volumes (Temporary Instruction 2515/177, Section 04.03.d.8).
- Qualitative void assessment methods included expectations that the void will be significantly less than allowed by acceptance criteria (Temporary Instruction 2515/177, Section 04.03.d.9).
- Venting results were trended periodically to confirm that the systems are sufficiently full of water and that the venting frequencies are adequate. The inspectors also verified that records on the quantity of gas at each location are

maintained and trended as a means of preemptively identifying degrading gas accumulations (Temporary Instruction 2515/177, Section 04.03.d.10).

- Surveillances were conducted at any location where a void may form, including high points, dead legs, and locations under closed valves in vertical pipes (Temporary Instruction 2515/177, Section 04.03.d.11).
- The licensee ensure that systems were not preconditioned by other procedures that may cause a system to be filled, such as by testing, prior to the void surveillance (Temporary Instruction 2515/177, Section 04.03.d.12).
- Procedures included gas sampling for unexpected void increases if the source of the void is unknown and sampling is needed to assist in determining the source (Temporary Instruction 2515/177, Section 04.03.d.13).

The inspectors verified the following with respect to filling and venting:

- Revisions to fill and vent procedures to address new vents or different venting sequences were acceptably accomplished (Temporary Instruction 2515/177, Section 04.03.e.1).
- Fill and vent procedures provided instructions to modify restoration guidance to address changes in maintenance work scope or to reflect different boundaries from those assumed in the procedure (Temporary Instruction 2515/177, Section 04.03.e.2).

The inspectors verified the following with respect to void control:

- Void removal methods were acceptably addressed by approved procedures (Temporary Instruction 2515/177, Section 04.03.f.1).
- The licensee had reasonably ensured that the residual heat removal B system pump is free of damage following a gas-related event in which pump acceptance criteria was exceeded (Temporary Instruction 2515/177, Section 04.03.f.2).

Documents reviewed are listed in the attachment to this report.

This inspection effort counts towards the completion of Temporary Instruction 2515/177 which will be closed in a later inspection report.

b. Findings

No findings were identified.

## 2. RADIATION SAFETY

### Cornerstone: Occupational and Public Radiation Safety

#### 2RS01 Radiological Hazard Assessment and Exposure Controls (71124.01)

##### a. Inspection Scope

This area was inspected to: (1) review and assess licensee's performance in assessing the radiological hazards in the workplace associated with licensed activities and the implementation of appropriate radiation monitoring and exposure control measures for both individual and collective exposures; (2) verify the licensee is properly identifying and reporting Occupational Radiation Safety Cornerstone performance indicators; and (3) identify those performance deficiencies that were reportable as a performance indicator and which may have represented a substantial potential for overexposure of the worker.

The inspectors used the requirements in 10 CFR Part 20, the technical specifications, and the licensee's procedures required by technical specifications as criteria for determining compliance. During the inspection, the inspectors interviewed the radiation protection manager, radiation protection supervisors, and radiation workers. The inspectors performed walkdowns of various portions of the plant, performed independent radiation dose rate measurements and reviewed the following items:

- Performance indicator events and associated documentation reported by the licensee in the Occupational Radiation Safety Cornerstone
- The hazard assessment program, including a review of the licensee's evaluations of changes in plant operations and radiological surveys to detect dose rates, airborne radioactivity, and surface contamination levels
- Instructions and notices to workers, including labeling or marking containers of radioactive material, radiation work permits, actions for electronic dosimeter alarms, and changes to radiological conditions
- Programs and processes for control of sealed sources and release of potentially contaminated material from the radiologically controlled area, including survey performance, instrument sensitivity, release criteria, procedural guidance, and sealed source accountability
- Radiological hazards control and work coverage, including the adequacy of surveys, radiation protection job coverage, and contamination controls; the use of electronic dosimeters in high noise areas; dosimetry placement; airborne radioactivity monitoring; controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools; and posting and physical controls for high radiation areas and very high radiation areas

- Radiation worker and radiation protection technician performance with respect to radiation protection work requirements
- Audits, self-assessments, and corrective action documents related to radiological hazard assessment and exposure controls since the last inspection

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of the one required sample as defined in Inspection Procedure 71124.01-05.

b. Findings

No findings were identified.

**2RS02 Occupational ALARA Planning and Controls (71124.02)**

a. Inspection Scope

This area was inspected to assess performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspectors used the requirements in 10 CFR Part 20, the technical specifications, and the licensee's procedures required by technical specifications as criteria for determining compliance. During the inspection, the inspectors interviewed licensee personnel and reviewed the following items:

- Site-specific ALARA procedures and collective exposure history, including the current 3-year rolling average, site-specific trends in collective exposures, and source-term measurements
- ALARA work activity evaluations/postjob reviews, exposure estimates, and exposure mitigation requirements
- The methodology for estimating work activity exposures, the intended dose outcome, the accuracy of dose rate and man-hour estimates, and intended versus actual work activity doses and the reasons for any inconsistencies
- Records detailing the historical trends and current status of tracked plant source terms and contingency plans for expected changes in the source term due to changes in plant fuel performance issues or changes in plant primary chemistry
- Radiation worker and radiation protection technician performance during work activities in radiation areas, airborne radioactivity areas, or high radiation areas
- Audits, self-assessments, and corrective action documents related to ALARA planning and controls since the last inspection

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of the one required sample as defined in Inspection Procedure 71124.02-05.

b. Findings

No findings were identified.

**2RS03 In-plant Airborne Radioactivity Control and Mitigation (71124.03)**

a. Inspection Scope

This area was inspected to verify in-plant airborne concentrations are being controlled consistent with ALARA principles and the use of respiratory protection devices on site do not pose an undue risk to the wearer. The inspectors used the requirements in 10 CFR Part 20, the technical specifications, and the licensee's procedures required by technical specifications as criteria for determining compliance. During the inspection, the inspectors interviewed licensee personnel, performed walkdowns of various portions of the plant, and reviewed the following items:

- The licensee's use, when applicable, of ventilation systems as part of its engineering controls
- The licensee's respiratory protection program for use, storage, maintenance, and quality assurance of National Institute for Occupational Safety and Health certified equipment, qualification and training of personnel, and user performance
- The licensee's capability for refilling and transporting self-contained breathing apparatus air bottles to and from the control room and operations support center during emergency conditions, status of self-contained breathing apparatus staged and ready for use in the plant and associated surveillance records, and personnel qualification and training
- Audits, self-assessments, and corrective action documents related to in-plant airborne radioactivity control and mitigation since the last inspection

Specific documents reviewed during this inspection are listed in the attachment.

These activities constitute completion of the one sample as defined in Inspection Procedure 71124.03-05.

b. Findings

No findings were identified.

#### 4. OTHER ACTIVITIES

##### 4OA1 Performance Indicator Verification (71151)

###### .1 Data Submission Issue

###### a. Inspection Scope

The inspectors performed a review of the performance indicator data submitted by the licensee for the first quarter 2011 performance indicators for any obvious inconsistencies prior to its public release in accordance with Inspection Manual Chapter 0608, "Performance Indicator Program."

This review was performed as part of the inspectors' normal plant status activities and, as such, did not constitute a separate inspection sample.

###### b. Findings

No findings were identified.

###### .2 Safety System Functional Failures (MS05)

###### a. Inspection Scope

The inspectors sampled licensee submittals for the safety system functional failures performance indicator for the period from the first quarter 2010 through the first quarter 2011. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73." The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports, and NRC integrated inspection reports for the period of January 2010 through March 2011 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one safety system functional failures sample as defined in Inspection Procedure 71151-05.

###### b. Findings

No findings were identified.

.3 Reactor Coolant System Specific Activity (BI01)

a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system specific activity performance indicator for the period from the first quarter 2010 through the first quarter 2011. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors reviewed the licensee's reactor coolant system chemistry samples, technical specification requirements, issue reports, event reports, and NRC integrated inspection reports for the period of January 2010 through March 2011, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. In addition to record reviews, the inspectors observed a chemistry technician obtain and analyze a reactor coolant system sample. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one reactor coolant system specific activity sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings were identified.

.4 Reactor Coolant System Leakage (BI02)

a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system leakage performance indicator for the period from the first quarter 2010 through the first quarter 2011. To determine the accuracy of the performance indicator data reported during those periods, the inspectors used definitions and guidance contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6. The inspectors reviewed the licensee's operator logs, reactor coolant system leakage tracking data, issue reports, event reports, and NRC integrated inspection reports for the period of January 2010 through March 2011, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the attachment to this report.

These activities constitute completion of one reactor coolant system leakage sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings were identified.

.5 Occupational Exposure Control Effectiveness (OR01)

a. Inspection Scope

The inspectors reviewed performance indicator data for the third quarter 2010 through the first quarter 2011. The objective of the inspection was to determine the accuracy and completeness of the performance indicator data reported during these periods. The inspectors used the definitions and clarifying notes contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, as criteria for determining whether the licensee was in compliance.

The inspectors reviewed corrective action program records associated with high radiation area (greater than 1 rem/hr) and very high radiation area non-conformances. The inspectors reviewed radiological, controlled area exit transactions greater than 100 mrem. The inspectors also conducted walkdowns of high radiation areas (greater than 1 rem/hr) and very high radiation area entrances to determine the adequacy of the controls of these areas.

These activities constitute completion of the occupational exposure control effectiveness sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings were identified.

.6 Radiological Effluent Technical Specifications/Offsite Dose Calculation Manual  
Radiological Effluent Occurrences (PR01)

a. Inspection Scope

The inspectors reviewed performance indicator data for the third quarter 2010 through the first quarter 2011. The objective of the inspection was to determine the accuracy and completeness of the performance indicator data reported during these periods. The inspectors used the definitions and clarifying notes contained in NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, as criteria for determining whether the licensee was in compliance.

The inspectors reviewed the licensee's corrective action program records and selected individual annual or special reports to identify potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose.

These activities constitute completion of the radiological effluent technical specifications/offsite dose calculation manual radiological effluent occurrences sample as defined in Inspection Procedure 71151-05.

b. Findings

No findings were identified.

**4OA2 Identification and Resolution of Problems (71152)**

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Physical Protection**

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that they were being entered into the licensee's corrective action program at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. The inspectors reviewed attributes that included the complete and accurate identification of the problem; the timely correction, commensurate with the safety significance; the evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent of condition reviews, and previous occurrences reviews; and the classification, prioritization, focus, and timeliness of corrective actions. Minor issues entered into the licensee's corrective action program because of the inspectors' observations are included in the attached list of documents reviewed.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure, they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of

items entered into the licensee's corrective action program. The inspectors accomplished this through review of the station's daily corrective action documents.

The inspectors performed these daily reviews as part of their daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings were identified.

.3 Selected Issue Follow-up Inspection

a. Inspection Scope

During a review of items entered in the licensee's corrective action program, the inspectors recognized a corrective action item documenting debris found on the emergency core cooling system suction strainers. The inspectors reviewed the licensee's evaluation of the debris found on the emergency core cooling system suction strainers and determined the emergency core cooling systems were able to perform their safety function.

These activities constitute completion of one in-depth problem identification and resolution sample as defined in Inspection Procedure 71152-05.

b. Findings

No findings were identified.

**40A3 Event Follow-up (71153)**

.1 April 7, 2011, Notification of Unusual Event

On April 7, 2011, the licensee declared a notification of unusual event due to a hydrogen burn occurring when cutting stator cooling water piping during their refueling outage. The licensee was performing maintenance on the stator cooling water piping when plant personnel noticed a small flame and then heard a loud audible noise. Plant personnel immediately evacuated the area and conducted a full walkdown of the affected area. No plant personnel were injured during the event. The event is captured in Event Notification 46739. The licensee later retracted the event report on April 11, 2011.

.2 (Closed) Licensee Event Report (LER) 05000397/2009-004-01: 6.9 kV Non-Segregated Electrical Bus Failure

This licensee event report documents an update to the contributing causes that were identified for the electrical fault on a 6.9 kV non-segregated bus on August 5, 2009, that resulted in a main turbine trip and automatic reactor scram. See NRC Inspection Report 05000397/2009010 for a discussion of two self-revealing findings associated with this issue. The inspectors completed a review of the licensee event report and did not

identify any other violations of regulatory requirements or findings. This licensee event report is closed.

#### **40A5 Other Activities**

- .1 NRC Temporary Instruction 2515/177, "Managing Gas Accumulation in Emergency Core Cooling Decay Heat Removal and Containment Spray Systems (NRC Generic Letter 2008-01)"

As documented in Sections 1R04 and 1R22 of this report, the inspectors confirmed the acceptability of the described actions for the low pressure core spray system. This inspection effort counts towards the completion of Temporary Instruction 2515/177 which will be closed in a later inspection report.

- .2 (Closed) NRC Temporary Instruction 2515/183, "Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event"

- a. Inspection Scope

The inspectors assessed the activities and actions taken by the licensee to assess its readiness to respond to an event similar to the Fukushima Daiichi nuclear plant fuel damage event. This included (1) an assessment of the licensee's capability to mitigate conditions that may result from beyond design basis events, with a particular emphasis on strategies related to the spent fuel pool, as required by NRC Security Order Section B.5.b issued February 25, 2002, as committed to in severe accident management guidelines, and as required by 10 CFR 50.54(hh); (2) an assessment of the licensee's capability to mitigate station blackout conditions, as required by 10 CFR 50.63 and station design bases; (3) an assessment of the licensee's capability to mitigate internal and external flooding events, as required by station design bases; and (4) an assessment of the thoroughness of the walkdowns and inspections of important equipment needed to mitigate fire and flood events, which were performed by the licensee to identify any potential loss of function of this equipment during seismic events possible for the site.

- b. Findings

Inspection Report 05000397/2011007 (ML11133A202) documented detailed results of this inspection activity. Following issuance of the report, the inspectors conducted detailed follow-up on selected issues. No findings were identified during this follow-up inspection.

- .3 (Closed) NRC Temporary Instruction 2515/184, "Availability and Readiness Inspection of Severe Accident Management Guidelines (SAMGs)"

The inspectors reviewed the licensee's severe accident management guidelines (SAMGs), implemented as a voluntary industry initiative in the 1990's, to determine (1) whether the SAMGs were available and updated; (2) whether the licensee had procedures and processes in place to control and update its SAMGs; (3) the nature and

extent of the licensee's training of personnel on the use of SAMGs; and (4) licensee personnel's familiarity with SAMG implementation.

The results of this review were provided to the NRC task force chartered by the Executive Director for Operations to conduct a near-term evaluation of the need for agency actions following the Fukushima Daiichi fuel damage event in Japan. Plant-specific results for Columbia Generating Station were provided as Enclosure 3 to a memorandum to the Chief, Reactor Inspection Branch, Division of Inspection and Regional Support, dated May 26, 2011 (ML111470264).

#### **4OA6 Meetings**

##### Exit Meeting Summary

On April 14, 2011, the inspectors presented the results of the radiation safety inspections to Mr. B. MacKissock, Plant Manager, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

On April 29, 2011, the inspectors presented the results of this inservice inspection to Mr. B. Sawatzke, Chief Nuclear Officer, and other members of the licensee staff. The inspectors telephonically re-exited with Don Gregoire, Manager, Regulatory Affairs, on June 16, 2011. The inspectors also acknowledged review of proprietary material during the inspection. All proprietary material was returned to the licensee.

On June 30, 2011, the inspectors presented the inspection results to Mr. B. Sawatzke, Chief Nuclear Officer, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.



TSP-DG2/LOP- B501	Standby Diesel Generator DG2 Loss of Power Test	14
TSP-DG2/LOCA- B501	Standby Diesel Generator DG2 LOCA Test	17

**Section 1R05: Fire Protection**

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
FSAR	Columbia Generating Station Final Safety Analysis Report, Appendix F	60

**Section 1R08: Inservice Inspection Activities**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/DATE</u>
CEP-NDE-0404	Manual Ultrasonic Examination of Ferritic Piping Welds (ASME XI)	4
CEP-NDE-0731	Magnetic Particle Examination (MT) for ASME Section XI	3
CEP-NDE-0903	VT-3 Examination	2
CEP-WP-001	Welding Procedure Specifications	2
EPRI-DMW-PA-1	Manual Phased Array Procedure for Dissimilar Metal Welds	1
GEH-UT-311	Procedure For Manual Ultrasonic Examination Of Nozzle Inner Radius, Bore And Selected Nozzle To Vessel Regions	16
GEH-UT-311 V.16	Clarify sweep range applicable to calibrations and examinations to provide improved resolution of both calibration reflectors or target exam volume	16
GE-PDI-UT-10	PDI Generic Procedure For The Ultrasonic Examination Of Dissimilar Metal Welds	February 2010
GE-UT-300	Procedure For Manual Examination Of Reactor Vessel Assembly Welds In Accordance With PDI	10
GE-UT-304	Procedure For Manual Ultrasonic Planar Flaw Sizing In Vessel Materials	8

GE-UT-309	Procedure For Manual Ultrasonic Planar Flaw Sizing Of Nozzle Inner Radius And Bore Regions	10
URS	Industrial Radiography	22

ACTION REQUESTS

00197265	00197408	00197488	00197736
00197842	00197844	00197857	00197899
00197948	00198044	00198222	00198289
00198462	00198873	00199390	001999392
00199393	00199394	00199414	00199539
00199551	00200168	00204088	00209684
00211084	00212690	00218430	00218663
00218665	00222885		

MISCELLANEOUS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/DATE</u>
	Various Welder Performance Qualification Records	
	Various NDE Technician Certification Records	
GI2-11-012	Columbia Generating Station - Relief Requests 31SI-10 and 31SI-11 For The Third 10-Year Inservice Inspection Program (Tac Nos. Me3582 And Me3714)	February 3, 2011
G02-10-039	Columbia Generating Station, Docket No. 50-397 Revision Requests To The Third Ten-Year Inservice Inspection Program For Columbia Generating Station	March 11, 2010
	3ISI-02 Relief Request and Safety Evaluation	4
	3ISI-03 Relief Request and Safety Evaluation	4
	3ISI-04 Relief Request and Safety Evaluation	4
	3ISI-05 Relief Request and Safety Evaluation	4
	3ISI-06 Relief Request and Safety Evaluation	4
	3ISI-07 Relief Request and Safety Evaluation	4
	3ISI-08 Relief Request and Safety Evaluation	4
	3ISI-09 Relief Request and Safety Evaluation	4

**Section 1R12: Maintenance Effectiveness**

ACTION REQUEST/CONDITION REPORTS

241447                      241311                      243296

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/DATE</u>
Work Order 01183734	CVB-V-1-JK Valve Overhaul	April 12, 2011
ASME Section XI Work Plan	Change Notice, Plan Number 2-2414,	Change Number 1
SOP-RPS- BYPASS	Bypassing RPS Interlocks in Modes 3, 4, and 5	4

**Section 1R13: Maintenance Risk Assessment and Emergent Work Controls**

PROCEDURE

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
TSP- RHRB/RHRC- B501	RHRB/RHRC LSFT	12

**Section 1R15: Operability Evaluations**

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
Action Request 240566	DG-Gen-DG1 Pole Repairs in 1991 Used Incorrect Weld Filler	May 14, 2011

**Section 1R18: Plant Modifications**

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
	Engineering Change 09984	April 16, 2011

## Section 1R19: Postmaintenance Testing

### MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/DATE</u>
10.2.206	Quad Voter Solenoid Valve Maintenance-DEH-SV-TRIP/A	2
1.3.7.6	Integrated Risk Management	25
PPM 3.2.1	Normal Plant Shutdown	66
OSP-SW/IST-Q701	Standby Service Water Loop A Operability	20
AR/CR 245223	RC 1 and 2 Half Isolations Not Received As Expected During Maintenance Testing	June 22, 2011
Engineering Change 7095	Level 1 to Level 2 Modification	8

### WORK ORDERS

01188901      01184204

## Section 1R20: Refueling and Other Outage Activities

### MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/DATE</u>
3.2.1	Normal Plant Shutdown	65
Action Request 237779	Significant Unidentified Water leakage into Under Vessel Sump	April 12, 2011
Action Request	Procedure Issues Regarding Direction to Shut MS-V-1 and MS-V-2	April 14, 2011
Drawing M502	Flow Diagram Main and Exhaust Steam System	35
Work Order 01173410	Failed Channel Check MS-LIS-24B, -38A, -36B	July 14, 2009
10.3.21	Reactor Pressure Valve Disassembly	33

SOP-CAVITY- Reactor Cavity and Dryer Separator Pit Fill  
FILL

14

ACTION REQUESTS/CONDITION REPORTS

238691      238830      238692

**Section 1R22: Surveillance Testing**

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/DATE</u>
Work Order 1179876	LPCS Fill and Vent	May 3, 2011
OSP-RHR-IST- Q702	RHR Loop Operability Test	29
OSP-LPCS- A702	Low Pressure Core Spray Keep Fill Integrity Test	3

**Section 2RS01: Radiological Hazard Assessment and Exposure Controls**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
SWP-PRO-01	Description and Use of Procedures and Instructions	16
HPI-0.19	Radiation Protection Standards and Expectations	9
PPM 11.2.7.1	Area Posting	35
PPM 11.2.7.3	High Radiation Area, Locked High Radiation Area, and Very High Radiation Area Controls	36
PPM 11.2.13.1	Radiation and Contamination Surveys	28
PPM 11.2.14.4	Procurement, Receipt, control and Lead Testing of Radioactive Sealed Sources and Devices	20

AUDITS, SELF-ASSESSMENTS, AND SURVEILLANCES

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
208559	Contamination Control Self-Assessment	November 23, 2010

ACTION REQUESTS/CONDITION REPORTS

229376                      235649                      229543

RADIOLOGICAL SURVEYS

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
0160811	Drywell 501' Initial Survey	April 3, 2011
0601111	Drywell 512' RWCU Post Shielding	April 5, 2011
1071811	Drywell 548' MSRV Maintenance	April 7, 2011
1069111	Drywell 565' Remove N4 Insulation	April 6, 2011
1068611	Reactor Building 606' Routine	April 6, 2011
300211	Reactor Building 606' Reactor Cavity Initial	April 8, 2011
1070411	Reactor 422/441 South	April 6, 2011
1035811	Reactor Building 441/422 South Monthly	March 16, 2011
997811	Reactor Building 441/422 South Monthly	February 17, 2011
1036111	Reactor Building 422/441 North Monthly	March 17, 2011
997911	Reactor Building 422/441 North Monthly	February 17, 2011

**Section 2RS02: Occupational ALARA Planning and Controls**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
GEN-RPP-01	ALARA Program Description	7
GEN-RPP-02	ALARA Planning and Radiation Work Permits	26
GEN-RPP-13	ALARA Committee	10

ACTION REQUESTS/CONDITION REPORTS

235693                      229377

RADIATION WORK PACKAGES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
30002623	R20 DW MSRV Maintenance LHR	0
30002677	R20 RF RX Cavity Disassembly Work HR	0
30002683	R20 RF Support Work	0
30002636	DW CRA-M/FN Maintenance and Repairs HR	0

**Section 2RS03: In-plant Airborne Radioactivity Control and Mitigation**

PROCEDURES

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
GEN-RPP-05	Respiratory Protection Program Description	11
GEN-RPP-10	Use of Respiratory Protection Equipment	10
PPM 10.2.62	Breathing Air Compressor Operation	10
HPI-8.2	Quantitative Respirator Fit Testing Using Portacount Plus System	21
PPM 11.2.11.3	Issuance of Respiratory Protection Equipment	16

AUDITS, SELF-ASSESSMENTS, AND SURVEILLANCES

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
208560	Respiratory Protection Self-Assessment	September 15, 2010

ACTION REQUESTS/CONDITION REPORTS

229299

**Section 4OA1: Performance Indicator Verification**

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
CSP-I131-W101	Reactor Coolant Isotopic Analysis for I-131 Dose Equivalent	7
HPI-0.14	Assessing and Reporting NRC Occupational Exposure Control Effectiveness Performance Indicator Data	5
CI-10.17	Iodine	8

**Section 4OA2: Identification and Resolution of Problems**

ACTION REQUESTS/CONDITION REPORTS

00237687      00237690      00237683      00237685      00237687

00237690	00237755	00237779	00237780	00237888
00237835	00237836	00237857	00237858	00237874
00240100	00240115	00240138	00239942	00239839
00239840	00239895	00239695	00239894	00240080
00240107	00240155	00240168	00240199	00240212
00240213	00239479	00239490	00240093	00239169
00239171	00239169	00239171	00239189	00239281
00239283	00239291	00239292	00239318	00239319
00239329	00239330	00239329	00239330	00239345
00237960	00237962	00237963	00238004	00238006
00238010	00238014	00238019	00238639	00238644
00238658	00238659	00238667	00238668	00238523
00238534	00238587	00238588	00238592	00238593
00238595	00238616	00238630	00239738	00239741
00239742	00239760	00239839	00239840	00239847
00239954	00239955	00239943	00239944	00240822
00240826	00240834	00240873	00240902	00240908
00240929	00240930	00240931	00240933	00240434
00240436	00239758	00240684	00240749	00240756
00240764	00240775	00240777	00240787	00240788
00240825	00240827	00240828	00240866	00240870
00240871	00240873	00240874	00240877	00240903
00240907	00240923	00240924	00240993	00240994
00241002	00241003	00199313	00240775	

DRAWINGS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
ENWC-013-PR-02	Columbia Generating Station Drywell and Wetwell Area Map	A

WNP2-ECCS-8016-1000      WPPSS Nuclear Plant No. 2 Sure-Flow Strainer Project  
 General Arrangement

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>DATE</u>
ME-02-97-03	Calculation for WNP-2 Specific Evaluation: Resolution of ECCS Suction Strainer Plugging Issue Identified in NRC Bulletin 96-06	May 6, 1998
5.17.19	Calculation for RHR Pressure Drop Calculation Modes A.1, A.2, B, C.1, C.2, C.3, C.4, D, E, F, G, & S	February 10, 1988
8302	EC Evaluation Text	

**Section 4OA3: Event Follow-Up**

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/DATE</u>
SOP-SCW-SHUTDOWN	Stator Coil Cooling System Shutdown	1
	Control Room Operators Log	April 7, 2011
M958	Flow Diagram Stator Cooling Water Turbine Generator Building	24

WORK ORDERS

01174810      01195522

**Section 4OA5: Other Activities**

MISCELLANEOUS DOCUMENTS

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION/DATE</u>
Work Order 1179876	LPCS Fill and Vent	May 3, 2011
TM 2166	Technical Memorandum – Acceptance Criteria ECCS Gas intrusion GL2008-01	2
RHR-2571-1	¾ " RHR (52)-2 From RHR-p-2B to Pump Pit	13