



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-4005**

November 5, 2003

Mr. J. V. Parrish  
Chief Executive Officer  
Energy Northwest  
P.O. Box 968; MD 1023  
Richland, Washington 99352-0968

**SUBJECT: COLUMBIA GENERATING STATION - NRC INTEGRATED INSPECTION  
REPORT 05000397/2003006**

Dear Mr. Parrish:

On October 4, 2003, the NRC completed an inspection at your Columbia Generating Station. The enclosed integrated inspection report documents the inspection findings, which were discussed on October 6, 2003, with Mr. Dale Atkinson 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 three issues that were evaluated under the risk significance determination process as having very low safety significance (Green). Two findings were determined to be violations of NRC requirements, however, because they were of very low safety significance and because they were entered into your corrective action program, the NRC is treating the issues as noncited violations, in accordance with Section V1.A.1 of the NRC's Enforcement Policy. If you contest these noncited violations you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the U.S. Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011-4005; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident inspector at the Columbia Generating Station.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document

Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.gov/reading-rm/ADAMS.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

William B. Jones, Chief  
Project Branch E  
Division of Reactor Projects

Docket: 50-397  
License: NPF-21

Enclosure:  
NRC Inspection Report  
05000397/2003006

cc w/enclosure:  
Rodney Webring (Mail Drop PE04)  
Vice President, Nuclear Generation  
Energy Northwest  
P.O. Box 968  
Richland, WA 99352-0968

Albert E. Mouncer (Mail Drop PE01)  
Vice President, Corporate Services/  
General Counsel/CFO  
Energy Northwest  
P.O. Box 968  
Richland, WA 99352-0968

Chairman  
Energy Facility Site Evaluation Council  
P.O. Box 43172  
Olympia, WA 98504-3172

Douglas W. Coleman (Mail Drop PE20)  
Manager, Performance Assessment  
and Regulatory Programs  
Energy Northwest  
P.O. Box 968  
Richland, WA 99352-0968

Christina L. Perino (Mail Drop PE20)  
Manager, Licensing  
Energy Northwest  
P.O. Box 968  
Richland, WA 99352-0968

Chairman  
Benton County Board of Commissioners  
P.O. Box 190  
Prosser, WA 99350-0190

Dale K. Atkinson (Mail Drop PE08)  
Vice President, Technical Services  
Energy Northwest  
P.O. Box 968  
Richland, WA 99352-0968

Thomas C. Poindexter, Esq.  
Winston & Strawn  
1400 L Street, N.W.  
Washington, DC 20005-3502

Bob Nichols  
Executive Policy Division  
Office of the Governor  
P.O. Box 43113  
Olympia, WA 98504-3113

Lynn Albin  
Washington State Department of Health  
P.O. Box 7827  
Olympia, WA 98504-7827

Chief, Technological Hazards Branch  
FEMA Region X  
Federal Regional Center  
130 228th Street, SW  
Bothell, WA 98201-9796

Electronic distribution by RIV:  
 Regional Administrator (**BSM1**)  
 DRP Director (**ATH**)  
 DRS Director (**DDC**)  
 Senior Resident Inspector (**GDR**)  
 Branch Chief, DRP/E (**WBJ**)  
 Senior Project Engineer, DRP/E (**VGG**)  
 Staff Chief, DRP/TSS (**PHH**)  
 RITS Coordinator (**NBH**)  
 A. Boland, OEDO RIV Coordinator (**ATB**)  
 Columbia Site Secretary (**LEF1**)  
 W. A. Maier, RSLO (**WAM**)  
 Dale Thatcher (**DFT**)

ADAMS:  Yes     No    Initials: \_\_wdj\_\_  
 Publicly Available     Non-Publicly Available     Sensitive     Non-Sensitive

R:\\_COL\2003\COL2003-06RP-GDR.wpd

RIV:SRI:DRP/E	RIV:RI:DRP/E	TL:PSB	C:DRP/E	
GDRreplogle	ZKDunham	MPShannon	WBJones	
<b>F - WBJones</b>	<b>T - WBJones</b>	<b>/RA/</b>	<b>/RA/</b>	
11/4/03	10/31/03	11/4/03	11/5/03	

OFFICIAL RECORD COPY      D=Discussed      T=Telephone      E=E-mail      F=Fax

**ENCLOSURE**

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket: 50-397  
License: NPF-21  
Report: 05000397/2003006  
Licensee: Energy Northwest  
Facility: Columbia Generating Station  
Location: Richland, Washington  
Dates: July 6 through October 4, 2003  
Inspectors: G. D. Replogle, Senior Resident Inspector, Project Branch E, DRP  
Z. K. Dunham, Resident Inspector, Project Branch E, DRP  
S. C. Schwind, Senior Resident Inspector, Cooper Nuclear Station, DRP  
J. B. Nicholas, Senior Health Physicist, DRS  
Accompanying Inspector: M. P. Shannon, Team Leader, Plant Support Branch, DRS  
Approved By: W. B. Jones, Chief, Project Branch E, Division of Reactor Projects  
ATTACHMENT: Supplemental Information

Enclosure

## SUMMARY OF FINDINGS

IR05000397/2003006; July 6 through October 4, 2003; Columbia Generating Station.  
Inspection Report; ALARA Planning and Controls; Event Followup

The report covered a 13-week period of inspections by resident inspectors and announced inspections by a senior health physicist. One Green finding and two Green noncited violations were identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Manual Chapter 0609, "Significance Determination Process." 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 3, dated July 2000.

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

#### Cornerstone: Mitigating Systems

Green. A self-revealing noncited violation of Technical Specification 5.4.1.a was identified for the failure to properly follow a surveillance procedure, which rendered the reactor core isolation cooling system inoperable for approximately one hour. A technician pressurized an instrument out of procedural sequence, which caused the reactor core isolation cooling steam supply valve to auto-isolate.

The finding had more than minor significance because it affected the reactor safety mitigating systems objective to ensure the availability of systems that respond to initiating events. However, the finding was determined to be of very low risk significance because the issue: (1) was not a design or qualification deficiency; (2) did not result in the loss of a safety system; (3) did not represent an actual loss of a safety function of a single train for greater than its technical specification allowed outage time; (4) did not represent an actual loss of safety function of one or more non-technical specification trains of equipment designated as risk significant per 10 CFR 50.65 for greater than 24 hours; and (5) was not potentially risk significant due to a seismic, fire, flooding, or severe weather initiating event (Section 4OA3).

#### Cornerstone: Occupational Radiation Safety

- Green. The inspectors identified an as-low-as-reasonably-achievable finding because a performance deficiency resulted in the collective dose of a work activity that exceeded 5 person-rem and also exceeded the original dose estimation by more than 50 percent. Specifically, the licensee had to re-work the original repairs on reactor water cleanup (RWCU) Valve RWCU-MO-4. This resulted in Radiation Work Permit 30001080, "R16 RX 522' RWCU Pump Room and Mezzanine Work, High-High Rad," accruing 5.2 rem and exceeding the original dose estimate by 52 percent.

The failure to repair the reactor water cleanup Valve RWCU-MO-4 so it would pass testing requirements the first time is a performance deficiency. This finding was more than minor because it is associated with the Occupational Radiation Safety Cornerstone attribute (as-low-as-reasonably-achievable planning/projected dose) and affected the

Enclosure

associated cornerstone objective (to ensure adequate protection of worker health and safety from exposure to radiation). This finding involved performance deficiencies which caused the re-work of the original repair on Valve RWCU-MO-4 and resulted in unnecessary occupational collective dose for the work activity. When processed through the Occupational Radiation Safety Significance Determination Process, this finding was found to have no more than very low safety significance because the finding was an as-low-as-reasonably-achievable planning issue, but the licensee's three-year rolling average collective dose was less than 240 person-rem (Section 2OS2).

- Green. The inspectors identified additional issues associated with a licensee identified violation of Technical Specification 5.4.1.a for workers failing to read, understand, and follow special instructions on the appropriate radiation work permit when installing insulation on the reactor core isolation cooling system. The workers received additional dose as a result of temporary shielding being prematurely removed in the work area prior to performing the work activity. Problem Evaluation Request 203-2346 documented these issues and was closed prior to the inspection. Although the violation was identified by the licensee, the inspectors identified that the licensee had not developed a corrective action plan to address recurrence of two issues: (1) use of the wrong radiation work permit to perform work on the reactor core isolation cooling system and (2) performance of a work task in an area where radiological conditions resulted in additional dose due to removal of installed temporary shielding prior to work completion on the reactor core isolation cooling system.

Energy Northwest performed work without using the appropriate radiation work permit, which would have required shielding in the work area. The workers receipt of additional dose is a performance deficiency. This finding was greater than minor because it is associated with one of the Occupational Radiation Safety Cornerstone attributes (exposure control and monitoring) and affected the associated radiation safety cornerstone objective (to ensure the adequate protection of the worker health and safety from exposure to radiation from radioactive material). The finding involved workers failure to adhere to appropriate radiation work permit requirements resulting in additional dose that was contrary to Technical Specification 5.4.1.a. When processed through the Occupational Radiation Safety Significance Determination Process, this finding was found to have no more than very low safety significance because it was not an as-low-as-reasonably-achievable finding, there was no overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised (Section 2OS2).

B. Licensee Identified Violations

None.

## REPORT DETAILS

### Summary of Plant Status

The inspection period began with Columbia Generating Station at approximately 78 percent power, due to an out of service condensate booster pump. The licensee reinstalled the pump and raised power to 100 percent on July 15. Operators maintained the plant at essentially 100 percent power for the remainder of the inspection period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

##### 1R01 Adverse Weather Protection (71111.01)

###### a. Inspection Scope

The inspectors performed one inspection of the standby service water system (the ultimate heat sink) to determine the system's susceptibility to damage from high winds or a tornado strike. During the inspection period, the inspectors reviewed the Final Safety Analysis Report and other design information for the standby service water spray ponds and pump house buildings and walked down the spray ponds and pump houses to verify that the system would remain functional during a tornado strike on site. Additionally, the inspectors walked down the tower makeup pump house which was credited as the makeup source of water to the spray ponds in the event of pond level depletion during a tornado strike. The inspectors also reviewed and walked down Energy Northwest's procedure for high wind and tornados to ensure that the procedure could be performed during adverse wind conditions.

###### b. Findings

No findings of significance were identified.

##### 1R04 Equipment Alignments (71111.04)

###### a. Inspection Scope

The inspectors performed two partial system walkdowns. The inspectors reviewed system drawings, Final Safety Analysis Report, Technical Specifications (TS) and Operations' procedures to establish the proper equipment alignment to ensure system operability. The inspectors then walked down the system to verify that critical valve and electrical breaker positions were aligned correctly, and that support equipment such as cooling water, ventilation, and lube oil systems were in the proper configuration.

- Reactor Core Isolation Cooling (RCIC) and High Pressure Core Spray (HPCS): On July 16, 2003, the inspectors reviewed the alignment of critical system components of the RCIC and the HPCS systems while the low pressure core spray system was out of service for planned maintenance. The inspectors

Enclosure

selected both the RCIC and HPCS systems for review based on their importance in the site specific probabilistic risk assessment work sheets.

- Division I Emergency Diesel Generator: On August 27, 2003, the inspectors walked down the mechanical and electrical alignments of the Division I emergency diesel generator while the Division II unit was out of service for planned maintenance. The inspectors reviewed the alignment of critical system components using Procedure SOP-DG1-STBY, "Emergency Diesel Generator (Div I) Standby Lineup," Revision 2, as criteria for this inspection.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors performed walkdowns of nine fire protection areas to verify operational status and material condition of fire detection and mitigation systems, passive fire barriers and fire suppression equipment. The inspectors reviewed Energy Northwest's implementation of controls for combustible materials and ignition sources in selected fire protection zones. The inspectors compared observed plant conditions against descriptions and commitments described in the Final Safety Analysis Report, Section 9.5.1, "Fire Protection System," and "Fire Protection Evaluation," Appendix F. The fire areas inspected included:

- Residual heat Removal A pump room (Fire Area R-5); August 12, 2003
- Residual heat Removal B pump room (Fire Area R-4); August 12, 2003
- Residual heat Removal C pump room (Fire Area R-7); August 12, 2003
- Battery Room 1 (Fire Area RC-5); August 13, 2003
- Battery Room 2 (Fire Area RC-6); August 13, 2003
- A standby service water pump house (Fire Area SW-1); July 21, 2003
- B standby service water pump house (Fire Area SW-2); July 21, 2003
- Reactor building (Fire Area R1, 471' Elevation); September 12, 2003
- Reactor building (Fire Area R1, 522' Elevation); September 12, 2003

The following documents were reviewed in support of this inspection:

- Administrative Procedure 1.3.10A, "Control of Ignition Sources," Revision 9
- Fire Protection Procedure 15.1.11, "Fire Hose Station Inspection," Revision 9
- Fire Protection Procedure 15.3.2, "Three Year Hose Station Changeout," Revisions 4, 9, and 11

- Ignition Source Permits 03-0172 and 03-0173
- Fire Protection Engineering Evaluation 2.1, "Compliance with NFPA 72E-1974 Smoke Detector Placement," Revision 0
- Fire Protection Engineering Evaluation 2.15, "Reanalysis of Columbia Generating Station Fire System Surveillance," Revision 2

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

The inspectors selected one area, the emergency diesel generator building, for this inspection. The inspectors reviewed Final Safety Analysis Report Sections 2.4, 3.4 and 9.3; Drawing M852, "Embedded Piping, Floor, Equipment & Miscellaneous Drains Diesel Generator Building," Revision 12; and Drawing M512-2, "Flow Diagram - Diesel Oil & Miscellaneous Systems Diesel Generator Building," Revision 29 for this inspection. The inspectors' review included identification of the predicted water diversion pathways for locations containing safety-related and risk-significant equipment. The inspectors verified the adequacy of Energy Northwest's analysis and that the plant configuration was consistent with the licensing basis and Energy Northwest's assumptions. The inspectors conducted walkdowns of these areas on August 11, 2003.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

a. Inspection Scope

The inspectors observed two licensed operator requalification simulator training sessions on September 15 and 22, 2003. The inspectors evaluated crew communications, alarm response, and emergency procedure usage during the scenario. Additionally, the inspectors evaluated the shift manager's and control room supervisor's oversight and control of the emergency drill, as well as their ability to correctly implement TSs and the facility emergency plan. The inspectors also walked down the simulator control room boards to verify that simulator physical fidelity closely matched the actual control room. The inspector reviewed Scenario LR001559; "Loss of SM-7 and Offsite Power, Motor Generator Fail to Trip, Spray with Service Water B," Revision 0, for this inspection.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors performed an in-office review of two Maintenance Rule related issues and independently evaluated Energy Northwest's maintenance effectiveness by reviewing the availability and reliability of risk-significant structures, systems and components.

- On August 5, 2003, the inspectors selected the Division II standby gas treatment system for routine review of a safety-related system.
- On July 8, 2003, the RCIC system Valve RCIC-V-63 unexpectedly auto-isolated, rendering the system inoperable. Problem Evaluation Request 203-2645

The inspectors utilized the following documents for this inspection:

- Columbia Generating Station Maintenance Rule Program Status Report, January through June, 2003
- Procedure TI 4.22, "Maintenance Rule Program," Revision 5
- Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2
- NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2
- 10 CFR 50.65, "Maintenance Rule"

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

a. Inspection Scope

The inspectors selected six samples of planned and emergent maintenance tasks for evaluation. The evaluation consisted of reviewing Energy Northwest's assessment of plant risk for the activity, risk management and review of compensatory measures, where appropriate, and reviewing plant status to ensure that other equipment deficiencies did not adversely impact the planned risk assessment. The inspectors sample included:

- Scheduled maintenance activities for all work scheduled the week of July 21 through 25, 2003
- July 8, 2003, the RCIC system Valve RCIC-V-63 unexpectedly isolated, rendering the system inoperable - emergent work
- August 26, 2003, maintenance on two systems concurrently, the Division II emergency diesel generator and the Division II main steam leakage control system
- September 3, 2003, maintenance on three systems concurrently, the Division I standby gas treatment system, the Division I containment atmosphere control system and the Division II hydrogen/oxygen monitor
- September 5, 2003, safety-related breaker truck operated cell repairs on 16 safety related 4160 VAC breakers (performed sequentially)
- September 6, 2003, both hydrogen oxygen monitors out concurrently, emergent maintenance on one monitor

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed three operability evaluations to evaluate Energy Northwest's assessment of operability for degraded or non-conforming equipment performance. The inspectors reviewed the Final Safety Analysis Report, TS, plant drawings where applicable, and associated Problem Evaluation Requests to determine if Energy Northwest's evaluation justified operability.

- Problem Evaluation Request 203-2898; Unplanned TS Action Statement entry due to low room cooler service water flow, dated July 30, 2003
- Problem Evaluation Request 203-2983; During check of Division II standby service water flow, low flow readings found to three components, dated August 6, 2003
- Problem Evaluation Request 203-3104, Failure of one Division III emergency diesel generator room ventilation fan

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds (71111.16)

a. Inspection Scope

On September 23, 2003, the inspectors performed the semi-annual review of cumulative effects of operator workarounds. The inspectors reviewed the plant tracking list summary of operator workarounds. The inspectors evaluated the potential affects of the workarounds on the operator's ability to implement abnormal or emergency operating procedures and the cumulative effects of workarounds on the reliability and availability of plant systems.

b. Findings

No findings of significance were identified.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors witnessed or completed an in-office review of six postmaintenance tests. The inspectors considered whether Energy Northwest properly implemented procedural controls, as applicable, and that each test adequately demonstrated equipment operability. The inspectors also considered whether Energy Northwest met TS and licensing basis requirements. The inspection sample included:

- Work Order 01059915; Division II emergency diesel generator testing following maintenance, dated August 27, 2003, observation
- Work Order 1064587; SM-75 4160 breaker testing following truck operated cell modification, dated September 5, 2003, observation
- Division II standby gas treatment system maintenance outage, August 18, 2003, Procedure OSP-SGT/IST-Q702, "SGT Valve Operability (System B)," Revision 1; Procedure OSP-SGT-M702; "Standby Gas Treatment System B Operability," Revision 3, document review
- Work Order 01064001; E-B2-1 Battery Cell 166 Replacement, dated August 22, 2003, document review
- Work Order 01064035; Division III emergency diesel generator room ventilation fan repair work, August 21, 2003, document review

- Work Order 01065562; Truck operated cell adjustment on 4160 Breaker to residential heat removal Pump RHR-P-2A, September 22, 2003, document review

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors evaluated the six surveillance tests listed below. The inspectors reviewed TSs, Final Safety Analysis Report, and applicable Energy Northwest procedures to determine if the surveillance tests demonstrated that the tested components were capable of performing their intended design functions. Additionally, the inspectors also evaluated significant test attributes such as potential preconditioning, clear acceptance criteria, accuracy and range of test equipment, procedure adherence, and completion and acceptability of test data.

- Procedure OSP-ELEC-M701, "Diesel Generator 1 - Monthly Operability Test," Revision 17, July 14, 2003, observation
- Procedure OSP-ELEC-M701, "Diesel Generator 1 - Monthly Operability Test," Revision 17, September 10, 2003, observation
- Procedure OSP-FPC/IST-Q701, "Fuel Pool Cooling System Operability Surveillance," Revision 7; September 16, 2003, observation
- Procedure OSP-LPCS/IST-Q702, "Low Pressure Core Spray System Operability Test," Revision 10, September 12, 2003, document review
- Work Order 01059323, Residential Heat Removal Pump Breaker RHR-CB-P2C mechanism operated cell switch linkage measurements, August 14, 2003, document review
- Work Order 01058014, Fire hose hydrostatic tests, September 3-30, 2003, document review

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

On September 22 and 29, 2003, the inspectors observed two simulator evaluations in which the control room staff were required to make and report emergency classifications in response to a simulated accident. The inspectors reviewed the facility emergency plan implementing procedures and the Emergency Plan to establish the criteria for the simulated emergency classifications. Additionally, the inspectors reviewed the completed emergency action level declaration and notification forms to verify the accuracy of the forms. Lastly, the inspectors reviewed Energy Northwest's evaluation of the drill to ensure that any performance deficiencies associated with classification, notification, and protective action recommendation development were accurately characterized.

b. Findings

No findings of significance were identified.

2 **RADIATION SAFETY**

Cornerstone: Occupational Radiation Safety

2OS2 ALARA [As Low as Is Reasonably Achievable] Planning and Controls (7112102)

a. Inspection Scope

The inspectors interviewed radiation protection personnel and radiation workers throughout the radiologically controlled area and conducted independent radiation surveys of selected work areas to assess Energy Northwest's performance against regulatory requirements in implementing physical and administrative controls for airborne radioactivity areas, radiation areas, and high radiation areas; radiation worker practices; and work activity results; and to determine their knowledge of ALARA practices. The inspectors discussed changes and trends related to the ALARA program with the Radiation Services Manager and the Acting ALARA Planning Supervisor. No work was performed in high exposure or high radiation areas during the inspection. Therefore, this aspect of the above inspection procedure was not evaluated.

The inspectors interviewed radiation protection staff and other radiation workers to determine the level of planning, communication, integration, and supervision of ALARA practices into work activities and/or work packages. The inspectors reviewed initial and emergent work scopes and estimated man-hour information provided to the radiation protection group for accuracy.

The following radiation protection program controls, planning, and preparation items were reviewed and compared with regulatory requirements to assess whether Energy Northwest had an adequate program to maintain occupational exposure ALARA during the recently completed Refueling Outage R16:

- ALARA program procedures
- Processes, methodology, and bases used to estimate, justify, adjust, track, and evaluate personnel exposures
- Plant collective exposure history for the past 3 years, current exposure trends, source term measurements, and 3-year rolling average dose information
- Refueling Outage R16 Exposure Data
- ALARA and radiological work planning, in-progress reviews, and postjob reviews for eight radiation work permit (RWP) packages that resulted in some of the highest personnel collective exposures during Refueling Outage R16
- Hot spot tracking and reduction program including inspection and posting verification of selected hot spots throughout the radiological controlled area
- Use and results of administrative and engineering controls to achieve dose reductions, including four temporary shielding request (TSR) packages planned and installed during Refueling Outage R16
- Individual exposures of selected work groups (radiation protection, operations, and maintenance)
- Plant related source term evaluation and control/reduction strategy
- Declared pregnant worker and embryo/fetus dose evaluation, monitoring, and controls
- Senior Site ALARA Committee meeting minutes
- Two Integrated Performance Assessments performed during the time periods January through June 2002 and July through December 2002 which evaluated the radiation program and the implementation of the ALARA program
- Two radiation protection department self-assessments ("2001 Annual Radiation Protection Program," performed in October 2002 and "ALARA Planning and Controls," performed in January 2002)

b. Findings

- .1 Introduction. The inspectors identified a Green ALARA finding because worker performance deficiencies involving repairs on Valve RWCU-MO-4 resulted in the collective dose of that work activity to exceed 5 person-rem and also exceed the original dose estimation by more than 50 percent.

Description. Based on historical and pre-job information, Energy Northwest estimated that RWP 30001080, "R16 RX 522' RWCU [Reactor Water Cleanup] Pump Room and Mezzanine Approved Work, High-High Rad," would accrue 3.405 rem of collective dose. Instead, the actual dose for the work activity was 5.197 rem or 152 percent of the original dose estimate. The dose overage was the result of re-work of the original repair on Valve RWCU-MO-4 which involved adjusting the packing of the gland three times as a result of diagnostic testing failures.

Analysis. The finding was more than minor because it was associated with the Occupational Radiation Safety Cornerstone attribute (ALARA planning/projected dose) and affected the associated cornerstone objective (to ensure adequate protection of worker health and safety from exposure to radiation). The finding involved a failure to maintain or implement, to the extent practical, procedures or engineering controls needed to achieve occupational doses that were ALARA and that resulted in unplanned, unintended occupational collective dose for a work activity. When processed through the Occupational Radiation Safety Significance Determination Process, this ALARA finding was found to have no more than very low safety significance because Energy Northwest's 3-year rolling average collective dose was less than 240 person-rem. The finding was documented in Energy Northwest's corrective action program as Problem Evaluation Request 203-2913 (FIN 50-397/2003-06-01).

Enforcement. No violation of regulatory requirements occurred.

- .2 Introduction. The inspectors identified additional issues associated with an Energy Northwest identified violation of TS 5.4.1.a for workers failing to read, understand, and follow special RCIC instructions on the appropriate radiation work permit when installing insulation on the system. The workers received additional dose as a result of temporary shielding being prematurely removed in the work area prior to performing the work activity. Although the violation was identified by Energy Northwest, the inspectors identified that Energy Northwest had not developed a corrective action plan to prevent recurrence.

Description. Energy Northwest identified that on June 11, 2003, workers performed insulation work on the RCIC system using the wrong RWP 30000809 and ALARA Task WO 0104073. The RWP used was for installation of insulation on the main steam relief valves (MSRVs), and the RWP special instruction section did not require shielding for that work task. However, the appropriate RWP 30000791 and ALARA Task WO 01044921 for work on the RCIC system stated in the RWP special instruction section that drywell shielding will be installed and approved per the shielding

plan/shielding coordinator prior to work on the RWP and to avoid the N2 and N6 reactor pressure vessel (RPV) nozzles. The drywell coordinator, thinking that all work was completed on the 548 feet drywell elevation, had the temporary shielding on that elevation removed which included shielding of the N6B RPV nozzle. The nozzle had a contact dose rate of 1200 millirems per hour. This shielding removal occurred prior to the workers installing the RCIC system insulation located only a few feet away from the unshielded nozzle. The workers received up to 400 millirems additional dose performing the work in an area that required shielding in accordance with the appropriate RWP 30000791. The additional dose was the result of workers not reading, understanding, and following the special instructions involving shielding on the appropriate RWP. After reviewing Problem Evaluation Request 203-2346, which was closed prior to the inspection, the inspectors identified that Energy Northwest had not developed a corrective action plan to address corrective actions to prevent recurrence of the two issues: (1) use of the wrong RWP to perform work on the RCIC system and (2) performance of a work task in an area where radiological conditions resulted in additional dose due to removal of installed temporary shielding prior to work completion on the RCIC system. This problem identification concern is referenced in Section 4OA2.

Analysis. The workers failed to utilize the appropriate RWP, which would have required shielding in the work area, resulted in the workers receiving additional dose. This is a performance deficiency. This finding was greater than minor because the finding is associated with one of the cornerstone attributes (exposure control and monitoring) and affected the associated radiation safety cornerstone objective (to ensure the adequate protection of the worker health and safety from exposure to radiation from radioactive material). Because the finding involved the failure to adhere to the appropriate RWP requirements that resulted in workers receiving additional dose, the finding was processed through the Occupational Radiation Safety Significance Determination Process. The finding is of very low safety significance (Green) because it was not an ALARA finding, there was no overexposure or substantial potential for an overexposure, and the ability to assess dose was not compromised.

Enforcement.

TS 5.4.1.a requires written procedures be established, implemented, and maintained covering the activities referenced in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978. Appendix A, Section 7.e(1) references radiation protection procedures for access control to radiation areas including a Radiation Work Permit system. Procedure GEN-RPP-04, "Entry Into, Conduct In, and Exit From Radiologically Controlled Areas," Revision 8, Paragraph 4.4.1.b, stated, in part, that each individual will read applicable RWPs and review radiological conditions for the work area or job. In addition, all personnel entering the RCA are expected to be knowledgeable of the radiological conditions in their work location and the requirements of the RWP. Because the failure to read, understand, and follow special instructions on the appropriate RWP and be knowledgeable of the radiological conditions in the work area when installing insulation on the RCIC system was of very low safety significance and Energy Northwest entered the violation into the corrective action program as Problem

Enclosure

Evaluation Request 203-2917, this violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy (NCV 50-397/2003-06-02).

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors assessed the accuracy of four sets of Energy Northwest submitted performance indicator data for the past four calendar quarters. The inspectors compared the data with operator logs, maintenance records, and corrective action documents. The inspectors verified that Energy Northwest calculated performance indicators in accordance with NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 2. The inspectors' sample included the following performance indicators:

- Residual heat removal system availability (mitigating systems)
- Unplanned power changes (initiating events)
- High pressure core spray system availability (mitigating systems)
- Emergency power availability (mitigating systems)

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 IP 71121.02 ALARA Planning and Controls

a. Inspection Scope

The inspectors reviewed Energy Northwest's audit program's scope and frequency to determine if 10 CFR 20.1101(c) requirements were met. The inspectors interviewed staff members and reviewed a summary list of ALARA related problem evaluation requests written since the previous inspection of this area in February 2002. Selected problem evaluation requests involving exposure tracking, higher than planned exposure levels, and radiation worker performance and radiation protection practices were reviewed to determine if identified problems were properly characterized, prioritized, and timely and effectively resolved. The selected corrective action documents are listed in the attachment to this inspection report. In addition, the inspectors reviewed corrective action documentation for repetitive deficiencies and significant individual deficiencies for identification and resolution. The inspectors used regulatory and procedural requirements as criteria for determining the adequacy of Energy Northwest's problem identification and resolution results.

b. Findings

Section 2OS2.2 describes a finding (originally identified by Energy Northwest) for the failure to perform work on the RCIC system using the appropriate radiation work permit (RWP). This finding is indicative of a potential deficiency in Energy Northwest's corrective action program within the radiation protection program because Energy Northwest failed to develop a corrective action plan and take corrective actions to prevent recurrence prior to closing Problem Evaluation Request 203-2346.

4OA3 Event Followup (71153)

1. (Closed) Licensee Event Report 05000397/2003001-00, Residual heat removal Train B potentially inoperable during a design basis event due to apparent inability of system to adequately maintain pressure as assumed in Appendix R analysis. This NRC-identified issue was previously documented and dispositioned in NRC Inspection Report 50-397/03-02, Section 1R05.3.
2. (Closed) Licensee Event Report 05000397/2003003-00, Shutdown cooling isolation caused by de-energization of wrong relay. The inspectors addressed this issue in NRC Inspection Report 50-397/03-05, Section 1R20.
3. (Closed) Licensee Event Report 05000397/2003004-00, SCRAM discharge volume reactor trip instruments not operable in shutdown condition. The inspectors determined that the issue was minor. Considering plant conditions (shutdown and reactor mode switch in refueling), the problem did not affect any cornerstone or cornerstone objective. The licensee was limited to withdrawal of one control rod at a time and criticality was not possible. In addition, redundant scram discharge volume float switches were still operable and other reactor protection signals were still available.
4. (Closed) Licensee Event Report 05000397/2003005-00, Shutdown cooling isolation caused by procedure deficiency. The inspectors previously addressed and dispositioned this issue in NRC Inspection Report 50-397/03-05, Section 1R20.
5. (Closed) Licensee Event Report 05000397/2003006-00, Failure to restore emergency diesel generator within TS completion time and subsequent plant shutdown. The inspectors previously addressed this issue in NRC Inspection Report 50-397/03-04, Section 4OA2.
6. (Closed) Licensee Event Report 05000397/2003007-00, Automatic reactor SCRAM due to a main transformer differential current relay actuation. The inspectors previously addressed this issue in NRC Inspection Report 50-397/03-05, Section 4AO3.

7. (Closed) Licensee Event Report 05000397/2003008-00, Inadvertent loss of reactor core isolation cooling due to failure to follow procedure.

a. Inspection Scope

The inspectors reviewed the licensee event report to assess the significance of the event and to verify that corrective actions were reasonable.

b. Findings

Introduction. A Green self-disclosing noncited violation of TS 5.4.1.a was identified for the failure to perform a surveillance procedure in sequence, which rendered the RCIC system inoperable for approximately 1.0 hour.

Discussion. At the time of the event, the licensee was performing a channel functional test on RCIC system differential pressure indicator Switch RCIC-DPIS-13B. The switch's function is to trip on high steam flow, which is indicative of a steam supply line break. The switch feeds into the logic that causes auto-isolation of Valve RCIC-V-63 (steam supply isolation valve).

In order to avoid the auto-closure of Valve RCIC-V-63 during the test, Procedure ISP-RCIC-Q903, "RCIC Isolation on Reactor Core Isolation Cooling Steam Supply Flow High Div 2 - CFT/CC," Revision 9, required that the breaker for Valve RCIC-V-63 be opened prior to providing pressure inputs to RCIC-DPIS-13B. While waiting for the operator to open the valve's breaker, the maintenance technician failed to follow the procedure's specified sequence and pressurized RCIC-DPIS-13B before the breaker was opened. Subsequently, the valve auto-closed on the simulated high steam flow signal. This rendered the system inoperable for approximately one hour, until operators restored the system. Additional corrective actions included a management timeout on human performance errors with maintenance teams and coaching of the involved technicians on self-checking and peer-checking techniques. The licensee documented the event in Problem Evaluation Request 203-2645.

Analysis. The issue was greater than minor significance because it affected the reactor safety mitigating systems objective to ensure the availability of systems that respond to an initiating event. However, the finding was determined to be of very low safety significance (Green) using the Significance Determination Process Phase 1 Worksheet because: (1) it was not a design or qualification deficiency; (2) it did not result in the loss of a safety system (two-train system); (3) it did not represent an actual loss of a safety function of a single train for greater than its TS allowed outage time; (4) it did not represent an actual loss of safety function of one or more non-TS trains of equipment designated as risk significant per 10 CFR 50.65 for greater than 24 hours; and (5) it was not potentially risk significant due to a seismic, fire, flooding, or severe weather initiating event.

Enforcement. TS 5.4.1.a requires, in part, that the applicable procedures in Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2, Appendix A, be established and implemented. Regulatory Guide 1.33, Appendix A, Section 8, specifies, in part, that specific procedures for surveillance tests include RCIC system tests. Contrary to this requirement, on July 8, 2003, the RCIC system was rendered inoperable when a technician failed to properly implement Procedure ISP-RCIC-Q903. Because the finding was of very low safety significance, and was entered into Energy Northwest's corrective action program, this issue is being treated as a noncited violation, consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 50-397/03-06-03).

#### 4OA4 Crosscutting Aspects of Findings

Section 20S2.1 and .2 of this report describes human performance crosscutting aspects that resulted in workers receiving additional dose.

In the first instance rework of a valve caused dose to exceed 152 percent of the original dose estimate. In the second case workers failed to read and understand an RWP which resulted in additional dose being received when temporary shielding was prematurely removed.

Section 4OA3 of the report describes a human performance crosscutting issue where a technician failed to properly implement a surveillance procedure, which involved the cross cutting area of human performance. This resulted in rendering the RCIC system inoperable for about 1 hour.

#### 4OA5 Other

##### 1. Institute of Nuclear Power Operations (INPO) Audit and Evaluation Review.

The inspectors completed a review of the INPO audit and evaluation for Columbia Generating Station, dated July 28, 2003. The INPO team was on site during October, 2002.

##### 2. United Services Alliance Audit of Davis-Besse Corrective Actions

The inspectors interviewed Energy Northwest and audit personnel regarding the United Services Alliance audit of the Columbia Generating Station's actions in response to the Davis Besse reactor head degradation event. All plants in the industry were requested to review their safety oversight programs in response to this event. The audit was conducted during the spring of 2003.

4OA6 Management Meetings

Exit Meetings

Regional and resident inspectors conducted two exit meetings with members of Energy Northwest's management during the inspection period. The exit meetings included:

- On July 31, 2003, the inspector presented the inspection results for the review of the ALARA planning and controls area to Mr. R. Webring and other members of his staff.
- On October 6, 2003, the Senior Resident Inspector provided the remaining inspection results to Mr. D. Atkinson, Vice President, Technical Service and other members of Energy Northwest's staff.

Energy Northwest acknowledged the inspection results during each meeting. Following the meetings, the inspectors asked Energy Northwest whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee Personnel

J. Parrish, Chief Executive Officer  
D. Atkinson, Vice President, Technical Services  
I. Boreland, Manager, Radiation Services  
D. Coleman, Manager, Performance Assessment and Regulatory Programs  
D. Feldman, Acting Plant General Manager  
S. Jerrow, Acting Manager, Operations  
W. Oxenford, Plant General Manager  
C. Perino, Manager, Licensing  
R. Webring, Vice President, Nuclear Generation  
S. Wood, Manager, Chemistry

### ITEMS OPENED, CLOSED, AND DISCUSSED

#### Opened

None

#### Opened and Closed

05000397/200306-01	FIN	Failure to maintain collective doses associated with RWP 30001080 ALARA (Section 2OS2.1)
05000397/200306-02	NCV	Failure to use the proper Radiation Work Permit (Section 2OS2.2)
05000397/200306-03	NCV	Human performance error results in loss of reactor core isolation cooling system (Section 4OA3.7)

#### Closed

05000397/2003001-00	LER	Residual heat removal train B potentially inoperable during a design basis event due to apparent inability of system to adequately maintain pressure as assumed in Appendix R analysis (Section 4OA3.1)
05000397/2003003-00	LER	Shutdown cooling isolation caused by de-energization of wrong relay (Section 4OA3.2)

05000397/2003004-00	LER	SCRAM discharge volume reactor trip instruments not operable in shutdown condition (Section 4OA3.3)
05000397/2003005-00	LER	Shutdown cooling isolation caused by procedure deficiency (Section 4OA3.4)
05000397/2003-006-00	LER	Failure to restore emergency diesel generator within Technical Specification completion time and subsequent plant shutdown (Section 4OA3.5)
05000397/2003007-00	LER	Automatic reactor scram due to a main transformer differential current relay actuation (Section 4OA3.6)
05000397/2003008-00	LER	Human performance error results in loss of reactor core isolation cooling system (Section 4OA3.7)

Discussed

None

LIST OF DOCUMENTS REVIEWED

Procedure

ABN-Wind; Tornado / High Winds; Revision 5  
 SOP-HPCS [High Pressure Core Spray]-STBY; Placing HPCS in Standby Status; Revision 0  
 SOP-RCIC-STBY; Placing RCIC in Standby Status; Revision 0  
 OSP-HPCS-M102; HPCS Valve Lineup; Revision 0  
 OSP-RCIC-M101; RCIC Fill, Flow Controllers, and Valve Lineup Verification; Revision 5  
 ISP-RCIC-Q903; RCIC Isolation on RCIC Steam Supply Flow High Div 2 - CFT/CC; Revision 9  
 ESP-B21-A101; 12 Month Battery Inspection of 250 VDC E-B2-1; Revision 4  
 ESP-B21-Q101; Quarterly Battery Testing 250 VDC E-B2-1  
 OSP-ELEC-M701; Diesel Generator 1 - Monthly Operability Test; Revision 17  
 OSP-FPC/IST-Q701; Fuel Pool Cooling System Operability Surveillance; Revision 7  
 Administrative Procedure 1.3.1; Operating Policies, Programs and Practices; Revision 61  
 SWP-OPS-06; Verbal Communication Policy; Revision 1

**Section 2OS2: ALARA Planning and Controls (71121.02)**

Procedures:

GEN-RPP-02 "ALARA Planning and Radiation Work Permits," Revision 7  
 GEN-RPP-14 "Control of Temporary Shielding," Revision 3

Temporary Shielding Request (TSR) packages:

TSR 03-05 Drywell ERD Heat Exchanger  
TSR 03-10 501' Drywell Inner Annulus  
TSR 03-15 Drywell 540' RWCU-V-1  
TSR 03-18 RWCU-V-5A

Radiation Work Permit (RWP) packages:

RWP 30000735 "R16 RF Reactor Disassembly - Cavity Work"  
RWP 30000739 "R16 RF Invesel Maintenance"  
RWP 30000755 "R16 DW Health Physics Support"  
RWP 30000810 "R16 DW/UV Undervessel Tip Removal/Installation"  
RWP 30000816 "R16 DW ISI/NDE/EC and Support"  
RWP 30001058 "R16 DW/UV EDR/FDR Sump Cleanout"  
RWP 30001066 "R16 DW/RR Retrieve LPRM Diverter, Shutter, LPRM's Transfer to SFP"

Senior Site ALARA Committee (SSAC) meeting minutes:

SSAC Meeting 02-02A, February 26, 2002  
SSAC Meeting 02-03, March 20, 2002  
SSAC Meeting 02-04, April 23, 2002  
SSAC Meeting 02-05, May 29, 2002  
SSAC Meeting 02-09, September 24, 2002  
SSAC Meeting 02-10, October 22, 2002  
SSAC Meeting 02-12, December 10, 2002  
SSAC Meeting 03-01, January 7, 2003  
SSAC Meeting 03-04, April 1, 2003  
SSAC Meeting 03-06, June 24, 2003

ALARA Problem Evaluation Requests:

202-1183, 202-2287, 202-3181, 203-0041, 203-0057, 203-0060, 203-0242, 203-0370,  
203-0651, 203-1554, 203-1811, 203-1963, 203-1965, 203-2090, 203-2306, 203-2346,  
203-2349, and 203-2421

Calculations

Calculation E/I-02-92-1168; Calculation for Instrument Indication Recording Uncertainties  
Determination for Instrument Loops SGT Flow Recorder 2A1, 2A2, 2B1, and 2B2

Calculation E/I-02-91-1055; Calculation for Setting Range Determination for Instrument Loops  
SGT Flow Transmitter 1A1, 1A2, 1B1, and 1B2

Calculation NE-02-92-06; Calculation for SGT Annubar Flow Meter Correction Factors

Calculation ME-02-03-02; Diesel Generator Building Flooding Analysis; February 10, 2003

### Drawings

Drawing M741; Composite Piping Plan and Details Yard; Revision 29  
Flow Diagram M544; HVAC - Standby Gas Treatment Reactor Building; Revision 67  
M526-1; Flow Diagram Fuel Pool Cooling and Clean-up System; Revision 93  
M526-2; Flow Diagram Fuel Pool Cooling and Clean-up System; Revision 0

### Other

WOT 01058193 01; ISP-RCIC [Reactor Core Isolation Cooling]-Q903 ISO>HI Steam Flow;  
July 8, 2003

Final Safety Analysis Report 2.3; Meteorology; Amendment 53

Final Safety Analysis Report Section 6.5; Fission Product Removal and Control Systems;  
Amendment 53

Final Safety Analysis Report 3.3; Wind and Tornado Loadings; Amendment 53

Final Safety Analysis Report, F.4; Fire Hazards Analysis; Amendment 54

Technical Specification 3.6.4.3; Standby Gas Treatment System; Amendment 169

FM892-1; Sprinkler & Hose Plans Miscellaneous floor and Buildings; Revision 3

IEEE Std 450-1975; IEEE Recommended Practice for Maintenance, Testing, and Replacement  
of Large Lead Storage Batteries for Generating Stations and Substations; September 16, 1975

Final Safety Analysis Report Table 9.2-4; Flow Rates and Associated Heat Loads Used in the  
Ultimate Heat Sink Analysis; Amendment 56

Final Safety Analysis Report Chapter 8; Electrical Power; Amendment 54

WNP-2 Inservice Testing Program Plan (Pumps & Valves); 2<sup>nd</sup> Interval (13 Dec 1994 -  
12 Dec 2004); Revision 2

NUREG-1482; Guidelines for Inservice Testing at Nuclear Power Plants; April 1995

### Resident Inspector Reviewed Problem Evaluation Requests

PER 203-3125; ESP-B21-Q101 was Inaccurate with Respect to TSs 3.8.6 Table 3.8.6-1;  
August 22, 2003

PER 203-2898; Unplanned TS Action Statement Entry Due to Low Room Cooler Service Water Flow

PER 203-2903; Unplanned TS Action Statement Entry Due to Low Room Cooler Service Water Flow

PER 203-2921; Inconsistencies Between Design Values, Operability Limits, and Alarm Setpoints for Service Water Cooling Flow to Individual Loads

PER 203-2989; Current Practice of Aligning SW to CCH-CR-1B After Performing OSP-SW-M-102 Seems to Affect SW B System Flow Balance More Than Previously Thought

PER 203-2989; During Check of SW-SYS-B Flow Readings Low Flow was Found to Three Components