



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
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August 2, 2000

Mr. J. V. Parrish (Mail Drop 1023)  
Chief Executive Officer  
Energy Northwest  
P.O. Box 968  
Richland, Washington 99352-0968

SUBJECT: WNP-2 INSPECTION REPORT NO. 50-397/00-11

Dear Mr. Parrish:

From May 21 through July 8, 2000, the NRC completed a safety inspection at the WNP-2 facility. The enclosed report presents the results of this inspection. The radiological monitoring instrumentation inspection results were discussed on June 8, 2000 with Mr. R. Webring and other managers. On July 11, 2000, the remainder of the inspection results were discussed with you and other members of your staff.

The inspectors examined activities conducted under your license as they relate to safety and to compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspectors examined a selection of procedures and representative records, observed activities, and conducted interviews with personnel.

Based on the results of this inspection, the NRC documented two issues in this report. The inspectors evaluated both issues under the significance determination process and determined the issues had very low safety significance (Green). Your staff entered these issues into your corrective action program. These issues are discussed in the summary of findings and in the body of the attached inspection report. Of the two issues, one involved a violation of NRC requirements but, because of the very low safety significance, the violation is not cited.

If you contest 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, DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Cooper facility.

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.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room). Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

*/RA/*

Linda Joy Smith, Chief  
Project Branch E  
Division of Reactor Projects

Docket No.: 50-397  
License No.: NPF-21

Enclosure:  
NRC Inspection Report No.  
50-397/00-11

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**ENCLOSURE**

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 50-397  
License No.: NPF-21  
Report No.: 50-397/00-11  
Licensee: Energy Northwest  
Facility: WNP-2  
Location: Richland, Washington  
Dates: May 21 through July 8, 2000  
Inspectors: G. D. Replogle, Senior Resident Inspector, Project Branch E, DRP  
J. P. Rodriguez, Resident Inspector, Project Branch E, DRP  
J. F. Melfi, Project Engineer, Project Branch E, DRP  
M. P. Shannon, Senior Health Physicist, DRS  
  
Accompanying Personnel: R. W. Deese, Reactor Inspector, DRS  
  
Approved By: Linda Joy Smith, Chief, Project Branch E, Division of Reactor Projects

ATTACHMENTS:

Attachment 1: Supplemental Information  
Attachment 2: NRC's Revised Reactor Oversight Program

SUMMARY OF FINDINGS  
WNP-2  
NRC Inspection Report 50-397/00-11

The report covers a 7-week period of resident inspection from May 21 to July 8, 2000, and an announced inspection by health physics inspectors. The significance of issues is indicated by their color (green, white, yellow, red) and was determined by the significance determination process in Inspection Manual Chapter 0609.

Cornerstone: Mitigating Systems

- Green. The NRC inspectors had identified that, during a station blackout, the reactor core isolation cooling system was vulnerable to water hammer. Station blackout is the most risk significant event at WNP-2. The licensee planned to implement system modifications by Refueling Outage 15 to correct the problem. This issue did not constitute a violation because the licensee had only partially credited the reactor core isolation cooling system for station blackout mitigation in the licensing basis. Specifically, the NRC safety evaluation report indicated that the system could fail because of a lack of room cooling.

The inspectors found that this issue had very low safety significance because of the low probability (10 percent) of reactor core isolation cooling system failure from water hammer. Further, the system could still supply water for approximately 1.5 hours before a water hammer would occur (Section 4OA5).

- Green. Two emergency safety features actuations occurred following two instances where the same operations crew failed to follow procedures. In the first case, when swapping reactor protection system power sources, the operators did not reset the 1/2 main steam isolation valve close signal. Upon securing the second power source (completing the logic), the valves automatically closed. In the second instance, operators failed to bypass all four instrument channels associated with main steam isolation valve closure in response to a loss of condenser vacuum (only two channels were bypassed). When condenser vacuum was broken as part of the shutdown, the valves unexpectedly closed. The failure to follow procedures was a violation of Technical Specification 5.4.1.a. This violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy. The problems are in the corrective action program as Problem Evaluation Requests 200-1051 and 200-1078.

The inspectors determined that these issues had very low safety significance because the plant was shut down at the time and the events had little impact on the plant (Section 1R14).

## Report Details

### Summary of Plant Status:

At the start of the period, the plant was at 70 percent power because of economic dispatch (load following). Operators increased power to 80 percent on May 22, but could not attain 100 percent power because of ongoing repairs to a condensate booster pump. After completing repairs, the plant achieved 100 percent power on June 1. On June 16, operators reduced power to 75 percent to support repairs to Governor Valve 1 and restored power to 100 percent on June 18. On June 26, the turbine tripped and the plant scrambled (shutdown) because of an instrumentation short in the overall differential current trip circuit. After completing repairs, operators transitioned the plant to Operational Mode 2 on July 2, synchronized to the grid on July 4, and achieved 100 percent power on July 6. The plant remained at essentially 100 percent power for the remainder of the period.

### **1 REACTOR SAFETY**

Cornerstones: [Initiating Events](#), [Mitigating Systems](#), [Barrier Integrity](#)

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

##### a. Inspection Scope

The inspectors performed a partial equipment alignment verification for the Division II standby gas treatment system while the Division I unit was out of service. The inspectors verified that the alignment was correct for the plant conditions.

##### b. Issues and Findings

There were no findings identified during this inspection.

#### 1R12 Maintenance Rule Implementation (71111.12)

##### a. Inspection Scope

The inspectors reviewed equipment failures associated with the: (1) low pressure core spray system; (2) main steam leakage control system, Train A; and (3) Division I, emergency diesel generator circuit breaker to evaluate proper implementation of the Maintenance Rule program. The inspectors reviewed the following documents during this inspection:

- Maintenance Rule Status Report for the Fourth Quarter, 1999
- Maintenance Rule Status Report for the First Quarter, 2000
- Problem Evaluation Requests 299-1903, low pressure core spray system failure; 299-1832, main steam leakage control system failure; and 299-1339, emergency diesel generator breaker failure
- Maintenance Rule Program, Revision 3

b. Issues and Findings

There were no findings identified during this inspection.

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

a. Inspection Scope

The inspectors reviewed the following work prioritization, risk evaluation, and control activities to evaluate the effectiveness of licensee risk management efforts:

- Emergent reactor core isolation cooling system maintenance
- Emergent Division I standby service water system work

b. Issues and Findings

There were no findings identified during this inspection.

1R14 Personnel Performance During Nonroutine Plant Evolutions (71111.14)

.1 Turbine Trip and Reactor Scram

a. Inspection Scope

The inspectors evaluated operator performance following a turbine trip and reactor scram on June 26. Additionally, the inspectors interviewed operators and other plant personnel regarding the event. The following documents were reviewed as part of this inspection:

- Operator logs
- Reactor trip and root cause reports
- Problem Evaluation Request 200-1043, reactor scram because of turbine trip + number one bypass valve failed full open after scram
- Problem Evaluation Request 200-1092, reactor vessel Level 8 (high water level) received following scram

b. Issues and Findings

There were no findings during this inspection.



.2 Main Steam Isolation Valve Closure Events

a. Inspection Scope

The inspectors reviewed the circumstances surrounding two automatic main steam isolation closure events that occurred on June 27. The inspectors reviewed the following documents as part of this inspection:

- Operator logs
- Problem Evaluation Request 200-1051, unplanned main steam isolation valve closure while swapping reactor protection system power sources
- Problem Evaluation Request 200-1078, unplanned main steam isolation valve closure while breaking condenser vacuum
- Procedure 2.7.6, "Reactor Protection System," Revision 14
- Procedure 3.2.1, "Plant Shutdown," Revision 42.

b. Issues and Findings

With the plant shut down, the same operations crew failed to follow procedures in two instances that resulted in closure of main steam isolation valves. In the first instance, operators failed to follow Procedure 2.7.6 when swapping reactor protection system power sources. Specifically, operators skipped a procedure step and did not reset the 1/2 main steam isolation valve close signal. Upon securing the second reactor protection system power supply (completing the logic), the valves closed. Shutdown cooling was out of service during the evolution and the event delayed establishing shutdown cooling for a few minutes. Reactor coolant temperature rose from 160 to 180°F during the entire evolution.

In the second instance, operators failed to follow Procedure 3.2.1. The crew failed to bypass all four instrument channels associated with the auto closure of main steam isolation valves in response to loss of condenser vacuum (operators bypassed only two channels). When condenser vacuum was broken, the valves closed.

These two failures are examples of a Technical Specification 5.4.1.a violation. Technical Specification 5.4.1.a requires that procedures recommended by Regulatory Guide 1.33, Appendix A, be properly implemented. The regulatory guide recommends procedures for: (1) operations from hot standby to cold shutdown, and (2) startup, operation, and shutdown of safety-related systems.

This violation is being treated as a noncited violation, consistent with Section VI.A of the NRC Enforcement Policy. The problems are in the corrective action program as Problem Evaluation Requests 200-1051 and 200-1078 (397/00011-01).

This same crew had failed to notice that a main steam isolation valve had closed with the plant at 60 percent power, as documented in NRC Inspection Report 50-397/00-10, Section 1R14.

Considering this recent trend of poor performance involving this one operations crew, the licensee planned to subject certain crew members to remediation prior to standing watch. In addition, on a temporary basis, the licensee planned to replace the control room supervisor with one that is known to have strong command and control capabilities. The inspectors agreed that these planned corrective measures should address the identified deficiencies.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the following operability evaluations affecting mitigating systems and barrier integrity. These reviews ensured that operability was properly justified and the components/systems remains available, such that no unrecognized increase in risk had occurred:

- Consideration of the generic aspects of main steam isolation Valve MS-V-28A failure. Documented in Problem Evaluation Request 200-0803.
- Temperature indication reliability for 10 control rod drives. Documented in Problem Evaluation Request 200-0920.
- Out of tolerance problems with Level Switch MS-LIS-100A, which controls high pressure core spray injection valve closure at Level 8. Documented in Problem Evaluation Requests 200-0957 and 200-0789.

In addition to the problem evaluation requests, the inspectors reviewed the following documents as part of this inspection:

- Procedure ISP-MS-Q913, "HPCS [High Pressure Core Spray] Injection Valve Closure on Reactor Water level 8 - CFT [Channel Functional Test]/CC [Channel Check]," Revision 0
- WNP-2 Final Safety Analysis Report

b. Issues and Findings

There were no findings identified during this inspection.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors evaluated the following postmaintenance testing activities to determine whether the tests confirmed equipment operability:

- Work Order 01015288, reactor core isolation cooling system keepfill pump postmaintenance testing (risk significant component)
- Troubleshooting and postmaintenance testing of the overall differential overcurrent relay circuit (related to post scram corrective actions)
- Postmaintenance testing associated with a nonsafety digital electrohydraulic controls system leak on Governor Valve 1 (potential scram initiator).

b. Issues and Findings

There were no findings identified during this inspection.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed the following surveillance testing to verify that the testing adequately demonstrated system/component capability:

- OSP-ELEC-M702, "Diesel Generator 2 - Monthly Operability Test," Revision 9
- OSP-ELEC-M703, "High Pressure Core Spray Diesel Generator Monthly Operability Test," Revision 10

b. Issues and Findings

There were no findings identified during this inspection.

EP6 Drill Evaluation (71114.06)

a. Inspection Scope

The inspectors observed an emergency preparedness drill on June 15 to evaluate the critique process, drill conduct, and drill performance. The following documents were reviewed as part of this inspection:

- The WNP-2 Emergency Plan, Revision 25
- Drill Scenario

b. Issues and Findings

There were no findings identified during this inspection.

10A1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors utilized guidance contained in NEI-99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 0. The inspectors verified the completeness and accuracy of information associated with the following performance indicators, for the 1st quarter of 2000:

- Reactor Coolant System Specific Activity
- Reactor Coolant System Leak Rate
- Residual Heat Removal System availability

b. Issues and Findings

There were no findings identified during this inspection.

**2 RADIATION SAFETY**

Cornerstones: Occupational Radiation Safety, Public Radiation Safety

2OS3 Radiological Monitoring Instrumentation

a. Inspection Scope

The inspector interviewed licensee personnel and reviewed the following items:

- Calibration, operability, and alarm setpoints, when applicable, of portable radiation detection instrumentation, temporary area radiation monitors, continuous air monitors, whole-body counting instrumentation, and personnel contamination monitors
- Calibration, operability, and alarm setpoints, when applicable, of area radiation monitors not covered by the maintenance rule
- Source response check documentation for radiation detection instruments staged for use, whole-body counting instrumentation, and personnel contamination monitors
- Radiation protection technician instrument selection and self-verification of instrument operability prior to use

- The status and surveillance records of self-contained breathing apparatuses staged and ready for use in the plant
- 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
- Control room operator and emergency response personnel training and qualifications for use of self-contained breathing apparatus
- Licensee self-assessments and audits focusing on radiological incidents that involved personnel internal exposures
- Selected exposure significant radiological incidents that involved radiation monitoring instrument deficiencies since the last inspection in this area

b. Issues and Findings

There were no findings identified during this inspection.

**4. OTHER ACTIVITIES**

4OA5 Other

- .1 (Closed) URI 50-397/00004-01: reactor core isolation cooling system vulnerability during station blackout.

The NRC inspectors had identified that, during a station blackout, the reactor core isolation cooling system keepfill pump would fail and the system would be vulnerable to water hammer. Specifically, if the reactor core isolation cooling system tripped on Level 8, the system would lose fill since the water would drain through the open lube oil cooling water line. Subsequently, when operators restarted the system, a water hammer would occur. Historically, operators have had trouble maintaining reactor vessel water level below Level 8 while controlling inventory with the reactor core isolation cooling system. For station blackout, the licensing basis described that the reactor core isolation cooling system operated until the room overheated. In addition, the licensee relied on the system to mitigate station blackout (the most risk significant event at WNP-2) in the probabilistic safety analysis. The licensee had also determined that the potential for water hammer, from a keepfill pump failure, exceeded the system design and reported the condition to the NRC via Licensee Event Report 397/2000-002.

Since initially identifying this issue, the licensee completed additional modeling that determined the reactor core isolation cooling system piping supports would not likely survive a water hammer. However, the detailed analysis did not determine whether the piping would fail.

The inspector worked with the NRC senior risk analyst and the licensee risk experts to evaluate the risk of the design issue. The risk assessment included the following assumptions:

- Maximum decay heat level
- Operators maintain reactor vessel level below Level 8 with the reactor core isolation cooling system operating for at least 1.5 hours before a system trip (based on historical data), therefore core damage does not occur for at least 2.5 hours
- One water hammer occurs and the reactor core isolation cooling system is rendered inoperable in 10 percent of the cases (based on generic industry data).

The licensee's assessment of the change to the core damage frequency determined that risk increased by  $7E-7$ /year (Green). The senior reactor analyst reviewed the modeling assumptions and agreed with the overall risk assessment.

In response to the issue, the licensee planned, by Refueling Outage R15, to change Valve RCIC-V-46 (lube oil cooler valve) positioning logic to close in response to a system trip and install an additional check valve downstream of the piping tap for Valve RCIC-V-46. These planned corrective measures should prevent system draindown following a system trip, thus preventing water hammer upon a subsequent restart. The inspectors found these planned corrective measures acceptable provided the licensee performs periodic testing to ensure that the installed check valve remains relatively leaktight.

## .2 TI 2515/144, Performance Indicator Data Collecting and Reporting Process Review

### a. Inspection Scope

The inspectors reviewed the licensee's performance indicator data collecting and reporting process to determine whether the licensee appropriately implemented the NRC/industry guidance. The inspectors assessed whether the licensee clearly understood the indicator definitions, data reporting elements, calculation methods, and clarifying notes and verified that the process will produce accurate performance indicators in accordance with the guidance in NEI-99-02. The inspectors reviewed the following specific performance indicators:

- Initiating Events - Unplanned Power Changes per 7000 Critical Hours
- Mitigating Systems - Residual Heat Removal System Unavailability Performance Indicators
- Emergency Preparedness - Emergency Response Organization Drill Participation
- Occupational Radiation Safety - Occupational Exposure Control Effectiveness

- Physical Protection - Protected Area Security Equipment Performance Index

b. Issues and Findings

There were no findings identified during this inspection.

4OA6 Meetings

Exit Meeting Summary

The NRC senior health physicist presented the radiological monitoring instrumentation inspection results to Mr. R. Webring and other members of licensee management on June 8. Following the meeting, the inspectors asked the licensee whether or not any materials examined during the inspection should be considered proprietary. No proprietary information was identified. The licensee acknowledged the findings presented during the meeting.

The senior resident inspector presented the remainder of the inspection results to Mr. J. Parish and other members of licensee management at an exit meeting on July 11. Some proprietary information was reviewed during this inspection but was not discussed in this report. The licensee acknowledged the findings presented during the meeting.

## Attachment 1

### Supplemental Information

#### PARTIAL LIST OF PERSONS CONTACTED

##### Licensee

J. Parrish, Chief Executive Officer  
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A. Barber, Supervisor, Quality Services  
I. Borland, Radiation Protection Manager  
S. Boynton, Quality Assurance Manager  
R. Brownlee, Engineer, Licensing  
P. Inserra, Manager, Licensing  
R. James, Operations Supervisor, Radiation Protection  
M. Laudisio, Supervisor, Radiation Protection  
D. Martin, Security Manager  
C. McDonald, Supervisor, Health Physics/Chemistry/General Employee Training  
S. Oxenford, Operations Manager  
J. Peters, Manager, Radiological Services  
J. Pierce, Support Supervisor, Radiation Protection  
D. Poirier, Maintenance Manager  
T. Powell, Engineer, Licensing  
G. Smith, Vice President - Generation/Nuclear Plant General Manager  
R. Webring, Vice President - Operation Support  
S. Wood, Manager, Chemistry

#### ITEMS OPENED AND CLOSED

##### Opened and Closed During this Inspection

50-397/00011-01	NCV	Two emergency safety features actuations caused by failure to follow procedures
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##### Previous Items Closed

50-397/00004-01	URI	Reactor core isolation cooling system water hammer vulnerability during station blackout
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## LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
NCV	noncited violation
NRC	Nuclear Regulatory Commission
URI	unresolved item

## PARTIAL LIST OF DOCUMENTS REVIEWED

### Procedures

- Quality Department Surveillance Report SR298-075
- Radiation Protection Program Annual Review SA-99-016
- Health Physics Instruction 5.6, "Calibration of the Fastscan WBC System," Revision 0
- Health Physics Instruction 12.72, "Calibration of the IPM-8 Contamination Monitor, Revision 3
- IPM-8 Contamination Monitor Calibration records for 1999 and 2000
- Portal Monitor Calibration records for 1999 and 2000
- Whole-Body Counter Calibration Records for 1999
- 1998 and 1999 Calibration Records for Area Radiation Monitors RRA-RIS-3, TRA-RIS-1, WRA-RIS-1, and WRA-RIS-2
- Self-Contained Breathing Apparatus Personnel Qualifications Records for 2000
- Problem Evaluation Requests 200-0935, 200-0938, 200-0940, 200-0941, 200-0948, 200-0949, 200-0953, 200-0955, 200-0958, and 200-0971

## **ATTACHMENT 2**

### **NRC's REVISED REACTOR OVERSIGHT PROCESS**

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

<b>Reactor Safety</b>	<b>Radiation Safety</b>	<b>Safeguards</b>
<ul style="list-style-type: none"><li>● Initiating Events</li><li>● Mitigating Systems</li><li>● Barrier Integrity</li><li>● Emergency Preparedness</li></ul>	<ul style="list-style-type: none"><li>● Occupational</li><li>● Public</li></ul>	<ul style="list-style-type: none"><li>● Physical Protection</li></ul>

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.