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

April 21, 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 50-397/03-04; 72-35/03-01

Dear Mr. Parrish:

On March 22, 2003, the NRC completed an inspection at your Columbia Generating Station. The enclosed integrated inspection report documents the inspection findings, which were discussed on February 5 and 7, March 7, 19, and 27, and April 2, 2003 with you and/or 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, one Green finding was identified which was determined to be a violation of NRC requirements. However, because of its very low safety significance and because it has been entered into your corrective action program, the NRC is treating this finding as a noncited violation, in accordance with Section V1.A.1 of the NRC's Enforcement Policy. If you contest this noncited violation, 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, Region IV; 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; 72-35
License: NPF-21

Enclosure:
NRC Inspection Report
50-397/03-04

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

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

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

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

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

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

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

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

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

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

Technical Services Branch Chief
FEMA Region X
Federal Regional Center
130 228th Street, SW
Bothell, Washington 98201-9796

Electronic distribution by RIV:
Regional Administrator **(EWM)**
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)**
B. McDermott **(BJM)**
Columbia Site Secretary **(LEF1)**
Dale Thatcher **(DFT)**
W. A. Maier, RSLO **(WAM)**

ADAMS: ☐ Yes ☐ No Initials: _____
☐ Publicly Available ☐ Non-Publicly Available ☐ Sensitive ☐ Non-Sensitive

R:_COL\2003\COL2003-04RP-GDR.wpd

RIV:SRI:DRP/E	C:DNMS/FCDB	C:DRS/PSB	DRS/SRA	C:DRP/E
GDReplogle	BDSpitzberg	TWPruett	DPLoveless	WBJones
F - WBJones	***/RA/***	***MPShannon for***	***/RA/***	***/RA/***
4/21/03	4/18/03	4/18/03	4/18/03	4/21/03

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:	50-397/03-04 and 72-35/03-01
Licensee:	Energy Northwest
Facility:	Columbia Generating Station
Location:	Richland, Washington
Dates:	December 29, 2002, through March 22, 2003
Inspectors:	G. D. Replogle, Senior Resident Inspector, Project Branch E, DRP E. L. Crowe, Project Engineer, Project Branch E, DRP R. J. Elkmann, Emergency Preparedness Inspector, DRS G. F. Larkin, Resident Inspector, Project Branch E, DRP G. A. Pick, Senior Security Inspector, DRS T. W. Pruett, Chief, Plant Support Branch, DRS
Approved By:	W. B. Jones, Chief, Project Branch E, Division of Reactor Projects
ATTACHMENT:	Supplemental Information

SUMMARY OF FINDINGS

IR05000397-03-04/072000035-03-01; Energy Northwest; 12/29/2002 - 3/22/2003; Columbia Generating Station. Integrated Inspection Report; Problem Identification and Resolution

The report covers a 12-week period of routine resident and regional inspection activities from December 29, 2002, through March 22, 2003. The inspection identified one finding of very low safety significance (Green). The finding was a noncited violation. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Manual Chapter 0609, "Significance Determination Process" (SDP). Findings for which the SDP 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. Inspector Identified Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified that the licensee had failed to take prompt corrective measures to address a condition adverse to quality associated with the Division I emergency diesel generator and had failed to properly evaluate emergency diesel generator operability. Specifically, as early as 1998, plant vibration data indicated that one of the unit's generator bearings was significantly degraded and was continuing to degrade at an accelerated rate. The licensee's operability evaluation was inadequate because it relied on an inappropriate method to determine remaining bearing life. As a result of the NRC concerns, the licensee declared the emergency diesel generator inoperable and, ultimately, shut down the reactor to complete repairs.

  A violation of 10 CFR Part 50, Appendix B, Criterion XVI, was identified that is being treated as a noncited violation in accordance with Section V1.A.1 of the NRC's Enforcement Policy. The inspectors determined that the issue was more than minor in significance because it impacted the mitigating systems cornerstone and affected the ability of the emergency diesel generator to perform it's safety function for the required 30 day design requirement. The inspectors utilized the Significance Determination Process, Manual Chapter 0609, Appendix A, worksheet and determined that the issue was of very low safety significance (Green). The issue screened out as Green because the finding did not result in the loss of a safety function of the system or the loss of a single train of safety-related equipment for longer than its Technical Specification allowed outage time. The inspectors determined that the emergency diesel generator should have operated for at least 5 days, which would meet the licensee's probabilistic risk assessment mission time and would provide sufficient time to establish other compensatory measures in the event the emergency diesel generator bearing degraded further.

B. Licensee Identified Violations

None

Report Details

Summary of Plant Status:

At the start of the period, operators maintained the plant at 100 percent power. On February 1, 2003, Pump A of the reactor recirculation control system ran back from 60 Hertz to approximately 51 Hertz, due to the failure of one of two in-service adjustable speed drive channels. Power reduced to approximately 89 percent as a result of the run-back. On February 2, operators reduced plant power to approximately 65 percent to recover the tripped channel and then proceeded to increase power to 100 percent. On February 27, operators initiated a Technical Specification 3.8.1, Action F, required plant shutdown, due to an inoperable Division I emergency diesel generator. Operators manually scrammed the reactor (per the normal shutdown procedure) and achieved cold shutdown on February 28. Following generator repairs, on March 12, operators transitioned the plant to Operational Mode 2 (startup) and the reactor achieved criticality on March 13. Operators synchronized the main generator to the electrical power grid on March 14 and increased power to 100 percent on March 15.

Notice of Enforcement Discretion:

On February 13, 2003, the licensee declared the Division I emergency diesel generator inoperable due to a damaged generator bearing. The Technical Specification allowed outage time for the emergency diesel generator is 72 hours. On February 16, the licensee contacted the NRC by telephone and requested a Notice of Enforcement Discretion to permit continued plant operation until February 27, 2003, to avoid an unwarranted plant shutdown and plant transient. The licensee made the request in accordance with Section VII.c of the "General Statement of Policy and Procedures for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600. The licensee provided documentation and a risk assessment that demonstrated that necessary requirements were met. The NRC reviewed the licensee's compensatory measures and verified that the overall risk to the public, based on the licensee's plan, did not increase. However, due to difficulties restoring the emergency diesel generator to operable status within the new time constraints, the licensee initiated a reactor shutdown on February 27, until the completion of necessary repairs and testing. The issues related to emergency diesel generator degradation are described in Section 4OA2 of this report.

1. REACTOR SAFETY

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

1R04 Equipment Alignments (71111.04)

a. Inspection Scope

The inspectors completed three partial system walkdowns and one complete walkdown of safety-related systems during the inspection period. The inspectors reviewed the system alignments and readiness during periods when redundant equipment was removed from service. The inspections included:

.1 Partial System Walkdowns (Quarterly)

- Division III Emergency Diesel Generator: On February 26, 2003, the inspectors walked down the mechanical and electrical alignments of the Division III emergency diesel generator while the Division I unit was out of service for planned maintenance. The inspectors reviewed the alignment of critical system components using Procedure SOP-DG3-STBY, "High Pressure Core Spray Diesel Generator Standby Lineup," Revision 1, as criteria for this inspection.

- Division II Emergency Diesel Generator: On March 5, 2003, the inspectors walked down the mechanical and electrical alignments of the Division II emergency diesel generator while the Division I unit was out of service for planned maintenance. The inspectors reviewed the alignment of critical system components using Procedure SOP-DG2-STBY, "Emergency Diesel Generator (Div 2) Standby Lineup," Revision 1, as criteria for this inspection.

- Division II Standby Gas Treatment System: On March 18, 2003, the inspectors walked down the mechanical and electrical alignments of the Division II residual heat removal system while the Division I system was out of service for planned maintenance. The inspectors reviewed the alignment of critical system components using Procedure PPM 2.3.5, "Standby Gas Treatment Systems," Revision 23, and Drawing M-544, standby gas treatment system flow diagram, Revision 66, during this inspection.

.2 Complete System Walkdown (Semiannual)

On February 7, 2003, the inspectors performed one complete system walkdown of the high pressure core spray system to verify operational status and material condition of the system and its components. The inspectors verified the system lineup per Plant Drawing M-520, "Flow Diagram HPCS [High Pressure Core Spray] and LPCS [Low Pressure Core Spray]," Revision 89. The inspectors also reviewed outstanding maintenance work orders and assessed operability and conformance with licensing requirements and commitments. The inspectors evaluated the licensee's corrective measures to address related conditions adverse to quality. The inspectors reviewed the following additional documents during the inspection:

- Final Safety Analysis Report, Chapter 6, Section 3, "Emergency Core Cooling System," Amendment 53, dated November, 1998

- Technical Specification 3.5, "Emergency Core Cooling Systems and Reactor Core Insolation Cooling System," Amendment 169

- Technical Specification Bases 3.5, "Emergency Core Cooling Systems and Reactor Core Insolation Cooling System," Revision 24

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors performed walkdowns of five 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 the licensee'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. Specific fire areas inspected included:

- Division II emergency diesel generator room, Fire Area DG-3, March 4, 2003
- Remote shutdown room, Fire Area RC-9, March 19, 2003
- Division I switchgear room, Fire Area RC-4, March 4, 2003
- Cable spreading room, Fire Area RC-2, March 5, 2003
- Low pressure core spray pump room, Fire Area R-8, March 4, 2003

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

a. Inspection Scope

On March 19, 2003, the inspectors observed operator training as operators participated in a scenario on the plant simulator. The inspectors evaluated crew performance in terms of formality of communication, prioritizing actions, interpreting and verifying alarms, correct use and implementation of procedures, and timely control board operation and manipulation. The inspectors also evaluated simulator fidelity by comparing simulator configurations with the plant control room.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed five planned or emergent maintenance-risk assessments performed per 10 CFR 50.65(a)(4). The inspectors considered the accuracy and

completeness of information in the licensee-risk assessments. The inspectors also used Procedure 1.5.14, "Risk Assessment and Management for Maintenance/Surveillance Activities," Revision 9, and Operations Instruction OI-49, "Protected Systems," Revision B, during the review. The inspection sample included:

- Emergent maintenance to repair a steam leak on Valve MS-V-110B (steam jet air ejector steam supply) on January 24, 2003, Problem Evaluation Requests 203-0229, 203-0017, and 203-008
- On-line Division I emergency diesel generator bearing replacement, February 13-17, 2003, planned maintenance
- Adjustable speed drive channel trip on February 1, 2003, emergent work
- Containment Vacuum Breaker 1JK apparent failure on February 27, 2003, emergent work
- Valve MS-V-189 (steam jet air ejector to condenser) failure on February 9, 2003, emergent work

b. Findings

No findings of significance were identified.

R14 Nonroutine Events (71111.14)

Partial Loss Reactor Recirculation Flow

a. Inspection Scope

On February 1, 2003, operators responded to a partial loss of reactor recirculation system flow. One of two channels that powered reactor recirculation Pump A tripped and pump speed ran back from 60 Hertz to approximately 51 Hertz. Consequently, reactor power lowered to about 89 percent. Operators reduced Pump B frequency to match flow in the other loop. The licensee determined that the transient was caused by a failed power supply and effected corrective measures. The following day reactor operators reduced reactor power to 65 percent and recovered the tripped channel. Shortly thereafter, operators returned the plant to 100 percent power.

The inspectors reviewed Technical Specifications, operator logs, problem evaluations requests, and operator training manuals to verify proper operator actions.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed four licensee operability evaluations for degraded equipment conditions. The inspectors reviewed the adequacy of the licensee's technical evaluation and implementation of compensatory measures considering overall plant risk. The inspectors also compared each operability review against system requirements described in the Final Safety Analysis Report, plant Technical Specifications, and Technical Specification Basis documents. The inspectors reviewed the following plant operability evaluations:

- Main steam isolation valve Actuator MS-AO-22B missing lockwashers, Problem Evaluation Request 203-0322, February 7, 2003
- Material specification for reactor feedwater system Valves RFW-V-32A and RFW-V-32B not matching the ASME, Section III design report, January 30, 2003
- Fire protection check Valve FP-V-1B found degraded but operable, January 22, 2003
- Reactor core isolation cooling system barometric condenser level Switch RCIC-LS-11 not functioning, Problem Evaluation Request 203-0199, January 22, 2003

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 two postmaintenance tests. The inspectors considered whether the licensee properly implemented procedural controls, as applicable, and that each test adequately demonstrated equipment operability. The inspectors also considered whether the licensee met Technical Specification and licensing basis requirements. The inspection sample included:

- Division I emergency diesel generator vibration data from February 25 to March 3, 2003. Partial observations.
- Work Order 01053518, Furmanite Valve MS-V-110B (steam jet air ejector steam supply Valve B) on January 3, 2003. Visual inspection after work.

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outages (71111.20)

a. Inspection Scope

On February 27, 2003, operators initiated a forced shutdown in accordance with Technical Specification 3.8.1, Action F (see the "Notice of Enforcement Discretion" Section at the beginning of this report). After repairs, operators started up the plant and synchronized to the electrical power grid on March 14, 2003, signifying the end to the forced outage.

During the shutdown, the inspectors verified that the licensee adequately controlled emergent work, configuration changes, and unexpected conditions in accordance with Procedure FO-03-01, "Outage Shutdown Safety Plan," Revisions 0-4. The inspectors reviewed decay heat removal parameters to verify proper system function. On a sampling basis, the inspectors verified that Technical Specification, license conditions, commitments, and other administrative prerequisites were met prior to reactor mode changes. The inspectors observed portions of the reactor startup and utilized Procedures PPM 3.1.1, "Master Startup Checklist," Revision 31; PPM 3.1.2, "Reactor Plant Startup," Revision 57; and PPM 3.2.1, "Normal Shutdown to Cold Shutdown," Revision 46; Technical Specifications; and the Final Safety Analysis Report during this inspection.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors performed an in-office review of a surveillance that involved main turbine and generator vibration readings, from February 19, 1991, through February 4, 2003. In addition to the documentation review, the inspectors verified current vibration data with control room instrument readings. The inspectors referenced the Final Safety Analysis Report during this inspection. The inspectors determined that the surveillance test adequately demonstrated that no immediate concern exists with respect to vibration levels.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

.1 Procedure Change

a. Inspection Scope

The inspectors performed an in-office review of Revision 10 (editorial) to Procedure 13.1.1A, "Classifying the Emergency - Technical Bases." This change updated a procedural reference related to fission product barrier emergency action levels. The inspectors compared Revision 10 with its previous revision and with 10 CFR 50.54(q) to determine if the revision decreased the effectiveness of the emergency plan.

b. Findings

No findings of significance were identified.

.2 Emergency Plan Change

a. Inspection Scope

The inspectors performed an in-office review of Revision 34 to the Columbia Generating Station Emergency Plan, submitted October 21, 2002. The inspectors compared this revision to its previous revision and to 10 CFR 50.54(q) to determine if the revision decreased the effectiveness of the emergency plan.

b. Findings

No findings of significance were identified.

3. SAFEGUARDS
Cornerstone: Physical Protection (PP)

1PP1 Access Authorization (71130.01)

a. Inspection Scope

The NRC completed a review of a drug test administered by the licensee on March 5, 2001. The review was performed to determine whether the licensee administered the test in accordance with the its Fitness-For-Duty (FFD) program or 10 CFR Part 26.

b. Findings

Introduction. A minor violation of 10 CFR Part 26.20 was identified because the licensee conducted a drug test which was not described in either their FFD program or 10 CFR Part 26.

Description. On November 7, 2001, the NRC requested that Columbia Generating Station provide information regarding the implementation of certain aspects of the FFD drug testing program. On December 6, 2001, Columbia Generating Station submitted Letter GO2-01-161 in response to the NRC's request. Based on a review of the licensee's FFD procedures, the NRC determined that on March 5, 2001, the licensee conducted a drug test which was not described in their FFD program or 10 CFR Part 26.

Analysis. The finding was evaluated in accordance with NRC Inspection Manual Chapter 0612, "Power Reactor Inspection Reports." Performing a test that is not described in an FFD program or 10 CFR Part 26 is a performance deficiency. However, if left uncorrected it would not be viewed as a precursor to a significant event or a more significant safety concern. Additionally, the finding was not related to a performance indicator, and the finding did not affect the physical protection cornerstone of the reactor oversight process because the objective of ensuring that the physical protection system can protect against a design basis threat of radiological sabotage was not affected.

Enforcement. 10 CFR 26.20 requires, in part, that each licensee establish and implement written policies and procedures designed to meet the general performance objectives and specific requirements of this part. These policies and procedures must address procedures to be used for the testing for drugs and a description of the immediate and followup actions which will be taken. The NRC determined that a drug test administered on March 5, 2001, was not described in the licensee's FFD program nor was it a test described in 10 CFR Part 26. This finding was considered a minor violation of 10 CFR 26.20 in accordance with Section VI of the NRC Enforcement Policy, NUREG 1600. (Although this finding should be corrected, it constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section VI of the NRC's Enforcement Policy.) The finding was entered into the licensee's corrective action program as Problem Evaluation Request 203-1012.

3PP4 Security Plan Changes (71130.04)

a. Inspection Scope

The inspectors reviewed the following Physical Security Plan changes to determine if they decreased the effectiveness of the Physical Security Plan and to determine if requirements of 10 CFR 50.54 (p) were met:

- Physical Security Plan, Revision 47, dated September 23, 2002
- Physical Security Plan, Revision 48, dated October 3, 2002
- Physical Security Plan, Revision 49, dated October 29, 2002

The inspectors noted that the changes were administrative in nature.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors assessed the accuracy of three sets of licensee submitted performance indicator data for all four calender quarters of 2002. The inspectors compared the data with operator logs, maintenance records, and corrective action documents. The inspectors verified that the licensee calculated performance indicators in accordance with NEI 99-02, “Regulatory Assessment Performance Indicator Guideline,” Revision 2. The inspectors' sample included the following performance indicators:

- Reactor coolant system activity
- Reactor coolant system leakage
- Unplanned scrams per 7000 critical hours

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

a. Inspection Scope

The inspectors reviewed one plant issue to verify that equipment, human performance, and programmatic issues were being identified by the licensee at an appropriate threshold and were being entered in the licensee's corrective action program. In addition, the inspectors verified that the licensee's corrective actions were commensurate with the significance of the issue. The issue evaluated during this inspection period was:

- Division I emergency diesel generator bearing trending in a negative direction, Problem Evaluation Request 202-2692, September 24, 2002.

b. Findings

Introduction:

The inspectors identified a violation of 10 CFR Part 50, Appendix B, Criterion XVI, for the failure to promptly identify and correct a condition adverse to quality. The licensee had indication that an emergency diesel generator bearing was in a substantially degraded condition, since at least 1998, but took inadequate measures to correct the

problem. In addition, the licensee had utilized an inadequate method for demonstrating operability and failed to provide suitable contractor oversight to ensure a high quality engineering assessment that would be used to support a second operability evaluation. On February 13, 2003, the licensee declared the diesel generator inoperable and on February 27 shut down the reactor to support final repairs. The inspectors determined that the violation was of very low risk significance.

Discussion:

Background: At Columbia Generating Station, the emergency diesel generators' design basis provides that they operate at least 30 days postaccident. The Division I emergency diesel generator has demonstrated degraded performance since 1995. Specifically, plant vibration data indicated that the north generator bearing (a double row tapered bearing) has experienced an accelerated degradation trend since that time. At the initiation of the inspection, the bearing was in an advanced stage of degradation.

Prior to NRC involvement, the licensee had written Problem Evaluation Request 202-2962 on September 24, 2002, to document the degraded condition and to evaluate operability. Plant engineers determined that the diesel generator was operable.

Inadequate Operability Analysis: The inspectors identified that the licensee had utilized an inappropriate method for determining bearing (emergency diesel generator) operability. Plant engineers had used advanced vibration techniques to determine the level of bearing degradation. The licensee then located the degradation point on a typical bearing degradation curve and extrapolated the remaining life. The licensee's extrapolation technique assumed that the bearing would degrade consistent with the normal rate of wear expected for a "normal population" of bearings that had reached the same level of degradation (assuming a nominal 50-year life).

The inspectors consulted with experts in the NRC's Office of Nuclear Reactor Regulation and determined that the licensee's technique was not appropriate for the bearing of concern. The bearing had reached a 95 percent to 99 percent level of degradation in less than 700 hours of run time (an equivalent to 47.5 to 49.5 years of elapsed life for a normal bearing). Since bearing wear had never followed a standard degradation curve, the NRC staff concluded that it was not reasonable to assume that bearing wear would follow the standard degradation curve for the remainder of its life. The inspectors asked the licensee to provide objective evidence to support their technical position, such as industry data or studies. The licensee provided no such evidence to the inspectors. On January 21, 2003, the NRC inspectors advised the licensee of the continued technical concern and further questioned diesel generator operability.

Inadequate Contractor Oversight: In response to the inspectors concerns, the licensee procured two industry bearing experts to evaluate the bearing's condition (Contractors A and B). On January 31, Contractor A advised the licensee that they believed that the bearing would last for at least 30 days of continuous operation. The contractor believed that the degradation mechanism was "overwhelmingly" related to a

bearing cage problem and that the degradation mechanism had stabilized. The contractor provided a formal report to the licensee on February 3, 2003.

On February 6, 2003, Contractor B informed the licensee that the bearing had reached an unpredictable stage in wear (i.e., there was not reasonable assurance of diesel generator operablity). Contractor B believed that the degradation driver was likely fatigue cracking.

On February 11, 2003, licensee management considered both views and determined that the bearing was operable based, primarily, on the views of Contractor A. The inspectors reviewed the contractors' positions and on February 13, 2003, the inspectors conducted a conference call with the licensee, the lead engineer for Contractor A, and other members of the NRC's staff to discuss apparent discrepancies in Contractor A's report. The inspectors noted that the contract representative could not explain most of the discrepancies. The contractor requested that the NRC contact two other individuals involved in writing the report. That evening, the licensee declared the emergency diesel generator inoperable.

Through followup discussions with Contractor A, the inspectors found that the contractor had not established a thorough basis for bearing operability and that the licensee had failed to provide adequate contractor oversight to ensure a quality product. For example, the contractor's report stated, in part:

> The initial defect frequencies began to show up around 1995. The trend history supports that this bearing has been operating, **without issue,** since at least that time period. **It appears that the cage is stable and wear is not progressing**.

Contrary to the contractor's statements, bearing vibration had continued to degrade relatively rapidly since 1995 and had demonstrated no signs of stabilization. The inspectors found that Contractor A had failed to properly evaluate the vibration data and had erroneously believed that vibration levels had stabilized (based, in part, on misunderstood statements made by the licensee's vibration engineer). The inspectors also found that the contractor had inappropriately based its position on bearing oil analysis results. Due to the methods of analyzing the oil, and the licensee's tendency to replace the oil periodically (which the contractor did not realize), the bearing oil analysis results had never shown indications of a significant problem (even when the bearing demonstrated step changes in performance). Based on the above, the inspectors determined that the licensee had provided inadequate contractor oversight and had failed to properly question clear inconsistencies between the contractor's report and the licensee's own test data. Consequently, the licensee's second operability evaluation was also inadequate.

Bearing Inspection and Replacement: When disassembling the generator, the licensee found that bearing degradation was caused by something other than the two theories provided by their contractors. The north bearing had signs of fluting (grooves in the bearing surface caused by electrical arcing). The licensee found that an alignment

pin had not been properly insulated during assembly (probably in 1991). This condition permitted as much as 65 amperes of electrical current to travel through both the north and south generator bearings whenever the generator operated. The electrical current degraded the bearing surfaces. In addition, the licensee identified that the south generator bearing (a small single row roller bearing not known to have problems) had degraded more than the north bearing, to the point where the surface had spalled (a separation of material). The licensee's vibration analysis program did not identify a problem with the south bearing, in part, because noise from the north bearing (the larger bearing) partially masked the south bearing's vibration signal.

The licensee requested that Contractor A evaluate the ability of both generator bearings to accomplish their safety functions in their as-found conditions. The contractor determined that the south bearing would not have lasted for 30 days postaccident. However, the contractor believed that the north bearing could have operated properly for the 30-day design requirement. The contractor based its position on engineering judgement and on past experience involving other similar (paper mill) bearings with comparable levels of degradation, which seemed to last for about a month. The contractor acknowledged significant uncertainties in it's evaluation, stating that there is currently no way to quantify remaining bearing life. In addition, the rate of degradation because of uncorrected electrical arcing added further uncertainty.

Assessment:

The inspectors determined that the issue had more than minor safety significance because it impacted the mitigating systems cornerstone and affected the ability of the emergency diesel generator to perform it's safety function for the required 30-day design requirement. Based on the best available information at the time, the inspectors determined that the emergency diesel generator would have operated for at least 5 days (based on a straight line extrapolation of bearing life using the actual calculated degradation rate).

The inspectors utilized the Significance Determination Process, as described in NRC Manual Chapter 0609, and discussed the issue with the Region IV senior risk analyst. The NRC determined that the issue was of very low safety significance because the finding did not result in the loss of safety function of the system nor the loss of a single train of safety-related equipment for longer than its Technical Specification allowed outage time. The inspectors determined that the emergency diesel generator should have been able to operate for at least 5 days, which would meet the licensee's probabilistic risk assessment mission time and would provide sufficient time to implement compensatory measures in the event the emergency diesel generator bearing degraded further.

Enforcement:

The inspectors identified a noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, which requires the licensee to take effective corrective measures to correct conditions adverse to quality, such as degraded conditions. In 1998, one of the Division I emergency diesel generator bearings demonstrated degraded performance.

Contrary to the requirements, the licensee failed to take prompt corrective measures to address this problem until prompted by the NRC in February 2003. The condition required a plant shutdown to correct. The issue is being treated as a noncited violation, consistent with Section V1.A.1 of the NRC's Enforcement Policy. The licensee entered this issue into their corrective action program as Problem Evaluation Request 203-0352 (NCV 50-397/03004-01).

4OA5 Review of Open Items (81001)

.1 (Closed) Inspection Followup Item 72-35/0201-02: Verification of the operability of the security systems. The inspectors interviewed maintenance personnel and alarm station operators and reviewed maintenance work orders related to the installation and testing of security systems for the Columbia Generating Station dry storage Independent Spent Fuel Storage Installation (ISFSI). During the preoperational inspection, the systems were not available. The licensee developed individual work order tasks for each portion of the maintenance and documented the work activities in Master Work Order 01036272, "ISFSI Security System Post Installation." The following individual tasks and other documents were reviewed:

- Task 01, "ISFSI Closed Circuit Television Fixed Camera Focus and Alignment"
- Task 02, "ISFSI Perimeter Intrusion Detection System Post Installation Testing"
- Task 03, "ISFSI Closed Circuit Television Pan-Tilt-Zoom Camera Testing"
- Task 04, "ISFSI Infrared Illuminator Testing"
- Design Change BDC 97-0180-2C, "Independent Spent Fuel Storage Installation Site Design"

The inspectors determined that the licensee performed appropriate installation and testing of the perimeter intrusion detection system zones and cameras. In addition, the inspectors verified operability of the annunciator alarms in the alarm station.

.2 (Closed) Inspection Followup Item 72-35/0201-03: Test of the security uninterruptible power supply system. The inspectors interviewed maintenance personnel and alarm station operators and reviewed maintenance work orders related to the installation and testing of the uninterruptible power supply for the Columbia Generating Station dry storage ISFSI security systems. During the preoperational inspection, the uninterruptible power system was not operational. The following maintenance work orders and other documents were reviewed:

- Design Change BDC 97-0180-2C, "Independent Spent Fuel Storage Installation Site Design"
- Work Order 01039444, "ISFSI Uninterruptible Power Supply Start-up Testing"

- Work Order 01056125, "Functional Testing of ISFSI Uninterruptible Power Supply System"

The inspectors reviewed the completed test records and interviewed the design engineer and maintenance technicians. From this review, the inspectors concluded that the uninterruptible power supply transferred smoothly and carried the required loads. Since the loads were less than the rated loads, the licensee determined that the batteries alone could carry the existing loads for 17 hours, rather than the rated 12 hours.

.3 (Closed) Inspection Followup Item 72-35/0201-04: Verification that alarm station operators have been properly trained. The inspectors interviewed alarm station operators, reviewed training and test records, and reviewed the alarm system in the alarm stations. The inspectors determined that the alarm station operators were familiar with the ISFSI alarm points. Also, the inspectors verified that alarm points associated with the ISFSI isolation zones displayed ISFSI in their description.

4OA6 Management Meetings

Exit Meetings

Regional and resident inspectors conducted six exit meetings with members of licensee management during the inspection period. The exit meetings included:

- On February 5 and March 19, an emergency preparedness inspector telephonically presented the emergency preparedness inspection results to Mr. J. Pierce, Supervisor, Emergency Planning.

- On February 7, a senior security inspector telephonically presented the physical protection inspection results to Mr. F. Schill, Licensing Engineer.

- On March 7, a senior security inspector presented the spent fuel, dry cask storage, inspection results to Mr. J. Parrish, Chief Executive Officer, and other members of the licensee's staff.

- On March 27, the plant support branch chief telephonically presented the access authorization inspection results to Mr. S. Scammon, Resource Protection Manager, and other members of the licensee's staff.

- On April 2, 2003, the senior resident inspector presented the remaining inspection results to Mr. R. Webring, Vice President, Nuclear Operations, and other members of the licensee's staff.

The licensee acknowledged the inspection results during each meeting. Following the meetings, the inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. The licensee identified no proprietary information.

ATTACHMENT

Supplemental Information

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Parrish, Chief Executive Officer
D. Atkinson, Vice President, Technical Services
D. Coleman, Manager, Performance Assessment and Regulatory Programs
D. Feldman, Manager, Operations
W. Oxenford, Plant General Manager
C. Perino, Manager, Licensing
J. Peters, Manager, Radiation Services
R. Webring, Vice President, Nuclear Generation
S. Scammon, Manager, Resource Protection

ITEMS OPENED AND CLOSED

Items Opened, Closed, and Discussed During this Inspection

Opened

None

Opened and Closed

50-397/03004-01	NCV	Failure to promptly correct degraded emergency diesel generator bearing (Section 4OA2)

Previous Items Closed

72-35/0201-02	IFI	Verification of the operability of the security systems (Section 4OA5.1)
72-35/0201-03	IFI	Test of the security uninterruptible power supply system (Section 4OA5.2)
72-35/0201-04	IFI	Verification that alarm station operators have been properly trained (Section 4OA5.3)

PARTIAL LIST OF DOCUMENTS REVIEWED

Procedures

SWP-MAI-01, Work Management - Planning, Scheduling & Work Activities
SWP-LIC-02, Licensing Basis Impact Determinations
PPM 10.1.26, “On-Line Leak Sealing,” Revision 8
PPM 2.4.6, “Reactor Core Isolation Cooling System,” Revision 34

Calculations

EQ-02-97-01, “Evaluation of Active Failure of RCIC-LS-11 In Seismic Event,” Revision 0

Drawings

Dwg M502, “Flow Diagram Main and Exhaust Steam System,” Revision 19

Dwg M519, “Flow Diagram Reactor Core Isolation Cooling System,” Revision 84

Dwg EWD-GE-004, “Electrical Wiring Diagram Reactor Core Isolation Cooling System Pump RCIC-P-4,’ Revision 10

Other

Night Order Number 430
Night Order Number 431
Nuclear Energy Institute 94-01, “Industry Guideline for Implementing Performance-Based Option of 10 CFR Part 50, Appendix J,” Revision 0

Problem Evaluation Requests

203-0008 202-0640 203-0229 203-0017 202-3471 203-0199