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August 15, 2005
GO2-05-141

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397**
LICENSEE EVENT REPORT NO. 2005-003-00

Dear Sir or Madam:

Transmitted herewith is Licensee Event Report No. 2005-003-00 for the Columbia Generating Station. This report is submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A). The enclosed report discusses the reportable event and actions taken.

If you have any questions or require additional information, please contact Mr. MK Brandon at (509) 377-4758.

Respectfully,

WS Oxenford
Vice President, Technical Services
Mail Drop PE04

Enclosure: Licensee Event Report 2005-003-00

cc: BS Mallett – NRC RIV
BJ Benney – NRC-NRR
INPO Records Center
NRC Sr. Resident Inspector – 988C (2)
RN Sherman – BPA/1399
WA Horin – Winston & Strawn
CE Johnson – NRC RIV/fax

IE22

NRC FORM 366 (6-2004) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 6-30-2007

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Columbia Generating Station	05000397	1 OF 3

4. TITLE

Reactor Trip due to Digital Electro-Hydraulic (DEH) Control System Failure

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
06	15	05	2005	-003-	00	08	15	05	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE

1

10. POWER LEVEL

100

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203 (a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER *(Include Area Code)*
Michael K. Brandon – Principal Engineer, Licensing	509-377-4758

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	JJ	ECBD	AVX	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On June 15, 2005 at 1400 hours, the reactor tripped from 100% power. The trip resulted from a Reactor Protection System (RPS) actuation due to a failure in the Digital Electro-Hydraulic (DEH) system that caused the four turbine throttle valves to spuriously stroke from full open to full close.

Although no specific DEH system failure could be identified, the three circuit cards providing the control signals to the four turbine throttle valves were replaced. These cards were identified as the most likely source of the DEH system failure. The root cause of this event is the DEH Control System design has single point vulnerabilities and the cards in this system do not exhibit a predictable failure mechanism which would allow replacement prior to failure. Long-term corrective actions are being pursued as identified in Problem Evaluation Request 205-0424. Energy Northwest is performing a Single Failure Vulnerability Assessment to identify and address single failure vulnerabilities.

This event did not adversely affect the health and safety of the public. A similar event was reported by Energy Northwest as LER 2004-004-00.

17. NARRATIVE *(If more space is required, use additional copies of NRC Form 366A)*

Plant Condition

The plant was operating in Mode 1 at 100 percent power at the time of this event.

Event Description

On June 15, 2005 at 1400 hours, the reactor [RCT] tripped from 100% power. The trip resulted from a Reactor Protection System (RPS) [JC] actuation when the four turbine throttle valves (TVs) [FCV] simultaneously stroked from full open to full close. The RPS actuates when two of four TVs are 95% open with power greater than 30% power. All rods fully inserted as expected in response to the RPS actuation.

Nineteen minutes later, all four TVs reopened with no operator action. During the time from the reactor trip to the TVs reopening, the main turbine [TA] failed to trip as designed. At thirty minutes following the reactor trip, plant operators manually tripped the main turbine from the front standard resulting in the re-closure of TVs at 1430 hours.

At 1538 hours, the NRC was notified of the RPS actuation per 10 CFR 50.72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A) (reference event notification number 41779). This LER is submitted pursuant to 50.73(a)(2)(iv)(A) as an event or condition that resulted in manual or automatic actuation of the reactor protection system.

Immediate Corrective Action

Following the event, plant personnel performed numerous troubleshooting activities. Although no specific DEH system [JJ] failure could be identified, the three circuit cards [ECBD] providing the control signals to all four turbine throttle valves were replaced. These cards were identified as the most likely source of the DEH system failure.

Cause

The root cause of this event is the DEH Control System design has single point vulnerabilities and the cards in this system do not exhibit a predictable failure mechanism which would allow replacement prior to failure.

Failure analysis on the three cards replaced was unable to identify any component failure for this event.

A significant contributing cause is the design of this system occurred at a time when the impacts of Balance of Plant system failures were not emphasized. This resulted in a system with single failure vulnerabilities.

Further Corrective Action

Long-term corrective actions are being pursued as identified in Problem Evaluation Request 205-0424. Energy Northwest is performing an assessment to identify and address single failure vulnerabilities.

Assessment of Safety Consequences

This event posed no threat to the health and safety of the public or plant personnel. All safety equipment was available during this transient and performed as expected. Local manual action was required to trip the main turbine, but there were no safety consequences associated the failure of the turbine to trip automatically. Thus this event was not safety significant.

Similar Events

The relevant recent LERs, PERs, and CR records for DEH Control System circuit card failures include: LER 2004-004-00, PERs 204-0969 and 205-0424, and CRs 2-04-04824, 2-04-05205, 2-05-05314 and 2-05-05564.

Columbia's DEH circuit cards have failed at a rate of about 11/200 over a 7 year period. Of these failures, two have resulted in plant scrams, both occurring within 11 months of each other. This historical failure rate is an indicator; however, the data is insufficient to provide an accurate predictor of future performance.

The internal experience shows the failures are random and the elimination of these failures would require DEH system replacement. A project to evaluate the replacement of this system has been initiated.

EIIS information denoted as [XX]