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January 4, 2010
GO2-10-001

10 CFR 50.73

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. 2009-005-00

Dear Sir or Madam:

Transmitted herewith is Licensee Event Report No. 2009-005-00 for Columbia Generating Station. This report is submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A). The enclosed report discusses items of reportability and corrective actions taken related to a manual reactor scram that occurred on November 7, 2009.

There are no commitments being made to the NRC herein. If you have any questions or require additional information, please contact Mr. MC Humphreys at (509) 377-4025.

Respectfully,

WS Oxenford
Vice President, Nuclear Generation & Chief Nuclear Officer

Enclosure: Licensee Event Report 2009-005-00

cc: EE Collins, Jr. – NRC RIV
CF Lyon – NRC NRR
INPO Records Center
NRC Sr. Resident Inspector – 988C (2)
RN Sherman – BPA/1399
WA Horin – Winston & Strawn
WC Walker – NRC RIV/fax

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NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 80 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 4

4. TITLE

Manual Reactor Scram due to Main Turbine DEH Control System Fluid Leak

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
11	07	2009	2009	– 005 –	00	01	04	2010	FACILITY NAME	DOCKET NUMBER 05000

9. OPERATING MODE
1

10. POWER LEVEL
52

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

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Donald W. Gregoire, Engineering Specialist	509-377-8616

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
D	JJ	ACC	S477	N					

14. SUPPLEMENTAL REPORT EXPECTED		15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)*	☒ NO				

ABSTRACT

On November 7, 2009, the control room staff had completed a scheduled downpower of Columbia Generating Station to perform maintenance activities. After reaching the targeted power level, a rapid loss of hydraulic fluid from the main turbine digital electro-hydraulic control (DEH) system occurred. This resulted in the initiation of a manual scram of the reactor as directed by plant procedures at 0725. This event meets the reporting requirements of 10 CFR 50.73(a)(2)(iv)(A) for manual actuation of a system described in 10 CFR 50.73(a)(2)(iv)(B)(1).

The direct cause for the loss of hydraulic fluid was the failure of an o-ring at the lower mounting block flange of accumulator DEH-TK-1D. This flange was determined to be incorrectly assembled following preventive maintenance performed during the previous refueling outage. The root cause was determined to be that the administrative requirements associated with maintenance on the DEH Accumulators did not impose special verifications, controls, or personal accountability measures to ensure that maintenance is performed appropriately.

The affected flange was reassembled with a new o-ring and bolts torqued to recommended values. This event did not adversely affect the health and safety of the public.

Plant Condition

The plant was in mode 1 operating at 52% power.

Event Description

On November 7, 2009, the control room staff had completed a scheduled downpower of Columbia Generating Station (Columbia) to perform turbine governor valve [FCV] testing and other maintenance activities. After reaching the targeted power level, a rapid loss of hydraulic fluid from the main turbine digital electro-hydraulic (DEH) control system [TG] occurred. A DEH reservoir [RVR] low level alarm was received in the control room at 0718. Subsequently, a low-low level alarm was received at 0724. At 0725, the reactor was manually scrammed as required by plant procedures.

All rods fully inserted as expected in response to the manual RPS actuation and heat removal through the main condenser [SG] was maintained. Following the scram, a reactor water level 3 isolation occurred. Post trip reactor vessel water level was restored and maintained in the normal band using the feedwater [SJ] and condensate systems [SD]. Pressure was controlled in the normal band using the main steam line drains. No other safety systems actuated or were required to actuate. There was no inoperable equipment at the start of the event that contributed to the event. Off-site power was available and all three emergency diesel generators [EK] were operable and available.

Reference Event Notification #45484 for initial reporting of this event.

Causes

The direct cause for the loss of hydraulic fluid was the failure of an o-ring at the lower mounting block flange of DEH accumulator DEH-TK-1D [ACC]. This flange was determined to have been incorrectly assembled following preventative maintenance that replaced the o-ring during the previous refueling outage. Two of the four flange bolts were found to be loose and torqued improperly. The opportunity to identify this latent condition was missed when an oil leak in the general area of the accumulator was reported by an equipment operator approximately a month and a half prior to the event. However, the leak was wiped up prior to Maintenance investigation of the leak, giving the impression that there was no equipment problem when Maintenance personnel inspected the location.

The root cause for the incorrect assembly of the block flange was determined to be that the administrative requirements associated with maintenance on the DEH accumulators did not impose special verifications, controls, or personal accountability measures to ensure that maintenance was performed appropriately, even though portions of the pressure boundary are a single point vulnerability for a turbine trip.

Contributing causes include:

1. Energy Northwest supervision provided inadequate oversight to verify the quality of field work and failed to monitor and reinforce expectations for performing work.

2. There was no post maintenance test (PMT) performed on the DEH fluid side of the pressure boundary after the flange was reassembled.

3. Less than adequate decision making caused the work request that identified an oil leak on the accumulator issued a month and a half previous to the event to be closed based on a decision to accept DEH pressure boundary leakage as is.

4. The root cause evaluation for the failure of a DEH Swagelok fitting that occurred in August of 2008 failed to include other pressure boundary fittings in the extent of condition.

Corrective Actions Taken or Planned

Immediate corrective actions include:

- The DEH-TK-1D o-ring was replaced and satisfactorily passed the PMT leak check.

- An extent of condition and technical evaluation were performed to provide a reasonable assurance of system functionality and reliability prior to plant startup. Startup was approved by the Plant Operations Committee based on this information.

Interim corrective actions include:

- Operations issued a night order to ensure condition reports and work requests are generated for all existing oil leaks.

- Operations issued a night order to establish the expectation that in the future when operators wipe up oil that they ensure a condition report, work request, and deficiency tag have been established for the leak. The Shift Manager is to ensure that all oil leaks have been identified.

Corrective actions to prevent recurrence include:

- Identify locations/joints that have experienced leaks or are of concern and perform a DEH hydraulics pressure boundary review of threaded and flanged mechanical joints on the high pressure and trip header/components. Based on vendor or industry guidance identify appropriate torque values for bolted connections and appropriate additional test/inspection requirements that should be used to validate joint pressure boundary reliability for both threaded and bolted connections. Provide information to Maintenance for inclusion into model work orders.

- Establish in work instructions for DEH hydraulic high pressure and trip header components:
  - parts verification inspections sign off steps, and
  - quality control or peer verification sign off steps for steps that apply test/inspection criteria that validate mechanical joint pressure boundary integrity.
- Revise DEH hydraulic fluid component model work orders with the criteria and expectations developed in the first two corrective actions above.
- Identify required specifications for DEH-TK-1A through 1F o-ring application, including hardness, and provide critical characteristics information to Maintenance.
- Verify specifications of currently installed materials based on work history and generate condition reports for installed o-rings that do not meet required specifications. Identify critical characteristics for purchase of new o-rings and revise the bill of materials as necessary to include o-rings that meet specifications.
- Identify other high risk/consequence systems for a pressure boundary event and other at risk bolted connections, and perform a risk evaluation to determine which systems should have additional risk mitigation methods similar to the second corrective action above. Define appropriate risk mitigation method(s) for each system determined to be risk significant, and generate additional corrective actions to track completion.
- Evaluate personnel performance against performance gaps identified in the barrier, failure mode, and cause and effect analysis. Address individual personnel accountability issues via individual performance improvement initiatives.

Other corrective actions for addressing contributing causes have also been established that were not included in this report.

Assessment of Safety Consequences

This event did not involve an event or condition that could have prevented the fulfillment of any safety function described in 10 CFR 50.73(a)(2)(v). This event does not qualify as a reactor scram with complications; all safety systems performed as designed, and therefore, this event posed no threat to the health and safety of the public or plant personnel.

Similar Events

A similar event occurred at Columbia on August 21, 2008 (reference LER 2008-001) in which a Swagelok compression fitting failed, resulting in a loss of DEH fluid. However, in contrast, the event that occurred on August 21, 2008 involved an immediate drop in DEH system trip header pressure below the reactor protection system trip setpoint resulting in an automatic initiation of a reactor scram.

Energy Industry Identification System (EIIS) Information

EIIS codes are bracketed [ ] where applicable in the narrative.