ENERGY NORTHWEST

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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. 2007-005-00

Dear Sir or Madam:

Transmitted herewith is Licensee Event Report No. 2007-005-00 for Columbia Generating Station. This report is submitted pursuant to 10 CFR 50.73(a)(2)(i)(B). The enclosed report discusses items of reportability and corrective actions taken.

There are no new commitments being made. If you have any questions or require additional information, please contact Mr. GV Cullen at (509) 377-6105.

Respectfully,

Typed for D. Atkinson

DK Atkinson
Vice President, Nuclear Generation & Chief Nuclear Officer

Enclosure: Licensee Event Report 2007-005-00

cc: EE Collins, Jr. – NRC RIV
CF Lyon – NRC NRR
INPO Records Center
NRC Sr. Resident Inspector – 988C (2)
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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 information 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 5

4. TITLE

Inoperable Diesel Generator due to inadequate procedure that caused potential transformer fuses to clear during shut down of the diesel

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 0500
12	10	2007	2007	– 005 –	00	02	07	2008	FACILITY NAME	DOCKET NUMBER 0500

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

FACILITY NAME	TELEPHONE NUMBER *(Include Area Code)*
Michael A. Huiatt - Licensing	509-377-4243

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
A	EK	FU	G080	N						

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

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

On December 10, 2007, it was discovered that an unidentified failure of the Emergency Diesel Generator (DG) that supports the High Pressure Core Spray system resulted in a failure to comply with the required actions of three separate conditions of Technical Specification 3.8.1, AC Operating Sources on two separate occasions. The cause of the DG failures was the performance of inadequate procedures on May 3, 2005 and October 19, 2007 that resulted in clearing of the fuses on the primary side of the metering and relaying potential transformers during shut down of the DG. The potential transformers provide power to the electronic governor as well as the local and remote indications rendering the electronic governor inoperable while the fuses were cleared. The DG was inoperable from May 3, 2005 to June 7, 2005 and again from October 19, 2007 until November 10, 2007.

The root cause of the inadequate procedures was a lack of knowledge of the DG shut down logic by licensee Operations and Engineering personnel. Corrective actions include revising the affected procedures and providing training for the appropriate Operations and Engineering personnel.

This event did not adversely affect the health and safety of the public because the DG remained available and no loss of off-site power occurred during the time frames the fuses were cleared.

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, with the remaining DG and offsite power systems operable at the time these conditions were discovered. There were no structures, systems, or components that were both a) inoperable at the time of the events, and b) contributed to the events.

Event Description

On June 5, 2005 the Division 3 Emergency Diesel Generator [DG] was started for monthly operability surveillance testing under procedure OSP-ELEC-M703. This procedure starts the DG at idle speed for a warm up, then increases speed and places the electronic governor in control via taking the unit mode selector switch from MAINTENANCE to AUTO. When the electronic governor [65] is placed in service, the exciter field flashes and generator terminal voltage is developed. When the DG was started there was no indication of voltage or frequency after the unit mode selector switch was taken to AUTO at either the remote or local control panels. Operations declared the DG inoperable due to the lack of indications of voltage and frequency. Investigation revealed that the fuses [FU] on the primary side of the metering and relaying potential transformers [XPT] had cleared. The potential transformers provide power to the electronic governor as well as the local and remote indications for voltage and frequency of the DG. The clearing of the fuses at that time was determined to be age related. The fuses were replaced, and the DG was declared operable on June 7, 2005 following satisfactory performance of the required surveillances.

On November 8, 2007 the Division 3 DG was started for monthly operability surveillance testing under procedure OSP-ELEC-M703. Similarly to the incident discussed above, Operations declared the DG inoperable due to lack of indications for voltage and frequency. Engineering performed a walk down of the DG and control panels and observed normal exciter field current and field voltage which indicated the field had flashed and the terminal voltage had developed. DG speed was approximately 925 RPM which indicated the speed was being controlled by the hydraulic governor vice the expected 900 RPM when controlled by the electronic governor.

Troubleshooting revealed that the fuses on the primary side of the metering and relaying potential transformers had cleared. An investigation comparing the two fuse failure incidents resulted in a discovery on December 10, 2007 that the operating procedures that were performed prior to discovery of the two cleared fuse events shut down the Division 3 DG by taking the engine control switch to STOP while the unit mode selector switch was still in AUTO. Since both of these events occurred during shut down of the DG, no indication was available to alert Operations personnel of the cleared fuses condition until the next attempted performance of the monthly surveillance.

The May 3, 2005 fuse clearing incident was caused by performance of procedure TSP-DG-E501, "Simultaneous Start of All Three Diesel Generators." This procedure is used to satisfy SR 3.8.1.20 which is performed once every ten years. This procedure placed the engine control switch to STOP while the unit mode selector switch was still in the AUTO position to shut down the DG.

The October 19, 2007 fuse clearing incident was caused by performance of OSP-ELEC-C703, "HPCS Diesel Generator AC Source Operability" which also placed the engine control switch to STOP while the unit mode selector switch was in AUTO to shut down the DG. A revision was implemented to OSP-ELEC-C703 in February 2006 to shut down the DG by placing the engine control switch to STOP without first placing the unit mode selector switch to MAINTENANCE. On October 19, 2007, OSP-ELEC-C703 was run using the revised shut down method for the first time. This procedure is performed when there is a potential common cause failure that requires a start/run of the other diesels.

Review of the Division 3 DG control circuitry indicated that by placing the engine control switch to STOP without first placing the unit mode selector switch to MAINTENANCE shuts the DG down without collapsing the excitation field. In this sequence, the voltage regulator will attempt to maintain voltage as the engine speed and frequency drop. It was concluded that this results in an over excitation condition and excessive volts per hertz operation causing the fuses to clear.

It was concluded that from the performance of TSP-DG-E501 on May 3, 2005 and OSP-ELEC-C703, on October 19, 2007, the Division 3 DG fuses were cleared and the Division 3 DG was inoperable until the fuses were replaced and the DG restored to service on June 7, 2005 and November 10, 2007 respectively. The time period that the fuses were cleared on the Division 3 DG exceeded the Technical Specifications allowed completion time for the required actions of LCO 3.8.1 Condition B for both incidents. In addition during the 2007 incident, the Division 2 DG was inoperable for maintenance for just over seven of the 22 days that Division 3 DG was inoperable with the cleared fuses. Seven days with two DGs inoperable exceeds the Technical Specifications allowed completion time for the required actions of LCO 3.8.1 Condition E.

During the time the Division 3 DG fuses were cleared, the electronic governor would have been out of service as well as the local and remote indications of voltage and frequency for the DG. Because of the lack of indications and reliance on the hydraulic governor, Operations could not have satisfactorily completed all surveillance requirements rendering the DG inoperable.

Immediate Corrective Action

In both incidents, the fuses were replaced and the diesel operability surveillance was satisfactorily completed prior to declaring the DG operable. OSP-ELEC-C703 was deactivated to preclude use of this procedure pending revision to correct the inadequate shut down method. TSP-DG-E501 was not deactivated; however it is not scheduled to be performed until 2015 and as discussed below will be revised prior to its next use.

Cause

A combination of change and barrier analyses was used to evaluate these events. The root cause team determined that the procedure revision process was adequate and that the actions of the licensee personnel were logical given their level of knowledge.

The root cause for this event was caused by a lack of knowledge of the Division 3 DG shut down logic by Operations and Engineering personnel. This lack of knowledge led to the direct cause of introducing inadequate procedural guidance that created an over excitation condition which cleared the fuses.

Further Corrective Action

The procedures described above will be revised to ensure that the correct method for shut down of the Division 3 DG is utilized. The requisite lesson plans for Operations and Engineering training will be updated and training provided to ensure the lessons learned from this event address the knowledge shortfall.

Assessment of Safety Consequences

The Division 3 DG is used to supply power to the High Pressure Core Spray (HPCS) [BG] system in the absence of the normal/startup power sources. During the times the Division 3 DG fuses were cleared, the electronic governor would have been out of service as well as the local and remote indications of voltage and frequency for the DG. If an actual load demand had occurred during the time frames the fuses were cleared due to the loss of normal/startup power sources, Energy Northwest has concluded that there is reasonable assurance that the hydraulic governor would have controlled the DG with the High Pressure Core Spray system loads to meet safety function requirements.

For a demand start of the Division 3 DG that involves HPCS system load acceptance, the Division 3 DG would pick up the load upon DG output breaker closure. The 4.16 kV critical bus with the Division 3 DG power supply and HPCS loads running would reach a steady state frequency according to the Division 3 DG output frequency versus load droop control characteristic set into the hydraulic governor actuator. According to Original Equipment Manufacturer guidance, the hydraulic governor speed droop control knob on the front of the governor actuator is set for 3% droop when the electronic governor is controlling the unit. This means at full load on the Division 3 DG with no electronic speed control, the critical bus frequency is expected to be in the range of 61.2 to 61.0 Hz (where 61.0 Hz would represent a minimum recommended separation between the electronic and mechanical governor operation to avoid interference). This frequency would meet Technical Specification requirements for loaded operation with a concurrent loss of offsite power. Hence, the Division 3 DG and associated High Pressure Core Spray system would have fulfilled their safety functions during these conditions.

In addition, the normal/startup power sources remained available to the affected bus during the entire time frames that the Division 3 DG was inoperable.

Similar Events

No other events involving clearing of these fuses occurred in the previous ten years.

EIIS information denoted as [XX].