



ENERGY NORTHWEST

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May 31, 2007
GO2-07-088

10 CFR 20.2201

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. 2007-002-00**

Dear Sir or Madam:

Transmitted herewith is Licensee Event Report No. 2007-002-00 for Columbia Generating Station. This report is submitted pursuant to 10 CFR 20.2201(b). The enclosed report discusses items of reportability and corrective actions taken.

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

Respectfully,

WS Oxenford
Vice President, Nuclear Generation
Mail Drop PE04

Enclosure: Licensee Event Report 2007-002-00

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

JE22

MRR

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

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.

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4. TITLE
Discrepancy in Special Nuclear Material Inventory

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
04	04	2007	2007 - 002 - 00			05	31	2007	FACILITY NAME	DOCKET NUMBER 0500
									FACILITY NAME	DOCKET NUMBER 0500

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: <i>(Check all that apply)</i>									
10. POWER LEVEL 97	<input checked="" type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)						
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER						
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A							

12. LICENSEE CONTACT FOR THIS LER	
FACILITY NAME Stephen Mazurkiewicz, Senior Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 509-377-8463

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

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO						

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

During preparations for an NRC inspection of Columbia's SNM Control and Accounting Program (April 16-19, 2007), documentation concerning the recovery of two pieces of a broken fuel rod was obtained. The documentation revealed the existence of potential fuel particles estimated to be less than 1 gram, in aggregate, located in the spent fuel pool. The exact location of these particles cannot be confirmed at this time.

The particles were created during a 1990 refueling outage when a fuel rod broke during an inspection. Following the recovery of the broken rod, a survey was performed that revealed a small dark particle of material surrounded by smaller black particles in a stainless steel bucket which had been positioned under the broken fuel rod pieces. The bucket was suspended off of the spent fuel pool wall where it is believed to have been later dislodged and its contents spilled into the pool. The location of these particles is most likely in the spent fuel pool or buried at a site licensed to receive radioactive material. Given the disposition of the material, no threat to the health and safety of the public exists.

Energy Northwest is pursuing corrective actions to both address the missing fuel particles and to prevent future recurrence of a loss of control and accountability of licensed material.

There have been no other events associated with the loss of control and accounting of loose SNM at Columbia.

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

Plant Conditions

On April 4, 2007, Columbia Generating Station (Columbia) was operating in Mode 1 (Power Operation) at 97 percent of rated power when a small amount of licensed material in the form of special nuclear material (SNM) was identified as potentially missing. There were no structures, systems, or components (SSCs) inoperable at the time of the event that contributed to the event.

Event Description

During preparations for an NRC inspection of Columbia's SNM Control and Accounting Program (April 16-19, 2007), documentation concerning the recovery of two pieces of a broken fuel rod was obtained. The documentation revealed the existence of potential fuel particles estimated to be less than 1 gram, in aggregate, located in the spent fuel pool.

The particles were created during a 1990 refueling outage while inspecting a leaking fuel bundle. To identify the leaking rod, the bundle was disassembled and rod-by-rod electronic sorting performed. During the process of inspecting the failed rod, the rod bent and snapped while being guided through a fuel inspection funnel. A procedure was approved and successfully executed to recover the broken rod sections. Following the recovery, an inspection was performed with an underwater camera to determine if any fuel pellets had been released as part of the evolution. No fuel pellets were identified; however, a small dark particle of material, surrounded by smaller black particles, was observed in a stainless steel bucket which had been positioned under the broken fuel rod pieces. The bucket containing the particles was suspended off the west wall of the spent fuel pool. The location of the particles within the bucket was viewed as a temporary storage location; however, no corrective actions were established to ensure a suitable long-term storage location. Statements from station personnel indicate that during the next refueling outage the bucket containing the fuel particles was dislodged from this location and its contents are believed to have spilled into the spent fuel pool. This observed condition was not entered into the corrective action program at the time.

The contents of the bucket have been described by the individuals involved in the broken rod recovery as a small particle of material roughly the size of a fingernail clipping surrounded by a few black particles the size of ground pepper. The material is suspected to be a small portion of an irradiated fuel pellet, i.e., ceramic Uranium Dioxide (UO₂) containing irradiated Uranium-235 (U²³⁵), small amounts of Plutonium generated during reactor operation, and embedded fission products. An underwater survey performed at the time indicated a radiation level of greater than 400 Rad per hour on contact for the largest particle. Due to radioactive decay, the dose rate of this particle today is estimated to be 40 Rad per hour with an activity of less than 0.4 Curies. The total amount of material is estimated to be considerably less than 10 percent of a single pellet's worth of material, and therefore, less than 1 gram.

On May 4, 2007, Energy Northwest informed the NRC of a potential loss of positive control and accounting of these fuel particles pursuant to 10 CFR 20.2201(a)(1)(ii) (Event Notification #43344).

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Energy Northwest is continuing to investigate this event. This report is submitted pursuant to 10 CFR 20.2201(b) as the location of these particles of licensed material cannot be positively identified at this time.

Immediate Corrective Action

Upon the identification of missing licensed material, Energy Northwest promptly initiated an investigation of the circumstances surrounding the issue. This investigation was discussed with NRC personnel inspecting Columbia's SNM Control and Accounting program on April 16, 2007.

Cause of Event

The apparent cause of the missing licensed material is a lack of programmatic guidance for action and issue tracking at the time the loose fuel particles were generated. This was further compounded by a lack of understanding that SNM tracking requirements apply to small amounts of material, i.e., less than one gram.

Contributing to this event was the initial decision to inspect the failed fuel rod, which ultimately created the condition under which the loose SNM was generated. This inspection was performed without an adequate contingency plan and long-term storage solution in the event loose SNM was generated.

Assessment of Safety Consequences

This event does not pose a threat to the health and safety of the public or plant personnel.

Statements from plant personnel indicate that in 1991, the bucket used to capture the fuel particles was observed to be lying upside down on the floor of the spent fuel without contents. As such, it is believed that the fuel particles were spilled into the spent fuel pool. The spent fuel pool is an ideal location to safely contain SNM, and therefore, no threat to the health and safety of the public or plant personnel would exist.

The only credible path for the particles to be removed from the spent fuel pool would be through the vacuuming of the pool floor with a Tri-Nuc vacuum. The general area where the spill of the bucket occurred was vacuumed in November 2006, as part of a spent fuel pool cleanup campaign. The two Tri-Nuc filters associated with this vacuuming currently remain in the spent fuel pool. These filters have been surveyed at less than 1 Rad per hour indicating that it is unlikely that they contain fuel particles. No specific records of vacuuming the pool floor in the area of interest exist prior to this point; however, the possibility that a previous vacuuming of this area occurred between 1991 and 2006 cannot be ruled out. Should this have occurred, the Tri-Nuc filters would have been surveyed and shipped to the US Ecology commercial disposal site for long-term storage.

In summary, the location of the licensed material is most likely on the floor of the spent fuel pool (or suspended on some other structure internal to the pool) or contained within Tri-Nuc filters that have

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been sent to a site licensed to receive radioactive material for long-term storage. Given the disposition of the material, there is no significant potential that this licensed material has resulted, or will result, in any exposure to radiation for plant personnel. Furthermore, as the licensed material is located in either the spent fuel pool or buried at a facility licensed to receive and store radioactive material, there is no potential for exposure of persons located in unrestricted areas.

Further Corrective Actions

Energy Northwest is pursuing corrective actions to both address the missing fuel particles and to prevent future recurrence of a loss of control and accountability of licensed material.

Energy Northwest is planning to perform a survey with an underwater camera in the area where the fuel particles were believed to have been spilled.

At the time the particles were generated, the corrective action culture at Columbia was not as robust as it is today. This was manifest by a lack of programmatic guidance for action and issue tracking and was compounded by a lack of understanding of tracking requirements for small amounts of SNM. Since that time, the corrective action program and associated culture at Columbia has matured and specific guidance has been incorporated into the plant procedure governing control of SNM (PPM 9.2.1, "Special Nuclear Material Control"). This procedure was revised in 1998 to clarify that the 1 gram threshold for the requirement to report SNM transfers is not a threshold for control and accountability purposes. Therefore, there is a high degree of confidence that Energy Northwest would address this event in a more focused manner today than 17 years ago.

Additional corrective actions being pursued to preclude recurrence include:

Procedure SWP-NFM-01, "Nuclear Fuel Reliability," will be revised to require contingency planning when removing an irradiated fuel pin from its bundle for inspection purposes. The contingency plan would address the potential for fuel pin separation or other damage and the associated potential for generation of loose SNM.

Procedure SWP-NFM-01 will also be revised to direct the use of suitable temporary and long-term storage devices for the capture and storage of any loose SNM generated during fuel inspection activities.

Procedure PPM 9.3.32, "Fuel Integrity Monitoring," will be revised to address balancing the risk of generating loose SNM during handling of individual failed rods for inspections, against the need for information to support failed fuel root cause evaluations.

Energy Northwest will evaluate the availability of reliable storage canisters for loose SNM (pellets and fragments). Such canisters would be of sufficient size, capable of being handled underwater using appropriate refueling tools, capable of being covered and sealed with a tamper proof seal to meet accountability requirements, and have requisite criticality and cooling analyses.

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Similar Events

There have been no other events associated with the loss of control and accounting of loose SNM at Columbia.