



Nuclear Operations Division

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August 24, 2007
07-144

Director
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
ATTN: Document Control Desk

Reference: License SNM-42, Docket 70-27

Subject: 30-Day Written Report for Event Notification # 43528

Gentlemen:

BWX Technologies, Inc., Nuclear Operations Division - Lynchburg (NOD-L) is providing a 30-Day written report for Event Notification # 43528 per 10 CFR 70.50(c)(2). The event notification was reported under 10 CFR 70 Appendix A(b)(1), any event or condition that results in the facility being in a state that was not analyzed, was improperly analyzed, or is different from that analyzed in the Integrated Safety Analysis, and which results in failure to meet the performance requirements of §70.61.

The enclosure presents the detailed information on this event and corrective actions. If there are any questions in this regard, please contact me at (434) 522-6570.

Sincerely,

Leah R. Morrell
Manager, Licensing and Safety Analysis
(Licensing Officer)

Enclosure

cc: NRC, Region II
NRC, Resident Inspector
NRC, MT Adams

solution and the 1.25-inch slab height, there was no risk of a criticality accident. The vacuum cleaner was outside the process area when it tipped over, so there was no opportunity that additional uranium-bearing solution could have been collected in the bags or the vacuum cleaner.

An initial evaluation of the event was performed and it was determined that the event was different from that analyzed in the ISA. All transfers of portable Raschig-ring-filled vacuum cleaners outside of controlled areas have been suspended until the proper analysis and controls are implemented. NRC was notified according to 10 CFR 70 Appendix A(b)(1). An internal evaluation by Nuclear Criticality Safety (NCS) and a Human Performance Analysis were performed to review the event and determine corrective actions.

Investigation Team Findings

During the investigation, the development of the safety basis for Raschig-ring-filled vessels was reviewed. The first documented Integrated Safety Analysis (ISA) was performed in 1996. The results of the initial evaluation concluded that any solution spilled outside of a Raschig-ring-filled vessel would freely disperse and not collect in an unfavorable geometry apart from the Raschig rings.

In January 2004 and April 2004, two similar incidents occurred inside the Recovery facility, which resulted in a portable Raschig-ring-filled vessel being tipped over and spilling its contents. Both analyses evaluated the potential for preferential separation of high concentration solution from the Raschig rings and concluded it was not credible for solution to remain in the vessel without the poisoning effects of the Raschig rings. This evaluation also assumed any solution spilled outside the vessel would freely disperse and not collect in an unfavorable geometry apart from the Raschig rings. In the July 26, 2007 event, the spilled solution was preferentially separated from the Raschig rings in the two bags that were used for contamination control. The concentration of the solution in the vessel was very low and was the result of floor scrubbing operations in the Recovery area.

A review of Radiation Protection procedures confirmed that standard practice for removal of contaminated items from a radiologically controlled area is to wrap or bag the materials to ensure that there is no spread of contamination. In this instance, two bags were used. The use of bags on Raschig-ring-filled vacuum cleaners was not previously evaluated by NCS. NCS assumed any solution that spilled and separated from Raschig rings would freely disperse. Therefore the preferential separation and collection of solution apart from the Raschig rings was not analyzed as part of the ISA.

With respect to the incident, the HPI investigation team determined that there are two different groups of Raschig-ring-filled vacuum cleaners in use at the facility.

The first group is used in the Recovery area for general cleaning activities and normally remains in the Recovery area. The Raschig-ring-filled vacuum cleaners in the second group are equipped with lifting fixtures for fork-lift trucks; these vacuum cleaners are infrequently transferred to other areas of the facility and into the Recovery area to be serviced. The individuals involved in the event were accustomed to moving Raschig-ring-filled vacuum cleaners which are equipped with the lifting fixtures. The individuals had been requested to move the vacuum cleaner into Bay 10A and had verified with Recovery personnel that the vacuum cleaner did not contain solution.

Recovery personnel had visually inspected the Raschig-ring-filled vacuum cleaner and determined it to be empty, when in fact it contained approximately 24 liters of solution. There are two methods to check for solution in a Raschig-ring-filled vessel. The dipstick method is a comparison of the overall height of the container and the height of the solution. A rod or a ruler is placed inside a tube in the vessel to determine the solution height. The upset condition would be a Raschig ring lodged in the tube preventing the rod or ruler from touching the bottom of the vessel, thus leading to an inaccurate reading of the solution height. In the second method (the one used for this event), the operator visually verifies the level in the tube. The upset condition is that solids may form which prevent an accurate reading by blocking the solution from the tube. The specific method for verification of solution in a Raschig-ring-filled vacuum cleaner is not documented in a procedure.

The specific methods that operators use to transport the Raschig-ring-filled vacuum cleaners is not communicated through any formal training or documented in a procedure. It was determined during interviews that the normal practice is to move only those vacuum cleaners that are equipped with the lifting fixture. The operator driving the fork-lift truck had observed that there was no lifting fixture on the vacuum cleaner but decided the transfer could be made safely, and directed the other operator to steady the vacuum cleaner by its handle during the transfer.

Errors and Corrective Actions to Prevent Recurrence

As a result of the NCS evaluation and the HPI investigation, errors and corrective actions to prevent recurrence were identified. The errors and corrective actions to address those errors are as follows:

Error #1: Preferential separation of solution from Raschig rings in a vessel that has been wrapped or covered for contamination control was not previously considered as a scenario in the ISA.

Corrective Action #1-1: Perform an evaluation of the preferential separation of Raschig rings in a vessel that has been covered and implement safety controls.

Completion Date: 3/1/2008

Error #2: The Raschig-ring-filled vacuum cleaner was of a different configuration type than the type that the operators had previous experience with in that it had no lifting device.

Corrective Action #2-1: Install lifting devices on Raschig-ring-filled vacuum cleaners.

Completion Date: 2/1/2008

Error #3: There is no procedure for transferring Raschig-ring-filled vacuum cleaners.

Corrective Action #3-1: Revise the operational procedure for SNM transfers to include the Raschig-ring-filled vacuum cleaners.

Completion Date: 10/31/2007

Corrective Action #3-2: Implement controls to prevent the transfer of Recovery Raschig-ring-filled vacuum cleaners.

Completion Date: 11/30/2007

Corrective Action #3-3: Distribute a lesson's Learned Report to Operations Management to discuss the incident and the importance of performing operations in accordance with written procedures.

Completion Date: 9/30/2007

Error #4: The method used to determine the Raschig-ring-filled vacuum cleaner to be empty was less than adequate.

Corrective Action #4-1: Develop a reliable procedure to ensure that Raschig-ring-filled vacuum cleaners are empty when required prior to transfer.

Completion Date: 11/30/2007

Error #5: The fork-lift truck operator decided to attempt to transfer the Raschig-ring-filled vacuum cleaner without a lifting device and with only one fork of the fork-lift truck.

Corrective Action #5-1: Revise the Powered Industrial Truck training to incorporate a requirement to stop and notify supervision prior to transporting items of unusual configuration or without approved lifting devices.

Completion Date: 11/30/2007