

Date: Wed, 14 Jan 1998 13:07:25 -0700
From: Meredith Brown <racer@lanl.gov>
Subject: Green Alert: **Unanticipated Work Condition**

Title: GREEN Alert **Employees Exercise Good Judgment**

The following Idaho National Engineering and Environmental Laboratory (INEEL) Lockheed Martin Idaho Technologies Green Alert Lessons Learned is being issued to inform you that, by assuming a worst-case scenario when unanticipated events are encountered during spent nuclear fuel movements, negative consequences can be avoided.

Identifier: INEEL Lessons Learned #97361
Dated: November 12, 1997

Lessons Learned Statement: Workers involved in spent nuclear fuel movements observed bubbles rising from a spent fuel canister and immediately notified their supervisor. The supervisor assumed a worst-case scenario (breach of cladding). Work activities were halted, all workers left the area, and the appropriate personnel were advised of the event. Although no radiological hazard was posed by the event, assumption of a worst-case scenario ensured the health and safety of workers and the environment.

Discussion: Canisters loaded with spent nuclear fuel have been stored in the Power Burst Facility (PBF) canal since 1987. The PBF fuel has a helium-filled annulus between the fuel pellets and cladding. The fuel is stored in canisters underwater. The canisters are moved every 3 to 5 years as part of the regularly scheduled inspection process.

While preparing to move one of the canisters, fissile material handlers observed bubbles rising from the canister. The Operator and Radiological Control Technician Bill Downs and Rob Peddrew immediately notified Shift Supervisor Greg Gerber. On-scene instrumentation did not detect changes in radiological conditions. However, assuming a worst-case scenario (breach of cladding), Gerber instructed the two handlers to immediately stop work and all three exited the canal area.

Bubbles coming from a canister containing spent nuclear fuel are a potential source of airborne radioactivity. Bubbles had not previously been observed in the 10-year history of fuel movement in the canal. However, based on past experiences with comparable fuel, Gerber recognized the most likely source of the bubbles was helium cover gas and possibly noble gases and iodine escaping through breached cladding.

After an extensive engineering evaluation was completed, fuel movements were resumed. Additional worker protection and radiological instrumentation were established. While moving several canisters, personnel again observed bubbles. The bubbles were attached to the walls of the fuel storage racks and to one of the canisters. Movement of the canister knocked loose some of the bubbles. (Later review of a video tape of the activity confirmed the observation.)

Analysis: The breached cladding theory was not substantiated, and a definitive origin of the bubbles is not known. Most likely, the bubbles formed over long periods of time, due to the growth of biological organisms on the aluminum walls of the canisters and fuel racks. No more bubbles have been seen in the 8 months since the second observation.

Activities conducted to ensure the health and safety of workers and the environment resulted in a 3-week delay in completion of the fuel rack inspection. However, the delay was justified to ensure the safety and health of workers and the environment.

Because the source of the bubbles was unknown, the assumption they posed a possible radiological concern was the most prudent course of action. The ensuing course of action after the initial observation ensured that the safety of personnel was never compromised.

Recommended Actions:

Personnel should immediately alert their shift supervisor when unanticipated events are encountered. Personnel should assume a worst-case scenario when encountering unanticipated events and take the appropriate actions.

Originating Organization: Power Burst Facility

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Priority Descriptor: GREEN

Keywords: spent nuclear fuel, unanticipated event, worst-case scenario

Functional Categories: Environmental Protection, Nuclear Safety, Occupational Safety and Health, Radiation Protection

Follow-up Action: Information in this report is accurate to the best of our knowledge. As a means of measuring the effectiveness of this report, please notify Terry Pierce at (208) 526-4288 (or by electronic mail at txp@inel.gov) or the INEEL Lessons Learned Program Office at (208) 526-1530 (e-mail at mae@inel.gov or limitll@inel.gov) of any action taken as a result of this report or of any technical inaccuracies you find. Your feedback is important and appreciated.