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From: Meredith Brown <racer@lanl.gov>
Subject: Green Alert: Contamination Events Avoided

Title: GREEN - **Personnel Contamination Events Successfully Avoided**

The following Idaho National Engineering and Environmental Laboratory (INEEL) Lockheed Martin Idaho Technologies Green Alert Lessons Learned is being issued to inform you that personnel contamination events can be avoided by careful planning, special training, and rigorously following procedures.

Identifier: INEEL Lessons Learned #97314
Dated: September 29, 1997

Lessons Learned Statement: In more than 800 entries, the ROVER Deactivation Project had only one personnel (clothing) contamination event. (The single instance was a result of a one-time modification to the otherwise successful donning and doffing procedures.) Successful avoidance of contamination events is attributed to reviewing and learning from previous events. Team members with past experience at a facility may bring additional knowledge not otherwise available.

Contamination events may also be avoided by (1) considering and planning for contamination potential during project design; (2) conducting dry runs, testing, and training; (3) training personnel in donning and doffing procedures; and (4) ensuring a health physicist is present and assists with the doffing sequence, including performing the wipe down of personnel.

Discussion: The ROVER area is an inactive reprocessing facility for experimental fuel. The facility has been shut down since the early 1980s. Residual uranium remained in piping systems and processing vessels. LMITCO's Facility Transition Department was tasked with recovering the uranium-bearing material, which entailed dismantling the process piping and vessels.

Many of the project activities took place in the Material Handling Cave and Cells 3 and 4, which are very highly contaminated. The cave and cells are covered with an ash-like graphite dust, which is flighty and easily becomes airborne. Activities in the facility in the 1983-1984 time frame resulted in more than 100 personnel contamination events. The Project Design Team for the current project studied these previous contamination events and applied the lessons learned to the Deactivation Project's design.

The Team, led by Dennis Schanz, Project Manager, recognized that personnel working in the Material Handling Cave and Cells 3 and 4 would potentially have a considerable amount of dust on them. To reduce or avoid personnel contamination events, the Team worked closely with radiological engineering, training, health physicists, and others to design and institute a successful series of donning and doffing procedures.

Entrants to the cave and cells wore modesty clothing, cloth coveralls, and three pairs of breathable tyvek coveralls. All personnel received special donning and doffing training before

working in these areas. When personnel exited these areas, a health physicist was on hand to wipe down the bubble hoods to remove excess dust and assist personnel with doffing.

Analysis: The single contamination event in more than 800 entries was a result of modifying the successful procedures. The modification, replacing one pair of tyvek coveralls with wet suit bottoms, was made to protect the operators from potential sharp edges in the area in which they were working. Wiping down the bottoms prior to doffing was not identified as necessary to compensate for the change.

In the single event, contamination presumably migrated from the dusty wet suit bottoms and either permeated through the tyvek coveralls or adhered to the damp modesty clothing. The wet suit bottoms, possibly in conjunction with cave temperatures and strenuous activity, caused the operator to perspire at a rate higher than normal, allowing the contamination to readily adhere to the modesty clothing.

After the event, the Team returned to using the previously successful procedures. No further personnel contamination events occurred since that time.

Personnel contamination events frequently involve delays in activities or increased costs. The successful avoidance of such incidents has contributed to the ROVER Project's completion 6 months ahead of its 3-year schedule, under its $20 million budget, and well within its 52 person-rem worker exposure target.

Recommended Actions:

1. Lessons learned from previous activities should be reviewed and incorporated during conceptual design and carried throughout the entire project.

2. Careful planning, training, and execution can effectively reduce personnel contamination events.

3. Before modifying successful procedures, careful consideration should be given to understanding what made the procedures successful. In the single contamination event, a modification was made to the type of equipment used. However, the consequences of the modification were not accounted for, resulting in a personnel contamination event.

4. Lessons learned during the course of a project should be immediately incorporated into activities.

Originating Organization: ROVER Deactivation Project
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Name of Authorized Derivative Classifier: D. Claflin
Name of Reviewing Official: D. Sanchez
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Functional Categories: Decontamination/Decommissioning/Restoration, Occupational Safety and Health, Radiation Protection, Training/Qualification/Education
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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 lmitll@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.