Lesson Learned Statement:

When analyzing the hazards for a task that will be performed in a high contamination area, great care should be taken in determining not only the existing hazards, but how the hazards can change by introducing liquids needed to perform the task. This can greatly affect the personal protective equipment (PPE) being worn during performance of the task. Also, when it is necessary to add liquids into a highly contaminated area, the amount of liquids should be minimized, if possible.

Discussion:

During frisking, upon leaving the job site at W-6 Valve Box, an employee's shoe and pant leg was found to be contaminated. The right shoe had 20,000 dpm beta-gamma, and the left pant leg had 24,000 dpm beta-gamma. The Radiation Work Permit (RWP) called for two sets of tyvek and non-skid shoe covers.

Analysis:

This event occurred during a confined space entry into a valve box to leak test interconnecting pipeline of the Low Level Waste (LLW) system. The RWP for the job required two sets of Tyvek, booties, and a respirator. Blotter paper was placed into the floor area of the pit to help control transfer of contamination while the employee was standing on the floor. The employee began leak-testing piping using a leak test solution (which is a soap solution).

Once the leak was found, the pipe fitter exited the pit onto a step-off pad (blotter paper). The pipe fitter doffed shoe covers, harness, first layer of Tyvek, and outer gloves. This was performed with the help of the Rad Con Technician covering the job inside the high contamination area. The pipe fitter moved away from the pit area and proceeded to the buffer area and doffed the second layer of Tyvek, respirator, and inner gloves. The contamination was discovered during the survey at the buffer area.

The direct cause was identified as Error in Equipment or Material Selection because of the permeation of the employee's personal protective equipment (PPE) by liquids introduced into the job site by the test procedure being performed. The boot itself most likely became contaminated when the employee stepped onto some of the soap solution, which may have penetrated the cloth bootie, and both pair of Tyvek. In future jobs where a wet solution is introduced to dry area, water resistant PPE will be required to ensure protection of the worker. In applications where a wet solution is required, a spray bottle will be used instead of a squirt bottle when applying liquids in high contamination areas.

The work package, which included the use of liquid soap solution, in the dry work
environment, did not include the need for water resistant PPE. Therefore, it was determined the root cause was Work Organization/Planning Deficiency.

**Recommended Actions:**

1. Re-issue RWP for leak testing of system piping inside of Valve #6 to include the use of water-resistant shoe covers.

2. Issue a Lessons Learned to Bechtel Jacobs Company projects and subcontractors operating facilities highlighting the need to treat leak-testing liquids as a possible source for the spread of liquid radioactive contamination when used in radiological control zones.

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**Priority Descriptor:**

Yellow / Caution

**Keywords:**

leak-testing liquids; contamination; radiological control zones; PPE

**References:**

Occurrence Report - ORO--BJC-X10WSTEMRA-2000-0007

Information in this report is accurate to the best of our knowledge. As means of measuring the effectiveness of this report please use the "Comment" link at the bottom of this page notify the Lessons Learned Web Site Administrator of any action taken as a result of this report or of any technical inaccuracies you find. Your feedback is important and appreciated.

**DOE Function / Work Categories:**
Occupational Safety & Health - Personnel Protective Equipment
Radiation Protection

ISM Category:

Analyze Hazards

Hazard:

Personal Injury / Exposure - Radiation / Contamination

End of Lesson!