# Information Bulletin

## Flammable Gases Found in Low Level Waste Drums

**September 10, 2007** **2007-RL-HNF-0034** **Tracking No: 650**

**Summary:** Venting controls should be applied to all unvented waste containers which require intrusive processing actions in order to reduce the potential impact to safety, unless it can be proven that flammable gases cannot exist.

**Discussion of Activities:** During waste drum repackaging operations, T Plant identified two unvented Low Level Waste (LLW) drums from separate waste streams which contained flammable gases at levels higher than anticipated. When the drums were opened to place void space filler, industrial hygiene sampling detected flammable gas concentrations at levels higher than expected. The drums contained soil from two different generators. The drums were packaged in 1991 and 1995 in accordance with applicable Solid Waste Acceptance Criteria. Based on the assumed drum contents (soil), the generators had no reason to evaluate the waste stream as having the potential to generate flammable gasses.

**Analysis:** In 2006, a positive Unreviewed Safety Question (USQ) was identified relating to Volatile Organic Compounds in retrieved waste drums. The USQ was performed because of an occurrence report from the Savannah River Site (EM-SR--WSRC-SW&I-2005-0028). An occurrence in 2006 (EM-RL--PHMC-SWOC-2006-0001) identified that although the safety analysis contained controls for flammable gases, the new information from Savannah River could indicate the controls were not adequate. Additional controls were established through a Justification for Continued Operations (JCO) process. The JCO did not require venting of newly generated drums (packaged after 1988, when packaged to applicable criteria), although it did require venting of retrieved drums. The controls in the JCO were based on the assumption that any drums packaged in accordance with post-1988 waste acceptance criteria would either be vented if required, or would not meet the criteria for venting. Based on the new information from the T Plant event, it was identified that assumptions on which the controls were based did not compensate for the potential for unknown/unrecognized organic materials in a LLW stream.

Additionally, the safety analysis may not have fully considered the length of storage time on the potential to generate flammable gasses in post-1988 drums. The controls focused on a hydrogen-based explosion as the bounding accident. Each of the waste streams in question had been in storage for 10-15 years.

**Recommended Actions:** Require unvented, accepted waste drums which are required to be opened to be vented and, as recommended in 2006-RL-HNF-0034, the headspace gas verified to be nonflammable prior to removal of the waste drum lid.

**Cost Savings/Avoidance:** Not evaluated

**Work Function:** Waste Remediation

**Hazards:** Personal Injury/Exposure

**ISM Core Functions:** Analyze Hazards and Risks, Develop/Implement Controls

**Keywords**: unvented waste drums

**Originator**: Fluor Hanford, Inc. Submitted by Beth Poole

**Contact**: PHMC Lessons Learned; *(509) 372-2166; e-mail: PHMC_Lessons_Learned@rl.gov*

**References**: EM-RL—PHMC-SWOC-2007-0002; 2006-RL-HNF-0034, EM-RL--PHMC-SWOC-2006-0001