Incident Type: Uncontrolled chemical reaction resulting in over pressurization of a waste container  
Date: June 4, 2013  
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Incident Description:  
A post doctorate was requested to dispose of three expired bottles of Tetrahydrofuran (THF). The post doctorate opened the bottles and comingled the THF with a bottle of waste solvent which they understood to contain THF. This was accomplished in a laboratory hood. The waste container was returned to a secondary containment pan outside of the laboratory hood. Approximately 45-60 minutes later the student recognized a reaction (color change and bubbling) inside the 4 Liter plastic waste jug. The container was placed inside the laboratory hood and the sash closed. A few minutes later the container ruptured releasing the contents of the bottle into the lab and a small amount on the floor in front of the lab (Photo 1). Attachment 1 shows the reaction.

Findings:  
- The expired THF bottles were discovered during LISP Joint Assessment.  
- During the LSIP assessment RMS instructed the PI to tag the bottle with a waste tag and dispose through RMS.  
- The PI instructed the post doctorate to dispose of the chemicals but did not convey how to dispose of the material.  
- The post doctorate completed the required laboratory safety training.  
- The post doctorate stated he was wearing the appropriate PPE during the waste transfer.  
- The emergency process was followed properly.  
- The post doctorate was unaware of the proper methods to dispose of expired chemicals that may contain peroxides.

Root Causes:  
The over pressurization of the container was caused by a chemical reaction from mixing the expired THF (possibly containing peroxides) with other waste solvents.  
The management system causes include:  
1. Training – The post doctorate was unaware of the proper disposal process for expired chemicals or materials possibly containing reactive materials.  
2. Procedural – A procedure outlining the proper methods of handling and disposing expired chemicals or chemicals containing reactive materials is not available.  
3. Communication – The post doctorate was not informed of the proper method of disposing reactive materials.  
4. Procedural – A procedure outlining the process to decommission laboratories does not exist.
5. **Procedural** – A procedure outlining the process for a PI taking over a used lab does not exist.

**Recommended Actions:**
1. Develop procedure or process for handling expired chemicals.
2. Train students for this PI on process for handling / wasting expired chemicals.
3. Develop decommissioning process for labs and present to Office of Research/Deans.
4. Communicate laboratory decommissioning procedure to affected personnel.
5. Develop process / check list for new PI taking over used lab.
6. Communicate process for PI’s taking over a used laboratory.
7. Advise the Academy to communicate to all PI’s to check their chemical storage areas for expired materials and properly dispose by applying a waste tag and contacting RMS.

**Safety Alert Actions:**
1. Communicate this Alert as appropriate.

**Attachment 1:**

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R^1 - O - O - R^2 + 2Fe^{3+} \rightarrow [O_2 + R^1 + R^2 + 2Fe^{3+}] \rightarrow 2Fe^{2+} + O_2 + R^1 + R^2
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\[
2Fe^{2+} + R^1 + R^2 \rightarrow [2Fe^{2+} + R^1 + R^2] \rightarrow 2Fe^{3+} + R^1R^2, R^1R^1, R^2R^2
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R^1 = \text{structure} \quad \text{or} \quad H
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R^2 = \text{structure}
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