

Lesson Learned Briefing

No.: LL16-0028

Title: Peroxide-Former Chemical Labeling, Testing, and Disposal

Event: LBNL Event

Event Date: 11/16/2015

Category: ES&H - Chemical Hygiene

Lesson Learned Statement:

During a recent laboratory safety inspection, containers of peroxide-forming chemicals were found without evidence of having been tested, and some were found to be past the manufacturer's expiration date. Peroxide-forming chemicals can form shock-sensitive explosive peroxide crystals, which have led to numerous explosions at other institutions. Labeling, testing, and timely disposal are important safety controls for these compounds.

Discussion:

LBNL's Chemical Hygiene and Safety Plan (CHSP), Work Process P, has been recently updated to clarify the details on labeling, testing, and disposal of peroxide-forming compounds. This Lessons Learned briefing, along with helpful tables of storage times and testing frequencies, are available in a PDF at the end of the briefing. In summary, you must determine if you have peroxide-forming chemicals in your area, label and test them on a periodic basis, and dispose of them as per the CHSP.

While explosions have never been reported at LBNL, on at least four occasions, external HazMat teams have been hired to transport, open, test and neutralize suspect dated containers that were deemed unsafe to handle by LBNL personnel. This was done at considerable cost.

Required Actions:

Do not open or disturb containers of peroxide-forming compounds showing the following:

- signs of peroxide crystal formation
- signs of leakage
- exceedance of shelf life
- no evidence of testing

Contact your Division Safety Coordinator or the EHS Health & Safety

Representative (<http://www2.lbl.gov/ehs/directory/>) supporting your Division for guidance. Upon examining the container, it may be necessary to dispose of it as hazardous waste. The Health & Safety Representative and the Waste Generator Assistant will collaborate with the owner of the material to evaluate it for safe and compliant disposal.

Identification:

LBNL's CHSP provides tables of common peroxide formers, found in Work Process P

(http://www2.lbl.gov/ehs/pub3000/CH45/CH45_7.html#_Work_Process_P.) and also included in the PDF attachment at the bottom of the briefing. The Chemical Management System (CMS) may also be used to identify these compounds. These are not exhaustive lists, so you may need to consult other sources of information, such as container labels and Safety Data Sheets or SDSs (formerly, Material Safety Data Sheets).

Labeling:

Label peroxide-former containers with the date received, date opened, peroxide testing interval and test results. EHS has labels for this purpose that can be obtained from the EHS Health & Safety Representative supporting your Division. A copy of this label is attached to this Lessons Learned briefing. Do not wait for the first test date to attach this label.

Testing:

Test peroxide formers periodically according to their appropriate testing interval. The CHSP provides testing intervals for different compounds (http://www2.lbl.gov/ehs/pub3000/CH45/CH45_7.html#tablep1). EHS will send peroxide-former owners periodic reminders of the need to test these materials. In addition, some owners may choose to use a calendar function to remind them to test on a regular basis.

Use commercially available peroxide test strips. These are available via the Laboratory's Procurement & Property website. Carefully follow the manufacturer's instructions for testing and interpreting results. The test strip **MUST** be treated with a drop of distilled water after the solvent has evaporated, otherwise the test will produce a false negative.

- If the peroxide concentration is greater than 30 ppm, but less than 100 ppm, the chemical may be used, but **DO NOT DISTILL OR CONCENTRATE**.

- If the peroxide concentration is greater than or equal to 100 ppm, the material should be evaluated prior to disposal. Discontinue use and contact your EHS Waste Generator Assistant for guidance.

Disposal:

Evaluation and testing is required prior to disposal of peroxide-former chemicals. Contact the Waste Generator Assistant for guidance.

Lessons Learned are part of the ISM Core Function 5, Feedback and Improvement. Applicable Lessons Learned are to be considered during

working planning activities and incorporated in work processes, prior to performing work.

Please contact the following subject matter experts if you have any questions regarding this briefing.

- Ettinger, Kurt R (KREttinger@lbl.gov)
- Toor, Herb S (HSToor@lbl.gov)
- McLouth, Lawrence D (LDMcLouth@lbl.gov)

Uploaded documents/attachments:

[Peroxide Former Label.pdf](#)

[Organic Peroxide_Formers.pdf](#)

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