UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

December 10, 2008

MEMORANDUM

SUBJECT: **Peroxyacetic Acid and Hydrogen Peroxide (PERformance LS)**: Assessment of Occupational and Residential Exposure from Proposed Use as Laundry Sanitizer

EPA Reg. No.: 1677-EET
PC Code: 000595; 063201
DP Barcode: D353015

FROM: Pat Jennings, Environmental Engineer Pat Jennings 12/10/08
Risk Assessment and Science Support Branch (RASSB)
Antimicrobials Division (7510P)

TO: Demson Fuller, Chemical Review Manager
Marshall Swindell, Product Manager
Dennis Edwards, Chief
Regulatory Management Branch I
Antimicrobials Division (7510P)

THROUGH: Nader Elkassabany, Team Leader Nader Elk
Team Two
Risk Assessment and Science Support Branch
Antimicrobials Division (7510P)

and

Norm Cook, Chief
Risk Assessment and Science Support Branch
Antimicrobials Division (7510P)

I. ACTION REQUESTED

The Regulatory Management Branch I (RMBI) of the Antimicrobials Division (AD) requests that the Risk Assessment and Science Support Branch (RASSB) of AD evaluate the potential for human exposure to peroxyacetic acid (also referred to as peracetic acid) and hydrogen peroxide for proposed uses as a laundry sanitizer and bleach.

II. BACKGROUND

Ecolab, Inc., submitted an application for the product PERformance LS containing 5.8% peroxyacetic acid and 27.5% hydrogen peroxide, which is intended to be used as a laundry sanitizer and/or bleach in commercial and/or institutional settings. The directions on the proposed label (Ecolab, Inc., 2008a) for use of PERformance LS to bleach and sanitize laundry are to "dose a minimum of 9 ounces PERformance LS per 100 pounds of laundry using an appropriate Ecolab dispenser in the bleach/sanitizing step of the wash formula." The directions for bleaching laundry are to "dose a minimum of 3 ounces PERformance LS per 100 pounds of laundry using an appropriate Ecolab dispenser in the bleach step of the wash formula." Based on confidential business information submitted to the Agency, Ecolab Inc. contends that the Ecolab tunnel washer automated dispensing process is a "closed system" (Ecolab, Inc., 2008b).

The Material Safety Data Sheet (MSDS) for 20-40% hydrogen peroxide prepared by FMC, a leading supplier of hydrogen peroxide and peroxyacetic acid, indicates that acute effects from overexposure to hydrogen peroxide lead to extreme irritation/corrosivity to the eyes and gastrointestinal tract (FMC, 2006a). This MSDS also indicates that hydrogen peroxide may cause irreversible tissue damage to the eyes, including blindness and that inhalation of mist or vapors may be severely irritating to nose, throat, and lungs and may cause skin irritation.

The MSDS for 5% peracetic acid prepared by FMC indicates that acute effects from overexposure to liquid peracetic acid may cause severe burns and irreversible tissue damage to eyes, including blindness (FMC, 2006b). This MSDS also indicates that inhalation of peracetic acid vapors causes lacrimation and irritation of the mucous membranes, eyes and nasal passages.

Hydrogen peroxide and peroxyacetic acid, also referred to as peracetic acid, are inherently unstable due to the peroxide bond. Hydrogen peroxide degrades rapidly and is transformed to hydrogen and oxygen. Peroxyacetic acid also degrades rapidly and is initially transformed to hydrogen peroxide and acetic acid, both of which are ultimately transformed to water and oxygen (EPA, 2007). Ultimate transformation products of hydrogen peroxide and peroxyacetic acid have been determined to be of no toxicological concern (EPA, 2008).

III. RESULTS/DISCUSSION

General Exposure Information

The proposed use of PERformance LS as a laundry sanitizer and bleach is considered an indoor non-food use. According to the proposed product label, PERformance LS is not for household use and is to be used only in commercial industrial/institutional establishments that employ the Ecolab tunnel washer automated dispensing system that is provided by Ecolab, Inc. (Ecolab, Inc., 2008a)

Occupational Exposure

Based on a review of confidential business information describing the Ecolab tunnel washer automated dispensing system (Ecolab Inc. 2008b), the Agency finds that this system is essentially a closed system. Most steps in the Ecolab tunnel washer automated dispensing process pose negligible potential for exposure.

According to Ecolab, Inc. (2008b), one step in the laundry sanitizing/bleaching process, removing the bung from the drum containing the product and inserting the pick-up probe, poses potential for exposure to plant personnel in commercial and institutional establishments for 3 minutes or less once daily. Two other steps in the process have the potential for plant personnel to be exposed no more than twice annually for 5 minutes. For plant personnel involved in these steps with potential for exposure, dermal and inhalation exposure can be mitigated by wearing appropriate personal protective equipment (PPE) or employing preventive measures to minimize exposure.

Non-Occupational Exposure

The only potential pathway of non-occuptional exposure to PERfomance LS occurs when handling and/or wearing clothing that has been sanitized and/or bleached with PERformance LS. Since hydrogen peroxide and peroxyacetic acid are inherently unstable and degrade rapidly into components that are of no toxicological concern (EPA, 2007; EPA, 2008), RASSB finds negligible potential for non-occupational exposure to PERformance LS from this pathway.

Recommended Label Revisions

Although the proposed label recommends PPE to use when handling PERformance LS, more specific information that would be helpful to plant personnel is available from the MSDS for Hydrogen Peroxide (20 to 40%) (FMC, 2006a) and the MSDS for Peracetic acid (5%) (FMC 2006b). Note that the range of percentages (i.e., 20-40%) on the MSDS for hydrogen peroxide is inclusive of the percentage of hydrogen peroxide in PERformance LS (i.e., 27.5%). The PPE recommended on the MSDS for Hydrogen peroxide (20-40%) is somewhat more protective than that for peroxyacetic acid (5%). Since hydrogen peroxide is present at a greater percentage in product than peroxyacetic acid and since peroxyacetic acid can eventually be transformed to hydrogen peroxide, RASSB recommends that the more specific information that appears on the MSDS for hydrogen peroxide (FMC 2006a) be reflected in the Precautionary Statements section of the PERformance LS label. Specifically, RASSB suggests that the label language that follows:

"...The following Personal Protective Equipment (PPE) should be used when handling the product: coveralls over long-sleeved shirt and long pants, socks and chemical-resistant footwear, goggles or face shield, chemical-resistant gloves (such as rubber or made out of any waterproof material), chemical-resistant apron. Wear a mask or pesticide respirator jointly approved by Mine Safety and Health Administration and the National Institute for Occupational Safety and Health."

be replaced with the language that follows:

"...The following Personal Protective Equipment (PPE) should be used when handling the product:

3

For eyes and face: Use chemical splash-type monogoggles and a full-face shield made of polycarbonate, acetate, polycarbonate/acetate, PETG or thermoplastic.

Respiratory: If TWA concentrations in excess of 1 ppm or short-term excursion exposures > 5 ppm are expected, use NIOSH/DHHS approved self-contained breathing apparatus (SCBA), or other approved atmospheric-supplied respirator (ASR) equipment (e.g., a full-face airline respirator (ALR)). **DO NOT** use any form of air-purifying respirator (APR) or filtering facepiece (AKA dust mask), especially those containing oxidizable sorbants such as activated carbon.

Protective Clothing: For body protection, wear protective clothing such as an approved splash protective suit made of SBR Rubber, PVC (PVC Outershell w/Polyester Substrate), Gore-Tex (Polyester trilaminate w Gore-Tex), or a specialized HAZMAT Splash or Protective Suit (Level A, B, or C). For foot protection, wear approved boots made of NBR, PVC, Polyurethane, or neoprene. Overboots made of Latex or PVC, as well as firefighter boots or specialized HAZMAT boots are also permitted. **DO NOT** wear any form of boot or overboots made of nylon or nylon blends. **DO NOT** use cotton, wool or leather, as these materials react rapidly with higher concentrations of hydrogen peroxide. Completely submerge hydrogen peroxide contaminated clothing or other materials in water prior to drying. Residual hydrogen peroxide, if allowed to dry on materials such as paper, fabrics, cotton, leather, wood or other combustibles can cause the material to ignite and result in a fire.

Gloves: For hand protection, wear approved gloves made of nitrile, PVC, or neoprene. **DO NOT** use cotton, wool, leather for these materials react rapidly with higher concentrations of hydrogen peroxide. Thoroughly rinse the outside of gloves with water prior to removal. Inspect regularly for leaks."

In addition to the use of PPE, potential for inhalation exposure can be reduced by use of a local exhaust ventilation system that captures the vapors as they are released from the drum. This system would consist of a drum bung hole vent hood connected to an exhaust fan as described in Burgess (1995).

The proposed label specifies minimum doses to be used as a laundry sanitizer and bleach and as a laundry sanitizer. However, the doses specified on the product label should be doses that must not be exceeded. RASSB recommends omitting the words, "a minimum of" from doses specified on the product label.

IV. CONCLUSIONS

Since hydrogen peroxide and peroxyacetic acid are inherently unstable and degrade rapidly into components that are of no toxicological concern (EPA, 2007; EPA 2008), RASSB finds negligible potential for residential exposure from wearing clothing that has been sanitized or bleached with PERformance LS. No additional exposure data will be required at this time.

IV. REFERENCES

Burgess, W.A. (1995). Recognition of Health Hazards in Industry – A Review of Materials and Processes. Second Edition.

Ecolab, Inc. (2008a). PERformance LS Laundry Sanitizer proposed label, 1677-EET, dated March 14, 2008.

Ecolab, Inc. (2008b). Letter dated September 3, 2008 from Rhonda Schulz, Associate Director of Regulatory Affairs, Ecolab, Inc. to Demson Fuller, AD Chemical Review Manager: PERformance LS, EPA Reg. No. 1677-EET, Additional Information – Tunnel Washer Operation and Chemical Contact.

EPA (2008). Memorandum dated October 17, 2008 from Jenny Tao, AD Toxicologist to Demson Fuller, AD Chemical Review Manager: Peroxyacetic acid and hydrogen peroxide (PERformance LS): Toxicology Review of Proposed Use as Laundry Sanitizer (D353492).

EPA (2007). Memorandum dated July 12, 2007 from Jim Breithaupt, AD Agronomist, to Marshall Swindell, AD Risk Manager: Summary Review of Available Literature for Hydrogen Peroxide and Peroxyacetic acid for New Use to Treat Wastewater (D340077).

FMC (2006a). MSDS: Hydrogen Peroxide (20 to 40%). MSDS Ref. No. 7722-84-1-3, 4/27/2006.

FMC (2006b). MSDS: Peracetic Acid 5%. MSDS Ref. No. 79-21-0-3, 11/10/2006.