The Use of Third–Party Review to Reduce Health and Environmental Hazards from Surfactants and Cleaning Products in the Janitorial Industry

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Abstract

The demand for environmentally preferable products is increasing in the area of Institutional and Industrial (I&I) cleaners. The GreenBlue Institute (GreenBlue) and U.S. Environmental Protection Agency's (U.S. EPA's) Design for Environment (DfE) launched two programs to review surfactant ingredients and final cleaning products, with the National Sanitation Foundation (NSF) conducting third-party reviews. The Local Hazardous Waste Management Program (LHWMP) in King County, Washington, has a strategic goal to reduce the risk of exposure of hazardous chemicals to vulnerable populations such as janitorial workers. This report summarizes the NSF partnership with GreenBlue, CleanGredients, and U.S. EPA's DfE to perform third-party reviews of cleaning product ingredients and its relevance to LHWMP's interest in reducing risks to workers in the janitorial industry. Due to information barriers, workers in the janitorial industry are at risk daily to these hazardous chemicals. The surfactant and formulator review program will make positive contributions towards the reduction of toxic chemical exposure to the employees of the janitorial industry. With proper communication and an increased use of less toxic cleaners, exposures to vulnerable populations can be reduced.

Introduction

Demand for environmentally preferable products is greater than ever before. Pressures from environmental groups, the business community, consumers, and industry are encouraging organizations to use less toxic alternatives to promote a more sustainable environment. One area that NSF International (NSF) has become involved in is Institutional and Industrial (I&I) cleaners. With the collaboration of the GreenBlue Institute (GreenBlue) and U.S. Environmental Protection Agency's (U.S. EPA's) Design for the Environment (DfE), two programs were launched for NSF to conduct third-party reviews of surfactant ingredients and final cleaning products. Many stakeholders participated in creating this process.

Larry Brown and Emmanuel Rivera of the Local Hazardous Waste Management Program (LHWMP) in King County, Washington, are conducting a project on the janitorial industry's exposure to toxic cleaning products. People in this industry are at risk for chemical ingredient exposure. This report summarizes research of the NSF partnership with GreenBlue, CleanGredients, and U.S. EPA to perform third-party reviews of cleaning product ingredients and its relevance to LHWMP's interest in reducing risks to workers in the janitorial industry.

Stakeholders and Sponsors Involved in Review Program

DfE, created by U.S. EPA, is the umbrella group for the surfactant and formulator review and provided initial funding for the review programs. This umbrella group is comprised of multiple stakeholders from government, environmental organizations, industry associations, cleaning product formulators and distributors, and chemical manufacturers and suppliers (U.S. Environmental Protection Agency [U.S. EPA], 2007c). All of these stakeholders are working towards making their I&I cleaning products less toxic to humans and less harmful to the environment.

U.S. EPA's DfE Green Formulator Program was started by the Office of Pollution Prevention and Toxics. They provide chemical knowledge, information resources, and assistance on Green Chemistry. Green Chemistry is a technology that promotes reduction or elimination of hazardous substances through design, manufacture, or use of chemicals in products (U.S. EPA, 2007b). The program gathers information on chemicals and recognizes manufacturers who have produced less harmful products.

GreenBlue is a nonprofit organization that encourages industry to develop new and practical solutions to foster a more sustainable environment. DfE and GreenBlue created the Green Formulation Initiative and managed the steering and technical advisory committee (L. Heine, personal communi-

cation, August 1, 2007). Working with U.S. EPA, GreenBlue has designed and hosts the CleanGredients Web site.

The DfE Green Formulator Program became involved because it believes it can reach a wider audience by encouraging the industry to use CleanGredients and that this approach can effectively promote the use of safer chemicals in cleaning products (L. Heine, personal communication, August 1, 2007).

The CleanGredients database is a "one stop shop for green formulation (T. McGrath, personal communication, June 25, 2007)." It was created by over 500 stakeholders and is a subscriber-provided database of cleaning product ingredients (L. Heine, personal communication, August 1, 2007). The database allows the cleaning product industry to choose less toxic ingredients that benefit and achieve environmental and human health goals of this project (NSF, 2007b; U.S. EPA, 2007c).

NSF will be performing third-party reviews for both the surfactant and formulator programs of the data submitted by the companies. NSF is a nonprofit organization of scientists, engineers, technicians, educators, and analysts. The organization provides testing, certification, and audits for more than 130,000 products in 82 countries (NSF, 2007a). The organization's objective is to provide timely, objective, high quality certification services. NSF only places its "mark" or seal of approval on products that have passed their strict testing criteria (NSF, 2007a). The surfactants and cleaning products that are reviewed in this project will not be receiving NSF marks since NSF is only doing a third-party data verification (T. McGrath, personal communication, June 25, 2007).

The organization conducting the janitorial project is LHWMP. LHWMP is a multiagency program made up of the Environmental Health Division of Public Health Seattle & King County (PHSKC), the Solid Waste and Water and Land Resources Divisions of the King County Department of Natural Resources and Parks, Seattle Public Utilities, and suburban cities. LHWMP has a strategic goal to reduce exposure of hazardous chemicals to vulnerable and traditionally underserved populations.

In addition to the stakeholders already discussed, four sponsors for the CleanGredients database should be mentioned. One sponsor is the International Sanitary Supply Association (ISSA). This association is a group of distributors, manufacturers, building service contractors, and in-house service provider members. The association provides education, technology, legislative, regulatory services, and periodicals to its members (ISSA, 2007).

Another sponsor is the EcoLogo Program, a group established to review a variety of products, such as cleaning products, in order to promote less harmful alternatives. EcoLogo uses a third-party verification system to ensure credibility of their logo. The program assists marketers, consumers, and buyers to identify and use sustainable products (EcoLogo, 2009).

A third sponsor, Reckitt Benckiser, is a household product manufacturing company with a large cleaning product line. Based in England, the company has a sustainability program to move in the direction of creating a more sustainable environment. Their representative has worked on the Technical Advisory Committee (TAC) with GreenBlue and CleanGredients to develop the modules and human health criteria for the surfactant review program (L. Heine, personal communication, August 1, 2007).

The fourth sponsor, Henkel, a company based in Germany, specializes in home care, beauty and personal care, and adhesive products. The company has recognized the importance of a sustainability program and created a comprehensive strategy to achieve its objectives (Henkel, 2007a). Some of those objectives are development of testing methods that do not require animals, optimization of all products to be in line with health and safety considerations, and preparation for European Union's Registration, Evaluation, Authorisation, and Restriction of Chemicals (Henkel, 2007b).

Methods

The surfactant and formulator review program was researched using the information available from the Web sites of NSF, GreenBlue, CleanGredients, and U.S. EPA DfE. This was followed by telephone interviews with Teresa McGrath of NSF and Dr. Lauren Heine of GreenBlue. Information was also gathered from published research reports. The information obtained was analyzed to find its relevance and benefits to the LHWMP Janitorial Industry Project.

Results

History

The surfactant review program was started by GreenBlue, and U.S. EPA's DfE provided the initial funding. The program started as a result of requests from industries that pointed out that an abundance of negative lists or "do not use" lists were circulating (T. McGrath, personal communication, June 25, 2007). Formulators, however, could not figure what they could or should use and wanted the creation of a positive list of ingredients for their products. U.S. EPA and GreenBlue recognized the need to create a database where all available information could be displayed (T. McGrath, personal communication, June 25, 2007).

These suppliers can show their ingredients and formulators can search for ingredients in an online database called CleanGredients. This database was created and is maintained by GreenBlue. The annual fee collected from the suppliers and formulators goes toward maintenance and expenses. Currently, 13 suppliers and 118 formulators are using the database (GreenBlue, 2007a).

Surfactant Review Program

Suppliers begin the review process by subscribing with CleanGredients and receiving materials from NSF needed for the review. The suppliers directly input all data on the CleanGredients database except for Tier 1 attributes, which the TAC has defined to be aquatic toxicity and biodegradability (GreenBlue, 2007a). The TAC for surfactants was made up of the stakeholders and subscribers to the CleanGredients database. These organizations decided these two attributes of a surfactant were vital in determining the harm that it can cause to humans and the environment and thus defined as Tier 1 attributes (L. Heine, personal communication, August 1, 2007). These attributes determine if the surfactant will support an environmentally preferable product formulation. The TAC used information from *DfE Screens for Safer Chemical Ingredients* to support the development of Tier 1 attributes (U.S. EPA, 2007c). In addition to these attributes, the catch-all attribute that applies to human health is called, "No degradation of concern." This is to show that the surfactant will not degrade or change form to cause harm to human health. Since no known surfactant has been proven to be carcinogenic or to cause serious ill health effects, this attribute is used to indicate that the surfactant is not toxic at lower concentrations (T. McGrath, personal communication, June 25, 2007).

Tier 2 attributes consist of acute mammalian toxicity, irritancy, sensitization, presence

of alkylphenol ethoxylates, and volatile organic compound content. This information is required if known and is self-reported. Tier 2 attributes are important in determining whether it will support an environmentally preferable product formulation but does not require submission for third-party data review (GreenBlue, 2007a).

Tier 3 attributes include life cycle analysis, origin of feedstock, endocrine disruption, other product features, risk assessment, and additional aquatic toxicity. Tier 3 information is voluntary but the TAC has defined it as environmentally relevant. Tier 3 attributes are intended to provide more health and environmental perspectives and whether they will support an environmentally preferable product formulation (GreenBlue, 2007a).

The supplier will send in the Tier 1 attribute data to NSF for review. The *NSF International CleanGredients Review Quick Start Package,* available at the NSF Web site, provides detailed information on the stakeholders involved, the procedure, and a checklist on what the suppliers need to do (NSF, 2006a). After NSF reviews the Tier 1 data, they will input the information on the CleanGredients database and the surfactant will become available to the formulators who have subscribed to the database (T. McGrath, personal communication, June 25, 2007).

NSF/DfE Formulator Review Program

U.S. EPA's DfE takes an active role in the Green Formulator Product Review Program. Products that have passed this review are eligible to use the DfE symbol (U.S. EPA, 2007c). A formulator needs to subscribe to the CleanGredients database as a formulator. The company then chooses ingredients from the database, creates a product, and sends data to NSF for third-party review (NSF, 2006b). The advantage to the formulator for using ingredients on the CleanGredients database is that NSF will waive the per-ingredient review fee since the review has already been done. If a formulator wishes to use an ingredient not on the CleanGredients database, they will pay a per-ingredient fee (T. McGrath, personal communication, June 25, 2007). Formulators should use the *NSF International DfE Formulator Review Quick Start Package* available on the NSF Web site. The package provides forms, procedures, and comprehensive information for the entire program. After NSF reviews the data submitted, NSF creates a summary report of each ingredient and includes attributes such as fate, ecotoxicity, human health, and safety profiles. If the product passes the review, NSF will recommend that it be recognized by U.S. EPA's DfE. The formulator will receive a draft memorandum of understanding (MOU) to start a partnership. The formulator then will need to submit summary report and MOU to DfE for final approval. After a product receives the approval, it becomes a partner with DfE (T. McGrath, personal communication, June 25, 2007).

Performance of Products

The surfactants and the final cleaning products that pass the review processes are believed to be less toxic to human health without compromising performance. Consumers may not purchase products that do not meet or exceed performance of cleaners that are toxic. DfE released a document in March 2007 that outlines revised criterion for the review process. One of the criteria is *Product Performance Testing*. Formulators requesting a review and formulators renewing their partnership must submit appropriate performance test results (U.S. EPA, 2008). In order for both the surfactant and cleaning product review programs to be successful, the products being produced must meet the needs of consumers. One study that illustrates the need of marketing these less toxic cleaners as an effective cleaner is the LHWMP's *Household Hazardous Waste Survey*. In the first part of this survey, 1,000 respondents were asked about their perceived risk regarding several different types of household hazardous waste. When asked about household cleaners, the top reason (36% of respondents) given for not using less toxic cleaning products was that they are perceived to be less effective. If the responses categorized as "other" and "don't know/refused" were excluded (both 16%), the next popular response was "doesn't really matter (9%)." The results of this survey indicate that people have a strong misperception of the effectiveness of less harmful cleaning products and this misperception will put people more at risk for exposure (LHWMP, 2004).

Benefits to Janitorial Industry Project

The Janitorial Industry Project can see a positive impact from the two review programs. Cleaning product toxic exposures makes English-as-a-second-language (ESL) populations more vulnerable, since they often cannot read the cleaning product labels. This project reaches out to the employees of the cleaning industry and the unions, which influence the janitors (Brown & Rivera, 2007). It is suggested that a benefit extends to the vulnerable and underserved communities of janitors. Some of these people are not proficient in English and have limited access to information on the products they are using. Many of them are at daily risk of exposure to hazardous chemicals. If the products that are being used have gone through the review process, it would be less critical or less important for people to read the labels.

A study that was recently published by the Washington State Department of Ecology in April 2007 shows the vulnerable aspect of minorities. The study, *Reducing Toxic Threats Statewide Household Survey*, surveyed households regarding many areas of toxins and toxic exposures. A total of 601 surveys were conducted, 23 of which were completed in Spanish. When Spanish-speaking respondents were surveyed regarding their opinions and myths about toxic products, they were more likely to agree with the statement that "concerns about dangers of toxic products were exaggerated" than non-Spanish speaking respondents (Jull et al., 2007). The results indicate that an information barrier exists with the Spanish-speaking community in Washington. Communication is an essential component to reduce chemical exposure. With an increased use of less toxic cleaners and the communication of correct information, exposures to underserved and vulnerable populations can be reduced.

Conclusion

The surfactant and formulator review program created by GreenBlue, U.S. EPA's DfE, and the third-party role of NSF are steps in the positive direction of reducing toxic cleaning product exposure. Janitorial companies and individual consumers now have an easier way of identifying less harmful products that can meet or exceed performance expectations. In order for both programs to be successful, the products being produced must meet the needs of consumers.

The two review programs can be improved with tools to appeal to private organizations and government agencies such as LHWMP. Outside the realm of I&I cleaners these programs are unknown, and increasing awareness of these programs can further reduce the dangers of toxic cleaners. Currently, the surfactant suppliers subscribed to

CleanGredients do not use the name "CleanGredients" to market their products. If these organizations can create ways to popularize CleanGredients and the U.S. EPA's DfE Green Formulator Program, coupled with an increased use of less toxic cleaners, exposures to underserved and vulnerable populations can be reduced.

Acknowledgments: The research reported here was funded through NSF International and with assistance from the Association of Environmental Health Academic Programs. Appreciation is extended to Jefferson Ketchel and Larry Brown of LHWMP for their guidance and time spent on revision of this document, Dr. Lauren Heine of GreenBlue, and Teresa McGrath of NSF International for their explanations of the review processes.

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QUICKFACTS

Dust Mites

- Exposure to dust mite allergens has been causally linked to development of asthma in children.
- The likelihood of developing sensitivity to the allergen increases as exposure increases.
- The allergen occurs primarily in the mite feces.
- At 10–40 mm in size, the feces tend not to remain airborne for long.
- Dust mites require a relative humidity of at least 50% to flourish.
- Nevertheless, over 80% of U.S. homes are thought to have detectable levels of dust mite allergens in bedrooms.

Source: National Center for Healthy Housing, Housing Interventions and Health: A Review of the Evidence, *January 2009.*

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