

INTRODUCTION

In the United States, cleaning and maintaining office, retail, commercial, industrial, educational, and healthcare facilities is a \$49-billion industry that employs 2.8 million people as maids, housekeepers, janitors, and cleaners (BSCA 1999; BLS 1999a). Cleaning is an essential part of maintaining a healthy, comfortable, and attractive indoor environment. With U.S. sales of cleaning chemicals climbing to \$6.14 billion in 1997 (ISSA and SM 1999), Green Seal believes that it is appropriate to establish an environmental labeling standard for industrial and institutional cleaning products. The standard will help users and purchasers of cleaning chemicals select products that clean effectively while minimizing negative health and environmental effects. Aberdeen Proving Ground is sponsoring this work, and Green Seal expects to pilot the standard with Aberdeen Proving Ground.

The University of Tennessee Center for Clean Products and Clean Technologies worked together with Green Seal to evaluate three classes of industrial and institutional cleaners: general-purpose cleaners, bathroom cleaners, and glass cleaners. Green Seal focused on these three cleaners because they are frequently used and, with annual sales of \$2.38 billion, they represent a large portion of the industrial and institutional cleaner market (ISSA and SM 1999). In performing this evaluation, Green Seal collected information on the ingredients of over 120 products and qualitatively examined their life-cycle environmental impacts. This evaluation is not a quantitative life-cycle assessment as defined by the Society of Environmental Toxicology and Chemistry and the United States Environmental Protection Agency (EPA).

Cleaning promotes a healthy environment. It controls harmful organisms including insects, rodents, and microorganisms that can carry or cause disease in humans. Because people spend the majority of their time indoors, a healthy indoor environment is critical to maintaining human health (Berry 1994). Cleaning also helps maintain a comfortable and attractive environment by controlling odors, soil and dirt and by contributing to orderliness. Finally, cleaning protects valuable materials by removing soils that wear away surfaces.

However, those who are responsible for maintaining a clean indoor environment may be at risk. Individuals whose jobs require the use of cleaning products may be exposed to these products for several hours a day over several years. Some cleaning chemicals can severely damage the skin and eyes, some are readily absorbed through the skin, and some are flammable. The United States Chemical Safety and Hazard Investigation Board lists liquid cleaning compounds among the top twenty causes for chemical incidents, excluding fuels (U.S. Chemical Safety and Hazard Investigation Board 1999).

Cleaning chemicals also affect building occupants and the environment. In particular, volatile cleaning chemicals may contribute to poor indoor air quality, which can cause headaches, dizziness, eye irritation, and fatigue. The extraction, manufacture, and disposal of cleaning chemicals also generate negative environmental impacts. Industrial and institutional cleaners can be toxic to aquatic life, and some ingredients

persist in the environment. Recently, a number of organizations (including EPA; the states of Vermont, Massachusetts, Minnesota, and Washington; the city of Santa Monica, California; King County, Washington; and Santa Clara County, California) have developed environmental purchasing programs for cleaning products (Barron et al. 2000). Such efforts reflect the concerns of purchasers about the effects of cleaners on users, building occupants, and the environment.

In 1993, Green Seal issued a standard for general-purpose household cleaners; this standard and accompanying environmental evaluation laid the groundwork for many of the state and local environmental purchasing programs for cleaners. Green Seal's standard for industrial and institutional cleaners builds on this previous work. The industrial and institutional standard applies to a broader range of products than the household cleaners standard (general-purpose, bathroom, and glass cleaners), and it reflects a greater concern for worker health and safety due to the greater exposure of workers to cleaning chemicals. In developing this standard and evaluation, Green Seal considered new research on cleaning chemicals, particularly on the environmental fate of alkylphenol ethoxylates and the increasing use of antimicrobials.

This document is divided into six parts. The standard, presented in Part 1, is the result of Green Seal's research to define criteria for identifying environmentally preferable industrial and institutional cleaning products. Readers may wish to review the standard first and then review Parts 2 through 5 to understand how Green Seal developed their criteria. Part 2 contains the results of Green Seal's survey of industrial and institutional cleaning products. Part 3 presents the health and environmental impacts of common cleaning ingredients. Existing health and environmental standards and purchasing programs are discussed in Part 4. Green Seal discusses cleaning performance standards and testing in Part 5.