

Case Study:

Usage of Environmentally Responsible Cleaning Solutions at Dalhousie University

Summary

Each year, Dalhousie University uses approximately 950,000 litres of cleaning solutions to clean 4.8 million square feet of space used by about 16,000 students and 3,000 staff. This means approximately 50 litres of cleaning solution is used per facility user annually. In 2008, Dalhousie's Facilities Management, with assistance from its Environmental Health and Safety Office, converted to environmentally responsible general purpose cleaners, degreasers, carpet cleaners and deodorizers. These new cleaning solutions are less toxic, and can be used with cold water, making them safer while saving energy, emissions and costs. In addition, less volume of product is required, thus reducing packing and chemical costs by up to 25%. Additional benefits include improved janitorial staff morale and productivity, approval of facility users and stronger supplier-customer relationships for future sustainability product development. Dalhousie University supports other universities wishing to convert to environmentally responsible cleaning, by sharing their story and providing assistance.

Environmental and Human Health Impact of Traditional Cleaning Solutions

Cleaning solutions are applied to create liveable and healthy indoor environments. Yet, chemicals in some cleaning solutions can be damaging to human health and the environment. "Approximately one out of every three commercial cleaning products contains harmful chemicals that are linked to cancer, reproductive disorders, asthma and other respiratory ailments, or skin and major organ damage."¹

Cleaning solutions can also result in occupational hazards. About six out of every 100 janitors are injured each year, 20% of which are serious burns to the eyes or skin while 12% are resultant of chemical fumes². On average, 25% of the 85-105 kg of cleaning chemicals each janitor handles annually are hazardous substances³ (weight did not include water for dilution in usage).

In addition to human health effects, chemicals in cleaning solutions can also detrimentally affect the quality of water resources and harm aquatic and terrestrial life. According to a 2002 United States Geological Survey study, 69% of streams sampled contained persistent detergent metabolites and 66% contained disinfectants⁴.

Traditionally, concerns were focused on volatile organic compounds (VOCs) and scents that could be harmful to building tenants. Emerging concerns now include toxic chemicals that may be endocrine disruptors and carcinogens. Endocrine disruptors are synthetic chemicals that can mimic or block hormones and disrupt the normal body functions of humans and other animals. Carcinogens are agents directly involved in the promotion of cancer or in the facilitation

¹ Green Cleaning. Northeast Assistance & Pollution Prevention News, Spring 2007. www.newmoa.org/prevention/newsletters/17_1/Vol7_1.htm

² INFORM Inc., Cleaning for Health in New England Schools. www.informinc.org

³ INFORM Inc., Cleaning for Health in New England Schools. www.informinc.org

⁴ Cleaning Products. Worldwatch Institute. www.worldwatch.org

of cancer propagation. Harmful chemicals classifications commonly found in cleaning solutions and their associated environmental/human health effects include: phosphates (eutrophication); alkylphenol ethoxylates (endocrine disruptor); ammonia (asthma, respiratory disease); methyl ethyl ketone (irritation to eyes, throat, nose and skin, possible neurological damage after chronic exposure); dibutyl phthalate (endocrine disruptor, possible kidney damage); heavy metals such as lead, mercury, cadmium; toluene (possible liver, kidney and brain damage); and quaternary ammonium compounds in disinfectants/sanitizers (toxicity to aquatic life, asthma, allergies).

Human reactivity to chemicals in cleaning solutions is dependent on a number of factors, including: time over which exposure took place (acute or chronic), frequency and number of exposures, dose of exposures, individual's sensitivity to the chemical, *etc.* Janitorial staff are exposed to chemicals in cleaning solutions during their intended use, spills, and disposal. Facility users are exposed to residual cleaning chemicals during their time in the facilities.

Finally, chemicals in cleaning solutions can have an adverse effect on the environment. Some cleaning solution chemicals are not biodegradable and can bioaccumulate in the environment. Aquatic organisms are exposed to these chemicals when the chemicals are washed down drains during regular use or are disposed of improperly. Terrestrial organisms are also exposed to these chemicals by improper disposal on land or bioaccumulation in organisms they consume. Of particular concern are endocrine disruptors which cause subtle to dramatic effects in mimicking growth and behavioural hormones, especially in aquatic organisms, and carcinogens, some of which are identified by the Canadian Environmental Protection Act (CEPA) to be toxic.

Conversion

The conversion to new cleaning solutions by Dalhousie's Facility Management was relatively simple due to the existence of products certified by well-recognized product certification programs such as EcoLogo (Canadian) and Green Seal (American).

EcoLogo Program

The EcoLogo Program was established by Environment Canada in 1988 to help purchasers identify products and services that are less harmful to the environment. Products must undergo rigorous testing to ensure that they meet strict environmental standards before they can be certified. To identify EcoLogo certified products look for the EcoLogo (three stylized doves intertwined to form a maple leaf) on the product label.



Green Seal

Green Seal, a not for profit organization in the United States, was founded in 1989. It certifies products and services based on science-based environmental standards. Standards are based on a life-cycle approach to ensure that all significant environmental impacts of a product are considered, from raw materials extraction, to manufacturing, to use and disposal. To identify Green Seal certified products look for the Green Seal logo on the product label.



The existence of recognized certified products allowed for language in the tender to reference requirement for certified products rather than writing out technical specifications at length. Dalhousie went a step further and obtained significant input from the University's Director of Environmental Health and Safety Office who has Ph.D. in Chemistry with special expertise in chemical toxicity. Dalhousie added extra technical requirements to its tender but allowed for the customization of existing products by bidders to meet these new requirements.

Training for staff was provided by the supplier, which was routine for any switch to new cleaning products. No complications were encountered in the transition to slightly different processes and janitorial staff involved with the full testing of new products were very satisfied with their performance.

Benefits

Cost Reduction

Total cost of new cleaning solutions is estimated to be up to 25% less than for cleaning solutions purchased in previous years. The savings come from concentrated cleaning solutions that can be used at higher dilution rates and metered dilution for proper amount usage in specific applications. Packaging is also reduced as less product is needed, while previous energy reductions are sustained as all cleaning products remain diluted with cold water.

Increased Effectiveness

Dalhousie's janitorial staff confirm that the new cleaning solutions are significantly more effective than ones previously used.

In addition to microfibre cloths which have been in use for the past few years, microfibre high dusting, floor mopping and waxing systems new introduced increase cleaning effectiveness and reduce waste. Microfibre is, both, more effective and durable than regular cloth, sometimes even eliminating the need for cleaning solutions. More effective cleaning saves time, allowing janitorial staff to take care of other duties.

Elimination of Toxic Chemicals

Three new daily-use environmentally responsible cleaning products replace over 40 previously used cleaning products, and reduce annual production and disposal of approximately 870,000 litres of general purpose cleaners, 60,000 litres of degreasers, 15,000 litres of deodorizers and 10,000 litres of carpet cleaners. This is about 50 litres of chemical cleaning solution per regular facility user annually! By pledging to use environmentally responsible cleaners and procedures, Dalhousie University is confirming its avoidance of toxic chemicals found in and otherwise associated with many traditional cleaners. Constantly changing products and usage volumes over time make it near impossible to determine exact amounts of toxic chemicals eliminated.

Dalhousie is also working with its cleaning solutions provider to develop strippers and waxes which will also meet its standards. High density vinyl flooring not requiring waxing is being explored, where possible, to further reduce the need for chemical cleaning solutions.

Students in residence have free access to environmentally responsible cleaning solutions to clean their rooms, extending toxic chemical reduction and exposure beyond janitorial staff's work.

Increased Safety

In fully converting to cold water and metered dilution, there is less chance of misting in product use from cooler solution temperature and mixing in exact proportions, creating a safer work environment for janitorial staff.

Social Impact

Dalhousie's janitorial staff and facility users have expressed approval of the new products, with staff morale increasing from knowing the new products are more effective, safer, better for their health, facility users' health and the environment. There is all-around pride that comes with being a leader in this area of accountability, and with willingness to share the secrets of success.

Dalhousie University's Leadership

Dalhousie University is among the first universities in Canada to fully convert to cleaning with environmentally responsible cleaning solutions, and may be the first to work with a supplier to develop new cleaning solutions that exceed EcoLogo certified standards. Other clients will be able to use these new products and other universities will be able to learn from Dalhousie's experience.

Future work includes making the conversion to environmentally responsible cleaning solutions more visible to facility users and the public.

CONCLUSION

The benefits to cleaning with environmentally responsible cleaning solutions clearly outweigh the efforts of making the change. It is a win-win result in terms of environmental responsibility and cost.