

# Training for a Non-Toxic Workplace

AN INNOVATIONS AT WORK PROJECT

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(Workers' Compensation Board of British Columbia).

## FINAL REPORT



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Labour Environmental Alliance Society [www.leas.ca](http://www.leas.ca)  
1203-207 West Hastings Street, Vancouver, BC V5L 2R8  
Tel: 604-669-1921 Fax: 604-696-9621 E: [office@leas.ca](mailto:office@leas.ca)

## Executive Summary

The hotel industry and school districts are heavy users of commercial-institutional cleaning products. Many of the products that are used contain toxic ingredients, including carcinogens, reproductive toxicants, asthmagens and endocrine-disrupting chemicals, which pose a health risk to workers using cleaning products on a regular basis. Often workers are limited in their knowledge of chemicals because they do not receive training on the potential health effects, including chronic effects, of chemicals and because barriers sometimes exist in obtaining access to Material Safety Data Sheets (MSDS) and MSDS information on toxicological effects. The purpose of the project was to determine if greater knowledge about toxic cleaning products and training on chemical exposure regulation and product substitution — provided by an outside organization in a worker-friendly environment — could lead to institutional change on product purchasing and use.

After numerous exploratory meetings with prospective project partners, researchers with the Labour Environmental Alliance Society arranged with three B.C. school districts and two B.C. hotels properties to carry out the project with their joint occupational health and safety committees and staff. MSDS for all cleaning products used in the schools and hotels were gathered and products reviewed for potentially toxic ingredients using criteria developed by LEAS that included screening for carcinogens, reproductive toxicants, sensitizers and asthmagens. Based on that review a priority list of candidate chemicals for substitution was developed for each committee. Training workshops were then held with committees in each district and hotel that covered education on reading MSDS, determining the potential health effects of cleaning product chemicals, using Internet research to obtain more information, and developing OH&S committee strategies to replace products that contain toxic ingredients with safer substitutes. The LEAS research coordinator made it clear that committees retained complete autonomy in deciding how to deal with any toxic product ingredients identified and were under no obligation to make changes simply because they were participants in the project. The workshop sessions demonstrated that when detailed information was provided on chemicals used in the workplace and both OH&S committees and staff became aware of potential health and environmental effects, participants were highly motivated to seek safer products and carry out product substitution. Following the workshops, the research coordinator consulted with committees to provide assistance and to review what changes were made in product use. At the conclusion of the project (which was extended for four months), all projects had made changes in their product purchasing and use. Products containing carcinogens and reproductive toxicants identified in the various product reviews were eliminated from use in four of the five participating project sites and were proposed for substitution in the fifth site. The eliminated products were replaced with safer substitutes. Two Lower Mainland school districts made a further decision to discontinue their existing conventional product use, to begin using a line of

environmentally-certified products. and to follow that certification standard in future product purchasing. A publication entitled Cleaners and Toxins Guide, which contains priority lists of some 29 chemicals for substitution, was produced as part of the project and will be available as a handbook for workers in the commercial cleaning industry.

The project results suggest that directed training for OH&S committee and cleaning staff can create the motivation for making a change to safer, greener products. The methodology has wide application in other sectors where cleaning products are used and could produce similar results.

## The issue and context

The hotel industry and school districts are heavy users of commercial-institutional cleaning products. Despite improvements in the cleaning product industry over the past several years, many of the products used still contain toxic ingredients, including carcinogens such as tetrachloroethylene and trisodium nitrilotriacetate, as well as reproductive toxicants, endocrine-disrupting chemicals, asthmagens and substances listed as CEPA-toxic under the federal Canadian Environmental Protection Act 1999. The risk of adverse health effects from those toxicants is difficult to define, but there is a clear risk, evidenced by U.S. studies that indicate that commercial-institutional cleaners have the highest rates of occupational asthma among blue-collar workers. At the same time, there is a growing public awareness of the impact of toxic substances on health and the environment, which is in turn encouraging the development of “green products” that are free of most of the toxic substances often found in conventional cleaning products.

Even as that public awareness grows, however, its application in the workplace is constrained by the limited knowledge of the specific products and ingredients being used and their potential health effects. Workplace Hazardous Materials Information System (WHMIS) training and the availability of Material Safety Data Sheets should in theory provide the knowledge, but there are often gaps in the information provided by training. The barriers to direct MSDS access created by electronic systems and the frequent non-disclosure of key toxicological information on MSDS also limit knowledge.

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## The methodology

During the summer of 2006, staff researchers with the Labour Environmental Alliance Society (LEAS) conducted pre-project interviews and meetings with three school districts, Surrey, New

Westminster and West Vancouver, and two hotels, the Fairmont Vancouver and the Fairmont Empress in Victoria, to secure their participation in the project. However as the work got underway in October, 2006, changes were required. After receiving an initial product review from LEAS, the West Vancouver School District decided not to proceed further, opting to make changes on its own instead. The Surrey School Board withdrew from the project following changes in operations management at the district. The North Vancouver School District also expressed interest and held an exploratory meeting with LEAS but later declined to participate. LEAS had to conduct further interviews and reached agreement with the Burnaby School District and the St'at'imc First Nations School District. The inclusion of the Burnaby School District provided an additional dimension to the project, since Burnaby had carried out an informal product review and initiated some changes in 2002 in collaboration with LEAS. However, numerous new products containing toxic ingredients were subsequently introduced to the district following a change in suppliers.

In the spring of 2007, LEAS also conducted three meetings with hotels to secure a third hotel property as a project participant. LEAS also applied for an extension to extend the project to the end of 2007, in order to accommodate busy spring and summer hotel seasons. However two properties, after tentatively agreeing to participate, later declined, indicating that they were unable to make the necessary staff time available for workshops. Another opportunity at a third hotel was also lost when staff and management became involved in a lengthy contract dispute. As a result, the project work was focussed on the original two hotel partners, the Fairmont Vancouver and the Fairmont Empress in Victoria.

LEAS Research Coordinator Sean Griffin met initially with the joint occupational health and safety committee in the two Fairmont hotels, the district OH&S committee (including teachers and support staff) in the New Westminster School District and the custodial OH&S committee in the Burnaby School District. In the case of the St'at'imc School District, because there are too few employees for an OH&S committee, the meetings took the form of community workshops, which included custodial staff.

At each of the meetings, LEAS research staff outlined the process the project would follow:

- The collection of MSDS;
- A LEAS review of products, identification of potentially toxic ingredients and creation of a priority list of products for substitution;
- An eight-hour workshop for OH&S committee members and follow-up meetings to consider committee strategies and action on products identified as candidates for substitution.
- A review of results at the end of the project.

Research staff made it clear that committees retained complete autonomy in deciding how to deal with any toxic product ingredients identified and were under no obligation to make changes simply because they were participants in the project.

OH&S committees were asked to provide printed copies of MSDS for all cleaning as well as floor and carpet care products currently in use in schools in the district or in the hotel properties. Products such as paints and lubricants, even where they may have been used by custodial staff, were excluded from the review.

Once the MSDS were collected, LEAS research staff examined MSDS for compliance with WHMIS regulations, to determine whether sheets were current and whether they included all 54 items of required information. Where sheets were out of date or otherwise non-compliant, a new sheet was requested from the supplier and any non-compliance was noted.

## Products, ingredients reviewed

Research staff then reviewed product ingredients listed on MSDS for each project participant and developed a priority list of ingredients for potential substitution based on the following criteria:

- Inclusion of the ingredient on a list of IARC 1, 2A or 2B or ACGIH 1 and 2A, or California Proposition 65 or EPA known, probable or possible human carcinogens;
- Inclusion of the ingredient on the Proposition 65 list of reproductive or developmental toxicants or the ACGIH list of R-designated substances;
- Inclusion of the ingredient on the CEPA Priority Substances List 1 or 2
- Substances designated by ACGIH as sensitizers
- Substances with a high toxicity profile for liver, kidney or respiratory damage, based on a number of sources;
- Substances that can react with other materials in the workplace to create toxic gases.

LEAS research staff developed an eight-hour workshop as the training component of the project. It consisted of:

- A introductory presentation on the potential health effects of carcinogens, reproductive toxicants, endocrine disrupting chemicals and asthmagens and the association of some common cleaning product ingredients with those health effects;
- An introduction to the provisions of the WorkSafe Occupational Health and Safety Regulation governing workplace use of hazardous materials, with specific reference to Part 5.57 on product substitution;
- A review of MSDS to encourage greater user and understanding and to highlight areas where inaccuracies and non-disclosure of information occur;
- An interactive session, using a computer lab and accompanying handout materials, to provide internet training on ingredient research;
- An explanation of LEAS' priority list of toxic ingredients used in the project workplace,

coupled with a group discussion of product usage, potential for substitution and strategies for making product changes.

- Group discussion of a proposed handbook for cleaning and custodial workers, based on revising and updating an existing version. Copies of the old handbook were provided for comment at the workshop and later in personal communication with LEAS research coordinator Sean Griffin.

Participants in the project consisted of:

**Fairmont Vancouver Hotel:** The 10-member Occupational Health and Safety Committee. Nine of the committee members participated in the eight-hour training workshop.

**Fairmont Empress Hotel:** The 12-member OH&S committee. All were scheduled to participate in the training workshop, but a staff emergency on the scheduled day — arranged after several previous postponements — reduced that number to five.

**New Westminster School District:** The 10-member OH&S Committee in addition to custodians in the district. Twenty-five custodians, virtually all of those working for the district, attended the eight hour workshop.

**St'at'imc First Nations School District:** One custodial staff and community members.

**Burnaby School District:** the eight-member Custodial OH&S Committee, in addition to the 12 custodial supervisors in the district. Additional training was provided in Burnaby, where, in addition to an OH&S committee workshop, two one-hour workshops were conducted with all 160 custodians in the district. In both cases, the material from the eight-hour workshop was adapted, with particular attention paid to the workplace product review.

## Research/project findings

*There is limited knowledge among both management and worker representatives on OH&S committees about the toxicity of cleaning product chemicals, the information that should be provided on MSDS and the regulations governing chemical exposure in the workplace.*

Nearly all participants in the project had the benefit of basic WHMIS training, covering workplace product labels, identification of acute hazard symbols and access to MSDS. But few had any knowledge of any chemicals that might pose a chronic hazard in the workplace and no one was familiar with either the chronic hazards designations on MSDS or Part 5.57 of the WorkSafe OH&S Regulation that provides for regulatory substitution of designated chemicals. Similarly, no participant was aware that chemical exposure in B.C. workplaces is regulated based on an amended ACGIH table of exposure limits.

*Electronic retrieval systems are frequently a barrier to full workplace MSDS access, contributing to the lack of information about chemicals used in the workplace.*

In every project workplace where an electronic retrieval system was used for MSDS, workers were not able to access sheets readily. In one hotel, the electronic system stored MSDS for maintenance products in a compressed format that could not produce readable printed documents. The Fetch system, used in the two Lower Mainland school districts was somewhat better, but there were numerous instances where workers were unfamiliar with the pass code system for obtaining MSDS or didn't have access to a fax machine to receive the MSDS (when working on an afternoon shift, for example). In one district, many MSDS for products currently in use in the district were not available from the Fetch system, because they had not been filed on the central database. The Fetch system requires that each district upload its MSDS to a central server. If that is not done on a regular basis, gaps inevitably arise in MSDS availability.

Cleaning products used in the school districts and the two hotels at the beginning of the project contained numerous ingredients associated with chronic health hazards.

Those ingredients were:

- Tetrachloroethylene, an IARC 2A carcinogen (probable human carcinogen), found in a vandal mark eraser, used in one school district.
- Paradichlorobenzene, an IARC 2B carcinogen (possible human carcinogen), found in urinal blocks used in two school districts.
- Trisodium nitrilotriacetate, an IARC 2B carcinogen, found in a carpet treatment product in one school district and warewashing products used in both hotels.
- Cocamide diethanolamine, an EPA Group C carcinogen (possible human carcinogen), found in a soap used in one school district and manual warewashing products used in both hotels.
- Silica, an IARC 1 carcinogen (known human carcinogen) found in metal polishing compounds that release respirable dust used in one school district and one hotel.
- Toluene, a reproductive toxicant listed by California's Proposition 65, found in a vandal mark eraser used in one school district.
- N-methyl 2-pyrrolidone, a reproductive toxicant listed by California's Proposition 65, found in graffiti removal towels used in one hotel.
- Dibutyl phthalate, a reproductive toxicant listed by California's Proposition 65 and listed as an R-designated substance by ACGIH, found in a floor care product used in one school district.
- Octyl and nonyl phenol ethoxylates, endocrine-disrupting chemicals, listed as CEPA-toxic under the Canadian Environmental Protection Act. Found in cleaning and floor care products used in one school district and an air freshener used in one hotel.
- Ethylene glycol monobutyl ether (2-butoxyethanol), a substance listed as CEPA-toxic, found in cleaning and floor care products used in all three school districts and both hotels.

- Ammonia, a suspected asthmagen, and sodium hypochlorite (chlorine bleach). Both ingredients were placed on the priority list for substitution, especially where the two ingredients were being used in the same workplace, or where bleach was being used on the same site as an acid bowl cleaner.

***Awareness of the toxicity and potential health effects of product ingredients and trust in the source of information motivated project participants to seek safer products and make product substitutions.***

Initial meetings with project participants revealed some skepticism, particularly among management representatives on OH&S committees, that a product review might result in exaggerated health and environmental concerns and might lead to greatly increased costs because of product changes. Project research staff consistently assured participants that any product changes were entirely the prerogative of the workplace committee and designed workshop materials to ensure that information about potential chronic health effects associated with product ingredients was well-documented and referenced. As a result, the initial skepticism was overcome and the awareness created by the new information carried a high degree of motivation for most participants and committees, as evidenced by the product substitution that was achieved.

***Product substitution to replace products containing toxic ingredients with safer products was achieved in all project sites. In two school districts, the decision was made to replace most products with a new line of environmentally certified green products.***

The decisions to make product substitutions were made at different times in the project depending on the project site. In the case of the Burnaby School Board, the decision was made almost immediately following the OH&S committee workshop and discussion of the product review (although it evolved further as the project progressed). In the case of New Westminster, the decision came near the end of the project, in part because the decision involved a significant change in product purchasing policy, from conventional to green procurement. Again, the decision to adopt a green cleaning policy was a management initiative, made in response to the issues raised in the product review.

In other sites, product substitutions have been made as the project progresses and changes will continue to be made beyond the project dates, as new substitutes are found. The Fairmont Vancouver Hotel was a notable example of an effective OH&S committee in that all the recommendations for changes came from the committee (in response to the product review) and were subsequently adopted by management.

Contracts with suppliers were clearly a factor in carrying out product substitution. Where existing suppliers were able to provide alternatives, either within the current product line or from another manufacturer represented by the same distributor, substitution was more easily implemented. The absence of a binding contract with a supplier also made it easier for those project sites that wanted to make product changes. Where a binding contract was in place between an outside purchaser and a cleaning product distributor — which was the case for the

two Fairmont hotels — project sites had to find safer products within an existing product line, something that was not always possible. OH&S committee members reported that seeking an alternate supplier for a safer product involved decision-making at a higher management level where there may not be the same level of motivation to make the change as on the workplace OH&S committee.

Significantly, cost was not ultimately a deciding factor, even though it was an important underlying consideration in the initial discussion around product substitution. In all worksites, the final decision to change either a number of specific products or an entire cleaning product line was made without reference to cost. The supplier for the new green line in Burnaby and New Westminster may have independently provided assurance that costs would be maintained, but it was not a determining factor in the decision to replace toxic products with safer alternatives.

The changes in summary:

**Hotel Fairmont Vancouver:** A metal polish, containing potentially respirable crystalline silica was replaced with an alternate product, which uses non-carcinogenic fumed silica.

Another metal polish and two manual warewashing detergents, all containing cocamide diethanolamine, were eliminated from use. Substitutes for a fourth manual warewashing detergent were still being sought from the supplier as the project ended Dec. 31.

**Fairmont Empress, Victoria.** A metal polish, containing potentially respirable crystalline silica, was eliminated from use, as was a air freshener containing octyl phenol ethoxylate. Another product, containing 2-butoxyethanol, was discontinued as a result of contracting-out of laundry services. Five additional products, variously containing 2-butoxyethanol, cocamide diethanolamine, n-methyl-2-pyrrolidone and trisodium nitrilotriacetate, have been listed for substitution and will be replaced as soon as safer substitutes are available from the manufacturer/distributor that supplies the Fairmont chain.

**Burnaby School Board:** Nine products identified during the product review, variously containing silica, cocamide diethanolamine, 2-butoxyethanol, nonyl phenol ethoxylate and dibutyl phthalate were dropped from use and unused new stock returned to the distributor. Arrangements were made with the existing distributor to supply equivalent products from Enviro-Solutions, a green line of Environmental Choice and Green Seal-certified products. The district will continue use of Johnson Wax Complete (not flagged for substitution in the product review) pending performance testing of an Enviro-Solutions or other environmentally certified product, which will be introduced for the summer 2008 maintenance program.

**St'at'imc First Nations School District:** a carpet pre-spray containing 2-butoxyethanol was replaced with a Green Seal certified all-purpose spotter. Urinal blocks containing paradichlorobenzene were replaced with non-para urinal blocks. A powdered cleanser containing respirable crystalline silica was replaced with a liquid cream cleanser that met LEAS standard.

**New Westminster School District:** all existing products, with the exception of a floor wax (which had not been flagged for substitution in the product review) were eliminated from use and replaced with equivalent products from EnviroSolutions, a green line of Environmental Choice and Green Seal-certified products. Phase-in of the new products was begun in the final month of the extended project, with full integration throughout the district slated for March, 2008. Demonstration of new environmentally-certified floor care products was scheduled to take place in spring 2008, with the selection expected to be complete by the time the district-wide floor waxing program begins in the summer. Chlorine bleach will, however, be retained by the district, to be used only where required by the local health authority.

For each site, product substitutions were either recommended by project research staff or were reviewed for ingredient content by project research staff where suggested by suppliers. The review was considered unnecessary in the case of products that came with Environmental Choice or Green Seal certification, since the criteria set by both certifying bodies meets or exceeds the criteria used by LEAS in the project.

A publication, entitled Cleaners and Toxins Guide, was produced, which will provide continuing assistance to project participants and will be available as a handbook for OH&S committees, workers and suppliers throughout the commercial-institutional cleaning industry. In consultation with project participants, LEAS Research Coordinator Sean Griffin produced the 28-page publication, which includes an outline of the health and environmental issues, suggestions for Internet research and a list of priority ingredients for substitution. Photos of project participants at work have been included throughout the handbook. Cleaners and Toxins Guide was based on an existing LEAS publication, which was updated, expanded and completely revised in the course of the project.

Implications for future research/projects on workplace health and safety

*To work effectively within the culture of workplace health and safety committees, it is important that outside organizations establish a high level of credibility and trust, based on past work and the quality of the information and research they provide.* There is often skepticism that an outside group can bring any knowledge not already available to the committee and sometimes even distrust of the group's perceived agenda. An established reputation for effective research, based on past work, and well-documented information and research are of key importance in effective work with workplace OH&S committees.

*An active functioning OH&S committee is also essential, both for initiating projects like this in the workplace and to ensure that they achieve some success even when there are personnel changes.* There were numerous management changes at project sites during the course of his project, affecting both hotels and three school districts, including districts that opted not to participate in the project after initial meetings. In cases where the OH&S committees were not

fully integrated into the project from the outset, those personnel changes were a major factor in project withdrawals. In the case of one project participant, the committee's work almost always fell to the two co-chairs, both of whom were already over-subscribed with responsibilities related to their employment. The result was numerous meeting postponements and delays in making decisions. But where the full committees were engaged in the process, they were able to ensure that the work continued more or less on schedule. Even when committee and management changes created interruptions, other committee members and co-chairs stepped up to keep project work on the agenda.

***Effective exposure control of chemicals used in the workplace is only possible if there is ready access to MSDS.*** The increased use of electronic retrieval systems, while arguably providing a more manageable way to store MSDS, often puts up an additional barrier to MSDS access. The inability of many OH&S committee members on our project sites to obtain MSDS from electronic retrieval systems, either because they were stored in unreadable formats or because people lacked access codes and accessible fax machines, suggests that electronic retrieval is not working as WHMIS and WorkSafeBC Occupational Health and Safety Regulation intended.

***More detailed training for OH&S committees on chemical use in the workplace and regulations governing chemical exposure could help create a safer workplace and promote use of healthier, greener chemicals.*** Most of the OH&S committee members and many workers on our project sites had had the benefit of basic WHMIS training. But the motivation for change that came with an increased knowledge of potential health and environmental effects of certain toxic chemicals suggests that more detailed training could make product review and chemical control an ongoing process and help promote green cleaning.

***More research is necessary to determine whether this approach could achieve comparable results on a sector-wide basis, encompassing the commercial and institutional cleaning industry.*** The project partners in this project involved worksites where there was effective union representation on the OH&S committee, a relatively stable workforce and in the case of the school districts, an established relationship with the Labour Environmental Alliance Society. Those were important factors in encouraging participation in the project. Elsewhere in the cleaning product industry, there is not the same level of unionization or worker participation in OH&S committees. In the context of a continuing trend towards green cleaning in the janitorial-sanitation industry, the results demonstrated in this project could help leverage support from employers to participate in a wider project, but it would require considerable preparatory work and relationship-building.

Identification of immediate and long-term benefits of the findings or results

### **Immediate benefits**

**A safer workplace:** the OH&S committee members and in some cases, custodial and cleaning staff directly, have received training in chemical exposure regulations, including the need for accessible MSDS and careful reading of MSDS information. In addition, all workers on participating project sites have been given copies of the newly published Cleaners and Toxins Guide. The training and the Guide help to provide greater control over chemical exposure through better MSDS accessibility, greater awareness of acute and chronic hazards and concrete steps that committees can take to carry out product substitution where necessary.

The substitution that committees have carried out as a result of the project product review will also provide an immediate benefit in removing from the workplace some acute hazards such as ammonia and sodium hypochlorite (except for the New Westminster School District where it will be retained for restricted use), eliminating the potential for toxic reactions that can result from the combination. Eliminating the use of ammonia also removes a respiratory irritant, which has been associated with occupational asthma.

Even where initial meetings with prospective project partners did not ultimately lead to their participation — in the case of the West Vancouver and North Vancouver school districts — the process led to positive change. The West Vancouver School District made numerous product substitutions following the product review that LEAS carried out and the North Vancouver School District instituted a permanent product review committee, with dedicated staff, following its meetings with LEAS.

**More effective committee participation:** Although we have not evaluated specifically for this, committee members have reported anecdotally that the training and product review “energized” them, giving worker representatives particularly additional tools that they can use to control safety in their workplace.

### **Long term benefits**

*All participating project sites have eliminated, or committed to eliminate from use all products containing known, probable and possible human carcinogens.* Prior to the initiation of the project, the carcinogens silica, tetrachloroethylene, paradichlorobenzene, trisodium nitrilotriacetate and cocamide diethanolamine were among the ingredients found in products in use in project sites. Four of the five participating project sites have eliminated products containing those ingredients as a result of the product review and subsequent substitution carried out during the project. The fifth site, the Fairmont Empress hotel, has eliminated silica from products used at the hotel and proposes to find substitutes for products containing cocamide diethanolamine and trisodium nitrilotriacetate as soon as substitutes are identified. While latency periods and the uncertainty of direct causal links between those carcinogens and cancer make it impossible to quantify the benefits, there is no question that reducing exposure to carcinogens in the workplace reduces the cancer risk.

Similarly, removal of the reproductive toxicants dibutyl phthalate, toluene and n-methyl 2-pyrrolidone from among product ingredients — which was also achieved as part of the project —

will also bring about a reduction in the risk of impaired reproduction and developmental defects that is associated with those ingredients.

Elimination of carcinogens, as well as reproductive and other toxicants from the schools will result in reduced health risks for other staff and students in the schools districts and for hotel clients in the hotels.

### **Environmental benefits**

The elimination of trisodium nitrilotriacetate as well as octyl and nonyl phenol ethoxylates from products ingredients will remove two toxic environmental contaminants from the waste stream. That is a particular benefit in areas where there is only primary wastewater treatment, such as Victoria.

The workplace environmental awareness generated by the project also had a spillover effect into areas that were not part of the project mandate. For example, during the project, both the New Westminster and Burnaby school districts made the decision to purchase technology known as the Bulb Eater, a newly-developed device that can simultaneously recycle the glass and the mercury from hundreds of fluorescent tubes that are used annually in district schools.

**Ongoing product review.** The training provided to OH&S committees, together with proposed structures for developing product review committees and green procurement policies, will provides the means to maintain the process developed during the project. The Cleaners and Toxins Guide, which includes tables of priority product ingredients for substitution, will also give workers and committees a practical tool to use as part of that product review.

### **Evaluation of training projects**

Although this project was entitled Training for a Non-Toxic Workplace, the training was not the primary objective. Rather it was intended to provide OH&S committees with the tools to evaluate cleaning products used in the workplace, identify ingredients with potential chronic health effects and develop strategies for replacing toxic products with safer substitutes. The key criterion for evaluating the effectiveness of that training was determining how well the objective was achieved —whether most of the toxic products identified were removed and replaced with safer substitutes. In our evaluation we set out to answer three basic questions:

*1. Was the procedure followed and the training provided useful in making the OH&S committee more effective in monitoring chemical use in the workplace and in making the workplace safer?*

To ensure that the training we were providing was effective in reaching our audience and was delivered at an appropriate reading and comprehension level, we asked workshop participants to fill out an anonymous questionnaire. It asked participants to rate the quality of printed materials and presentations, and asked particularly whether they found the workshop material understandable and useful. In every workshop, nearly participants rated the quality of the material and presentations as good to excellent and only two of the 60 questionnaires returned

rated the material as fair. No one indicated that the material was too complex or difficult to understand, although some did suggest that more time to review and evaluate products would have been valuable. In subsequent workshops more time was added for that segment.

*2. Did the information provided in the course of the project help foster change in the workplace?*

As we have outlined above, the information provided in the project and the awareness of potentially toxic product ingredients that it created among participants generated a high degree of motivation. That in turn led to significant changes in product use and procurement in all sites. Those changes have been outlined above.

*3. Will the substitution protocol and implementation plan developed in the workplace provide a basis for ongoing monitoring of cleaning products and could it be applied to other workplaces?*

In each of the project sites, following the report from committees on product changes, LEAS research staff recommended the creation of product review committees to monitor any changes in product purchasing and the adoption of a general procurement policy using the same product ingredient criteria used during the project. Alternatively, we suggested the use of products lines that have been certified by either Green Seal or Environmental Choice since the criteria meet or exceed the standards used in the project. In the case of the Burnaby School, District, a Product Review Committee has been established and an informal policy adopted that will specify that any new products will be selected from the environmentally-certified product line. The New Westminster School District has not established a formal product review committee but the operations department, in conjunction with the OH&S committee, has agreed to specify environmental certification in all new product purchases. In the St'at'imc First Nations School District, the absence of an OH&S committee makes a product review committee impractical but the Cleaners and Toxins Guide will provide a guideline for assessing new products as they are introduced.

In the two hotels, purchasing is carried out by a bulk purchasing company, Aventura, which buys for all properties within the Fairmont group. As a result, procurement policies are beyond the mandate of any individual property. However, OH&S committees in both hotels have added product review as part of their committee mandate to ensure that the standards used in the project will continue to apply to new products. The Fairmont Vancouver committee will also be urging the Fairmont group as a whole to move to green product purchasing.

## Identification of relevant user groups for the research project results

The results of the project will be of value to:

- Building management companies seeking to extend green building initiatives to cleaning products;

- Cleaning companies, especially those striving to develop environmental cleaning programs or moving from conventional cleaning to green cleaning;
- Unions whose certifications cover cleaning company workers, building management employees, hotel workers and custodians working in various commercial and institutional sites;
- Other school districts and hotel properties not covered by this project;
- Distributors of environmentally-certified cleaning products seeking to promote environmental cleaning and extend sales of environmentally-certified institutional cleaning products.

## Dissemination and knowledge transfer

The primary means of knowledge transfer will be through distribution of the Cleaners and Toxins Guide, produced as an educational component of this project, with the assistance and advice of project participants. Printed copies of the Guide will be provided immediately to all cleaning, stewarding and custodial workers in the three school districts and the two hotels and will also be available to workers in commercial cleaning operations, other hotels, school districts and hospitals. The Guide will also be available as a free pdf download on the LEAS website, along with an outline of this project and the results it achieved.

Discussions have been held with distributors of environmentally-certified product lines to use the Guide with clients to promote environmental cleaning policies and products.

LEAS also plans to issue a news release and media follow-up to highlight the product changes in the two Lower Mainland school districts and the potential benefits for staff and students in district schools