

# **Environmental Health and Safety 7<sup>th</sup> Annual Report 2004**

*Environmental Health & Safety Office*  
[www.dal.ca/safety](http://www.dal.ca/safety)

**MARCH 2005**



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# 1 INTRODUCTION

## 1.1 Environmental Health and Safety Office

### The Dalhousie Safety Office operates to:

- Offer advice to the University's Senior Management on ways in which the University can strengthen its efforts to provide a healthy and safe environment in support of the entire range of University activities.
- Support the activities of the Dalhousie Environmental Health and Safety Committee.
- Support the Deans, Directors and Chairs of Departments as they discharge their responsibilities for health and safety within their units.
- Liaise with regulatory agencies and other organizations to keep the University informed of developments that could impact Dalhousie's Environmental Health and Safety Program.
- Ensure that inspections, testing and training are carried-out as needed to ensure that the University is operating in accord with legislation.
- In accord with regulations, coordinate the disposal of hazardous waste created by teaching and research programs and by the University's operations.

The Safety Office operates with a staff of three:



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Director  
([William.Louch@dal.ca](mailto:William.Louch@dal.ca))



**Ms. Pauline Jones**  
Radiation Safety  
Officer  
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## 2 HIGHLIGHTS OF 2004

### 2.1 Smoking

In September 2003, Dalhousie became the first University in Canada to amend its Smoking Policy to ban smoking entirely from university buildings and grounds, and university-owned vehicles. The policy was generally well received by smokers and non-smokers alike, and compliance rates were gratifyingly high. The policy also attracted a great deal of interest from media and other educational institutions from across the continent.

The Safety Office, along with Security Services, invested considerable time during the year in encouraging compliance with the policy. During the summer, at the request of the President, the Safety Office coordinated a review of the first year's experience. Among the issues raised by the review, was the need to more effectively deal with the litter created by smoking around the University's perimeter. Under the new policy and with minor changes in place to address these issues, the beginning of the second year continued uneventfully.

### 2.2 Construction

2004 continued with what had been a series of very busy construction years. During 2004, major construction or renovation projects included completion of Risley Hall and an addition to Sexton Campus' N Building, renovations to the lower levels of Fenwick Place and Cameron Hall (the south-east section of Howe Hall), and the creation of a large-tiered classroom in the Killam Library. Ongoing projects include construction of the Kenneth C. Rowe Building that in mid-2005, will house the Faculty of Management, and repairs to the exterior facade of the Forrest Building. Together, these projects - which required hundreds of potentially dangerous person days of construction work - were carried-out without any significant work injury.

### 2.3 ChemEx

During 2004, ChemEx - Dalhousie's surplus laboratory chemical exchange program - was the recipient of an award from the Nova Scotia Resource Recovery Fund Board. The Recovery Fund Board is the organization that administers the Province's Blue Bag Recycling Program. Naming ChemEx the 'Industry Steward of the Year', the Board recognized Dalhousie's decade-long program of laboratory chemical stewardship.

### 2.4 Biosafety

For many years, work with materials which present a risk of infection has been overseen by a Biosafety Officer - usually a senior academic from the Faculty of Medicine. Although there has been effective oversight, we have lacked the training capacity and day-to-day support that teachers and researchers in other disciplines have come to expect. During 2004, we began the work of developing a full Biosafety Program. As a first step, working with Dr. Colin Stuttard, the current Biosafety Officer, other faculty members in Science and Medicine as well as external experts, the Safety Office developed and distributed a Biosafety Manual. This manual is now being used as a training resource and reference book across Medicine and Science departments.

Future biosafety developments include amassing an inventory of programs involving potentially infectious materials and developing an autoclave operation audit.

## **2.5 Annual Safety Award**

Each year since 1997, the Environmental Health and Safety Committee has recognized significant health and safety contributions at Dalhousie. With the 2004 award, the Committee recognized the efforts of those involved in the preparations for and response to Hurricane Juan. Particularly, those who responded to the very significant challenges that faced the staff and residents of Fenwick Place.

## **2.6 White Juan**

Dalhousie had just nicely recovered from Hurricane Juan when, in late February, White Juan dropped an unprecedented amount of snow onto the campus. Other than posing a considerable challenge for contractors and staff of Environmental Services who are responsible for snow clearing, the snow presented few significant problems for the University. One area which did experience problems was Dalplex.

The power failure that accompanied the storm shut down the ventilation system which maintains the air supported dome-shaped roof of the Field House. The roof immediately began to sag under the weight of the snow. The ventilation system that the emergency power system restarted, lacked the power required to lift the roof. The now inverted roof provided a catchment for melting snow and soon, very large volumes of water began to flow into the Building through the emergency openings in the roof. It took several hours to drain the water and reposition the roof. In the interval, the flooding did considerable damage to walls ceilings and some contents in the Dalplex.

Clean-up started within days and porous water-damaged materials were replaced or repaired. During the reconstruction, steps were taken to capture roof water should a similar situation occur in the future.

## **2.7 Mould Remediation**

During the year, we were faced with several projects that unexpectedly became complicated regarding concerns about mould.

During the Cameron House renovations in Howe Hall, mould was found at the floor level on the reverse side of the hallway's drywall. This discovery complicated the renovations.

In response to concerns of those who occupy areas of the PR level of Fenwick Towers, exploratory openings were cut in drywall panels. Again, mould was discovered in areas where large scale flooding is reported to have occurred some years ago. Although more limited in scope, mould was also found in locations where the cause appeared to be related to either plumbing or structural leaks. The interior work to replace contaminated building materials was completed in time for the occupants to return to their space for the opening of the fall term.

Given the amount of water damage caused by the White Juan flood in Dalplex, the University was concerned that mould growth might develop before all the water-damaged material could be removed. There was also concern the mould could colonize on surfaces that did not show obvious signs of water damage. In response, we did a major remediation, rapidly drying spaces when possible, removing and replacing water damaged porous building materials and cleaning and drying water damaged personal property.

In each of these projects, external environmental consultants helped in preparing work procedures. The consultant also conducted testing of air and surfaces to ensure that remediation work did not create hazards for either workers or building occupants.

### 3 PROGRAM ADMINISTRATION

#### 3.1 Environmental Health and Safety Committee

Throughout 2004, the Dalhousie Environmental Health and Safety Committee continued to operate as a forum for discussion of health and safety policy and procedural matters. Although the Committee responds to the requirements of Nova Scotia's Occupational Health and Safety Act, it was actually created in 1980, some years before Nova Scotia law required organizations to establish such committees.

Committee membership for the year is shown below:

**Chair Person**                      **2003 - 2004**                      **F. Fyfe**                      **Employee Group Appointee**  
**2004 - 2005**                      **D. Boutilier**                      **University Appointee**

<b>2004-2005 ENVIRONMENTAL HEALTH &amp; SAFETY COMMITTEE MEMBERSHIP</b>			
<b><u>Employee and Student Group Appointees</u></b>			
Anne Weeden	DUAG	Medicine	<a href="mailto:Anne.Weeden@dal.ca">Anne.Weeden@dal.ca</a>
Curtis McGrath	DSU	President	<a href="mailto:dsupres@dal.ca">dsupres@dal.ca</a>
Tom Hunter	IUOE	Facilities Mgmt. c/o	<a href="mailto:Peter.Coolen@dal.ca">Peter.Coolen@dal.ca</a>
Michael Keifte	DFA	Biology	<a href="mailto:Michael.Kiefte@dal.ca">Michael.Kiefte@dal.ca</a>
Forest Fyfe	DFA	Physics	<a href="mailto:Forest.Fyfe@dal.ca">Forest.Fyfe@dal.ca</a>
Joe Dorey	IUOE	Facilities Mgmt. c/o	<a href="mailto:Gary.Gaudet@dal.ca">Gary.Gaudet@dal.ca</a>
Marvin Silver	CUPE	Biology	<a href="mailto:Marvin.Silver@dal.ca">Marvin.Silver@dal.ca</a>
Dawn Korn	NSGEU	External Relations	<a href="mailto:Dawn.Korn@dal.ca">Dawn.Korn@dal.ca</a>
<b><u>University Appointees</u></b>			
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Colin Stuttard		Microbiology & Immunology	<a href="mailto:Colin.Stuttard@dal.ca">Colin.Stuttard@dal.ca</a>
Darrell Boutilier		Facilities Management	<a href="mailto:Darrell.Boutilier@dal.ca">Darrell.Boutilier@dal.ca</a>
Mateo Yorke		Housing & Conference Svs.	<a href="mailto:Mateo.Yorke@dal.ca">Mateo.Yorke@dal.ca</a>
Patrick McGrath		Athletics & Recreational Svs.	<a href="mailto:Pat.McGrath@dal.ca">Pat.McGrath@dal.ca</a>
Paul Amyotte		Chemical Engineering	<a href="mailto:Paul.Amyotte@dal.ca">Paul.Amyotte@dal.ca</a>
Ruth Murray		Faculty of Engineering	<a href="mailto:Ruth.Murray@dal.ca">Ruth.Murray@dal.ca</a>
<b><u>Ex-officio Members</u></b>			
William J. Louch		Director	
Jan Taylor McIntyre		Recording Secretary	

## 3.2 Committee Activities

During the year, the Committee took part in responding to three matters raised by the inspectors from Nova Scotia Department of Environment and Labour. Very late in 2003, a Labour inspector ordered that a sheltered walkway be installed to protect pedestrians entering and leaving Fenwick Place while overhead work was underway. Later in the winter, the Committee reviewed first the test protocol, and later the results, in response to a request from an inspector that the University assess the potential of fibreglass particles being released into the Dalplex Field House air. The testing yielded non-detectible fibre levels. During the early summer, the Committee reviewed the response prepared by the Department of Pathology to a set of orders issued by an inspector following an employee's complaints that visitors' use of scent products caused her to feel unwell. Among other suggestions, the Committee urged the Dean of Medicine to take a more proactive role in disseminating information on the University's Scent-Free program throughout the Faculty.

The Committee took an active interest in ensuring safety during that project to increase the capacity of the Sir Charles Tupper Medical Building's fumehood system. The Committee reviewed the procedures developed for training contractors' employees, conducting research during times when fumehood air flows were restricted, assembling and hoisting new equipment to the roof of the tower and commissioning the new system.

The Committee also provided comments on revisions to several Safety Office documents including the Fire Warden Handbook, the New Employee Orientation Handbook and the recently released Biosafety Manual.

Among the more routine matters handled by the Committee during the year, were reviews of:

- Environmental Health and Safety Committee Terms of Reference
- Environmental Health and Safety Policy  
(as required by Section 27 of the NS Occupational Health and Safety Act)
- Environmental Health and Safety Program  
(as required by Section 28 of the NS Occupational Health and Safety Act)
- Monthly and Annual Accident Experience
- Results of Environmental Monitoring
- Health and Safety Promotional Efforts

Through the Safety Office, the Committee communicated regularly with the University Administration and with many local safety committees that operate across campus.

## 3.3 Local Safety Committees

In response to the University Policy which encourages Deans, Directors and Departmental Chairs to engage staff and faculty in safety matters, 17 local safety committees operate on a faculty, departmental, building or functional level. During 2004, the composition and mandate of Facilities Management's Trades Safety Committee was expanded to include management and employee representatives from Environmental Services. The new Trades and Custodial Safety Committee seems determined to take a more focussed look at the policy and procedure framework within which employees do their work.

To the extent possible, the Safety Office Director attends meetings of these committees.

### **3.4 Communications**

During 2004, the Safety Office continued to expand its website: [www.dal.ca/safety](http://www.dal.ca/safety). The site has become both the Environmental Health and Safety Committee and Safety Office's most important means of communicating with the University and the broader community.

The site is heavily used both by members of the University and outsiders interested in health, safety and environmental protection. A tracking program, managed by University Computing and Information Services, reports that about 80,000 users visited the Safety Office website during 2004. Visitors viewed almost a quarter million pages.

Again during 2004, the Safety Office authorized a number of organizations, including other universities and colleges, hospitals and schools, to reproduce materials from the website for use in their safety programs.

## 4 SAFETY AND ACCIDENT PREVENTION

### 4.1 Accident Reporting

Dalhousie requires staff and faculty to report work-related accidents and injuries. Such reporting is an important component of the University's Safety Program in that these reports provide a means to:

- document the incident,
- ensure that the accident victim receives appropriate care, and
- initiate a review which aims to prevent similar accidents.

When accidents occur, those involved are required to report the accident to their supervisors. In turn, the supervisor directs the individual to complete the section on the Accident/Incident form which describes the sequence of events that led to the accident and the nature of the injuries. The supervisor then completes the section of the form describing the steps which the supervisor believes are necessary to prevent similar accidents. Copies of the report are provided to:

- the individual involved in the accident,
- the local safety committee (acting on behalf of the Dean, Director or Chair),
- the supervisor, and
- the Director of Environmental Health and Safety.

Where the accident is serious, the Director of Environmental Health and Safety, in cooperation with the Dalhousie Environmental Health and Safety Committee, carries-out a formal accident investigation.

### 4.2 2004 Accident Experience

As **Figure I** shows, employees suffered 176 accidental injuries during 2004. This total is marginally higher than the 166 accident injuries reported in 2003. But it is well in-line with the experience of the past several years.

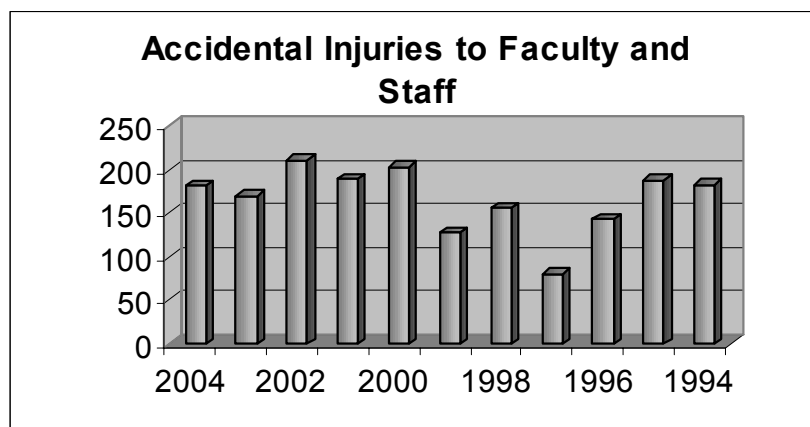


Figure I

The number of accidental injuries has remained largely unchanged over the past 5 years despite a growing number of employees. During 2004, the number of University employees (as full-time equivalents) grew by about 2%. A similar 2% growth in employment was experienced within Facilities Management.

In fact, it is encouraging to note that this accidental injury trend-line has remained reasonably flat, despite the rapid growth in enrolment and research activity the University has seen, particularly over the past 5 years.

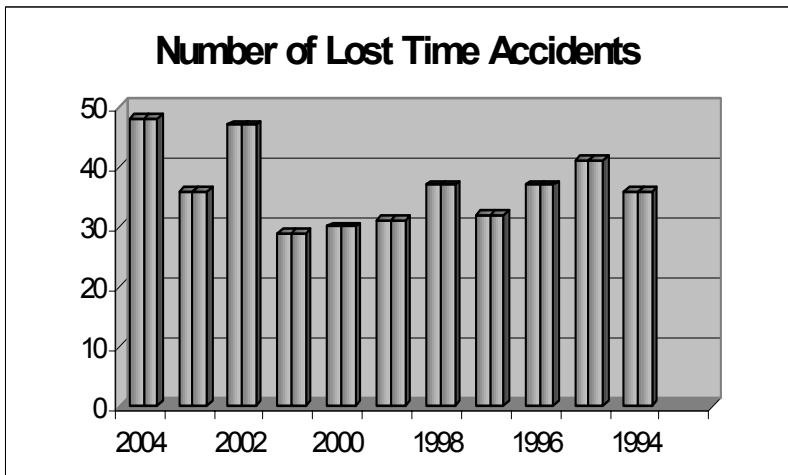
**Table I** breaks down the proportions of staff and faculty reporting injuries.

**Table I**

<b>2004 ACCIDENTAL INJURIES BY EMPLOYEE GROUP</b>	
<b>Employee Group</b>	<b>Number of Accidental Injuries</b>
Faculty	1
Engineering Services	39
Environmental Services	117
Security Services	2
Other Staff	17
<b>Total Employees</b>	<b>176</b>

As is always the case, the highest proportion of injuries are reported by employees of Facilities Management. Included amongst these employees are the carpenters, plumbers, electricians and mechanics - employed in Engineering Services, the custodians, truck drivers and grounds keepers - employed in Environmental Services, and the security officers - employed in Security Services. Other universities across the country, report similar accidental injury patterns.

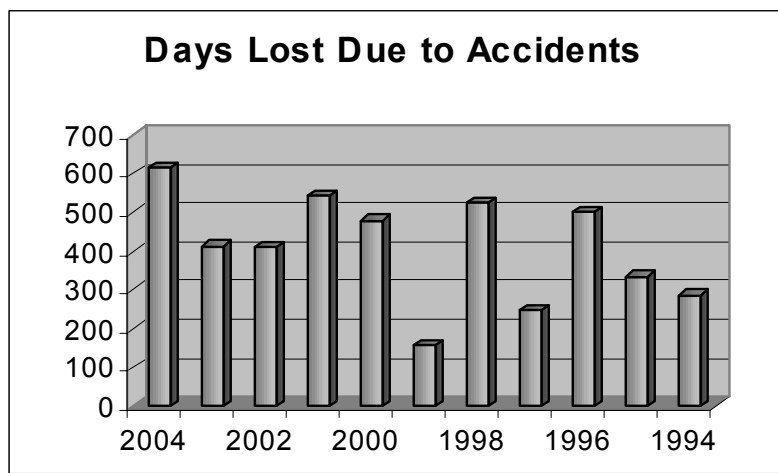
Although all accidents are of concern, clearly some are more serious than others. One measure of accident severity is time lost from work. Dalhousie counts as a lost time accident one which prevents the injured person from returning to work on the next scheduled work day. During 2004, 48 accidents caused injuries serious enough to keep staff from reporting to work on their next scheduled work day. Although the 2004 experience was not as good as we experienced in 2003, 48 lost time accidents is not out-of-line with the last decade's results which are shown in **Figure II**.



**Figure II**

However, the picture changes when we look at accident severity as measured by the number of days lost. In total, the 48 time loss accidents recorded during 2004 resulted in 567 lost work days. Two accidents which occurred in late 2003, resulted in an additional 48 days lost during 2004, bringing the 2004 total to 615 days lost.

As **Figure III** shows, the lost work day toll was considerably higher than we have seen previously.



**Figure III**

As **Table II** shows by far, the majority of those involved in lost time accidents are employees of Facilities Management's Engineering Services and Environmental Services.

**Table II  
Distribution of Lost Time Accidents among Employee Groups**

	<b>NUMBER OF TIME LOSS ACCIDENTS</b>	<b>DAYS LOST</b>
Engineering Services	17	292
Environmental Services	27	261
Security Services	2	11
Other Staff	2	3
<b>Total</b>	<b>48</b>	<b>567</b>

In-line with the usual experience, a small number of accidental injuries accounted for the bulk of the loss time. In 2004, one over-exertion injury resulted in a 120 day absence. And only 8 accidents accounted for 60% of the total lost time.

**Table III** sheds some additional light on the 2004 time loss experience. As the data shows, over-exertion, falls (including falls from a height as well as falls on the level) and striking something or being struck by something, were the most important causes of loss time accidents.

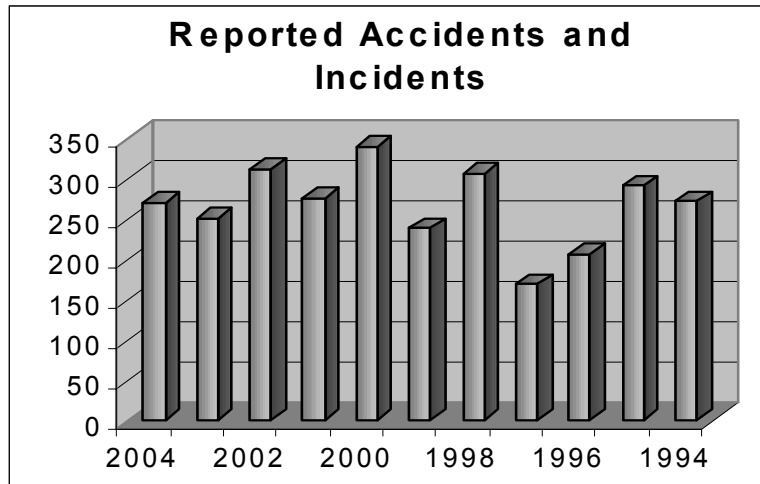
**Table III**

	<b>Over-Exertion</b>	<b>Falls</b>	<b>Struck/Being Struck</b>	<b>Other</b>
Number of Accidents	18	23	4	3
<b>Total days Lost</b>	<b>250</b>	<b>302</b>	<b>12</b>	<b>16</b>

2004's unusually high lost time experience is a result of a modest increase in the number of over-exertion injuries and a more than doubling of the number of falls. Half of the falls were caused by water on interior surfaces or ice or snow on exterior walks and stairs. Falls which occur on wet slippery walking surfaces lead to absences from work which averages twice as long as the absences caused by slips and trips on dry surfaces.

In large measure, the higher than normal time loss experience was caused by an unusually severe winter during the early months of 2004. With frequent snow falls, including "White Juan", and prolonged cold weather, footing on campus walks and neighbourhood sidewalks was treacherous for a much longer period than normal. Custodians had to contend with ice and snow being tracked into Dalhousie buildings for weeks longer than normal. Together, these results account for about 100 additional days lost. As pointed out earlier, the University employee compliment continues to grow. And the increased employee base is perhaps also a modest factor driving the accident experience.

Accidents and injuries involve not only staff. Faculty, students, contractors and visitors, are also occasionally injured. Further, the Safety Office receives reports of other campus events, some of which relate to injuries.



**Figure IV**

**Figure IV** shows that the Safety Office received a total of 267 such reports during 2004, generally in-line with the experience of recent years. Included among these reports were:

- Accidents causing injuries to staff and faculty 176
- Other work or study accidents (1) 28
- Sport accidents involving:
  - students 6
  - visitors 7
- Medical emergencies 30
- Incidents (2) 20

(1) *Other work or study accidents include:*

- *cuts and punctures suffered by students in laboratory or clinic programs, and*
- *other miscellaneous injuries suffered by students in the course of attending classes or working on campus.*

(2) *Incidents included 5 fires, 7 chemical spills, several indoor air quality episodes and similar events.*

## 5 FIRE SAFETY

### 5.1 The Fire Safety Program

During 2004, Dalhousie continued to operate the aggressive fire safety program which has been developed over the years. The University makes ongoing efforts to install and maintain detection, suppression and alarm systems, and to upgrade equipment and facilities to keep pace with changes in the National Building and Fire Codes of Canada.

#### 5.1.1 Fire Warden Teams and Evacuation Drills

During the year, the Safety Office continued to work with fire warden teams which serve each of the University's major buildings. To ensure that both wardens and building occupants are familiar with the building's emergency evacuation plan, evacuation drills are conducted annually. In most cases, the drill is conducted during the first few weeks of the Fall term. The evacuation systems are now so well established that we are able to evacuate most Dalhousie buildings in under 5 minutes.

### 5.2 Follow-up to the 2003 Fire in Chemistry

In September of 2003, a fire occurred in a Chemistry research lab. A graduate student who was working in the laboratory at the time suffered burns to his hands and face when a flammable solvent escaped from a still in which it was being purified. The injured student was escorted to a nearby building and then taken by ambulance to the hospital. Fortunately, the student's injuries were not severe and he made a complete recovery, returning to his studies within a couple of weeks.

Although the fire did damage the laboratory and some research equipment, the sprinkler system contained the fire until the Fire Department arrived to extinguish it and begin the clean-up.

Both the Department of Chemistry's Safety Committee and the University Environmental Health and Safety Committee, carried-out reviews of the causes of and response to the fire. As a result, the Chemistry emergency evacuation procedure has been improved and the lessons learned applied to evacuation planning elsewhere on campus.

Since the fire, the distillation apparatus that was involved in the fire has been replaced with a much safer commercial unit and the University Laboratory Safety Policy amended to require the use of such commercial units when research programs require ongoing solvent purification. In addition, a new policy was put in place, requiring research directors to conduct an annual assessment of the hazards present by their work and to prepare written procedures that laboratory staff are to follow to reduce the risks. During 2004, the Director of the Safety Office and the Vice-President Research Services met with the Deans of Dentistry, Engineering, Medicine and Science and their department heads to begin to put in place the policy changes.

### 5.3 The 2004 Fire Experience

Dalhousie's 2004 fire experience was exceptional. During the year, only five fires were recorded. As the table shows, the 2004 experience is as good as we have seen during the

past decade. None of the 2004 fires caused any injuries and fire and water damage was small.

### 5.3.1 Residence Fires

Four of the five 2004 fires took place in Dalhousie residences. In the first, an electrical malfunction in a Fenwick Parkade fusebox created a smokey fire. Emergency systems functioned properly and the Fire Department was easily able to deal with the fire. Damage was minimal.

A kitchen fire broke out later in the year in Fenwick Place when a resident allowed a pan of cooking oil to overheat. Again, the alarm system activated properly and the floors adjacent to the fire evacuated in an orderly fashion. The Fire Department responded promptly and extinguished the fire without serious difficulty.

During the fall term, a small fire occurred in a Howe Hall corridor where it appears that someone deliberately set fire to some paper. The fire systems functioned properly, the students evacuated without difficulty and the fire did very little damage.

Just days before Christmas, a fire broke out in the emergency generator room of the newly opened Riskey Hall. Students had left for the Christmas break and only a skeleton staff were on-hand at the time. The fire broke out during a test of the building's emergency generator. During the commissioning of the building, the contractor had experienced some difficulties with the generator controls. The components had been replaced and a full test of the generator was underway when heat from the exhaust ignited some nearby insulation. Contractors were on-hand to monitor the test. The fire was detected early enough that no-one was endangered and the damage was slight. During the holiday break, the system was repaired and the generator and building's fire monitoring system were successfully tested.

### 5.3.2 Grounds Fire

In most recent years, Dalhousie has experienced several grounds and outdoor waste container fires. During 2004, there was only one small fire in a recently mulched flower bed outside of Fountain House. This fire was discovered by Security Officers while they were making their routine rounds. The Officers, assisted by the Fire Department, were easily able to extinguish the fire before it did any damage.

Although it may be a bit premature to be too categorical, it is possible that the decline in outdoor fires is a consequence of the University's adoption of the Smoke-Free campus policy.

<b>Year</b>	<b>2004</b>	<b>2003</b>	<b>2002</b>	<b>2001</b>	<b>2000</b>	<b>1999</b>	<b>1998</b>	<b>1997</b>	<b>1996</b>	<b>1995</b>
<b># of Fires</b>	5	11	5	7	8	10	7	12	6	4

## **5.4 2004 Fire Safety Upgrades**

### **5.4.1 Residence Fire Safety**

During 2004, Housing and Conference Services carried-out a multi-million dollar renovation of the Cameron wing of Howe Hall. The renovation included wiring upgrades, renewal of the fire alarm system and an addition of a sprinkler system into that section of the residence. The renovation also included creating the distribution system which will allow the sprinkler system to be extended to other parts of the building in future years.

Renovations are also underway in Gerard Hall. Again, wiring is being upgraded. Gerard Hall is equipped with a sprinkler system and a modern fire alarm. An emergency generator was installed recently.

### **5.4.2 Other Fire Safety Upgrades**

Each issue of the National Building and Fire Codes of Canada introduces new fire safety requirements. Although some of these changes cannot easily be accommodated within existing structures, Dalhousie tries, whenever practical, to meet these new standards. Continuing on a project started in 2002, the University improved exit route safety by systematically installing latched stairwell doors in two more areas of the Life Sciences Centre. Over the coming years, we plan to make similar changes in each of the older university buildings.

During the year, Facilities Management staff completed the last of a three-phase project to provide the Life Sciences complex with a fully-modernized fire detection and alarm system.

Work is underway to replace aging and under-sized emergency generators in both the Life Sciences Centre and the Sir Charles Tupper Building.

## 6 MANAGEMENT OF HAZARDOUS MATERIALS

### 6.1 Highly Regulated Materials

Dalhousie has had years of experience dealing with materials such as asbestos, freons and PCBs. During 2004, we continued our programs which are designed to ensure that we manage these materials safely and in full compliance with Federal and Provincial regulations.

Because asbestos is so prevalent in Dalhousie buildings, the University has, for many years, set aside funds to remove asbestos in priority locations. During 2004, roughly \$40,000 was spent in small asbestos removals associated with maintenance jobs on all three campuses. Much of this work was carried-out in preparation for renovations or equipment repair or replacement.

Given the extent of the University's use of these highly regulated materials, their management will challenge Facilities Management for many years to come.

### 6.2 Hazardous Waste

Since 1988, the Safety Office has coordinated the University's chemical waste disposal effort. The effort is carried-out in two phases. During the academic year, the Safety Office collects waste solvents and related wastes each month. Using a small room in the Life Sciences Centre, these wastes are bulked into 45 gallon drums with other compatible wastes and shipped for disposal to a fully-licensed waste site by a licenced hazardous waste disposal firm. The second phase, during which we accept the full range of waste chemicals, is carried-out during the summer. This phase depends upon the availability of a vacant undergraduate Chemistry laboratory and the assistance of a senior student, recruited to help with this work. During the summer, we undertake a much wider range of activities including acid and base neutralization, concentration of metal bearing wastes and chemical destruction of sometimes dangerously reactive wastes. Together, these techniques allow us to safely and responsibly deal with the very broad range of wastes created by the University's research and teaching programs. What has emerged is a highly integrated chemical waste management program which incorporates the reduction, reuse, recycling and disposal components that characterize a fully integrated system.

From the perspective of researchers and teachers, this system has become very effective. The supervisors of laboratories take full advantage of the regular collection to dispose of wastes. As a consequence, the volume of chemical waste in storage in university laboratories at any time is far less than it was a decade ago.

There are, however, stress points. As time has passed, and particularly in recent years, research and teaching programs have grown dramatically. At the same time, laboratory supervisors have become more demanding. Many are no longer satisfied to dispose only of their chemical wastes on our schedule. Instead, many researchers insist that they need to be able to discard any type of chemical waste at any time during the year. So for example, it is now common for the Safety Office to be asked to look after the disposal of acids or reactive chemicals during the school year. Without access to the laboratory facilities which we use during the summer, dealing with these wastes during other times of the year presents a growing challenge.

During 2004, the University embarked upon a project designed to address these and other stresses. A team of external consultants, staff of Facilities Management, members of the Chemistry Department, and the safety Office has nearly completed a preliminary design for a new facility which will relocate Chemistry Department storage units. These units are presently poorly located within the heart of the building. The new facility will also accommodate waste storage and handling facilities which will allow the waste handling program to expand to meet demands. During the next year, we will have to deal with funding and construction challenges. But it is encouraging that we are now taking the initial steps which will lead to improvements in the near term.

Despite the pressures of increasing demands for chemical services, we continue to refine our practices. For a number of years, laboratory supervisors have reused 4 litre glass solvent bottles for the storage and disposal of solvent wastes. Over the past year or so, several laboratories reported that accidental breakage of these bottles had created some potentially dangerous situations. Responding to requests for change, we introduced a new system under which the Safety Office purchased reusable wide-mouth plastic bottles which have generally replaced the glass bottles in the waste handling program. The effort involves additional handling on our part, but we believe it offers an improved margin of safety for both those who work in the laboratories and for those who handle the waste.

One highlight of the year was the awarding of a Mobius Award to ChemEx - the University's surplus chemical exchange program. Established in 1992, ChemEx diverts surplus chemicals from disposal to use in teaching and research. Although ChemEx primarily serves Dalhousie researchers and teachers, others representing schools, universities and research institutions across the Maritimes, also donate or receive chemicals. ChemEx neither pays for nor charges for chemicals. The Safety Office supervises shipments of chemicals between Dalhousie locations. External participants make their own shipping arrangements. To our knowledge, when ChemEx was launched there were no similar exchanges operating at any other university. In the ensuing years, safety offices at a number of major universities across the continent have introduced similar programs.

Mobius Awards are given annually by the Nova Scotia Resource Recovery Fund Board. The Board is the agency which operates Nova Scotia's blue bag/Enviro Depot system. The Board recognized the ten years of responsible chemical management by naming ChemEx the "Industry Steward" of the year.

### **6.3 The 2004 Experience**

During the year, the disposal program handled almost 8650 individual wastes, ranging in size from a few milligrams to a few kilograms. In total, the program handled over 11,000 kg. In recent years, the year over year growth in demand has run about 10%. The 2004, demands were up almost 60% in terms of items and almost 30% in terms of volumes.

Of this total, about 6200 kg. was made up of laboratory solvents and other associated dissolved solids. A breakdown of the type of wastes handled is shown below.

### Waste Disposal

<b>Toxic and reactive metallic compounds</b>	<b>170 kg.</b>
<b>Scintillation waste</b>	<b>400 kg.</b>
<b>Various reactive organic chemicals</b>	<b>70 kg.</b>
<b>Contaminated acids</b>	<b>175 kg.</b>
<b>Laboratory solvents and oil</b>	<b>6170 kg.</b>
<b>Non-hazardous chemical wastes</b>	<b>220 kg.</b>
<b>Sharps and other potentially infectious waste *</b>	<b>1355 kg.</b>
<b>Contaminated solid and sediments</b>	<b>385 kg.</b>
<b>Other wastes</b>	<b>930 kg.</b>

\* This quantity represents only a fraction of roughly 27,000 kg. in sharps and potentially infectious waste created by research and teaching laboratories and clinics in Medicine, Dentistry and Science. Disposal of most of this material was handled by Facilities Management's Environmental Services.

In addition to this disposal activity, we are increasingly able to reuse or recycle some of these surplus and waste materials. The 2004 totals for materials diverted from disposal are shown below.

<b>Metals including mercury, lead and chromium</b>	<b>120 kg.</b>
<b>Batteries</b>	<b>1008 kg.</b>
<b>Paint</b>	<b>93 kg.</b>
<b>Gas Cylinders</b>	<b>40 kg.</b>
<b>Glass</b>	<b>2375 kg.</b>
<b>ChemEx</b>	<b>30 kg.</b>

Chemical disposal costs can be significant. Since 1992, when much of the chemical waste handling was taken over by the Safety Office, annual disposal costs have run between \$10,000 - \$15,000. As the table shows, 2004 disposal costs increased, reflecting increases in the unit disposal fees and the increased volumes.

<b>Year</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>
<b>Annual Chemical Disposal Cost</b>	\$8000	\$68000	\$27000	\$12000	\$11200	\$10800	\$13700	\$10800
		<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
		\$13500	\$16000	\$14250	\$16200	\$14600	\$14800	\$20675

## 6.4 ChemEx

The Safety Office continued to operate ChemEx, the University's Surplus Chemical Exchange Program. During the year, ChemEx placed 455 items with a catalogue value of just over \$21,000. In-line with other areas of hazardous materials management, demand for ChemEx services in 2004 was about 30% higher than that experienced in 2003.

As the Table hows, 2004 activity brings the value of chemicals placed since 1992 to almost \$350,000. The value of the exchanged chemicals under-estimates the avoided costs as it does not include shipping or brokerage costs associated with new purchases nor the disposal costs which otherwise would have been incurred.

<b>Year</b>	<b>2004</b>	<b>1992-2003</b>
<b>Number of chemicals exchanged</b>	<b>455</b>	<b>6560</b>
<b>Value of chemicals exchanged</b>	<b>\$21,225</b>	<b>\$341,200</b>

## 7 LEGAL MATTERS

### 7.1 Regulatory Changes

By far the most significant legal change during the year was the coming-into-force of Bill C-45. Officially known as amendment "Respecting the Criminal Liability of Organizations", Bill C-45 has its origins in the final recommendation of the Commission of Inquiry into the Westray Tragedy. As his final recommendation, Justice Richard recommended that the Federal Government take the necessary steps to be able to hold organizations and their officers accountable for failure to act appropriately in ensuring workplace safety.

From one respect, Bill C-45 makes little change. Although it introduces a new legal duty, the same exercise of prudence - or what is often referred to as due diligence - is required both to reduce the chances that an accident will occur, and the chances that an organization or individual will face prosecution should an accident occur.

From another perspective, C-45 has introduced substantial changes. Under occupational health and safety law, organizations found guilty of an offence could face fines. And in recent years the courts have been prepared to impose much higher fines. But C-45 moves the proceedings into the realm of criminal law. And the penalties could be even more substantial. C-45 requires that an individual who directs others to do work or perform tasks take reasonable steps to prevent bodily harm. Failing to discharge that duty in a way which shows wanton or reckless disregard for the lives or safety of others could lead, in the case of a serious injury, to 10 years in prison. In the case of a fatality, upon conviction the individual could face a sentence of life in prison. For organizations too the consequences could be very significant. There is no upper limit on the fine that can be imposed upon organizations, and the courts here been given great latitude in imposing other, more creative penalties.

Senior Management wanted to ensure that information about the new law was widely disseminated throughout the University. So late in the year, the Director of Environmental Health and Safety and the University Legal Council began to deliver a series of briefings. In late 2004, the first briefing was held for members of the Deans Council. Early 2005 sessions are being held for the Administrative Directors and for management and supervisory staff of Facilities Management.

The sessions are proving to be quite popular and we expect to deliver a number of other sessions throughout the spring term.

### 7.2 Department of Environment and Labour Inspections and Orders

#### 7.2.1 Overhead Work at Fenwick Place

Very late in 2003, a Labour inspector placed orders on Dalhousie and the contractor repairing Hurricane Juan damage to Fenwick Place. The orders required the contractor to erect a covered walkway to protect pedestrians entering and leaving the building.

The order was a consequence of an incident in which a contractor dropped a short length of aluminum window trim while replacing a storm-damaged upper floor window. In planning the job, provisions had been made to ensure that workers wore fall protection gear when

exposed to a risk of falling and tethers had been attached to hand tools to reduce the chances of a tool being dropped. But the inspector felt that the incident indicated a need for the covered walkway.

The walkway was installed during mid-December. Work continued without further incident through the final weeks of December and into early January 2005. With the completion of the overhead work, the covered walkway was removed in January.

### 7.2.2 Dalplex Air Quality

Responding to a report from a patron who had attended the annual Dalplex Christmas Craft Sale, an inspector visited in January 2004. Noticing the exposed fibreglass insulation on the Field House ceiling, the patron had reported to the Labour inspector his belief that there were dangerous levels of glass fibre present in the indoor air.

This was the first time in over 25 years of operation that this concern had ever been raised and the Dalplex staff had no evidence that suggested the existence of a problem. As there did not appear to be a work-related issue, the inspector elected not to issue an order. We did, however, agree to conduct air tests in the Field House and to report the results to the inspector.

With input from the Environmental Health and Safety Committee regarding sampling methodology, we conducted five air tests at location throughout the Field House over a 24 hour period. In none of these tests were fibres observed at levels above the detection level of 0.1 fibre/cubic centimetre. As the sampling method measures all fibres not just fibreglass, we were quite confident that glass fibres were present at levels well below those which might give rise to concerns. These results were reported to the inspector and the Environmental Health And Safety Committee.

### 7.2.3 Scent Exposure in Tupper

In June, a laboratory technician in the Pathology Department lodged a complaint with the Department of Labour. The employee reported being adversely affected by exposure to scented products being worn by frequent visitors to her area of Tupper. After visiting several times the inspector issued a series of orders. The most significant order directed the Department to make reasonable efforts to protect the employee from scent exposure. The inspector also raised several more minor concerns about incident reporting and first aid services.

The Dean of Medicine and the Chair of the Department wrote formal notes to the entire Faculty and to other members of the Department, asking for cooperation. The laboratory supervisor addressed a similar appeal to colleagues from outside the building.

The Safety Office assisted the Department in preparing a response to the Inspector's orders.

## 8 TRAINING

Although a number of units and departments across campus provide safety training, the Safety Office is one of the focal points for safety training. During 2004, the Safety Office delivered, or participated in, sessions which provided instruction and information to approximately 480 staff and students.

### **8.1 Workplace Hazardous Materials Information System (WHMIS)**

WHMIS is a set of interlocking Provincial and Federal regulations, created to give employers and employees information upon which they can develop procedures to work safely with chemicals. WHMIS regulation requires employees to be trained in WHMIS, and in how the employee is to apply this information to daily work with chemicals. The Safety Office provides much of the WHMIS training for those whose exposure to chemicals arises in laboratories or clinics. Although the WHMIS regulation technically only applies to employees, many of those participating in these training sessions are students. During 2004, the Safety Office conducted 8 training sessions for staff and students in Biology, Chemistry, Dental Hygiene, Dentistry, Facilities Management, Housing and Conference Services, Medicine and Science Co-op.

### **8.2 Student Security**

As has been the practice for the past 9 years, the Safety Office provided two half-day safety orientation sessions for members of Tiger Patrol and the Student Building Security Service.

### **8.3 Radiation Safety Training**

The Radiation Safety Office also conducts training for all staff and students working with radioactivity. The training meets the terms set in the consolidated licence issued to the University by the Canadian Nuclear Safety Commission. More information of these training programs is presented in the Radiation Safety Annual Report which is appended to this report.

### **8.4 Security Safety Awareness Training**

The Safety Office conducted two training sessions to acquaint security officers with the basics of chemical, radiation and biological safety. The sessions also dealt with the basics of emergency response.

## 9 OUTLOOK FOR 2005

The Safety Office, like other Dalhousie units, strives to deliver current programs while also addressing emerging issues. Among the issues which we expect to require attention during 2004 are:

### 9.1 Emergency Preparedness

Although we had hoped to have it completed in 2004, the Task Force was unable to complete the preparation of comprehensive Crisis Management Plan during the year. Work continues on the project as Task Force members work on detailing the requirements for crisis coordination and crisis communications centres, communications plans and residence crisis plans. The Task Force hopes to complete its work by mid-year.

### 9.2 Accessibility

With the construction of a ramp running from the Dunn parking lot to the Chemistry/Killam Plaza, the first stage of a campus accessibility upgrade was completed. In the years to come, several other barriers to the west of the new ramp will be addressed. During 2005, we expect that quadrangle reconstruction will similarly eliminate accessibility barriers on the Carleton campus quadrangle.

### 9.3 New Construction

We look forward to the completion of the K.C. Rowe Building as well as the renovations to Gerard Hall. The Safety Office will continue to be involved with construction safety matters on both these projects. The Safety Office has also been involved in planning discussions with both the contractor and representatives of the NS Department of Public Works regarding the demolition of the old Halifax Infirmary Hospital. Although the work will largely be carried-out on hospital property, given the location immediately adjacent to the Sexton campus there will inevitably be concerns raised by University staff and students.

### 9.4 Biosafety

During 2004, with the preparation of a Biosafety manual, we took the steps to introduce a comprehensive biosafety program. During 2005, we expect to see this effort expanded. Included among the plans for 2005 is the introduction of an autoclave audit program. This program will independently verify the testing done by local units to demonstrate that autoclaves are providing effective sterilizations of both laboratory supplies and potentially infectious waste.

### 9.5 Chemical Safety

In late 2004 a design team began the conceptual work in preparation for the construction of a new facility. The facility - likely to be located adjacent to the Chemistry Building - would allow several bulk chemical storage units to be moved to quarters designed to current standards. The new facility would also house the University's waste chemical disposal program. We expect that a preliminary plan will be completed early in 2005.

## APPENDICES

### MILESTONES IN HEALTH AND SAFETY AT DALHOUSIE

**1976** Appointment of Dr. GFO Langstroth, a faculty member in the Department of Physics, as Radiation Safety Officer and Chair of the Radiation Safety Committee.

**1977** Appointment of A. Chisholm as Director of Safety (in addition to duties as an engineer within Physical Plant and Planning).

**1980** Establishment of the Dalhousie Environmental Health and Safety Committee composed of both University and Employee Group representatives charged with providing policy advice and presenting an opportunity for the resolution of health and safety concerns.

**1982** Establishment of a Radiation Safety Program in cooperation with the Nova Scotia Cancer Centre. Appointment of P. Jones as Assistant Radiation Safety Officer. Atomic Energy Control Board of Canada issues Dalhousie University its first consolidated radioisotope licence.

**1983** Appointment of Dr. J. Johnson as Director of Safety. Dr. Johnson, a physician with years of service at Dalhousie brought to the Program a professional stature and an important skill set.

**1985** Enactment of the Nova Scotia Occupational Health and Safety Act. This Act mandated the creation of committees and introduced important new workplace rights and responsibilities.

**1990** Appointment of Dr. Wm. Louch, Director of Environmental Health and Safety.

**1995** Adoption of the Scent Reduction Program. In an effort to support sensitive members of the University community, the program encourages people to avoid using scented personal care products. The Program also encourages Facilities Management to avoid unnecessary chemical exposure which may arise from maintenance and operations of Dalhousie buildings.

**1996** Enactment of an amended Occupational Health and Safety Act.

**1997** Amalgamation of Dalhousie University and Technical University of Nova Scotia. The Dalhousie Safety Office assumed responsibilities for environmental health and safety at the Sexton Campus.

**2000** Amalgamation of Environmental Health and Safety and Radiation Safety Offices. Appointment of P Jones as Radiation Safety Officer.

**2001** Dalhousie becomes the first University to be issued a consolidated licence by the new Canadian Nuclear Safety Commission.

**2003** Dalhousie becomes the first Canadian University to adopt a smoke-free campus policy.

**2004** An amendment to the Criminal Code of Canada created a new legal obligation in matters of safety for those who direct or who have the authority to direct work.