Canada's Advantage

Industry Canada Industrie Canada

MICMAC

Major Industrial Accidents Council of Canada

Canada's Advantage

ACKNOWLEDGEMENT

This booklet is based on a discussion paper researched and written by Nada Vrany of the Environmental Affairs Branch of Industry Canada. The present text is the result of co-operative efforts by the Major Industrial Accidents Council of Canada (MIACC), and the Industry Sector of Industry Canada (the Environmental Affairs Branch and the Marketing and Promotion Services Directorate).

INDUSTRY SECTOR DEVELOPMENT

DÉVELOPPEMENT SECTORIEL DE L'INDUSTRIE

For further information,
or to obtain additional copies of this publication, contact:

Major Industrial Accidents Council of Canada (MIACC)
Suite 600, 265 Carling Avenue
OTTAWA, ON
K1S 2E1
Tel.: (613) 232-4435
Fax: (613) 232-4915
Internet: miacc@globalx.net

Cat. No. C2-292/1996E
ISBN 0-662-24109-6
50913E

Cette publication est aussi disponible en français sous le titre :
L'atout du Canada

Contents

Beginnings

Industrial accidents are not a new phenomenon. They began with the Industrial Revolution and have punctuated industrial progress ever since. What is new, however, is the universal recognition — by industry, governments and ordinary citizens — of the serious risks and potential consequences of a major industrial accident. Today, an accident can affect tens of thousands of people, cause massive and widespread environmental damage that may persist for decades, and cost taxpayers millions of dollars.

As Canadians we enjoy all the benefits of living in a highly developed, complex, modern industrial society. There are risks that accompany those benefits, however. A major industrial accident — a toxic spill from a train derailment, the accidental release of a hazardous substance into the atmosphere, or a leak of crude oil from a disabled supertanker into a body of water — can happen any time, anywhere. No one is exempt from the effects of such accidents. It is therefore in everyone's interest to recognize the risks and to do everything possible to minimize them. This is, in large measure, the mission of the Major Industrial Accidents Council of Canada (MIACC).

Major Industrial Accidents

Most major industrial accidents today involve hazardous substances and/or potentially dangerous mixes of otherwise "safe" materials. Working with such substances requires specialized technical and scientific knowledge. Great care must be taken with their storage, handling and transportation. The risk of a major spill or accidental release can be significantly reduced if positive steps are taken to encourage prevention, preparedness and response (PPR).

A major industrial accident can affect ordinary citizens who happen to live nearby, or who are passing the site when it occurs, as well as employees at a manufacturing site, workers who transport or re-process hazardous materials and emergency response personnel.

The potential damage to property and the long-term effects on the environment are significant, and they are complicated by the wide variety of hazardous substances and elements that may be involved in an accident. The quantities of materials involved, and the precise conditions when and where an accident occurs — time of day, season of year, proximity to rivers or populated areas — are all factors that must be taken into account.

Everyone pays for a major industrial accident — the companies involved in the manufacture or transportation of the products, the people whose daily lives are disrupted, and those whose lives or health are jeopardized by the event. Industry, governments and taxpayers all feel the ripple effects through higher insurance rates, increased taxes and higher prices for some kinds of products. Unquestionably, it is in everyone's interest to do everything possible to guard against major industrial accidents.

The Evolution of Environmental Policy

Public awareness of environmental issues has grown steadily since Rachel Carson published her seminal book, *Silent Spring*, in 1962. As a result of her work, public attention was focussed on environmental problems: belching smokestacks and urban smog; acid rain and dead lakes; chemicals that bioaccumulate, deforming wildlife and putting human health at risk; raw municipal sewage pumped directly into bodies of water; deforestation and soil erosion; overflowing landfills and polluted subsurface waters; overpopulation; unsustainable rates of resource extraction; oil spills; accidents involving hazardous substances; and even rivers so heavily polluted that they burst into flame.

The public response to these revelations triggered a crisis mentality, and governments responded by introducing "command-and-control" regulations targeted at easily identifiable, large, fixed industrial sources of pollution. These prescriptive regulations, considered by industry to be intrusive, dictated when, and to what

level, individual polluters — as well as industry at large — were required to reduce pollution and its effect on the environment. In some cases the legislation went so far as to prescribe the technology to be used. Industry was not given the option to explore and develop alternative or less expensive ways to reduce pollution. Governments at that time gave little thought to other possible courses of action, such as using economic instruments or inviting voluntary initiatives from industry.

Although these efforts by government were successful in reducing industrial pollution significantly at large fixed sites, they did not address the far more complex pollution problems posed by the thousands of relatively small operators who, collectively, were inflicting enormous damage on the environment. These small diffuse sources became the largest contributors to the environmental pollution problem; continued targeting of large industrial sources would not solve the main problem. Under the circumstances, voluntary initiatives on the part of industry were much more likely to be effective in influencing their behaviour than command-and-control regulations. Clearly, a new approach was needed.

The Emergence of MIACC

MIACC traces its beginnings to the tragic accident at Bhopal, India, in December 1984, when deadly gases were accidentally released from a chemical plant, resulting in the death of more than 3 300 people and injuries to tens of thousands more. This accident and its devastating consequences focussed world attention on the many risks involved in manufacturing, storing, transporting and using hazardous substances.

Following the Bhopal tragedy, the Canadian federal government, under the auspices of Environment Canada, formed a government/industry task force to respond to the question: "Can it happen here?" The task force's 1986 report, *Bhopal Aftermath Review: An Assessment of the Canadian Situation*, determined that "the possibility

of a major industrial accident does exist" in Canada. It went on to argue that the probability and impact of such an event could be significantly reduced if risks were properly identified and evaluated, and contingency plans developed. The report included recommendations that would enable government and industry to co-operate to prevent and respond to major industrial accidents related to the manufacture, storage, distribution, transportation, handling, use and disposal of hazardous substances.

Formed in 1987, MIACC is a uniquely Canadian, not-for-profit organization. It works through a voluntary, consultative and consensus-building process with the primary objective of minimizing the risk from major accidents involving hazardous substances. MIACC is a multi-stakeholder group that includes government, industry and other organizations. It used working groups staffed by stakeholder volunteers to develop standards, guidelines and information-exchange forums aimed at prevention, preparedness and response to industrial accidents. Today, MIACC operates as the "Internet" of PPR professionals.

In addition to developing a national strategy that sets out the organization's objectives, MIACC produced a workplan outlining the framework within which those objectives might be achieved. The workplan is based on the needs of stakeholders and anticipates the organization's growth and development. Phase I of the plan focussed on developing new products and tools for PPR. Phase II is concentrating on the distribution of products and the implementation of the national strategy.

In Canada, responsibility for management of environmental emergencies is shared by federal, provincial and municipal governments. In practical terms, this means that the first response to an emergency is usually made by local or regional authorities. Thereafter, if the scale of the emergency warrants, provincial and federal levels may become involved. If a co-ordinated effort among local, municipal and provincial authorities is required,

confusion and misunderstanding is minimized when all parties have integrated their individual emergency preparedness programs.

MIACC's second objective is to promote the implementation of comprehensive and effective prevention, preparedness and response programs in every jurisdiction and community in Canada. This will help to ensure that PPR efforts are better co-ordinated, that the administrative burden on industry is reduced, and that costs to government are reduced. In addition, an increased level of protection will be achieved for the public and the environment as well as a reduction in the frequency and severity of major industrial accidents. MIACC pursues its goal believing that "an ounce of prevention is worth *more than* a pound of cure."

A New Role for Governments

The approach to environmental problems being taken by governments today represents a major shift from past practices and attitudes. This has come about partly because of the recognition that environmental problems are complex and their solutions call for sophisticated techniques. The limitations of command-and-control regulation (and its "react and cure" approach) highlight the need for more innovative, *voluntary* "anticipate and prevent" approaches to bring about environmental improvement. The fundamental changes from one approach to the other are summarized in Table 1.

Governments are now challenged to encourage industry-led, market-based approaches to public safety and environmental protection. Ideally, such approaches will also solve existing environmental problems, improve the climate for investment and strengthen the competitiveness of investing firms. In this context government is seeking new ways to work in partnership with industry, with government concentrating its efforts on residual problems that can be addressed either through regulatory action or by applying economic instruments.

TABLE 1

CHANGES IN APPROACH TO ENVIRONMENTAL PROBLEMS

OLD APPROACH	NEW APPROACH
Environmental protection and economic growth considered to be in opposition.	Sustainable development links environmental and economic decision-making.
Focus on local problems.	Focus on regional, global problems.
Environmental agenda driven by domestic considerations.	Environmental agenda responsive to international trade and competitiveness.
Public looks to government to solve environmental problems.	Public participates in identifying environmental problems and developing solutions.
Jurisdictional fragmentation results in duplication and overlap.	Jurisdictional co-operation strives to harmonize approaches.
"React and cure" mentality.	"Anticipate and prevent" mentality.
"Command-and-control" approach to problem solving.	Broad array of approaches, including voluntary action and economic instruments.
Regulations prescribe technical solutions, and inhibit innovation.	Performance standards give industry flexibility, and encourage innovation.
Focus on large, easy-to-identify sources of pollution.	Focus on diffuse and difficult-to-manage sources of pollution.

Although an effective regulatory environment includes both legislative and non-legislative components, its strength depends on voluntary initiatives. The system therefore relies heavily on the network of organizations, people, equipment and procedures that, together, act to prevent accidents as well as to mitigate their effects when they do occur.

By participating in MIACC, governments at all levels underscore industry's acceptance of its responsibility to public safety and its commitment to working co-operatively with competitors as well as governments. As long as all stakeholders voluntarily do the "right thing," government should not have to impose prescriptive and costly regulations. The threat of regulation should encourage all companies where there is a risk of a major industrial accident to become committed partners in the MIACC process.

> Voluntary approaches are likely to work whenever the environmental improvement objective is seen by the companies as reasonably balanced and as meeting societal expectations. In these circumstances companies are likely to conclude, in a sense of enlightened self-interest, that they are going to have to eventually achieve the objective anyway, so they might as well do it voluntarily and flexibly rather than by being forced by prescriptive regulations.
>
> (Submission to the Standing Committee on Environment and Sustainable Development on Review of the *Canadian Environmental Protection Act* by The Canadian Chemical Producers Association, September 1994.)

The Role of Industry

In today's global marketplace, competitive advantage is based as much on devising innovative ways to use raw materials efficiently as it is on low cost. There is also a growing appreciation of the strategic importance of integrating environmental considerations into industrial operations, products and services. Progressive enterprises are taking steps to continually improve their economic and environmental performance.

Other forces, too, provide industry with incentives to take its environmental responsibilities seriously. Banks and insurance companies, for example, may withhold or increase the cost of loans or insurance coverage when a company represents an undue environmental risk. In addition, many industrial suppliers and customers now demand that the companies with whom they do business provide evidence of their environmental responsibility. Companies have also learned that poor environmental performance may affect their ability to compete in the global marketplace. Together, these factors are creating an atmosphere within which good environmental performance is rewarded and poor environmental performance is penalized. Companies now know that investment in pollution prevention can strengthen their competitiveness while reducing their legal liability and other costs associated with adverse environmental consequences.

Although governments now co-operate with industry to manage environmental affairs, existing legislation continues to exert a

strong influence on industry. The *Canadian Environmental Protection Act* (CEPA) and other federal and provincial statutes continue to impose fines and penalties on managers, officers and directors of corporations that release contaminants into the environment. The due diligence requirement of the Act also provides a strong incentive for companies to ensure that they do everything possible to prevent accidents and to clean up if one does occur. Together, these forces provide industry with strong incentives to be environmentally responsible.

So why haven't all companies where there is a risk of a major industrial accident developed PPR programs? In the case of smaller companies, often the operators do not realize the risks associated with their operations or the consequences of an accident. In other cases, a company may have addressed its own problems but because it has no authority or legislative requirement to go beyond its own property, there is no incentive for the company to integrate its PPR programs with community emergency preparedness programs. Lastly, with downsizing and re-engineering, companies may not give their PPR programs the attention they deserve.

The Costs of Major Industrial Accidents

To Industry

Since 1970, structural changes and consolidations within the oil, gas and petrochemical industries have resulted in fewer facilities (such as refineries and chemical manufacturing plants) handling more product. Consequently, each facility represents a larger risk. According to figures obtained from the Swiss Reinsurance Company in Zurich (which gathers its information from all over the world), worldwide insurance payouts to the oil, gas and petrochemical industries in 1989 reached a record US$3.9 billion. In the same year industry premiums totalled only US$1 billion — resulting in a significant net loss for the insurance industry and prompting some underwriters to withdraw from the business. Insurance payouts for accidents to the oil, gas and petrochemical sectors are expected to

continue at a high level throughout the 1990s — around US$1 billion per year. (Payout forecasts were first provided by Munich Reinsurance and subsequently confirmed by Swiss Reinsurance.) Combined with the declining availability of casualty insurance, these high losses have contributed to significant increases in industrial insurance premiums.

As a result of the increases in premiums, many companies are opting for self-insurance and higher deductibles. This, in turn, has prompted them to look more closely at the issues of plant safety and risk management in order to mitigate the effects of increased premiums.

Table 2 shows insurance payouts for accidents to the oil, gas and petrochemical industries in millions of 1994 U.S. dollars for Canada, the United States and the world. (The insurance payout data for these sectors are based on settled claims compiled by Swiss Reinsurance and contain historical data not available in Canadian databases. The figures for Canada represent almost 100 percent of settled claims from accidents.) The losses claimed by companies fall into two categories: material damage loss and business interruption loss.

Using the average Canadian share of total world payouts for the period 1988–1992 as an indicator of future payouts (and assuming a 75-cent Canadian dollar), the oil, gas and petrochemical sectors' annual claims from industrial accidents are estimated to be approximately C$25.7 million (1.9 percent of the forecast US$1 billion of total world payouts, as shown in Table 5). With forecasts of such extensive material damage and business interruption losses, industry is highly motivated to strengthen its PPR capabilities. *Indeed, the $25.7 million forecast probably underestimates the real losses because a company's insurance rarely covers all of its losses. When the total costs of an accident are considered, the uninsured costs often exceed the insured costs.*

Table 3 shows examples of losses related to direct and indirect costs from accidents, some of which can be insured against and some of which cannot.

TABLE 2

MATERIAL DAMAGE AND BUSINESS INTERRUPTION LOSSES PAID OUT TO THE OIL, GAS AND PETROCHEMICAL SECTORS CANADA, UNITED STATES AND WORLD (MILLIONS OF US$ 1994)

	MATERIAL DAMAGE		BUSINESS INTERRUPTION		TOTAL CANADA	MATERIAL DAMAGE		BUSINESS INTERRUPTION		TOTAL U.S.	MATERIAL DAMAGE		BUSINESS INTERRUPTION		TOTAL WORLD
YEAR	No.	$ Amt.	No.	$ Amt.	$	No.	$ Amt.	No.	$ Amt.	$	No.	$ Amt.	No.	$ Amt.	$
1981	15	12.3	4	23.8	36.1	26	166.3	6	35.7	202.1	165	477.0	38	213.7	690.7
1982	20	28.8	5	76.7	105.6	30	108.9	11	76.4	185.3	271	493.3	42	238.6	731.9
1983	11	9.7	2	23.2	32.9	79	259.2	16	53.1	312.3	329	636.0	74	504.1	1 140.1
1984	11	104.4	3	233.1	337.5	32	243.4	5	23.5	266.9	196	778.0	29	348.2	1 126.2
1985	9	9.0	6	20.0	29.0	27	218.2	5	40.8	259.1	186	533.9	48	148.0	681.9
1986	5	16.0	1	17.9	33.9	16	42.8	4	25.6	68.3	170	231.0	27	97.2	328.3
1987	10	50.3	3	94.5	144.7	14	404.5	3	265.8	670.4	145	1 017.3	32	570.4	1 587.7
1988	7	4.5	2	2.0	6.5	26	655.8	3	16.2	672.0	153	1 005.0	39	256.4	1 261.4
1989	8	51.5	6	50.6	102.1	58	1 068.9	29	1 230.8	2 299.7	171	1 684.6	71	1 993.1	3 677.7
1990	7	8.6	6	36.9	45.5	46	702.5	17	335.9	1 038.5	203	1 151.8	66	764.0	1 915.8
1991	5	4.7	10	18.5	23.2	43	321.1	10	197.6	518.7	147	1 236.6	60	608.6	1 845.1
1992	5	35.5	2	1.2	36.7	13	146.2	6	138.9	285.1	90	886.6	37	548.1	1 434.7

Note: Data beyond 1992 are incomplete.
Totals may not add due to rounding.

Source: Swiss Reinsurance Company, Zurich, Switzerland.

TABLE 3

INSURABLE AND UNINSURABLE COSTS

DIRECT COSTS	INDIRECT COSTS
INSURABLE	
Employer's liability and public liability claims	Business interruption
Damage to buildings	Product liability
Damage to vehicles and equipment	
UNINSURABLE	
Sick pay	Investigation costs
Repairs	Good will
Lost and damaged products	Corporate image
	Hiring and training of replacement staff

Source: Health and Safety Executive, *The Costs of Accidents at Work*, Health and Safety Series Booklet HS(G)96, London, HMSO 1993.

In a study undertaken in 1993 by the Safety Policy Division of the Hazardous Installations Policy Branch in the United Kingdom, the ratios of insured costs to uninsured costs were calculated and compared for a number of industry sectors including construction, transportation and oil platforms. The results showed that uninsured costs far exceeded insured costs. The ratios for these sectors ranged from 1:8 for the transportation sector to 1:11 for both the construction and the oil platform sectors. *In other words, for these sectors, the uninsured costs were eight to eleven times higher than the insured costs.*

Companies whose operations carry serious risks of major industrial accidents have a strong incentive to take preventive measures of their own and to ensure that quick response capabilities are available at the community level as well.

TO GOVERNMENTS

Most of the estimated 10 000 to 15 000 spills and pollution accidents reported each year in Canada are comparatively minor. From time to time, however, there are major accidents that require governments

to intervene. Often the costs of such interventions are borne by the taxpayer. In some instances those costs have been very high. For example:

- The 1988 fire in a PCB waste storage warehouse in St-Basile-le-Grand, Quebec, involved the evacuation of 5 300 people over a period of 17 days and cost over $40 million.
- In December 1988, the collision of an oil tanker with a tugboat off the coast of Washington state released 875 000 litres of bunker oil into Canadian waters along the British Columbia shoreline. The cost recovery and environmental damage claims totalled over $10 million.
- The 1990 fire at a used tire storage facility in Hagersville, Ontario, cost over $20 million and caused ecological damage to the Niagara escarpment.

The response to the incident at St-Basile-le-Grand was described and critically evaluated in a report by Emergency Preparedness Canada. One of the recommendations contained in that report was that

> . . . the responding parties and managers should establish links during normal conditions. Meetings to exchange information and discuss problems related to emergency operations should be organized regularly. The persons concerned should make an effort to participate.
>
> (*Fire in a Warehouse Containing PCBs at St-Basile-le-Grand: Federal Involvement*, Emergency Preparedness Canada, December 1988.)

MIACC is such a link.

MIACC Products and Services

In addition to developing technical tools (standards, guidelines, other publications and software), MIACC is an important vehicle for information exchange — conferences, workshops, courses and seminars.

Under MIACC's original workplan, Phase I concentrated on developing practical tools for PPR. The prodigious efforts of the working groups resulted in the products listed at the back of this booklet.

In Phase II, MIACC is concentrating on the implementation of its workplan. This means, among other things, bringing about actual change in the prevention and preparedness of industry, carriers and communities across Canada. It is here, at the grass-roots level, where MIACC products are likely to have the most value and where significant risk reductions can be made. The workplan will be implemented through new regionally based MIACC chapters, communities, and industry and carrier sectors. (At present, regional MIACC chapters are operating in Alberta, Saskatchewan, Manitoba and the Montreal Urban Community, with development work under way in Ontario and British Columbia.)

The success of the workplan depends upon the co-operation and support of those organizations that produce or otherwise deal with hazardous materials (industry and carriers) as well as those that must respond when something goes wrong (municipalities and regions).

Implementation of MIACC's workplan relies on community awareness, co-operation and voluntary participation at the local level. Communities must have access to information concerning both risks and measures for prevention, preparedness and response, including the emergency response plans of the organization(s) that control hazardous substances.

The voluntary participation of stakeholders is essential for two reasons. First, the success of the endeavor depends on the extent of stakeholder buy-in, and the level of buy-in will be

higher if stakeholders participate voluntarily. Second, voluntary participation is extremely cost-effective for governments at all levels. Typical cost savings can be achieved in several ways: through the development of legislation and regulation, where appropriate, that references technical, consensus-based standards and supports and builds on effective practices developed and implemented by industry; through lower-cost awareness programs as a result of industry's involvement in the development of technical standards; through higher compliance rates which are a result of higher participation; and through lower enforcement costs.

The Benefits of MIACC

MIACC initiatives and tools have benefited industry and governments by providing significant cost savings; by providing a forum for the harmonization of PPR legislation; by encouraging governments to reference national standards in legislation; and by providing a network for PPR professionals. MIACC provides Canada with an effective process for major hazard control at less cost than the systems in many other industrialized countries and does so while allowing for regional and sectoral differences.

It has been estimated within the Canadian chemical industry that one MIACC information product — all by itself — could potentially contribute over $10 million annually to Canadian industry through cost savings and cost avoidance. This product — CAN/CSA-Z731, *Emergency Planning for Industry* — was developed by MIACC and published by the Canadian Standards Association. Z731 provides operators of all sizes with the necessary guidelines to prepare and implement a comprehensive emergency response plan. This is particularly important to small companies, many of which lack the technical expertise to develop and implement their own plans. In fact, the $10 million figure probably underestimates the real value of Z731 to industry because it does not reflect any of the

benefits that derive from the reduced risks (and the savings) in having an emergency response plan in place.

The potential annual value of MIACC products to industry could well be between $100 million and $200 million. This value is expected to increase as more products are developed.

Governments also benefit from Z731. As noted earlier, three levels of government share the responsibility for emergency management. Each level has laws and regulations appropriate to its jurisdiction. This approach is fragmented and unco-ordinated and often results in overlap, duplication and gaps in legislative coverage.

Recognizing the challenge inherent in adopting a consistent approach to program implementation across the country, the House of Commons Standing Committee on Environment and Sustainable Development has recommended a federal-provincial consultation mechanism to harmonize and co-ordinate new and existing legislation as well as the activities of all three levels of government.

> CEPA should recognize standards, codes and guidelines developed through consensus by organizations like MIACC. The opportunity to incorporate these in the Act by reference, where appropriate, would reduce the need to make separate regulations.
>
> (Report of the House of Commons Standing Committee on Environment and Sustainable Development, *It's About Our Health! Towards Pollution Prevention — CEPA Revisited*, Chapter 10, Environmental Emergencies, June 1995.)

MIACC is already contributing substantially to this objective.

Some MIACC information products can be used cost-effectively by governments, where appropriate, to harmonize legislation. In fact, one MIACC information product (Z731, described above) has already gone through the standardization process and is now a national standard. Steps are now being taken to raise it to the level of an international standard. As with all standards, Z731 will be updated and revised every five years. The participation of all affected stakeholders in the standardization process ensures wide acceptance and buy-in as well as a useful and practical product. In

TABLE 4
FEDERAL LEGISLATION WITH POTENTIAL FOR REFERENCING Z731

DEPARTMENT	LEGISLATION*
Atomic Energy Control Board	*Atomic Energy Control Act*
Environment Canada	*Canadian Environmental Protection Act*
Fisheries and Oceans	*Fisheries Act*
Health Canada	*Hazardous Products Act* *Pest Control Products Act*
Indian and Northern Affairs Canada	*Northern Inland Waters Act* *Territorial Lands Act*
National Energy Board	*National Energy Board Act*
Natural Resources Canada	*Explosives Act* *Oil and Gas Production and Conservation Act*
Transport Canada	*Canada Shipping Act* *Transportation of Dangerous Goods Act*

* The Regulations to each Act also apply.

addition, by referencing standards in legislation, governments save time and reduce costs (of researching, writing and amending regulations) while requiring up-to-date practices.

At present, there are 12 pieces of federal legislation (Table 4) and more than 30 pieces of provincial legislation that could reference Z731.

In addition to saving money for both industry and government by eliminating duplication, the harmonization of requirements for emergency response plans will promote consistency in the development and implementation of preparedness and response programs across Canada.

In 1990, the total value of voluntary commitment from stakeholders was conservatively estimated to be $1.6 million. *This implies that for every dollar invested in MIACC in 1990, the organization was able to lever six dollars of expertise from its stakeholders through voluntary commitment.*

During Phase II, the value of the voluntary commitment of stakeholders is expected to increase significantly as the regional chapters and the industry and carrier sectors begin implementing the national strategy. The Leeds and Grenville experience provides a good example of a community-based forum and a sound basis for estimating the value of similar voluntary commitments.

The Co-ordinating Committee of the Leeds and Grenville Community Alert Network — which includes representation from police, firefighters, elected officials, local industry, carriers, paramedics and other organizations — meets periodically to discuss emergency planning. Each year the committee simulates an accident in order to test the region's emergency response capabilities and to refine its emergency plan. The contribution of one company to this exercise — Dupont Canada's Maitland site — was conservatively estimated at $17 000. The value of the time and resources donated voluntarily by other community stakeholders was estimated to be around $26 000.

Assuming that the total value of voluntary commitment of time, resources and money in other municipalities is similar to the Leeds and Grenville example ($43 000), the total value of voluntary commitments to the implementation of MIACC's national strategy in the approximately 1 000 other municipalities across Canada that present a similar level of risk could reach $43 million each year.

On a larger scale, the Montreal Urban Community (MUC) is responsible for co-ordinating PPR plans and efforts for 29 municipalities in the Montreal area. It is another working example of the implementation of the MIACC national strategy. The value of voluntary commitment to the implementation by MUC stakeholders is conservatively estimated to be between $600 000 and $1 million each year.

Although successful implementation of the MIACC workplan at the grass-roots level will not eliminate accidents entirely, it will undoubtedly bring together more stakeholders (industry, government and the public) and increase public awareness that safety is

TABLE 5

SHARE OF TOTAL WORLD INSURANCE PAYOUTS TO THE OIL, GAS AND PETROCHEMICAL SECTORS, CANADA, UNITED STATES AND THE REST OF THE WORLD

YEAR	REAL GDP CANADA (OIL, GAS & PETROCHEM.) 1992 = 100	CANADIAN SHARE (%)	U.S. SHARE (%)	REST OF WORLD (%)
1981	71.4	5.23	29.26	65.51
1982	69.3	14.41	25.32	60.27
1983	77.6	2.88	27.39	69.72
1984	81.9	29.97	23.70	46.33
1985	85.8	4.25	37.99	57.76
1986	81.7	10.34	20.82	68.85
1987	87.1	9.12	42.22	48.66
1988	94.9	0.51	53.27	46.22
1989	95.1	2.78	62.53	34.69
1990	95.3	2.37	54.21	43.42
1991	95.5	1.26	28.11	70.63
1992	100.0	2.56	19.87	77.57
Average 1981–87		**10.9**	**29.5**	**59.6**
Average 1988–92		**1.9**	**43.6**	**54.5**

Note: Totals may not add to 100% due to rounding.

everyone's responsibility. At the community level the result should be a reduction in both the risk and the cost of a major industrial accident.

DOWNWARD TRENDS IN CANADIAN ACCIDENT LOSSES

Table 5 shows the share of total world insurance payouts (material damage loss plus business interruption loss) to the oil, gas and petrochemical sectors as a result of major accidents for Canada, the United States and the rest of the world for the period 1981–92. It is based on data shown in Table 2. There appears to be a break in the data series between 1987 and 1988. Based on this observation, averages have been calculated for the sample periods 1981–87 and 1988–92.

In Canada, between 1981 and 1992, real gross domestic product (GDP) for these industry sectors increased each year except 1982 and 1986. Canada's share of total world insurance payouts declined from 10.9 percent (1981–87 average) to 1.9 percent (1988–92 average). Although more data are required to draw firm conclusions, this sharp drop in Canada's share of total world payouts during a period when real GDP was increasing would suggest that Canadian PPR performance has improved.

In the United States, on the other hand, the share of total world insurance payouts increased to 43.6 percent (1988–92 average) from 29.5 percent (1981–87 average). Although more data are required to draw any conclusions regarding safety performance in the United States, this increase is particularly interesting considering that major legislation addressing accidents involving hazardous materials was introduced in the United States in 1986. The data for the rest of the world exhibit the same downward trend in total world payouts as the Canadian data, although to a lesser extent.

Table 6 shows the average total insurance payout per accident for each year from 1981 to 1992 for Canada, the United States and the rest of the world. (It is derived from the data shown in Table 2 and the figures are the sum of the average of the business interruption loss and the average of material damage loss.)

In contrast to the data for the United States and the rest of the world, the Canadian data provided here show a downward trend in the average total insurance payout per accident. The averages calculated for the periods 1981–87 and 1988–92 suggest that, in Canada, the costs associated with an accident today (US$6.87 million) are significantly lower than a decade ago (US$26.43 million). The opposite is true for the United States and the rest of the world, where an accident today is more costly than it was in the past.

Although more data are needed to substantiate the assertion that Canadian PPR capabilities have improved since 1988, these data suggest that this is indeed the case. To some extent, this

TABLE 6

AVERAGE TOTAL INSURANCE PAYOUT PER ACCIDENT TO THE OIL, GAS AND PETROCHEMICAL SECTORS, CANADA, UNITED STATES AND THE REST OF THE WORLD (MILLIONS OF US$ 1994)

YEAR	CANADA	UNITED STATES	REST OF WORLD
1981	6.78	12.35	7.97
1982	16.77	10.58	4.90
1983	12.47	6.60	9.18
1984	87.19	12.30	7.18
1985	4.33	16.25	4.40
1986	21.12	9.06	3.60
1987	36.52	117.51	12.73
1988	1.63	30.63	9.88
1989	14.88	60.87	25.14
1990	7.38	35.03	12.04
1991	2.79	27.23	19.01
1992	7.71	34.39	23.86
Average 1981–87	**26.43**	**26.38**	**7.14**
Average 1988–92	**6.87**	**37.63**	**17.99**

improvement can be attributed to the co-operative efforts and voluntary initiatives undertaken by industry and encouraged by various levels of government. MIACC is one of the leading examples of this co-operative spirit.

REGULATION — A COSTLY BUSINESS

Since 1986, U.S. state and federal regulators have been mandating implementation of process safety management (PSM) programs at workplaces that handle hazardous substances including explosives, toxic materials and flammables. The cost of the regulations to industry is shown in Table 7. The figures were obtained from a survey sent to 84 facilities, representing 25 major companies in the United States. The respondents provided historical costs as well as estimates of future costs to comply with government regulations related to PSM.

Respondents were asked to identify the costs incurred in years 1 through 5, then in years 5 through 10, and the ongoing costs to

TABLE 7

AVERAGE COST OF PROCESS SAFETY MANAGEMENT PER FACILITY IN THE UNITED STATES (MILLIONS OF US$ 1992)*

FACILITY	YEARS 1-5	YEARS 6-10	YEARS 1-10	ONGOING ANNUAL COST	YEARS 1-10 ADJUSTED TO 0% COMPLIANCE
Aggregate	3.6	2.2	5.8	0.40	7.0
w/o very large plants	4.3	2.6	6.9	0.50	8.0
Gas Plant/Oil Field	0.7	0.3	1.0	0.07	2.4
Refinery	10.9	6.7	17.6	1.30	20.0
Petrochemical	11.9	4.1	16.0	0.80	19.0
Pulp & Paper	1.3	0.4	1.7	0.08	1.9
Chemical	10.2	7.6	17.8	1.40	19.0
w/o very large plants	3.6	3.1	6.7	0.60	8.0

* Beginning at an average of 40% compliance, October 1992.

Source: W. G. Bridges, "The Cost and Benefits of Process Safety Management," *Process Safety Progress*, American Institute of Chemical Engineers, February, 1994.

maintain compliance. During years 1 through 5, the costs identified typically included capital expenditures to achieve 100 percent compliance during that period. During years 6 through 10, the costs identified typically included ongoing costs, although capital cost outlays were included by some respondents in these years. The last column provides an estimate of the total costs incurred over the 10-year period for a facility in each industry segment, assuming that the facility began from zero percent compliance instead of the average 40 percent compliance.

The total cost for the 84 facilities surveyed for the 10-year period was $484 million, beginning with an average compliance of 40 percent (or $592 million if extrapolated proportionally back to zero percent compliance).

Based on these estimates, the total industry cost was projected to be between $80 billion and $100 billion (over 10 years). This is approximately 15 times higher than the estimate provided by the Occupational Safety and Health Administration (OSHA) and does

not even consider the additional costs due to other relevant legislation under the authority of the Environmental Protection Agency.

Justification for this tremendous compliance burden imposed on industry in the United States is based on the belief that "no amount is too much" when it comes to saving a life. However, recognizing that only limited resources are available to invest in reducing the risk of injury or death, the question becomes "How should these resources be best invested — to save a few lives (perhaps even none) or many lives?" Evidence suggests that greater benefits, including far greater reductions in risk, could be achieved by allowing industry to decide how to invest these resources.

> As for OSHA, industry has been putting increased pressure on the agency (EPA) since the November [1992] election to justify its rule-making on the basis of cost-benefit analysis. In December 1994, the National Association of Manufacturers (NAM) sent a lengthy position paper to the agency calling for it to do a better job of risk assessment and to consider the costs and benefits of standards . . . .
>
> (*Environmental Manager*, April 1995.)

The integration of environmental and economic decision-making requires that limited resources be allocated among competing issues — all of which are aimed at improving human health and the environment. Environmental risk assessment (how risky is the situation?), comparative risk analysis (how risky is this situation compared with others?) and risk management (what should be done about the situation?) all provide critical information to assist in setting priorities and making decisions. The appropriate response must weigh the conclusions of the risk assessment and comparative risk analysis with other considerations such as statutory requirements, costs, benefits and public value.

When a voluntary approach like the MIACC process, backed by the necessary legislative framework, can enable Canada to achieve the high levels of public safety and environmental protection that Canadians want, and achieve them more effectively than other countries (assuming that other countries rely on legislation), then the Canadian initiative must be supported.

MIACC — Canada's Advantage

MIACC is proud of its record to date. It has developed valuable products and technical tools and has built a solid network of PPR professionals. As a result of its efforts, both industry and government enjoy significant cost-saving opportunities. Those individuals who have participated in the MIACC Work Groups have indirectly contributed to forward-looking government policy and have also taken back valuable technical information to their own organizations.

Because industry's commitment to the MIACC process is voluntary, governments at all levels benefit in ways that would not likely be achieved under a regulatory regime. The financial savings are significant — but so are the benefits that governments derive from having easy access to industry's technical expertise. As can be seen from the U.S. experience, the cost of legislating compliance can be very high. In comparison, Canada is achieving high levels of environmental protection at much lower cost. Continuing government support for the MIACC process can help reduce these costs further and achieve even higher levels of environmental protection.

The declining incidence and cost of major industrial accidents in Canada (as evidenced by insurance payout data previously cited) suggest that efforts such as those being spearheaded by MIACC are having a positive effect. Implementation of the Phase II workplan is expected to add substantially to these results.

The workplan includes a number of ambitious objectives, one of which is to initiate a voluntary registry where all companies that use hazardous substances beyond certain designated thresholds are identified and made aware of the recommended practices for effective PPR. They will then be encouraged to demonstrate that they understand the hazards and risks involved and have appropriate management systems in place for proper control, and that the site and community are prepared in case of emergencies.

Another objective is to foster closer relationships with provincial governments — to encourage them to participate actively in the MIACC process, thereby facilitating comprehensive and effective implementation of prevention, preparedness and response programs in all jurisdictions across Canada. MIACC is also committed to assisting in the development of nationally standardized criteria and formats for accident reporting.

The more Canada relies on voluntary processes and co-operation with industry, the better the environment and the public will be served, and the more a competitive advantage will be enjoyed by Canadian companies. By supporting initiatives such as MIACC, Canadian governments encourage a favourable investment climate and promote innovation and growth in the national economy.

MIACC stands prepared to meet its objectives and looks forward to the challenges of the 21st century.

1996 MIACC Board of Directors

Federal Sector

Robert Bégin, Director Emergency Preparedness
Public Works and Government Services Canada

David Bell, Assistant Deputy Minister, Review
Transport Canada

David Egar (Secretary-Treasurer of the Board), Director General
National Programs Directorate, Environment Canada

Ron Harper, Director and Associate Manager
Environmental Affairs Branch, Industry Canada

Roy Hickman, Director General
Environmental Health Directorate, Health Canada

Christine Panasuk, Director, Planning and Co-ordination Division
Corporate Services Branch, Agriculture and Agri-Food Canada

Eric L. Shipley, Executive Director
Emergency Preparedness Canada

Michael C. White, Head, Uranium Processing Facilities Section
Uranium Facilities Division, Atomic Energy Control Board

Industrial Sector

Stan Bradbury, Manager, Dangerous Commodities, Canadian Pacific Ltd.
(representing Railway Association of Canada)

Robert J. Good, President, Autogas Propane Ltd.
(representing Propane Gas Association of Canada Inc.)

Robert A. Hill, V.P. Technology and Operations
The Canadian Energy Pipeline Association

Allan G. Jones (Chairman), V.P. Operations and Environmental Affairs
Rhône-Poulenc Canada Inc.

Kerry Mattila, V.P. Operations
Canadian Petroleum Products Institute

Eric P. Newell (Past Chairman), Chairman, President and CEO, Syncrude Canada Ltd.
(representing Canadian Association of Petroleum Producers)

Brian Smith, Manager, Distribution, Sherritt Inc.
(representing Canadian Fertilizer Institute)

Brian Wastle, V.P. Responsible Care®
The Canadian Chemical Producers Association

George Werezak, Director, Environment, Health and Safety
Dow Chemical Canada Inc.

(Vacant)
The Mining Association of Canada

Municipal Sector

René P. Berthiaume, President
Canadian Confederation of Ambulance Service Associations

Jean-Bernard Guindon, Directeur, Bureau des mesures d'urgence
Communauté urbaine de Montréal

Chris J. Powers, Fire Chief, Nepean Fire Department
(representing Ontario Association of Fire Chiefs)

Don Warden, Fire Chief, Wasaga Beach Fire Department
(representing Canadian Association of Fire Chiefs)

Non-Governmental Sector

Vacant

Provincial Sector

David Blacquiere, Fire Marshal
Ministry of Provincial Affairs and Attorney General, Prince Edward Island

Jim L. Ellard, Director, Emergency Measures Ontario
Ontario Ministry of the Solicitor General

Jim O. Stith, Executive Director, N.B. Public Safety Services Branch
New Brunswick Department of Municipalities, Culture and Housing

Regional MIACCs

Regional MIACC — Alberta
Robert Ducharme, Planning Standards and Training Co-ordinator,
Syncrude Canada Ltd.

Regional MIACC — Saskatchewan
Dwight Osiowy, Director, Logistics, Environment, Health and Safety
Acropolis Warehousing Inc./Rosenau Transport Ltd.

MIACC Secretariat

Michael Salib, Executive Director

MIACC Product List

Education and Training

MP100E ***Emergency Response Training Inventory***, 1st ed. — Listings of emergency response training standards, courses and facilities, audio-visual and printed materials, conferences and computer programs.

MS109E ***Emergency Response Training Inventory*** (electronic) — Software version of MP100E. Features to assist in selecting training material. Users can update the information and add their own notes. (Forecast availability 4th quarter 1996)

MP107E ***Meeting the Standard**** — Aid to first responder trainers in evaluating existing courses or developing new courses to NFPA 47 series and other guidelines.

Risk Management

MP108E ***Hazardous Substances Risk Assessment: Mini-Guide for Municipalities and Industry*** — Introduction to basic risk assessment concepts that enable the reader to carry out initial screening assessments for simple situations.

MP108F ***Mini-guide d'évaluation des risques que posent les matières dangereuses**** — Introduction à l'évaluation élémentaire des risques, notamment dans les situations non complexes, et aux concepts qui la sous-tendent.

MP110E ***MIACC Lists of Hazardous Substances*** — To help municipal and industrial authorities identify the substances and the minimum (threshold) quantity of each that have the potential to precipitate a major disaster.

MP110F ***Listes des substances dangereuses**** — Pour aider les administrations municipales et le secteur privé à identifier les matières qui ont la possibilité de causer un accident majeur et les quantités seuils à partir desquelles un tel accident peut survenir.

MP111E ***Risk Assessment Guidelines for Municipalities and Industry — An Initial Screening Tool*** — Procedure for evaluating the risk at a site, including sites where inventories of several hazardous substances are held together in any quantity. (Forecast availability 2nd quarter 1996)

MP111F ***Lignes directrices sur l'évaluation des risques à l'intention des municipalités et de l'industrie : version préliminaire d'un outil de selection*** — Procédure pour l'évaluation des risques sur des sites, notamment des sites où se trouvent des stocks composés de nombreuses matières dangereuses, quelles qu'en soient les quantités. (Disponibilité prévue : 4e trimestre 1996)

MP113E ***Risk-Based Land Use Planning**** — Guidelines for protecting the public from the effects of major industrial accidents.

MP113F ***Planification de l'utilisation du sol en fonction des risques**** — Lignes directrices et techniques pertinentes pour assurer la protection du public contre les incidences des accidents industriels majeurs.

Life-cycle Management/Process Safety

MP104E ***Process Safety Management*** (1st ed.) — Overview guide for facilities handling hazardous substances based on the approach developed by the U.S. Center for Chemical Process Safety.

MP106E ***Report on Chlorine Accident Prevention*** — MIACC workshop study of chlorine, including case histories, contributed to a framework for the life-cycle management of hazardous substances.

MP112E ***Life-cycle Management of Hazardous Substances*** — Framework for application of recommended practices for safe manufacture, transport and use of hazardous chemicals including effective mitigation and emergency response to releases. (Forecast availability 1st quarter 1996)

MP112F ***Gestion du cycle de vie des matières dangereuses*** — Cadre d'application d'une série de pratiques recommandées pour la fabrication, le transport et l'utilisation sûrs de produits chimiques dangereux, y compris l'atténuation efficace des incidences et l'intervention d'urgence en cas de déversements. (Disponibilité prévue : 1re trimestre 1996)

MP114E ***Liquefied Petroleum Gases Life-cycle Accident Prevention Workshop Report*** * — MIACC workshop study to test the generic framework (MP112E), case studies, and an opportunity to evaluate management practices in the propane gas industry.

MP115E ***Process Safety Management — Tools and Training*** * — Listings of process safety tools and training. Includes sub-categories in process risk management, management of change, process and equipment integrity, human factors, incident investigation, compliance verification, software, management training aids and general references.

Emergency Planning

MP105E ***Guiding Principles for Joint Municipal and Industry Emergency Preparedness*** — How to initiate and carry out joint emergency preparedness to help protect communities against industrial accidents involving hazardous substances.

MP105F ***Principes directeurs sur l'état de préparation conjoint des municipalités et de l'industrie*** — Comment instaurer un état de préparation conjoint pour la protection des collectivités contre les accidents industriels majeurs mettant en cause des matières dangereuses.

CAN CSA Z731-95 ***Emergency Planning for Industry*** * — How to determine if an emergency plan is required by identifying potential hazards; assistance in developing an emergency response plan.

CAN CSA Z731-95 ***Planification des mesures d'urgence pour l'industrie*** * — Évaluez la nécessité d'un plan d'intervention d'urgence en identifiant les risques possibles. Le produit favorise aussi la mise au point d'un plan d'intervention d'urgence.

Proceedings

MP102 ER91 Conference ***Technological Response to Dangerous Substances Accidents*** — Proceedings of 1991 conference on prevention, preparedness and response to hazardous substances accidents including medical/psychological effects, public awareness and communications and industry experiences.

MP103 ER93CS Conference ***Practical Approach to Hazardous Substances Accidents*** — Proceedings of 1993 conference presented by MIACC, Environment Canada and the Air and Waste Management Association.

MP116 PPR'95 Conference ***Prevention, Preparedness and Response to Major Industrial Accidents Involving Hazardous Substances*** * — Proceedings of 1995 conference presented by MIACC in co-operation with 11 other organizations.

* Indicates 1995 release

MIACC Members as of January 1, 1996

Federal

Atomic Energy Control Board
Emergency Preparedness Canada*
Environment Canada*
Health Canada*
Industry Canada*
National Energy Board
Public Works and Government Services Canada
Transport Canada*

Provinces

Alberta Labour
Alberta Transportation and Utilities*
Alberta Energy and Utilities Board
New Brunswick*
Nova Scotia*
Northwest Territories*
Ontario*
Prince Edward Island*
Yukon*

Municipal/ER Associations

Canadian Association of Fire Chiefs
Canadian Confederation of Ambulance Service Associations
Ontario Association of Fire Chiefs

Municipalities

City of Regina
Communauté urbaine de Montréal
Regional Municipality of York

Non-Governmental Organizations/Institutions

Canadian Labour Congress
Sauvetage Canada Rescue
University of Waterloo/IRR

Industry Associations

Association Industrielle Laval
Canadian Association of Petroleum Producers*
The Canadian Chemical Producers Association*
The Canadian Energy Pipeline Association*
Canadian Fertilizer Institute
Canadian Petroleum Products Institute*
Canadian Pulp and Paper Association
Compressed Gas Association
The Mining Association of Canada*
Mining Association of Manitoba
Propane Gas Association of Canada Inc.
Railway Association of Canada*

Industry

Agrium Inc.
Arthur D. Little of Canada Ltd.
BASF Canada Inc.
Bayer Rubber Inc.
BCR Group of Companies
(Rail Operations)
Betz Inc.
Canadian National*
Canadian Pacific Ltd.*
Canadian Electrolytic Zinc
Canadian Occidental Petroleum Ltd.
Cargill Limited
Celanese Canada Inc.
Crisis Preparedness Group
Cytec Canada Inc.
DNV Technica
Dofasco Inc.
Dow Chemical Canada Inc.*
Eka Nobel Canada Inc.
Huntsman Corporation Canada
ICI Canada Inc.
Imperial Oil Limited*
Kronos Canada Inc.
Lever Brothers Ltd.
Lubrizol Canada Ltd.
Methanex Corporation
Molson Companies Limited
Monsanto Canada Inc.
Nacan Products Ltd.
Nalco Canada
National Silicates Ltd.
Novacor Chemicals (Canada) Ltd.*
Pétromont Inc.
Procter & Gamble Inc.
Rhône-Poulenc Canada Inc.
Simplot Canada Limited
Suncor Inc.*
Syncrude Canada Ltd.*
Synergistics Industries Limited
Tembec Inc.
Union Carbide Canada Ltd.
VFT Inc.
W4 Group
Westco Fertilizers Limited
Westcoast Energy Inc.
Westroc
Witco Canada Inc.

* A MIACC Coalition Partner

Canada