V.5.
Hazardous Material Management

Vérificateur général
de la Ville de Montréal

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LIST OF ACRONYMS

CAD	computer-assisted dispatch system
CBFVM	consolidated by-laws of the former Ville de Montréal
CSP	chlorine safety plan
CSST	Commission de la santé et de la sécurité du travail
DEDD	Direction de l'environnement et du développement durable
E2 Regulations	Environmental Emergency Regulations
FSP	fire safety plan
HAZMAT	hazardous materials
HHW	household hazardous waste
JMIC	joint municipality/industry committee
MAMROT	ministère des Affaires municipales, des Régions et de l'Occupation du territoire
MDDEP	ministère du Développement durable, de l'Environnement et des Parcs du Québec
MIARC	Major Industrial Accidents Reduction Council
MSP	ministère de la Sécurité publique
PGMUEM	Programme de gestion des mesures d'urgence dans les édifices municipaux
PRIM	Plan pour installations à risques industriels majeurs
SDO	Service du développement et des opérations
SSIM	Service de sécurité incendie de Montréal

V.5. HAZARDOUS MATERIAL MANAGEMENT

1. INTRODUCTION

Businesses, government institutions, municipalities and citizens make use of hazardous materials (HAZMAT) on a daily basis. These HAZMAT, which are used, stored, transported and disposed of, are an integral part of community life. All this activity includes its share of risks. Accidents can occur, and can constitute a danger for the health and safety of employees and the general population alike, not to mention the possible consequences for water, air and soil contamination.

FACTS FOR THE TERRITORY OF MONTRÉAL[1,2]

In 2009 and 2010, 25 accidents involving HAZMAT occurred on the territory of Montréal, including 24 at fixed sites and one connected to the transportation of HAZMAT.

Some examples of accidents that made headlines over the past few years:

- 2010: Leak of petroleum products from a refinery tank
  - Leak of 152,000 litres of petroleum hydrocarbons into the St. Lawrence River
  - Water, air and soil contamination
  - Citizens bothered by a strong odour of petroleum
- In 2007: Leak of acetic acid from a pipe in a petrochemical plant
  - Leak from a tank containing 180,000 litres of acetic acid in an 80% concentration
  - Air contamination, formation of a toxic cloud
  - Surrounding population told to stay indoors

Our illustrations of risks related to HAZMAT management take into account the limits imposed by current laws. These exposure limits require that risk generators disclose risks and accidents to certain government authorities only, and not to the general population.

[1] Registre des réponses d'Urgence-Environnement, MDDEP, March 30, 2011.
[2] Centre de sécurité civile, Ville de Montréal, 2011.

For further information about major accident risks, their effects and their consequences, see Appendix 4.1.

PRESENCE OF HAZARDOUS MATERIALS ON THE TERRITORY OF MONTRÉAL

According to data from the Ministère du Développement durable, de l'Environnement et des Parcs du Québec (MDDEP),[3] the Montréal administrative region produces 64.3 million kilograms of hazardous waste, ranking second in this category in Québec.

As of February 2, 2010, 55 facilities in the Montréal agglomeration are subject to federal Environmental Emergency (E2) Regulations. These facilities treat, store or transform HAZMAT in such quantity that the consequences, in the event of an accident, could extend beyond the boundaries of the facilities and reach the surrounding population.

The facilities subject to E2 Regulations are heavily concentrated in the petrochemical plant sector in the east of Montréal.

STATUTES AND REGULATIONS

The federal and provincial governments have enacted several statutes and regulations to control how risk generators use, store and dispose of hazardous materials in order to protect workers, the population and the environment (see Appendix 4.2).

ROLE AND RESPONSIBILITIES OF THE CITY WITH REGARD TO HAZARDOUS MATERIALS

The Ville de Montréal (the city) has a dual role in the management of hazardous waste. In terms of public safety, it must protect the population and the environment. Moreover, as its own facilities generate risks, it must also protect the health and physical integrity of its employees.

[3] *Gestion des matières dangereuses résiduelles au Québec*, MDDEP, Gouvernement du Québec, 2005, p. 8.

The city's major responsibilities in managing major industrial accident risks for public safety are:[4]

- set up and coordinate risk management committee(s)
- ensure that committee goals are met
- make sure that risk generators fulfill their obligations
- prepare and maintain a municipal emergency plan
- protect the population if a disaster should occur
- alert the population if a disaster should occur
- notify the ministries involved if a disaster should occur
- have an adequately trained emergency response team
- define buffer zones between risk generation sites and the population
- consider the risks of new industrial projects to the population's health and safety

In order to assume these responsibilities, the Service de sécurité incendie de Montréal (SSIM), through the intermediary of the Centre de sécurité civile and the Direction des opérations et de la prévention, works closely with the industrial sector to target and reduce the risks of major industrial accidents[5] and ensure better emergency response coordination.

The SSIM, as first responder, has an important role to play in the event of a major industrial accident in the Montréal agglomeration. In addition to its fire-fighting role, its primary responsibility is to have its HAZMAT response team detect and determine the product involved and carry out various response techniques.

At the scene of the accident, the SSIM may need to manage the disaster zone to some degree, depending on the scope of the event and the responsibilities of the various government stakeholders.

[4] List based on these documents: *Risk Management Guide for Major Industrial Accidents,* MIARC, 2007 edition, and *Matières dangereuses : Savoir quoi faire,* Directeur de santé publique, Gouvernement du Québec, 2008, p. 16.

[5] Major industrial accident: an unexpected and sudden event involving hazardous materials (release of toxic materials, explosion, thermal radiation) and having consequences for the population, environment or property outside the establishment.

The Direction de l'environnement et du développement durable (DEDD) of the Service du développement et des opérations (SDO) also works with the industrial sector to improve and protect the quality of Montrealers' environment.

The city itself is a risk generator in carrying out its activities. It stores, handles, transports and disposes of a significant number of diverse HAZMAT. Of course, some facilities have a greater risk of accidents because of the nature and quantities of the HAZMAT they use or store, for example: Service de l'eau drinking water treatment plants (they use chlorine), ecocentres (sites for reusing and recycling waste matter including household hazardous waste or [HHW]) and arenas (some refrigeration systems use ammonia). To protect the health and physical integrity of their employees, the different business units are responsible for establishing and maintaining an occupational health and safety management system. The Service du capital humain coordinates the formation and supervision of the city's occupational health and safety management system.

2. AUDIT SCOPE

The purpose of this audit was to ensure that HAZMAT are managed safely and comply with regulations so that the health and safety of employees, citizens, property and the environment are protected, and to evaluate the state of the city's preparedness to cope with a HAZMAT disaster.

Our audit dealt more specifically with the following elements:

- analysis and evaluation of risks attributable to HAZMAT
- control mechanisms for preventing accidents involving HAZMAT and intervening adequately in emergency situations
- compliance with laws and regulations
- reports, mechanisms of communication and of coordination among the various responders

The scope of our work included risk management of major industrial accidents on the agglomeration of Montréal territory as well as HAZMAT management by some city

facilities where they are used or stored (drinking water treatment plants and ecocentres).

We would like to clarify that this audit did not deal with managing domestic use of HAZMAT by citizens, the risk of a terrorist attack involving HAZMAT or managing HAZMAT transportation.

Our audit was concerned mainly with the Centre de sécurité civile and the Direction des opérations et de la prévention, which are under the authority of the SSIM. It was also conducted with the DEDD and the Direction du développement économique et urbain of the SDO, the Service de l'eau's Direction de l'eau potable as well as the Direction des immeubles of the Service de la concertation des arrondissements et des ressources matérielles. The audit covered 2010 and the first five months of 2011, and carried out predominantly from March to May 2011.

3. FINDINGS, RECOMMENDATIONS AND ACTION PLANS

3.1. MAJOR INDUSTRIAL ACCIDENT RISK MANAGEMENT

3.1.1. DETECTING AND EVALUATING MAJOR INDUSTRIAL ACCIDENTS RISKS

3.1.1.A. Background and Findings

Under various statutes and regulations, municipalities and risk generators are responsible for detecting and evaluating the dangers from activities involving HAZMAT.

The primary responsibility for detecting and evaluating risks falls to the risk generators. They must establish and maintain a risk management system to prevent HAZMAT accidents. However, despite prevention efforts, an accident is always possible. For this reason, risk generators and municipalities must be prepared to respond in an effective manner and coordinate their efforts to mitigate the consequences. Such preparation is only possible when the municipality is aware of the vulnerabilities in its jurisdiction and shares information with the risk generators.

To fulfil its responsibilities, the city must have adequate information about risk generators. The SSIM indicated in the 2008 fire safety cover plan that 42 facilities subject to E2 Regulations handled, stored or processed HAZMAT in such quantities that, in the event of an accident, the consequences could extend beyond the boundaries of the facilities and affect the surrounding population. As of February 2, 2010, there were 55 of these facilities.

During our audit, we wanted to make sure that the SSIM had access to adequate information for accurately evaluating industrial risks in the agglomeration of Montréal. In order to do so, we examined SSIM information regarding facilities subject to E2 Regulations.

Our audit identified following weaknesses:

- The city lacks key information for properly evaluating risks and preparing adequately for a major accident:
  - For the 55 facilities reporting under E2 Regulations:
    - 20% (11/55) have disclosed their risks to the city, i.e., their analyses of the consequences (standardized scenarios[6] and alternatives[7]) for the HAZMAT they use or store.
    - Risk reports are not updated regularly and are more than five years old in 91% (10/11) of the cases.

This situation is explained in part by the fact that current statutes and regulations do not oblige the risk generators to declare risks to the municipality. In fact:

- Environment Canada E2 Regulations require that risk generators reveal their risks and consequences to the population. This regulation does not specify disclosure to the municipality.
- Under section 8 of the *Civil Protection Act,* risk generators are required to report their risks to the municipality. However, to date, the Ministère de la Sécurité publique du Québec (MSP) has not produced any regulations defining which risk

[6] Standardized scenario: release of the largest quantity of a hazardous substance held in the largest container for which the impact distance is the greatest.

[7] Alternative scenario: the largest accident that could be produced by a hazardous material held in fixed critical quantity. Its occurrence is more than likely compared to the standardized scenario. It takes into consideration passive mitigation measures (e.g., a bund) and active mitigation measures (e.g., automatic sprinklers).

generators must report, when they must report, and the conditions under which the required information must be supplied. Municipalities have been waiting for this regulation since 2001. Under section 133, the municipality could initiate criminal prosecution for violation of section 8.

Consequently, if the city is not able to receive information on risks and their consequences from the risk generators, it might not be able to properly prepare and respond in the event of a major accident. In our opinion, it is essential that risk generators be obliged to communicate their risks to the municipality to protect the population and the environment. For this to happen, the city might consider these options, among others:

- work with Environment Canada so that risk generators comply with E2 Regulations and reveal possible risks and consequences to the population as required by the regulation
- apply sections 8 and 133 of the *Civil Protection Act*
- regulate risk disclosure by the risk generators

3.1.1.B. Recommendations

We recommend that the Service de sécurité incendie de Montréal, with the Service des affaires juridiques et de l'évaluation foncière, take the necessary measures to require risk generators to disclose their risks to the city so that it can identify and evaluate the risks in the agglomeration.

3.1.1.C. Action Plan of the Relevant Business Unit

[TRANSLATION] "In department regulations: Incorporation of the authority to ask industries for 'any information' *falling within their field of expertise and* 'an expert's technical report to help assess the risk . . . level . . . of a process'*. Applicable to all existing buildings in the Montréal agglomeration.* ***(Planned completion: December 2011)***

Fire safety cover plan – Major industrial accident risk management (E2 program): Determine the facilities subject to E2 Regulations and verification of the lists of HAZMAT subject to E2 Regulations. ***(Planned completion: January 2012)***

Send a letter to Environment Canada explaining the SSIM's risk management model and requesting Environment Canada's support in updating the information submitted by the companies under E2 Regulations." ***(Planned completion: September 2011)***

3.1.2. JOINT MUNICIPALITY/INDUSTRY COMMITTEES

3.1.2.A. Background and Findings

Every municipality is responsible for promoting municipal and industrial coordination of emergency measures. The establishment of a joint municipality/industry committee (JMIC*)* is recognized as being a good way to ensure this coordination.

A JMIC is a purely voluntary group representing municipal administrations, citizens, manufacturing concerns and government organizations working in the fields of health, emergency preparedness and the environment. They have a common desire to establish an integrated procedure for major industrial accident risk management. Their goal is to pool their resources, professional expertise, equipment, knowledge and experience.

The goals pursued by a JMIC are primarily to:

- determine the risks related to HAZMAT activities on its territory
- help risk generators evaluate the consequences of major industrial accidents
- encourage these risk generators to implement necessary preventative activities
- integrate municipal and industrial emergency plans
- inform the community and establish an effective communication network

The city encourages the establishment of JMICs. The first JMIC in Montréal, Entraide mutuelle de l'est de Montréal, actually came into being in 1950. Currently, there are four JMICs in the agglomeration of Montréal:

- Comité mixte municipalités-industries-citoyens de l'est de Montréal (CMMIC-EM)
- Comité industriel en sécurité de LaSalle (CISL)
- Comité mixte arrondissement et industries (CMAI) de Saint-Laurent
- Comité industries-municipalité d'Anjou (CIMA)

During our audit, we wanted to make sure that the JMICs allowed the city to effectively manage major industrial risks in the agglomeration of Montréal. We primarily examined the minutes of these committees.

This audit revealed the following deficiencies:

- The long-term survival of some JMICs is at risk. For example, one JMIC has been inactive for more than a year while the way others are functioning has been questioned.
- The roles and responsibilities of members are not clearly defined, especially for municipal representatives. We observed that the city did not play a leadership role with the JMICs.
- Turnover is significant in relation to the three member categories (businesses, municipalities, citizens).
- Little interaction exists among human, financial and material resources because of the number of JMICs in Montréal and the limited resources and specialized expertise available.
- City business objectives have not been established and conveyed to JMICs including:
  - communication of the risks to citizens (e.g., the percentage of facilities subject to E2 Regulations that have duly communicated risks to citizens)
  - design of municipality/industry response plans (e.g., the percentage of facilities subject to E2 Regulations having a duly coordinated municipality/industry response plan)
- No accountability for the city reaching its goals exists.
- Fair apportionment of the costs between the city and risk generators has not been established.
- The majority of facilities subject to E2 Regulations (69% or 38/55) are not JMIC members.

We note that a MIARC study[8,9] of best practices and challenges observed in Québec JMICs reports similar findings to those presented above.

Consequently, these deficiencies on the operation of JMICs do not promote integrated risk management, which includes coordination among stakeholders to ensure effective preparation and emergency response as well as adequate disclosure of the risks to the population.

3.1.2.B. Recommendations

To ensure that joint municipality/industry committees allow the city to effectively manage industrial risks, we recommend that the Direction générale, in collaboration with the Service de sécurité incendie de Montréal, clarify:

- **the city's business objectives for the joint municipality/industry committees;**
- **the roles and responsibilities of the city's business units and their representatives;**
- **the human and financial resources needed for supporting the joint municipality/industry committees;**
- **financing sources, so that there is a fair apportionment of costs between the city and risk generators;**
- **accountability mechanisms;**

as well as to review the appropriate number of joint municipality/industry committees that must be present in the agglomeration of Montréal and their methods of operation.

3.1.2.C. Action Plan of the Relevant Business Unit

[TRANSLATION] "The SSIM is mandated by the Direction générale to suggest directions to the municipal administration for current JMICs or any other coordination mechanisms it judges appropriate.

[8] *Bilan de l'étude du CRAIM [MIARC] sur les meilleures pratiques observées pour la concertation locale en gestion des risques industriels majeurs,* MIARC, November 2010, 21 p.

[9] Major Industrial Accidents Reduction Council: a group of experts (municipal, industrial and government) in the industrial risk field whose goal is to establish standards and management tools for the various stakeholders.

Major industrial accident risk accountability will be integrated into the Bilan de l'état de préparation de l'agglomération de Montréal pour faire face à un éventuel sinistre *presented annually by the Centre de sécurité civile."* ***(Planned completion: January 2012)***

3.1.3. MUNICIPALITY/INDUSTRY RESPONSE PLANS

3.1.3.A. Background and Findings

E2 Regulations require that risk generators prepare emergency plans that include the following information:

- types of emergencies likely to occur and have an impact on the environment, health or safety
- details of prevention, preparation, response and recovery measures
- register of individuals expected to execute the plan and their roles
- indication of the training these individuals have received
- inventory of response equipment and its location
- measures for notifying affected members of the public

By virtue of federal regulations, this emergency plan must be tested annually and the drills must be documented.

The risk generator must work in concert with the municipalities and other organizations involved to ensure improved response in an emergency situation.

During this audit, we wanted to make sure that, in the event of a major industrial accident, the SSIM—the first responder—had updated HAZMAT information and response plans for facilities subject to E2 Regulations. To do so, we examined the quality of the information contained in the E2 Regulations system[10] (a computerized system used by firefighters when they are called to respond to a fire) as well as SSIM response plans for the 55 facilities subject to E2 Regulations.

[10] Computer-assisted dispatch (CAD) system.

The SSIM, the first responder in event of an accident, does not have all of the information necessary to effectively respond with facilities subject to E2 Regulations. This audit enabled us to observe the following deficiencies:

- For some facilities (13% or 7/55), the E2 Regulations system contains no information on either HAZMAT or the fire response plan.
- In 64% (35/55) of the cases, the information in the E2 Regulations system is neither complete nor up to date regarding HAZMAT used or stored by the facilities and response plans.
- The SSIM is not informed of and does not have copies of emergency plans produced by risk generators.
- Although response plans have been written up, only one uses the standardized or alternative accident scenarios prepared by the risk generators. This leads us to question the adequacy of:
  - response and recovery measures anticipated in event of an accident
  - municipality and industry response capability
- Few agreements have been concluded to apportion funding responsibilities between city and industry teams for preparing response plans and optimizing response organization in the event of an accident.

We note, however, that the SSIM has a program mentioned in the 2008 fire safety cover plan that foresees the design and implementation of a fire safety management model for industries subject to E2 Regulations during the 2010 to 2013 fiscal years, using the structure of existing JMICs or their equivalents where appropriate.

3.1.3.B. Recommendations

In order to ensure the effectiveness of municipality/industry response plans, we recommend that the Service de sécurité incendie de Montréal:

- **Develop response plans as quickly as possible for all at-risk facilities and update them constantly.**

- **Continue with its efforts over the next few years to develop and implement a fire safety management model for industries subject to the Environmental Emergency (E2) Regulations that will:**
  - **make facility emergency plans known so that joint municipality/industry response plans can be prepared**
  - **use the standardized and alternative accident scenarios to prepare municipality/industry response plans and formally assess the adequacy of municipal and industry response capabilities**
  - **specify the human and financial resources necessary to prepare response plans and support response activities as well as funding sources for a fair apportionment of costs between the municipality and the industries.**

3.1.3.C. Action Plan of the Relevant Business Unit

[TRANSLATION] "Fire Safety Cover Plan – Major industrial accident risk management (E2 program):

- *Preparation of a specific SSIM response plan template for E2 facilities (PRIM: Plan pour installations à risques industriels majeurs):*
  - *CAD: the format of the specific response plans for high-risk industries must be compatible with vehicular computers.*
  - *The type of information to integrate into the response plans must be determined by the operations.*
  - *Industry information must be gathered by local fire stations working with industry.* ***(Planned completion: June 2012)***

Standardization of response activity and special response plans. ***(Planned completion: December 2012)***

Plan implementation – Use of a public alert system when responding to a toxic gas leak. ***(Planned completion: June 2012)***

Integration of PRIM in the emergency, succession and audit plans of boroughs and related municipalities. ***(Planned completion: December 2012)***

E2 Regulation program:

- *Management model: the management model will be defined in a summary document on the E2 Regulation Program, including the allocation of human and financial resources.* ***(Planned completion: January 2012)***

Departmental regulations: Incorporation of the authority to ask industries for 'an expert's technical report to help assess the risk . . . level . . . of a process.'" ***(Planned completion: December 2011)***

3.1.4. INSPECTIONS CARRIED OUT BY THE MUNICIPALITY (SERVICE DE SÉCURITÉ INCENDIE DE MONTRÉAL AND DIRECTION DE L'ENVIRONNEMENT ET DU DÉVELOPPEMENT DURABLE)

3.1.4.A. Background and Findings

The 2009-2013 fire safety cover plan for the agglomeration of Montréal makes fire prevention a top priority.

It mentions, among other things, that priority must be given to higher risks wherever they are on the territory, particularly for industries that report under the E2 Regulations.

Six programs have been adopted for implementing the plan and must be introduced between now and 2013. We primarily examined the progress and performance of one of these programs that focuses especially on the risk of major industrial accidents: the Programme d'inspection périodique des risques plus élevés. This program includes targeted actions with clear schedules, including:

- 2009 to 2013 – Priority given to the inspection of high- and very high-risk buildings in the most at-risk sectors (zones of risk), and populations made vulnerable because of their location, for each of the SSIM's operational divisions. To do this, the SSIM is committed to carrying out 22,500 category 3[11] and 4[12] inspections in five years.
- 2010 to 2013 – Annual inspection and production and verification of response plans and special response plans. Also, making owners aware by targeting all high-risk and very high-risk buildings to ensure that elements critical to detecting and

[11] High fire risk facilities.
[12] Extremely high fire risk facilities.

controlling fire outbreaks, evacuating occupants and response effectiveness are operational.

- 2011 to 2013 – Design and implementation of a fire safety management model for very high-risk industries (F1 use) and industries subject to E2 Regulations by using, the structure of existing JMICs or their equivalents where relevant.

Our examination of this program and its progress status allow us to make the following observations:

- No facilities subject to E2 Regulations (facilities in building categories 3 and 4) have received a planned inspection by the SSIM in the past three years. SSIM inspections have focused on the residential sector. We should point out that there have been individual responses required during this period (e.g., complaints, fire safety plan (FSP), compliance with particular standards) for 55% (30/55) of the facilities.
- The situation with response plans was dealt with in section 3.1.3.
- Inspection activities (work tools, inspectors' competency profiles, etc.) are not adapted to very high-risk industries. They focus above all on the residential sector. We note, however, that the SSIM has a program to design and implement a safety management model for this sector.
- There are no specific goals focusing mainly on industrial sector inspection activities and response plans.

As for inspections, the SSIM, DEDD and other government organizations (e.g., the MDDEP and Environment Canada) are working with the industrial sector to ensure compliance with laws and regulations. Even though government organizations have complementary jurisdictions, we observe that there is little interaction and coordination among the various inspection teams, including:

- for the SSIM and DEDD, inspected facilities and the industrial procedures causing risks are the same. Whether these services exist for protecting the environment or the population, they share a common interest, which is preventing industrial accidents. It should be possible to coordinate sharing work methods, tools and technical expertise.

- for the city (SSIM and DEDD) and government organizations, there has not been any agreement to share responsibilities and costs for industrial facilities among the various inspection teams.

Consequently, since industrial sector inspection programs are at the design and implementation stage, it is difficult for the SSIM to have a picture of how effective risk generators' preventive measures are and how comprehensive the list of identified at-risk facilities is. As there is no coordination of responses among stakeholders, this situation could also result in duplication of tasks and lack of optimization of human and financial resources.

3.1.4.B. Recommendations

In order to strengthen and optimize industrial sector inspection activities, we recommend that the Service de sécurité incendie de Montréal produce an action plan for creating and implementing a fire safety management model for industries subject to the Environmental Emergency Regulations. This action plan should, in particular:

- **specify objectives and schedule for industrial sector inspections**
- **plan to carry out systematic inspections of facilities subject to the Environmental Emergency Regulations as quickly as possible**
- **review the adequacy of competency profiles and work tools and methods for industrial sector inspections; review cooperation and coordination with other stakeholders (e.g., Direction de l'environnement et du développement durable and Environment Canada).**

3.1.4.C. Action Plan of the Relevant Business Unit

[TRANSLATION] "E2 Program:

- *The design of an action plan containing the elements from this recommendation will be part of the fire safety cover plan for the E2 inspection program.* ***(Planned completion: January 2012)***

For consistency between Division du contrôle des rejets industriels inspections and the SSIM, it was agreed to:

- *organize information sessions for Division du contrôle des rejets industriels and SSIM employees*
- *carry out several joint industry inspections* ***(Planned completion: March 2012)***

Send a letter to Environment Canada explaining the SSIM's risk management model and asking for Environment Canada's support to update the information submitted by businesses in compliance with E2 Regulations." ***(Planned completion: September 2011)***

3.1.5. PUBLIC ALERT SYSTEMS

3.1.5.A. Background and Findings

In accordance with E2 Regulations, establishments that use or store HAZMAT that exceed critical quantities must define the measures planned for notifying people that could be harmed by an emergency situation.

When there is a major accident involving the loss of containment of a toxic substance, taking shelter, the best protection for individuals, is not a natural reaction. Information about appropriate behaviour for the population is therefore necessary.[13]

A standardized alerting procedure based essentially on the use of an alarm siren is the basic element of the population alerting mechanism. People can also be warned by other alert methods, particularly by telephone notification systems, television, the Internet and social networks (e.g., Facebook, Twitter).

The alerting mechanism must be followed quickly by a notice to the population detailing safety procedures to follow.

During our audit, we wanted to ensure that measures were taken to alert the population in an emergency.

[13] *Risk Management Guide for Major Industrial Accidents,* MIARC, 2007 edition.

Our examination revealed that only 5% (3/55) of facilities subject to E2 regulations have:

- a siren-type alert system for quickly notifying people located inside high-risk areas
- an alert system integrated with the municipality's alert system

Without a timely warning, there is a risk that the population's safety will be adversely affected. In our opinion, it is fundamental that risk generators be under an obligation to set up public alert systems.

3.1.5.B. Recommendations

We recommend that the Service de sécurité incendie de Montréal, with the Service des affaires juridiques et de l'évaluation foncière, take the necessary measures to require risk generators to install effective public alert systems so the public is adequately protected.

3.1.5.C. Action Plan of the Relevant Business Unit

[TRANSLATION] "By-law concerning service:

- *The obligation for industries to have their public alert systems approved if they were installed to conform to E2 Regulations was integrated into prevention regulations.* ***(Planned completion: December 2011)***

Plan implementation – Use of public alert system to respond to a toxic gas leak. ***(Planned completion: June 2012)***

Updating the [TRANSLATION] Guide to the Implementation of the Public Alert System*."* ***(Planned completion: June 2012)***

3.1.6. LAND-USE PLANNING

3.1.6.A. Background and Findings

Establishing an appropriate distance between facilities at risk for major industrial accidents and residential areas is an effective way to reduce consequences for the public if an industrial accident should occur.

Determining these appropriate distances requires the application of a clear and reproducible methodology for evaluating consequences (radius of fallout) and the analysis of the population's vulnerability (land use).[14]

During our audit, we wanted to ensure that measures existed for determining and enforcing appropriate distances between facilities at risk for major industrial accidents and residential areas.

We observed that the city has not decided upon a methodology for determining and enforcing appropriate distances between industrial and residential uses. We note that the seminar on land-use planning and major industrial risks[15] held in Montréal in 2009 reported similar findings.

The current situation in the city shows that at-risk facilities are located very close to residential areas. In such cases, it is important to emphasize how important it is for establishments to manage their operational security well through fire prevention inspections, establishing links with emergency responders and notifying the population likely to be affected by an accident about the risks.

In light of the city's growth, some industrial-use areas are destined to be transformed or redeveloped for residential or commercial use. Since these lands are generally located near other industrial-use areas, we believe that an assessment of the distances between the industrial and residential uses must be conducted to minimize risks for the population.

Industrial businesses that wish to establish themselves in Montréal must request a certificate of authorization from the MDDEP in accordance with section 22 of the *Environment Quality Act* of Québec, which stipulates that:

> *"No one may erect or alter a structure, undertake to operate an industry, carry on an activity or use an industrial process or increase the production of any goods or services if it seems likely that this will result in an emission, deposit, issuance or discharge of contaminants into the environment or a change in the*

[14] *Risk Management Guide for Major Industrial Accidents,* MIARC, 2007 edition.
[15] *Rapport synthèse : Séminaire sur l'aménagement et les risques industriels,* Montréal, April 12, 2010.

quality of the environment, unless he first obtains . . . a certificate of authorization."

They must also obtain permits from the DEDD in compliance with municipal by-laws relating to air and water quality.

We note that before delivering authorization certificates or permits, there is not always an evaluation of major industrial accident risk owing to lack of criteria regarding safe distances, among other things.

In the absence of criteria for determining safe distances, it is difficult to assess the acceptable risk of new projects to the population in the event of a major industrial accident.

3.1.6.B. Recommendations

To protect the population, we recommend that the Service de sécurité incendie de Montréal, with the Direction du développement économique et urbain and the Direction de l'environnement et du développement durable, evaluate the possibility of regulating:

- **mandatory safe distances between industrial and residential land use**
- **evaluation of major industrial accident risk before municipal permits are issued**

We recommend that the Service de sécurité incendie de Montréal increase inspection activities for industrial facilities located near residential-use areas to ensure that the operational management mechanisms of these facilities are effective.

3.1.6.C. Action Plan of the Relevant Business Unit

[TRANSLATION] "Draft a letter requesting that the units involved assess the possibility of regulating reasonable distances around facilities that are at risk for major industrial accidents. ***(Planned completion: November 2011)***

Regulation concerning the department:

- *Possibility of giving his/her opinion on* 'elements of emergency preparedness related to land-use planning' *added to Add the manager's jurisdiction."* ***(Planned completion: December 2011)***

[TRANSLATION] "Give priority to the inspection of industries located near industrial sectors to that will be part of the high-risk industry inspection program." ***(Planned completion: December 2012)***

3.2. HAZARDOUS MATERIAL MANAGEMENT BY CITY FACILITIES

3.2.1. SERVICE DE L'EAU

3.2.1.A. Background and Findings

Drinking water treatment plants are the only city facilities to appear on the E2 Regulations register. They have declared that they use and store significant quantities of chlorine.

Given this fact, we examined the emergency measures surrounding the seven drinking water plants located in the agglomeration of Montréal.

Chlorine, a hazardous material, is currently used in significant quantities by the plants to disinfect water at the filtration stage as well as for water distribution. Water chlorination and ozonation are the technical processes currently used by the city during filtration. However, since ozonation leaves no residual product in the water, the water must still be chlorinated to prevent the proliferation of bacteria in the distribution network.

Table 1—Volumes Treated and Disinfection Processes for Montréal Agglomeration Drinking Water Treatment Plants

Plant	Volume (m^3/year) in 2010	Water disinfection processes
Atwater	204,603,000	Chlorination
Charles-J.-Des Baillets	372,743,000	Ozonation and chlorination
Pierrefonds	23,550,000	Ozonation and chlorination
Lachine	22,269,000	Ozonation and chlorination
Sainte-Anne-de-Bellevue	1,076,000	Chlorination
Ville de Montréal Total	**624,241,000**	
Dorval	9,972,000	Chlorination
Pointe-Claire	22,217,000	Chlorination
Island of Montréal Total	**656,430,000**	

Although the plants have declared that they store large quantities of chlorine, as per E2 Regulations, compliance does not require them to produce emergency measures because the quantity they handle (0.907 metric tons) is below the largest reservoir's critical quantity (1.13 metric tons). Emergency plans have been created, however, by the Direction de l'eau potable of the Service de l'eau.

To reduce the risk of major industrial accidents caused by chlorine, the city has started a program to replace chlorine with sodium hypochlorite, a less dangerous substitute for chlorine.

The Atwater and Charles-J.-Des Baillets plants are currently converting their equipment and systems to use sodium hypochlorite. The work should be completed by the beginning of 2013. The Pierrefonds plant is presently studying the question of replacing equipment and systems. The administration plans on changing to sodium hypochlorite by the beginning of 2013. Managements at the Lachine, Dorval and Pointe-Claire plants are also planning to convert to sodium hypochlorite, but no schedule has been set yet. Sainte-Anne-de-Bellevue plant management does not anticipate converting (the plant closed in July 2011).

For our audit, we wanted to ensure that plant contingency plans were duly authorized by the appropriate authorities.

We observed that:

- Consequences in the event of an accident involving chlorine are significant and extend beyond facility boundaries.
- Emergency plans for accidents involving chlorine are documented. However, they have not been formally approved by the appropriate authorities (e.g., the SSIM or the Division sécurité of the Direction des immeubles).

Consequently, in the absence of duly authorized emergency plans, we cannot be sure that major stakeholders are adequately prepared to deal with an accident involving a chlorine leak in one of the city's drinking water treatment plants.

3.2.1.B. Recommendations

We recommend that the Service de l'eau's Direction de l'eau potable take the necessary steps to obtain the required authorization for these drinking water treatment plants' emergency plans to ensure adequate risk management.

3.2.1.C. Action Plan of the Relevant Business Unit

[TRANSLATION] "Review of chlorine safety plans (CSP):

- *Plan – Usine Atwater* ***(Planned completion: December 2011)***
- *Plan – Usine Lachine* ***(Planned completion: March 2012)***
- *Plan – Usine Dorval* ***(Planned completion: March 2012)***
- *Plan – Usine Pointe-Claire* ***(Planned completion: March 2012)***
- *Plan – Usine Pierrefonds* ***(Planned completion: December 2011)***

Review of FSPs:

- *Plans for the Atwater, Charles-J.-Des Baillets, Lachine, Dorval, Pointe-Claire, Pierrefonds plants* ***(Planned completion: November 2011)***
- *Plans for the valve section of the primary waterworks system* ***(Planned completion: November 2011)***
- *Plans for drinking water reservoirs* ***(Planned completion: November 2011)***

Consultation for FSPs:

- *Comité de planification des mesures d'urgence of the Direction de l'eau potable* ***(Planned completion: February 2012)***
- *Manager of Direction de l'eau potable* ***(Planned completion: February 2012)***
- *Safety officer designated by the Division de la sécurité of the Direction des immeubles in compliance with the Programme de gestion des mesures d'urgence dans les édifices municipaux (PGMUEM) for FSPs including HAZMAT* ***(Planned completion: March 2012)***
- *Approval of standard FSPs by the safety officer designated by the Division de la sécurité of the Direction des immeubles in compliance with the PGMUEM* ***(Planned completion: March 2012)***
- *Approval for FSPs involving HAZMAT by the SSIM* ***(Planned completion: May 2012)***

Consultation in relation to the CSP:

- *Comité de planification des mesures d'urgence of the Direction de l'eau potable* ***(Planned completion: March 2012)***
- *Safety officer designated by the Division de la sécurité of the Direction des immeubles in compliance with the PGMUEM for FSPs involving HAZMAT* ***(Planned completion: April 2012)***
- *Centre de sécurité civile* ***(Planned completion: May 2012)***
- *SSIM – HAZMAT department* ***(Planned completion: June 2012)***
- *SSIM – Prevention department* ***(Planned completion: September 2012)***
- *Approval by the manager of the Direction de l'eau potable."* ***(Planned completion: October 2012)***

3.2.2. ECOCENTRES

3.2.2.A. Background and Findings

Although ecocentres are not subject to E2 Regulations, because of their function they manage significant quantities of HAZMAT. Approximately 1,100 metric tons of HHW are recycled every year by the city through the ecocentres.

Ecocentres are material recovery centres, where Montréal agglomeration citizens dispose of their HHW, among other items.

Six ecocentres are located on the Island of Montréal:

- Écocentre de l'Acadie
- Écocentre de Saint-Michel
- Écocentre de La Petite-Patrie
- Écocentre de Côte-des-Neiges
- Écocentre d'Eadie
- Écocentre de Rivière-des-Prairies

A seventh ecocentre was to be opened before the end of 2011 in LaSalle borough.

The city has signed Agreements with ecocentre managements and contractors for the safe transportation and processing of HHW. The DEDD, which reports to the SDO, is responsible for the administration of these agreements and oversees suppliers' compliance with these agreements.

Although the ecocentres are not subject to E2 Regulations because the quantities of HHW stored are less than the prescribed thresholds, they are still subject to various HAZMAT and worker health and safety regulations and laws (e.g., provincial HAZMAT regulation and the *Act Respecting Occupational Health and Safety*).

All ecocentres are equipped with permanent shelters designed for HHW and equipment to protect worker health and safety.

For our audit, we wanted to make sure that the emergency plans were duly authorized by the competent authorities and that HHW risks were adequately defined and assessed.

Our audit revealed the following deficiencies:

- No risk analysis (standardized scenarios and alternatives) has been carried out by the city to assess whether effects of an accident involving HHW could extend beyond the boundaries of the ecocentres. The proximity of residential areas to some ecocentres increases the risks and consequences in case of an accident.

- Contingency plans for an accident involving HHW are documented. However, they have not been formally approved by the SSIM as required in the *National Fire Code of Canada.*
- Although HHW operational policies and procedures exist, they are not all documented and conveyed to key stakeholders (e.g., procedures to follow when storing incompatible HAZMAT and organization of occupational health and safety committees).
- Inspection programs, for managers and contractors to comply with city policies and procedures, have not been formalized and documented.

In the absence of risk analyses and duly authorized contingency plans, it is difficult to determine if current control mechanisms (e.g., the effectiveness of containment walls in the event of an accident and storage procedures for incompatible HHW) and emergency measures are adequate. Moreover, the deficiencies observed in policies and procedures as well as in inspection programs can result in existing accident-prevention measures going undetected and not operating properly.

3.2.2.B. Recommendations

In order to ensure proper risk management, we recommend that the Direction de l'environnement et du développement durable:

A) determine and analyse the risks in the event of an accident involving household hazardous waste (standardized and alternative scenarios) with the Service de sécurité incendie de Montréal

B) obtain the necessary authorization for the ecocentre emergency plans from the Service de sécurité incendie de Montréal

In order to ensure adequate household hazardous waste management, we recommend that the Direction de l'environnement et du développement durable formalize:

C) city policies and directives, and communicate them quickly to managers

D) supervision activities with managers

3.2.2.C. Action Plan of the Relevant Business Unit

A) *[TRANSLATION] "Agreement for an assessment of the risks around the recycling of household hazardous waste at ecocentres.* ***(Planned completion: November 2011)***

Submission of review report. ***(Planned completion: March 2012)***

Implementation of recommendations, if necessary." ***(Planned completion: December 2012)***

B) *[TRANSLATION] "Confirmation of the authorizations required for emergency plans using the PGMUEM program for:*

- *écocentre de l'Acadie* ***(Completed)***
- *écocentre de La Petite-Patrie* ***(Completed)***
- *écocentre de Côte-des-Neiges* ***(Planned completion: October 2011)***
- *écocentre d'Eadie* ***(Planned completion: October 2011)***
- *écocentre de Rivière-des-Prairies* ***(Planned completion: October 2011)***
- *écocentre de Saint-Michel* ***(Planned completion: October 2011)***
- *écocentre de LaSalle* ***(Planned completion: November 2011)***

Process completed for all ecocentres." ***(Planned completion: December 2011)***

C) *[TRANSLATION] "The Guide de gestion des écocentres integrates directives and processes that ecocentre managers must follow. Updates are made on a regular basis.* ***(Planned completion: October 2011)***

Drafting a HHW management policy." ***(Planned completion: December 2011)***

D) *[TRANSLATION] "Drafting of a procedure work sheet (supervision activities)."* ***(Planned completion: February 2012)***

3.2.3. EMERGENCY MEASURES PLANS IN MUNICIPAL BUILDINGS

3.2.3.A. Background and Findings

To comply with current regulations, building owners must establish and maintain a specific operational emergency plan for each targeted building. These measures include FSPs and fire drills.

Because some city buildings that were the subjects of our audit did not have duly authorized FSPs, we wanted to examine the situation of all city buildings.

Our audit led us to examine the PGMUEM, created by the Division sécurité of the Direction des immeubles. The PGMUEM was established to manage and monitor the update of city building emergency plans and fire drills.

In compliance with a 2006 agreement with the SSIM, the Division sécurité monitors the program, informs users and authorizes some FSPs produced by business units. FSPs for buildings where HAZMAT are used, stored and transported must be approved by the SSIM.

Our audit revealed that:

- 15% of city buildings (172/1161)[16] have a FSP registered with the PGMUEM.
- 42% of the FSPs in the PGMUEM (73/172)[17] have been duly authorized and updated.
- The same observation applies for documenting fire drills that have been held.

According to the information collected, these statistics may not represent the actual situation. Some documented and duly authorized FSPs may exist but are not registered with the PGMUEM. This may be because this program is offered to central departments and boroughs to help them draft their emergency measures plans; however, they are not obliged to use to it.

[16] Data provided by the Division sécurité of the Direction des immeubles.
[17] *Idem.*

We have also observed that several business units are designing fire safety plans (Direction des immeubles, SSIM, central departments and boroughs). However, no unit has been designated to assess city compliance with current regulations.

Consequently, the city cannot demonstrate its level of compliance with current regulations because of the present situation regarding city building FSPs.

3.2.3.B. Recommendations

To adequately protect the safety of employees and the general population in the event of fire in municipal buildings, we recommend that the Direction générale designate a business unit to:

- **monitor a system that will ensure that central departments and boroughs produce emergency plans and take the steps required to obtain required approvals**
- **report to the Direction générale periodically on city compliance with current emergency plan regulations**

3.2.3.C. Action Plan of the Relevant Business Unit

[TRANSLATION] "The Direction générale designates the Direction des immeubles of the Service de la concertation des arrondissements et des ressources matérielles as the unit responsible for following up on the recommendation in an appropriate manner." ***(Planned completion: December 2012)***

4. APPENDICES

4.1. MAJOR RISKS FROM ACCIDENTS INVOLVING HAZARDOUS MATERIALS

Table A—Major Risks from Accidents Involving Hazardous Materials, their Effects and their Consequences[18]

Risk	Direct effect	Possible consequence for individuals depending on the event
Fire	Heat (thermal effect) and smoke (gas) emissions	• Burn injuries • Inhalation of asphyxiating, even toxic, smoke • Death
Explosion	Pressure wave and heat and smoke emission (gas)	• Internal injuries to lungs and eardrums • Injuries from flying debris • Burns • Death
Toxic fumes	Toxic cloud that is blown by the wind, dispersing in the air—may be visible or invisible	• Nausea • Irritation of the eyes and skin • Lung damage • Cancers • Death

[18] Based on *Risk Management Guide for Major Industrial Accidents,* MIARC, 2007 edition, and *Matières dangereuses : Savoir quoi faire,* Directeur de santé publique, Gouvernement du Québec, 2008, p. 12.

4.2. OVERVIEW OF LEGAL FRAMEWORK[19]

Canadian Environmental Protection Act (1999) **(Environment Canada) and** ***Environmental Emergency Regulations*** **(Environment Canada)**

- Obligatory registration of risk generators above specific thresholds, environmental emergency (E2) plans tested annually.

Sustainable Development Act **(MDDEP)**

- Establishes a definition of sustainable development for Québec.
- Introduces 16 principles to guide the action of the public service.
- Commits the government to adopt a single strategy for sustainable development applicable to all ministries and a significant number of organizations.
- Assigns responsibility to the premier to table the Government Sustainable Development Strategy in the National Assembly and report on its progress every five years;
- Commits departments and agencies concerned to identify actions they will take to help reach the strategy's governmental objectives and annually report results of their undertakings;
- Introduces sustainable development evaluation and accountability mechanisms to measure progress.

Environment Quality Act **(MDDEP)**

- Immediate notification of any spill to the MDDEP.
- Section 22: *"No one may erect or alter a structure, undertake to operate an industry, carry on an activity or use an industrial process or increase the production of any goods or services if it seems likely that this will result in an emission, deposit, issuance or discharge of contaminants into the environment or a change in the quality of the environment, unless he first obtains . . . a certificate of authorization."*
- Assessment and examination of the environmental impact of certain projects.
- Depollution attestation for industrial facilities.
- Land protection and rehabilitation.

[19] Based on *Gestion des matières dangereuses résiduelles au Québec,* MDDEP, Gouvernement du Québec, 2005, p. 18.

***Regulation Respecting Hazardous Materials of Québec* (MDDEP)**

- Describes the properties and storage conditions of HAZMAT, and requires that a record of materials produced or used be kept.

***Civil Protection Act* (2001, MSP)**

- Section 8: *"Every person whose activities or property generate a major disaster risk is required to report the risk to the local municipality where the source of the risk is located. . . . The report must describe the risk-generating activity or property and specify the nature and location of the source of the risk, the foreseeable consequences of a major disaster and the area that could be affected. The report must also set out the measures implemented by risk reporter and the other means at the disposal of the risk reporter to reduce the probability or mitigate the consequences of a major disaster."* (Pending a Québec government regulation defining the risk-generating activities or goods, the time allowed for producing the report and the conditions for providing the information).
- Section 133: "*Penal proceedings for an offence under section 8* . . . *enforceable by a local municipality may be instituted by the municipality."*
- Regional authorities have the responsibility for designing a civil protection plan (the draft plan must be produced within two years of the minister's notice requesting that a plan be established).
  - This plan must set goals for reducing vulnerability to the risks of major disasters and the action required to reach these goals.
- The goal of this law is to protect people and property from disasters. This protection is ensured by preventative measures, response preparation, response in the event of real of imminent disaster and measures for restoring the situation after the event.

***Fire Safety Act* (MSP)**

- Regional authorities must establish a fire safety cover plan determining fire protection objectives:
  - It must include an inventory, evaluation and classification of these risks.
  - It must include for each class of risk listed or each part of the territory defined, optimum fire protection objectives that can be achieved having regard to the measures and resources in place.

Act Respecting Land Use Planning and Development **(MAMROT)**[20]

- Local and regional authorities can designate buildings and human activities that generate major land use constraints and regulate this use in a suitable manner.
- Local municipalities can**,** on their own initiative and for reasons of safety and public health or general well-being, use zoning and subdivision regulations to regulate or prohibit land use, construction, works, or cadastral operations in the vicinity of a building or activity they recognize as being a source of major constraints.
  - A constraint is deemed major when a situation exceeds any limit of community acceptance.
  - There are two types of major constraints:
    - An environmental nuisance (smoke, dust, odour, vapour, gas, radiation, noise) so significant that its impact on citizens' well-being, their health and safety, results in permanent and continuous damage at a certain distance from the source (it is not a question of temporary inconveniences or annoyances)
    - A risk to the safety or health of citizens when there is danger of an accident with serious consequences (the risk is defined as the assessment of danger taking into consideration the probability of the occurrence of the feared event and the severity of its consequences).
- When the land-use and growth plan mentions sources of anthropogenic constraints and minimal regulations, municipalities must ensure their implementation through compliance processes.

Act Respecting Occupational Health and Safety **(LSST)**

- This law obliges all employers to ensure the safety and physical integrity of their employees.
- The majority of industries are required to implement a prevention program and also comply with more detailed application regulations.
- Businesses are subject to inspection by the Commission de la santé et de la sécurité du travail (CSST) and must enrol in the workplace accident insurance plan administered by the CSST.

[20] Ministère des Affaires municipales, des Régions et de l'Occupation du territoire.

***Municipal Powers Act* (MAMROT)**

- All municipalities have jurisdiction in environmental matters and can adopt regulations concerning the environment.

***By-law 2001-9 – Regulation on Wastewater Disposal in the Sanitation Works or Watercourses and on the Delegation of its Enforcement* (Communauté métropolitaine de Montréal, enforced by the Ville de Montréal)**

- Ban on disposing or allowing disposal of liquids containing HAZMAT into a sewer system or a watercourse.
- Includes control measures and criminal provisions in the event of permit infractions and requirements.
- This regulation will be replaced by By-law 2008-47 on wastewater characterization obligation and By-law RCG 08-041 related to the discharge at purification works on the territory of the urban agglomeration of Montréal. These regulations will take effect on January 1, 2012.
  - Requirement to report in the event of accidental spills.

***By-law 2001-10 – Regulation on Air Emissions and the Delegation of its Enforcement* (Communauté métropolitaine de Montréal, applied by the Ville de Montréal)**

- Ban on emitting HAZMAT into the air.
- Control measures and criminal provisions in the event of permit infractions and requirements.

***By-law CBFVM[21] c. M-3 – Regulation for Measures to Prevent Fires and for Public Safety* (Ville de Montréal)**

- The city's SSIM can verify compliance of existing buildings and all construction or facilities to prevent fires and has the power to issue notices of non-compliance.
- The SSIM has jurisdiction over HAZMAT storage and handling.

***By-law CBFVM c. P-5.1 – Regulation on Fire Prevention* (Ville de Montréal)**

- Fire prevention code that applies to the city.

[21] Consolidated by-laws of the former Ville de Montréal.