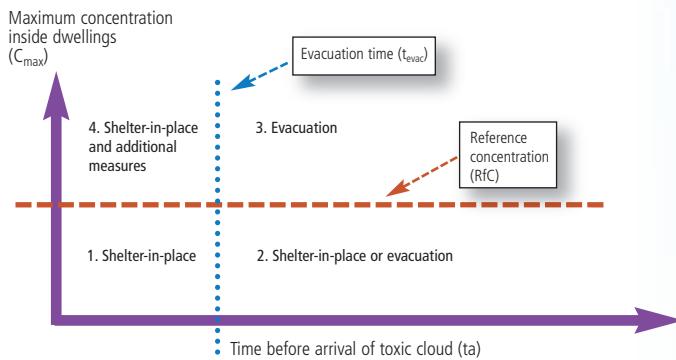


Selection chart for the determination of appropriate population protection measures



Source: *Guide toxicologique pour les urgences en santé environnementale*, Institut national de santé publique, 2004.

SHELTER-IN-PLACE: If a public alert system has already been implemented and the population is adequately prepared, sheltering-in-place presents the following advantages and disadvantages:

Advantages	Disadvantages
Relatively short completion time	Keeps the population in the danger zone
	Offers temporary protection
	Offers protection that varies according to building type

Once the alert is over, the public must be notified that sheltering-in-place is no longer needed.

EVACUATION: Advantages and disadvantages of an evacuation

Advantages	Disadvantages
Relocation of the population outside the danger zone	Relatively long completion time
	Considerable resources required
	Possible refusal of individuals to comply
	Special transportation needs
	Risk of traffic congestion
	Issues with rapid shutdown of industrial processes
	Risk of exposing the population to the toxic cloud during the evacuation

Source: Presentation by Luc Lefebvre, M.Sc., Toxicologist, Public Health Branch, 11-22-2007

Technical Popularization Pamphlet 6

CRAIM
MAJOR INDUSTRIAL ACCIDENTS
REDUCTION COUNCIL*

Evacuation versus Shelter-in-place

In response to a toxic substance release

Vision and Mission of the CRAIM

Vision

CRAIM aims to be the benchmark in hazardous substance risk management within the scope of sustainable development by applying rigorous, responsible and concerted methodologies.

Mission

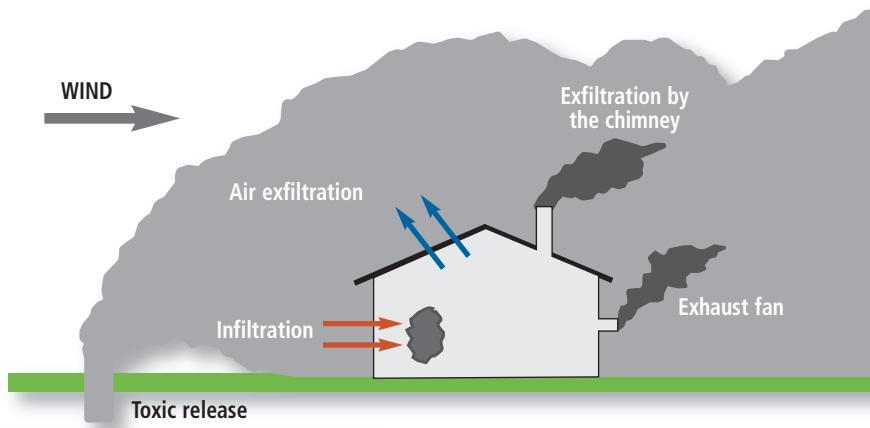
To DEVELOP rigorous tools and methods that provide responsible management of risks related to hazardous substances.

To PROMOTE and support a culture of collaboration between all stakeholders to effectively manage the risks involving hazardous substances.

To FOSTER, with stakeholders, a reduction in the risks of major industrial accidents through the implementation of appropriate prevention, preparedness, response and recovery measures.

This document, based on current available facts, is designed to familiarize the reader with certain basic concepts. The reader must be aware that the information provided in this document is not complete, and therefore, that other complementary sources must be consulted to avoid any unfortunate situations. The reader is entirely responsible for any decisions or actions taken on the basis of this document.

The authorities' decision to request an evacuation or to shelter-in-place the population must not be based on simple intuition, but rather on concrete data. This TPP summarizes the main elements to be considered when a major industrial accident occurs involving a toxic cloud.



Characteristics of a toxic cloud

- Occasionally invisible
- Variable displacement velocity
- Variable concentration level depending on source and weather conditions

Following are some of the questions that first responders should consider during the situation assessment process. A cloud can come from different products in various states: liquid, gas or solid.

- What substance is involved? (its characteristics and properties)
- What quantity has been released? (discharge rate; continuous or instantaneous release)
- What is the probable duration of the release?
- What are the prevailing weather conditions? (wind speed and direction, temperature)
- What is the concentration level of the substance in the cloud?
- What zone is potentially affected?
- How many people are potentially affected?
- Are any vulnerable populations present that may be affected? (hospitals, schools)
- How long before the cloud reaches the population?
- What types of buildings may be affected? (uses, age)

- What resources are available to the responders? (manpower, material)
- What are the capabilities and response times of the teams called to the site?
- What access or evacuation routes can be used?
- Has the public already been alerted to the risks involved?
- Is the public familiar with the notion of sheltering-in-place?

The answers to many of these questions are difficult to obtain in the heat of the action. Modelling typical accident scenarios is the only way to establish an estimate of the cloud's potential impact zone and time of displacement. The results of these scenarios must be included in an efficient emergency plan to be shared with all responders before an accident occurs.

This emergency plan will facilitate the decision-making process in the event that an incident occurs.

Simulation software packages enable the estimation of the concentration levels outside and inside of buildings, as well as the time of displacement before a cloud reaches a given endpoint.

Here is an example of the results obtained using the ALOHA.

