Shelter in Place
For Business
• Every year hazardous emergencies take their toll in dollars and human lives.

• While some losses are unavoidable, adding shelter-in-place to emergency plans can help businesses cope with a fast-moving toxic cloud when there isn’t time to evacuate.
The concentration of contaminated air within a shelter relative to that outside depends on:

- The rate at which air is exchanged with the outdoors –called the “air exchange rate”
- The removal of the contaminant as it passes between the outdoors and the shelter, and
- The deposition rate of the contaminant within the shelter.
The air exchange rate will vary depending on:

- The building’s volume,
- The tightness of the doors and windows,
- The existence of vertical routes such as chimneys, flues and elevator shafts,
- Whether heating, ventilation, and air-conditioning systems are operating,
- The indoor–outdoor temperature differences – the greater the difference the higher the infiltration rate,
- Wind speed and the orientation of the building to those winds as higher windspeeds increase the infiltration rate,
- And the sheltering of the structure by surrounding trees and buildings.

**Air Exchange Rate Calculator:**


<table>
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<th>Typical Air Changes Per Hour Table</th>
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• Some contaminated air may have seeped into the building while the vapor cloud passed so the structure should be thoroughly vented.

• Venting the structure will replace the contaminated inside air with clean outside air. The only time it is not necessary to vent is when emergency officials determine the building was not actually exposed to the hazardous material – something that might happen if the wind blew the cloud away from the building or heavy rain washed the contaminants out of the air before it reached the building.
Advantages Of Sheltering In Place:

- The protection offered by sheltering against airborne clouds of hazardous substances can be substantial.
- For particulate clouds of long duration (such as outdoor air pollution, pollen, and soil particles) concentrations inside buildings are generally 10 to 50% of the outdoor air concentrations.
- For clouds of short duration - 15 minutes or less – the exposure may easily be as low as 5% of that outside.
- Once the cloud with hazardous materials has passed, the concentration that has built up inside the shelter decreases with time.
- Occupants must exit or vent the shelter to prevent further exposure.
Depending on your circumstances and the type of emergency, the first important decision is whether you:
Stay where you are or get away?

• As a business, your staff should understand and plan for both possibilities.

• Always use the available information to determine if there is immediate danger.

• In an emergency, local authorities may or may not immediately be able to provide information on what is happening and what you should do.

• When anyone sees large amounts of debris in the air, or if local authorities say the air is badly contaminated, your business most likely will need to "shelter-in-place."
Advantages of Sheltering in Place:

If you have a shelter-in-place plan, be sure to keep the following in mind:

1. Implement a means of alerting your employees to shelter-in-place that is easily distinguishable from that used to signal a fire or evacuation.

2. Train employees in the shelter-in-place procedures and their roles in implementing them.
Adding SIP into your Emergency Response Plan

- First, a business will select appropriate areas inside the building to use as a shelter location.
- Next, be sure the shelter provides at least 10 square feet of floor space per person to provide ample oxygen for a couple hour period assuming a normal breathing rate while resting.
- Officials should not recommend that people shelter for more than 1 to 2 hours because this strategy is to protect against short-term releases.
- Rooms that are ground level or above with minimal connections to the outside of a building make the most effective shelters. (The ideal room will not have windows or exterior doors or vents to the outside).
- If your business has an emergency power supply, such as a back-up generator, lighting in the shelter and at least one electrical outlet should be on the emergency power circuit.
- A telephone line in the shelter will allow a convenient alternate voice and computer capability.
Identify the people responsible for:

- Locking doors, windows and other entrances to block outside air from entering the structure,
- Shutting down external HVAC systems or setting air to recirculate only,
- Placing placards at business entrances to indicate the business is closed for the duration of the emergency,
- Ensuring dangerous or critical operations are secured,
- Sealing doors or other openings in the shelter space with duct tape and plastic as necessary,
- Accounting for persons in the shelter space, and determining what to do if some employees, customers, or visitors remain unaccounted for.
Identify the people responsible for:

- Monitoring official announcements advising when to leave the building, and ensuring everyone sheltered evacuates to a pre-selected site,
- Venting the structure, and
- Determining when it is safe for employees to return to the building.
It is important to identify who will be responsible for each task.

- You will already have decided who can authorize shelter-in-place – the same person may be the one to issue the warning to take shelter.
- The usual choice is a manager, owner, or CEO - but it could be your safety officer or managers responsible for certain groups or areas of the facility.
- If you have a 24/7 operation you will need to designate a person for each shift.
- The person should be very familiar with the notification elements of the emergency plan.
- This may include initiating telephone call-downs as well as specialized warnings to make sure everyone – including those with disabilities – is informed of the decision to shelter.
Prepare an emergency kit for a shelter.
At a minimum the shelter-in-place kit should include:

- Portable battery operated radio or TV with extra batteries in case of power outage. A radio or TV that plugs into a wall socket is desirable if power exists.
- Flashlight and extra batteries.
- Portable telephones.
- Blankets or large towels, one for each expected occupant.
- Bottled water and snacks.
- A first aid kit.
- Plastic sheeting – pre-cut to cover windows, doors and ceiling vents.
- Duct or sealing tape to secure plastic to walls, cover vents, and seal beneath doors and other areas of infiltration. The whole building doesn't need to be sealed - just the actual shelter space.
Other items to consider:

- Office supplies
- N95 Masks
- Several wall outlets are desirable to charge computers and phones people may bring with them.
- Record who is in the shelter and to make sure everyone is out of the building when it’s being vented.
- Periodically check the kits to replace outdated supplies.
Remember to:

- Select an off-site point of contact employees can call to learn when they can return to work or where they should go if the building cannot be reoccupied right away.
- Determine what to do after leaving the shelter and the approximate time needed to purge the structure of contaminated air. Some managers may want employees to go to a designated area to make sure everyone is safe and accounted for.
- Regularly train personnel and employees through periodic drills or exercises.
- Evaluate your plan yearly, when management teams change, or when physical structures are modified.
- Existing emergency plans can be altered to include shelter-in-place.
Once notified to shelter-in-place, occupants:

1. Stop their activities, go inside if out-of-doors, and proceed to a pre-selected location inside a structure. Everyone should be told that the building will be closed in a certain timeframe (such as in three minutes) and that no one will be allowed in or out until authorities sound the all-clear signal.

2. Employees then go the pre-selected shelter areas, shut doors and windows, and, if not done ahead of time, seal leaky areas with duct tape and plastic against infiltration.

3. Then they listen to emergency broadcasts on radio or television to find out when it is safe to exit the shelter. And, finally, they leave when told to do so by authorities – usually going to a pre-selected site so that everyone can be accounted for.
Why would a business develop a plan to shelter-in-place?

- It is quickly implemented in a fast-paced event when evacuation would take much longer;
- It provides temporary protection from airborne chemical clouds which pass by in less than an hour;
- It’s preferred when weather conditions are unfavorable for evacuation;
- It’s less disruptive to business processes, and it’s often less costly than evacuation.
Questions

Contact Mark Reali or Michelle Cechowski, by email at mreali@ecfrpc.org or michelle@ecfrpc.org with any questions.

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