## UNIT INSTRUCTOR INFORMATION

| NAME | AGENCY | CONTACT INFORMATION |
|---|---|---|
| | | |
| | | |

## UNIT INTRODUCTION

The New York City landscape encompasses more high rise buildings than any other city in the United States. We live in a vertical city both above and below street level. This presents unique challenges to residents, first responders and to NYC CERT members.

In this unit we will discuss potential roles for NYC CERT in high rise fires and utility emergencies. A high rise building is defined as more than seven stories or 75 feet. Having a clear understanding of NYC CERT roles within the New York City emergency response system is critical to the safety of everyone involved. Strict adherence to the NYC CERT response protocols is mandatory. While not all emergencies will result in a NYC CERT deployment, a trained member may be of great assistance to his or her family and/or fellow occupants and first responders.

One of the major challenges encountered during fires and emergencies in high rise buildings is how to move people up and down safely. This includes evacuating occupants at the same time that first responders are moving into a position to fight the fire or mitigate the emergency. In this unit, we will discuss evacuation and elevator protocols as well as the concept of sheltering in place. Additionally, we will discuss the importance of confining the fire and how actions as simple as closing the door can aid in limiting the spread of fire and smoke. Far too many times, occupants have become victims as a result of the choices they make due to a lack of awareness and understanding.

We will also identify the most common power and utility emergencies encountered within New York City's urban environment. These include overhead and underground electrical emergencies, steam emergencies, natural gas and carbon monoxide emergencies and the hazards that are associated with each.

## UNIT OBJECTIVES

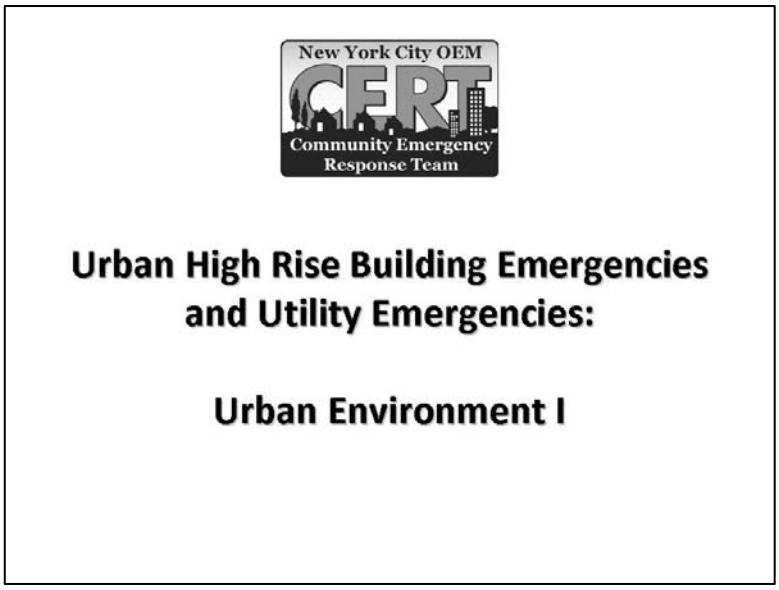
- Discuss actions at a high rise building fire.
- Describe the role of a NYC CERT during utility emergencies.
- Raise your own personal awareness to high rises and utility emergencies.
- Participate in a scenario-based discussion.

## UNIT REVIEW

When thinking about and discussing the knowledge applications at the end of this unit, remember the structure of ICS. When learning about fires and evacuations, think about ICS and how it relates to first responders and CERT during an emergency.

## LOOKING FORWARD

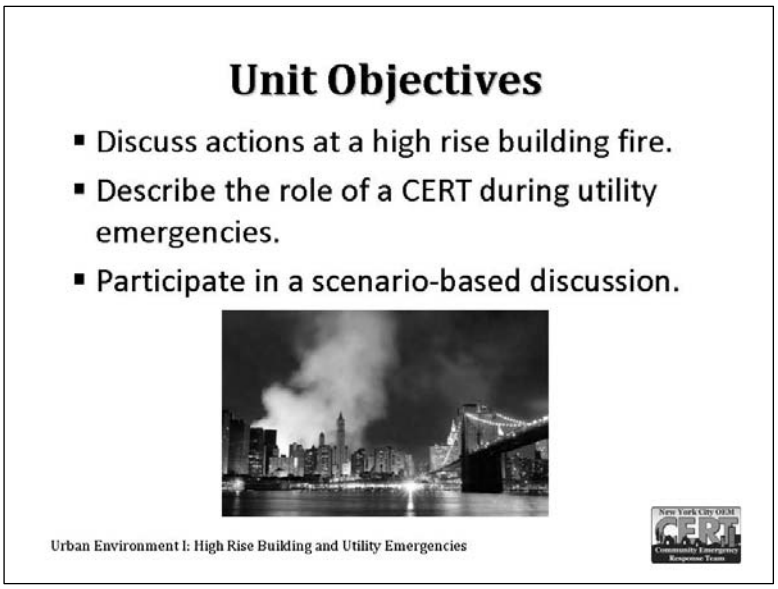
Next week you will learn about the unique aspects of transportation in New York City. The subway systems, tunnels, and bridges make living in NYC an adventure and challenge. Knowing what to look for and how you can help in the event of an emergency may come in handy during an emergency.




**Key Points**

- The intent of this unit is to familiarize students with high rise building and utility emergencies found in NYC's urban environment.
- We will also instruct students on high rise safety during a non-CERT response as well as possible CERT roles during utility emergencies.

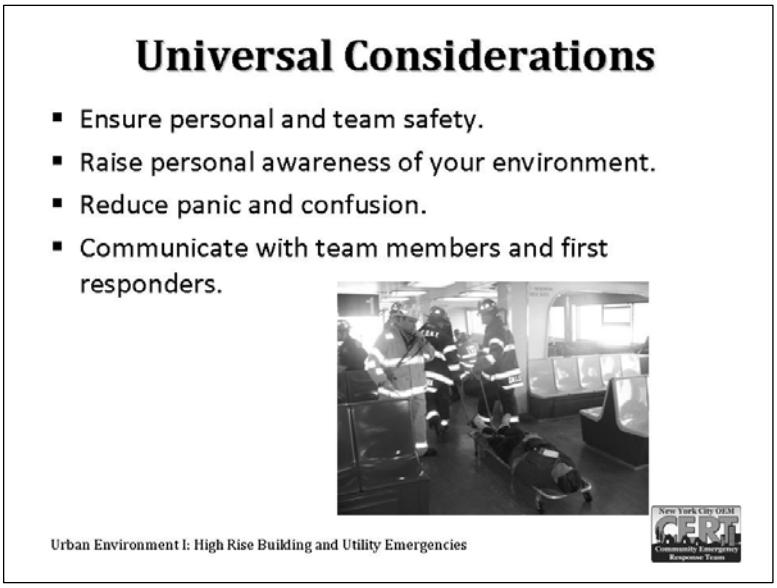
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- By the end of this unit you should be able to:
  - Consider possible actions during a high-rise emergency.
  - Understand the role of a CERT during a utility emergency.
  - Be able to participate in a scenario-based discussion and make decisions based on your training.

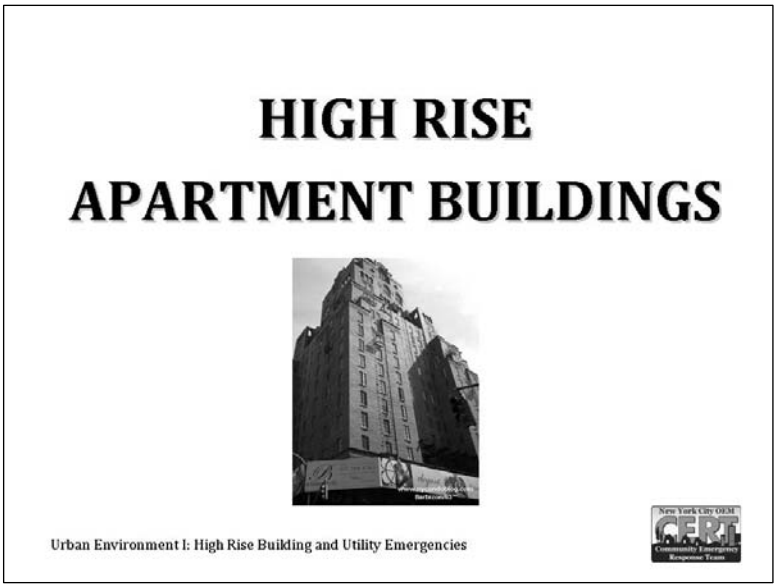
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- Personal and team safety is the primary concern of all CERT members.
- Raising personal awareness of their environment allows CERT members to better understand their communities and specific hazards present in their areas.
- Panic and confusion are dramatically reduced by:
  - Providing an organized, uniformed presence;
  - Establishing a plan and executing it; and
  - Giving clear instructions to those impacted by the emergency.
- Always maintain good communication between CERT members and responders.
- Poor communication leads to:
  - Duplication of effort;
  - Inefficient use of resources; and
  - Conflict and confusion.

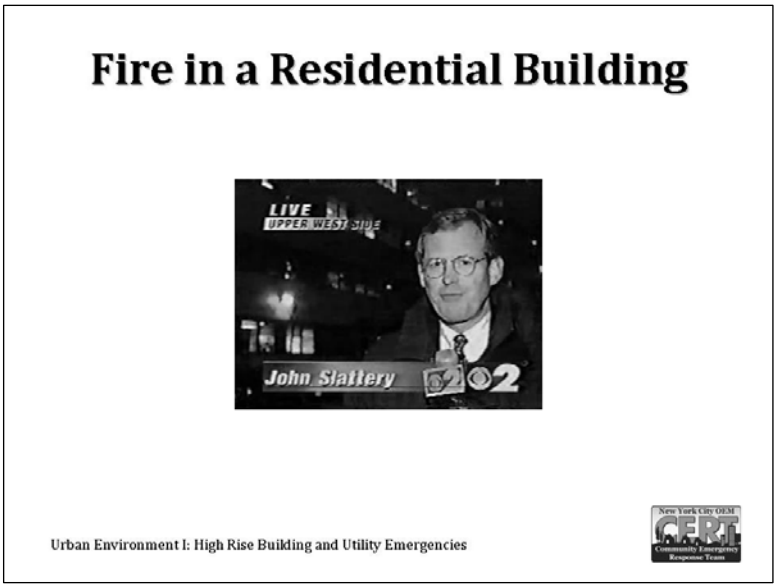
| Notes: |
| --- |
| |
| |
| |
| |




**Key Points**

- This section will discuss the specific characteristics of a high-rise apartment building.
- We will discuss possible roles during a fire in a high-rise apartment building.

| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- CERTs should never operate on any floors above the fire.
- Due to the rapidly changing conditions involved in a fire, heat and smoke travel upward quickly, making the floors above the fire extremely dangerous.
- The safest location for any occupant during a high rise fire is in his or her apartment unless the apartment is directly involved in a fire.
- Self evacuation could result in serious harm.

| Notes: |
| --- |
| |
| |
| |
| |
| |

## Fire In Your Apartment

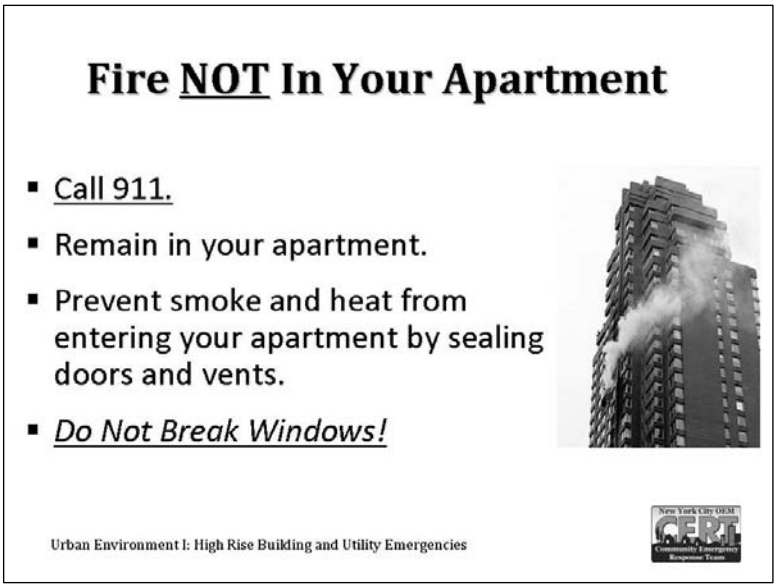
- Call 911.
- Do not attempt to extinguish *if* other than a minor fire (i.e. trash can).
- Get out as quickly as possible.
- Close doors behind you; do not lock them!
- Go to your pre-determined meeting place at least two floors below the fire.

Urban Environment I: High Rise Building and Utility Emergencies

**Key Points**

- Immediately call 911 to tell the FDNY the exact location of the fire.
- Fires larger than a wastebasket may exceed the capability of a fire extinguisher and the scope of CERT training.
- Always operate a fire extinguisher between the fire and the primary exit.
- Close the door to limit the oxygen in the room and slow the spread of the fire.
- Remember the Ready New York video; use your pre-determined meeting place. This allows occupants to quickly determine if everyone escaped and notify incoming first responders of anyone who may be missing.

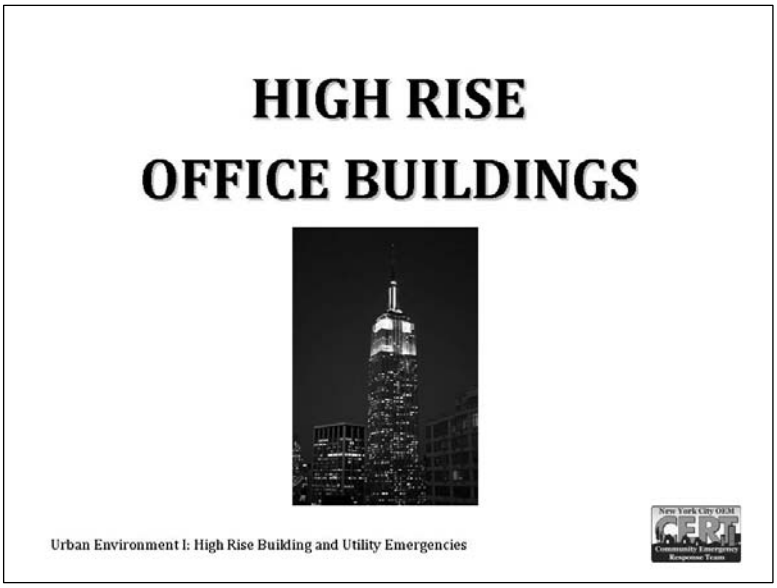
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- Immediately call 911 to inform the FDNY the exact location of the fire.
- Construction features of high-rise buildings will limit the spread of fire from the involved apartment.
- Common duct work for heating and ventilation may allow smoke to enter your apartment.
- Sealing ducts and doorways will limit the amount of smoke entering your apartment.
- If there is no heavy fire or smoke below your window, open it slightly to establish a positive pressure within your apartment thereby limiting the amount of smoke.
- Once a window is broken, it cannot be closed. Changing fire conditions could allow fire to extend into your apartment via the window.

| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- This section will discuss the specific characteristics of a high-rise office building.
- We will also discuss possible CERT roles and individual roles during a fire in a high-rise office building.

| Notes: |
| --- |
| |
| |
| |
| |
| |

## Fire Command Station

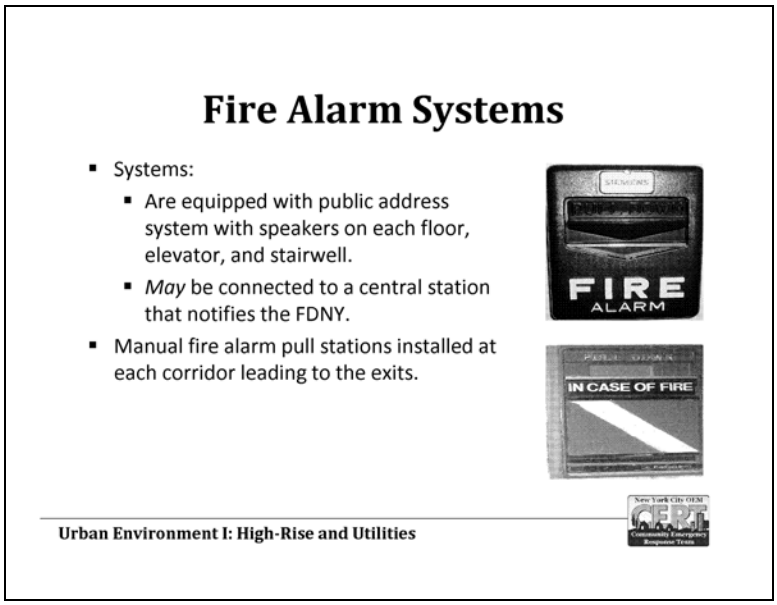
- Located in the lobby of an office building or near the entrance and/or elevators at hotels.
- Main component is a flashing FIRE signal that indicates activation of an alarm at the console.

Urban Environment I: High-Rise and Utilities

**Key Points**

- The fire command station will provide information about the status of the building systems including the:
  - Heating, Ventilation and Air Conditioning Equipment (HVAC)
  - Elevators
  - Smoke Detectors
- The fire command station will provide two way communications with floor wardens.
- The fire safety director should be located at the fire command station.
- The fire command station is capable of making announcements via a public address system in the elevators, stairwells and on each floor.

| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

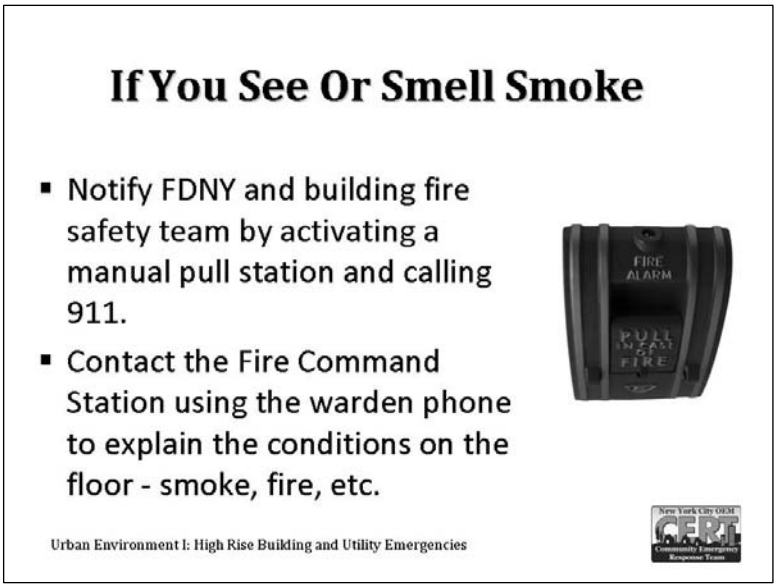
- Activating a manual pull station will send a message to the fire command station.
- Pull stations with a diagonal white stripe indicate the alarm is connected to a central station that notifies the FDNY when the system is activated.
- Immediately after activating any pull station, a follow up call to 911 should be made to provide specific information to the responding units, including:
    - Location of the fire emergency (address, floor, wing)
    - Type of incident (fire, emergency, other)
    - Status of evacuation (stairwell used, sheltering in place)

| Notes: |
| --- |
| |
| |
| |
| |
| |

**Key Points**

- Floor warden stations are placed between exits ensuring that evacuating occupants will pass a station while exiting the floor.
- The emergency phone provides direct contact with the fire command station.
- Floor wardens will use emergency phones to obtain evacuation instructions from the fire safety director.
- In the absence of a floor warden, the phone located at the floor warden station can be used to contact the fire command station to receive evacuation instructions.

| Notes: |
| --- |
| |
| |
| |
| |
| |



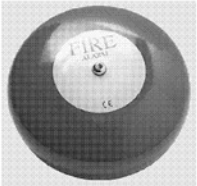

**Key Points**

- Immediate notification via the pull station and 911 will ensure a rapid response by FDNY units.
- Unless you are located on the fire floor, await instructions from the floor warden, fire safety director, or FDNY at the fire command station. Avoid entering the stairwell as you may hamper response operations or put yourself or others in a more dangerous situation.
- The Fire Department will designate an attack stairwell used to extinguish the fire.
    - Entering this stairwell will expose you to high heat and heavy smoke.
- The Fire Department will also designate an evacuation stairwell if it is determined that an evacuation is required.

| Notes: |
| --- |
| |
| |
| |
| |
| |

## If You Hear a Fire Alarm

- Immediately stop what you are doing and listen for instructions over the public address system.
- If you are told to leave, proceed to the evacuation locations on your floor.




Urban Environment I: High-Rise and Utilities

**Key Points**

- Floor wardens and fire safety directors use the public address (PA) systems to inform occupants of the status of the emergency and whether an evacuation is required.
- Specific instructions such as whether to evacuate, which stairwell will be used for evacuation, and which elevators are safe to use will be announced over the PA system.

| Notes: |
| --- |
| |
| |
| |
| |
| |

**Key Points**

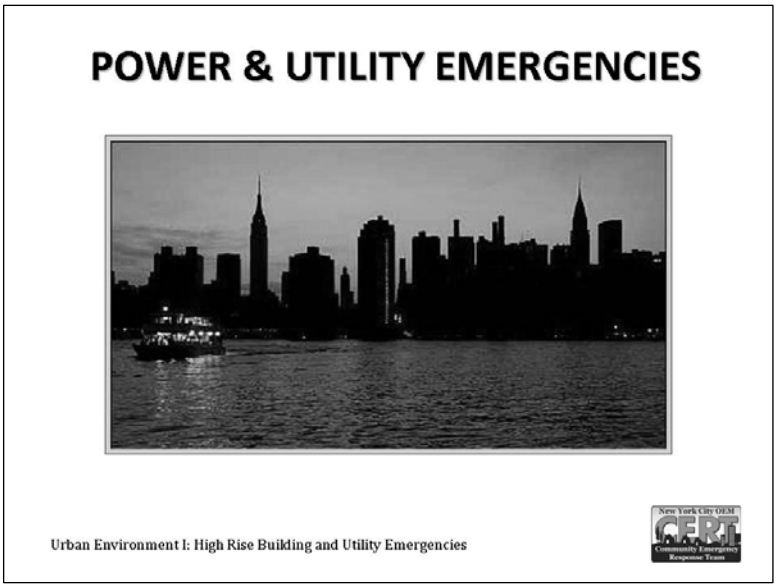
- Closing the door closest to the fire area will help to contain the fire.
- As you evacuate, close each door you pass through to limit the spread of smoke and flames.
- Always check each door prior to opening:
  - Feel above the middle of the door with the back of your hand prior to opening.
  - If you see smoke or feel heat, ***immediately*** close the door and check for another approved stairwell.
- ***Do not*** evacuate to the roof. Evacuating to the roof places you above the fire and further from incoming rescuers with limited, if any, means of escape.
- Breaking windows could fuel the fire with oxygen and enhance the rapid spread of the fire.

| Notes: |
|---|
| |
| |
| |
| |
| |

**Key Points**

- Unless instructed to do so by the floor warden or fire safety director, ***never*** use an elevator during a fire.
- Water, heat and smoke can cause elevators to act erratically.
- The elevator shaft acts as a chimney and may cause the car to quickly fill with smoke.
- Elevators may stop on the fire floor and open to a wall of smoke or fire.
- Elevators may be recalled to the lobby and put out of service to eliminate the possibility of an occupant entering the elevator during a fire.

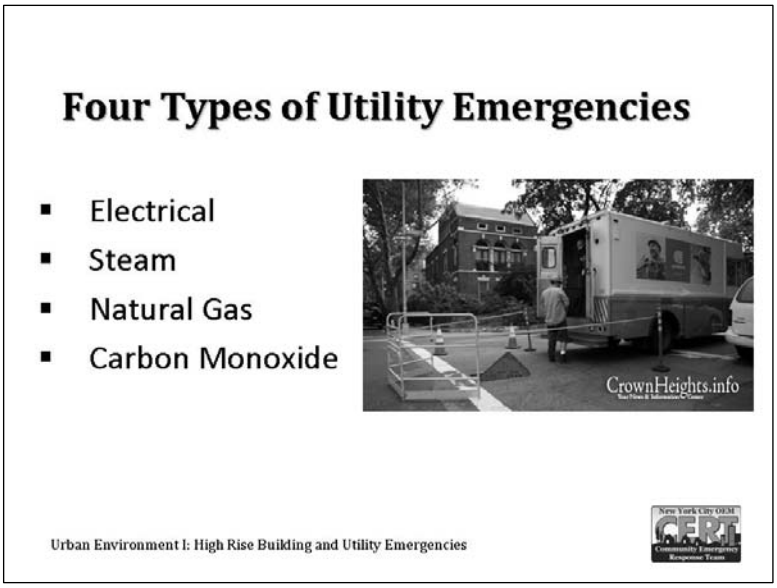
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- This section will cover utility emergencies common to the urban environment.
- We will also discuss CERTs' role during a utility emergency.

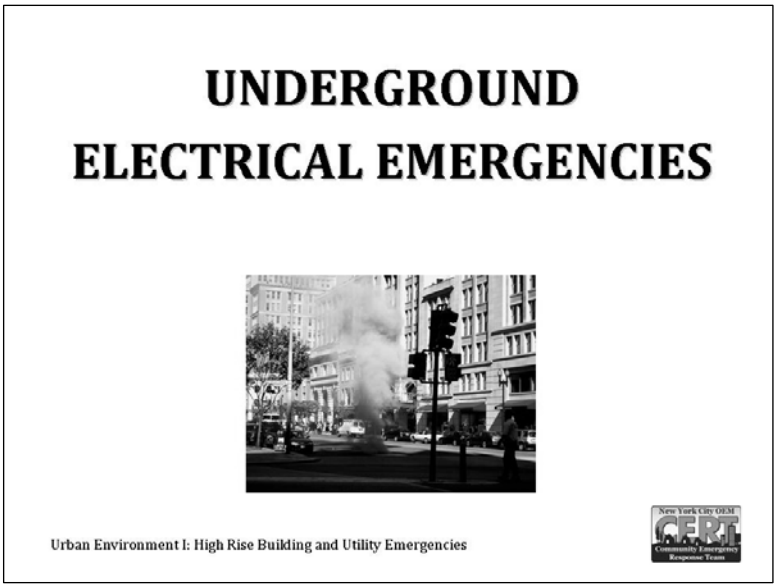
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- These are four types of utility emergencies in which a CERT team may be activated.
- Each emergency is unique and CERTs must recognize the hazards associated with each one.

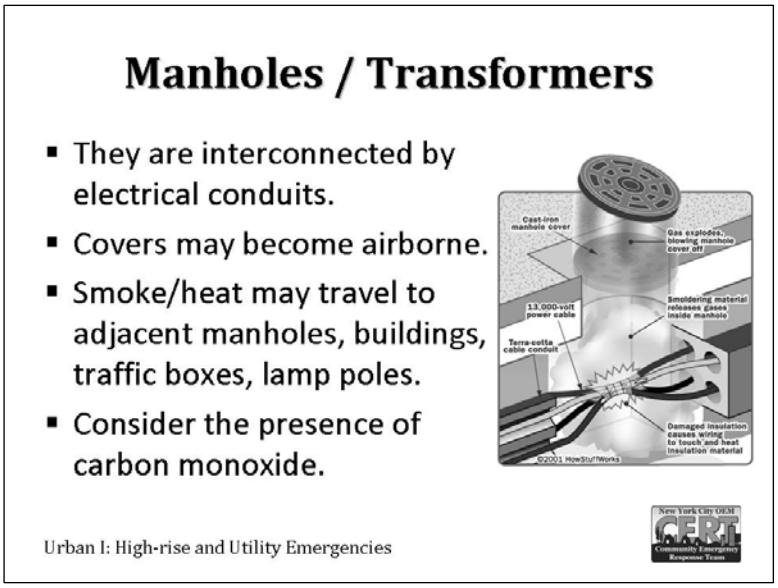
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- This section will cover the warning signs of underground electrical problems and the dangers of these types of emergencies.
- This information will act as a guide for what you can do as a CERT member at an underground electrical emergency.

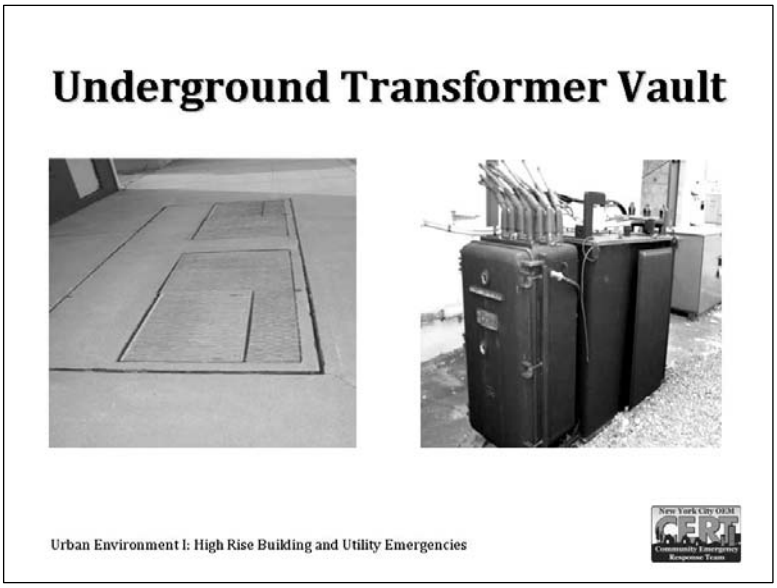
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- Manholes are used as access points to the underground system. Manhole covers may become pressurized causing them to blow as high as several stories.
- Smoke and carbon monoxide (CO) can travel via the manhole and conduits and can enter the building through the electrical piping.
- CERT members should consider that all the surrounding manholes and buildings may be affected.
- At a CO emergency, CERT members should never go below grade (i.e. basement or cellar).
- CERT members can assist by determining the number of buildings affected by:
    - Questioning tenants if they are experiencing electrical problems;
    - Inquiring if their carbon monoxide meter has been activated.

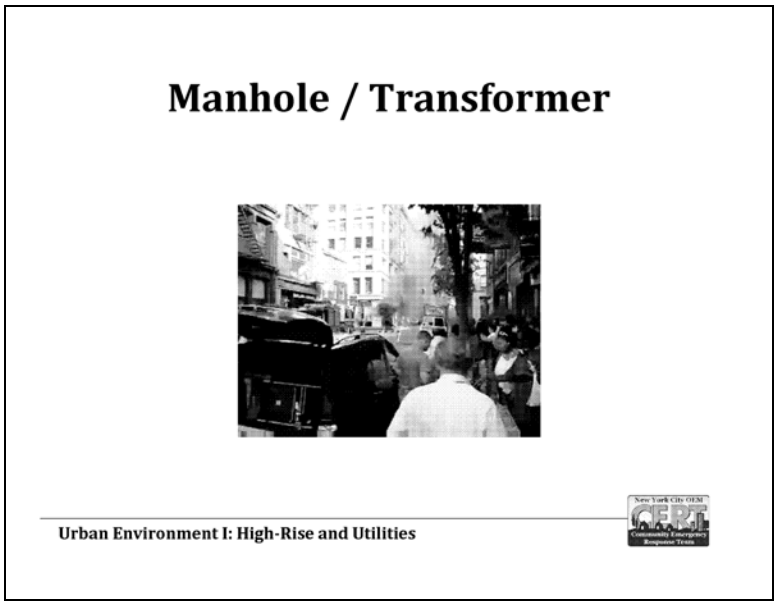
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- Transformers either increase or decrease electrical current so it can be delivered to residential and commercial customers.
- Underground transformers can be found on the sidewalk or in the street.
- They are usually indicated by the rectangular cover.
- Covers may be slotted or solid.
- CERT members should not operate within close proximity of a transformer vault.
- Transformers are filled with dielectric fluid that is toxic when it burns.

| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- Manhole/transformer covers can explode without warning sending the cover into the air.
- Toxic smoke and flames are usually associated with the explosion.
- It is not necessary for CERT members to approach the manhole/transformer to establish a danger zone.
- Post caution tape or rope at waist to chest level to prevent onlookers from entering.
- Position CERT members around the perimeter to act as a uniformed presence, restricting entry and informing the public of the dangers of the incident. As always, CERT members should work in pairs.

| Notes: |
| --- |
| |
| |
| |
| |
| |

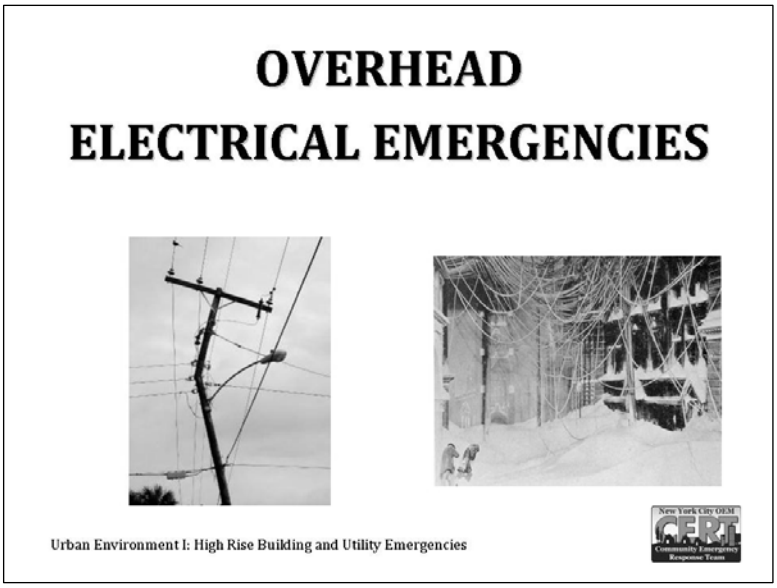
# Manhole Explosion

Urban Environment I: High Rise Building and Utility Emergencies

**Key Points**

- A transformer vault explosion can deliver enough force to overturn a parked car.
- Salt used to melt ice can deteriorate the insulation of the wires.
- As the insulation fails, the wires can connect when they touch causing a fire.
- Explosions are usually caused by a large buildup of CO within the piping or manhole.
- When CO reaches 12,500 parts per million, it enters its flammable range and can explode with great force when confined within a small area such as a conduit, manhole or transformer vault.

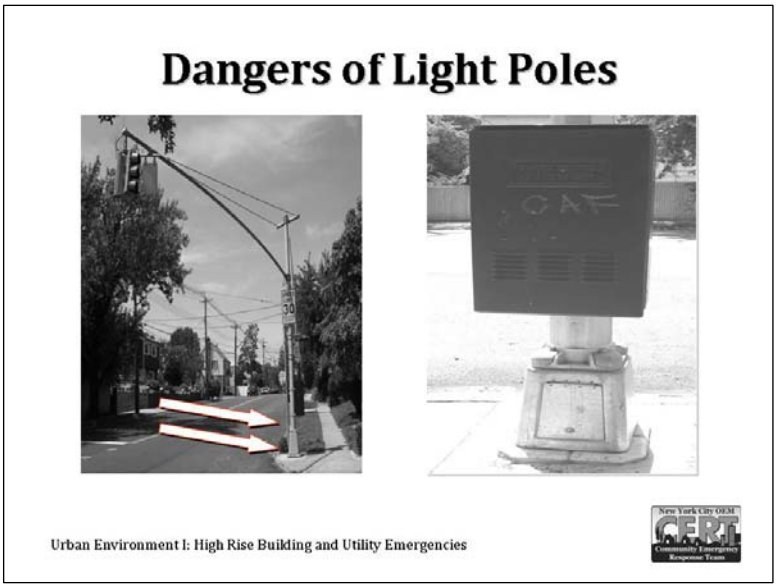
| Notes: |
|---|
| |
| |
| |
| |
| |




**Key Points**

- This section will discuss the dangers of overhead electrical emergencies
- Overhead electrical power can be found throughout New York City except in Manhattan.
- This information will act as a guide for what you can do as a CERT member at an overhead electrical emergency.

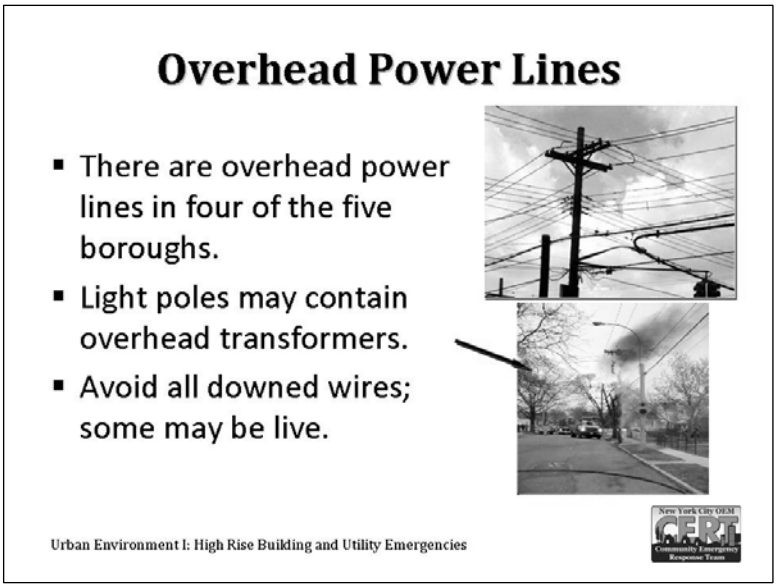
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- Light poles receive power from the underground electrical system.
- The conduit for the electrical wires can allow smoke and CO to build up inside the light pole and traffic box.
- Sparks caused by faulty connections within the light pole can ignite the accumulated CO causing an explosion.
- The light pole should be considered part of the danger zone when cordoning off an area.
- CERT members should close the sidewalk restricting pedestrian traffic in the area of the light pole.

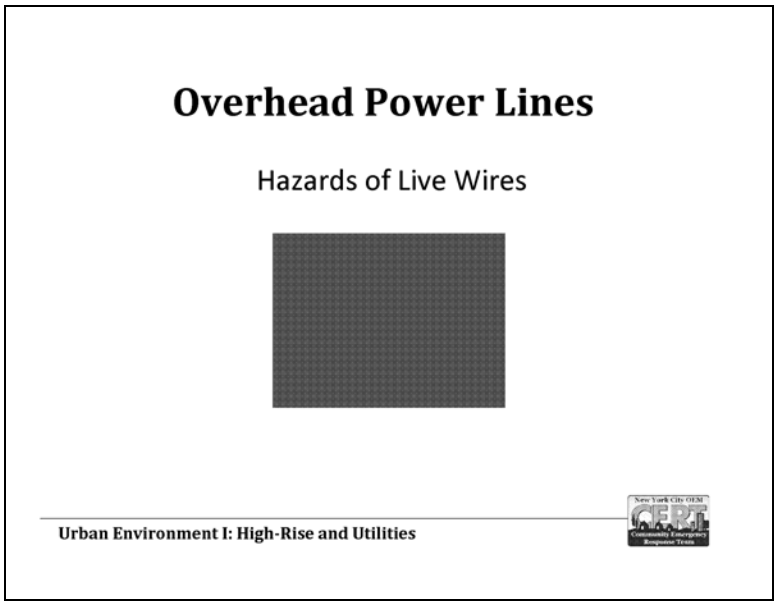
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- Power lines contain high voltage electricity.
- Electricity from power lines can jump and electrocute someone who does not come in direct contact with the wire.
- Never operate in close proximity of a downed wire.
- Overhead wires can remain live even though they are broken.
- Downed wires can energize the ground close to where they lie.
- CERT members should tape or rope off the area and assess the surrounding buildings to determine the extent of the emergency.

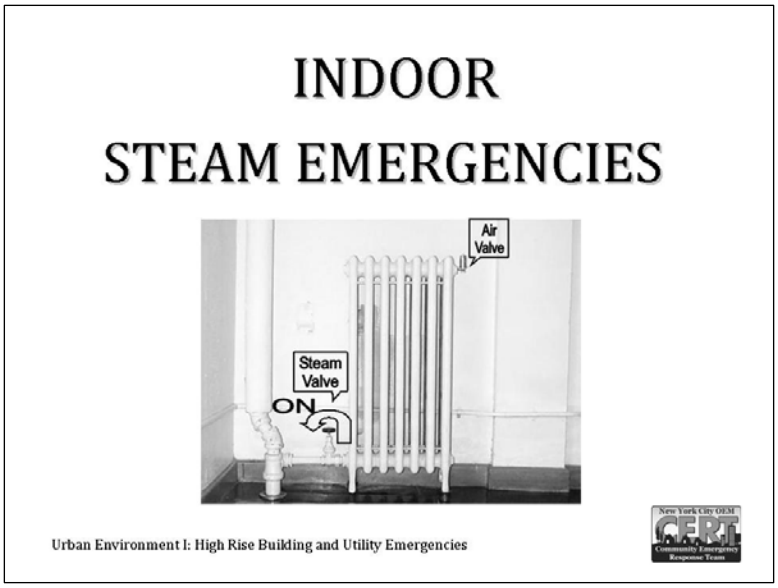
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- Electricity can travel long distances via a conductor.
- Even wood can conduct high voltage electricity.
- Chain link fencing can carry the electrical current the entire length of the fence.
- If an automobile comes in contact with a downed wire the entire vehicle becomes energized.
    - Instruct the passengers to remain in the vehicle and move towards the center of the car without touching sides or roof.
- CERT members should recognize potential conduits for the electrical current and include that area in the danger zone.

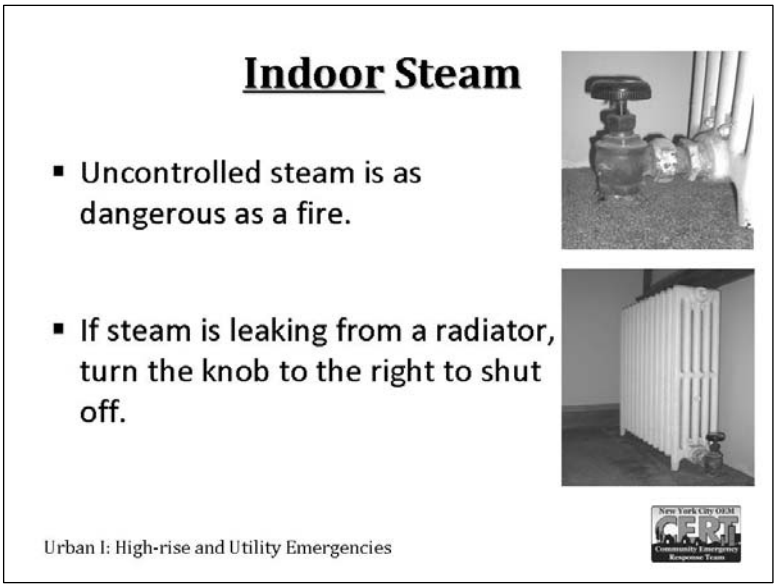
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- This section will discuss indoor steam emergencies.
- Indoor steam emergencies usually involve either defective boilers and broken pipes or radiators.
- This information will act as a guide for what you can do as a CERT member at an indoor steam emergency.

| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- Steam expands to 1,600 times the volume of water.
- Its rapid expansion allows superheated gas to fill a room quickly.
- Steam can burn your skin the same way as fire would.
- The simplest steam emergency to mitigate is a leaking radiator. This can be controlled by turning off the radiator valve.
- If you are unable to control the leak at the radiator, call 911.

| Notes: |
| --- |
| |
| |
| |
| |
| |

## Indoor Steam

If you are unable to control a steam leak at the radiator:

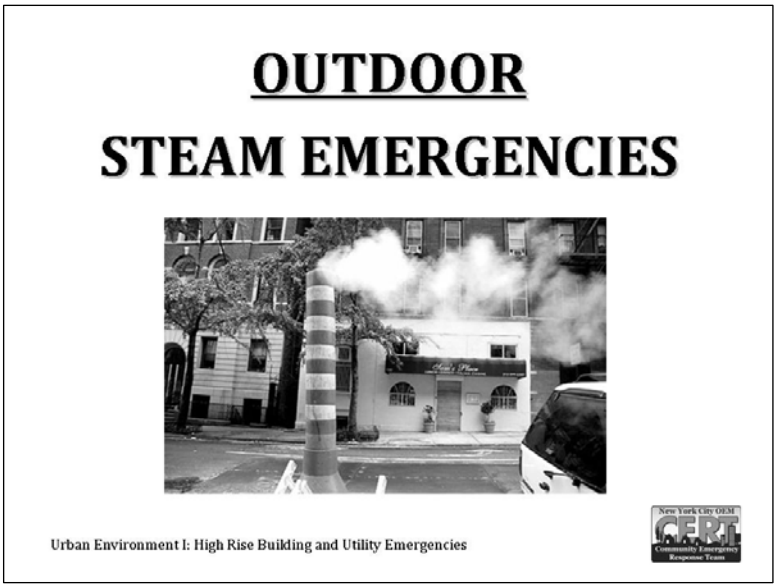
- Notify the fire department (call 911).
- Shut down the boiler / furnace (red switch plate).
- Tape or rope off the area for safety.

Urban I: High-rise and Utility Emergencies

**Key Points**

- If you are unable to control the leak at the radiator, call 911 and control access to the danger area by taping or roping off the affected the area.
- If you have access, turn off the boiler using the remote switch located at the top of the stairs or outside the boiler room.
    - This switch usually has a red switch plate.
    - Allow the residual steam to release prior to entering the room.
- Large scale indoor steam emergencies may require the entire building to be shut down leaving occupants without heat. This may become a possible CERT response to assist in the temporary relocation of residents.

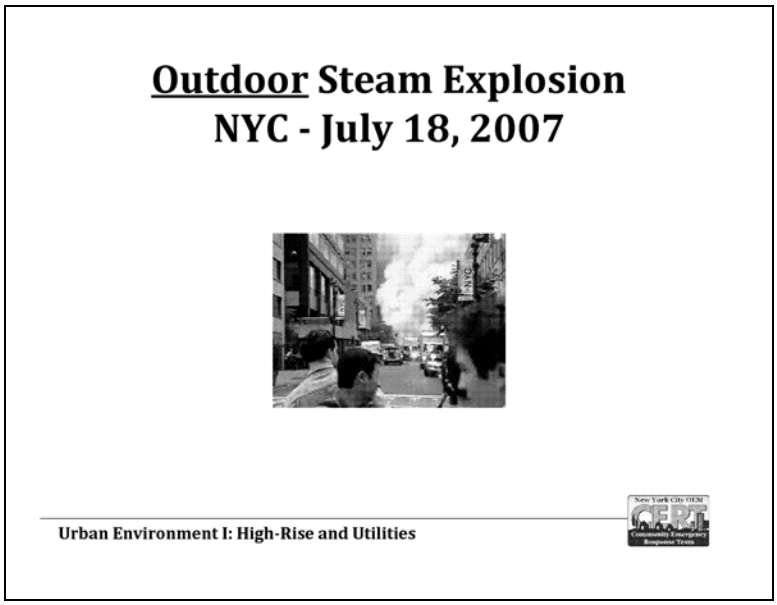
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- This section will discuss outdoor steam emergencies.
- As the infrastructure in New York City continues to deteriorate due to age, these emergencies are becoming more frequent.
- This information will act as a guide for what you can do as a CERT member at an outdoor steam emergency.

| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- Existing underground steam pipes are usually wrapped in asbestos.
- CERT members should always assume an asbestos release when underground piping is ruptured.
- Asbestos can travel great distances once it is airborne. CERT members should consider the wind direction when establishing their safety zone and should always operate upwind.
- While high pressure steam can be invisible, another warning sign will be an extraordinarily loud roar, similar to a jet engine.

| Notes: |
| --- |
| |
| |
| |
| |
| |

**Key Points**

- The illustrations above depict the magnitude of a high pressure steam explosion.
- Steam and debris may shoot up to 15 stories.
- The force of the explosion will undermine the street surrounding the ruptured pipe.
- Debris from the explosion can travel great distances and strike victims.
- Motorists who abandon their vehicles will cause major traffic problems which will delay first responders.

| Notes: |
| --- |
| |
| |
| |
| |
| |

## Outdoor Steam

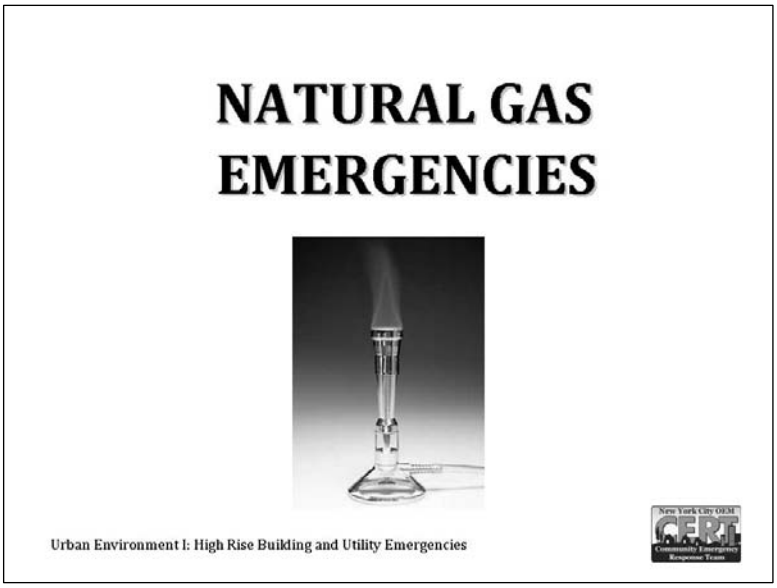
- Notify FDNY via 911 immediately.
- Notify OEM Watch Command and follow response protocol.
- Possible actions:
  - Rope or tape off the area for safety.
  - Avoid breathing in the contaminated air.
  - Evacuate the area as far away as possible.

Urban I: High-rise and Utility Emergencies

**Key Points**

- Immediate notification to 911 will provide an on-scene report to the dispatcher to inform incoming first responders.
- CERT members should notify their team chief who will notify Watch Command and determine if a CERT response is required.
- From a safe location (i.e. uphill, upwind, upstream) CERT members may:
  - Be tasked to assist in traffic control. CERT members should remember the importance of establishing a lane for emergency vehicles.
  - Keep onlookers away from the scene to prevent exposure to the asbestos. This can best be accomplished by using caution tape or rope.
- Victims who have been exposed to airborne contaminants should remain on scene for evaluation and possible decontamination.

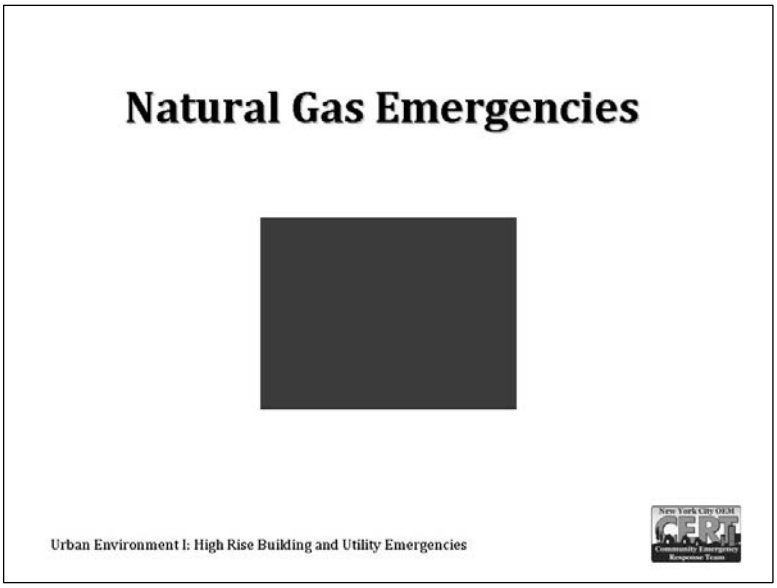
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- This section will discuss natural gas emergencies.
- Natural gas emergencies can occur indoors or outdoors.
- This information will act as a guide for what you can do as a CERT member at a natural gas emergency.

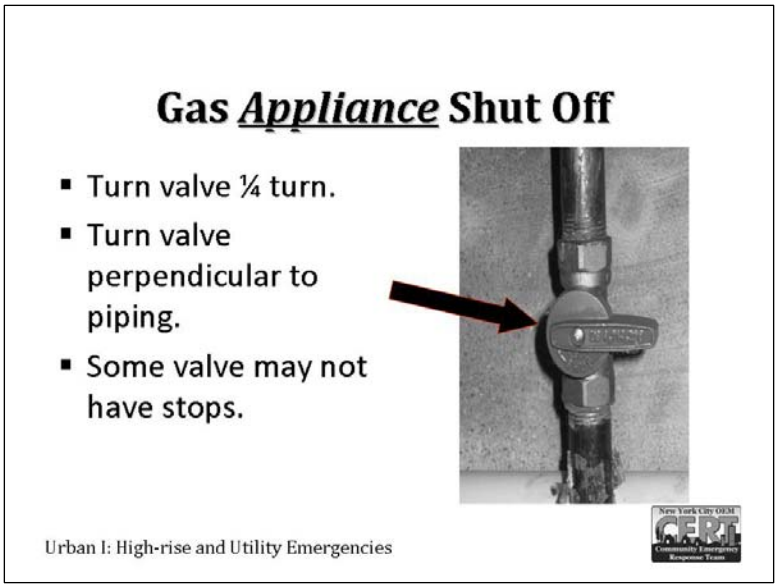
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- A natural gas leak can result in the accumulation of gas inside a building to the point that it may reach its explosive range.
    - The explosive range of natural gas is 5% to 15% of the total atmosphere.
- Without a combustible gas meter, it is impossible to detect the amount of gas in the atmosphere.
- A gas explosion can weaken the structural integrity of the building and may even cause a total collapse.
- No CERT member should operate in a gaseous atmosphere.
- When the presence of a gas odor is detected, immediately notify 911 with the location of the leak and the type of occupancy involved.

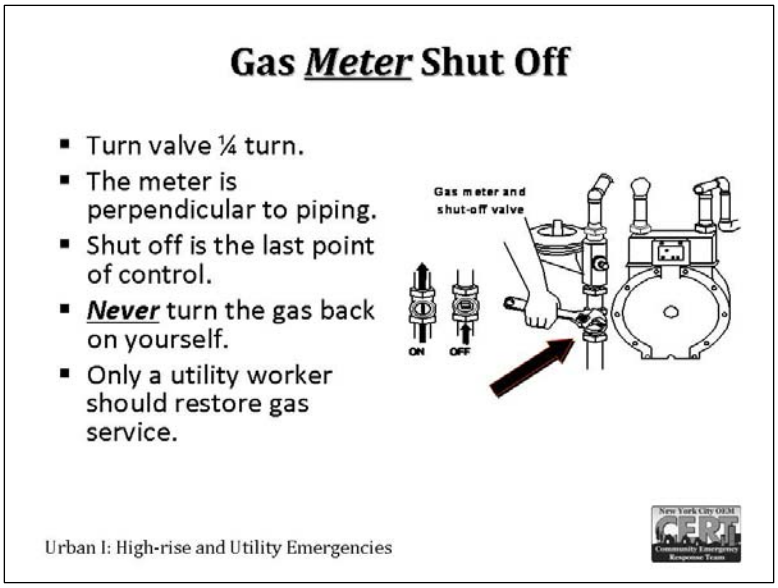
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- Gas flow may be stopped by turning the valve perpendicular to the pipe, usually a quarter turn.
- Some valves may not have stops and turning the valve beyond a quarter turn may reopen the valve.
- The valve is usually located close to the appliance it feeds.
- **Once gas has been shut down, it must be restored by the utility company.**

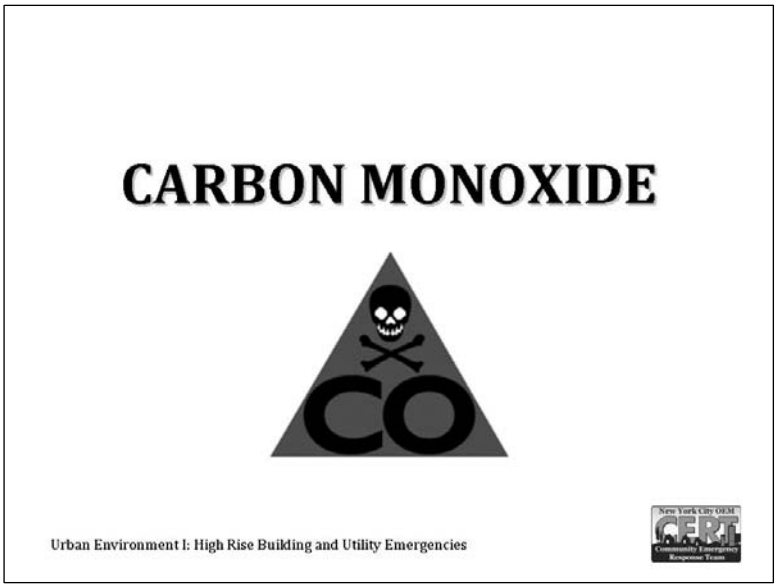
| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- The gas meter usually requires a quarter turn to close.
- Turn valve perpendicular to the piping.
- This is the last point of control for a gas leak within the building.
- Anytime a gas valve is shut down the utility company should be notified.
- CERTs role at a natural gas leak may be limited to taping off the area and restricting people from entering the affected building.
- **Once gas has been shut down, it must be restored by the utility company.**

| Notes: |
| --- |
| |
| |
| |
| |
| |




**Key Points**

- This section will discuss the dangers of carbon monoxide (CO).
- This information will act as a guide for what you can do as a CERT member at a CO emergency.

| Notes: |
| --- |
| |
| |
| |
| |
| |

## Carbon Monoxide (CO)

- Colorless, odorless, tasteless, non-irritating, toxic gas
- Natural by-product of incomplete combustion
- No early warning signs - can kill before its presence is known

Urban I: High-rise and Utility Emergencies

**Key Points**

- CO is undetectable without meters/detectors.
- Since it is a byproduct of incomplete combustion, it can be found any place a fossil fuel (oil, gas, and diesel) is burned.
- Some sources of CO are defective stoves, defective boilers, defective chimneys, kerosene space heaters, gas generators and transformer fires.
- Since CO is undetectable by human senses its effects may be undetectable until they reach dangerous levels.

| Notes: |
| --- |
| |
| |
| |
| |
| |

## Effects of CO Exposure

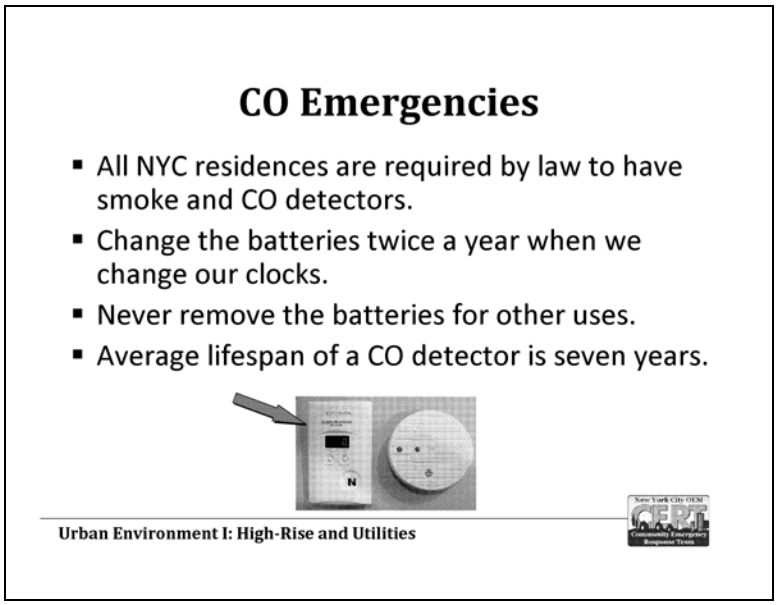
| PPM | Time | Symptoms |
|---|---|---|
| 200 | 120 minutes | Flu Like |
| 800 | 45 minutes | Flu Like |
| 800 | ***180 minutes*** | Death |
| 1600 | 60 minutes | Death |
| 3200 | 10 minutes | Flu Like |
| 3200 | 30 minutes | Death |
| 12,800 | 1-3 minutes | Death |

Urban Environment I: High Rise Building and Utility Emergencies

**Key Points**

- Effects of CO are based on exposure levels and length of exposure.
- Flu-like symptoms are an early warning sign to carbon monoxide poisoning.
- Exposure to 12,500 part per million can cause death in 1-3 minutes.
- If any CERT member experiences the warning signs of carbon monoxide he or she must immediately seek medical attention.

| Notes: |
|---|
| |
| |
| |
| |
| |




**Key Points**

- All residences within NYC must have a CO detector.
- Batteries for the CO detector should be changed twice a year when we adjust the clocks for daylight savings.
- Detectors indicate the presence of CO while digital meters detect the amount of CO in parts per million.
- CERT members should be able to recognize the early warning signs of CO poisoning.
- If safe, and the source (i.e. car, boiler, stove) of the CO is obvious, shut it down.
- If victims experience symptoms, they should move themselves to a safe area and remain on scene until they receive medical attention.

| Notes: |
| --- |
| |
| |
| |
| |
| |

## Unit Review Questions

1. Where is the safest location during a high rise residential fire?
2. What are the early warning signs of CO poisoning?
3. How do we control a gas leak on a defective stove?
4. When do we use elevators at a high rise fire?
5. What contaminate would you expect to find at an underground steam explosion?

Urban Environment I: High Rise Building and Utility Emergencies

**Key Points**

- The safest location at a high-rise residential fire is inside your apartment as long as it is not the source of the fire.
- Early warning signs of CO will appear as flu-like symptoms.
- A gas leak on a defective stove should be closed as close to the leak as possible – most stoves have a shut off directly behind the stove. If you are unable to control it at the valve the meter may have to be closed.
- Unless instructed to do so by the fire safety director or the floor warden, ***NEVER*** use an elevator at a high rise fire.
- The most common contaminant found at an underground steam explosion is asbestos since most underground piping is wrapped in asbestos.

| Notes: |
| --- |
| |
| |
| |
| |
| |

## LESSONS LEARNED

- Actions at a high rise building fire and/or evacuation.
- Utility emergencies and awareness.
- Roles CERT may play during these emergencies.

## NYC CERT in ACTION

- In February 2007, a six-alarm fire took over a neighborhood block in Far Rockaway. Members of the local NYC CERT were among the first to arrive on the scene. They were immediately able to identify the owners of the cars on the street to move for first responder vehicles. Their familiarity with the residents and local resources helped speed up efforts to provide food and shelter to evacuees.
- In September 2010, a torrential weather system swept across New York City. Microbursts surfaced in Staten Island and Queens, resulting in damage to private property and public utilities. Teams in both boroughs were quick to respond, cordoning streets that were impassible due to fallen trees and electrical wires and directing traffic at intersections that were left without power. The CERT members maintained safe distance from the hazards, keeping themselves and their neighbors safe.

## COMMUNITY AWARENESS

- What lessons were learned in this unit that you might bring to your community?

- What is a message learned in this unit that you might stress in a Ready NY presentation?

## PREPARING FOR YOUR FINAL WEEK

Use the knowledge about evacuations and utility awareness to prepare for the disaster simulation. How did you create an ICS structure for the knowledge applications this week?

## EVALUATION

Please fill out the evaluation for Unit 2 in the back of the binder. When completed, please hand in to your OEM Liaison.

## UNIT RESOURCES

NYC OEM Website: www.nyc.gov/oem

FDNY Fire Zone website (community link): http://www.fdnyfirezone.org/

ConEdison website: http://www.coned.com/

National Grid/KeySpan website: http://www.nationalgridus.com/

Carbon monoxide poisoning prevention guidelines: http://www.cdc.gov/co/guidelines.htm