



Canadian Science  
Centre for Human  
and Animal Health

Centre scientifique  
canadien de santé  
humaine et animale

# Emergency Preparedness in High Containment Laboratories

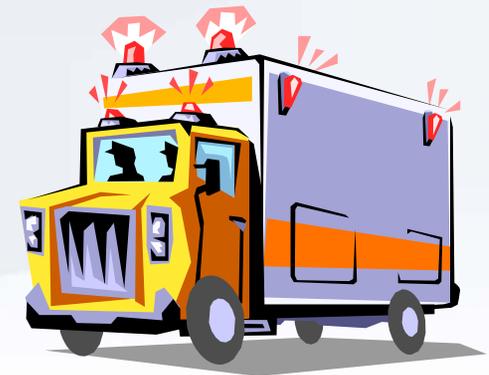
# Emergency Preparedness

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# Emergency Preparedness

- First Responders
- Why I feel safe
- Actual emergency egress
- Exercises

# Who are first responders?



# First Responder Partnerships

- **Fire**
- **Police**
- **EMS**

**What would first responders  
need to know when  
responding to an emergency  
at a  
high-containment laboratory?**

# Fire

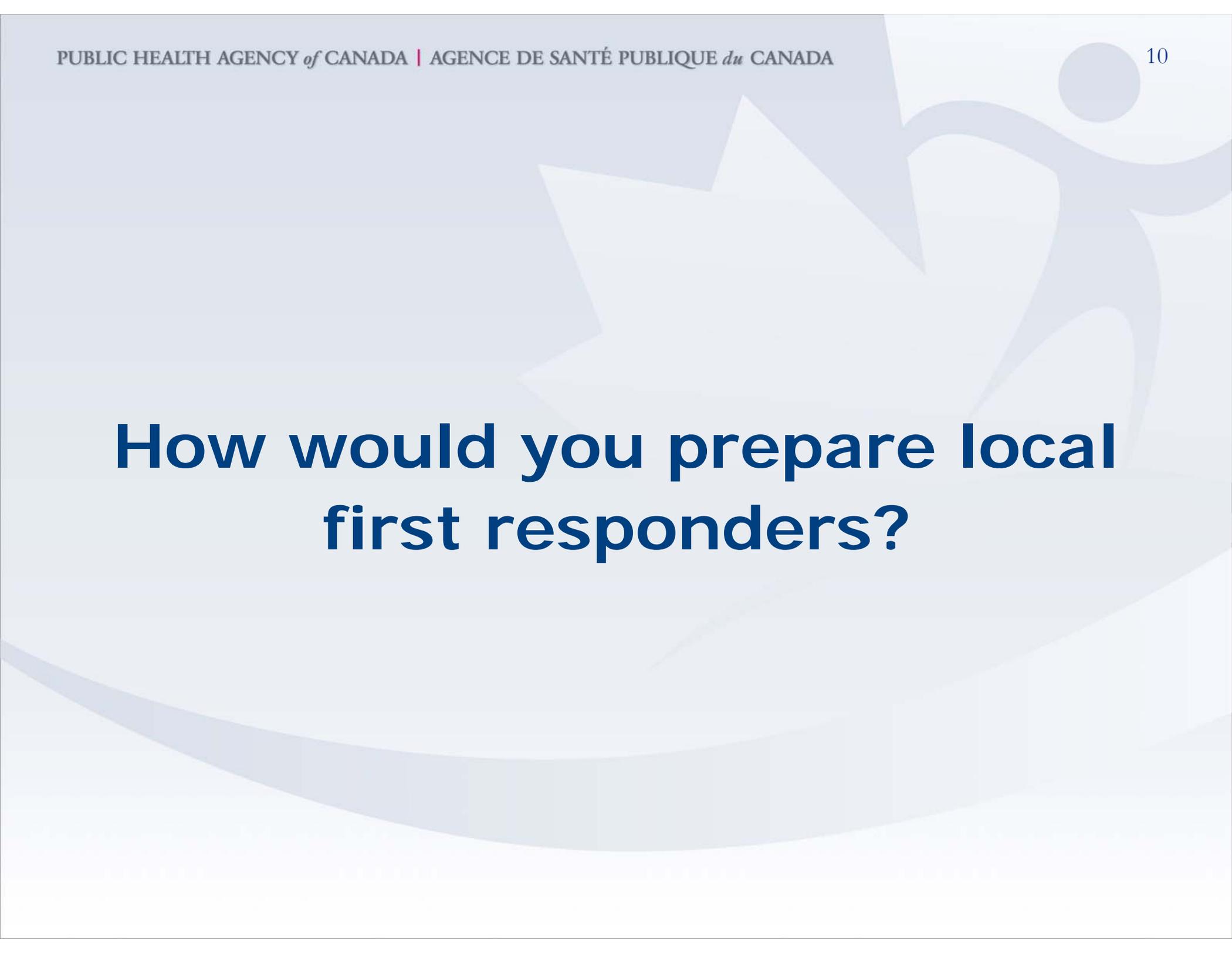
- HVAC Systems
- Fire Suppression Systems
- Electrical Systems
- Chemical/Explosive Issues

# Police

- Access Points and Security Strategies
- Cleared/Non-cleared Personnel
- Chain of Command within Laboratory
- List of Agents and/or Risks

# EMS

- Where to Go
- Risks Associated
- How to Transport
- Decontamination of Transport Vehicle



# How would you prepare local first responders?

# Preparing First Responders

- Reach Out
- Offer Tour
- Understand Needs
- Deliver Training

**What would you expect to see  
from individuals who have  
never worked with  
infectious diseases?**



# F E A R



# DOUBT

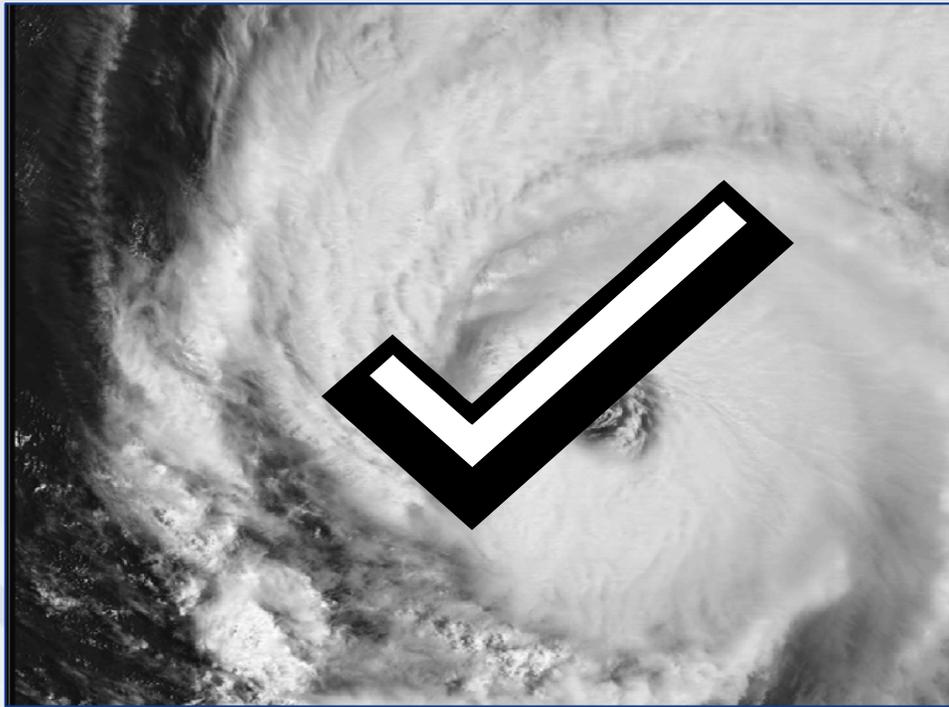


# OUTRAGE

# Defining Risk

- Hazard
- Exposure
- Public Perception
- Outrage



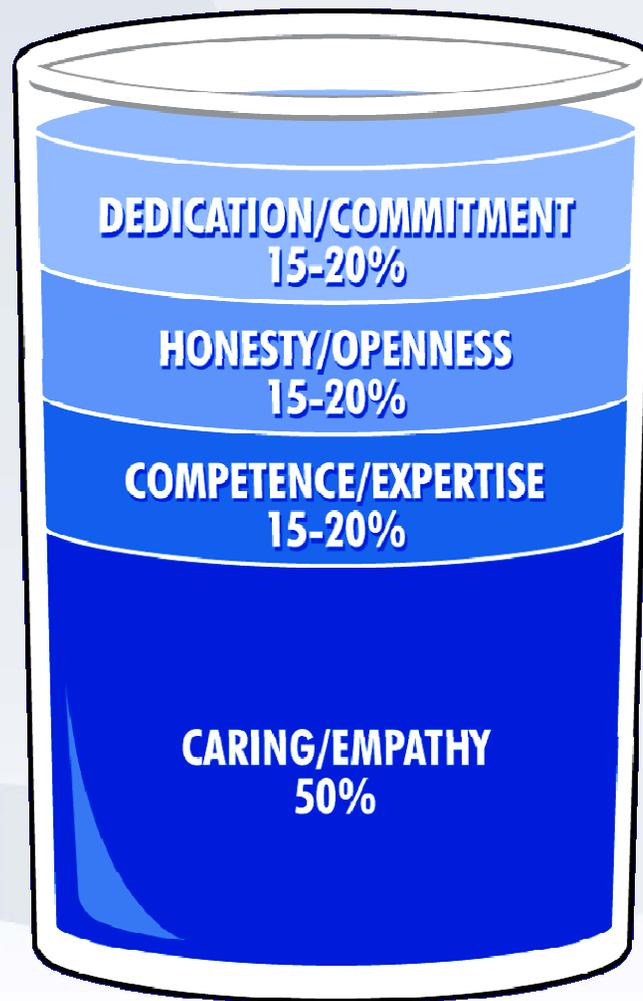


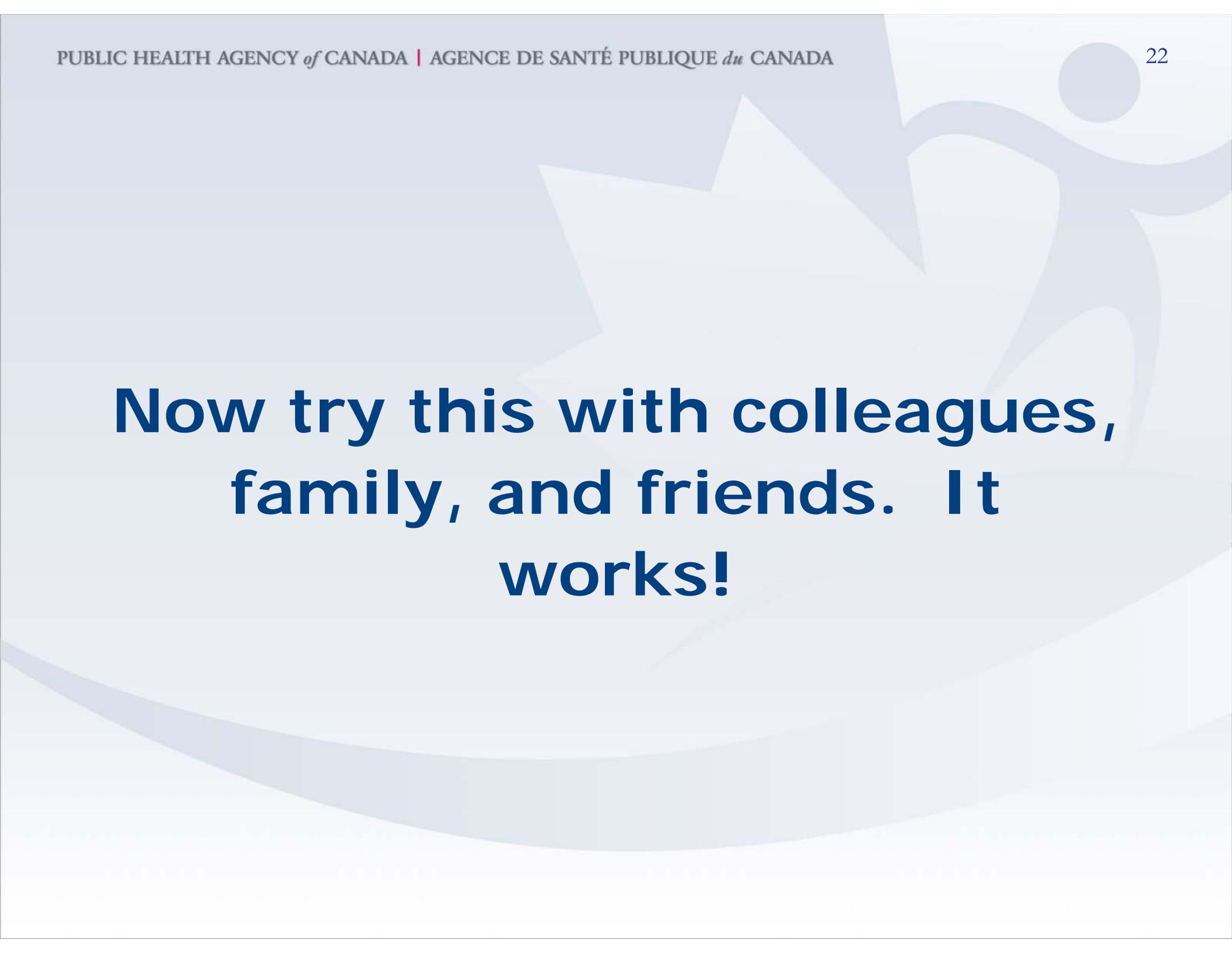


# Risk Perception Factors

| <b>FACTORS</b>           | <b>MORE HOSTILITY</b>        | <b>LESS HOSTILITY</b>          |
|--------------------------|------------------------------|--------------------------------|
| Catastrophic             | Grouped in time and space    | Scattered in time and space    |
| Familiarity              | Uncommon                     | Common                         |
| Understanding            | Not well understood          | Well Understood                |
| Personal Control         | Controlled by distrusted ind | Controlled by the source       |
| Voluntariness            | Involuntary                  | Voluntary                      |
| Effects on Children      | Likely to affect children    | Less likely to affect children |
| Moral Relevance          | Relevant                     | Not relevant                   |
| Timing of Effects        | Immediate effects            | Delayed effects                |
| Identity of Victims      | Closely related              | Statistical victims            |
| Level of Dread           | Greatly feared               | Apathetic                      |
| Trust of Institutions    | Distrust                     | Trust                          |
| Media Attention          | Highly popularized           | Seldom mentioned               |
| History of Accidents     | Well-known accidents         | No accidents                   |
| Equity                   | Viewed as unfair             | Viewed as fair                 |
| Distribution of Benefits | Benefits not equal to risks  | Benefits equal with risks      |
| Reversibility            | Damage irreversible          | Damage reversible              |
| Personal Stake           | Strong                       | Weak                           |
| Origin                   | Artificial                   | Natural                        |
| Level of Uncertainty     | Unknown to science           | Known to science               |
| Tone of Message          | Too positive                 | Objective                      |
| Organizational Attitude  | Organization ignores         | Organization seeks out         |
| Change in lifestyle      | Sharp change from norm       | Little change from norm        |
| Understanding of process | Data too complex             | Data aimed at audience         |

# Recipe for Trust





**Now try this with colleagues,  
family, and friends. It  
works!**

# Why am I here?

- Processes
- People
- The Facility



# Processes

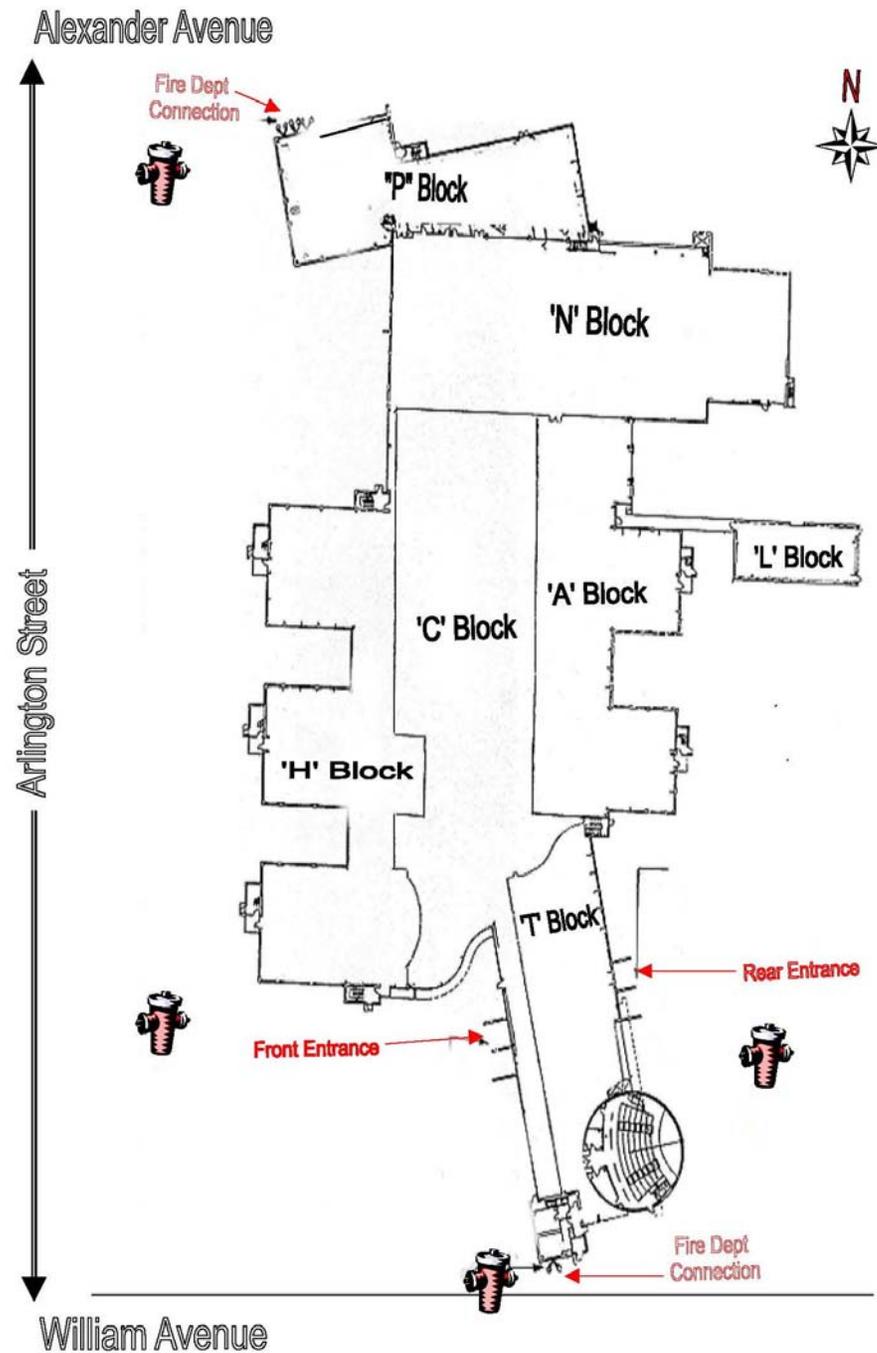
- Design
- Commissioning
- Operational



# The Facility

- Layout
- Redundancies
- Containment Features

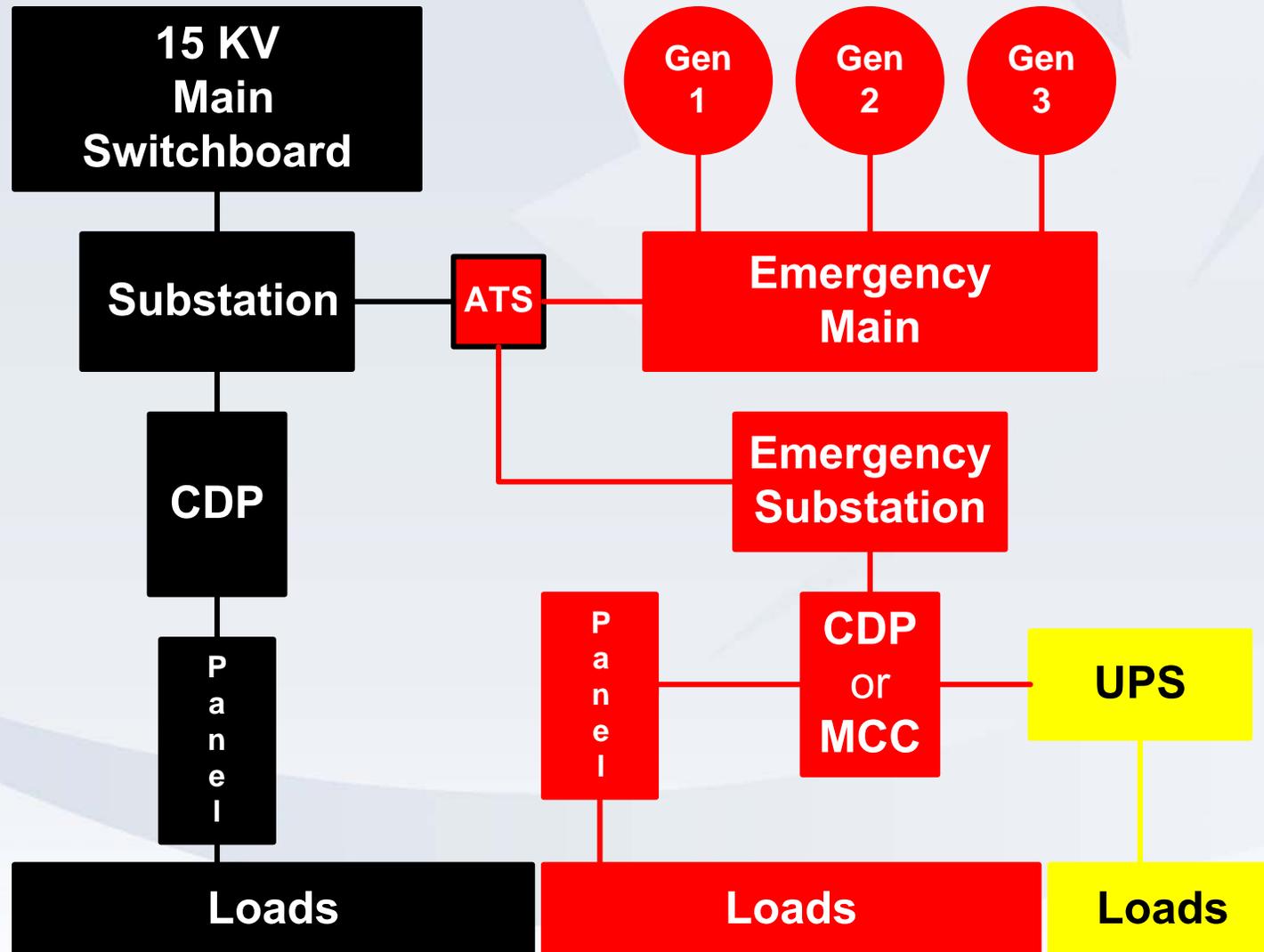
# The Facility



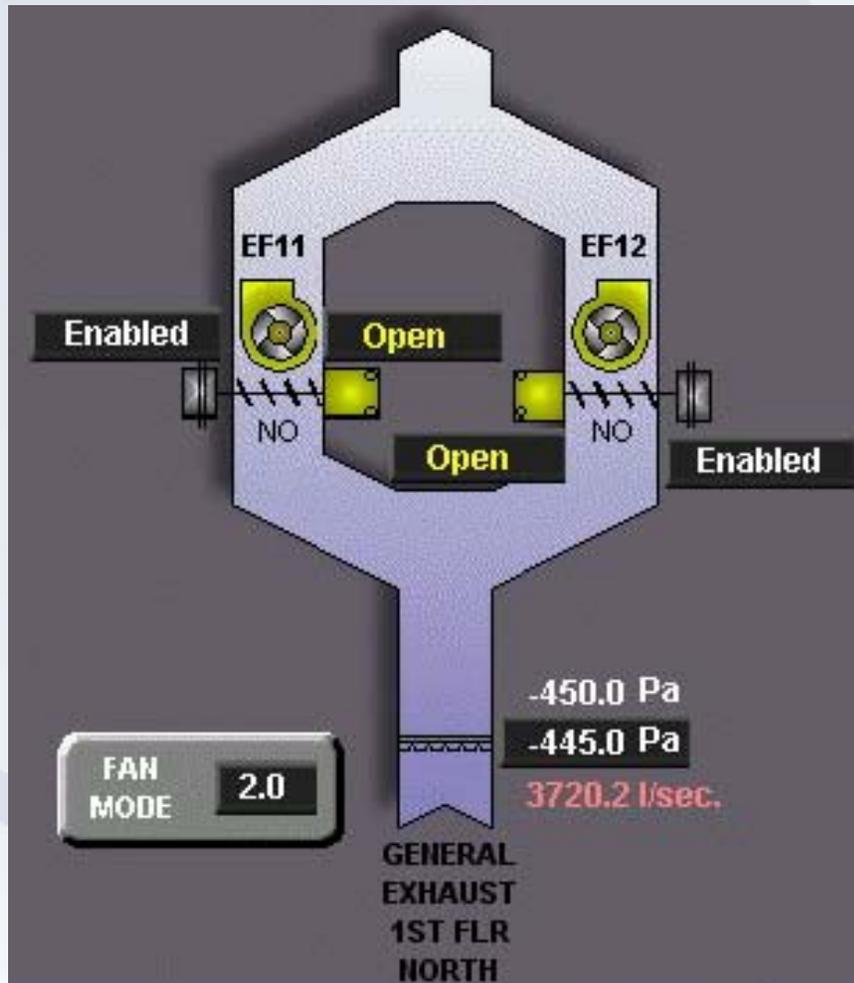
# Redundancies

- Electrical
- Fans
- Energy Centre
- Effluent Treatment
- Chemical Showers

# Redundancies - Electrical



# Redundancies - Fans



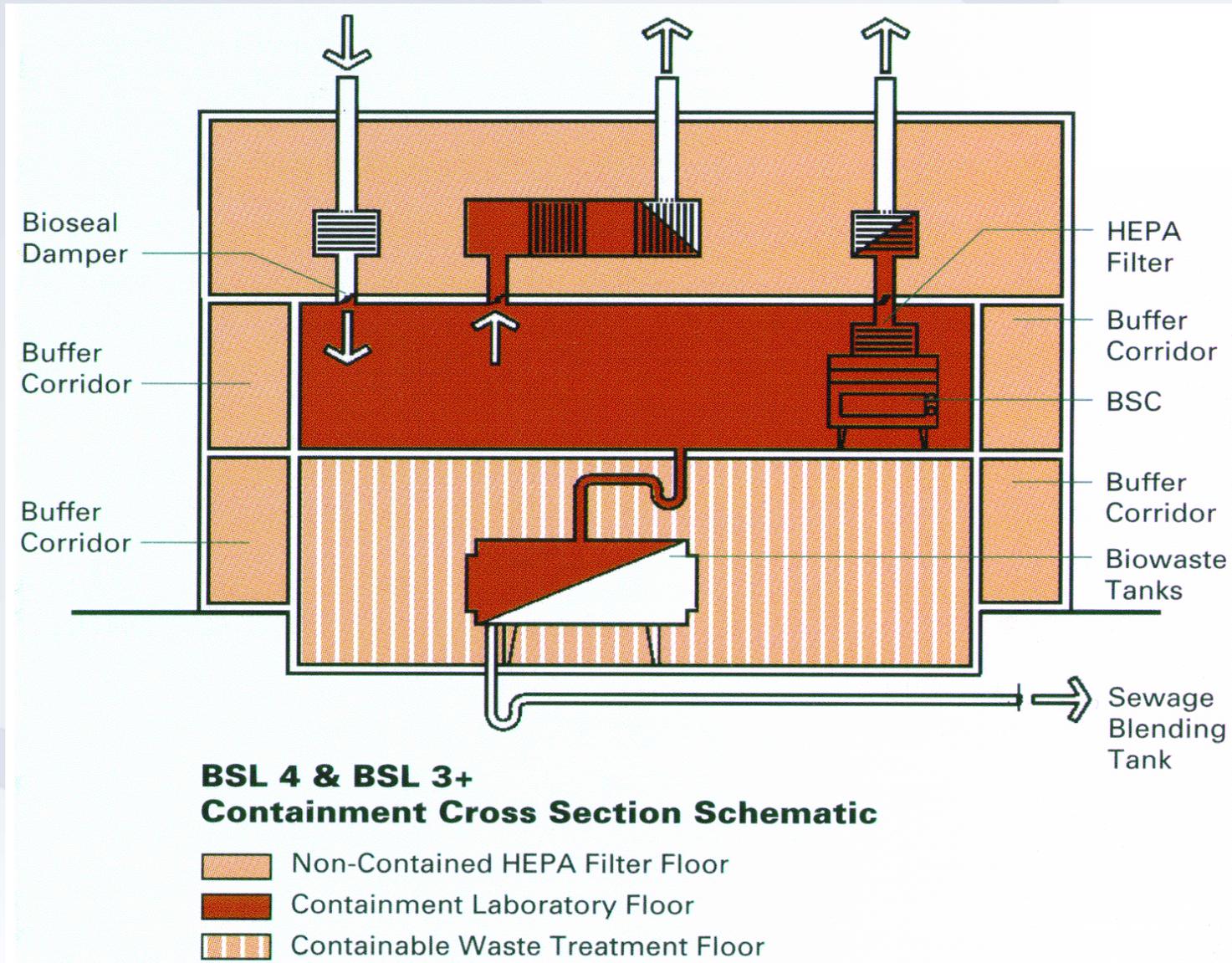
# Energy Centre



# Redundancies - *effluent*



# Containment Features



# CL 4



# HEPA Filters



# Containment Windows



# Bio-seal Doors



# Differential Pressure

## Differential Pressure Zones

|   |   |
|---|---|
|  -0 Pa   |  -150 Pa |
|  -50 Pa  |  -200 Pa |
|  -100 Pa |  -225 Pa |
|  -125 Pa |  -250 Pa |

# Fire Safety

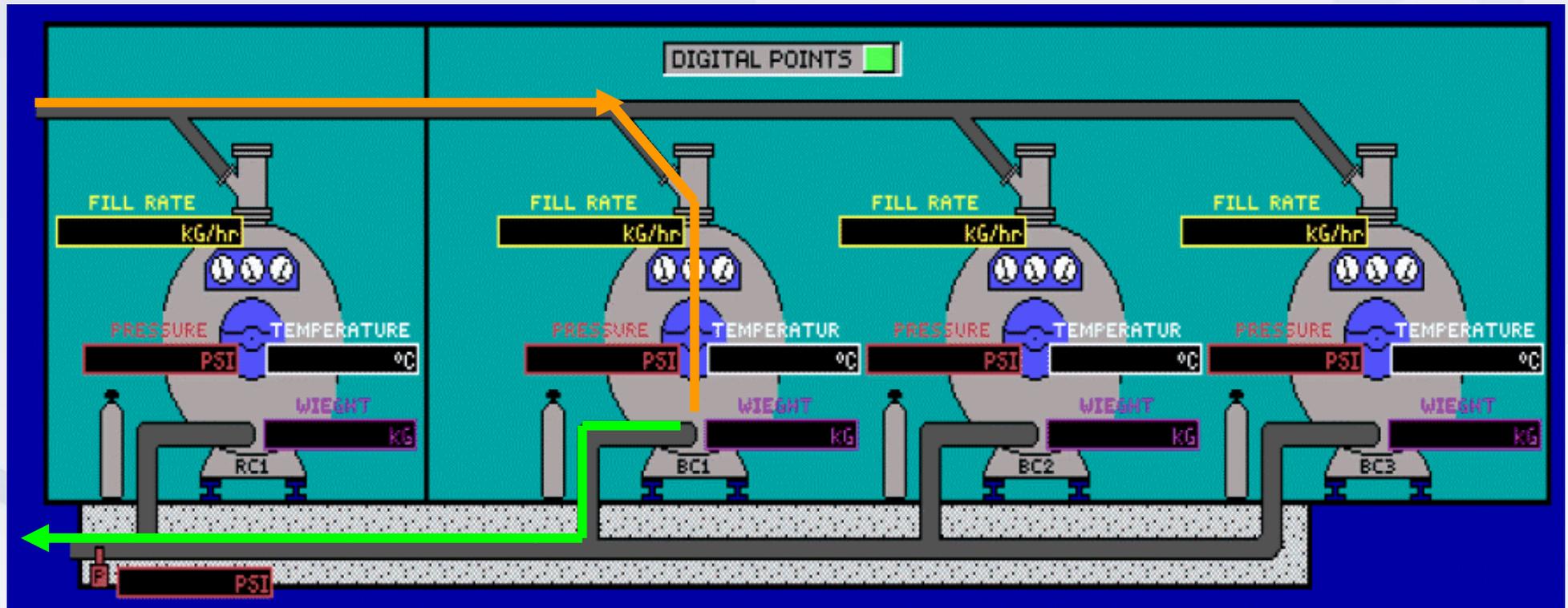
- Fire alarm system
- Fire alarm devices
- Fire suppression
- Fire safety program



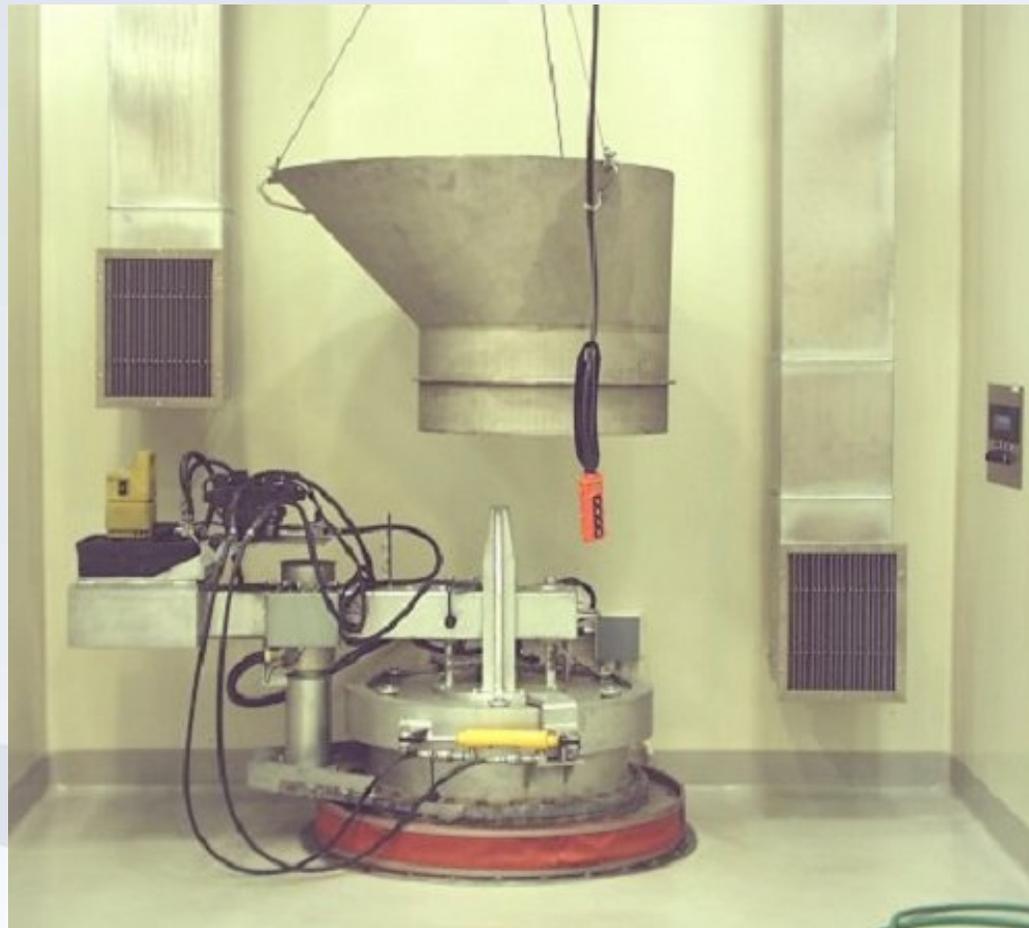
# The Rendering & Biowaste System

- What is it?
- How does it work?

# Rendering and Biowaste - *effluent treatment*



# Rendering and Biowaste - *rendering*



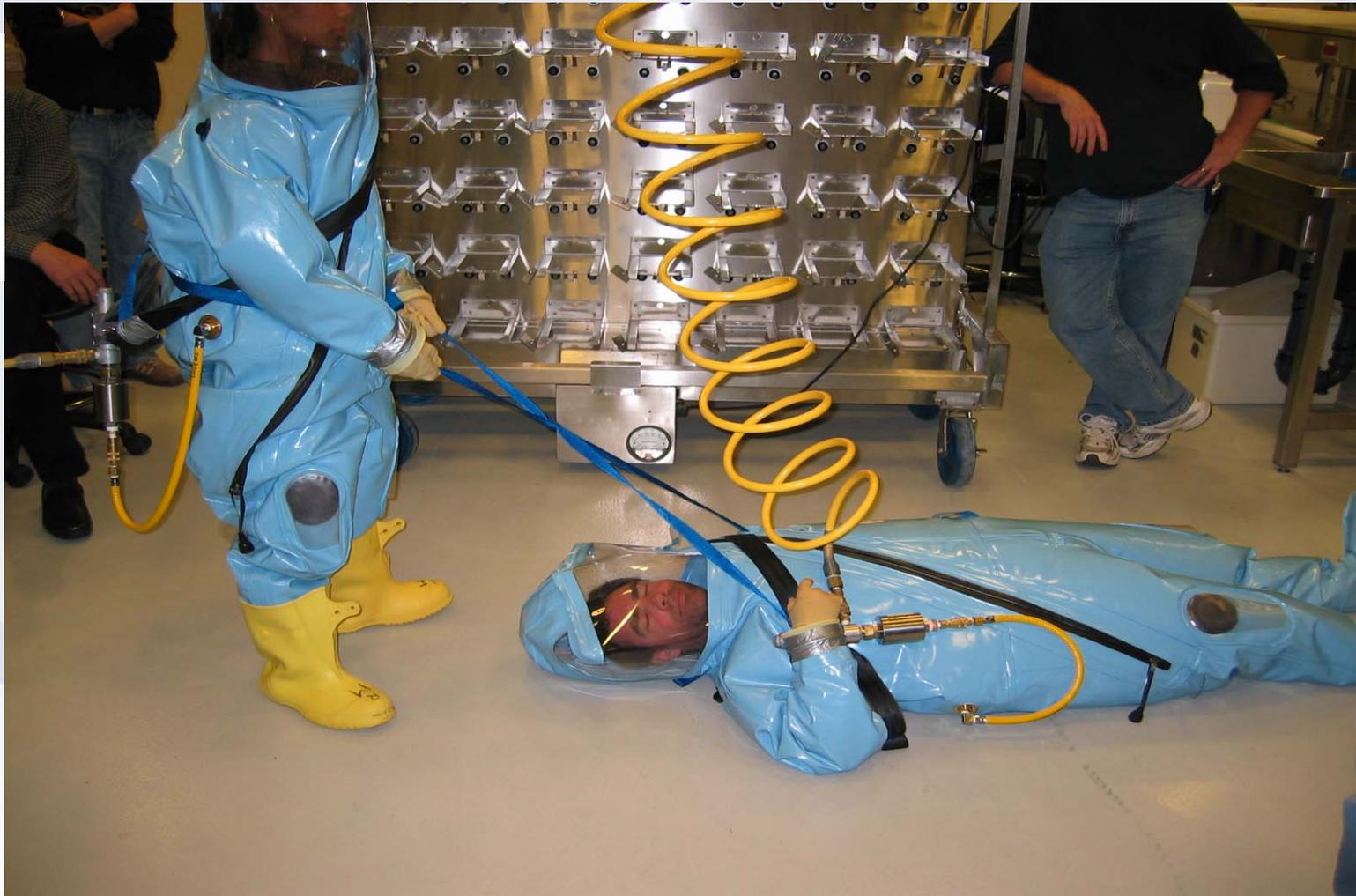
# Rendering and Biowaste - *rendering*



# Rendering and Biowaste - *rendering*



# Emergency Egress from CL3/CL4



# What is an Emergency?

- Slip and fall
  - Person unconscious / responsive
- Heart Attack / Stroke
- Wound which requires medical treatment
- Other emergency which requires medical attention (follow organizational protocols)



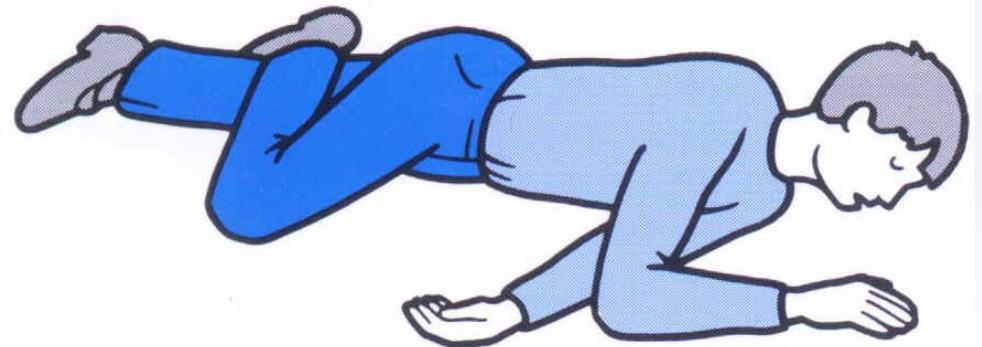
# What does Containment add to the Emergency?

- Isolation.....
- Restricted access.....
- Transmissible Biological agents.....



# Situation!!!

- You walk into containment laboratory and see a person on the ground!!
- What do you do??



# Golden Steps to any Emergency

- Activate a Response **“Call Out”**
  - Call your Buddy
- Is the Environment Safe for you?
  - Chemical spill?
  - Biological spill?
  - Electrical?
- Attend the patient... do your ABC's
  - Is the patient breathing / responsive

# Buddy Response I

- \*\*Medical Emergency has been called out\*\*
- CALL 911 / 'First Responders'
  - Call 911 tell dispatch that there is a medical emergency  
And that security will meet the paramedics at the front door
  - Get one/two trained people to enter and assist ASAP
- Call security tell them what the emergency is and to activate
  - The lead pager SES
  - Program manager
- Get back to the people in the laboratory
  - Keep them up-dated on what is happening

# Buddy Response II

- Person helping on the outside 'buddy'
  - Do a risk assessment to ensure the safety of entering helpers
- Set up extraction of patient / SES incident command
  - Get helpers 'program people'
  - Respiratory protective gear when needed
  - Decontamination of patient 'think ahead'
  - Backboard 'slip and fall incident'
- Helpers will extract patient and hand-off to Ambulance staff

# Inside – Waiting for Help 'Golden Steps'

- Activated a Response
- Is the Environment Safe for you?
- Attend the patient ....ABC

# Inside Person – Assess the Environment

- Look around the patient
  - Is there any hazard?
  - Remove the hazard or Remove the patient



# Is the Environment Safe?

- Look around is there any hazard?
  - Chemical spill
  - Biological spill
  - Electrical
- What was the person working on?
  - AGENT?
  - Were they working at a BSC?
  - Were they walking to another area?
- Do I have the right protective gear to help?

# Once it is safe Go to the Patient!!

- Is the patient responsive?
  - A** = Is the patient alert?
  - V** = Does the patient respond to verbal?
  - P** = Does the patient respond to painful stimuli?
  - U** = Is the patient unresponsive?
- Do your ABC's
- Or Egress as soon as possible



# Airway, Breathing, Circulation...ABC

- If the patient is responsive... ABC's are fine
  - Remove using normal means
- If the patient is unresponsive?
  - CL4 egress from the laboratory ASAP
  - Check vital signs
    - Pulse
    - Respiration (are they breathing)
    - Skin temperature and color (have they been there all weekend)

# Get the Patient Out

- Remove the patient from containment
- Decontaminate if needed (remove any contaminated gear)
- If the patient is ambulatory use normal shower protocols
- If the patient is unresponsive remove using backboard
- Egress through shower open both doors

# Key Components to a Successful Rescue

- Call your buddy...(**Start a response**)
- Check the environment (**Don't become a patient yourself**)
- Check the patients ABC's
- Egress from containment with helpers (**get the patient to proper medical professionals**)

# Liability: Food for Thought

- Legal
- Personal
- Professional
- Societal

# Acknowledgment

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**Time to learn!**