IN-PLACE PROTECTION (IPP)
FOR THE WORKPLACE
Scope

- What is In-Place Protection (IPP)
- Case Studies
- Importance of IPP
- Developing an IPP Plan for workplace
What is In-Place Protection

• Similar concept in keeping out dust and noise
  
  involues the occupant staying indoor and shutting windows and doors

• Minimise amount of exterior air entering
What is In-Place Protection

• In-place protection (IPP) includes additional precautions
  
  ➤ e.g. switching off ventilation system

  ➤ e.g. sealing all gaps with masking tape
What is In-Place Protection

- Concept rolled out to the public in Sep 03
- Targeted at residential premises
What is In-Place Protection

IN-PLACE PROTECTION (IPP) Video

Download from:
http://www.scdf.gov.sg/html/info/inf02_learnCD03.html#InPlace
Case Study

• IPP implemented in past incidents....
  • Nitro, West Virginia Dec 5, 1995

Incident - Process vessel at a chemical plant overpressurized and released a phosphorus chloride compound which reacted with rain to form Hydrogen Chloride cloud.

Lessons - In-place protection was issued over the community’s warning system. 800 employees of a neighbouring chemical plant adopted the recommendation and no injuries were reported.
Case Study

• IPP implemented in past incidents….
• Corruna, Ontario, Canada Mar 16, 2000

Incident - Hydrogen sulfide released from a refinery.

Lessons - Although fire officials advised area residents to conduct IPP, some who evacuated were exposed and complained of nausea and sore throat. Therefore, it was safer to stay indoors.
Case Study

• IPP implemented in past incidents….
  
  • Phoenix Arizona on Aug 3, 2000

  Incident - Warehouse explosion created smoke containing pesticides and cyanide.

  Lessons - Residents who evacuated complained of headaches and respiratory problems but no injuries reported for those who adopted in-place protection.
Framework for Incident Management

Incident Manager (SCDF)

Public Protective Action Decision Making

- SCDF (DIV)
  - Rescue
  - FF
  - Mitigation
- MOH (DSMC)
  - Triage
  - Medical Treatment
  - EBM
- MITA
  - Public & Media Info Mgmt
- SPF (DIV)
  - Security & Traffic Control
  - NOK Mgmt
  - Evacuation/IPP
  - Mgmt of Dead
- MCDS
  - Relief Housing
- SPF (CID)
  - Investigation
- SCDF & SPF (SSG)
  - Logistics & Civil Resources

SINGAPORE CIVIL DEFENCE FORCE
Types of Protective Action

Public Protective Action

- Evacuation
  - Executed through Fire Emergency Plan (FEP)

- IPP
  - Executed through In-Place Protection Plan (IPP Plan)
Buildings ~ natural barriers

- Building acts as barrier to protect occupants
Advantages of IPP

(1) Provides immediate protection after warning
(2) Little preparation time required to seal the room
(3) Ideal Life Support System
   (eg familiar surrounding, availability of water, food, medicines, communications)
(4) Reduce potential exposure to toxic fumes
(5) Best means for special population
   (eg handicapped, hospital patients)
Different Population Target

- Schools
- Residential
- Commercial (e.g., highrise offices, shopping centres)
- Industrial (e.g., refineries, chemical plants)

IPP
Implementation of IPP

Modify existing plan to take into account off-site release

Off-site release

Industry Gas Release Plan (internal)
# Residential vs Workplace

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Workplace</th>
<th>Residential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupancy</td>
<td>Voluminous</td>
<td>Small numbers</td>
</tr>
<tr>
<td>Transient Population</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Building Structure</td>
<td>Complex</td>
<td>Simple</td>
</tr>
<tr>
<td>Mechanical Ventilation Systems</td>
<td>Complex</td>
<td>Natural ventilation/air-condition</td>
</tr>
<tr>
<td>Announcement</td>
<td>System to notify all occupants</td>
<td>Shout across the room</td>
</tr>
<tr>
<td>Accountability System</td>
<td>Need to establish</td>
<td>Intuitive</td>
</tr>
<tr>
<td>Drills</td>
<td>Need to conduct drills</td>
<td>Simple</td>
</tr>
</tbody>
</table>
GUIDELINES

- Step 1: Know Your building/work premise
- Step 2: Develop IPP plan
- Step 3: Conduct IPP drills
GUIDELINES

• Step 1 : Know Your Building/work premise

  (1) Ventilation System
  🏛️ What is the type of ventilation system?
  🏛️ Is the building connected to other buildings, passageways, and tunnels?
  🏛️ Determine if there are smoke purge fans.

  (2) Switches that control air-handling units
  ✔ Building Automation System (BAS)-Commercial Premises
  ✔ Fire Command Centre

  (3) Location of ‘Safe Haven’ (Industrial Premises)
## GUIDELINES

**Building Information**

<table>
<thead>
<tr>
<th>Building Name</th>
<th>No. of Storeys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner’s Name</td>
<td>Telephone No.</td>
</tr>
<tr>
<td>FSM’s Name</td>
<td>Telephone No.</td>
</tr>
<tr>
<td>Building Address</td>
<td>Occupant Load</td>
</tr>
<tr>
<td>Correspondence Address (If different from above)</td>
<td>Gross Floor Area</td>
</tr>
<tr>
<td>Office Block</td>
<td>Car Park</td>
</tr>
<tr>
<td>Main Plant Room</td>
<td>AHU</td>
</tr>
<tr>
<td>Controls Switches of air-con plants</td>
<td>Fresh air intake</td>
</tr>
</tbody>
</table>
GUIDELINES

- Step 2: Develop IPP plan
- Format modeled after Fire Emergency Plan
- Contents include:
  1. Objective
  2. IPP Committee
  3. Signal for Initiation of IPP
  4. Pre-Activation Planning
     - Selection of appropriate room for IPP
     - Items required for implementation of IPP
     - Procedures for conducting IPP
GUIDELINES

- Contents cont‘d:
  (5) Action to be taken
  Co-ordinator
  Announcer
  Mechanical Ventilation Operator
  IPP Warden
  Chief Security Officer
  IPP Team
  All Staff

(6) Duties and Responsibilities

(7) IPP Drills
(1) **OBJECTIVE**

- Safeguard human lives in the event of hazardous release into the atmosphere.
- Establish duties and responsibilities to ensure systematic and orderly implementation.
Develop IPP Plan

(2) IPP Committee

a. Co-ordinator/Asst. Co-ordinator
b. Receptionist/Information counter staff
c. Mechanical Ventilation Operator
d. IPP Warden/Asst. IPP Warden
   (the Fire Warden can be assigned as the IPP Warden)
e. Chief Security Officer
f. IPP team
Develop IPP Plan

(3) Pre-Activation Planning

• Pre-identify appropriate room for IPP
• Items required for implementation of IPP
• Procedures for conducting IPP
Pre-activation Planning

• Guidelines for Selecting IPP Rooms
  † Rooms with as few windows, doors, vents as possible
  † Rooms should be easily accessible
  † Need to provide room for transient population, like visitors/guests.
Pre-activation Planning

• General items required

- Rolls of wide adhesive tapes (e.g. masking tapes)
- Sheets of plastic or trash bags
- Scissors
- A portable, battery operated radio
- Optional Items: eg Bottled water, non-perishable food, TV
Pre-activation Planning

• Procedures for Conducting IPP

The basic steps are:

• Close windows and doors and turn off machinery and lights to minimise heat generation
• Turn off all air handling equipment (e.g. air conditioning)
• Go to a pre-determined IPP room (or rooms)
• Seal any obvious gaps around windows, doors and vents with masking tape and cover with plastic sheets
• Turn on a TV or radio and listen for further instructions.
• Upon terminate of IPP, open windows and doors, turn on ventilation systems to ventilate the room(s)
When to Implement IPP

(4) Notification to Conduct IPP

In the event of a chemical incident, you will be notified by the authority to adopt in-place protection through

- Public Warning System (PWS)
- Radio and TV
- Loudhailers
- Door-to-door notification
## Develop IPP Plan

### (5) Action To Be Taken

<table>
<thead>
<tr>
<th>Action By</th>
<th>Action to be taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-ordinator</td>
<td>Initiate activation of IPP</td>
</tr>
<tr>
<td>Announcer</td>
<td>Make announcement through Public Address Sys</td>
</tr>
<tr>
<td>Mechanical Ventilation Operator</td>
<td>Shut down all air handling units</td>
</tr>
<tr>
<td>IPP Warden</td>
<td>Direct Staff to IPP rooms and conduct roll call</td>
</tr>
<tr>
<td>Chief Security Officer</td>
<td>Close all entrances and place signage</td>
</tr>
<tr>
<td>IPP Team</td>
<td>Assist in sealing room</td>
</tr>
<tr>
<td>All Staff</td>
<td>Shut down machinery and proceed to IPP rooms</td>
</tr>
</tbody>
</table>
GUIDELINES

- Signal / Announcements to Commence IPP
- Use of Public Address System
  (Some use Fire Alarm to attract attention)

Impt Note:
Need to deactivate any auto-pressurization system to avoid drawing in air from outside.
GUIDELINES

• Signal / Announcements to Commence IPP

Useful statements to include in the announcements:

- An In-Place Protection advisory has been issued
- **DO NOT**, leave the building. The air outside is not safe.
- The ventilation and air-conditioning systems will be **shutdown** to minimise infiltration of air from outside.
- Close windows and doors and turn off machinery and lights to **minimise heat generation**.
Develop IPP Plan

• Mechanical Ventilation & AHUs
  ✓ To include Step-by-step instructions to deactivate systems (intake and exhaust)
  ✓ May need to modify procedures to ensure quick deactivation (eg central controls for MVs and AHUs, co-locate controls in one location)
Develop IPP Plan

- **Mechanical Ventilation & AHUs**
  - Stop operation of Lifts - piston effect
  - To bypass activation of pressurised systems from auto alarm
**Develop IPP Plan**

- **Step 3 - Conduct IPP Drills**

  Important for familiarising occupants with procedures

**Practice Makes Perfect**

CERTIFIED
GUIDELINES

• Termination of IPP
  - Occupants may leave the building
  - Use of purging system to dilute and purge the building of any hazardous vapous which may have infiltrated
Conclusion

IPP will offer immediate protection to occupants when evacuation is not advisable during an emergency.

Guidelines for IPP at Workplace available on SCDF’s Website
http://www.scdf.gov.sg/html/info/inf02_fssb01.html#9
THANK YOU