RMERT Decontamination Training

Region 2 Medical Emergency Response Team

Why are we here?

- 80 % of victims that present to the hospital come by means other than EMS.
- Terrorism, MCI's, and HAZMAT spills are increasing.
- Police and Fire Departments assistance during any event may be an unrealistic expectation.
- Without appropriate training and knowledge a hazardous materials incident may put you in harms way

Reality of the world

September 11
Attack on the World Trade Center

Patients self transported to Emergency Rooms

- Jet Fuel
- Diesel Fuel
- Asbestos
- Battery Acid
- Concrete Dust
- Unknown if Bio/Chem Agent

NYU Downtown Hospital Treated 1500 patients in the first 24 hours

REGION 2 MEDICAL RESPONSE TEAM

Reality of the world

Oklahoma City Bombing

In the first 2 hours post incident the 6 closet hospitals treated 202 patients.

In all: 511 Adults & 38 Children were treated at hospitals. Another 233 were treated at physicians offices or clinics…

Reality of the world

Joplin, Missouri May, 2011
EF-5 Tornado

On May 22, 2011 a EF-5 Tornado struck Joplin, Mo. Winds over 200 mph killed 132, injuring 900 more. The tornado also destroyed St. Johns Regional Medical Center.

- **Oil**
- **Gasoline**
- **Asbestos**
- **Lead**
- **Zinc**
- **Other Heavy Metals**
- **Contaminated Dust**
- **Treated Wood**
- **Anhydrous Ammonia**

EMTALA anyone?

Emergency Medical Treatment and Active Labor Act.

All individuals requiring emergency care must receive a medical screening examination and initial stabilization.

A contaminated patient is no exception.

THERE IS NO HAZMAT BYPASS

"Business as usual"

Levels of Mitigation

-Awareness

A basic understanding of hazardous materials. This can be done online or in classroom

-Operations

Focuses on the contaminants and decontamination of hazards.

-Technician

Specialized training that deals with identification and clean-up of hazards.

-Incident Command

Training on the coordination of HAZMAT teams during an incident

Responsibilities

Protect Yourself

Protect Your Fellow Members

Protect the Healthcare Campus

Protect all Patients and Visitors

Patient Decontamination

Patient Treatment

Perform Hazard Containment

Legal Jargon….

Being an employee of a major industry qualifies you for certain training. 29cfr 1910.120 of OSHA stipulates this. The course you are about to participate in is taken from many sources but the guidelines all reflect OSHA'S strict course on employee protection. If you have questions you are encouraged to ask them. **We are not the final word on any item**, but we want you to be safe and this is the aspect of our training

This Training

IS:

- Safety around Hazardous Materials.
- Identifying what a Hazardous Material consists of.
- Possible identification of Hazardous Materials.
- Decontamination of contaminated patients.

IS NOT:

- Controlling, isolation or clean-up of a spill.
- Entering the Hot Zone.
- Rescue of patients from a Hot Zone

Awareness

ERP and SOG's

ERP: - Emergency Response Plan
SOG: -Standard Operating Guidelines

- Plans must be accessible to all members of the organization
- Recognition and identification are the most critical phases of a Hazmat emergency
- SARA Title III requires a LERP (local emergency response plan) for Hazmat emergencies and development of a LEPC (local emergency planning committee)

Awareness

Definition:

DOT-

A hazardous material is one that poses an unreasonable risk to the health and safety of operating or emergency personnel, the public, and/or the environment if it is not properly controlled during handling, storage, manufacturing, processing, packaging, use, disposal, or transportation.

OSHA-

A hazardous chemical is any chemical which is a physical hazard or a health hazard to employees.

FEMA

Hazardous materials emergency cause harm to people, the environment, critical infrastructure, and property. Their potential for harm exists regardless of whether hazardous materials are released by accident, malicious actor, fire, or weather-related event.

Awareness

External Emergencies

What happens in you come upon a Hazardous Materials Incident in your daily life?

If you were driving down the road and came upon this… What would you do?

Awareness

Internal Emergencies

- Recognize the presence of Hazardous Materials
- Implement **your hospital notification !**
- Secure the area of the emergency and prevent anyone else from entering

- What is the threshold for an emergency?
- At what point does a spill move beyond your capabilities to clean up?

REGION 2 MEDICAL RESPONSE TEAM

Awareness

YOU

Should be able to recognize that the material is hazardous (this can kill you!)protect yourself (don't be a hero) call for trained personnel and secure the scene!

Awareness

What to do?

- Survey from a distance
- Determine what's involved
- Keep everyone safe and away
- Has anyone been in contact with the material
- Assess for injuries or illness

NO action should be taken that will place the members in a position of danger or in contact with the material

Awareness

Gravity of the situation

R.A.I.N

(R) – Recognize	(R) – Recognize the presence of a Hazardous Materials
(A) - Avoid	(A) – Avoid the area, do not get contaminated
(I) - Isolate (if safe to do so)	(I) – Try and isolate the contaminant by closing doors and windows
(N) - Notify	(N) – Notify appropriate authorities

Hazardous Material Awareness

Material Identification and Standardized Markings

Awareness

Standardized Markings

NFPA 704 Marking System

Military Marking System

Hazardous Materials Information System, HMIS

Department of Transportation Hazard Classes

REGION 2 MEDICAL RESPONSE TEAM

Awareness

How its contained…

REGION 2 MEDICAL RESPONSE TEAM

Awareness

NFPA 704 Marking System

Health Hazard
Blue Diamond

4-Deadly
3-Extreme Danger
2-Hazardous
1-Slightly Hazardous
0-Normal Material

Fire Hazard
Red Diamond

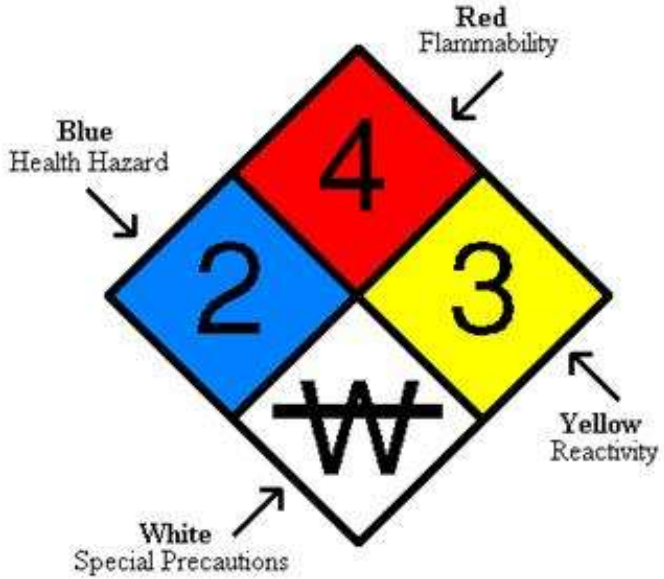
Flash Points
4-Below 73°F
3-Below 100°F
2-Above 100°F
not exceeding 200°F
1-Above 200°F
0-Will not burn

Specific Hazard
White Diamond

ACID - Acid
ALK - Alkali
COR - Corrosive
OXY - Oxidizer
- Radioactive
- Use No Water

Reactivity
Yellow Diamond

4-May Detonate
3-Shock & Heat
may detonate
2-Violent Chemical
change
1-Unstable if heated
0-Stable



Awareness

NFPA 704 Marking System

NFPA Rating Explanation Guide

RATING NUMBER	HEALTH HAZARD	FLAMMABILITY HAZARD	INSTABILITY HAZARD
4	Can be lethal	Will vaporize and readily burn at normal temperatures	May explode at normal temperatures and pressures
3	Can cause serious or permanent injury	Can be ignited under almost all ambient temperatures	May explode at high temperature or shock
2	Can cause temporary incapacitation or residual injury	Must be heated or high ambient temperature to burn	Violent chemical change at high temperatures or pressures
1	Can cause significant irritation	Must be preheated before ignition can occur	Normally stable. High temperatures make unstable
0	No hazard	Will not burn	Stable

RATING SYMBOL	SPECIAL HAZARD
ALK	Alkaline
ACID	Acidic
COR	Corrosive
OX	Oxidizing
	Radioactive
W	Reacts violently or explosively with water
W OX	Reacts violently or explosively with water and oxidizing

This chart for reference only - For complete specifications consult the NFPA 704 Standard

NFPA-Chart_1 www.ComplianceSigns.com

REGION 2 MEDICAL RESPONSE TEAM

Awareness

Labels. Placards, & Markings

Labels:

- Used on small packages
- Affixed on ONE side, near shipping name
- Indicates primary hazard
- Similar to placards in most cases

Awareness

Labels. Placards, & Markings

Pesticide Labels:

Signal Word

- **Danger / Poison: Severe Hazard / High Toxicity**
- **Warning: Less Severe Hazard / Moderate Toxicity**

Other Information

- **Name Address Telephone Number of manufacturer or importer**
- **Product Identifier**
- **Signal Words**
- **Hazard Statements**
- **Precautionary Statements**
- **Other Supplementary Information**

Awareness

Labels. Placards, & Markings

Pesticide Labels:

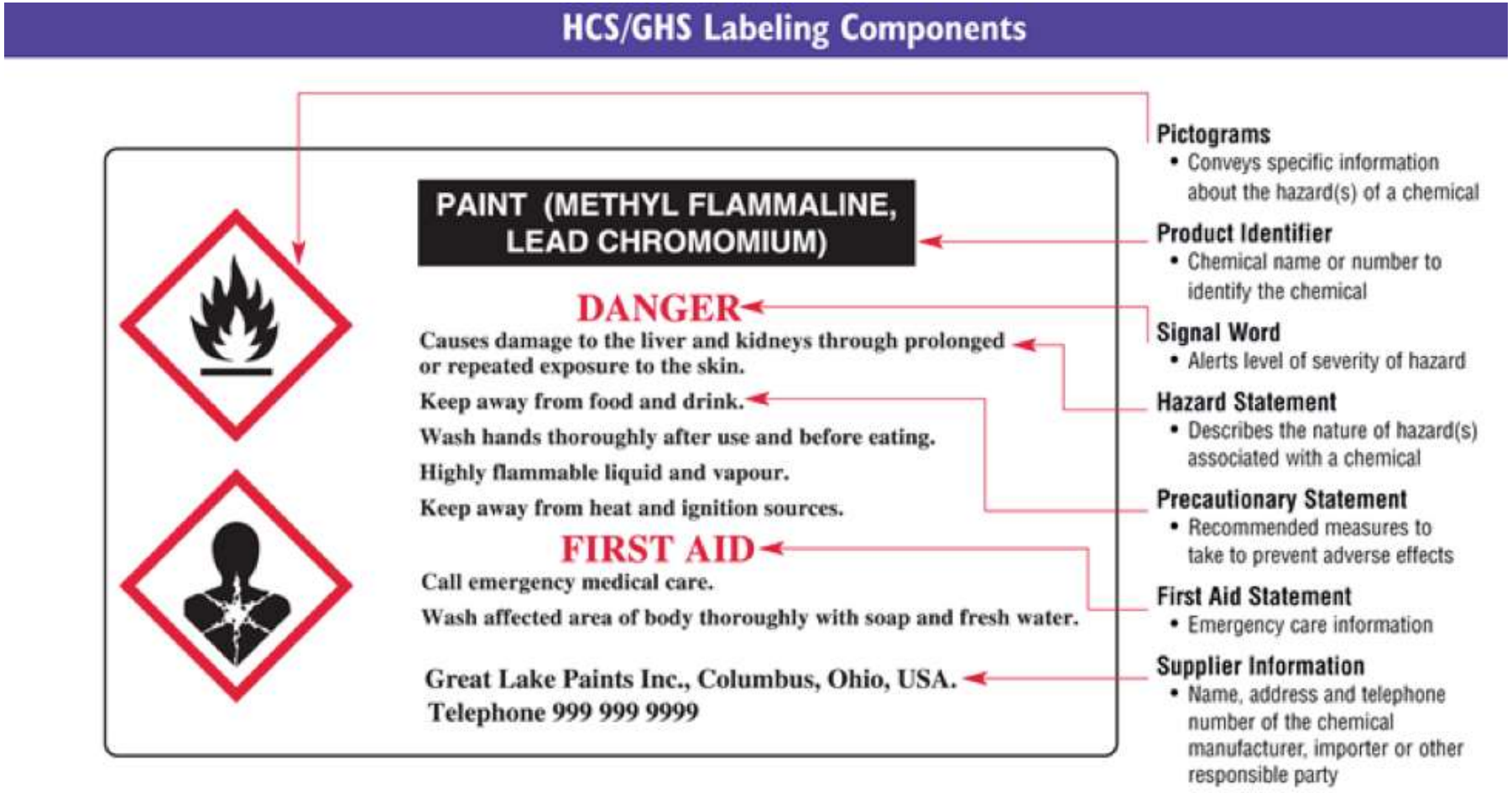
Pictograms:

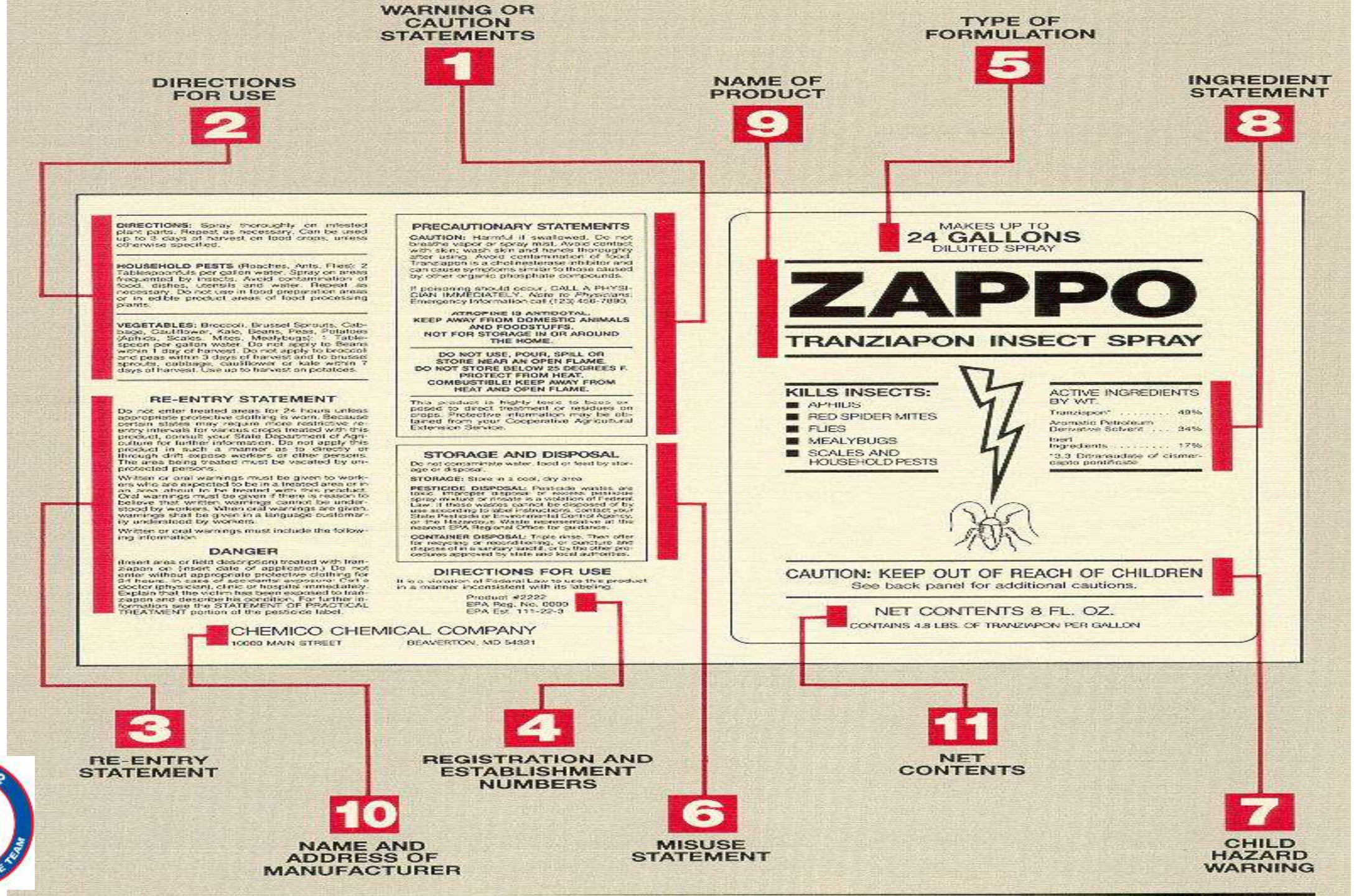
Health Hazard	Flame	Exclamation Mark
		
• Carcinogen • Mutagenicity • Reproductive Toxicity • Respiratory Sensitizer • Target Organ Toxicity • Aspiration Toxicity	• Flammables • Pyrophorics • Self-Heating • Emits Flammable Gas • Self-Reactives • Organic Peroxides	• Irritant (skin and eye) • Skin Sensitizer • Acute Toxicity (harmful) • Narcotic Effects • Respiratory Tract Irritant • Hazardous to Ozone Layer (Non Mandatory)
Gas Cylinder	**Corrosion**	**Exploding Bomb**
		
• Gases under Pressure	• Skin Corrosion/ burns • Eye Damage • Corrosive to Metals	• Explosives • Self-Reactives • Organic Peroxides
Flame over Circle	**Environment *(Non Mandatory)**	**Skull and Crossbones**
		
• Oxidizers	• Aquatic Toxicity	• Acute Toxicity (fatal or toxic)

Awareness

Labels. Placards, & Markings

Labels:





Awareness

Labels. Placards, & Markings

Toxicity:

- The ability of a substance to cause damage to living tissue, impairment of the Central Nervous System (CNS), or death.
- Toxicity is dependent upon:
  - Quantity (dose) of a substance
  - Route of entry
  - Duration of exposure
  - Frequency of exposure

Concentration:

- The relative amount of a substance when combined with another substance such as water

Awareness

Labels. Placards, & Markings

Placards

- **Located on bulk packaging and vehicles**
- **Indicates primary hazard of the material**
- **Some classes must be placarded in any amount**
  - Explosives, Dangerous When Wet, Poison, Radioactive
- **The remaining classes are placarded at 1,001 lbs. of product or greater of bulk material**

Awareness

Labels. Placards, & Markings

How to obtain information

- **Color**
- **Symbol**
- **Word or UN/NA Number**
- **UN Hazard Class or Division**

Awareness

Labels. Placards, & Markings

Nine Hazard Classes

Class 1 - Explosives
Class 2 - Compressed Gases
Class 3 - Flammable Liquids
Class 4 - Flammable Solids
Class 5 - Oxidizers
Class 6 - Poisons
Class 7 - Radioactive Material
Class 8 - Corrosives
Class 9 - Misc.

Awareness

Labels. Placards, & Markings

Hazard Classes

Class 1 - Explosives

An explosive is any substance or article, including a device, which is designed to function by explosion, i.e. an extremely rapid release of gas and heat, or which, by chemical reaction within itself, is able to function in a similar manner even if not designed to function by explosion, unless it is otherwise classified under the provision of the regulations

Awareness

Labels. Placards, & Markings

Hazard Classes

Class 2 – Compressed Gases (three sub-classes)

- Division 2.1 (Flammable Gas)
- Division 2.2 (Nonflammable, nonpoisonous gases)
- Division 2.3 (Poisonous (toxic) gas)

Awareness

Labels. Placards, & Markings

Hazard Classes

Class 3 – Flammable and Combustible Liquids

- *Flammable liquid*: any liquid having a flash point below 100ºF (37.8ºC)
- *Combustible liquid*: any liquid having a flash point at or above 100ºF (37.8ºC).

Awareness

Labels. Placards, & Markings

Hazard Classes
Class 4 – Flammable Solids

- Wetted explosives that are Class 1 explosives when dry, that are sufficiently wetted to suppress explosive
- Readily combustible solids that can cause fire through friction, such as matches
- Dangerous When Wet!!!
  - May combust, exothermic reaction, or release a poison gas

Awareness

Labels. Placards, & Markings

Hazard Classes

Class 5 – Oxidizers and Organic Peroxides

- **Oxidizer:** Oxidizers are materials that can, generally by yielding oxygen, cause or enhance the combustion of other materials.
- **Organic Peroxide:** Organic Peroxides are any organic compounds containing oxygen in a bivalent –O–O– structure and which may be considered derivatives of hydrogen peroxide

Awareness

Labels. Placards, & Markings

Hazard Classes
Class 6 – Poisonous or Toxic Materials

- Materials, other than a gas, known to be so toxic to humans as to pose a health hazard during transportation

Awareness

Labels. Placards, & Markings

Hazard Classes
Class 7 – Radioactive Materials

- If it has this symbol on it
- RUN!!!!

- OK Don't Run…

Awareness

Labels. Placards, & Markings

Hazard Classes

Class 8 – Corrosive Materials

- Corrosive materials are liquids or solids that cause full thickness destruction of human skin at the site of contact within a specified period of time; or a liquid that has a severe corrosion rate on steel or aluminum
- Acids
- Alkaline
- Organic
- Inorganic

Awareness

Labels. Placards, & Markings

Hazard Classes

Class 9 – Miscellaneous Hazardous Materials

Miscellaneous Hazardous Materials are materials that present a hazard during transportation but don't meet the definitions of hazard classes 1 – 8.

This includes:

Material that has an anesthetic, noxious, or similar property that could cause extreme annoyance or discomfort to a flight crewmember…

Any material that meets the definition of an hazardous substance, a hazardous waste, or a marine pollutant.

Awareness

Labels. Placards, & Markings

Military Marking System

Mass Explosion Hazard

Explosion Hazard with Fragmentation

Awareness

Labels. Placards, & Markings

Military Marking System

Mass Fire / Large Fire

Moderate Fire, No Blast Hazard

Awareness

Labels. Placards, & Markings

Indicates the presence of a harassing agents

Capsaicin (OC)

Chloraceptophenone (MACE / CN)

Indicates the presence of Highly Toxic Agents

Chemical Warfare Agents such as Phosgene Gas, Sulfur mustard, Chlorine, etc

Indicates the presence of White Phosphorus

Incendiary munition that burns extremely hot

Awareness

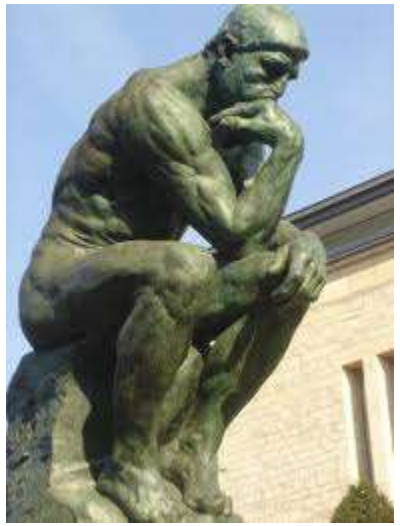
Labels. Placards, & Markings

Indicates the need to wear Protective Breathing Apparatus

Warning: Do not use water in the event of a fire

Awareness

Obtaining Information



Obtaining Information

Obtaining Information

Difficulties in Obtaining Information

- Shipping papers may be unavailable
- Inventories may be unavailable
- Contents may be unknown

Awareness

Obtaining Information

How do First Responders obtain information about chemicals?

Transportation

- Shipping papers
- The operator of the vehicle
- Shipper
- Receiver
- Emergency Response Guidebook (ERG)
- CHEMTREC, CHEMTEL, INFOTRAC, 3E

Fixed Facility (Contact Local Fire Department)

- LEPC Tier 2 Report
- Facility Manager
- MSDS sheets
- Inspection records
- Pre-incident tours & surveys, Workers

Awareness

Obtaining Information

CHEMTREC:

"CHEMTREC" stands for Chemical Transportation Emergency Center and is a public service of the Chemical Manufacturers Association.

CHEMTREC operates 24 hours a day and can be contacted through the US and Canada by calling 1-800-424-9300

Participation is not mandatory or shipment may not be logged due to small amount.

Awareness

Obtaining Information

Calling CHEMTREC: 1-800-424-9300

- Caller's name, title & organization
- Callback number at scene
- Dispatch center phone number
- Description of incident and actions taken
- Type and number of injuries/exposures
- Material involved, including:
  - Name of the products(s), preferably a trade name
  - Carrier and trailer or car number
  - UN, NA (placard) or STCC number of the products
  - Points of origin and destination
- Type or description and number of containers/packages
- Specific information you need right away (MSDS, medical help, etc.)
- Size of or amount of release
- Location, time, weather at the scene

REGION 2 MEDICAL RESPONSE TEAM

Awareness

SDS Sheets

Chemical - Safety Data Sheet

(formerly MSDS)

OSF HealthCare is required to maintain SDS sheets in the faculties risk communication plan. OSF acquires SDS sheets from the manufacturers, suppliers and vendors of materials that are deemed hazardous materials. OSF HealthCare uses an electronic system to house our SDS Sheets called MSDSOnline. This system is available in the One OSF Portal Page.

Awareness

SDS Sheets

Manufacturer of material

- **Supplier**
- **Facility Hazard Communication Plan**
- **Local Emergency Planning Committee**
- **Attached to shipping papers (sometimes)**
- **FAX or INTERNET**

Awareness

SDS Sheets

Section 1: Identification

- Identifies the chemical
- Recommended uses.
- Essential contact information of the supplier.
- Product identifier used on the label
- Name, address, phone number of the manufacturer
- Emergency phone number.
- Recommended use of the chemical

Awareness

SDS Sheets

Section 2: Hazard(s) identification

- **The hazard classification of the chemical**
- **Signal word.**
- **Hazard statement(s).**
- **Pictograms**
- **Precautionary statement(s).**
- **Description of any hazards not otherwise classified.**

Awareness

SDS Sheets

Section 3: Composition/information on ingredients

- Substances
- Chemical name and concentration
- Common name and synonyms.
- Chemical Abstracts Service (CAS) number
- Impurities and stabilizing additives,
- Mixtures
- The concentration (exact percentages) of each ingredient must be specified except concentration ranges may be used in the following situations:
    - A trade secret claim is made,
    - There is batch-to-batch variation, or
    - The SDS is used for a group of substantially similar mixtures.

Awareness

SDS Sheets

Section 4: First-aid Measures

- This section describes the initial care that should be given by untrained responders
- Description of the most important symptoms or effects, and any symptoms that are acute or delayed.
- Recommendations for immediate medical care and special treatment needed, when necessary

Awareness

SDS Sheets

Section 5: Fire-fighting Measures

- Recommendations of suitable extinguishing equipment
- Advice on specific hazards that develop from the chemical during the fire
- Recommendations on special protective equipment or precautions for firefighters.

Awareness

SDS Sheets

Section 6: Accidental Release Measures

- Use of personal precautions and protective equipment.
- Emergency procedures
- Methods and materials used for containment
- Cleanup procedures

Awareness

SDS Sheets

Section 7: Handling and Storage

- Precautions for safe handling
- Minimizing the release of the chemical into the environment
- Providing advice on general hygiene practices
- Recommendations on the conditions for safe storage

Awareness

SDS Sheets

Section 8: Exposure Control / Personal Protection

- OSHA Permissible Exposure Limits (PELs)
- Threshold Limit Values (TLVs)
- Appropriate engineering controls
- Personal protective measures
- Personal protective equipment (PPE)
- Any special requirements for PPE, protective clothing or respirators

Awareness

SDS Sheets

Section 9: Physical & Chemical Properties

- Appearance (physical state, color, etc.);
- Upper/lower flammability or explosive limits;
- Odor
- Vapor pressure
- pH
- Flammability (solid, gas)
- Relative density
- Solubility(ies)

Awareness

SDS Sheets

Section 10: Stability and Reactivity

- Chemical stability
  - Indication of whether the chemical is stable or unstable under normal temperature and conditions while being handled.
- Indication of any safety issues that may arise should the product change in physical appearance.
- List of all conditions that should be avoided

Awareness

SDS Sheets

Section 11: Toxicological and Health Effects

- Information on the likely routes of exposure
- Description of the effects from short or long-term exposure.
- The numerical measures of toxicity
- ex. LD50 (lethal dose killing 50%)
- Description of the symptoms
- Is the chemical in the National Toxicology Program
- Report on Carcinogens

Awareness

SDS Sheets

Section 12: Ecological Information

- Data from toxicity tests performed on aquatic and/or terrestrial organisms
- Whether there is a potential for the chemical to persist and degrade in the environment
- Other adverse effects (e.g., environmental fate, ozone layer depletion potential).

Awareness

SDS Sheets

Section 13: Disposal Considerations

- Description of appropriate disposal containers to use.
- Recommendations of appropriate disposal methods to employ.
- Description of the physical and chemical properties that may affect disposal activities.
- Language discouraging sewage disposal.

Awareness

SDS Sheets

Section 14: Transport Information

- UN number
- UN proper shipping name
- Transport hazard class(es).
- Environmental hazards
- Guidance on transport in bulk
- Any special precautions which an employee should be aware of or needs to comply with

Awareness

SDS Sheets

Section 15: Regulatory Information

This section identifies the safety, health, and environmental regulations specific for the product that is not indicated anywhere else on the SDS. Any national and/or regional regulatory information of the chemical or mixtures

Awareness

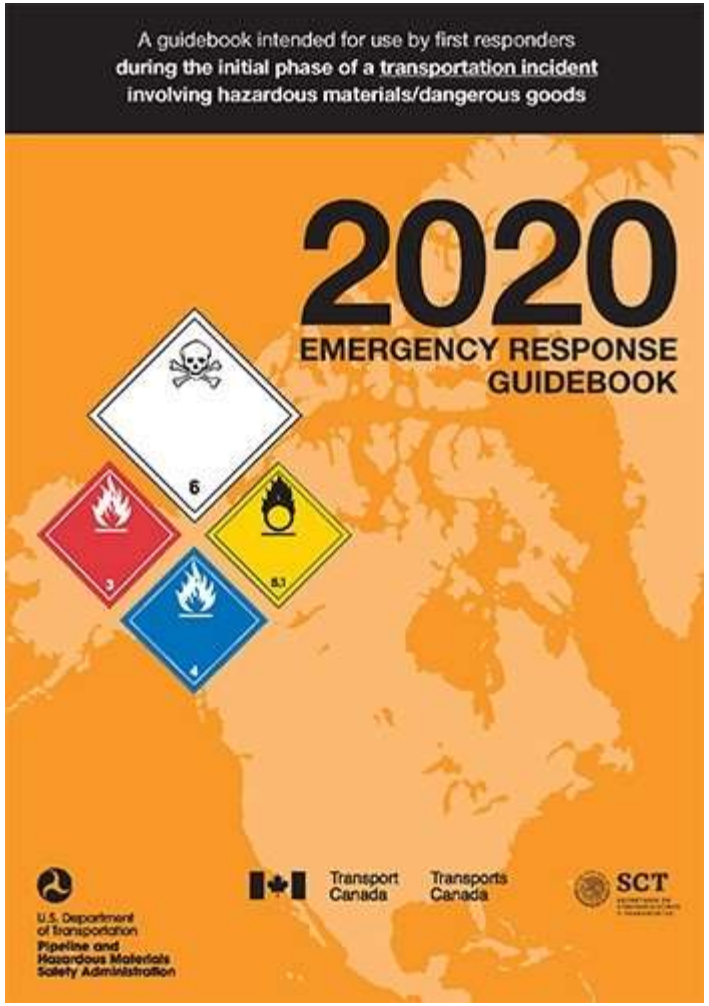
SDS Sheets

Section 16: Other Information

This section indicates when the SDS was prepared or when the last known revision was made. The SDS may also state where the changes have been made to the previous version. You may wish to contact the supplier for an explanation of the changes. Other useful information also may be included here.

Awareness

Emergency Response Guidebook

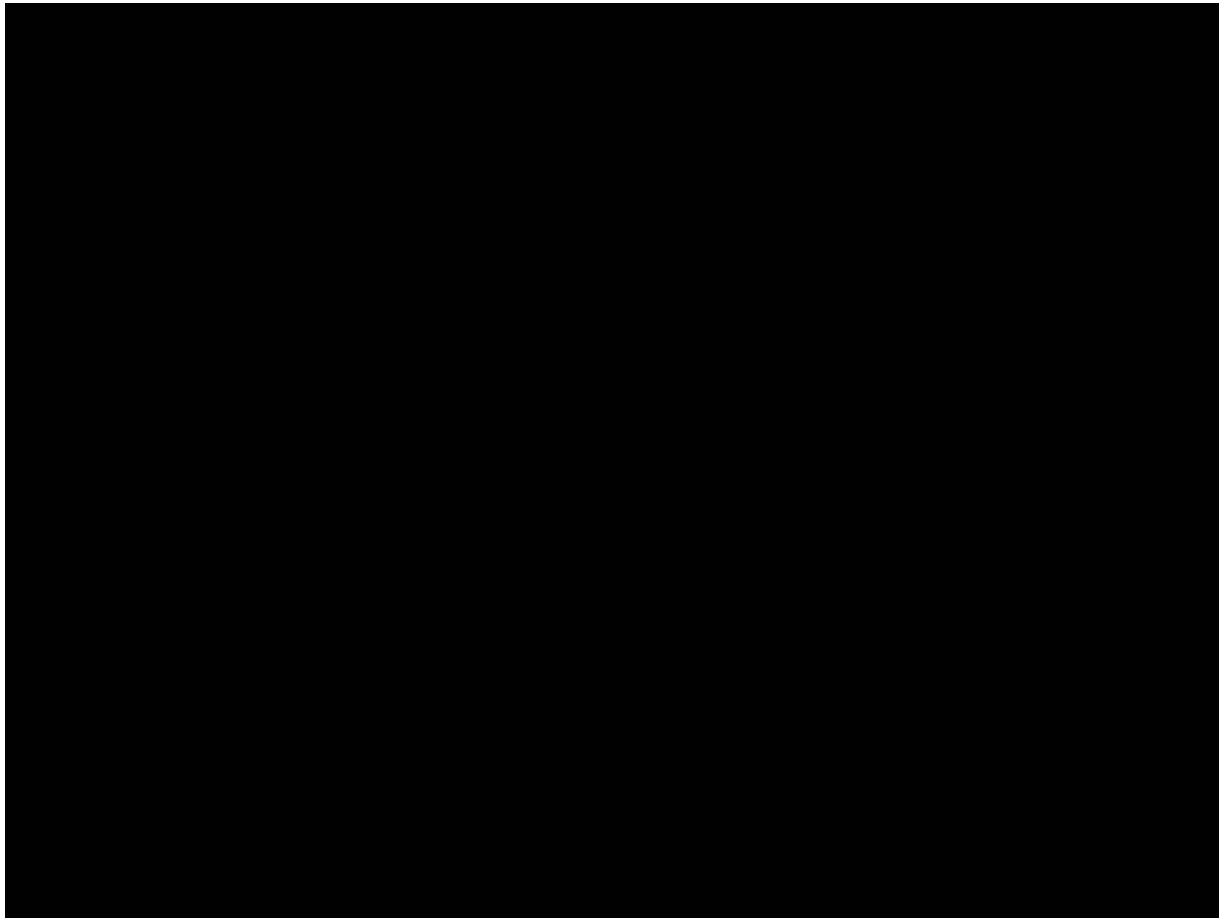


REGION 2 MEDICAL RESPONSE TEAM

Emergency Response Guidebook

Awareness

ERG Video

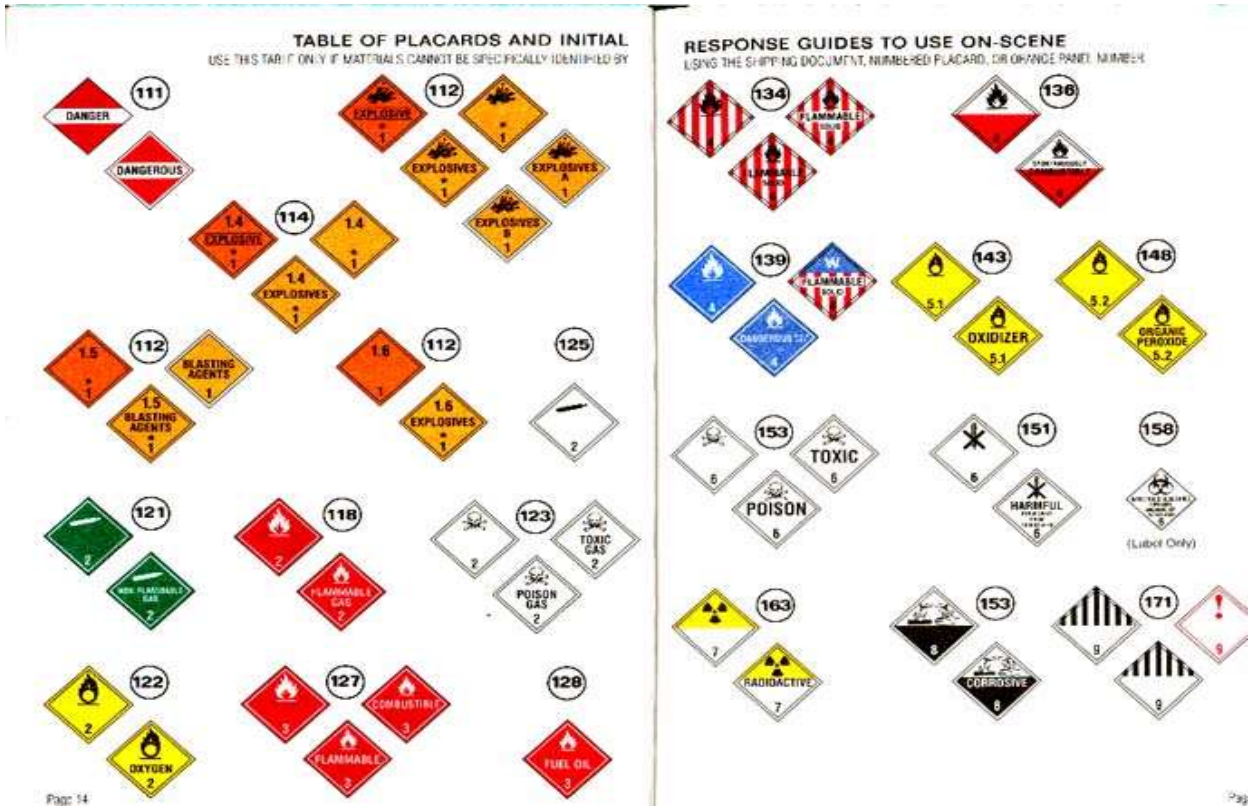


https://www.youtube.com/watch?v=WCpr4Xmhrss

Awareness

Emergency Response Guidebook

If all you can see is the Placard…



REGION 2 MEDICAL RESPONSE TEAM

Awareness

Emergency Response Guidebook

For an UNKNOWN use Guide #111

- You can find the hazard classification system in the front of the book
- If the guide # is followed by a “p” (131P) the item will polymerize (unstoppable chain reaction)
- If the guide # is [redacted] the material is considered a Inhalation Hazard
- Book only good for the first 30 minutes of a accident!

Awareness

Online Resources

OSF has developed a Reference Sheet with QR codes that can be used to assist in the identification of a Hazardous Materials.

This is not a comprehensive set of resources! These 4 were selected for their relative ease of use and wide usage.

OSF HealthCare Decon Team – Chemical Reference

Chemical Reference – QR Codes

Use the following sources to gather information regarding the chemicals involved and decontamination considerations for presenting patients.

Online Hazardous Materials Reference

NIOSH Guide to Hazardous Materials

Radiological Emergency Medical Management

Awareness

Radiation

Awareness

Radiation

Radiation

•Radiation is energy given off by matter in the form of rays or high-speed particles.

•Atoms emit radiation to eliminate excess energy

•Simply, the transfer of energy

- United States Nuclear Regulatory Commission

Awareness

Radiation

Types of Radiation

Radiation can be either ionizing or non-ionizing, depending on how it affects matter.

Non-ionizing radiation includes visible light, heat, radar, microwaves, and radio waves… It does not have sufficient energy to break molecular bonds or remove electrons from atoms.

Ionizing radiation (such as x-rays and cosmic rays) is more energetic than non-ionizing radiation. Consequently, when ionizing radiation passes through material, it deposits enough energy to break molecular bonds and displace (or remove) electrons from atoms which may cause changes in living cells of plants, animals, and people.

- United States Nuclear Regulatory Commission

Awareness

Radiation

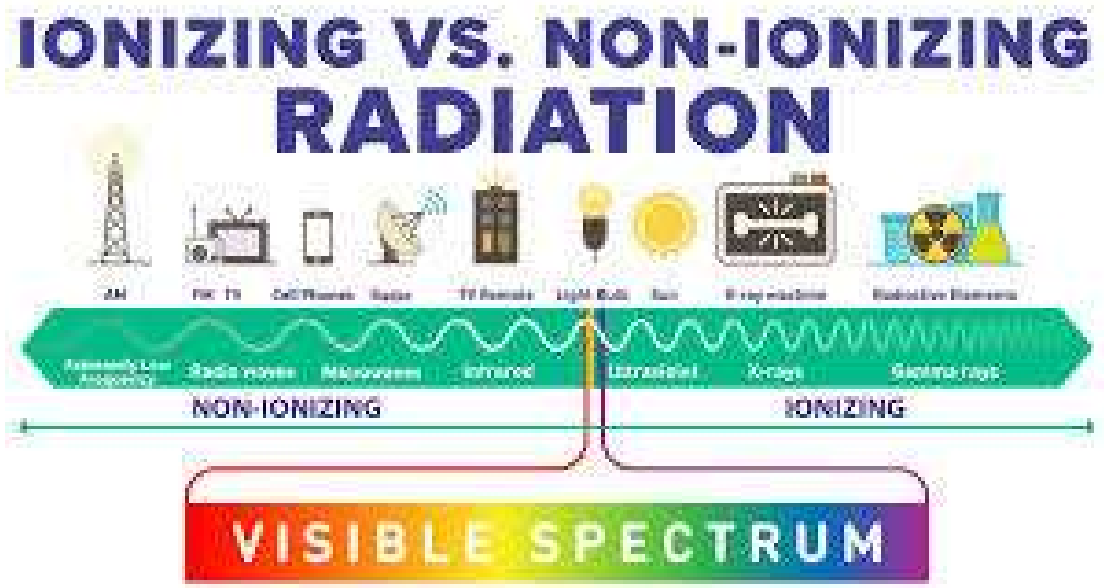
Types of Radiation

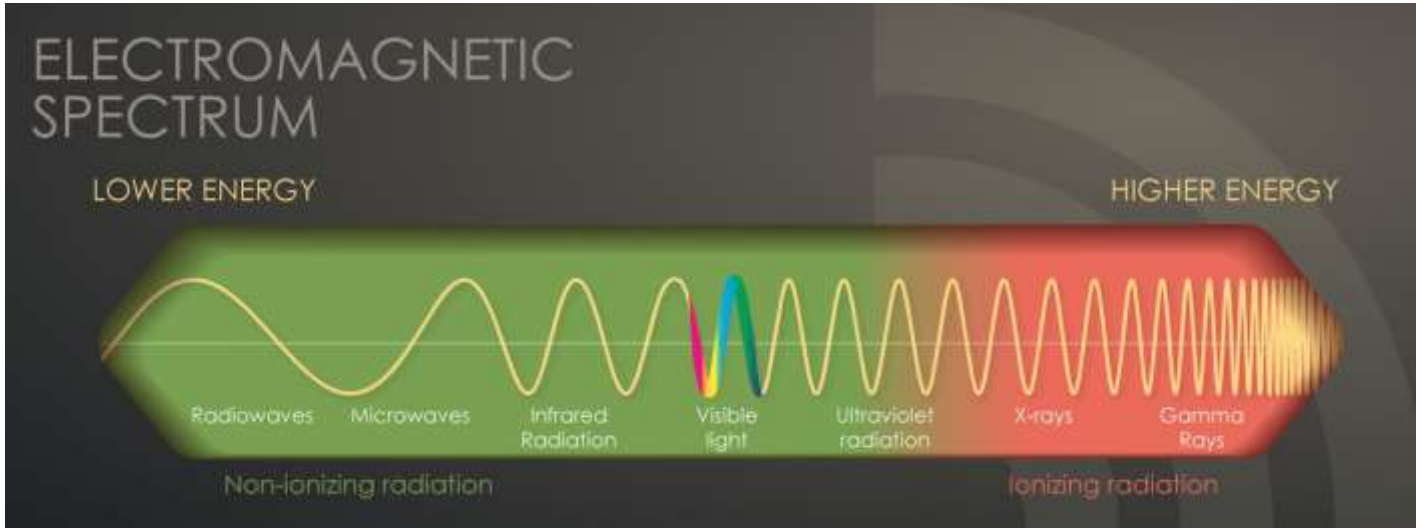
Ionizing – Hot Labs, CT, Mobile X-Ray, Alpha, Beta and Gamma Rays

Non-Ionizing – Radio and/or Microwaves, or Visible, Infrared, or Ultraviolet Light

Awareness

Radiation

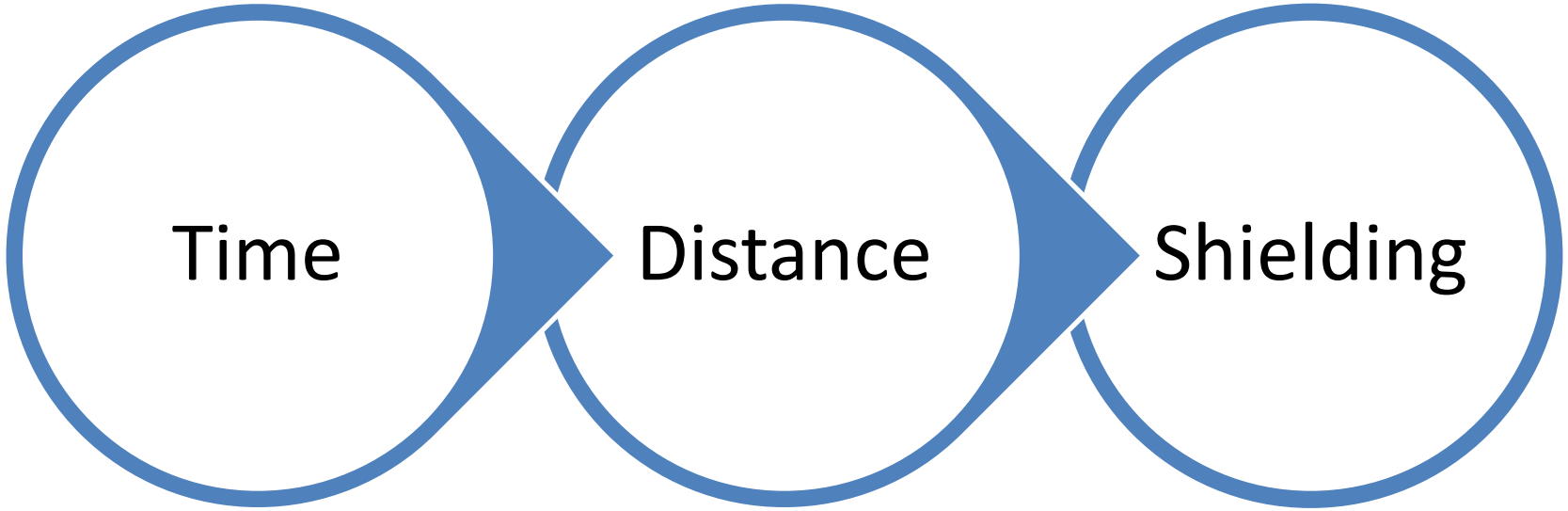




Awareness

Radiation

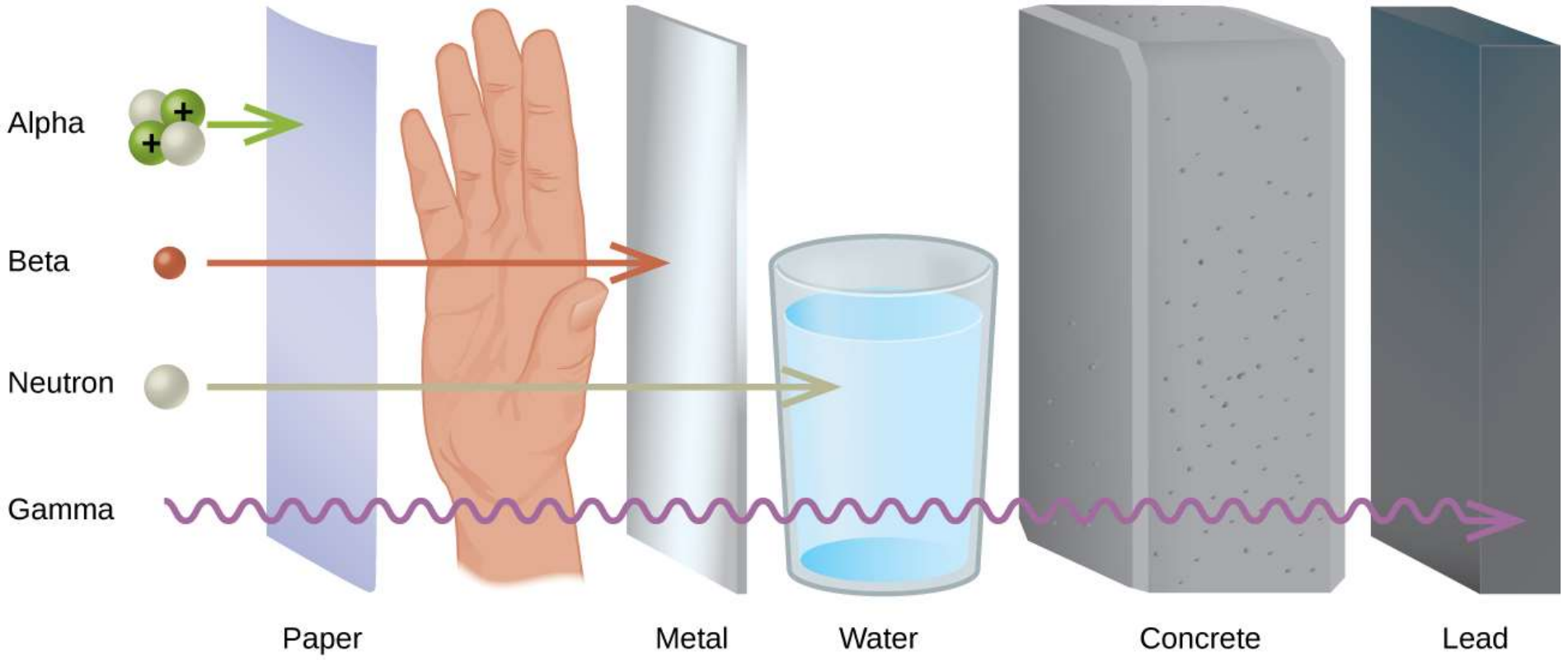
Radiation Protection



Awareness

Radiation

Radiation Protection



Awareness

Radiation

RMERT

Radiation Detection

Awareness

Radiation

Radiation Decontamination

In the event of an incident involving radiation… Internal specialists(Radiation Safety Officer) and local officials will assist in the decontamination process.

- Water is not necessarily the first method of decontamination for radiation. Gently brush the surface of this skin with a brush or towel, use items such as lint rollers to remove as much of the surface contaminant as possible. Make sure to contain the particles. Do not make the particles airborne for others inhale.
- Removal of outer clothing and rapid washing of exposed skin and hair removes up to 95% of contamination. Care must be taken to not irritate the skin…

Awareness

Radiation

Radiation Decontamination

In the event of an incident involving radiation… Internal specialists(Radiation Safety Officer) and local officials will assist in the decontamination process.

- Bandages will be removed, wounds decontaminated, *bandages will only be replaced if the wound is bleeding*
- Decon water should be contained and held for disposal. If this water cannot be collected, flushing down standard drains is appropriate. Local waste water purification should be notified of this action

Awareness

Radiation

Radiation Protection

Decontamination should not delay or impede stabilization of any patient

Removal of clothing alone can reduce contamination on the patient by up to 95%

Awareness

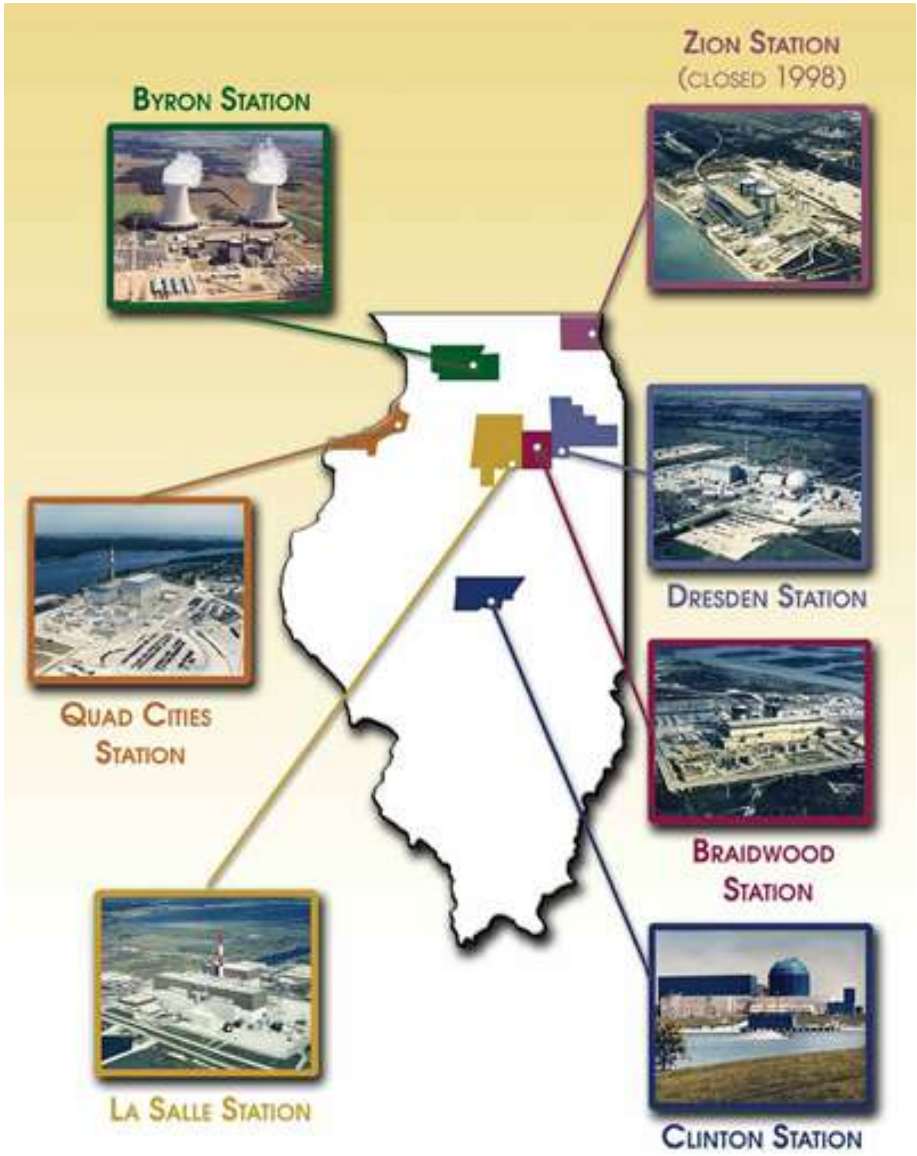
Radiation

Nuclear Power in Illinois

11- Reactors

6- Sites

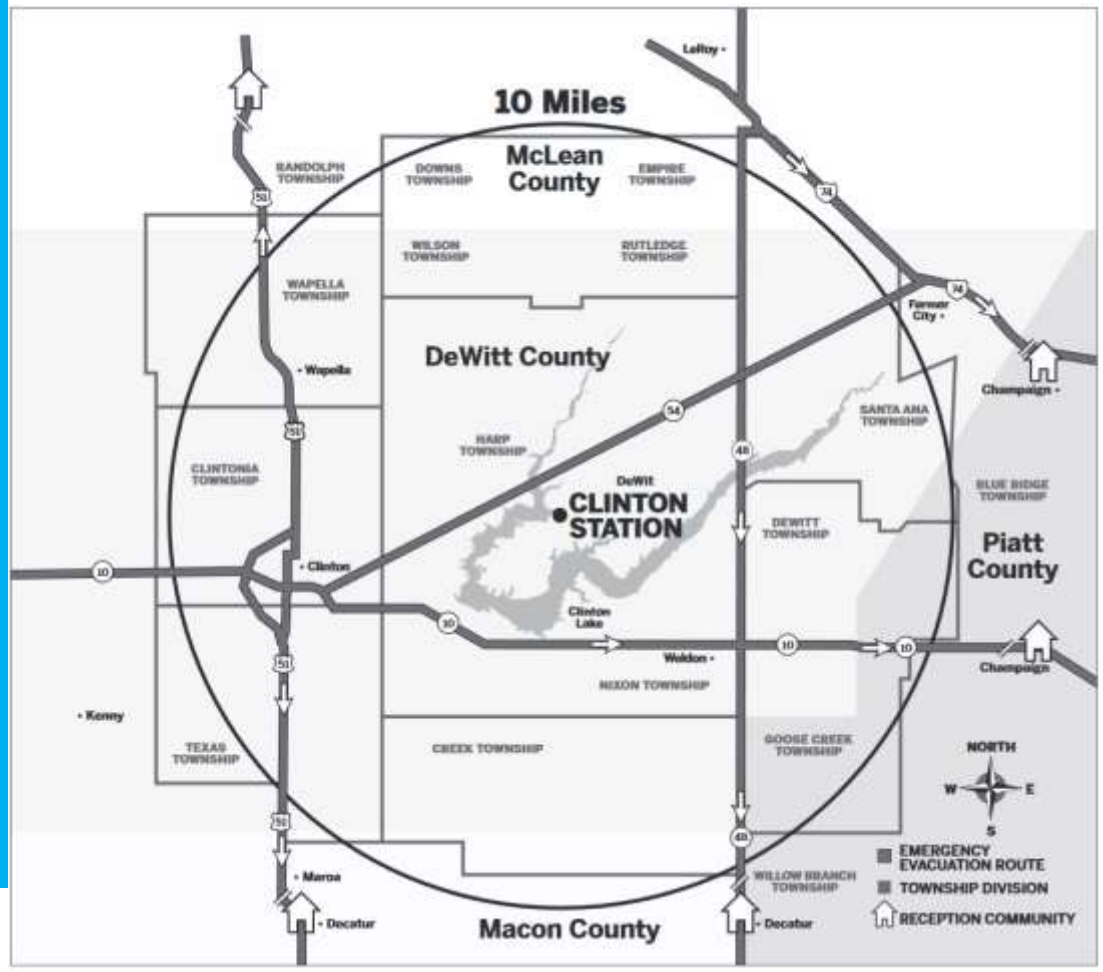
~50% of the states power



Nuclear Regulatory Commission:
Nuclear Exclusion zone: 10 miles

Awareness

Radiation

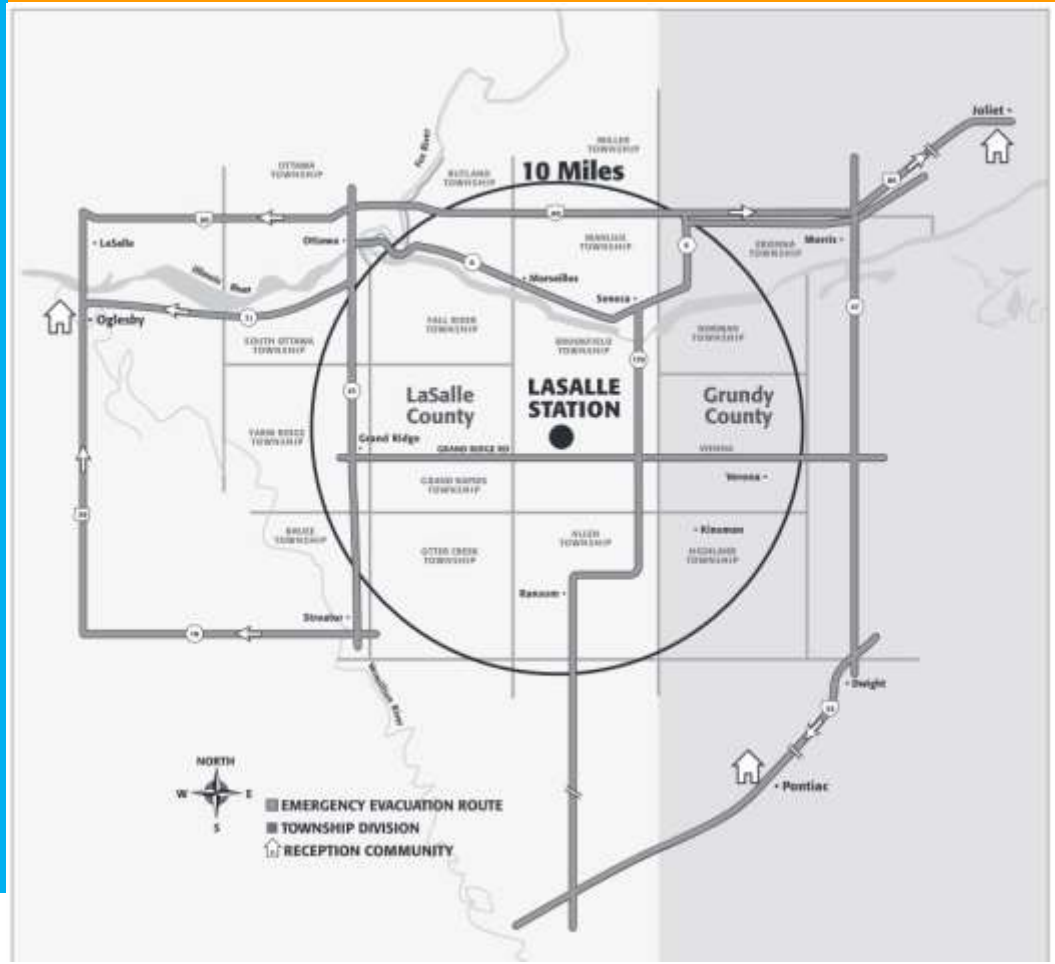


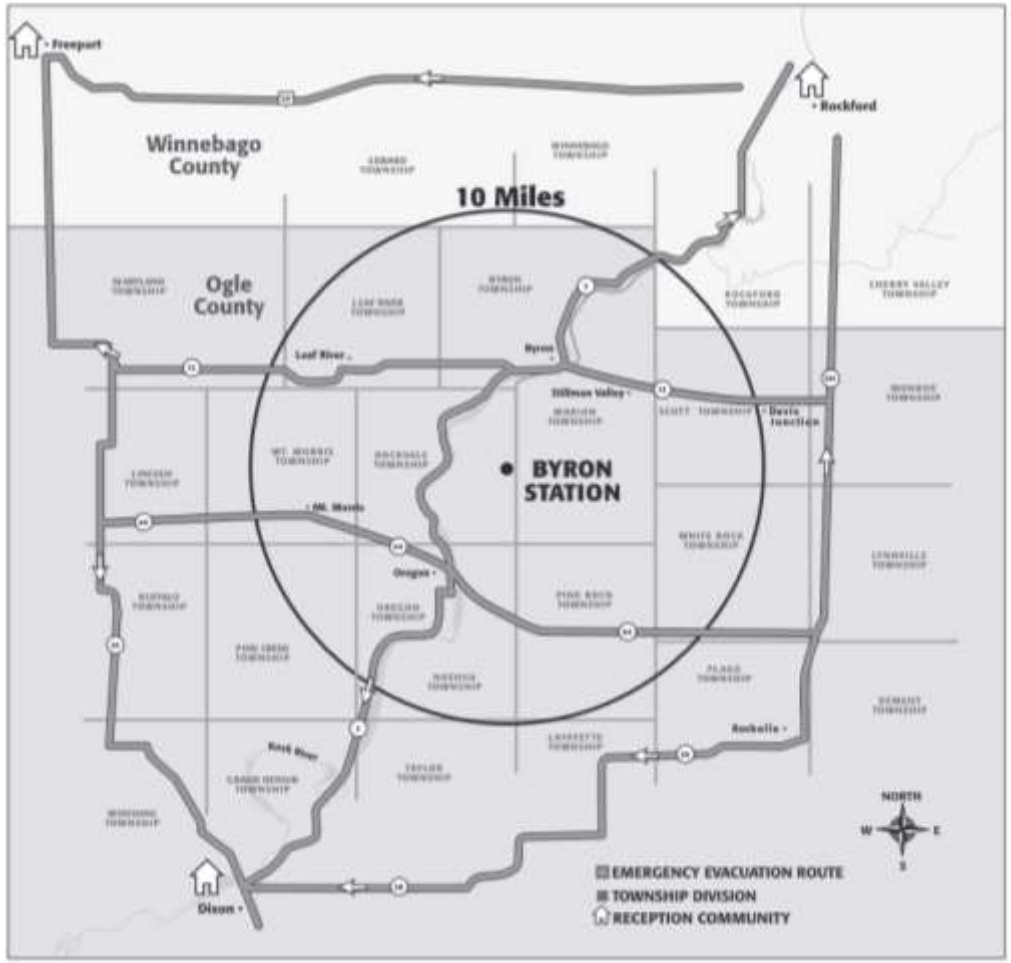
Clinton Generating Station
- OSF Saint Joseph Medical Center

Quad Cities Generating Station
- OSF Saint Mary, OSF Saint Luke, Holy Family

Awareness

Radiation





LaSalle Generating Station
-OSF Saint Elizabeth Medical Center, Saint Paul Medical Center, Saint James

Byron Generating Station
-OSF Saint Anthony Medical Center

Awareness

Radiation

Potassium Iodine (KI):

Potassium Iodide (KI) is a nonprescription drug that may prevent the thyroid from absorbing radioactive iodine.

KI is effective in blocking the absorption of radioactive iodine only.

People living within a 10-mile radius of the state's six operating nuclear power plants can now obtain their free Potassium Iodide (KI) pills from one of 64 participating pharmacies.

REGION 2
MEDICAL RESPONSE TEAM

Radiation

Awareness

Potassium Iodine (KI):

How often should **internally contaminated** patients take KI?

Answer: ONCE (One Dose) unless otherwise specified. One does will provide thyroid protection for 24 hours

People should only take KI (potassium iodide) on the advice of public health or emergency management officials. There are health risks associated with taking KI.

Awareness

Radiation

Internal vs External Contamination vs Exposure

Exposure - When a person is exposed to certain types of radiation, the energy may penetrate the body. A person exposed to radiation is not necessarily contaminated with radioactive material. For a person to be contaminated, radioactive material must be on or inside of his or her body.

External Contamination - occurs when radioactive material comes into contact with a person's skin, hair, or clothing.

Internal Contamination - can occur when radioactive material is swallowed or breathed in.
Internal contamination can also occur when radioactive material enters the body through an open wound.

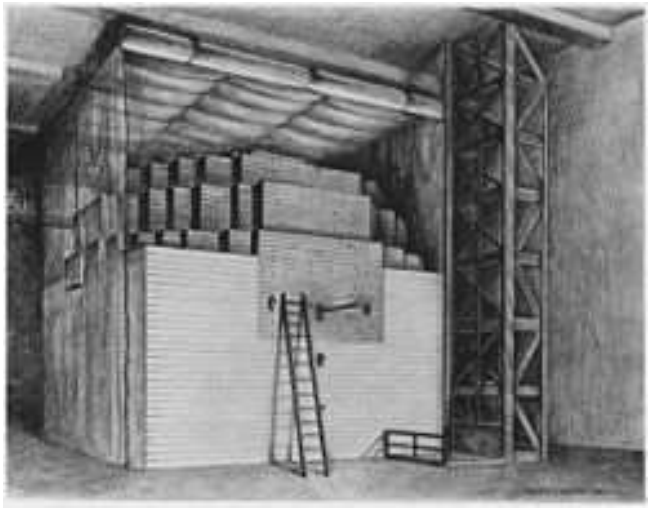
REGION 2 MEDICAL RESPONSE TEAM

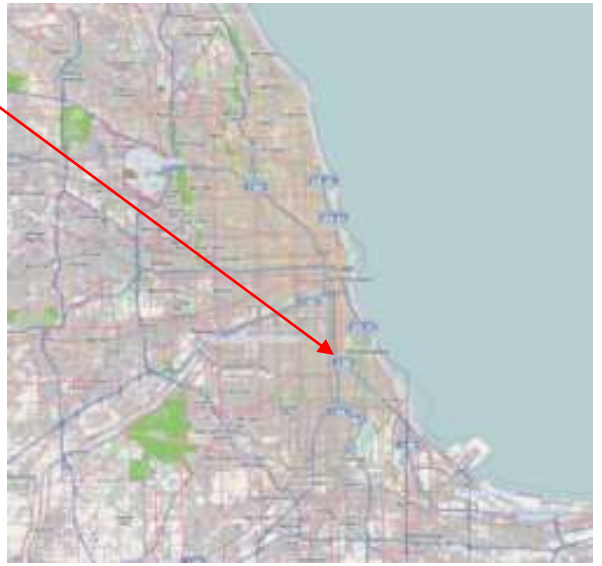
Awareness

Radiation

History

Chicago Pile-1 (CP-1) was the world's first artificial nuclear reactor. On 2 December 1942, the first human-made self-sustaining nuclear chain reaction was initiated in CP-1, during an experiment that laid a foundation for the Manhattan project





CP-2 and CP-3 were later constructed in 1943 and 1944 and ran for 10 years during WWII. All decommissioned in 1970…

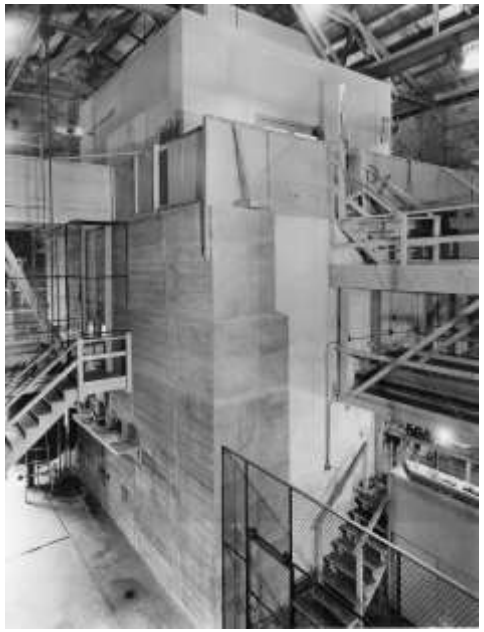
Constructed under West Stands of Stagg Field at the Univ. of Chicago

Awareness

Radiation

History

Chicago Pile-1 (CP-1) operation was terminated in Feb 1943. CP-2 and CP-3 were moved to "Site A" in the Argonne Forest. This later became the Argonne National Laboratory.



In 1994, the United States Department of Energy and the Argonne National Laboratory yielded to public pressure and earmarked $24.7 million and $3.4 million respectively to rehabilitate the site. As part of the cleanup, 500 cubic yards (380 m3) of radioactive waste was removed and sent to the Hanford Site for disposal.

Operations

PPE

Personal Protective Equipment

Operations

PPE

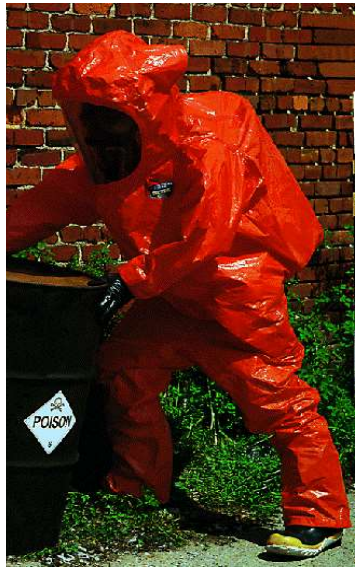
- **<u>It is important to realize that no single combination of protective equipment and clothing is capable of protecting against all hazards.</u>**

- **PPE must be used in conjunction with other protective practices such as available engineering controls and a medical surveillance program.**

Operations

PPE

Highest Protection ←

Level A	Level B	Level C	Level D
			

Turnout Gear??

Higher Cost ←

Operations

PPE

III. Level C - The concentration(s) and type(s) of airborne substance(s) is known and the criteria for using air purifying respirators are met.

1. Full-face or half-mask, air purifying respirators
2. Hooded chemical-resistant clothing
3. Coveralls.
4. Gloves, outer, chemical-resistant.
5. Gloves, inner, chemical-resistant.
6. Boots (outer), chemical-resistant steel toe and shank.
7. Boot-covers, outer, chemical-resistant (disposable).
8. Hard hat.
9. Escape mask.
10. Face shield.

Offers a degree of splash protection, respirator filters current atmospheric oxygen.
Used by front line medical treatment personnel.

Operations

PPE

IV. Level D - A work uniform affording minimal protection: used for nuisance contamination only.

1. Coveralls.
2. Gloves.
3. Boots/shoes
4. Safety glasses or chemical splash goggles.
5. Mask (surgical or N95)
6. Goggles

Provides minimal protection from chemical or biological hazards.

Operations

PPE

What do you wear under your suit???

- **Nametag?**
- **Shoes?**
- **Rings and other jewelry?**
- **Glasses?**
- **Expensive clothes?**
- **Wallets or some type of clutch/purse?**

If it is invaluable to you, or is irreplaceable…
DO NOT WEAR IT UNDER YOUR SUIT!!

Operations

PPE

How does a suit become damaged or unusable?

#1 Degradation

Defined as: breakdown of matter due to the impact of external forces in conformity with the laws of nature and time[1].

Involves physical changes in a material as the result of a chemical, exposure, use, or ambient conditions, such as sunlight.

The most common signs of material degradation are:

- **Discoloration**
- **Swelling or bubbling within the material**
- **Loss of physical strength**
- **Physical Deterioration.**

Operations

PPE

How does a suit become damaged or unusable?

#2 Penetration

Defined as: The action or process of making a way through or into something.

Is the bulk movement of chemicals through imperfections in a protective clothing material or other areas such as zippers and seams

Operations

PPE

How does a suit become damaged or unusable?

#3 Permeation

Defined as: To spread through or penetrate something[1]

This is the process of which a chemical is able to cross through a porous material such as fabrics. This can take time and some chemicals lack an inherent ability to Permeate.
The amount of time is takes a chemical to breakthrough or "Permeate" is called "Breakthrough Time[2]"

Operations

Respirators

OSHA Code: 29 CFR 1910.134 Pertains to Respiratory Protection

Operations

PPE

Legal Stuff…

OSHA 29 CFR 1910.134

- Covers all required and voluntary use of respiratory protection in general industry
- Requires a written program on file
- Requires employee training, medical evaluation, and Fit-testing

Operations

PPE

Types of Respiratory Protection:

Air-purifying respirator →

Negative pressure respirator (tight fitting) →

← ***Escape-only respirator***

Powered air-purifying respirator (PAPR) →

Operations

PPE

Fit Testing

Qualitative fit test (QLFT) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test

- Isoamyl acetate (sweet)
- Irritant smoke (tart)

Quantitative fit test (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator

- Corn oil
- Dioctyl phthalate
- Ambient atmosphere *OU that uses QNFT

PPE

General Requirements for Respirators

- Use of NIOSH-approved respirators only
- Evaluation of hazards
- Availability of multiple respirator types

Operations

PPE

PAPR's (Powered Air Purifying Respirator)

Operations

PPE

Versaflow / CAPR / PAPR

HEPA (High Efficiency Particulate Air) Filter

Operations

PPE

Air-Mate Usage

Motor blower draws contaminated air through a HEPA filter and blows filtered air up into head covering

OLD

NEW

This NIOSH-approved particulate filter helps provide high efficiency respiratory protection against dust, mist, fumes, asbestos, radionuclides and radon.

OLD

NEW

HEPA filters do not reduce exposure to gases or vapors - NOT FOR DECON USE

Operations

PPE

Remember if there is no OXYGEN all respirators are USELESS!!!!

Operations

Patient Decontamination

Operations

Patient Decontamination

Decontamination:

– the process of removing or neutralizing contaminants that have accumulated on personnel and equipment -*OSHA*

Operations

Patient Decontamination

Why Do We Decontaminate?

- **Protects all Members by sharply limiting the transfer of Hazardous Materials from contaminated areas into the clean zones.**

- **<u>Protects Members</u> by reducing the contamination and resulting permeation or degradation of PPE**

Operations

Patient Decontamination

When?

Decontamination should be performed if the potential contamination of a patient, requiring treatment, poses a risk of exposure to Members other patients, or contamination of the facility

All patients with:

- Signs and symptoms of exposure displayed by the patient;
- Visible evidence of contamination on the patient's skin or clothing
- Proximity of the patient to the location of the release
- Contamination detected on the patient using appropriate detection technology
- The chemical identity (if known), physical state, characteristics, and behavior
- Request by the patient for decontamination, even if contamination is unlikely
- ***REGARDLESS of field decontamination or treatment!**

Operations

Patient Decontamination

In an emergency, the primary concern is to prevent the loss of life or severe injury to personnel. If immediate medical treatment is required to save a life, decontamination should be delayed until the victim is stabilized.

If a patient has been contaminated with an extremely toxic or corrosive material that could cause severe injury or loss of life, decontamination must be performed IMMEDIATELY.

Operations

Patient Decontamination

Contamination:
-Direct Contact

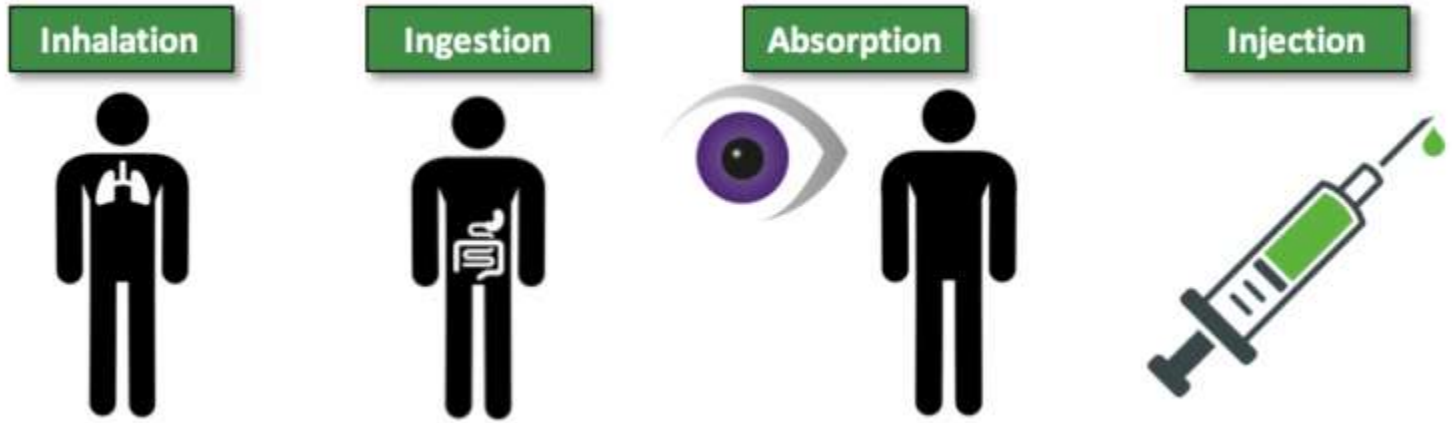
Exposure
-No Direct Contact

Operations

Patient Decontamination

Routes of Contamination:

- Inhalation
- Ingestion
- Absorption
- Injection



Operations

Patient Decontamination

Situational Awareness & Hazard Recognition

- Always be aware of the Hazards that may exist
- Patient may present by various routes
- Look for warning signs:
  - Wet clothing
  - Unusual Diaphorises
  - Unusual behavior / ALOC

Operations

Patient Decontamination

When a hospital receives a call that a patient exposed to a Hazardous Material is to be received a planned course of action should be implemented.

Obtain as much information as possible including:

- Type and nature of incident
- Caller's telephone number (callback number)
- Number of patients
- Signs and symptoms
- Nature of Injuries
- Name of Chemicals Involved
- Extent of Decon in Field (Hose down, Fire Dept/HAZMAT)
  - Notification that OSFHC will conduct decon upon arrival
- Estimated Time of Arrival

Operations

Patient Decontamination

Once Chemical or Hazard is Identified…

- **Poison Control (1-800-222-1222) (24/7)**
- **Chemtrec (1-800-424-9300) (24/7)**
- **Manufacturer**
- **MSDS Sheet**
- **Fire Department Haz Mat Team**
- **Communication with Responders on-scene**
- **Official On-line source (3M Online)**
- **Emergency Response Guidebook**
- **OU Emergency Management**

Operations

Patient Decontamination

Preparing for Patients:

- **Notify all services involved**
- **Begin Intelligence gathering on incident and material**
- **Shut-down Decon area and block it off**
- **Setup Decon structure or prepare showers**
- **Start the dress out process (suits, PAPR, vitals, etc.)**
- **Flow test decon and rinse water.**

Operations

Patient Decontamination

The best place for patient decontamination is the Internally Constructed Shower or designated area

- **The showers offer stable environment with security and privacy**

Excessive number of patients requiring Decontamination:

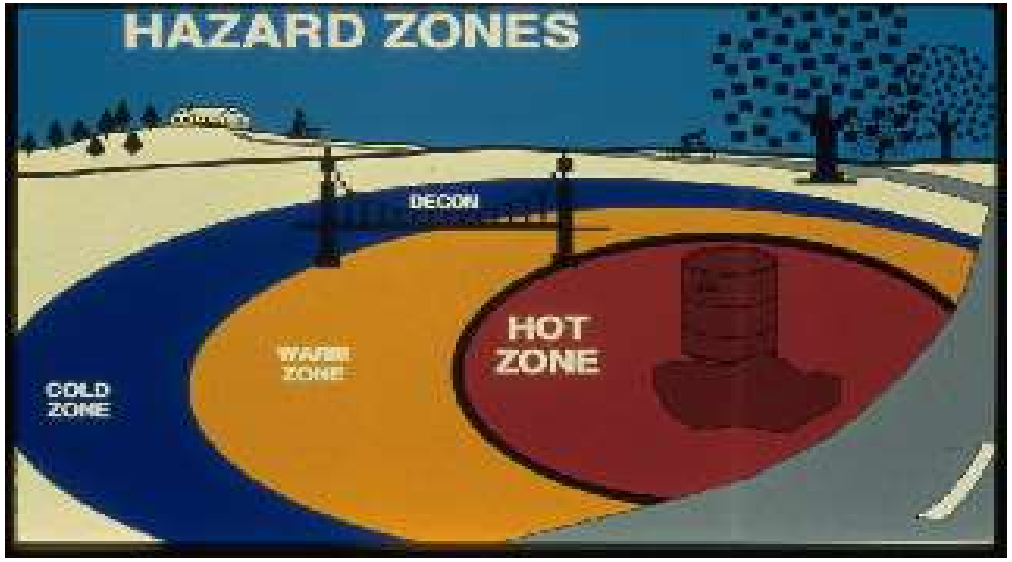
- **Setup additional decon equipment in designated area**
- **Optimal: 3 Corridors (Male, Female, Non-Ambulatory)**
- **Consider Shutdown or Divert Traffic**
- **Tepid Water pre-piped and available**
  - **ANSI Z358.1-2004 defined as 60° to 100°**
- **Contain Decon Water and Clothing**

REGION 2 MEDICAL RESPONSE TEAM

Operations

Patient Decontamination

The ZONES



Hot Zone:

Warm Zone / Decon:

Cold Zone :

Operations

Patient Decontamination

The Hot Zone is where the patients arriving disembark…

Whether its by Ambulance or other method of transportation these patients are considered to be contaminated and therefore a HOTZONE

Operations

Patient Decontamination

The WARM ZONE is where decontamination occurs.

In this zone all patients are decontaminated. This zone requires PPE

What occurs in the warm zone:

HAZMAT Triage

ABCDD patient care

- airway, breathing, circulation, drugs, and decon in that order.

Doff-it suits

Decontamination.

All Decontaminated Equipment stays in the WARM ZONE!!!

Operations

Patient Decontamination

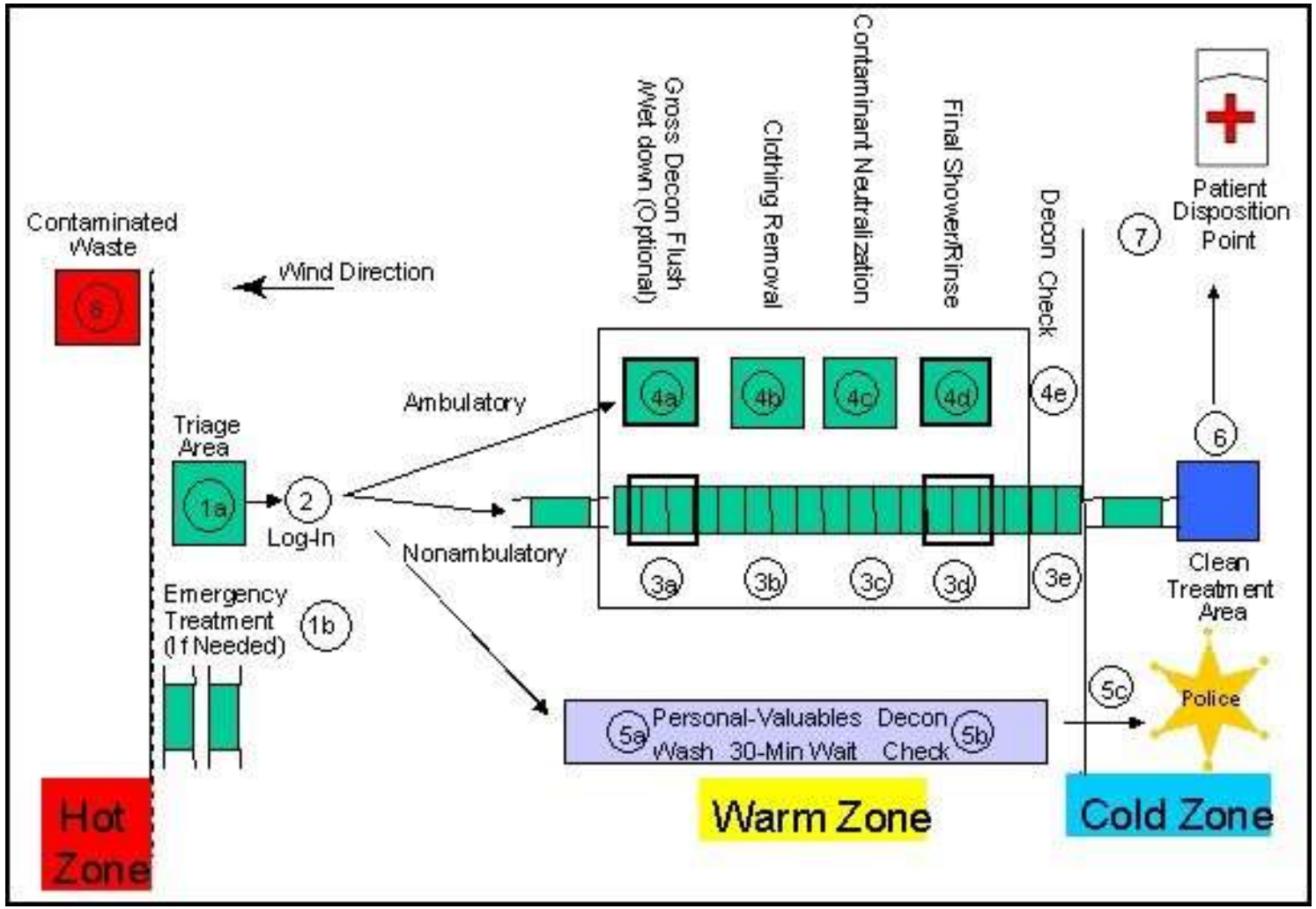
The COLD Zone

- **Area where decontaminated patients exit to after decontamination has occurred**
- **This is a safe area with no contamination.**
- **Has entrance to the hospital.**

REGION 2 MEDICAL RESPONSE TEAM

Operations

Patient Decontamination



Operations

Patient Decontamination

Types of Decontamination

- Physical vs. Chemical
- Gross Decontamination (Removal of clothing, 80% of the contamination).
- Secondary Decontamination. Mechanical removal and dilution of chemical.
  - ✓ Usually uses a mild detergent
  - ✓ Rarely use another chemical to inactivate the contaminating chemical.

Operations

Patient Decontamination

Care of the Contaminated Patient: Key Points

Remember A-B-C-D-D (Airway, Breathing, Circulation, Drugs and Decon)

Airway: Airway compromise is a key contributing factor to DEATH

- Place an adjunt if necessary (intubation provides best protection)
- Watch decon water and scrubbing
- Prevent aspiration or ingestion

Breathing: using a BVM is difficult but possible, no supplemental

Circulation: BLS shock maneuvers (tredelenburg positon)

Drugs: Antidotes such as 2-Pam and Atropine, or anticonvulsants

Decon: Scrub Scrub Scrub

REGION 2 MEDICAL RESPONSE TEAM

Operations

Patient Decontamination

AMBULATORY DECON

AMBULATORY DECON

https://www.youtube.com/watch?v=uDvwsw65hmk

Operations

Patient Decontamination

Walking The Patient Through Decon

The patient should shower for a minimum of five minutes – *Agency for Toxic Substances and Diseases Registry (ATSDR)*

Special attention should be placed on the

- Hair
- Body folds
- Areas that sweat
- Fingernails.

Operations

Patient Decontamination

NON-AMBULATORY DECON

NON-AMBULATORY DECON

https://www.youtube.com/watch?v=VuJtxiCEpc4

Operations

Patient Decontamination

NON-Ambulatory Decon

Very labor intensive 4-6 decon team members in PPE

Patient cannot decontaminate himself

Start by cutting off all clothes (e.g. shoes, pants, coat, jewelry)

Roll the patient, rolling the clothes away from the patient

Remove all porous materials (e.g. board straps, c-collar)

Wash patient with brushes and sponges. Use mild detergent.

- **Start from the head and work down**
- **Ensure patent airway during decon process**
- **Use a NRBM or BVM to protect face**
- **Be aware of splashing into face and eyes**

Roll patient side-to-side, clean victims back and the backboard

Operations

Patient Decontamination

Decontamination of Children

- Unlikely to be cooperative
- Will be frightened of process and staff
- Hypothermia risk
- Slippery when wet

How best to get them through the decon shower

- Laundry baskets (Best Option for toddlers)

- Infant Tub (Best Option for infants)

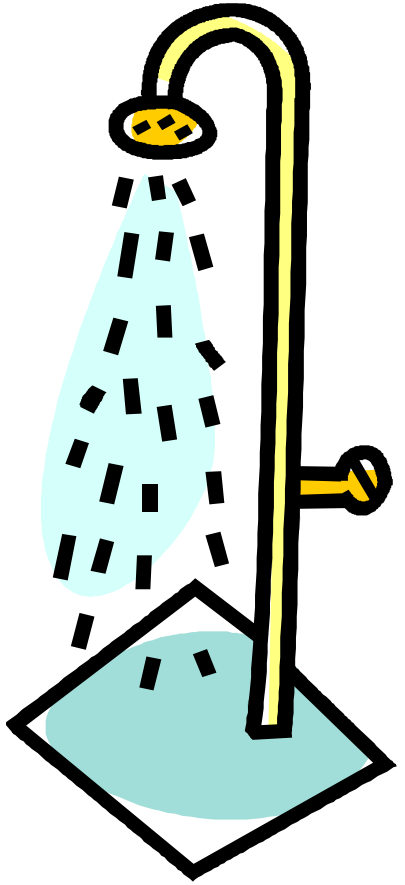
Remove all clothing including the diaper!

Operations

Patient Decontamination

Decontamination of Children

- Warm Water
  - High Volume/Low Pressure
- Keeping the family unit together as much as possible
- How will they hear you?
- Showering process will take more time with children
- Identification issues

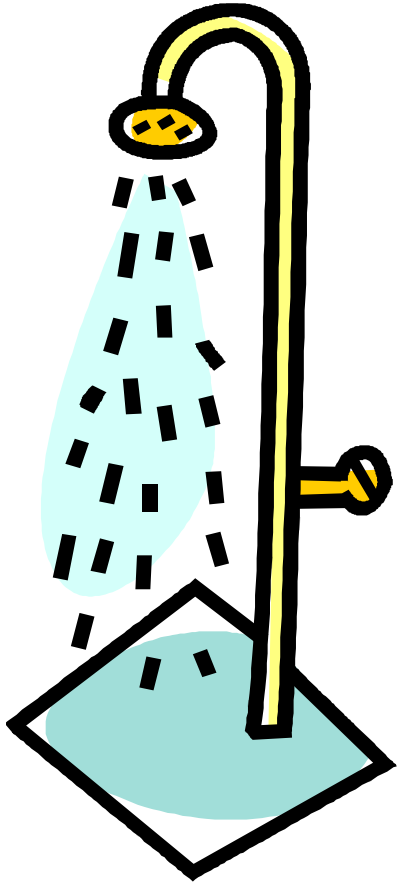


Operations

Patient Decontamination

Decontamination of Children

- Decontamination of kids is “not a fun time”
- Decon brushes can be rough on skin
- Blankets, booties and towels work well
- Use ink markers to write directly on skin to identify



Operations

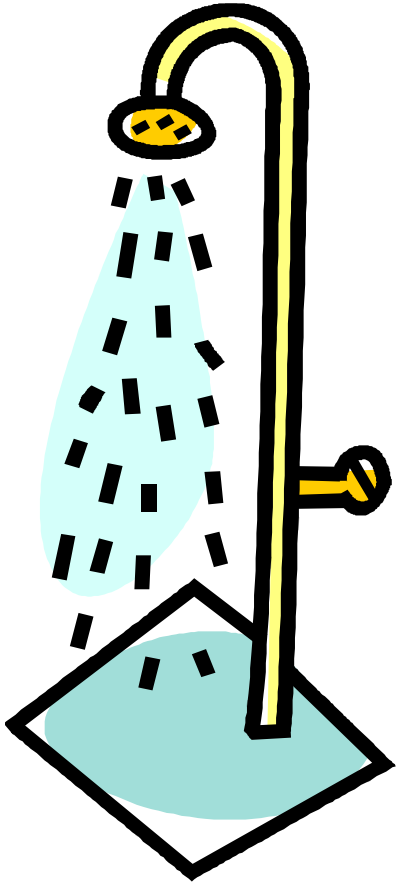
Patient Decontamination

Decontamination of Children

- ESMC Recommended water temperature between 98° - 110°
- ANSI “Tepid Water” – 60 ° -100 °

- To meet both EMSC and ANSI we can safely decontaminate at a temperature range of

98 °-100 ° - **Remember 100 °**



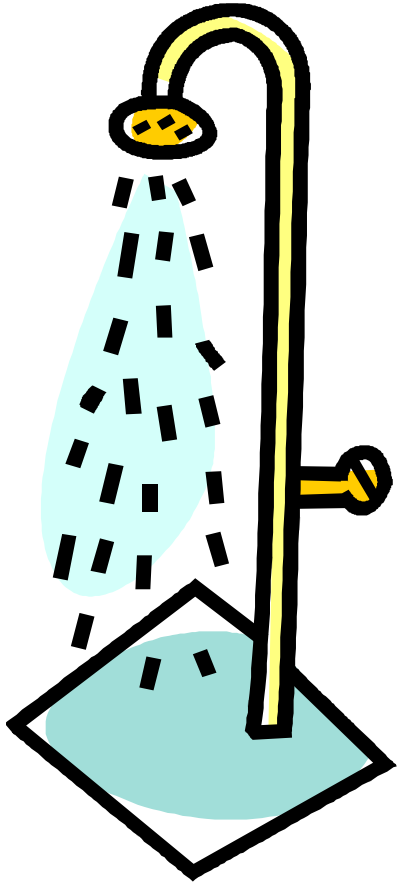
Operations

Patient Decontamination

Decontamination of Children

Post Decontamination

- Warm Blankets to reduce risk of hypothermia
- Rapid Reunification - when appropriate
- Age/size appropriate gowns/coverings
- Evaluate the patients for psychological trauma and provide appropriate treatment or access to mental health specialists



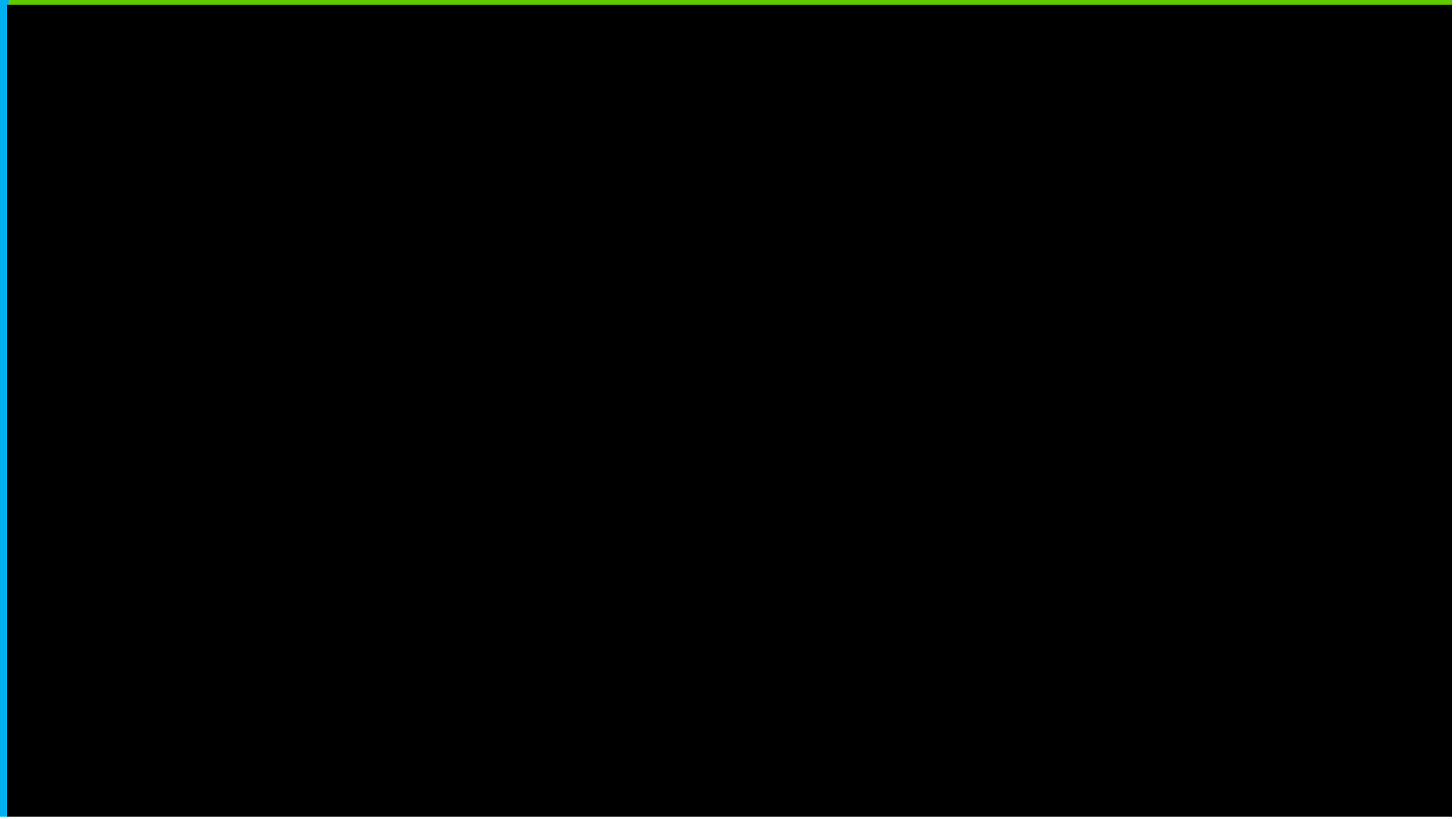
Operations

Patient Decontamination

DHHS –
Children are more vulnerable during chemical incidents

Operations

SPECIAL NEEDS POPULATION
Decontamination



Operations

Patient Decontamination

What about Radiation?

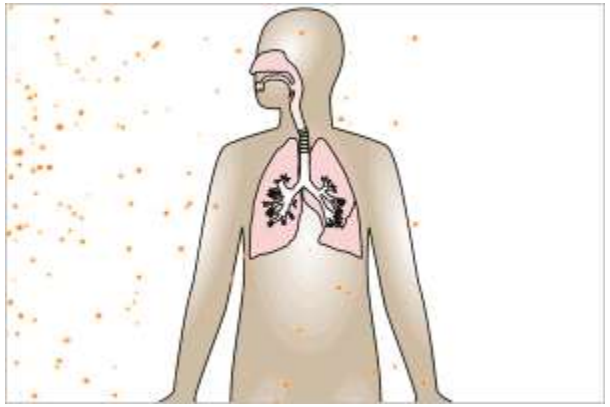
External Contamination:

Localized: Conduct spot specific decontamination

Whole Body: Shower the patient similar to a chemical exposure

Internal Contamination:

Nothing we can do besides decontamination the exterior and treat accordingly.

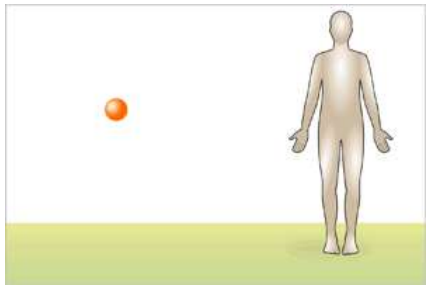


Operations

Patient Decontamination

What about Radioactive Shrapnel?

Dirty Bombs: A "dirty bomb" is one type of a radiological dispersal device — also called an RDD — that combines conventional explosives, such as dynamite, with radioactive material. Typically the radioactive material is low yield and this causes more panic and chaos than it does deaths!



Shrapnel Decon in a radioactive incident:

- Assume that all embedded objects will produce internal radioactive contamination
- Decontaminate the skin surrounding the embedded object
- If possible remove the foreign body using long handled forceps or other device
- Dispose of both the foreign body and the instruments in a lead lined container or keep instruments away from staff and patients until proper disposal can occur.

Operations

Patient Decontamination

How do we know when to stop decon?

Chemical:

- When we have decontaminated for a minimum of 5 minutes
- When there are no signs of contaminants left of the patient
- When we feel we have decontaminated the best we can

Radiological:

- Upon scanning the body, the level of radiation present is less than 2x background levels.
- If unable to gain less than 2x background level of radiation after 2x rounds of decon… Then move on to the next patient

REGION 2 MEDICAL RESPONSE TEAM

Service Animal Decontamination

Service Animal Decontamination

What constitutes a service animal?

Service Animal Decontamination

ADA (Americans with Disabilities Act)

The ADA defines a service animal as any guide dog, signal dog, or other animal individually trained to provide assistance to an individual with a disability. If they meet this definition, animals are considered service animals under the ADA regardless of whether they have been licensed or certified by a state or local government.

What is the most familiar service animal?

Service Animal Decontamination

A couple examples:

- Guide Dogs (seeing eye dog)
- Alerting person with hearing impairments to certain sounds
- Pulling Wheelchairs or carrying packs carrying items for impaired individuals
- Picking up items for person with mobility impairments
- Assisting a person with mobility impairments with balance

A service animal is **NOT** a pet

Service Animal Decontamination

How to identify a Service Animal

- Some, but not all, service animals wear special collars and harnesses.
- Some, but not all, are licensed or certified and have identification papers.
- If you are not certain that an animal is a service animal, you may ask the person who has the animal if it is a service animal required because of a disability.
- Special identification and certification, however, are not required by the ADA.

Service Animal Decontamination

Legality

The *Federal American's with Disabilities Act*, the *Illinois Service Animal Access Act* and *White Cane Law* are state criminal laws that guarantee the right of a person with a disability to be accompanied by a service animal in public.

Violation of the Service Animal Access Act is a Class C misdemeanor.

Violation of the White Cane Law is a Class A misdemeanor.

Service Animal Decontamination

Procedures for the Decontamination of Service Animals




Service Animal Decontamination

Canine Decontamination Steps

1. Assessment

- Medical assessment, if possible, to check the canine for health issues that warrant true emergency decontamination.
- If stable, ‘emergency decon’ can be repeated until the contaminant is judged to be removed.
- Owner should accompany the canine through decon if possible.
  - If not, an experienced canine handler is preferred
  - If a canine cannot be safely decontaminated without the owner, confine to contain contamination and alert animal control or veterinarian
  - If medical attention is needed, request immediate veterinary assistance

Service Animal Decontamination

2. Preparation

- Personnel assisting should have proper PPE to prevent being contaminated themselves.
- Remove all equipment and gear from the canine and place in Red bag until cleaned, deemed safe, or disposed of.
- A clean all metal collar and lead is placed on the canine. Alternately, inexpensive nylon may be used, then disposed of when done.
- Maintain control so as not to spread contaminants to clean areas.

Service Animal Decontamination

3. Rinse-Wash

- Thoroughly rinse the canine from behind the ears, down the back of the neck, from top of the back downward to the paws.
- Cleanse the head and face with moist towelettes, or gauze pads, & clean warm water
- Follow with a soap wash and soft scrub in the same manner as the rinse, paying special attention to the paw pads with a soft scrub brush.
- Rinse thoroughly and repeat wash-rinse 2 more times.
- If deemed necessary, a basin filled with 1-2 inches of 0.5% hypochlorite solution (1:10 diluted household bleach) followed by a basin filled with clean water can be set up for the canine to walk through.
- Try and limit the inevitable shaking off of water, all personnel should be protected with PPE

Service Animal Decontamination

4. Monitor and return to Service

- Monitor for contamination (radioactive cheeks if radioactive substances involved).
- Repeat decon if necessary, otherwise dry off the canine, especially if hypothermia is a risk. Replace all leashes and collars.
- Veterinary examination is recommended and treatments as needed.

Operations

Patient Decontamination

Decontamination Team

Operations

Patient Decontamination

Decon Team Leader

ROLES

- Understands and follows the SOG
- Accountable for all members of the Decon Team
- Needs to be proficient and knowledgeable in Hazardous Materials Decontamination of patients

Responsibilities:

- Responsible for decisions relating to Decontamination Operations
- Consciously avoid committing the team to a dangerous situation
- Perform a size-up and obtain further technical information
- Determine need for external or further resources
- Establish a staging area away from the incident
- Establish perimeters around the incident (HOT, Warm, Cold)
-

Operations

Patient Decontamination

Decon Team Leader cont'd

Responsibilities:

- Request appropriate amount of Members for Decon Team
- Select proper PPE. If substance is beyond PPE capabilities – in communication with OU Emergency Management request Hazmat Team (911)
- Conduct a briefing with Decon Team
- Monitor safety of Decon Team Members, Members, and patients
- Oversee setup of Decon area and implementation of decon procedures
- Conduct a brieifing with Decon Team Members after decon is complete

Operations

Patient Decontamination

Decontamination Team:

Consists of Members currently trained in Patient Decontamination procedures and active members of the OU Decon Team

A primary goal of the decontamination process is Mission Partner Safety! As such, the Decon Team members should strive to minimize patient contact. This is typically done with use of verbal directions.

NO PATIENT CONTACT SHOULD BE MADE UNLESS PROPER PPE IS BEING USED!

Operations

Patient Decontamination

Suit Support Team (“ANGELS”)(pre-Decon) / Rehab (post-Decon)

- Check suit for any type of degradation
- Checks that equipment works properly.
- Assist in suiting Decon Team members
- Checks personnel entering and exiting the warm zone.
- (post-Decon) Physical exam including vitals

Operations

Patient Decontamination

Equipment Support Team

- Gather PPE and other supplies necessary
- Set-up Decon Area as directed by the Decon Team Leader
- Turn water to the shower ON (water temp 60-100 degrees)
- Place the water pump into the lowest corner of the pool

Post Decon:

- Turn the water off
- Turn the pump off
- Assist in clean-up

Operations

Patient Decontamination

Rehab (Post-Decontamination)

- All team members have to go through rehab before and after decontamination.
- Vitals Checked
- Bottle of water
- Rest for 10 min.
- Recheck Vitals

Operations

Patient Decontamination

DO NOT BE A HERO!
-How many patients can you treat if you become a patient?

RMERT Decontamination REFRESHER

To receive Continued Education certificate:

1. View this PowerPoint.
2. Complete the 20 questions test
3. Attend hands-on (Don / Doff) dress out competency