

Disaster Sanitation & Emergency Planning

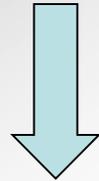


Presented by Christine Laga

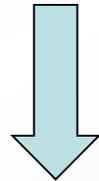
April 18, 2007

Brevard County Health Department

Preparing for disasters



Assist with Management of Disaster Situations



Assist with Post-Disaster Management

Preparing For Disasters

- Normally, emergency response planning is thought of as being undertaken for unpredictable but anticipated sudden events, such as a spill, gas release or even a natural disaster.
- Multiple organizations are most often involved during events which require emergency action and it is important to keep relationships in good standing.
- Working out the emergency plans in advance with these organizations helps everyone to understand their roles as well as the strengths and weaknesses of themselves and others.

Useful Link: Florida DOH Disaster Preparedness Page

<http://www.doh.state.fl.us/demo/eo/prepare.htm>

Preparing For Disasters

1. DOT (Department of Transportation) Handbook
2. HAZWOPER regulations
3. ICS (Incident Command Systems) and NIMS (National Incident Management System)
4. Risk assessment
5. Food and water security
6. Planning for emergencies
7. Emergency techniques

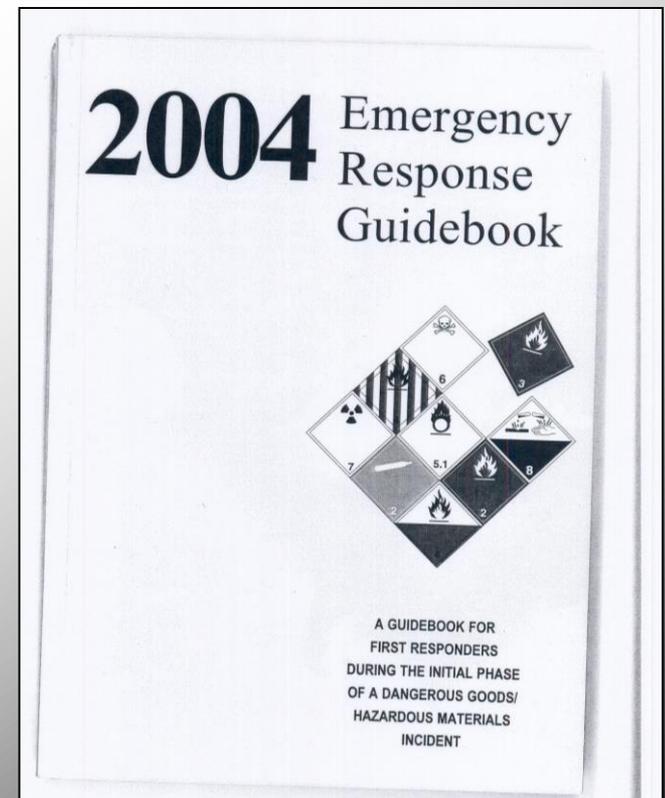
Emergency Response Guidebook 2004 Department of Transportation

Purpose

Provides guidance to responders during the initial phase of a dangerous goods/hazardous materials incident.

Remember!

- 1) Resist rushing in
- 2) Approach incident from upwind clear of all spills, vapors, fumes and smoke



Emergency Response Guidebook 2004 Department of Transportation

First 11 pages (white)

1. Directions on how to use the guide book
2. Safety precautions
3. Who to call for assistance
4. Hazard classification system
5. Placards and what they mean
6. Rail car & road trailer identification charts
7. Hazard identification codes

Emergency Response Guidebook 2004 Department of Transportation

Yellow Pages

Dangerous goods in numerical order by ID number

ID No.	GUIDE No.	Name of Material
1090	127	Acetone

Emergency Response Guidebook 2004 Department of Transportation

Blue Pages

Dangerous goods in alphabetical order of material name

Name of Material	GUIDE No.	ID No.
Sulfuric acid	137	1830

Emergency Response Guidebook 2004 Department of Transportation

Orange Pages

Provides safety recommendations

LEFT SIDE	RIGHT SIDE
Safety related information such as fires/explosions, effects on health, public safety, protective clothing and evacuations	Guidance and activities for fire situations, spill or leak incidents and first aid

Emergency Response Guidebook 2004 Department of Transportation

Green Pages

Contains a table which lists, by ID number, TIH materials, including certain chemical warfare agents, and water reactive materials (produce toxic materials with water).

Provides two types of recommended safe distances which are “initial isolation distances” and “protective isolation distances.”

The list is further subdivided by size of spill (small spill = 200 liters or less, large spill > 200 liters) and nighttime and daytime situations.

It is recommended that during the night, people remain further away from the contaminated zone. The air is generally calmer and causes the chemical to disperse less and therefore created a toxicity zone greater than what would occur during the day.

Emergency Response Guidebook 2004 Department of Transportation

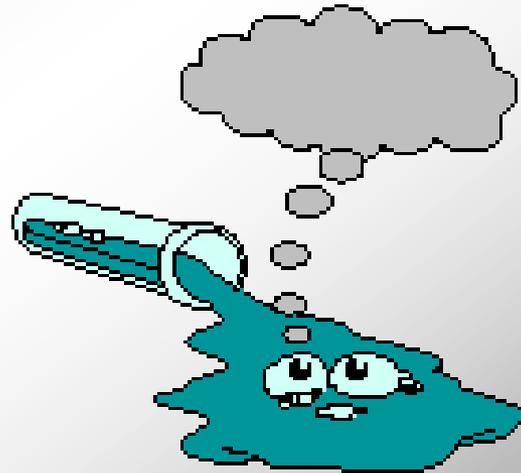
TIH: “Toxic Inhalation Hazard” A gas or volatile liquid which is known to be so toxic to humans as to pose a hazard to health during transportation, or in the absence of adequate data on human toxicity, is presumed to be toxic to humans because when tested on laboratory animals it has an LC50 value of not more than 5000 ppm.

**If the name is highlighted in the yellow or blue section it is a TIH and needs to be immediately addressed with the green section.

Emergency Response Guidebook 2004 Department of Transportation

Scenario:

There is a small chemical spill in the hallway!! You clear people out of the immediate area and search for a label.



Emergency Response Guidebook

2004 Department of Transportation

HNO₃ F.W.63.01

DANGER! Oxidizer, Corrosive,  **POISON** 
Contact with other material may cause fire. Causes eye and skin burns. May be fatal if inhaled. Causes severe respiratory tract irritation, characterized by coughing, headache, dizziness, weakness, dry throat/nose, chest pain and breath shortness.

TARGET ORGANS: None

FIRST AID: EYES - Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately. **SKIN** - Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. **INHALATION** - Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid immediately. **INGESTION** - If victim is conscious and alert, give 2-4 cupsful of milk or water. Do NOT induce vomiting. Get medical aid immediately.

PRECAUTIONS: Do not get on skin, or in eyes. Do not ingest or inhale. Wash thoroughly after handling. Wash clothing before re-use. Discard contaminated shoes. Keep from contact with clothing and other combustible materials. Do not store near combustible materials. Use with adequate ventilation. Store in a tightly closed container. In case of spill, keep from contact with combustible materials and do not touch. Isolate area and deny entry. See MSDS for spill/leak procedures.

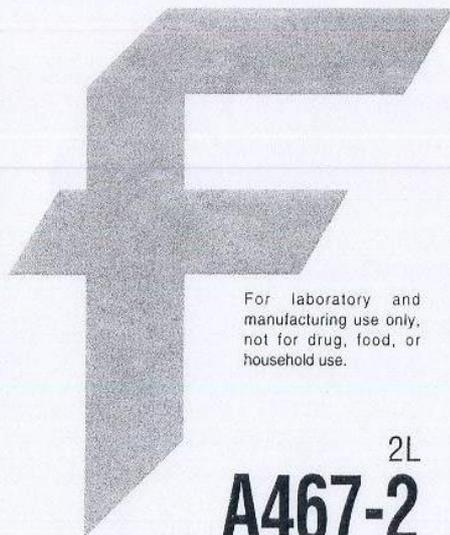
IMPORTANT! DO NOT PROCEED UNLESS MATERIAL SAFETY DATA SHEET HAS BEEN READ AND UNDERSTOOD.

Date Rec'd

Nitric Acid CAS 7697-37-2
Water CAS 7732-18-5

Manufactured by Seastar
Chemical Inc., for Fisher Scientific

Pittsburgh, PA, 15219
(201) 796-7100 Made in Canada



DO NOT TRANSFER TO AN UNMARKED CONTAINER

For laboratory and manufacturing use only, not for drug, food, or household use.

2L

A467-2

LOT NO. 1201110

Nitric Acid, UN2031

Nitric Acid OPTIMA

For The Most Exacting Analytical Requirements In:

- Environmental Testing
- Trace Metal Assays
- Plasma Analysis
- Electronics

- Distilled At Sub-Boiling Temperatures
- Packaged Under Class 100 Clean Room Conditions
- Analyzed by ICP/Mass Spectrometry For Virtually All Metallic Impurities

Assay: 69-71% as HNO₃
Certificate of Actual Lot Analysis Included

Fisher
ChemAlert®
Guide

SAFETY CODE



No 752

ID No.	Guide No.	Name of Material	ID No.	Guide No.	Name of Material
2003	135	Metal aryls, n.o.s	2022	153	Cresylic acid
2003	135	Metal aryls, water-reactive, n.o.s.	2023	131P	1-Chloro-2,3-epoxypropane
2004	135	Magnesium diamide	2023	131P	Epichlorohydrin
2005	135	Magnesium diphenyl	2024	151	Mercury compound, liquid, n.o.s.
2006	135	Plastic, nitrocellulose-based, spontaneously combustible, n.o.s.	2025	151	Mercury compound, solid, n.o.s.
2006	135	Plastics, nitrocellulose-based, self-heating, n.o.s.	2026	151	Phenylmercuric compound, n.o.s.
2008	135	Zirconium powder, dry	2027	151	Sodium arsenite, solid
2009	135	Zirconium, dry, finished sheets, strips or coiled wire	2028	153	Bombs, smoke, non-explosive, with corrosive liquid, without initiating device
2010	138	Magnesium hydride	2029	132	Hydrazine, anhydrous
2011	139	Magnesium phosphide	2029	132	Hydrazine, aqueous solutions, with more than 64% Hydrazine
2012	139	Potassium phosphide	2030	153	Hydrazine, aqueous solution, with more than 37% Hydrazine
2013	139	Strontium phosphide	2030	153	Hydrazine, aqueous solution, with not less than 37% but not more than 64% Hydrazine
2014	140	Hydrogen peroxide, aqueous solution, with not less than 20% but not more than 60% Hydrogen peroxide (stabilized as necessary)	2030	153	Hydrazine hydrate
2015	143	Hydrogen peroxide, aqueous solution, stabilized, with more than 60% Hydrogen peroxide	2031	157	Nitric acid, other than red fuming
2015	143	Hydrogen peroxide, stabilized	2032	157	Nitric acid, fuming
2016	151	Ammunition, poisonous, non-explosive	2032	157	Nitric acid, red fuming
			2033	154	Potassium monoxide

Guide 157

Use yellow pages when provided with an ID number

****If the material is highlighted in the yellow or blue section (underlined in this example) skip the orange guide pages for now and flip immediately to the green section for initial and protective isolation distances.***

Name of Material	Guide ID No.	ID No.	Name of Material	Guide ID No.	ID No.
Nicotine preparation, solid, n.o.s.	151	1655	Nitriles, toxic, liquid, n.o.s.	151	3276
Nicotine salicylate	151	1657	Nitriles, toxic, n.o.s.	151	3276
Nicotine sulfate, solid	151	1658	Nitriles, toxic, solid, n.o.s.	151	3439
Nicotine sulfate, solid	151	3445	Nitrites, inorganic, aqueous solution, n.o.s.	140	3219
Nicotine sulfate, solution	151	1658	Nitrites, inorganic, n.o.s.	140	2627
Nicotine sulphate, solid	151	1658	Nitroanilines	153	1661
Nicotine sulphate, solid	151	3445	Nitroanisoles	152	2730
Nicotine sulphate, solution	151	1658	Nitroanisoles, liquid	152	2730
Nicotine tartrate	151	1659	Nitroanisoles, solid	152	2730
Nitrates, inorganic, aqueous solution, n.o.s.	140	3218	Nitroanisoles, solid	152	3458
Nitrates, inorganic, n.o.s.	140	1477	Nitrobenzene	152	1662
Nitrating acid mixture	157	1796	Nitrobenzenesulfonic acid	153	2305
Nitrating acid mixture, spent	157	1826	Nitrobenzenesulphonic acid	153	2305
Nitric acid, fuming	157	2032	Nitrobenzotrifluorides	152	2306
Nitric acid, other than red fuming	157	2031	Nitrobenzotrifluorides, liquid	152	2306
Nitric acid, red fuming	157	2032	Nitrobenzotrifluorides, solid	152	3431
Nitric oxide	124	1660	Nitrobromobenzenes	152	2732
			Nitrobromobenzenes, liquid	152	2732

Use blue pages when provided with a material name to get the guide number

POTENTIAL HAZARDS

HEALTH

- **TOXIC;** inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- Reaction with water or moist air will release toxic, corrosive or flammable gases.
- Reaction with water may generate much heat that will increase the concentration of fumes in the air.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

FIRE OR EXPLOSION

- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
- Vapors may accumulate in confined areas (basement, tanks, hopper/tank cars etc.).
- Substance will react with water (some violently), releasing corrosive and/or toxic gases.
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.

PUBLIC SAFETY

- **CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.**
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.
- Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

- See the Table of Initial Isolation and Protective Action Distances for highlighted substances. For non-highlighted substances, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

Fire

- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

- Note: Most foams will react with the material and release corrosive/toxic gases.
- Small Fires** • CO₂ (except for Cyanides), dry chemical, dry sand, alcohol-resistant foam.
- Large Fires**
 - Water spray, fog or alcohol-resistant foam.
 - Move containers from fire area if you can do it without risk.
 - Use water spray or fog; do not use straight streams.
 - Dike fire control water for later disposal; do not scatter the material.
- Fire Involving Tanks or Car/Trailer Loads**
 - Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
 - Do not get water inside containers.
 - Cool containers with flooding quantities of water until well after fire is out.
 - Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
 - ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- A vapor suppressing foam may be used to reduce vapors.
- **DO NOT GET WATER INSIDE CONTAINERS.**
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Prevent entry into waterways, sewers, basements or confined areas.
- Small Spills** • Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Use clean non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.

FIRST AID

- Move victim to fresh air. • Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- **Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.**
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim warm and quiet.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Preparing for Disasters

HAZWOPER

“Hazardous Waste Operations and Emergency Response”



1. Effective March 1990
2. Mandates emergency response and preparedness programs for industry that include required interface activities with off-site agencies and prompt notification to them of an emergency situation. (sudden release of a substance, leaking underground tanks which could leak into a water supply or a fragile ecosystem).

Preparing for Disasters

HAZWOPER

- clean-up and voluntary clean-up
- corrective actions involving clean-up operations at sites covered by the **Resource Conservation and Recovery Act of 1976 (RCRA)** as amended (42 U.S.C. 6901 et seq.)
- operations involving hazardous wastes that at treatment, storage, and disposal facilities regulated by **Title 40 Code of Federal Regulations** Parts 264 and 265 pursuant to RCRA, or by agencies under agreement with U.S. Environmental Protection Agency to implement RCRA regulations
- emergency response operations for releases of, or substantial threats of releases of, hazardous substances regardless of the location of the hazard.

Emergency Planning for Industrial Facilities

Planning:

Analyze hazards associated with the facility, assess the resources currently available to control a potential emergency, determine the command structure, external resources available?, collect code and regulation information and analyze the existing plans and their effectiveness.

1. Written emergency action plan per 29 CFR 1910.38
2. Employee alarm plan per 29 CFR 1910.165
3. Some states require even more regulations

Preparation:

Allocation of resources necessary in an emergency, procedures to raise alarms and assess the severity of the situation, establish the chain of command, define response strategies to protect people, the environment, and property throughout the event.

Keep in mind that an effective emergency response plan includes off-site coordination.

Preparing for Disasters

The following are also helpful when preparing for emergencies/disasters:

1. Identification of roles/responsibility
2. Training programs
3. Setup communication structure
4. Emergency recognition and prevention
5. Identification of safe distances
6. Places of refuge and evacuation routes
7. Decontamination procedures
8. Emergency medical treatment and first aid training & locations
9. Emergency alerting and response procedures
10. Identification of personal protective equipment (PPE) and emergency equipment

Preparing for Disasters

Keeping a current list of available resources is very helpful and convenient when experiencing a disastrous event

A resource list may include absence/presence, number of and/or required/not required of the following.

1. EOC (Emergency Operations Center)
2. Media center
3. Site notification system
4. Off-site notification system
5. Communications equipment
6. PPE
7. Meteorological, firefighting, spill control and monitoring equipment
8. First aid capability
9. Security/access equipment
10. Auxiliary power
11. Trained employees

Preparing for Disasters

Risk Assessment

To determine the potential and severity of a possible incident

Things to consider:

1. Geographic descriptions of vulnerable areas
2. Size and type of populations expected in the vulnerable areas
3. Property and utilities that may be affected (transportation routes, electrical supply substations, wastewater treatment plants)
4. Environmental media that may be affected (water supply)

Risk assessment leads to...

- Identification of safe zones for response coordination
- Identification of facility needs
- Identification of equipment needs for emergency workers, spill cleanup, etc.

Preparing for Disasters

ICS (Incident Command System)

Refer to the Florida Incident Field Operations Guide (little orange book)

Common responsibilities, personnel incident safety/accountability, command, operations section, planning section, logistics, finance/administration, area command, complex, organization guides, wildland fire, hazardous materials, multi-casualty branch, urban search and rescue, health, law enforcement, and terrorism/weapons of mass destruction (WMD)

Contains quick reference sheets for terminology, command flow charts, chemical/biological/blister/choking/blood agents, phonetic alphabet (a = alpha, b = bravo, etc.)

*Mayday-not to be used for fire ground communications as it may be confusing

*Emergency traffic-Used to clear radio traffic in personnel emergency

Preparing for Disasters

ICS (Incident Command System)

The three main positions are:

Director of emergency management

Responsible to the governmental entity for emergency management and provides overall policy and direction

Emergency management coordinator or planner

Responsible for overall community disaster planning and coordination

Incident commander

Directs the disaster operation in the field

Preparing for Disasters

Set Emergency Action Levels (EALs)

Pre-set EALs remove ambiguity and confusion when a problem emerges

Level 1: Alert

The lowest emergency level, this EAL may be associated with an unusual event that is either under control or can be easily brought under control by plant personnel.

Level 2: Site Emergency

This emergency level is associated with fires, explosions, or toxic releases that affect more than the immediate area but have not spread beyond the plant boundary. Off-site populations are not expected to be affected by this event.

Level 3: General Emergency

This is the most critical emergency level and implies that the emergency event already has spread or has the potential for spreading beyond the plant boundaries. If a toxic release has occurred, the outside population may be affected and, depending on the type of release, may be instructed to take shelter or evacuate.

Assisting with Management of Disaster Situations

During The Disaster:

1. Implement the emergency plan

a. Follow proper chain of command for decisions

Most likely will refer to the Florida Incident Field Operations Guide that was previously discussed.

b. Determine equipment and supply needs

Sampling equipment, PPE, safe food and water supplies, etc.

c. Carry out techniques for emergency situations

Water, wastewater, hazardous waste, and radiation emergencies

Assisting with Management of Disaster Situations

Most common effects of a disaster:

- 1) Water supply and waste disposal disruption
- 2) Food handling
- 3) Home sanitation
- 4) Vector control

Assisting with Management of Disaster Situations

During The Disaster:

Two roles of EH employees:

- Ensuring that there are adequate amounts of safe drinking water; basic sanitation facilities; disposal of excreta, wastewater, and solid wastes; and adequate shelter
- Providing food protection measures, establishing or continuing vector control measures, and promoting personal hygiene.

Assisting with Management of Disaster Situations

Waterborne Outbreak Disasters

1939: 453 cases of typhoid fever and 60 deaths occurred in the Manteno State Hospital of Illinois when a leaking vitrified clay tile hospital sewer line seeped into a nearby drilled well.

1940: 35,000 cases of gastroenteritis and 6 cases of typhoid fever occurred when 5 millions gallons of untreated Genesee River water were accidentally pumped into the Rochester, New York, public water supply system.

1955: 29,3000 cases of jaundice in a population of 1,700,000. The water was inadequately chlorinated, operation control was lacking enthusiasm, and poor administrations contributed to the cause of the outbreak.



Assisting with Management of Disaster Situations

Waterborne Outbreaks Disasters

1. Water should be routinely monitored
2. Upstream dischargers (ex. Industrial facilities, factories, etc.) should have a plan set up to notify wastewater treatment plants during an accidental discharge

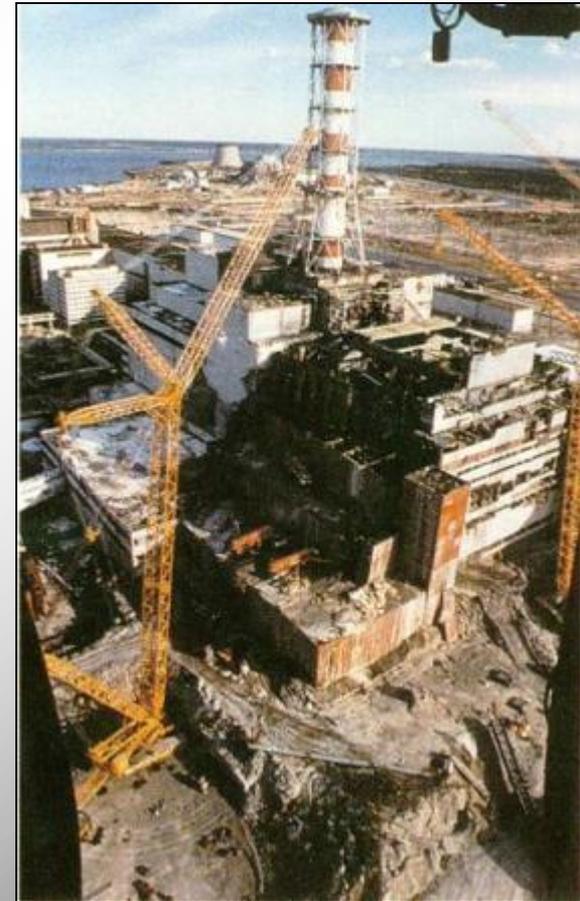
In an emergency situation the following measures may need to be taken:

1. Boiling: 1-2 minutes will kill most disease causing bacteria and viruses including *E. histolytica* and Giardia cysts.
 - a. Sterile water: Heat water in a pressure cook to 250°F (121°C) for 15 minutes.
2. Chlorination: Acceptable for disinfecting water that is not grossly polluted such as a clean lake, creek, or well water (1 pint/1000g water)
3. Iodine: Eight drops of 2% tincture of iodine to disinfect 1 qt of clear water. Allow water to sit for 30 minutes before use.
4. Portable pressure filters: For treatment of polluted water. Contain special sand, crushed anthracite coal, or diatomaceous earth.

Assisting with Management of Disaster Situations

Radiological Disasters

1. Facilities such as nuclear power plants are required to have an emergency response plan approved by the NRC and FEMA
2. The plan must be tested and conducted at least every two years and have on-site and off-site steps. On-site steps must be conducted each year.
3. Plan must include a means for public notification within 10 miles of the plant within 15 minutes.
4. Evacuations and special precautions such as maintaining a certain distance may be necessary.
5. Radiation control will get involved



April 26 1986 explosion and radioactive fallout at Chernobyl nuclear power plant

Assisting with Post-Disaster Situations

1. Inspect temporary facilities
2. Establish infection control procedures
3. Assess vector and pest problems and control measures (proliferation of breeding sites, increases person/vector contact, etc.)



Assisting with Post-Disaster Situations

The relationship between communicable diseases and dead bodies during a disaster is often misconstrued. While dead bodies do play role, there is greater risk for outbreaks due to population displacement.

1. Safe water and sanitation facility availability
2. Crowding
3. Current health of individuals
4. Availability of health services

****Dead bodies can pose a problem when the deceased died from cholera or hemorrhagic fever.**

Assisting with Post-Disaster Situations

Diseases associated with post-disaster situations include:

1. Water-related communicable diseases such as diarrheal diseases caused by Cholera, E. Coli, Salmonella and Cryptosporidium. Also, hepatitis A and E and leptospirosis
2. Crowding: Neisseria meningitidis (meningitis) and acute respiratory infections (ARIs)
3. Vectorborne Diseases: Malaria
4. Miscellaneous diseases: Tetanus (infected wounds), fungal infections such as coccidiomycosis (caused by Coccidioides immitis)

Assisting with Post-Disaster Situations

Available Resources

Bioterrorism: The Bureau of Laboratories has three labs throughout Florida capable of identifying bioterrorism agents. Teams are sometimes sent to the disaster site for sample gathering.

Refer to George Buck's 2002 emergency services guide, Preparing for Biological Terrorism

Radiation: The Department's Bureau of Radiation control is the primary state responder to all radiological incidents and emergencies.

<http://www.doh.state.fl.us/environment/radiation/>

Biological: The CDC has stockpiles antibiotics, antidotes, medical supplies and equipment and certain controlled substances which can be deployed anywhere in Florida

Useful Sources

Salvato et al. Environmental Engineering 5th edition

Emergency Response Guidebook 2004

Florida Incident Field Operations Guide 2006

Buck, G. Preparing for Biological Terrorism
Article on Epidemics 2002