Safety & Security

Exam Review

Flagging & Barricades

- Most common traffic & pedestrian warning systems
  *Flaggers
  *Barricades
  *Traffic Cones
- Flaggers should be 100 feet from work place
- Barricades should be placed at specific distances around the construction site
- Speed of traffic should affect spacing

On The Job Injuries

- Most commonly caused by failure to pay close attention to the job at hand
- You are responsible for your own personal safety
- Everyone is responsible for workplace safety
- Supervisor is responsible for the safety program

Trenching & Shoring

- Needed to prevent injury or loss of life
- 4 ft. deep requires a means of exit, usually a ladder.
- Exits or ladders must be provided at least every 25 feet.

Trenching & Shoring

- 3 basic means of preventing cave ins

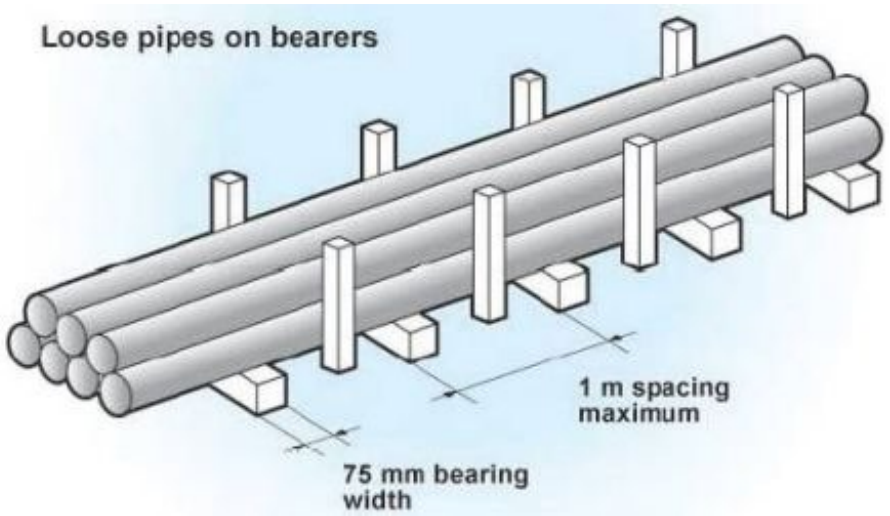
  *sloping

  *shielding

  *shoring
- Trench wall protection is needed for all trenches 5 ft. deep
- Means of access egress for trenches deeper than 4 feet
- Ladders must extend 3 feet above the surface excavation
- Soil must be placed at least 2 ft. from edge of trench

Storage

- Pipe should be adequately blocked and stacked



First-Aid

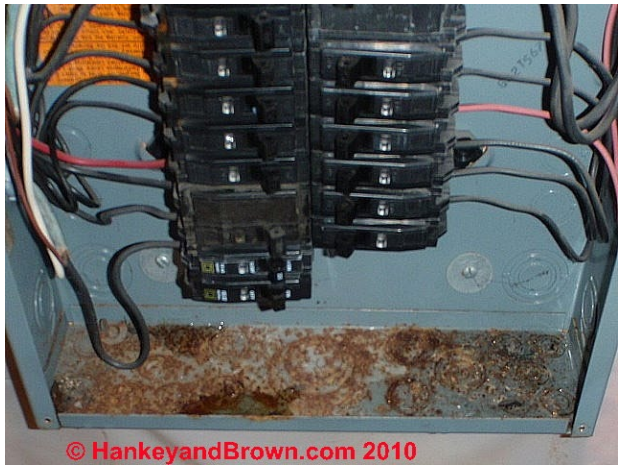
- For respiratory failure - know how to perform CPR.
- For bleeding - use direct pressure and pressure points.
- For 1st degree burns - use ice or cold water.
- For shock - lay victim down and cover them to keep them warm.
- Have annual training in CPR and First-Aid

Hydrogen Sulfide

- If you smell a rotten egg type smell in a pit, do not enter until proper precautions been taken
- Blowers are the most effective means to reduce atmospheric hazards
- Ventilate until proper oxygen levels are reached (minimum19.5%)

Vaults

- Considered hazardous
- Prone have condensation on electrical equipment
- They can collect toxic gases
- They are subject to flooding
- Calibrate air quality
- After ventilating, retest the air



Lockout/Tagged

- Lockout & tag electrical panels, compressed springs, gear motors, distribution valves, moving equipment, etc. before repairing
- Even though the circuit may off, there is control voltage still active in panels
- Tag needs to by signed by the person placing it on the equipment & only they can remove it

Accident Prevention

- Conditions around worksite
- Attitude of the employees to safety
- Having an effective safety program

Fire Extinguishers

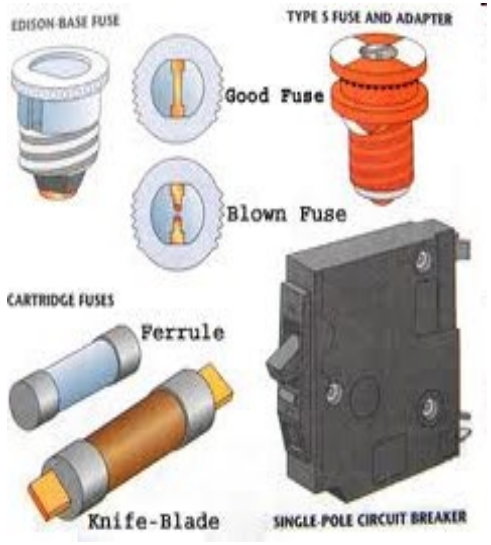
- Type A - Wood, paper, and other combustibles
- Type B - Fuels and oils
- Type C - Electrical equipment
- Type D - Metals
- For type C fires use dry chemical or carbon dioxide fire extinguisher
- ABC type for multiple use
- Don’t use water base extinguisher on an electrical fire due to shock

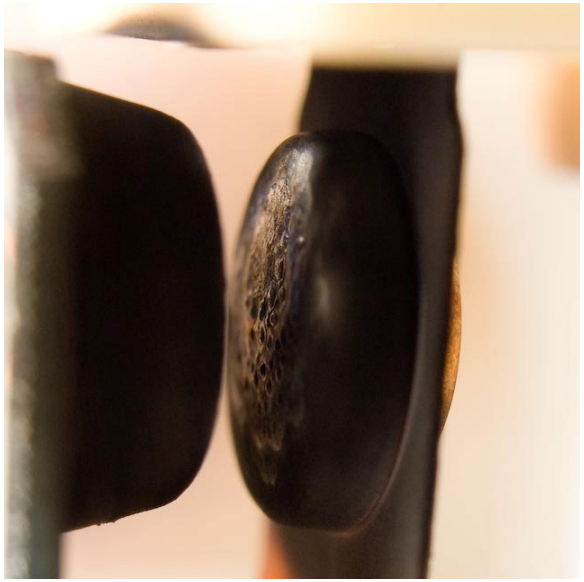
Fire Extinguisher Chart

Extinguisher		Type of Fire				
Colour	Type	Solids (wood, paper, cloth, etc)	Flammable Liquids	Flammable Gasses	Electrical Equipment	Cooking Oils & Fats
	Water	✓ Yes	✗ No	✗ No	✗ No	✗ No
	Foam	✓ Yes	✓ Yes	✗ No	✗ No	✓ Yes
	Dry Powder	✓ Yes	✓ Yes	✓ Yes	✓ Yes	✗ No
	Carbon Dioxide (CO2)	✗ No	✓ Yes	✗ No	✓ Yes	✓ Yes

Fuses & Breakers

- Found in electrical panels
- Determine the cause of the breaker tripping or the fuse blowing out
- Electrical contacts that are dusty & burned need to be cleaned to prevent fires





Electrical Motors

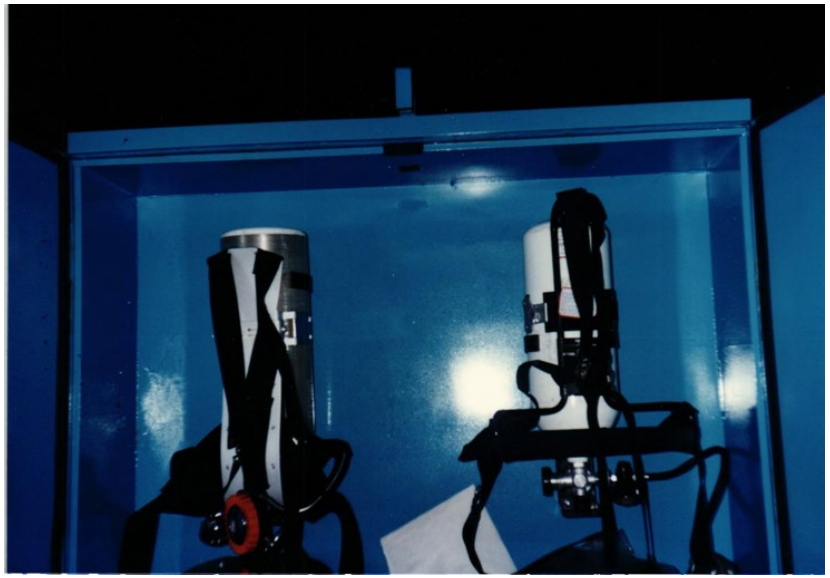
- Coupling guards protect from injuries
- Only trained staff should work on motors
- Lockout/tagout before working on

Management

- Should provide a safe working environment
- Should provide proper tools & equipment
- Should provide safety training
- Should provide Material Safety Data Sheets (MSDS) as part of right-to-know laws

Self Contained Breathing Apparatus

- Should be used on chlorine leaks
- Store away from but near chemical buildings
- Periodic inspections should be performed & records should be kept
- Length of time depends on breathing patterns of the operator



Treatment Plant Safety

- Operators should be familiar with electrical apparatus in the work place
- Operators should be familiar with chemical handling equipment
- Operators should have a knowledge of specific hazards unique to the facility

Well Head Safety

- Prevent contamination or pollution of the well
- Prevent accidents to operators

Chlorine

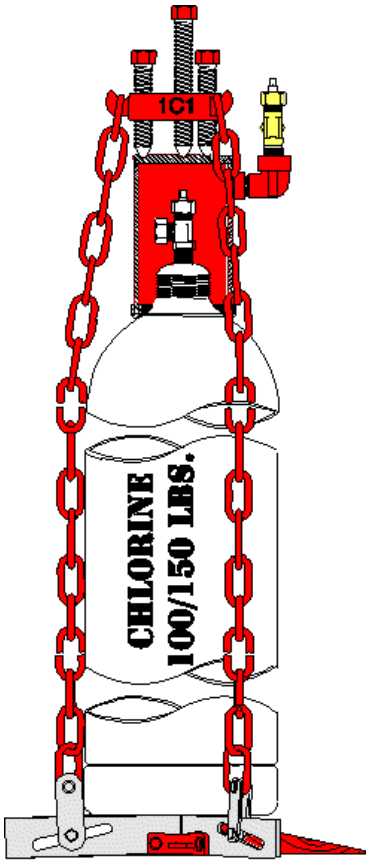
- Gas is heavier than air
- Have eyewash/shower available
- Most leaks occur around control valve
- Cylinder liquid form expands 460 times
- When changing cylinders, shut gas off at cylinder first, evacuate lines
- Produces hydrochloric acid mixed with moisture
- Use rubber gloves & ventilate
- Should practice response once per year
- Inspect daily for leaks in system

Vandalism

- A thorough investigation should be conducted
- Record the condition of premises
- Check water quality.
- Report damages and/or questionable conditions to supervisor.

Repair Kits

- A kit for 150 lb.
- B kit for ton cylinders
- C kit for train cars



Utility Vehicles

- Safety Equipment
- Proper tools
- Warnings flags
- Flares
- Flashlights
- First aid kits

Safety Inspection Reports

- Know who conducted inspection.
- Prevent overlooking safety features.
- Provides a record of who inspected the safety features of the equipment

Tank Safety

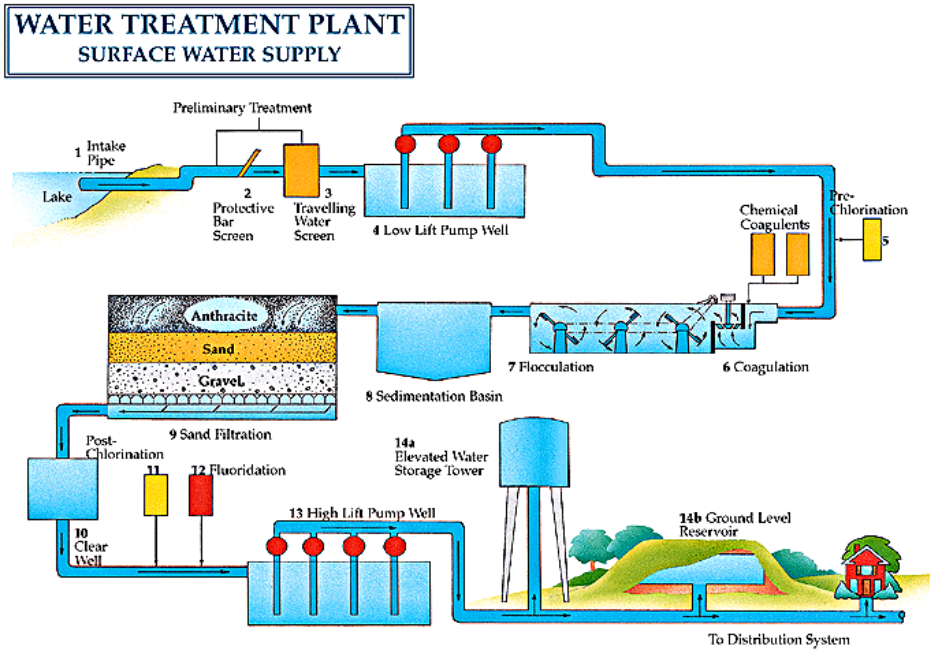
- Test the atmosphere in the tank prior to entry
- Use safety belts & harnesses when climbing
- Provide adequate ventilation while working inside

Vulnerability Assessments

- Systematic process to evaluate susceptibility
- VA's & ERP's viewed only by need to know personnel
- Determines types of assailants, threats, & probability
- Required for systems 3,300 or more

List Critical Components

- Source Types
- Treatment Plants
- Storage
- Power
- Distribution System
- Offices
- Communications



Source Water

- Ground Water
- Surface Water
- Purchased Water

Treatment Plant Inventory

- Buildings
- Pumps
- Equipment- Basins, Clearwell, Filters, etc.
- Process Controls
- Treatment Chemicals & Storage
- Lab Chemicals and Storage

Laboratory Safety

- Hazardous materials (acids, bases, toxic materials)
- Fire and Explosives
- Cuts and bruises
- Electrical shock
- Burns (heat and chemical)

Laboratory Safety

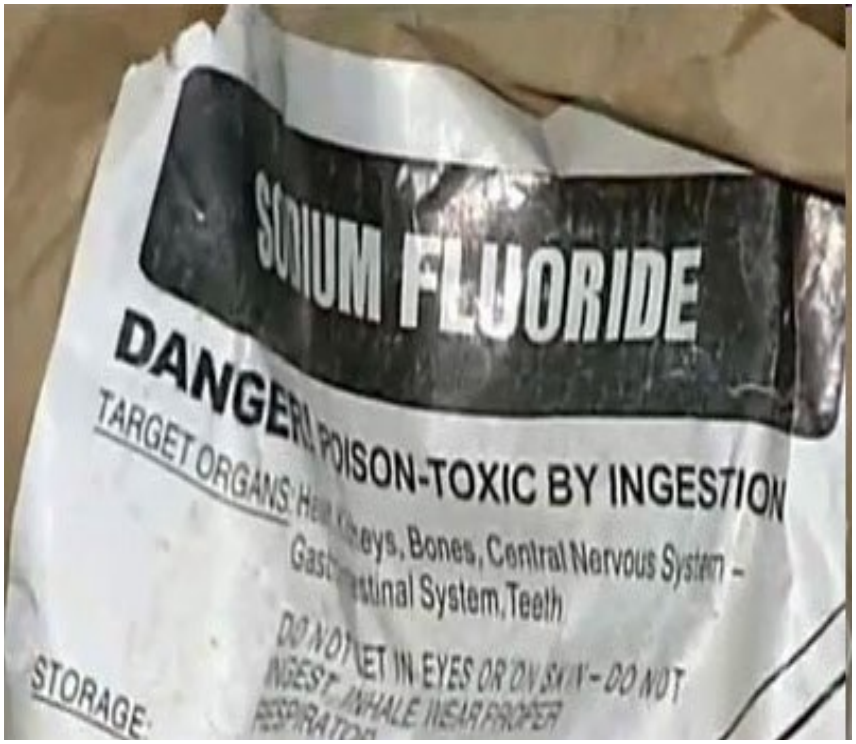
- Beware of hazardous chemicals
- Use caution when cleaning up spills
- Use care when handling glassware
- Never pipet liquids with your mouth, use a rubber suction bulb
- Practice good personal hygiene
- Use Personal Protection Equipment
- Safety glasses, rubber gloves, apron

Ferric Chloride

- Is a very corrosive material
- Should prevent splashing
- Use eye protection, rubber gloves, and protective clothing
- When spilled on skin, flush with large amounts of water

Fluoride

- Victims exposed to large amounts should me removed from area
- Operators should know the hazards contained in MSDS



Alum

- Alum is a mild corrosive
- Use rubber gloves and dust-proof clothing
- Exposure to dry alum dust greater than 15 mg/m3 for more than 8 hours is considered hazardous
- Need respiratory equipment around dry alum dust
- Need eye protection (goggles)
- Ventilation
- Never use the same conveyor system for alum and quicklime
- Potential for explosion

Caustic Soda Safety

- Strong caustic alkali and very hazardous
- Very reactive
- Dissolves human skin
- Generates heat with when mixed with water
- Reacts with amphoteric metals generating hydrogen gas which is flammable or explosive
- Use special precautions when handling

Chemical Safety for Acids

- Chemicals cause visible destruction or irreversible damage to skin tissue at the point of contact
- Swallowing can damage esophagus & stomach.
- Wear personal protective equipment
- Flush affected area with clean water
- Use sodium bicarbonate to neutralize acids
- Add acid to the water

Polymers

- Used as coagulant and filter aids
- Keep polymer dust off floors
- Will create very slippery surfaces when on floors
- Use inert, absorbent material such as sand to clean up spills

Potassium Permanganate

- Strong oxidizing agent, use caution
- Will react easily with organic materials
- Will ignite when in contact with antifreeze, sawdust compounds and many other materials
- All lubricants & fuels are potential fire hazards
- Store separately from other chemicals in a cool dry location
- Use dust masks and rubber gloves when handling & for cleaning up

Activated Carbon

- Is considered the most volatile powder
- Keep away from Cl2 compounds and KMnO4, possible spontaneous combustions
- The main problems are dust and fire control
- Will burn with intense heat, and without smoke or visible flame
- Keep electrical equipment clean
- Carbon dust can cause short-circuit fires
- Use explosion-proof electrical equipment

Explosions

- Don’t use sawdust to absorb liquids
- Powder activated carbon is the most volatile powder
- Methane is the most common combustible gas

Water Storage Information

- Storage Tanks- Buried, Elevated, Above Ground
- Pressure Tanks- Hydropneumatic

Clear Areas

- Tall vegetation
- Overhanging trees
- Landscaping that can hide intruders
- Trim trees and shrubs
- Unobstructed view of critical facilities

Power Sources

- Primary Sources- Power Company
- Auxiliary Sources- Diesel, Natural Gas, & Gasoline Powered Generators.

Offices Inventory

- Buildings
- Computers
- Files
- Transportation- Work Vehicles

Communications Inventory

- Telephones
- Cell Phones
- Radio
- Computer Control Systems (SCADA)

Distribution System Inventory

- Pumps
- Pipes
- Valves
- Appurtenances- Flush Hydrants, Backflow Assemblies, Meters, Regulators, etc.
- Other Vulnerable Points
- Knowing your system is the best way to prevent contamination events & have alternate sources of water

Threats

- 3 stages of threat management are possible, credible, & confirmatory
- 2 side by side activities: threat evaluation and response decisions
- Survivability of a biological agent in the water determines the severity of an event & they are difficult to detect
- Smallpox is a pathogen that has a high rate of secondary transmission
- Examples of biotoxins would be botulinum, anthrax (bacteria), smallpox (virus), plague (bacteria), ebola toxins (virus), etc.

Disasters

- FEMA lists 3 classifications: natural, technological and national security
- Natural hazards are determined by geological location and do not occur as a result of something man-made
- Require resources beyond the capability of local government
- Cyber attacks would be considered technological
- SARA (superfund amendments & reauthorization act) is legislation requiring utilities to report chemicals stored on site

Credibility

- Collection of samples for analysis helps determine the credibility of a threat
- Analytical confirmation is the most reliable means of confirming a water contamination incident

Incident Command System

- A model tool for command, control & coordination of an emergency response to a public crisis
- Emergency Response to Life, Property and Environmental Incidents

Emergency Response Plans

- Preparedness phase in emergency management
- Actions a system would take during an event or disaster
- Assigns specific responsibilities to individuals and teams
- Sets a command structure
- Should be updated annually
- Prepared by local officials
- Elevating the threat level should be based on evidence such as a security breach, along with signs of contamination and abnormal test results

Emergency Response

- An action plan should be a short, concise summary of the emergency response plan
- Lists critical customers
- Accessed by need-to-know personnel only

Four Phases In Emergency Response Planning

- Preparedness- preparing emergency response plans
- Responses- are initial actions taken during an emergency or disaster
- Recovery-
- Mitigation- actions taken to prevent an emergency or to lessen the harmful effects of an emergency such as backflow prevention

Alarm Systems

- Alarm system that notifies authorities and system personnel of intrusion
- Should be considered for buildings, tanks, pump houses, & treatment facilities.

Key Control

- Interlocking locks
- Contractors keys
- Control key access to critical components of system
- Accountability for those having access
- Do not duplicate engraved on keys
- Change pass codes and retrieve keys when employees are terminated from employment

Neighborhood Involvement

- Raise awareness around facilities with flyers, bill stuffers, or personal interaction
- Notify neighborhood watch programs
- Disposable cameras
- Give call down list to neighbors of whom to call

Exterior Lighting

- Good deterrent
- Intruders can be seen and detected
- Motion Sensors
- Perimeter Lighting

Fencing Critical Infrastructure

- All critical facilities should have perimeter security fencing
- Should be inspected frequently
- Secured with chains & tamper proof locks
- Concrete jersey barriers should be considered to guard against accidental or intentional vehicle intrusion

Cyber Security

- Hard wired systems are more secure than wireless systems
- Secondary passwords are designed to ensure at least two people are aware of changes being made to critical information technology programs

Computer Protocols

- Password protected and changed every 90 days
- Firewall protection
- Virus software that allows continuous upgrades
- Cyber attack is an example of a technological threat
- Backup files should be stored at an off-site location

Treatment Plants

- Chemicals delivered with system personnel present
- Chemicals w/tamperproof seals
- Drivers I.D. should be checked by the operator
- Discuss security with suppliers
- Suppliers should background check their employees
- Store hazardous chemicals properly
- Monitor raw water
- Match all delivered goods with manifest and purchase order

Warning Signs

- Hazardous chemical buildings should have secure & restricted access
- Facility Protected by Federal Law
- Unauthorized Access Prohibited
- Employees Only
- Authorized Personnel Only

Public Awareness

- Uniforms
- Employee I.D. cards for personnel
- System logos on water system vehicles
- Any critical items should be removed such as maps, computers, keys, tools, etc.

Methods of Estimating Contamination Spread

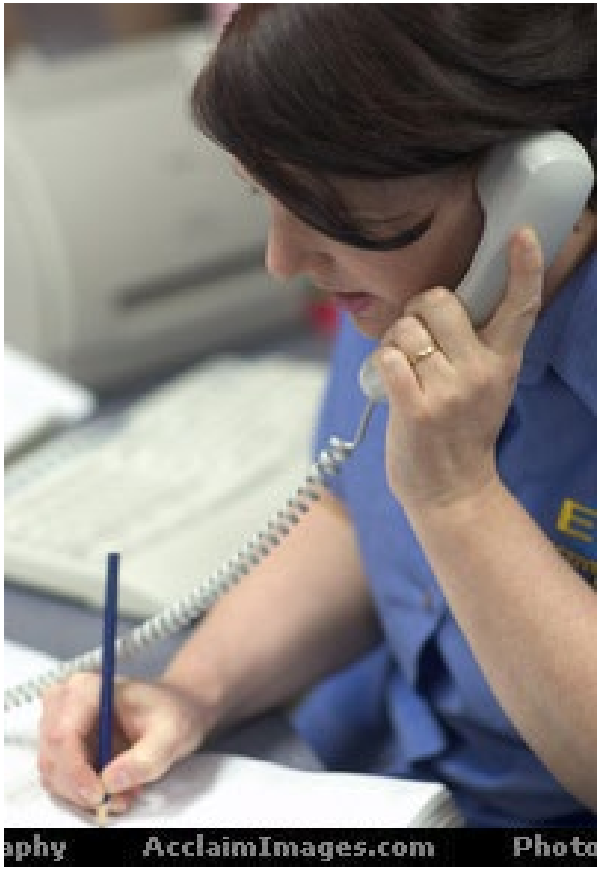
- Water flow analysis
- Hydraulic modeling
- Areas of customer complaints
- Field analysis
- Precursors to a contamination event can be on-line monitors that detect an unexpected change in pH and chlorine residual.
- Sarin is an example of chemical contamination

Distribution System

- Control use of fire hydrants and valves with locks
- Monitor system for constant positive pressure
- Implement backflow prevention program

Checklist

- How to handle threatening phone calls
- How to handle complaint phone calls
- How to handle suspicious activity reports
- Use of reverse 911 to warn public



Sensitive Information

- Remove sensitive information from Web
- Are maps, records and sensitive information in a secure location and labeled “Confidential”?
- Secure vehicles: maps, sensitive information, tools, keys, etc. could be stolen and should not be left in vehicle

Outreach

- How will you contact all customers within 24 hours of an emergency?
- Appoint a media spokesperson
- Contact nursing homes, hospitals, schools, & prisons or anywhere immune-compromised people may reside

Public Relations

- One spokesperson
- Restrict sensitive information distribution
- Procedure for public notification in the event of an incident
- Procedures for customer complaint calls on taste, odor, color or other physical changes in water quality