

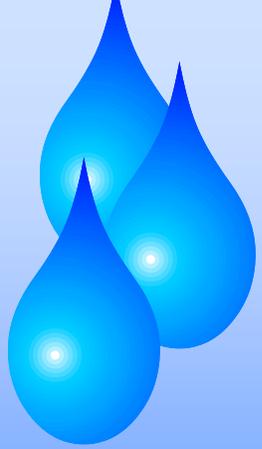


Infrastructure Security for Public Water and Wastewater Utilities

**Presented by
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Kentucky Rural Water Association**

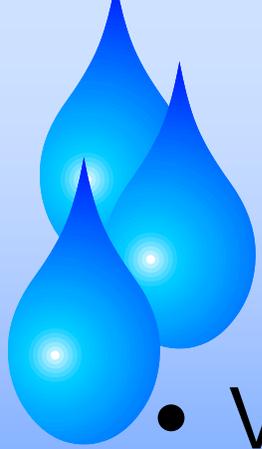
July 19, 2005





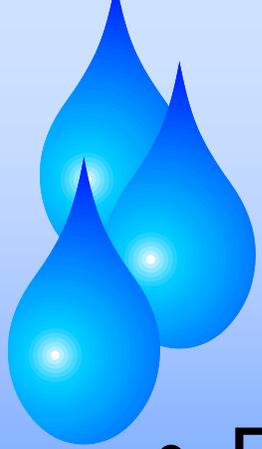
Public Health Security and Bioterrorism Preparedness and Response Act of 2002

Drinking Water Safety and Security



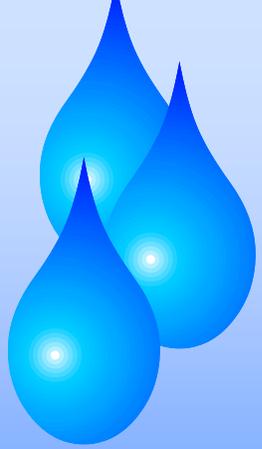
Requirements

- Vulnerability Assessments
 - >100,000 population by March 31, 2003
 - 50,000 – 100,000 by December 31, 2003
 - 3,300 – 50,000 by June 30, 2004
- Emergency response plans
 - within 6 months of vulnerability assessment
- USDA additional requirements
 - All borrowers both water and wastewater must complete VA and ERP no matter population



What is a Vulnerability Assessment

- Evaluate a utility to determine what threats (terrorist, vandal, etc) they may be susceptible to
- Identify corrective actions that can reduce or mitigate the threats.
- Provides a guide to utility that prioritizes upgrades and procedural policy changes



EPA Guidance

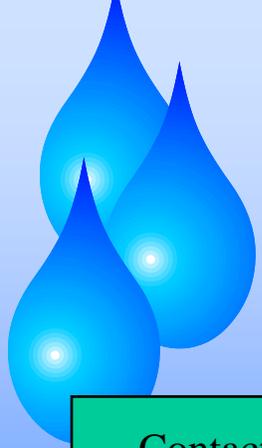
Common Elements of Vulnerability Assessments

1. Characterization of the water system, including its mission and objectives;
2. Identification and prioritization of adverse consequences to avoid;
3. Determination of critical assets that might be subject to malevolent acts that could result in undesired consequences;
4. Assessment of the likelihood (qualitative probability) of such malevolent acts from adversaries;
5. Evaluation of existing countermeasures; and
6. Analysis of current risk and development of a prioritized plan for risk reduction.

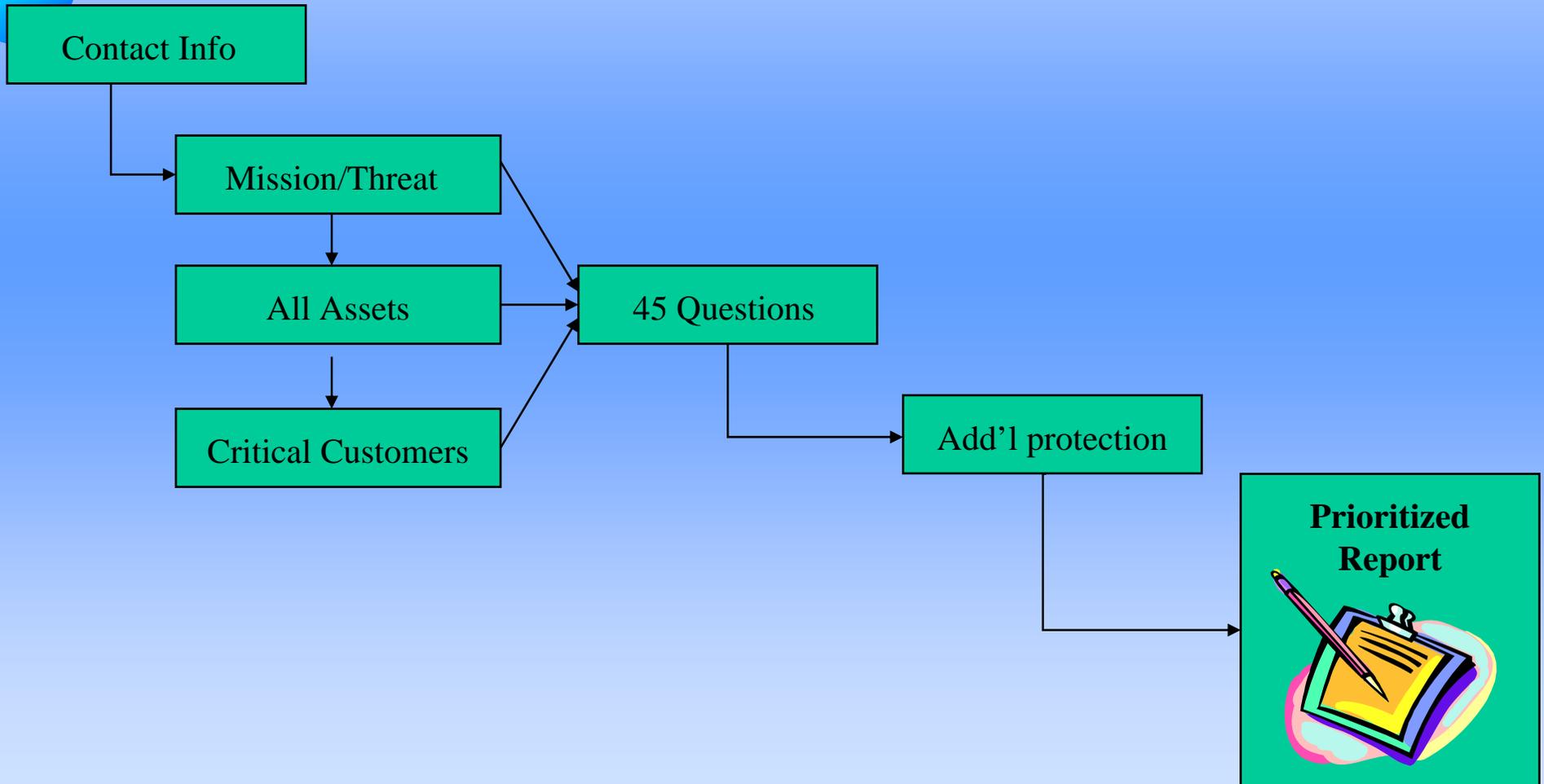


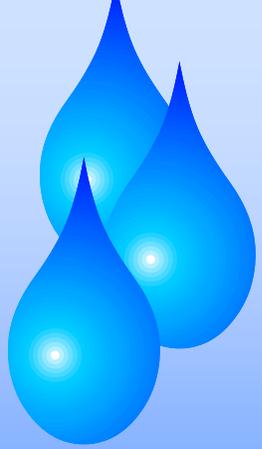
What is the Reality of a Breach?

- What scenarios or events could compromise a utility?
- Are they possible?
- What is the likelihood?



The “SEMS” VA Process





What is the Mission of my Utility?

- Mission of the utility
 - Safe potable water?
 - Fire protection?
 - Protection of public health?
 - Protection of the environment
 - Others?
- Is one mission more important than the other
 - Fire protection vs. safe water
 - Rural vs. city
- Increase in mission (or threats) invariably increase costs.

Step 1:
Mission



How could an attack take place?

- **Threats**
 - Vandal
 - Disgruntled employee
 - Terrorist
 - Other
- **For assistance:**
 - Evaluate history of community
 - Contact local law enforcement, FBI, DHS
 - U.S. EPA “Baseline Threat Information” document

Step 4:
Threats



What are the Critical Assets in my System?

- Identify all assets of utility
- Other concerns
 - Redundancy – spare pumps, parts, pipe
 - Back up power - Generator
 - Geographic importance
 - Critical customers (hospitals, govt buildings, etc)
 - Highest area or percentage of customers

Step 3: **Critical
Assets**



What are common critical assets at Water Utilities?

Typical single points of failure:

- Intake pumps
- Pumping stations
- Well pumps and motors
- Treatment facilities
- Chlorinator
- Chemical feeds
- Piping and distribution system
- Clear wells (ground water storage)
- Elevated storage (water towers)
- Power supply
- Others

Step 2:

What to Avoid



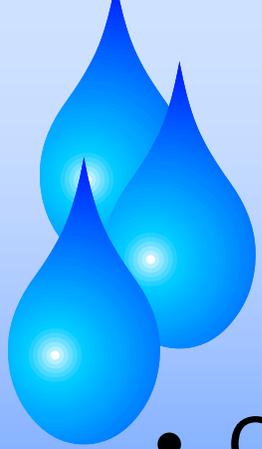
What are common critical assets at Wastewater Utilities?

Typical single points of failure:

- Lift stations
- Manholes
- Collection system
- Treatment facilities
- Chlorinator
- Chemical feeds
- Power supply
- Others

Step 2:

What to Avoid



So, is Everything Critical?

- Can't protect against everything – What will take you out the quickest?
- What is the easiest target to hit?
- What are my most critical customers? – Govt, military, industry, densely populated?
- Think about
 - How long would you be down?
 - How widespread would the impact be?
 - How severe?

Step 2:

What to Avoid



What are the most effective protective measures based on threat?

- Based on the threat, identify single points that if attacked would impact mission, critical customers, or disrupt service to many customers -
 - For example
 - Could not serve water to 70% of community
 - Could not provide adequate water for fire fighting
 - Power plant would not be functional
 - Contaminate streams or public health
- **Countermeasures needed – 45 questions**

Step 4:
Threats

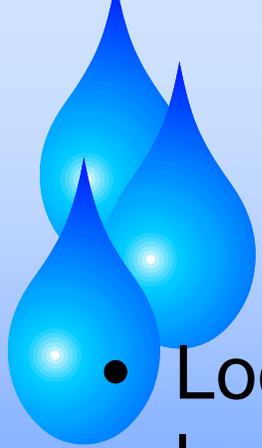


What protection do I currently have?

- Existing detect, delay, respond
- Existing cyber protection
- Existing security policies and procedures

Steps 4 and 5 are done simultaneously in SEMS

Step 5:
Existing Security



How Should I Prioritize?

- Local decision based on threats, location, size, resources, local information, etc.
- For example – With limited resources
 - Pump station responsible for serving few of the total community, customers located in rural area, and no critical customers – Finding: LOW priority
 - PWS name not displayed on vehicle - Finding MED priority
 - No neighborhood watch program – Finding: HIGH priority
 - No controlled use of hydrants – Finding: HIGH priority
 - Critical facilities unlocked – Finding: HIGH priority

Step 6:

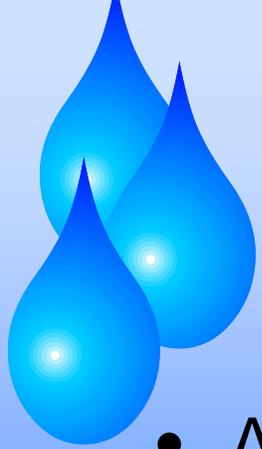
Prioritization



What can I do to protect my System?

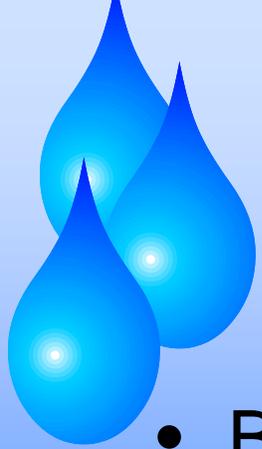
- Reduce DETECTION time – policies and procedures, alarms, video, lighting
- Increase DELAY time– barriers, locks, fences, security guards, neighborhood watch
- Reduce RESPONSE Time – planning, coordination, and training

Step 6:
Prioritization



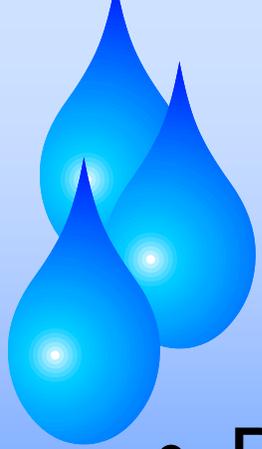
DETECTION

- Access Control – Card keys, punch codes,
- Manual – CCTV, check ID's
- Alarms
- Motion detectors
- High tech intrusions sensors
- Inspect deliveries
- Landscape maintenance
- Lighting
- Raw and finished wastewater monitoring



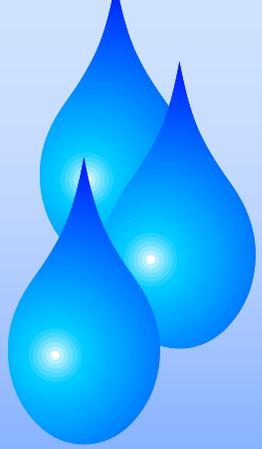
DELAY

- Barriers
 - Jersey barriers
 - Vehicle tires
 - 55 gallon barrels
- Fences
 - Chain link
 - Barbed or Razor wire
- Locks – gates, fences, doors, windows, hatches, fill pipes
- Harden doors and hinges



RESPONSE

- Public warning system
- Flow gates to divert contaminants
- Use alternative to gaseous chlorine
- Coordination with local first responders
- Emergency response plan
- **PRACTICE and TRAINING!**

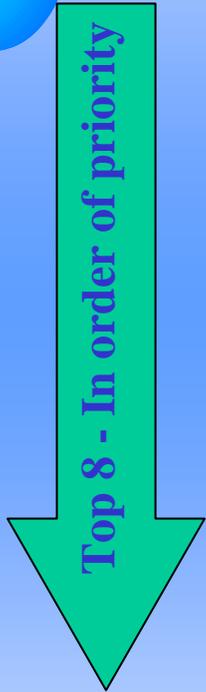


Results

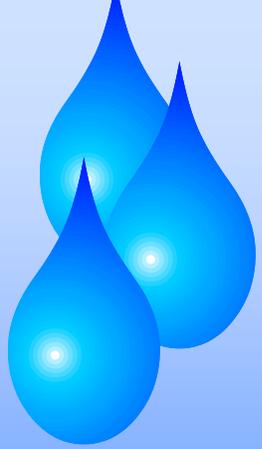


Common Security

Enhancements Systems < 10,000



- Employee awareness and training
- Fencing
- Locks
- More patrols
- More signs
- Neighborhood watch
- Intrusion alarms
- More lighting



Questions?