Wisconsin Wastewater Operators’ Association
Physical Security for Facilities

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Physical Security for Facilities

Introduction

- Welcome
- Security Planning and Evaluation
- Security Systems – Technologies and Trends
- Available Funding Sources
- Q&A
Physical Security for Facilities

Security Planning and Evaluation

- History

Pentagon Washington, D.C.
Building Safety vs. Building Security

Building Safety
- How a building functions given a predefined event. e.g. Power Outage, Flood, Chemical Spill, etc...
- Building Codes IBC, BOCA, NFPA address minimum building performance requirements

Building Security
- How a building functions in regards to prevention and detection of intentional, humanly motivated threats
- No prescriptive codes are available
the **BIG** question

What security measures should be implemented and where should they be used?
Security Planning and Evaluation

- Security Risk Assessment
  - The Risk Assessment is used to develop the DBT, or Design Basis Threat

- Security Plan Evaluation
  - The Security Plan Evaluation is a “checks and balance” approach to ensure that the Risk Assessment DBT has appropriately been addressed given the size and type of facility.
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Security Planning and Evaluation

- Assessment Methodology

- Asset Value Assessment (Section 1.1)
- Vulnerability Assessment (Section 1.3)
- Threat/Hazard Assessment (Section 1.2)
- Risk Assessment (Section 1.4)
- Identify Mitigation Options (Chapters 2 and 3)
- Cost Analysis
- Decision (Risk Management) (Section 1.5)
- Analyze how mitigation options affect asset criticality and ultimately risk
- Benefits Analysis
- Analyze how mitigation options change vulnerability and ultimately risk

FEMA 426; 2003
Assessment Methodology – Evaluating Asset Risk Level

- **Asset Categorization and Identification**
- **Identify Threats for Each Asset**
- **Determine Criticality**
  1. Very High
  2. High
  3. Moderate
  4. Low
- **Identify Countermeasures Already In Place**
- **Assign Vulnerability Rating**
  A. Very High
  B. High
  C. Moderate
  D. Low

<table>
<thead>
<tr>
<th>CRITICALITY RATING</th>
<th>Vulnerability Level</th>
<th>Loss Event Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Very High</td>
<td>A Very High</td>
<td></td>
</tr>
<tr>
<td>2 High</td>
<td>B High</td>
<td></td>
</tr>
<tr>
<td>3 Moderate</td>
<td>C Moderate</td>
<td></td>
</tr>
<tr>
<td>4 Low</td>
<td>D Low</td>
<td></td>
</tr>
</tbody>
</table>

**Determine Risk Level**

**Determine Acceptability of Risk**

<table>
<thead>
<tr>
<th>Asset Risk Level</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A, 1B, 1C, 2A, 2B, 3A</td>
<td>These risks may be addressed by management as a top priority to be controlled or eliminated.</td>
</tr>
<tr>
<td>1D, 2C, 2D, 3B, 3C</td>
<td>These risks may be unacceptable; however management may choose to formally accept these risks.</td>
</tr>
<tr>
<td>3D, 4A, 4B, 4C, 4D</td>
<td>These risks may be accepted upon management’s review.</td>
</tr>
</tbody>
</table>

**Identify Improvements for High Risk Assets**

**Perform Cost Benefit Analysis**

**Iteration Necessary to Identify Improvement Efficacy**

**Business Continuity Plan**
- Readiness
- Response
- Recovery

AMSA; 2002
Published Risk Assessment Guidelines

- Security Vulnerability Self-Assessment Tool – Association of Metropolitan Sewerage Agencies (AMSA)
- Guidelines for Physical Security of Wastewater and Stormwater Utilities, ASCE/AWWA
- Protecting Your Community’s Assets: A Guide for small Wastewater Systems, National Environmental Services Center (NESC)
- RAM-W; Risk Assessment Methodology for Water Utilities, DOE Sandia National Laboratories
Now that the **BIG** question has been answered....

What are my options for Security System designs?
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Security Systems – Technologies and Trends

- Basic Components of Security
  - Detection
    - The security system should be able to identify the presence of a threat
    - e.g. Video Surveillance, Door Position Switch, Motion Detectors
  - Deterrence
    - The security system’s ability to delay the occurrence of threat.
    - e.g. Signage, Fencing, Lighting, Building/Site Configuration
  - Response
    - The ability to respond or intervene to a threat in a timely manner.
    - Directly related to Deterrence
    - e.g. Owners established procedures to intervene
Security Component Relationship

Intrusion Event Begins

Intrusion Event Ends

Device Detection

First Alarm

Detection Time

Alarm Acknowledged

Response Time

Apprehend Adversary

Overall System Response Time

System Deterrence Time

Threat Completion Time
Security Systems – Technologies and Trends

Standard Security System Design

- **Site Security**
  - Perimeter Protection; Video Surveillance, Fences, Lighting, etc...
  - Crime Prevention Through Environmental Design, (CPTED)

- **Building Security**
  - Building Envelope; Roof, Doors, Windows, Access Controls, Motion Sensors, Glass Break Sensors etc...
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Security Systems – Technologies and Trends

Site Security System Design

GARDENER STREET
LIFT STATION
Physical Security for Facilities

Security Systems – Technologies and Trends

Site Security/Perimeter Protection Devices

- Fencing/Intrusion Detection Systems
  - Fence Disturbance Sensors and Beam Type Motion Sensors

Diagram of GARDENER STREET LIFT STATION
Fence Disturbance Sensor

Description: Microphonic Sensor that is woven through the fence material. The sensor detects flexing of the coaxial core.

Application: For protection of existing fences & structures against climbing, lifting or cutting. The cable is attached by means of special cable ties at 30cm intervals.

Advantages: Quick and simple to install, relatively inexpensive, zone lengths up to 350m, immune to EMI & RFI.

Possible Causes of Nuisance Alarms: Extreme weather, contact by large animals, badly maintained fences, overgrown vegetation.
Site Security/Perimeter Protection Devices

- Exterior Beam Type Motion Sensor
  - **Description:** Infrared or Photobeam Motion sensor emitting multiple beams.
  - **Application:** Can be used to provide secondary levels of protection or to cover gateways & openings etc.,
  - **Advantages:** Low cost, easy to deploy & maintain..
  - **Possible Causes of Nuisance Alarms:** Overgrown vegetation, fog, heavy rain/snow, large animals, movement of mounting posts, severe temperature changes.
Site Security/Perimeter Protection Devices

- Facility Gate Controls
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Security Systems – Technologies and Trends

Site Security/Perimeter Protection Devices

- Facility Gate Controls
  - Automatic Gate Operator
  - Interface with Building Access Control System
  - Interface with SCADA system to automatically open and close based on facility operation hours
Security Systems – Technologies and Trends

Site Security/Protection Devices

- Site Lighting

Diagram of a site with lighting fixtures marked around the perimeter and inside the lift station.
Security Systems – Technologies and Trends

Site Security/Protection Devices

- Site Lighting
  - Average Illuminance of 1.0 FC with 12:1 Uniformity
  - Lighting levels should be increased by facilities entrance
  - Some Municipalities may have special local lighting requirements that need to followed
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Security Systems – Technologies and Trends

Site Security/Protection Devices

- Video Surveillance
  - Fixed Camera
  - PTZ Camera
  - Digital Recording
  - Transmitting Video Images from Remote Sites
Site Security/Protection Devices

- Design Consideration for Video Surveillance System
  - PTZ vs. Fixed Camera
  - Fixed Lens Selection
    - Varifocus
    - Auto Iris
    - Viewing Angles
  - Color vs. Black/White
  - Camera Mounting
  - Line-of-Site Obstacles
Security Systems – Technologies and Trends

Site Security/Protection Devices

- Video Surveillance
Site Security/Protection Devices

- Video Surveillance System/Riser Diagram
Building Security

- Building Envelope
- Building Layout
- Building Detection Systems
Building Security/Building Envelope and Layout

- Building Facade Openings, Doors, Windows, Overhead Doors
  - Size
  - Location
  - Material

- Building Construction Methods
- Location of Assets
- Building Entrances
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Security Systems – Technologies and Trends

Building Security/Building Envelope and Layout
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Security Systems – Technologies and Trends

Building Security/Electrical Systems
- Security and Access Control Systems (Card Readers)
- Motion Sensor
- Glass Break Detectors
- SCADA
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Security Systems – Technologies and Trends

Building Security/Sample Building Layout
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Security Systems – Technologies and Trends

Security System Design Applications – Site

Fond du Lac Water Pollution Control Plant
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Security Systems – Technologies and Trends

Security System Design Applications – Site
Fond du Lac Water Pollution Control Plant

Facility Entrance

- Fencing
- Video Surveillance
- Facility Gate Access Control
- Lighting
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Security Systems – Technologies and Trends

Security System Design Applications – Video Surveillance

Fond du Lac Water Pollution Control Plant
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Security Systems – Technologies and Trends

Security System Design Applications – Video Surveillance

Fond du Lac Water Pollution Control Plant
Available Funding

- Clean Water Fund Program (Small Loan)
  - [http://dnr.wi.gov/org/caer/cfa/EL/Section/clean.html](http://dnr.wi.gov/org/caer/cfa/EL/Section/clean.html)
  - Wisconsin – CWFP (Small Loan)
    - Dave Calhoon
    - [David.Calhoon@Wisconsin.gov](mailto:David.Calhoon@Wisconsin.gov)

- Department of Homeland Security Grant Program
  - Wisconsin - Homeland Security Contact
    - BG Donald Dunbar
    - Homeland Security Advisor
    - PO Box 8111
    - Madison, WI 53707-8111
    - 608-242-3000
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Summary

- Security is a constantly evolving issue

- Security Risk Assessments
  - Review
  - Make Adjustments
  - Implement
Questions

- Any questions?