Physical Security

Critical Infrastructure

RELIABILITYFIRST Security Working Group

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- 30+ Years Physical Security Experience
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Presentation Goals

1. Provide an overview on NERC CIP-014 Standards
   - Threat and Vulnerability Assessment Overview (R4)
   - Security Plan Overview (R5)
2. Discuss common physical security challenges for utilities
3. Physical security concepts
   - Performing Vulnerability Assessments (R4)
   - Security Plans (R5)
   - Security Measures (R4 & R5)

What level of protection do you need?

CIP 014-2 Standards R4

CIP-014-2 Requirements at a Glance

- R1: Risk Assessment
- R2: Unaffiliated third party risk assessment verification
- R3: Primary Control Center
- **R4: Potential threats and vulnerabilities evaluation**
- **R5: Physical security plan**
- R6: Unaffiliated third party R4 and R5 verification

CIP-014-2 Requirement R4

- The R4 evaluation must consider:
  - Unique characteristics of the identified and verified CIP-014-2 asset
  - Prior history of attacks on similar facilities
    - Frequency
    - Geographic proximity
    - Severity of past physical security related events
  - Intelligence or threat warnings
    - Law enforcement
    - Electric Reliability Organization (ERO)
    - Electricity Information Sharing and Analysis Center (E-ISAC)
    - U.S. federal agencies
    - Canadian government agencies

R4 Threat & Vulnerability Assessment

- Usually based on expert judgement using:
  - Asset Identification & Unique Characteristics
  - Threat Identification (history & intelligence, credible, likely, prioritized)
  - Security Effectiveness Assessment
    - Current protective measures
    - Threat Analysis
    - Vulnerability/Gap Analysis
    - Consequences (partial and total)
  - Recommendations
  - Security Design and Mitigation Elements (Planning)

R4 TVA Common Challenges

- Lack of expertise/knowledge
- Did not use established analysis tools (DBT, RAM, CARVER, etc.)
- No path analysis (Adversary Sequence Diagrams)
- Lack of layered protection schemes
- Obvious threats are not analyzed
- Overlook high impact/low frequency events
- Threat identification is generalized, not specific
- Improper ballistic threat and IED protection
- No planning for insider threats and collusion
- No rationale for including or excluding threats
- Recommendations are not completed or follow-up is lacking

CIP 014-2 Standards R5

CIP-014-2 Requirement R5

- The R5 security plan
  - Developed within 120 days of R2 verification
  - Executed according to specified timeline
  - Resiliency or security measures:
    - Deter, detect, delay, access, communicate, and respond
    - Vulnerabilities identified in R4 evaluation
  - Law enforcement contact or coordination information
  - Physical security enhancements and modifications timeline
  - Provisions to evaluate:
    - Evolving physical threats
    - Corresponding security measures

Physical Security Misconceptions

- All barriers offer similar protection.
- Detection (and assessment) may only utilize equipment/condition sensors.
- Detection (and assessment) should only be within the site perimeter.
- Assessment is often assumed if there are operable surveillance cameras present.
- The assumption of an effective response by an unarmed employee or security officer.

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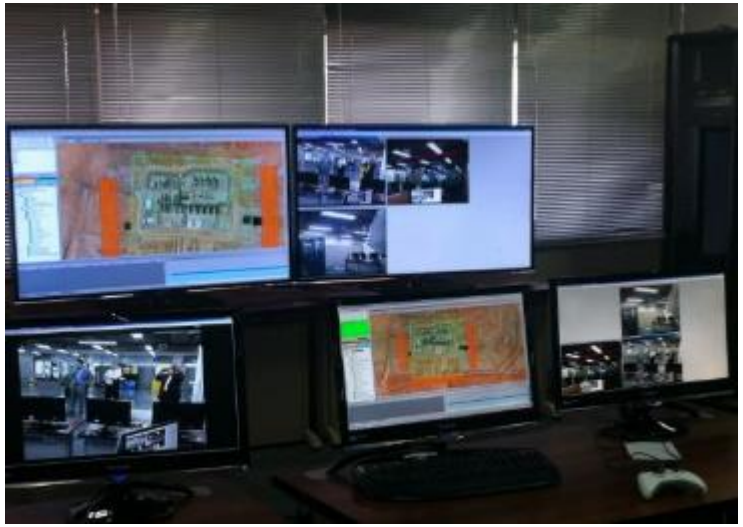
Courtesy of AMICO Security.

R5 Security Plan Common Challenges

- Resiliency or Security?
  - Collectively must Deter, Detect, Delay, Assess, Communicate & Respond to the threats and gaps identified in the TVA (R4).
  - Single points of failure
- Evaluation of the effectiveness of chosen security measures by site
- Timeliness for deployment of countermeasures
- Law enforcement coordination, and lengthy response times
- Evaluation of evolving threats and countermeasures by site
- Assume that bad things can happen. Flexibility to adapt is critical.
- Using templates and boilerplates for different sites

Basic Concepts of Physical Security

1. Deter
2. Detect
3. Delay
4. Assess
5. Communicate
6. Respond



Feature Based Criteria

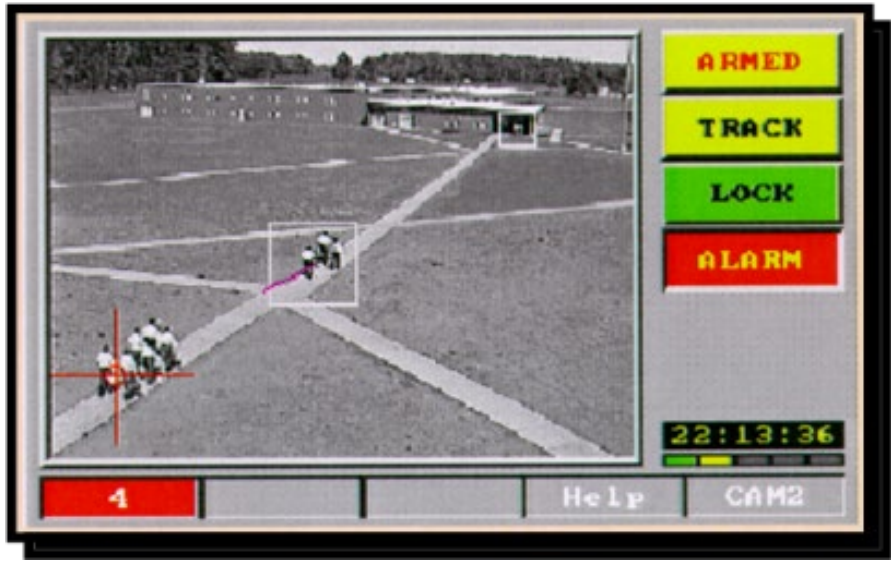
- Selects elements or procedures to satisfy requirements.
- Effectiveness measure is the presence of the features. (i.e. checklist only)
- Should generally be avoided or used with care
  - Will they perform as anticipated?
  - Will they work at night?
  - During inclement weather?
  - Under stress?
  - Are there any conflicts?

Performance Criteria

- Elements and procedures
  - Contribute to overall system performance
  - Not just a checklist
  - Baseline (existing) conditions verses requirements and amount of improvement can be determined.
  - Increase in system effectiveness verses the cost of program upgrades (Cost-Benefit)

Performance Testing of Systems

- Each device should be tested (Camera, intrusion sensor, card reader, lock, etc.)
- Each subsystem countermeasure should be tested (IDS, CCTV, Access Controls)
- The entire protection system should be tested for operation
- The entire system should be analyzed against all known and perceived (and potential) threats
- Document results



Perimeter Barriers

- Visibility
- Height
- Installation
- Reinforcement
- Ballistic ratings
- Intrusion sensors
- Vehicle ratings

Ballistic Threat Considerations

- Ballistic Protection should be based on identified threats
- Pistol and rifle calibers (Ratings)
- Approximate distances
- Consider vandals and accidental damages
- Site accessibility
- Response protocols
- Wind load / maintenance / engineering / oh yeah cost!

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Courtesy of Ameristar/ASSA ABLOY

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Gunshot Detection

- Coverage area
- Integration with video management
- Fixed/Mobile/Indoor/Outdoor
- Response force and protocols
- Privacy
- Budget

Protect Your Mobile Units

NERC CIP-014-2 Program Snags

- Focus on great security – do not just interpret the standards to meet the minimum level of protection.
- “It will never happen here”. Proven to be a wrong assumption.
- Accepting the risk. This is not appropriate for critical assets.
- Not meeting the timeline requirements and schedule for the program enhancement, risk analysis and implementation of security upgrades.
- Not involving engineering, operations and IT in the process.
- Using consultants that lack competency and knowledge.

You do not rise to the level of your goals.

You fall to the level of your program.

Final Thoughts

- Electricity = Life. I believe the greatest threat to our nation is an attack on the grid. The CIP-014 standards are designed to provide more than just physical protection; they have been developed to provide a holistic approach in preserving our nations critical infrastructure.
- Use a team approach. Everyone is important. If you don’t know something, find someone who does. Pride is the enemy of security.
- Lead. Do the right things. Develop, improve and inspire everyday.
- Adjust your sails. Solve problems.

Questions

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Thank You for Participating!

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