

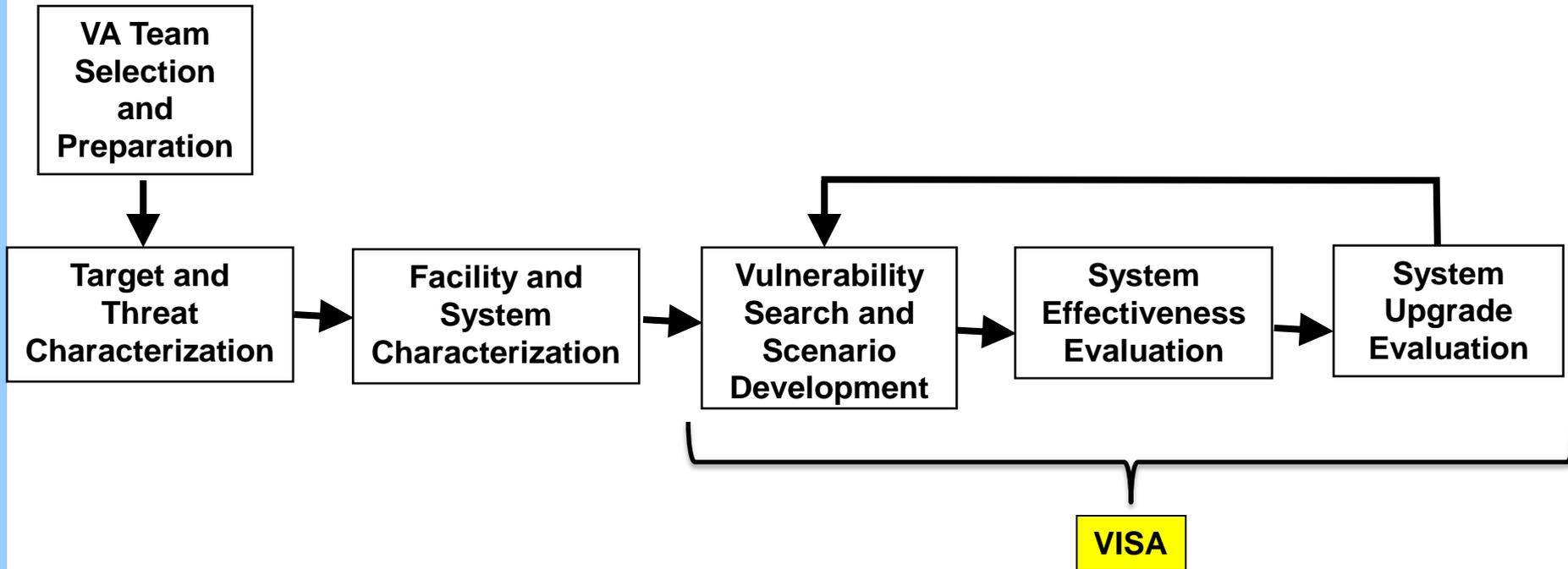


Module 2

System Effectiveness Evaluation Process

*A standard sequence of steps to evaluate
system effectiveness regardless of analysis
methodology*

System Effectiveness Process



VA Team Selection

VA Core Team Members

- Vulnerability analyst
- MC&A specialist
- Physical protection specialist
- Facility operations
- Performance testing
- Protective force

VA Team Selection Criteria

- Experience
- Team diversity
- Integration

VA Support Team Members

- Facility management
- PP maintenance
- MBA custodians
- MC&A measurements
- Nuclear material handlers
- Shipments
- Waste management
- Safety
- Nuclear criticality
- Other managers and experts as needed

VA Preparation

- **Gather documentation**
 - **Engineering Drawings & Blueprints**
 - **Photographs**
 - **Performance Assurance Information**
 - **Facility Operating Procedures**
 - **Current MC&A Procedures**
 - **Emergency Procedures**
 - **Security Alarm Test Reports & Procedures**
 - **Security Alarm Maintenance Procedures**
- **Tour the site**
 - **General Site**
 - **Buildings**
 - **Processes**

Target Characterization

- **Identify targets to be evaluated:**
 - **Nuclear materials**
 - **Theft Targets**
 - Discrete items
 - Bulk materials
 - **Strategies**
 - Abrupt Theft
 - Roll-up
 - Protracted Theft
 - **Sabotage Targets**
 - Radiological
 - Facilities and Equipment



Target Characterization

(continued)

- **Material quantity**
- **Material locations and flow through the facility**
 - **Identify vulnerabilities and determine attack opportunities**
 - **Consider rollup**

Target Characterization

(continued)

- **Rollup**
 - **The accumulation of smaller quantities of special nuclear material to a target category**
 - **MPC&A Measures may be less restrictive for smaller quantities**
 - **Physical protection**
 - **Surveillance measures**
 - **Access controls**
 - **Inventories (less frequent, smaller samples)**
 - **Determine if credible**

Target Characterization

(continued)

- **Document Target Material Descriptions:**
 - **Location**
 - **Outer and inner container descriptions (size, weight)**
 - **Nuclear material description (size, weight, configuration, portability, enrichment, etc.)**
 - **Accessed/secure frequencies**
 - **How often material is removed from container**

Target Prioritization

More attractive



Less attractive

Most Protection



Least Protection

Smallest quantities

Largest quantities

Level of protection is consistent with consequence of loss.

“Less Than Target Quantity”

- **Based on incidents reported to IAEA, only a few involved seizures of kilogram quantities of weapons-usable nuclear material. Most involved very small quantities.**

(See Appendix A for details.)

Threat Characterization

- **Design Basis Threat**
 - **Defines the threat MPC&A systems must perform against**
 - **Based on threat assessment**
 - **Periodically reviewed and revised**

Threat Characterization

(continued)

- **Threat definition**
 - **Types of adversaries**
 - **Insiders**
 - **Outsiders**
 - **Insider/Outsider collusion**
 - **Range of adversary tactics**
 - **Capabilities**
 - **Motivation**

Facility Characterization

Process

- **Philosophy**
 - Document major assumptions
 - Methodical and comprehensive
- **Steps**
 - Gather information
 - Documentation
 - Interviews
 - Obtain or develop facility schematics for analyzing possible adversary paths and target(s)
 - Characterize MPC&A measures
 - Identify facility states (shifts, hours of operation, configuration)

Facility Characterization

(continued)

- **Gather information related to key targets**
 - **Site, facility, and MPC&A system components**
 - **Physical protection plans and procedures**
 - **Security posts, plans and procedures**
 - **Material control and accountability plans/procedures**

Facility Characterization

(continued)

- **Information sources:**
 - **Facility tours**
 - **Architectural diagrams**
 - **Interviews with management and workers**
 - **Safeguards and security and material control and accountability plans**
 - **Maintenance and operating procedures**
 - **Safety analysis reports**
 - **Previous vulnerability assessments, audits, surveys, etc.**

Facility Characterization

(continued)

MPC&A Functions



Detect & Assess

- Intrusion Sensing
- Alarm Communication
- Alarm Assessment
- Entry Control
- Measurements
- Radiation Monitoring
- Inventory



Delay

- Passive Barriers
- Active Barriers



Respond

- Engagement:
 - Communication to Response Force
 - Deployment of Response Force
- Neutralization

Facility Characterization

(continued)

- **Protective Force**
 - **Staffing levels and locations for all different operating shifts**
 - **Equipment (weaponry, ammunition, body armor)**
 - **Communications equipment (radios, pagers, cellular telephones)**
 - **Training and capability**

Vulnerability Search and Scenario Development

- **Exploit potential vulnerabilities**
- **Develop for each specific adversary type**
 - **Insider scenarios**
 - **Outsider scenarios**
 - **Insider/Outsider collusion scenarios**

Insider Scenario Development

- **Define personnel types**
 - **Access to facility and target locations**
 - **Hands-on**
 - **System maintenance**
 - **Supervision**
 - **Material movement**
 - **Shipment requirements**
 - **Remove material**

Insider Scenario Development

(continued)

- **Group Insiders**
 - **Combine personnel types**
 - Same authorized access
 - Authority over protection
 - Knowledge
 - Similar safeguards performance
 - **Group Attributes**
 - Hands-on
 - MC&A records
 - Transfer material
 - Alarms
 - Security

Insider Scenario Development

(continued)

- **Range of insider tactics**
 - **Exploit knowledge**
 - **Abuse authority**
 - **Tamper with components**
 - **Shield material**
 - **Falsify records**
 - **Hide material**
 - **Create emergency**
 - **Defeat delay**

Outsider Scenario Development

- **Determine needed information**
- **Plan approach to facility**
 - **Foot, vehicle, or airborne**
- **Entry method**
 - **Deceit**
 - **Stealth**
 - **Overt action**

Outsider Scenario Development

(continued)

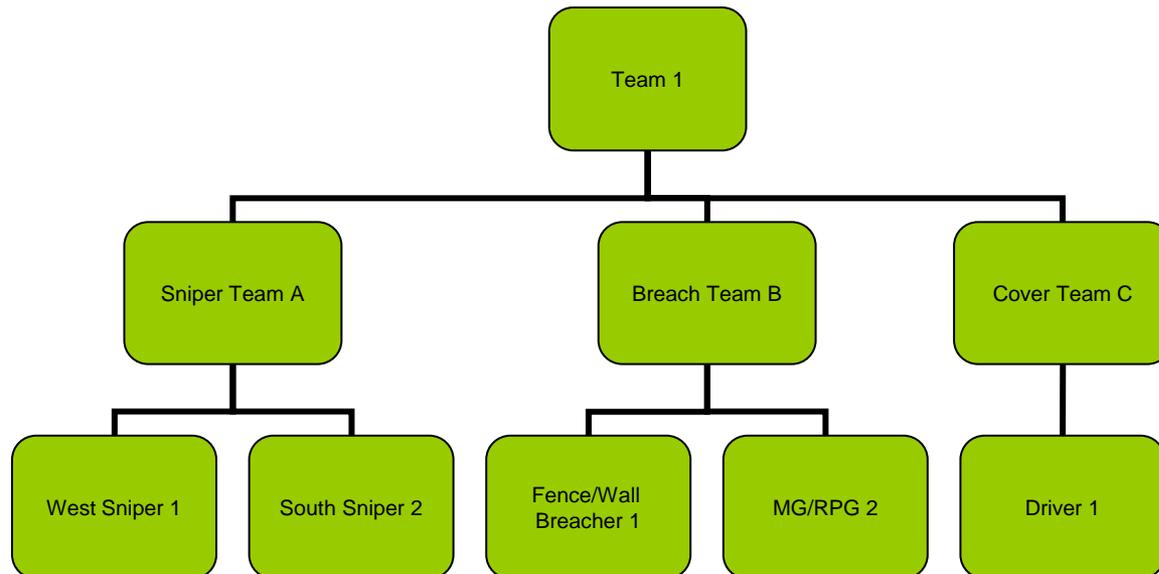
Attack Plan

- **Develop Adversary Force Organization**
- **Identify Equipment and Weapons**
- **Consider Pre-Attack Activities**
- **Develop Concept of Operation**
- **Develop timeline**

Outsider Scenario Development

(continued)

Example Adversary Team



Outsider Scenario Development

(continued)

- **Facility entry considerations**
 - **Doors / surface / windows**
 - **Barrier penetration**
 - **Explosive entry or hand/power tools**
- **Material Acquisition**
 - **Target task time**
 - **Tie-downs**
 - **Containers**
 - **How much material and what type**
 - **Weight**