SAND2007-3716P

Part I: Planning for a Security Risk Assessment

Screening Process

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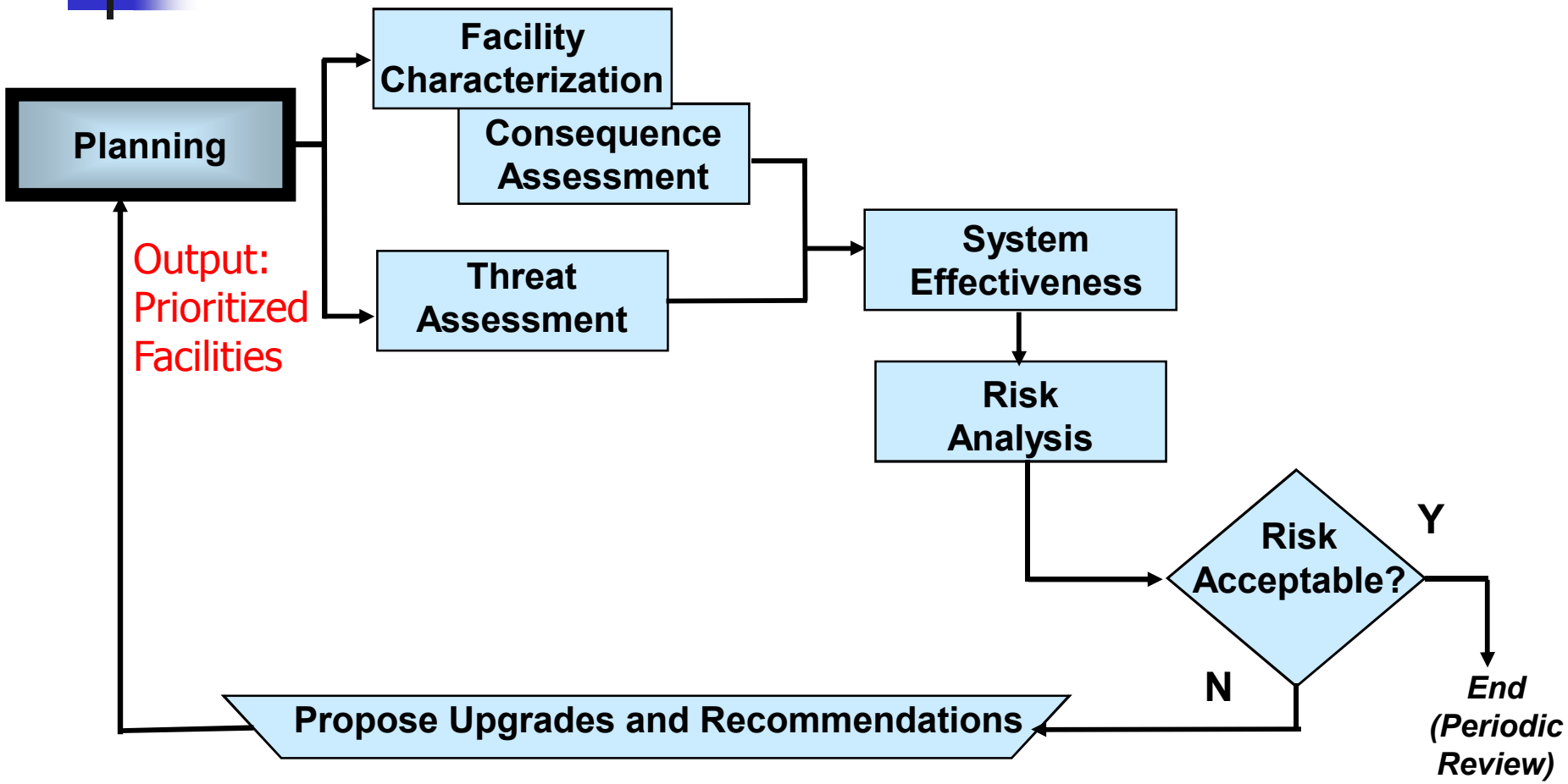
Risk Assessment Methodology for Communities (RAM-C)



Module Objectives

- Introduce screening process
  - Prioritize community facilities
- Apply screening process to select and prioritize facilities for further evaluation

Community Screening

- Selecting facilities of most concern, using a formal structured process
- Objective is to produce a prioritized list of facilities
- Recognize that higher priority facilities have higher consequence of loss

Examples of Facilities that Might Exist in a Community

- Communications
- Power / Electric
- Gas / Oil
- Industry
- Water
- Banking / Financial
- Education

- Government
- Transportation
- Emergency
- Foreign Represented Governments
- Recreational Venues
- Special Classification

Why Screen Facilities? Importance of Prioritization

- Need to prioritize facilities essential to community's critical missions / functions
- Consideration of facilities needed to continue critical community operations
- Global view must be taken to cost-effectively spend the limited resources available
- Facilities prioritized based on importance to community
  - Criteria must be developed and used

Who is Involved in the Screening Process?

- Decision makers in the community working with emergency management, police, risk management, fire departments, civic leaders, financial leadership, chamber of commerce, others
- Process takes time and requires detailed information about the community
- Process requires difficult decisions
- *This is a demonstration of the process for this class*

There are Many Approaches to Screening

- Most approaches are qualitative and subjective
- We have chosen to do screening by ranking the consequence severity levels because:
  - Forces immediate thinking about the worst things you don't want to have happen
  - Can define some very useful quantitative values
  - Allows for opinion and decisions but doesn't get into lots of detail
  - Can consider other factors as needed for more refinement later on

Screening Process Steps

- Determine the consequence parameters
  - Based on undesired events
- Define levels for the consequence parameters
- Initially select a "best guess" group of facilities
  - Need to start with a manageable number of facilities
- Assign consequence level value (1, 2, 3 or 4) for each parameter for each selected facility
- Sum consequence level values for each facility
- Rank facilities in order beginning with highest sum

Examples of Undesired Events

- Loss of human life
- Loss of critical facility
- Loss of revenue
- Loss of vital equipment
- Loss of vital capabilities
- Loss of critical mission
  - Loss of function / operation

Examples of Consequence Parameters - A Starting Point

- Number of people affected
- Critical mission / function
- Duration of loss
- Replacement value
- Business economic impact
- Environmental impact
- Public confidence
- Historical / cultural impact

Consequence Levels for No. of People Affected

Level	Number of People Affected (killed or seriously injured)
1	Less than 10
2	11 - 100
3	101-1000
4	More than 1000

Consequence Levels for Critical Mission / Function

Level	Loss of critical mission/function (e.g., loss of fire department or 911 services)
1	Loss of mission/function would have low level of impact – other facilities/functions not dependent on this facility
2	Loss of mission/function would have moderate impact – some other facilities/mission depend on this facility
3	Loss of mission/function would have high impact – other critical facilities/functions depend on this facility
4	Loss of mission/function would have severe impact – all critical facilities/functions depend on this facility

Consequence Levels for Duration of Loss

Level	Duration of Loss of a Mission/ Function (e.g., loss of EOC)
1	Recovery time – hours to a day
2	Recovery time –days to weeks
3	Recovery time –months to years
4	Recovery time – several years

Consequence Levels for Replacement Value

Level	Replacement Value of Facility (self-insured?)
1	Less than $100 thousand
2	$100 thousand – 1 million
3	$1 million - $10 million
4	More than $10 million

Consequence Levels for Business Economic Impact

Level	Business Economic Impact (direct or indirect, e.g., affects tourism)
1	Less than $10 million
2	$10 million - $100 million
3	$100 million – 1 billion
4	More than $1 billion

Consequence Levels for Environmental Impact

Level	Environmental Impact (e.g., destruction of critical habitat)
1	Low
2	Moderate
3	High
4	Severe

Consequence Levels for Public Confidence

Level	Public Confidence (behavior impact)
1	Fear and stress at local level
2	Fear and stress at regional level
3	Fear and stress at national level
4	Fear and stress at worldwide level

Consequence Level for Historical / Cultural Impact

Level	Historical/Cultural impact (e.g., Statue of Liberty)
1	Low level or no historical or cultural impact
2	Moderate historical or cultural impact
3	High historical or cultural impact
4	Very high historical or cultural impact

Prescreening of Facilities

- Utilize 2 or 3 of the consequence parameters, such as number of people and mission criticality, for the preliminary screening
  - Result is a manageable no. of facilities to be screened
- For example:
  - Facilities with greater than 300 people, and
  - Facilities providing functions that are immediately necessary and are not duplicated in the region

Screening Matrix - Example

	No. of People	Critical Mission	Duration of Loss	Replace. Value	Econ. Impact	Environ. Impact	Public Confid.	Historical/ Cultural Impact	Total
Facility A	3	1	2	3	2	3	1	2	17
Facility B	1	2	2	2	1	2	1	3	14
Facility C	1	1	1	2	1	1	2	2	11
Facility D	4	3	4	3	3	3	3	3	**26**
Facility E	3	1	3	3	2	3	1	3	19
Facility F	1	1	1	1	1	1	1	1	8
Facility G	4	4	4	4	4	4	4	4	**32**

Exercise Workbook: Community Screening Exercise

- Break into teams
- Each team takes one of the selected facility
- Using the undesired events in slides 12 – 19, complete the community screening matrix
  - Use Worksheet 3.2
- Assign consequence levels (1, 2, 3 or 4) for each consequence parameter for your facility
- Complete a community screening matrix by rank ordering the facilities as a class

Community Screening Matrix Exercise (Worksheet 3.2)

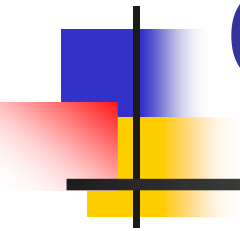
	No. of People	Critical Mission	Duration of Loss	Replace. Value	Econ. Impact	Environ. Impact	Public Confid.	Historical/ Cultural Impact	Total

Things to Consider

- This process doesn't assign weightings to the parameters, but could
- These are only screening factors - not final decision factors
- Document and justify reasons for ranking
- As we progress other facilities and parameters may emerge – this is OK
- This is the starting point not the final!

Module Objectives

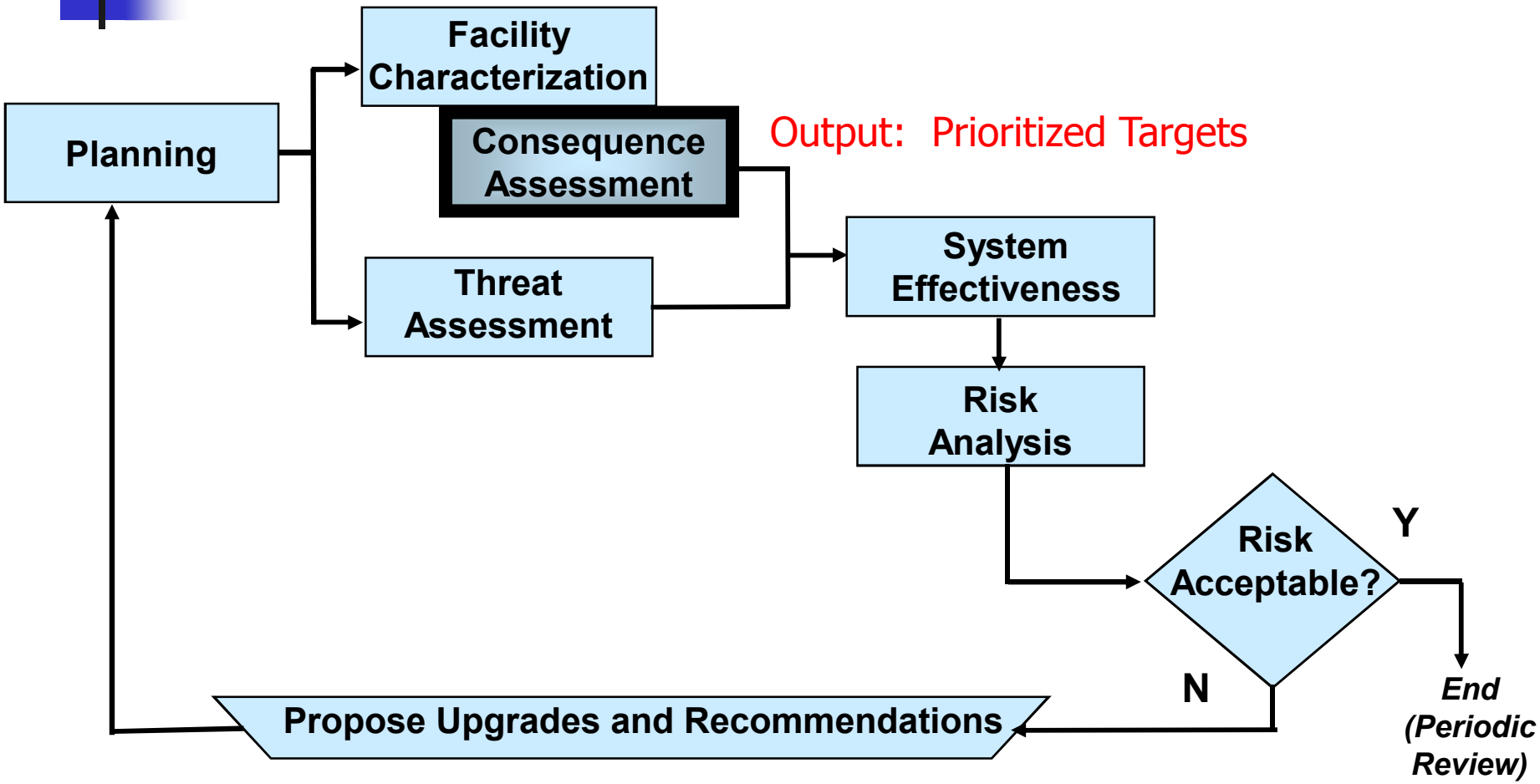
- Introduced screening process
  - Prioritize community facilities
- Applied screening process to select and prioritize facilities for further evaluation
- Questions??



Part II: Consequence Assessment

Prioritizing Targets

Risk Assessment Methodology for Communities (RAM-C)



Module Objectives

- Identify consequence parameters
  - Define criteria on which to evaluate and prioritize targets
- Develop community-specific consequence matrix
- Determine consequence values
  - VH, H, M, L
- Prioritize critical assets (targets) based on consequence severity level
- Introduce concept of consequence mitigation

Consequence

- Determine severity of undesired event (e.g., power failure, loss of mission / function, loss of life)
- Can be qualitative or quantitative
- RAM-C will use qualitative and quantitative approach
- Consequence matrix is necessary in determination of consequences resulting from undesired events

Process for Consequence Determination

- Develop community-specific consequence matrix (Worksheet 5.1)
  - Identify and list consequence parameters
    - Will present suggested standard parameters
  - Assign values to VH, H, M, L
    - Quantifiable criteria is preferable
    - Must use appropriate values that will help discriminate between assets
- Determine the priority order of assets
  - Worksheet 5.2

Suggested Consequence Parameters

- Loss of life or serious injury
- Loss of critical mission(s) / function(s)
- Duration of loss
- Economic impact
- Public confidence
- Other?

Consequence Matrix: Considerations

- Can minimize subjectivity with expert opinion, input from people intimately involved with facility, mission(s), and operations
- Can have multiple functions in one facility, some critical, others not (treat separately)
- Some functions have no redundancy
- Mission is critical
- Domino effect on other systems
- Policy makers must agree on values

Assign Values to VH, H, M, L

- Quantifiable criteria is preferable
- Use expert opinion, professional judgment, and existing data / information
  - Use appropriate resources: financial department, HR, etc.
- Assign a quantitative or qualitative value to each level
  - For example, M = > 10 days to 1 month loss of service, L = < 5 lives lost, VH = >$10B, M = moderate impact

Example of a Community-Specific Consequence Matrix

		Consequence Severity Levels			
		Low	**Medium**	**High**	**Very High**
Consequence Parameters	**Loss of Life or Serious Injury (Number of People)**	0 - 10	11 - 100	101 - 1000	>1000
	Loss of Critical Mission / Function* (Impact)	Low level of impact (other facilities not dependent)	Moderate impact (some facilities dependent)	High impact (other critical facilities dependent)	Severe impact (all critical facilities dependent)
	Duration of Loss (Lack of Redundancy) (Time)	Brief recovery time (hours to days)	Moderate recovery time (days to weeks)	Long recovery time (months to years)	Extremely long recovery time (years)
	Economic Impact ($)	< $10M	$10M - $100M	$100M to $1B	> $1B
	Public Confidence (Behavior Impact)	Fear, stress cause local change of behavior	Fear, stress cause regional change of behavior	Fear, stress cause nationwide change of behavior	Fear, stress cause nationwide change of behavior

***Applied to community as a whole**

Exercise Workbook: Develop a Consequence Matrix

- Break into teams
- Review the example community-specific consequence matrix
  - Review the consequence parameter definitions
- Complete Worksheet 5.1 for your community
  - Matrix must be developed such that it is applicable to the entire community
- We will combine results from each team to finalize the community-specific consequence matrix for the remainder of the course

Community Consequence Matrix Exercise (Worksheet 5.1)

Consequence Parameters	Consequence Severity Levels			
	Low	**Medium**	**High**	**Very High**
Loss of Life or Serious Injury (Number of People)				
Loss of Critical Mission / Function* (Impact)	Low level of impact (other facilities not dependent)	Moderate impact (some facilities dependent)	High impact (other critical facilities dependent)	Severe impact (all critical facilities dependent)
Duration of Loss (Lack of Redundancy) (Time)	Brief recovery time (hours to days)	Moderate recovery time (days to weeks)	Long recovery time (months to years)	Extremely long recovery time (years)
Economic Impact ($)				
Public Confidence (Behavior Impact)	Fear, stress cause local change of behavior	Fear, stress cause regional change of behavior	Fear, stress cause nationwide change of behavior	Fear, stress cause nationwide change of behavior

Next Steps – Prioritizing Targets

- Review the targets list you generated in Module 4 (Worksheet 4.1)
- Review the community-specific consequence matrix you just completed (Worksheet 5.1)
- Combine the information on these two worksheets to develop a prioritized ranking of the targets
  - Use Worksheet 5.2
- Note that the consequence matrix is for the entire community but the targets are for a specific facility – this results in common rankings within the community

VH, H, M, L Instructions

- The ranking of the assets depends on the severity of loss
- Determine consequence for each asset based on each consequence parameter
- Start with the first asset and work across the row, determining the consequence severity level for each parameter
  - Then determine an overall consequence value

Example: Prioritized Targets for a Facility

		Consequence Parameters and Severity Levels					
		Loss of Life or Serious Injury	Loss of Critical Mission	Duration of Loss	Economic Impact	Public Confidence	Overall Consequence Value
Assets / Targets	**People**	H	H	H	M	H	**H**
	Computers (Property)	L	L	L	L	L	**L**
	Transformer	L	M	M	L	L	**M**
	Records	L	H	H	H	L	**H**

Exercise Workbook: Prioritized Targets

- Break into teams
- Use the community-specific consequence matrix
  - Worksheet 5.1
- Evaluate the loss / damage / destruction of each asset (target) for each consequence parameter
  - Worksheet 5.2
- After evaluating each consequence parameter, determine an overall consequence value

How to Reduce Consequences?

- Consequence Mitigation - likely choice for communities
  - Can improve reliability as well as decrease security risk
  - Emergency response plans
- May have higher initial costs, but lower life-cycle costs than physical security upgrades
- Should be developed and evaluated for every unacceptable risk

Best Business Practices for Mitigating Consequences

- Develop and implement policies and procedures
- Security training
  - General employee population
  - Key personnel
- Spares
  - Located off-site in a protected location
  - Located “in-place” but protected
  - Shared between facilities
  - Meet minimum (emergency) requirements

Best Business Practices *(cont'd)*

- Back-up systems
  - Alternate energy sources
  - Agreements with local energy providers
  - Mobile systems
- Redundancy
  - Multiple paths
  - Multiple sources

Consequence Assessment Summary

- Develop consequence parameters
- Develop a community-specific consequence matrix
  - Developed values for VH, H, M, L
- Determine asset consequence severity levels and prioritize targets
- Consequence is difficult to quantify
- A community-specific consequence matrix is a necessary tool in determining community priorities
- Consider consequence mitigation for reducing consequence levels

Module Objectives

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- Develop community-specific consequence matrix
- Determine consequence values
  - VH, H, M, L
- Prioritize critical assets (targets) based on consequence severity level
- Introduce concept of consequence mitigation
- Questions??