BASIN ELECTRIC POWER COOPERATIVE

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DBT Implementation

WAPA Technology & Security Symposium

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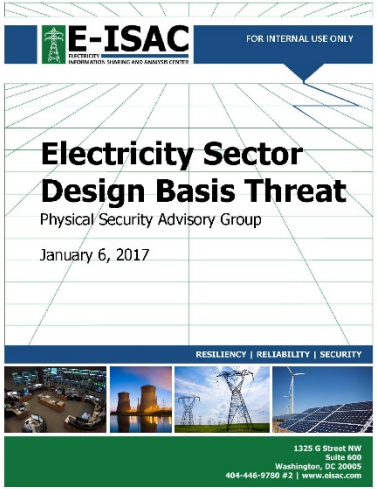
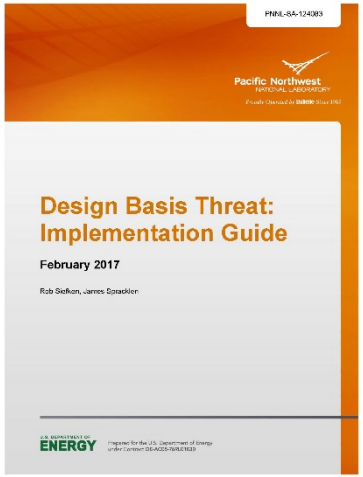
August 21, 2018

This presentation will discuss a process for a utility to use in assessing their physical security protection at a given asset against an agreed threat.





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Profile

- A not-for-profit generation and transmission cooperative incorporated in 1961 to provide supplemental power to a consortium of rural electric cooperatives
- Diverse energy portfolio: coal, gas, oil, nuclear, distributed, and renewable energy
- Consumer owned by 141 member cooperative systems
- Members' service territories comprise 540,000 square miles in nine states
- Operates >5,200 megawatts (MW) of wholesale electric generating capacity
- Owns 2,419 miles and maintains 2,505 miles of high-voltage transmission, and owns and maintains equipment in 82 switchyards and 217 telecommunication sites
- Serves 3 million electric consumers

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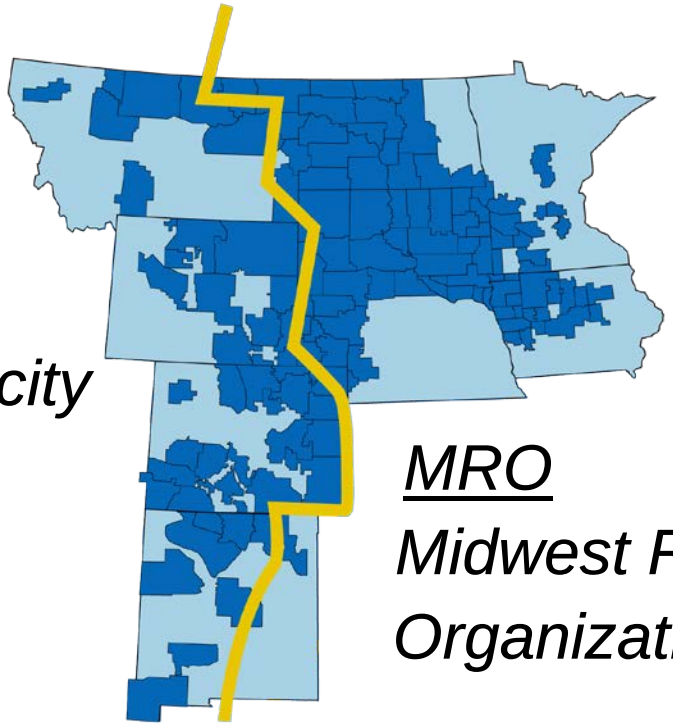
Service Area

<u>WECC</u>
Western Electricity Coordinating Council



<u>MRO</u>
Midwest Reliability Organization

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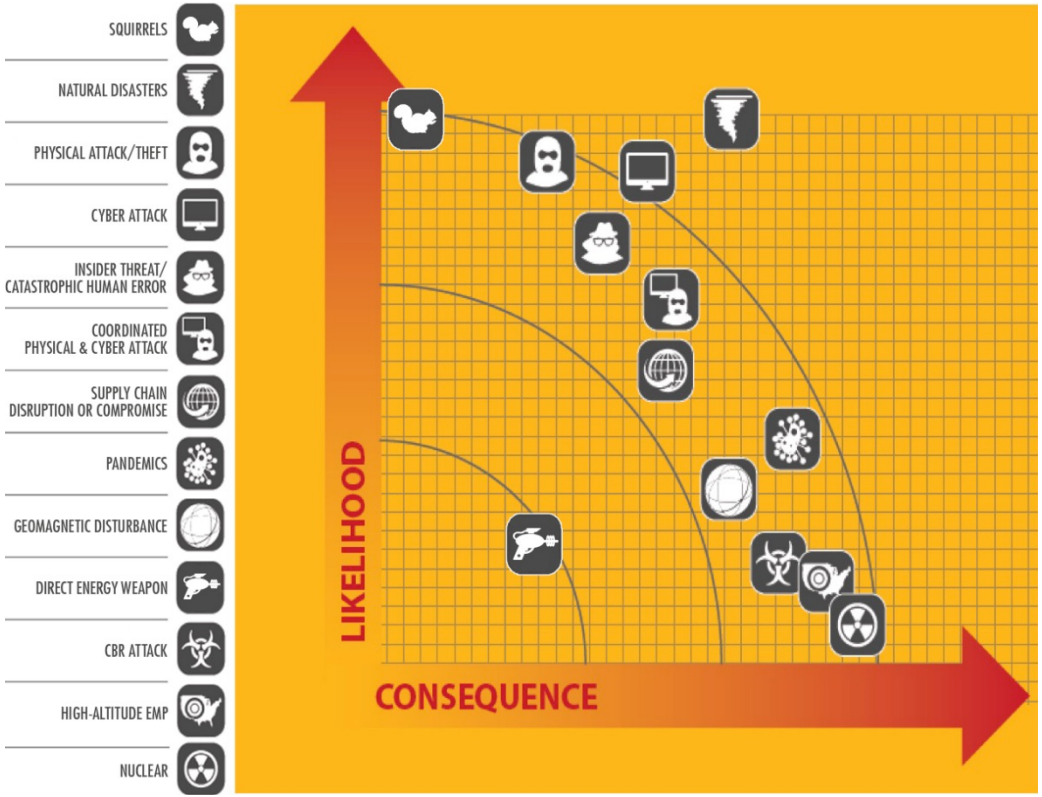
Threat Matrix



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Design Basis Threat (DBT)

The threat against which an asset must be protected and upon which the protective system's design is based.

It is the baseline type and size of threat that buildings or other structures are designed to withstand. The design basis threat includes the tactics aggressors will use against the asset and the tools, weapons, and explosives employed in these tactics.

Consequences

- Instability, uncontrolled separation, or cascading within an interconnection caused by:
  - Loss or degradation of critical security systems or components.
  - Catastrophic loss of critical components.
  - Unauthorized physical access to a control center or cyber system.
  - Loss of primary or backup BES control center and its ability to control the grid.
- Loss or compromise of proprietary critical node information (includes Critical Energy Infrastructure Information (CEII).
- Loss of a primary black-start path.

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Asset Protection Levels

- Levels
  - High Threat
  - Medium Threat
  - Low Threat

- Characteristics Considered
  - Numbers
  - Motivation
  - Intention
  - Weapons, Tools and Equipment
  - Communications
  - Modes of Transportation
  - Technical Skills
  - Knowledge
  - Tactics

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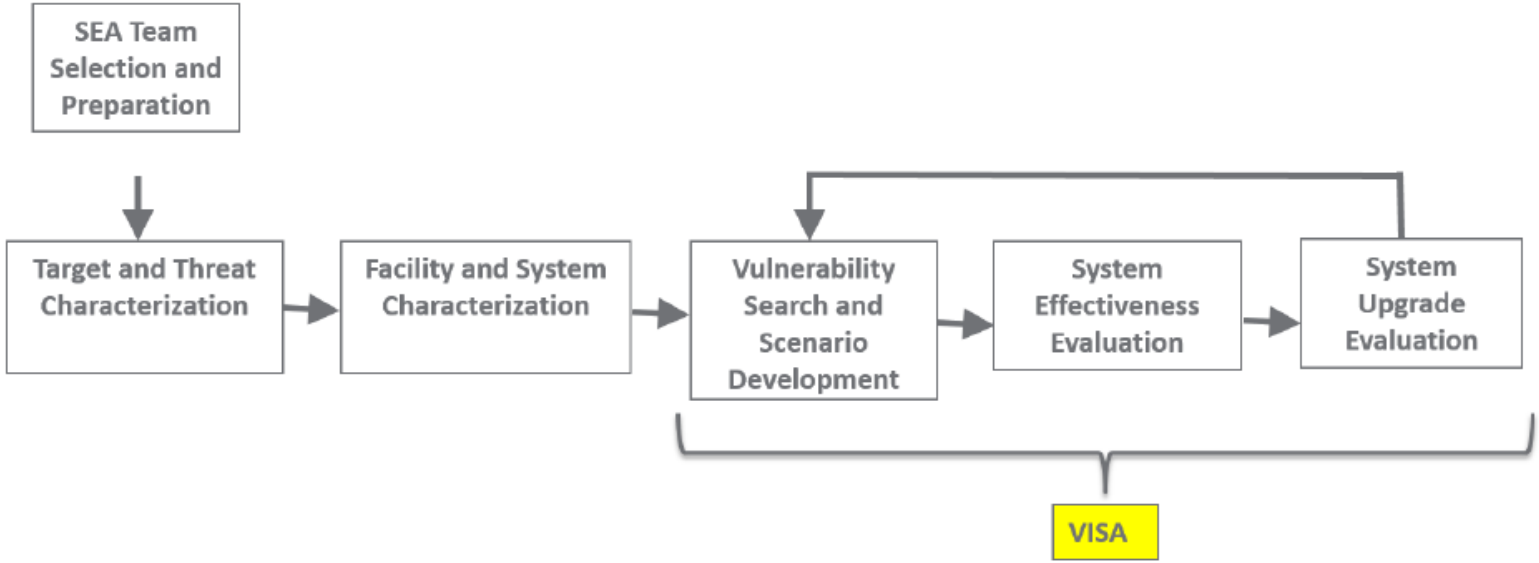
DBT Implementation Guide

- Provides an approach for a utility to use in assessing their physical security protection at a given asset, against an agreed threat (i.e. DBT).
- Uses the Vulnerability to Integrated Security Analysis (VISA) process
- VISA is a vulnerability assessment tool that can use a specified DBT to determine the overall system effectiveness of an integrated Physical Protection System (PPS).
- VISA looks at the functions of detection, delay, and response to baseline a physical protection system to determine cost-effective upgrades. VISA is a cost-effective methodology relying on subject matter expert input to help determine overall system effectiveness.

System Effectiveness Analysis (SEA)



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Target and Threat Characterization

- Goal is to determine the asset protection level (APL) for the site, so an appropriate level of DBT can be applied to the SEA. E.g. APL of 1-3.
- Characterizing the target or specific critical components can involve many different activities—from information gathering to actual site tours.
- Pathways and any dedicated response positions (e.g., guard booths) and times for responders are also documented.
- Failure to properly characterize a facility can lead to inadequate or overly restrictive security being applied and failure to adequately protect a facility.
- “the worst-case scenario” - Apply the highest DBT against the most critical site.

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Facility or System Characterization

- Location attributes
- Daytime/Nighttime Variables
- Seasonal variables
- Focus on People, Procedures and Equipment
- Document assumptions
- Understand the Physical Protection System (PPS)
  - Detect
  - Assess
  - Delay
  - Respond

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PPS Functions

- Detect/Assess
  - Intrusion Sensing
  - Alarm Communication
  - Alarm Assessment
  - Entry Control
  - Measurements
  - Inventory
- Delay (Passive barriers vs. Active barriers)
- Respond
  - Communications to Response Force
  - Deployment of Response Force
  - Neutralization

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Vulnerability to Integrated Security Analysis (VISA)

- Vulnerability Assessment (VA) tool
- Scenario based
- Utilizes multiple perspectives
- Simple/flexible/inexpensive/transparent
- Reasonable and Credible - sanity check
- Can be applied cyclically to gauge upgrades
- Dependent on the capabilities of the SMEs
- Assessment can be qualitative or quantitative

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VISA Process

- Develop scenario
- Divide scenario into logical steps
- Analyze system effectiveness for each step
- Document the step scores in a tabular format
- Develop system effectiveness for the scenario
- Assess risk acceptance versus overall system effectiveness

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Scenario - Example

Adversaries arrive by vehicle and park in the vicinity of the perimeter fence they are planning to breach. They breach the perimeter fence, enter the site, and set remote improvised explosively formed projectile (EFP) charges near three transformers. The adversaries then move into the control building and force the operators to manipulate the system. On their way off the site, the adversaries kill the control operators and detonate the explosive charges. The adversaries move back to the breach point in the fence and depart by vehicle.

Logical Steps - Example

Step	Step Time[a]	Cumulative Time[a]	Remaining Response Time[a]	Step Description	P_D	P_A	P_E	P_N	**Step Score**
1	30	30	1065	Cut through perimeter chain link fence					
2	65	95	1000	Move near Transformer #1 and place/aim 3 lb. EFP charge and set remote					
3	60	155	940	Move near Transformer #2 and place/aim 3 lb. EFP charge and set remote					

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Logical Steps - continued

Step	Step Time[a]	Cumulative Time[a]	Remaining Response Time[a]	Step Description	P_D	P_A	P_E	P_N	Step Score
1	30	30	1065	Cut through perimeter chain link fence					
2	65	95	1000	Move near Transformer #1 and place/aim 3 lb. EFP charge and set remote					
3	60	155	940	Move near Transformer #2 and place/aim 3 lb. EFP charge and set remote					
4	70	225	870	Move near Transformer #3 and place/aim 3 lb. EFP charge and set remote					
5	30	255	840	Move to Control Building					
6	5	260	835	Use cloned badge to enter control center					
7	180	440	655	Take control of all personnel and force operator to manipulate system					
8	60	500	595	Kill all personnel, detonate remotes and leave control center					
								Overall System Effectiveness	

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System Effectiveness Step - Example

Step	Step Time[(a)]	Cumulative Time[(a)]	Remaining Response Time[(a)]	Step Description	P_D	P_A	P_E	P_N	**Step Score**
1	30	30	1065	Cut through perimeter chain link fence	**VL**	**L**	**VL**	**L**	**VL**
2	65	95	1000	Move near Transformer #1 and place/aim 3 lb. EFP charge and set remote	**M**	**H**	**VL**	**VL**	**VL**
3	60	155	940	Move near Transformer #2 and place/aim 3 lb. EFP charge and set remote	**H**	**VH**	**VL**	**VL**	**VL**

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System Effectiveness Step - continued

Step	Step Time[a]	Cumulative Time[a]	Remaining Response Time[a]	Step Description	P_D	P_A	P_E	P_N	Step Score
1	30	30	1065	Cut through perimeter chain link fence	VL	L	VL	L	VL
2	65	95	1000	Move near Transformer #1 and place/aim 3 lb. EFP charge and set remote	M	H	VL	VL	VL
3	60	155	940	Move near Transformer #2 and place/aim 3 lb. EFP charge and set remote	H	VH	VL	VL	VL
4	70	225	870	Move near Transformer #3 and place/aim 3 lb. EFP charge and set remote	M	H	VL	VL	VL
5	30	255	840	Move to Control Building	M	H	VL	VL	VL
6	5	260	835	Use cloned badge to enter control center	VL	M	L	VL	VL
7	180	440	655	Take control of all personnel and force operator to manipulate system	VH	VH	L	VL	VL
8	60	500	595	Kill all personnel, detonate remotes and leave control center	VH	VH	L	L	L
								Overall System Effectiveness	L

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Overall System Effectiveness

Step	Step Time[a]	Cumulative Time[a]	Remaining Response Time[a]	Step Description	P_D	P_A	P_E	P_N	Step Score
1	30	30	1065	Cut through perimeter chain link fence	VL	L	VL	L	VL
2	65	95	1000	Move near Transformer #1 and place/aim 3 lb. EFP charge and set remote	M	H	VL	VL	VL
3	60	155	940	Move near Transformer #2 and place/aim 3 lb. EFP charge and set remote	H	VH	VL	VL	VL
4	70	225	870	Move near Transformer #3 and place/aim 3 lb. EFP charge and set remote	M	H	VL	VL	VL
5	30	255	840	Move to Control Building	M	H	VL	VL	VL
6	5	260	835	Use cloned badge to enter control center	VL	M	L	VL	VL
7	180	440	655	Take control of all personnel and force operator to manipulate system	VH	VH	L	VL	VL
8	60	500	595	Kill all personnel, detonate remotes and leave control center	VH	VH	L	L	L
								Overall System Effectiveness	L

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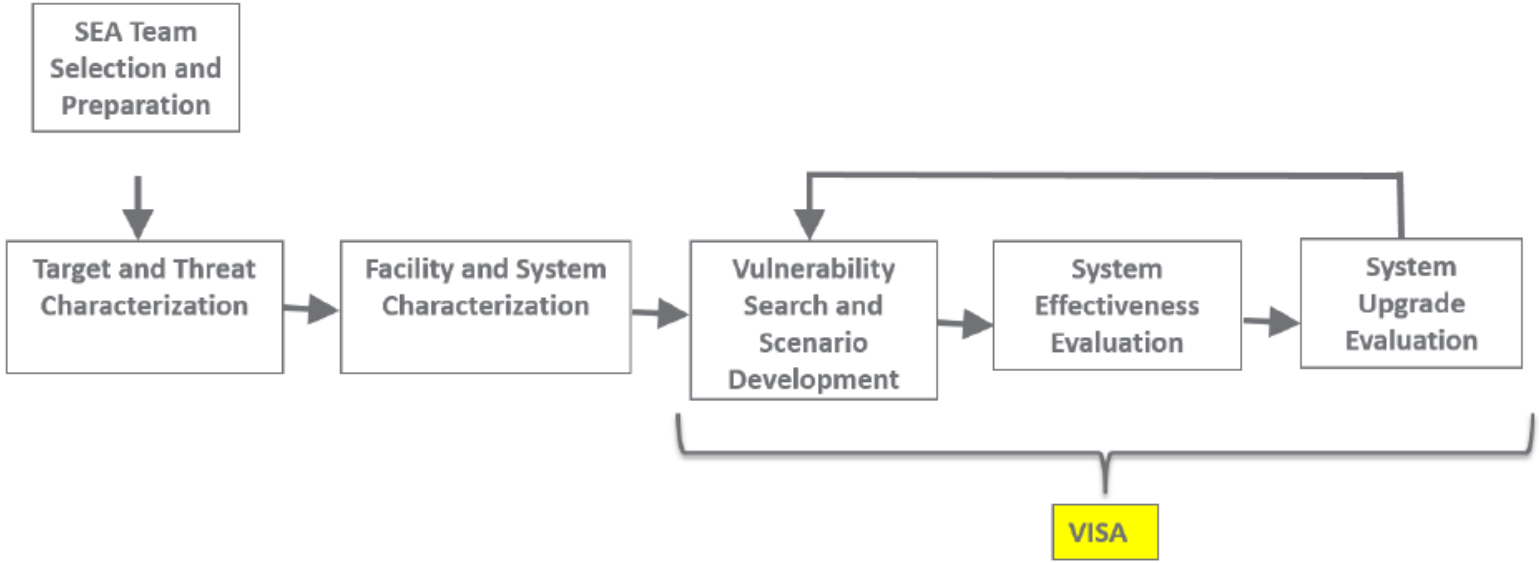
System Effectiveness Analysis (SEA)



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System Upgrades - Example

- Increased Detection - Sensors
- Improved Assessment - Camera or personnel coverage
- Greater Delay - Barriers
- Quicker Response Force Times - Proximity
- More Effective Neutralization

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Recent Workshop

- Facilitated by NERC/E-ISAC PSAG
- Instructed by Rob Siefkin, PNNL
- Participants

Countries Represented:	2
Total Organizations:	15
Total Utilities:	10
Total SMEs:	25
Experience Represented (Years):	
Physical Security:	375
Operations:	55
Industry:	232
Law Enforcement:	160

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Closing Thoughts

- Provides an approach for a utility to use in assessing their physical security protection at a given asset, against an agreed threat (i.e. DBT).
- DBT provides the parameters of the threat that is protected against
- Determine your Asset Protection Level - highest DBT applied most attractive targets
- VISA is a vulnerability assessment tool that can use a specified DBT to determine the overall system effectiveness of a Physical Protection System (PPS).
  - Is the existing PPS adequate to address the DBT level for the site?
  - How is the PPS effectiveness improved for a given set of upgrades?
  - What risks are we willing to accept?
- Reasonable and Credible Scenario
- Focus on People, Procedures and Equipment
- Performance Testing - improves accuracy
- Value the relationship with Local Law Enforcement
- Consider technical and procedural controls

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Questions

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