



Charting a Course to Energy Independence

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Army Power & Energy Initiative
Enhancing Energy Security

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Purpose

- ◆ Provide an overview of the Army Power and Energy Initiative (APEI) conducted by Concurrent Technologies Corporation and monitored by the US Army ERDC-CERL.
- ◆ Demonstrate a real world vulnerability assessment scenario that identifies potential risks to energy availability and quality.



APEI Objectives

- ◆ Demonstrate/Validate the Army Installations Energy Vulnerability Assessment Guide (FOUO document)
- ◆ Conduct On-site Energy Security Assessments (ESAs)
- ◆ Enhance the “Guide”
 - Lessons Learned
 - Best Practices
- ◆ Investigate development of an installation self audit model





ESAs - Methodology

- ◆ Utilized a War Gaming technique to gather data in the Phases 1-4 of the ESAs
 1. Assessment of Potential **On-post** Energy Vulnerabilities (Storage, Distribution, and Supply Systems)
 2. Assessment of Potential **Off-post** Energy Vulnerabilities (Commercial Energy Supplies)
 3. Assessment of **Mission-Critical Consequences** of Potential Energy Disruptions
 4. **Integrated Analysis** of Results (Phases 1-3) and Assessment of Priorities for Possible Action
 5. **Validation of Conclusions on Energy Vulnerability ***
 6. **Implementation of Corrective Measures ***

* Phase 5 and 6 were not included in this effort.



ESAs - Details

- ◆ **Critical Areas Included**
 - Electrical Energy Systems
 - Thermal Energy Systems (e.g., natural gas, boilers & steam, etc.)
 - Liquid Fuels Systems

- ◆ **Assessed each Critical Area**
 - Identify Key Hardware Components
 - Conduct Threat Assessment and identify actions affecting system disablement
 - Discuss Response, Repair, and Recovery Capabilities



ESAs – On-site Team

- ◆ **DPW**
 - Energy Manager
 - Electrical Systems Representative
 - Mechanical Systems Representative
- ◆ **DOL**
 - Liquid Fuels Representative
- ◆ **DES**
 - Physical Security Representative
- ◆ **DPTMS**
 - AT/FP Representative
- ◆ **DOIM**
 - Data and Communications Infrastructure Representative
- ◆ **Unit Staff Representative**



ESA – High Level Example

1. Identify Critical Facilities

- **Mission Essential Vulnerable Areas (MEVA) List**
- **High Risk Target (HRT) List**
- **DPW Critical Facilities List**

→ **INSTALLATION FUEL POINTS**

2. Determine Critical Functions/Components/Energy Requirements

- **Key Tennant Input**
- **Building Drawings**
- **Equipment Nameplates**
- **Utility Meters, if available**
- **Conduct a Study**

→ **CIRCULATE THE FUEL FOR EACH TANK CONTINUOUSLY AND DISPENSE THE FUEL; FUEL SUPPLY PUMP MOTORS; 2500W PER FUELING ISLAND**



ESA – High Level Example

3. Evaluate On-Post Concerns

- Available Backup Power
- Energy Disruption Events (War Gaming)
- Response/Recovery Plans
- Mission Consequences
- Alternate Mode to Conduct Mission

→ **NO BACKUP POWER EXISTS**

4. Evaluate Off-Post Concerns

- Energy Distribution System
- Distribution Redundancy
- Energy Disruption Events (War Gaming)
- Utility Response/Recovery Plans

→ **ALTERNATE ELECTRIC FEEDS TO INSTALLATION ON SINGLE SET OF UTILITY POLES**

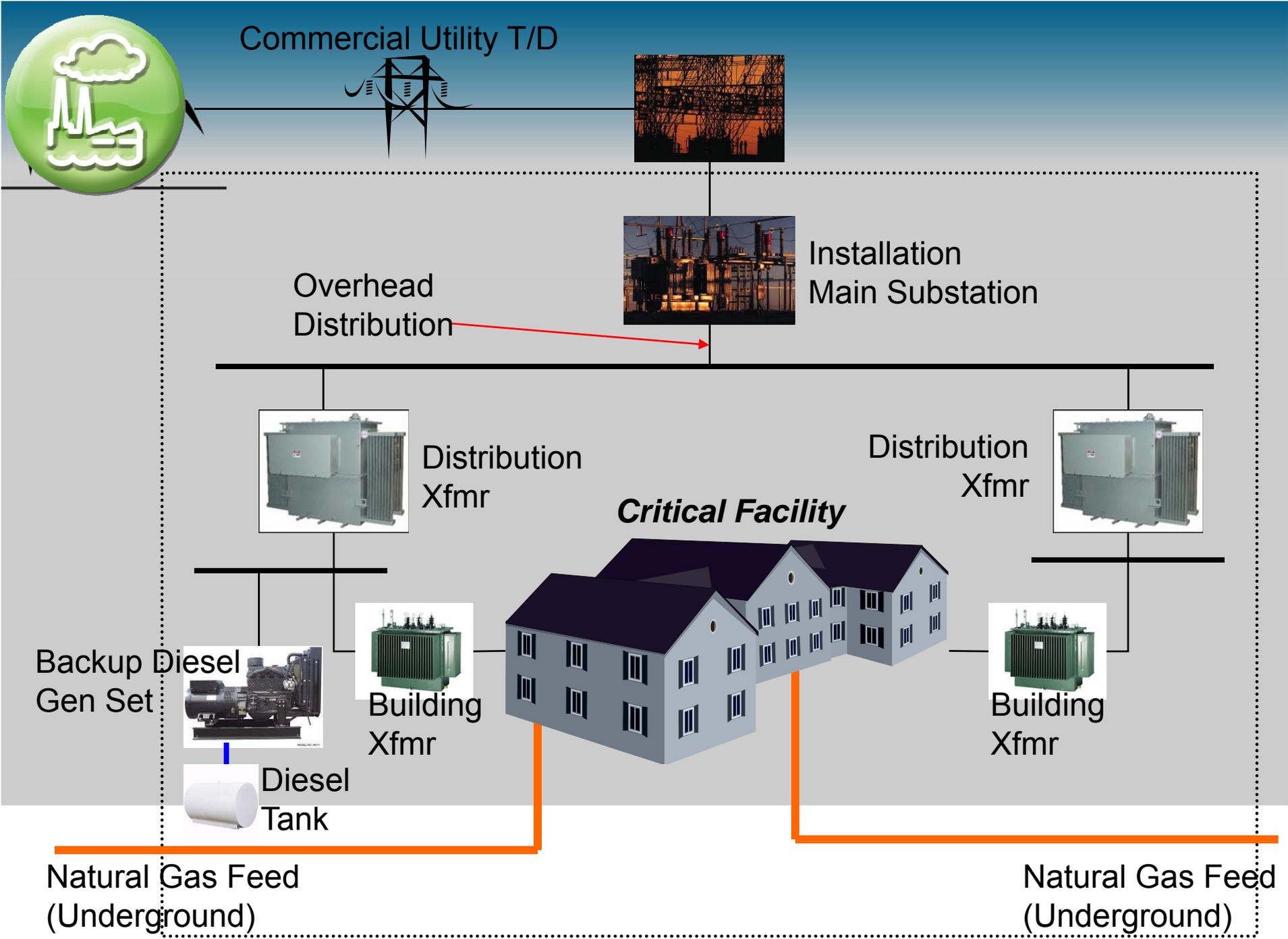
5. Conduct an Integrated Analysis

- Use a Vulnerability Assessment Tool (e.g., CARVER)



What is CARVER?

- ◆ **Considers 6 Factors that Affect the Desirability of a Target (Disruption):**
 - Criticality** – Impacts to Achieve Attacker’s Intent
 - Accessibility** – Physical Access to Target
 - Recuperability** – Ability of the System to Recover from Attack
 - Vulnerability** – Ease of Accomplishing the Attack
 - Effect** – Amount of Direct Loss from Attack
 - Recognizability** – Ease of Identifying a Target





Conclusion

<u>Critical Asset</u>	ESA Team Ranking						<i>PRIORITY</i>
	C	A	R	V	E	R	Total
Main Substation							
Overhead Distribution Lines							
Distribution XFMRs							
Backup Genset & Fuel							
Underground Natural Gas							

Final results may be considered CLASSIFIED information!

Results in Prioritized Metrics to:
-Develop projects to improve Energy Security
-Prioritize/Plan Budgets



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Thank You!!

Questions??