Asset Protection and Development

Target Sets and Vulnerability Analyses

Background

Westinghouse Asset Protection and Development (APD) engineers have 30+ years of combined experience in creating Target Set and Vulnerability Analyses in the nuclear industry.

APD staff is comprised of Professional Engineers with licenses in multiple states and countries. Our technical leads have years of operating plant, new build design and licensing experience. APD has been creating engineering analyses and security systems/analyses to fully comply with **10 CFR 73.55** for over 20 years.

Westinghouse also maintains a standalone **10 CFR 73.22**-compliant Safeguards Information (SGI) program. Currently, APD engineers hold security clearances in three countries and maintain four programs of secured information.

Description

The Target Set Analysis and Vulnerability Analysis are an integral part of a Nuclear Site's Security Strategy. The Target Set Analysis defines the equipment and locations which must be protected from adversary actions.

APD provides highly detailed Target Set Analyses to ensure the facility is protecting the correct equipment and the security system and security force are correctly-sized.

Westinghouse offers a means to accurately identify the Nuclear Site's Target Sets using the Facility's Probabilistic Risk Assessment (PRA).

Westinghouse offers two methods to perform Target Set Analyses. If the facility has a documented Probabilistic Risk Assessment, Westinghouse will perform the Fault Tree Target Set Assessment (FTTSA) methodology.

The FTTSA utilizes the fault trees developed in the plant's PRA to determine the most desirable combinations of **component and operator failures** which lead to core damage. The FTTSA overlays **pipe and cable run** information as well as flood propagation to determine single points of attack. The FTTSA provides a means to assess **cyber security** vulnerabilities using post-initiator operator actions defined in the PRA. The FTTSA complies with **Regulatory Guide 5.81** and aligns with **NEI 13-05**.

Without a PRA, APD engineers will utilize the second method for developing target sets which includes interviewing operators, reviewing safety analysis documents, discussing system vulnerabilities with knowledgeable technical leads, and utilizing the abundant experience from previous analyses to create accurate targets.

The Vulnerability Analysis provides justification of the successful defense of the site based on targets and the design basis threat.

The Vulnerability Analysis can also be performed using a 3D Modeling and Simulation suite like RhinoCorps Vanguard®. The 3D Modeling and Simulation suites provide a more detailed, reliable, and repeatable Vulnerability Analysis. The 3D Modeling and Simulation allows for:

- What-if scenarios
- Design changes
- Target set changes

3D Modeling and Simulation is the most accurate and useful method for creating Vulnerability Analyses. However, the Vulnerability Analysis can be performed using large printouts, computer drawings, and proposed adversary movement based on expected actions and scenario development.

Benefits

The Target Set Analysis is the foundation of a correctly-sized security force. With the correct Target Sets identified, the Site Security Personnel can confidently update the Site's Security Strategy knowing that no surprise vulnerabilities exist.

Other benefits of the FTTSA include:

- Seamless integration of component, cable, and pipe location
- Support system dependencies modeled in the PRA are included in all analyses. This

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provides a complete look at all vulnerabilities in the facility.

- Internal flood propagation
- Lists of component failure combinations to aid in re-creating the analysis in the future and for Regulatory audits
- Identification of cyber security vulnerabilities

The Vulnerability Analysis proves the site can defend against the design basis threat. The Vulnerability Analysis is an input to and needs to be recreated for any major plant changes. Using the 3D Modeling and Simulation allows the site to:

- Load numerous potential design changes into the tool to determine which would have the best return on investment
- Quickly update the Vulnerability Analysis to minimize cost in plant changes or security events
- Ensures the site has a repeatable and accurate defense posture

Deliverables

The Target Set Analysis deliverables include:

- Target Set Worksheets
- Target Set Drawings and Identification
- Tabularized Equipment Failure Combinations (~500,000-5,000,000)
- Cyber Security Vulnerability
- Methodology Document
- Training on how to use the FTTSA outputs

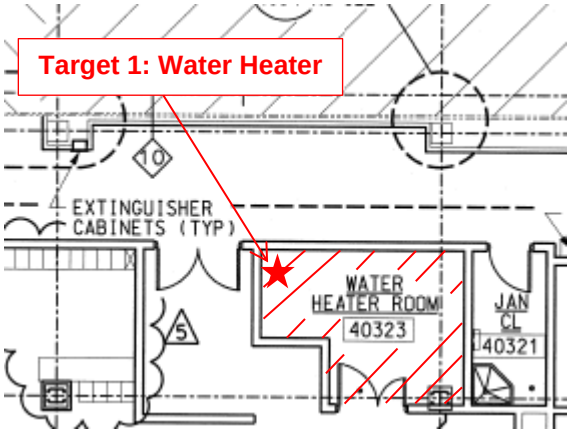
The Vulnerability Analyses deliverables include:

- Plant model (PDF, 3D Modeling/simulation)
- Scenario descriptions
- Scenario runs and results
- Training on how to use the results and/or 3D Model

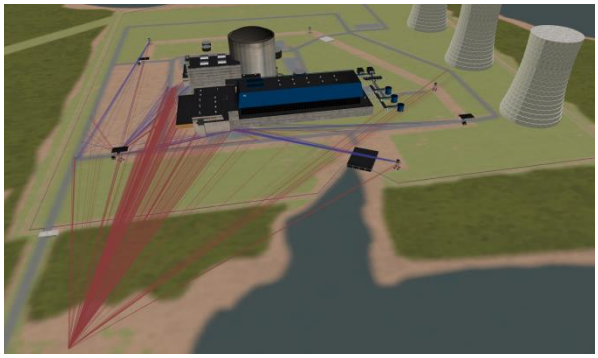
Experience

Westinghouse Asset Protection and Development has performed numerous Target Set and Vulnerability Analyses throughout the nuclear industry. Some key projects are listed below:

1. **AP1000® Plant Design Certification Document Target Set and Vulnerability Analysis**
2. **APR1400® Plant Design Certification Document Target Set Analysis**
3. **APR1400 Plant Target Set Analysis, Barakah, UAE**
4. **AP1000 Plant Site-Specific Target Set and Vulnerability Analysis, Alvin W. Vogtle Units 3&4, USA**



Example Target Equipment Identification.



Example RhinoCorps® Analysis.

Westinghouse Electric Company
1000 Westinghouse Drive
Cranberry Township, PA 16066