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Cyber Security for Nuclear Facilities: An Overview of the NRC Regulatory Framework

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Cyber Security

Today's Overview:

- *Why* – Threat and Consequence
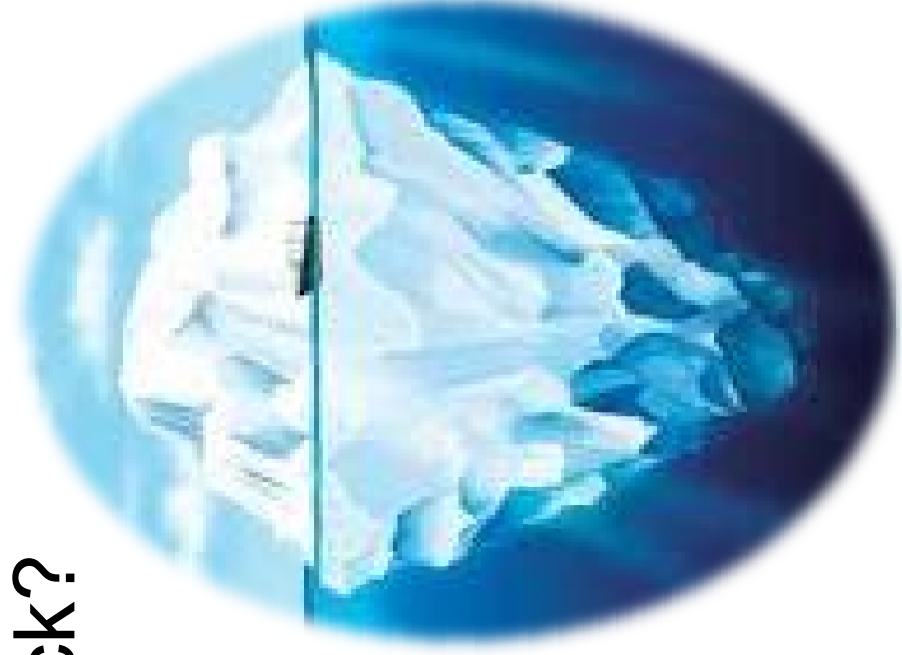- *What* – Modes of Protection
- *How* – Performance-Based Regulation

Why – Threat and Consequence

Why - Threat

- What is an Advanced Attack?

- What We Know/ Don't Know

- Attack Vectors

- Internal/External

Why - Threat

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Today

- **Stealthy**
- **Data Driven**
- **Targeted**
- **Dynamic**
- **Persistent**
- **Advanced**

Past

Visible

Disruptive

Low Hanging Fruit

Static

Ad hoc

Basic

Why – Consequence

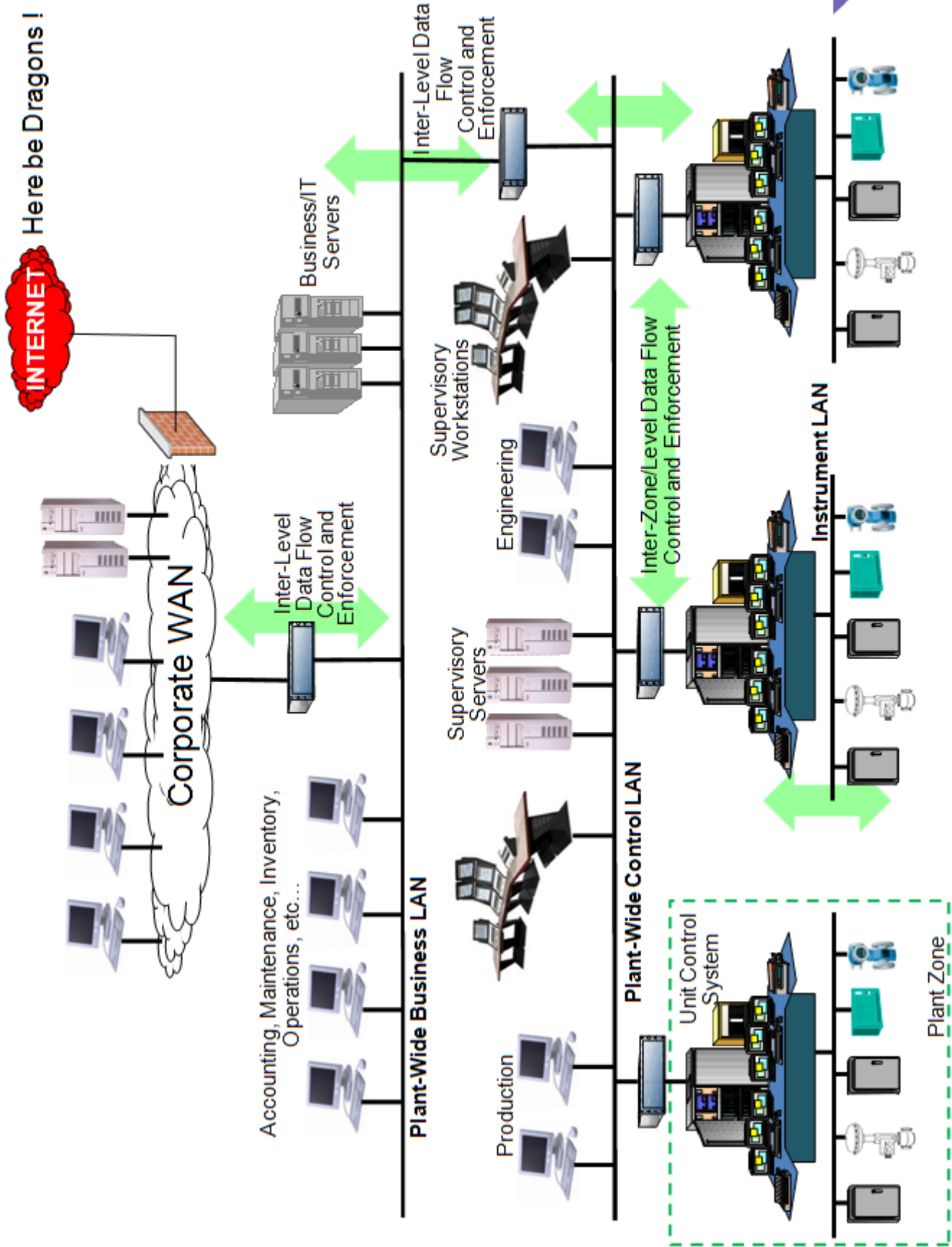

- Not the Same for All Licensees' Facilities

- Perceived and Real Consequences

- Security is a Process Not a State

- Think Maliciously

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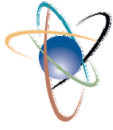# *What* – Modes of Protection

What – Modes of Protection

- Common Taxonomy

  – NIST Special Publication 800-82, "Guide to Industrial Control System (ICS) Security"

- ICS Not Designed with Security in Mind

- Programmatic

  – Standards Tailored for Flexibility & Effectiveness

  – RG 5.71 & NEI 08-09 (R6)

Here be Dragons !

INTERNET

Corporate WAN

Inter-Level Data Flow Control and Enforcement

Accounting, Maintenance, Inventory, Operations, etc....

Plant-Wide Business LAN

Production

Business/IT Servers

Supervisory Workstations

Engineering

Inter-Level Data Flow Control and Enforcement

Supervisory Servers

Plant-Wide Control LAN

Inter-Zone/Level Data Flow Control and Enforcement

Instrument LAN

Unit Control System

Plant Zone

How – Performance-Based Regulation

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How – Performance-Based Regulation

- NRC Cyber Security Rule (10 CFR 73.54)

  – Performance-Based, Programmatic

  – FOCUS: High Assurance of **Adequate** Protection

  – Generic (i.e., not reactor-specific)

  – Consistent with regulatory approach for physical security

  – Digital Systems and Equipment Associated with Critical Functions

  – Licensees Perform Analysis to Determine What Needs Protection

How – Performance-Based Regulation

- Basic Requirements

  ○ Digital assets that must be protected

  ○ Defense-in-depth protective strategy

  ○ Application of security controls to digital assets

  ○ Implementation details maintained on site

  ○ Submission of Cyber Security Plans to NRC for approval

- Balance of Plant Systems

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How – Performance-Based Regulation

- Regulatory Guidance
  - Align with Programmatic, Performance-Based Rule
  - Integration With Existing NRC Programs (Physical Security, etc.)
  - Template for Licensing
    - Cyber Security Plan

Standards-Based
- NIST
- DHS
- IEEE

Collaboration
- NEI
- Industry
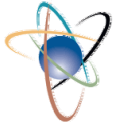- National Labs
- Private Sector

Finalize
- Concurrence
- ACRS Approval
- Publicly Available

How – Performance-Based Regulation

- Challenges
  - Scope of Cyber Security
  - Breadth of Programs (Physical Security, Maintenance, Digital I&C Development, etc.)
  - Monitoring the Threat-scape
  - Workforce Training and Development

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How – Performance-Based Regulation

- Path Forward for RTRs
  - Self-Assessments
  - NRC Evaluation of Self-Assessments
  - Site Visits
  - Determine Next Steps

- Additional Considerations for Cyber Security
  - Cyber Security Roadmap
  - Guidance Development
  - Cyber Security Training
  - Interagency and International Support

Questions?

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