

Session 6: Dam Owner Liability, Public Safety, and Security



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What Will Be Covered in Session 6

- Basic Legal Premises
- Dam Owner Negligence
- Standard of Duty
- Breach of Standard Duty

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What Will Be Covered in Session 6 (Cont.)

- Strict Liability
- Dam Owner Defense
- Dam Safety Owner Responsibility and Liability
- Public Safety Liability
- Dam Security Issues

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Session 6 Learning Objectives

- Identify Dam Owner Responsibilities
- Define “Standard of Duty”
- Define “Strict Liability”
- Identify Public Safety Responsibilities
- Identify Dam Security Procedures

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Basic Legal Premises

- We live in a litigious society.
- Widespread litigation will result from dam failure.
 - Particularly a catastrophic dam failure.
 - Everyone remotely associated with the dam will be sued.

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Basic Legal Premises (Cont.)

- Those likely to be sued will include:
 - Owner(s)
 - Operator(s)
 - Inspector(s)
 - Engineer(s)
 - Contractor(s)
 - State dam safety officials
 - Anyone else in the proximity of the dam at the time of failure

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Basic Legal Premises (Cont.)

- Lawsuits will claim extensive liability on the part of everyone involved in the dam failure incident

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Dam Safety Owner Responsibility and Liability

- The Owner is responsible for:
 - Safe management and operation
 - Compliance with applicable rules and regulations
 - Significant financial undertaking required of dam ownership, such as costs associated with operation, maintenance, inspections, registration, compliance, engineering study and design, risk assessment, permitting, Emergency Action Planning, repairs, reconstruction, and removal.
- The Owner is liable for:
 - injury to persons or damage to property of others, included but not limited to loss of life resulting from the operation, failure, or mis-operation of a dam.

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NEGLIGENCE

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Definition of Negligence

- Definition:
 - The failure to exercise reasonable care to avoid failure of the dam under the particular circumstances causing the failure
 - For high-hazard dams, a higher *Standard of Care* is expected of the dam owner

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Elements of Negligence

- Negligence can exist in any of the following aspects of a dam project:

-Design	-Construction
-Operation	-Maintenance
-Inspection	-Regulation
-Remedial dam repairs and alterations	

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STANDARD OF DUTY

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Standard of Duty

- Dam owners are considered responsible for carrying out the following duties:
 - Inspect dam regularly and completely
 - Monitor conditions regularly
 - Maintain the dam
 - Meet appropriate regulations and standards of care

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Standard of Duty (Continued)

- And:
 - Prepare and follow the operations and maintenance manual
 - Prepare, test, and update an EAP
 - Maintain complete sets of records

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Standard of Duty (Cont.)

- *Minimum Standards of Duty* are set forth in:
 - Statutes
 - Ordinances
 - Regulations
 - Professional/industry standards

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Breach of Standard of Duty

- Occurs when the dam owner does not maintain the Standard of Duty.
- Can be established through:
 - Expert testimony
 - Circumstantial evidence
 - Common sense
 - Legal theory

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Causation and Damages

- The Breach of Standard of Duty must be established as the *Causation* of damage/injury to the plaintiff
- *Damages* associated with dam failures often include:
 - Loss of life
 - Personal injury
 - Emotional distress
 - Property damage:
 - Diminished value
 - Restoration costs and/or replacement costs

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PUBLIC SAFETY

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Liability Related to Public Safety

- A dam owner/operator may be liable if:
 - There is a Failure to Warn or Guard the Public Against Injury from a Dangerous Condition that was Known or Should Have Be Known
- A dam owner/operator may be liable if:
 - There is a Failure to Properly Construct or Maintain in Good Repair **ANY** Structure or Recreational Facility; or Failure to Properly Control Potentially Hazardous Recreational Activities
 - Gross Negligence of an Employee is the Probable Cause of Injury

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Liability Related to Public Safety

- The owner/operator **MUST** Identify **ANY** Unreasonably Dangerous Condition and Either Correct the Condition or Warn Potential Victims of the Existence of the Condition within a Reasonable Period
- The owner/operator does not have to **Insure** against Possibility of Injury, but must **Act Reasonably** to Prevent Possibility of Injury

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Liability Related to Public Safety

- Courts often recognize that:
 - Participants are sometimes injured in recreational activities
 - There is not always a person or agency at fault

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Liability Related to Public Safety

- Owners/operators are Obligated to Inspect all Facilities and Adjoining Areas to Identify Potential Hazards to the Public, and to Take Action to Minimize Risks of Injury

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Liability Related to Public Safety

- Owners/operators bear an even greater responsibility for the safety of children
 - Children are generally unable to understand the danger of certain conditions a dam may pose
 - For example, signs alone may not adequately warn and security fencing may be necessary

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Liability Related to Public Safety

- For Liability to exist, it must be shown that:
 - Injury occurred
 - Dangerous conditions existed and had potential for harm
 - Negligent or wrongful action created the condition
 - Owner/operator had knowledge

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Liability Related to Public Safety

- Dam owner/operator must:
 - Make and Keep Premises Safe
 - Avoid Conduct or Conditions that could Injure Any Person, even Trespassers
 - Correct Existing Dangerous Conditions and Post Warnings

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Liability Related to Public Safety

- Inspections for Public Safety Hazards Must Be:
 - Conducted at Frequent Intervals
 - Conducted at Times when Normal Conditions are likely to have Changed (following heavy public visitation, floods, storms, etc.)
 - Documented with Proposed Corrective Actions

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Liability Related to Public Safety

- Remedial Actions Completion Must Be Documented
- Accidents Must Be Documented
- Accidents Must Be Followed by Immediate Corrective Action

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Public Safety: Common Hazards

- Most common hazardous areas around dams:
 - Spillways
 - Stilling basins
 - Outlet works intake structures
 - Power intake channels and open channel conveyance structures

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Public Safety: Common Hazards (Cont.)

- Most common hazardous areas around dams:
 - Walls, cliffs, and steep slopes
 - Power lines
 - Swimming beaches

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Public Safety Precautions

- Use signs to direct, identify, inform, or warn
- Signs should:
 - Be located to gain visitors' attention
 - Convey the nature of the hazard posed by specific conduct

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Public Safety Precautions

- Signs should:
 - Warn of the hazard with intensity commensurate with the potential outcome
 - Explain how to act to avoid injury
 - Explain consequences of failing to obey

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Safety Precautions



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Public Safety Precautions

- Fencing (most common protective device to restrict access to hazardous areas)



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Safety Precautions

Fencing



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Public Safety Precautions

- Guard rails (to restrict vehicular access)
- Floating barriers (to restrict or delineate recreational users and provide a means of self-rescue)
- Safety ladders (a means of escape from steep slopes/walls/open channels, but also providing access to restricted areas)
- Public awareness programs (brochures/ videotapes/web sites)

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Safety Precautions

Fencing Around Outlet Structure



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Safety Precautions

Railing Around Spillway Riser



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Safety Precautions

Floating Barriers



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Floating Barriers



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Dam Security

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Dam Security: State Initiatives

- Dam Safety Program engaged with Department of Homeland Security for assistance on Winooski River Flood Control Dams.
- Plan to use experience to develop dam security guidance

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DAM SECURITY

- Introduction
- Critical Asset Identification
- Risk Assessments
- Physical Security
- Cybersecurity
- Personnel Security
- Information Security
- References / Resources

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DAM SECURITY

Security defined:

A condition that results from the establishment and maintenance of protective measures that ensure a state of resistance from hostile acts or influences.

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Why Secure a Dam?

Dam failures may affect:

- Public health and safety
- Economy
- Public confidence
- Government capability
- Critical functions
- Critical infrastructure
- Environment

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Potential Security Threats

- Terrorism - Domestic and International
- Disgruntled Employees
- Unauthorized Operation
- Vandalism
- Attractive Nuisance

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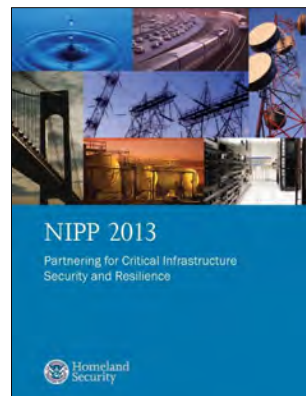
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National Infrastructure Protection Plan

The Homeland Security Act of 2002,
Homeland Security Presidential Directive 7

Strategy to **identify** and
prioritize Critical Infrastructure
(CI), and to **coordinate** the
corresponding security and
protection efforts.



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END OF THIS SESSION

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Critical Asset Identification

Critical Assets are facilities whose destruction or compromise would result in a high-consequence event.

- Foundation of any security program is to identify and protect these assets
- Prioritize critical assets based on consequences

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Critical Asset Identification & Prioritization Tools

- Department of Homeland Security (DHS) Dams Sector Consequence-Based Top Screen Methodology
- Federal Energy Regulatory Commission (FERC) “Security Program for Hydropower Projects”
- North American Electrical Reliability Corporation (NERC) “Security Guideline for the Electric Sector: Identifying Critical Cyber Assets”
- Transportation Security Administration (TSA) “Pipeline Security Guidelines”

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Types of Security

Dam Sector Security Practices – Four Categories

- Physical
- Cyber
- Personnel
- Information



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Risk Assessment

- A complete and thorough Risk Assessment is the industry standard by which to define appropriate security practices.
 - Applies to Physical, Cyber, Personnel and Information Security
- What is Risk?
 - Probability of an undesirable event occurring, or the capability for a potential loss and its probability of occurrence.

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Risk Assessment

- Risk = Consequence x Vulnerability x Threat
 - Consequence – range of loss or damage resulting from an undesired event.
 - Vulnerability – probability that an adversary would be successful in an attack and that the assets or components would be compromised.
 - Threat – probability of an attack by an adversary based on an analysis of motivation and capability

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Risk Assessment Process

- The risk assessment process typically consists of the following key steps:
 - Determining consequences of adverse event.
 - Loss of life
 - Economic impact
 - Determining vulnerabilities associated with physical, cyber, and human elements.

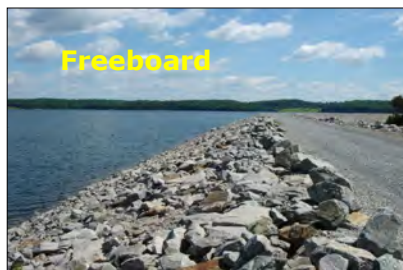
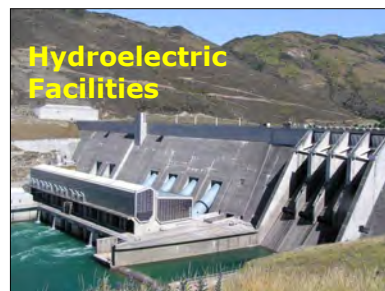
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Common Dam Vulnerabilities



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Common Dam Vulnerabilities



Instrumentation



**Gate Controls/
SCADA Systems**



**Inspections Galleries/
Tunnels**

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Risk Assessment Process (cont.)

- Identifying threats that could affect the facility.
 - Conduct threat assessment to analyze, evaluate, and quantify threat.
 - Include external and internal threats
 - Contact local law enforcement, FBI, DHS
- Utilizing consequence, vulnerability, and threat information to assign values to risk to make informed decisions pertaining to management and mitigation of risk.
 - Optimize expenditures and maximize performance of security countermeasures.
 - Update assessment when site or threat conditions change

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Available Risk Resources and Tools

- Criticality, Accessibility, Recuperability, Vulnerability, Effect, and Recognizability (CARVER) assessment methodology
- Sandia Labs - Risk Assessment Methodology for Dams (RAM-D)
- FERC Dam Assessment Matrix Security Vulnerability Risk (DAMSVR)
- FEMA Risk Prioritization Tool for Dams
- FERC Risk-informed Decision Making (RIDM)
- USACE Common Risk Model for Dams (CRM-D) risk assessment methodology
- EPA Vulnerability Self Assessment Tool (VSAT) for Water and Wastewater Utilities

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Physical Security

Measures that are designed to deny unauthorized access to facilities, equipment and resources, and to protect personnel and property from damage or harm

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Physical Security

Implementation of physical security measures

Measures must:

- Prevent
- Detect and Assess
- Delay and Deny
- Respond
- Restore



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Physical Security

Prevent

Presence of visible security features and operations may deter an adversary from attacking or disrupting an asset.

- Visible barriers
- Security Officers
- Surveillance Cameras
- Signage



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Physical Security

Detect and Assess

Provide earliest possible detection and assessment.

- Intrusion Detection System
 - Sensors and alarms
- Monitored Surveillance Systems
 - Cameras, video analytics
- Protective Lighting
- Electronic Access Controls
- Security Officers



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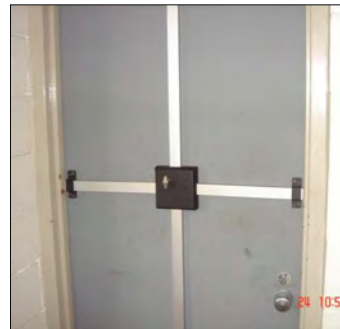


Physical Security

Delay and Deny

Increase time between detection and when damage can be inflicted.

- Entry Control Components
 - Hardening doors and windows, locked instrumentation caps
- Electronic Access Control Systems
- Barriers
- Blast Mitigation
 - Stand off distance



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Physical Security

Vehicle Barriers



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Physical Security

Respond

Shorten time for effective response.

- Communications
 - On and Off-Site
- Response Forces
 - On-site security
 - Local law enforcement
 - Safeguarding Personnel



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Physical Security

Restore

Mitigate adverse effects of high consequence events and minimize downtime

- Resources
 - Heavy Equipment, Replacement Parts, Contractual Support for Recovery Operations
- Mutual Aid
 - Agreements with other Sector facilities or companies

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National Terrorism Advisory System (NTAS)



Bulletin – Describes current developments or general trends regarding threats of terrorism.

Elevated Alert – Warns of a credible terrorism threat against the United States.

Imminent Alert – Warns of a credible, specific and impending terrorism threat against the United States.

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Security Plans

Protective measures should correspond to threat level

- Increase Security posture during 'Elevated' or 'Imminent' threat alert
 - Inform employees of threat condition
 - Maintain continuous contact with law enforcement
 - Restrict public access to all facilities
 - Implement 24/7 surveillance at critical facilities
 - Augment guard forces
 - Reduce facility access points
 - Implement screening procedures for deliveries
 - Cancel non-essential deliveries and maintenance

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Cybersecurity

Body of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage or unauthorized access

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Cybersecurity

Primary Cybersecurity Assets for dams:

Control Systems that monitor, automate, and control critical physical processes:

- Electrical Generation and Transmission
- Water Level and Transport
- Physical Access

IT Systems and Connecting Networks and Information

- Facility and Personnel Security

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Cybersecurity

Identify cybersecurity risks and evaluate the organization's cybersecurity practices and cyber-operational resilience:

- Can automated control systems be remotely manipulated to cause improper operation?
- Will improper operation cause significant damage or destruction?

What cybersecurity improvements can be made to address existing vulnerabilities?

- Implement Cybersecurity Measures Through comprehensive cybersecurity framework

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Cybersecurity Resources and Tools

- DHS Industrial Control Systems Cyber Emergency Response Team (ICS-CERT) Cyber Security Evaluation Tool (CSET)
- DHS United States Computer Emergency Readiness Team (US-CERT) Cyber Resilience Review (CRR)
- Department of Energy Cybersecurity Capability Maturity Model (C2M2)
- DHS Dams Sector: National Institute of Standards and Technology (NIST) Cybersecurity Framework Implementation Guide
- DHS Dams Sector Roadmap to Secure Control Systems

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Personnel Security

System of policies and procedures which seek to manage the risk of staff (permanent, temporary or contract staff) exploiting, or intending to exploit, their legitimate access to an organisation's assets or premises for unauthorized purposes.

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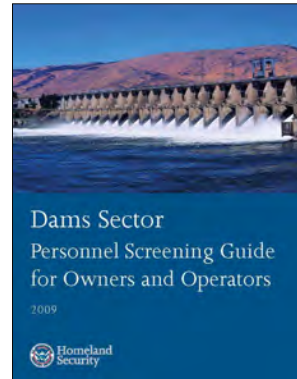


Personnel Security

Screening and Rescreening of Existing or Potential Personnel

- Past employment verification
- Criminal History
- Credit Checks
- Drug Testing

DHS Dams Sector Personnel Screening Guide for Owners and Operators



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Personnel Security

Insider Threat:

Probability of an attack facilitated or carried out by an individual with privileged access or information pertaining to a facility or asset of importance.

Effective program to protect against insider threat:

- Procedures to evaluate personnel and contractor information.
- Compliance assessments of personnel regarding insider threat policies and procedures.
- Facilitate sharing on information with human resources, law enforcement.

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Personnel Security

Prevent and Prepare

- Procedural Considerations
 - Segregation of duties or delegation of authority for operation of critical assets
- Training
- Exercises
 - Validate Security Plans, Test Operational Capabilities, Assess Leadership Effectiveness
- Lessons Learned
 - Document Past Incidents and Exercises
 - Improve Overall Project Security

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Personnel Security

Detect and Assess

- Security Awareness Training
- Insider Threat Policies
- Suspicious Activity Reporting

Delay and Deny

- Employ measures to delay or deny adversary's access to sensitive areas or assets.

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Personnel Security

Response and Recovery

- National Incident Management System (NIMS)
- Emergency Action Plan (EAP)
 - Actions to limit damage
 - Early warning and notification procedures
 - Delineation of responsibilities
- Recovery Plan
 - Minimize downtime and reduce economic consequences
- Response and Recovery Teams



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Information Security

Process of protecting the availability, privacy, and integrity of data

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Information Security

Operational or proprietary information could be used to harm or disrupt critical functions or business operations.

Develop procedures for information requests:

- Public Level
- Organization Level
 - Internal Use, Private
- Restricted Level
 - Confidential, Secret

CONFIDENTIAL

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Information Security

Information-Sharing Mechanisms

- Homeland Security Information Network – Critical Infrastructure (HSIN-CI)
- HSIN-CI Dams Portal
- Executive Notification System (ENS)
- Dams Sector-Specific Agency
- State Office of Homeland Security/Fusion Center
- State Dam Safety Offices

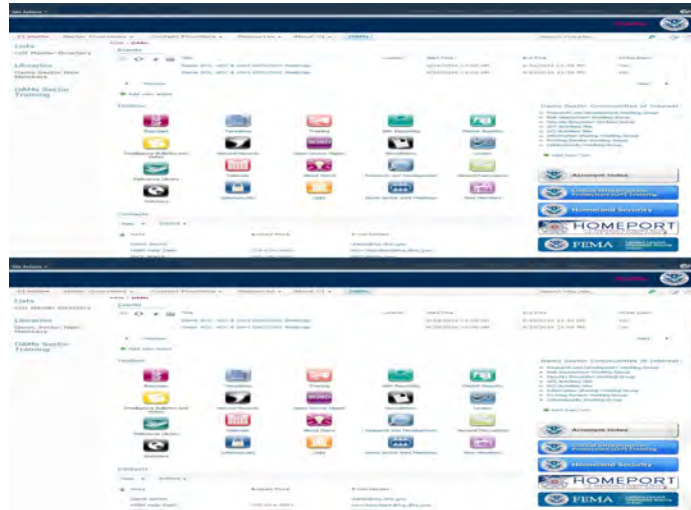
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HSIN-CI Dams Sector Portal



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Reporting an Incident

Threat Indicators

Any suspicious activity that warrants a reaction.

Anything unusual, such as:

- Items out of place
- Unusual behavior by visitors or employees
- Unattended objects
- Inventory control issues
- Unexplained equipment or process failures



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Reporting an Incident

Report suspicious activity to the following (if appropriate):

- Local law enforcement
- State Office of Homeland Security
- Local FBI Joint Terrorism Task Force: <https://tips.fbi.gov/>
- National Infrastructure Coordinating Center at: Nicc@hq.dhs.gov
- Dams Sector Suspicious Activity Reporting Tool available via HSIN-CI Dams Portal at <https://hsin.dhs.gov>
- Report cyber incidents - soc@us-cert.gov

Establish a relationship with the agencies before an incident

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Types of Suspicious Activity

- Breach/Attempted Intrusion
- Misrepresentation
- Theft/Loss/Diversions
- Sabotage/Tampering/Vandalism
- Cyber Attack
- Expressed or Implied Threat
- Aviation Activity
- Eliciting Information
- Testing or Probing of Security
- Photography
- Observation/Surveillance

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Dams Sector SAR Tool

Reporting Procedures

- Any member of the HSIN-CI Dams Portal (e.g., owners/operators, regulatory agencies, and other key stakeholders) can access the Dams SAR Tool to report and retrieve information pertaining to suspicious activities.
- Available via HSIN-CI Dams Portal at <https://hsin.dhs.gov>
- Click on the “SAR Tool” icon located under the toolbox to access the reporting tool
- Complete the SAR Form
- Submit a SAR

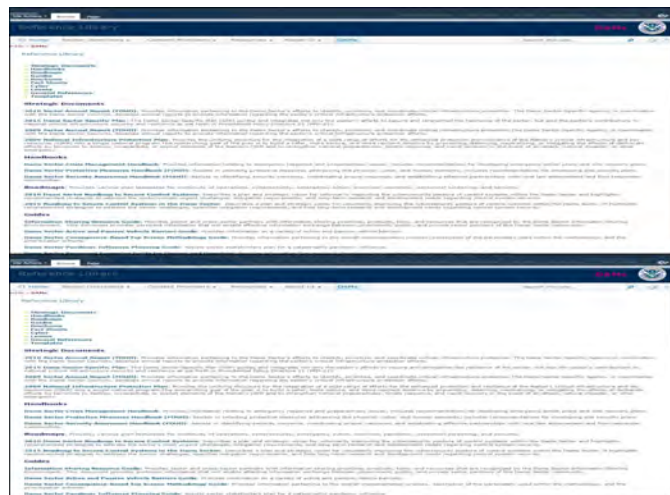


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HSIN-CI Dams Sector Reference Library



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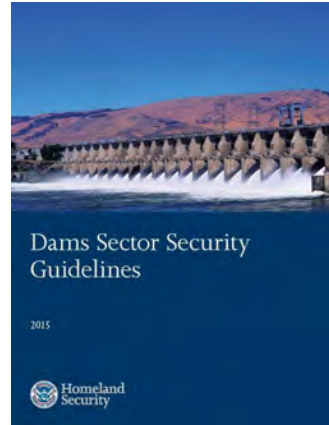
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References

DHS Dams Sector Security Guidelines

Consolidates effective industry security practices into a framework for owners and operators to select and implement security activities and measures that promote the protection of personnel, public health, public safety, and public confidence.



Appendix H of document includes links to many useful documents and websites.

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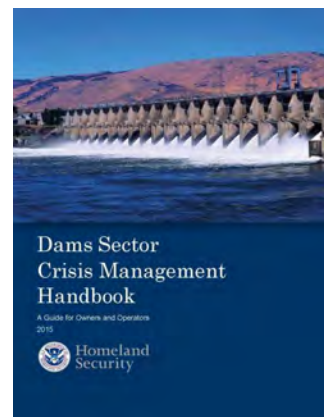
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References

DHS Crisis Management Handbook focuses on planning for and responding to impacts on human safety and infrastructure damage resulting from dam failure or damage.

- **Emergency action plans**
 - EAP elements- coordinated development/exercises - security plan alignment
- **Recovery plans**
 - Identify hazards/damage/options to minimize consequences for each critical component
- **Continuity plans**
 - Identify essential functions, delegation of authorities/vital records
- **Exercises**
 - Discussion-based exercises
 - Operations-based exercises



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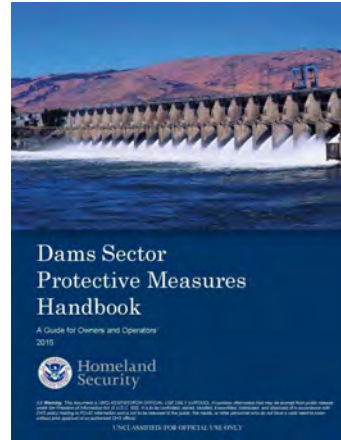
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References

DHS Protective Measures Handbook (FOUO):

Provides an introduction to protective measures for dam owners. It assists in selecting protective measures addressing the physical, cyber, and human elements; includes recommendations for developing site security plans.



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Other Dam Sector Trainings

Web-based: FEMA's Emergency Management Institute

- IS-870a Dams Sector Crisis Management
- IS-871a Dams Sector Security Awareness (FOUO)
- IS-872a Dam Sector Protective Measures (FOUO)

➤ <http://training.fema.gov/is/>

Classroom Seminar

- L260: Dam Security and Protection

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