

**U.S. NUCLEAR REGULATORY COMMISSION MANAGEMENT DIRECTIVE (MD)**

<b>MD 12.5</b>	<b>NRC CYBER SECURITY PROGRAM</b>	<b>DT-13-15</b>
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**EXECUTIVE SUMMARY**

Directive and Handbook 12.5 are revised to incorporate current Federal direction, address current threats, and update NRC organizational changes. This revision follows the internationally accepted information security policy framework issued by the International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) Joint Technical Committee as ISO/IEC Standard 27002:2005(E), "Code of Practice for Information Security Management." The directive and handbook provide requirements for securing information technology systems and devices. They are being issued in accordance with Commission direction to ensure NRC information is appropriately protected.

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## I. POLICY

- A.** It is the policy of the U.S. Nuclear Regulatory Commission to implement and maintain an agencywide Cyber Security Program to protect information and information technology (IT) systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to provide—
1. **CONFIDENTIALITY**—“Preserving authorized restrictions on information access and disclosure, including means for protecting personal privacy and proprietary information...” (44 U.S.C. 3542). A loss of confidentiality is the unauthorized disclosure of information.
  2. **INTEGRITY**—“Guarding against improper information modification or destruction, and includes ensuring information non-repudiation and authenticity...” (44 U.S.C. 3542). A loss of integrity is the unauthorized modification or destruction of information.
  3. **AVAILABILITY**— “Ensuring timely and reliable access to and use of information...” (44 U.S.C. 3542). A loss of availability is the disruption of access to or use of information or an IT system.
- B.** NRC-specific policies, standards, and guidance are consistent with the requirements of the Federal Information Security Management Act of 2002 (FISMA) (44 U.S.C. 3541 et seq.), Office of Management and Budget (OMB) policy guidance, and related regulations, policies, procedures, standards, and guidelines, including cyber security standards and guidelines for national security systems issued in accordance with law and as directed by the President and NRC mission and business objectives.
- C.** NRC cyber security protections shall be consistent with Federal guidance and commensurate with the risk and magnitude of harm resulting from unauthorized access, use, disclosure, disruption, modification, or destruction of information or IT systems that are operated, maintained, or sponsored by the agency.
- D.** NRC cyber security protections encompass computer-based hardware, software, or associated administrative procedures that are used to process, store, or transmit NRC information whether it is classified information, unclassified Safeguards information (SGI), or sensitive unclassified non-Safeguards information (SUNSI).
- E.** The Cyber Security Program shall directly support and enhance the mission and business objectives of the agency, including the capability for NRC to perform its mission in all threat environments.

- F.** The Cyber Security Program shall ensure that Communications Security (COMSEC) and classified systems comply with Committee on National Security Systems (CNSS) security requirements and Management Directive (MD) 12.4, "NRC Telecommunications Systems Security Program."
- G.** The Cyber Security Program shall ensure that National Institute of Standards and Technology (NIST) guidance is interpreted accurately and implemented appropriately.

## **II. OBJECTIVES**

- Implement cyber security measures to protect and ensure reliable access to NRC information and IT systems for authorized individuals. Cyber security measures include any computer-based hardware, software, or associated administrative and operational procedures that are used to process, store, or transmit NRC information, whether it is classified information, SGI, or SUNSI.
- Ensure users receive computer security awareness and training.
- Integrate cyber security management processes with agency strategic and operational planning processes.
- Ensure office directors and regional administrators provide cyber security controls for the IT systems and assets under their control.
- Ensure the secure interoperability and integration of NRC IT systems, which shall be achieved by ensuring cyber security requirements are fully integrated into the NRC Enterprise Architecture (EA).
- Operate and maintain a comprehensive cyber situational awareness capability that includes mitigating actions to prevent cyber security incidents.

## **III. ORGANIZATIONAL RESPONSIBILITIES AND DELEGATIONS OF AUTHORITY**

### **A. Executive Director for Operations (EDO)**

1. Ensures agency compliance with the requirements imposed on the agency by FISMA and related policies, procedures, standards, and guidelines.
2. Ensures that all offices have the necessary resources to comply with the requirements specified in the agencywide Cyber Security Program.
3. Appoints the agency Chief Information Officer (CIO) and delegates the authority to ensure compliance with the requirements imposed on the agency by FISMA and related policies, procedures, standards, and guidelines. Ensures that the CIO, in coordination with other senior executives, reports annually on the effectiveness of the agencywide Cyber Security Program, including progress of remedial actions.

4. Appoints the agency's Designated Approving Authority (DAA) and identifies the DAA's responsibilities via memorandum.
5. Ensures computer security controls protect information stored, processed, or transmitted by NRC IT systems used or operated by, for, or on behalf of the agency commensurate with the risk and magnitude of the harm that could result from unauthorized access, use, modification, disclosure, disruption, or destruction.
6. Ensures that office directors and regional administrators provide risk-based cyber security protections for the information and IT systems that support the operations and assets under their control.
7. Ensures that cyber security management processes are integrated with agency strategic and operational planning processes.
8. Ensures that the agency has trained personnel sufficient to assist the agency in complying with FISMA and related policies, procedures, standards, and guidelines.
9. Identifies NRC business areas and the business area leaders responsible for those business areas.
10. Enforces the agency's compliance of the Cyber Security Program at the organizational level.

**B. Chief Financial Officer (CFO)**

Ensures, in partnership with the Executive Director for Operations (EDO), that funds are available for essential IT resources, including staffing, so that all offices can comply with the NRC Cyber Security Program requirements.

**C. Office of the Inspector General (OIG)**

1. Investigates, audits, and takes other action in accordance with the Inspector General Act of 1978 (5 U.S.C. App. 3) to prevent and detect misconduct or wrongdoing in connection with the NRC Cyber Security Program.
2. Conducts an annual independent evaluation of the NRC Cyber Security Program to determine its effectiveness.
3. Oversees, evaluates, and supports resolution of compliance issues pertinent to the organization.
4. Inspects and tests IT systems to ensure compliance with computer security policy, procedures, and regulations.

**D. Office of the General Counsel (OGC)**

Provides legal advice for cyber security matters.

**E. Chief Information Officer (CIO)**

The CIO has inherent U.S. government authority, must be a Government employee, and is responsible for the following as it relates to cyber security:

1. Ensures the integrity, availability, and confidentiality of NRC's IT systems.
2. Advises and assists office directors and regional administrators on IT acquisition and management.
3. Ensures the implementation and maintenance of a sound, cost-effective, and integrated EA that supports the NRC's mission.
4. Ensures that NRC's IT systems, including Web sites, protect the privacy of the public, businesses, employees, and contractors.
5. Ensures that NRC maintains a workforce of well-qualified cyber security professionals.
6. Establishes, implements, and enforces an agencywide framework to facilitate an incident response program, ensuring proper and timely reporting to the United States Computer Emergency Readiness Team (US-CERT).
7. Appoints the agency Chief Information Security Officer (CISO) and delegates the authority to develop and maintain the agencywide Cyber Security Program.
8. Approves all connections and agreements related to connections between an NRC system and another federal agency system or a system owned by another party.

**F. Designated Approving Authority (DAA)**

The DAA is a committee consisting of authorizing officials with designated authority to assume formal responsibility for approving the operation of an IT system at an acceptable level of risk based on an agreed-upon set of implemented security controls. The DAA consists of senior executives with a level of authority commensurate with understanding and accepting such IT system-related security risks. The DAA has inherent U.S. Government authority, and is comprised of officials who must be Government employees. The DAA—

1. Assumes responsibility for the security risks associated with an IT system through the system security authorization process.
2. Approves or disapproves security plans, memoranda of agreement or understanding, and plans of action and milestones.
3. Authorizes and de-authorizes IT system operations.

4. Halts operations of any IT system when it determines that an unacceptable level of risk exists.
5. Coordinates authorization activities with the CISO, common control providers, information system owners, security control assessors, and other interested parties during the security authorization process.
6. Ensures that all activities and functions associated with security authorization that are delegated to authorizing official designated representatives (AODRs) are carried out.
7. Determines the actions necessary regarding risks discovered during continuous monitoring, annual assessments, and penetration testing.
8. Authorizes significant system changes and determines if reauthorization is required.
9. Approves deviations from defined security requirements.

**G. Chief Information Security Officer (CISO)**

1. Serves as the director of the Computer Security Office (CSO).
2. Plans, directs, and oversees the implementation of the agencywide Cyber Security Program.
3. Ensures the agencywide Cyber Security Program adheres to federally mandated and NRC-defined security requirements.
4. Enforces compliance with the agencywide Cyber Security Program at the operational level.
5. Ensures that cyber security policies, procedures, and control techniques are properly balanced against business objectives, costs, and the need to ensure that cyber security is addressed throughout the life cycle of each NRC IT system.
6. Functions as the NRC IT risk executive, ensuring that risk acceptance decisions are consistent across the agency. This includes aggregating risk from individual IT systems and ensuring that cyber security is integrated into segmented EAs.
7. Ensures that employees receive periodic computer security refresher training, including awareness, basics, and literacy instruction.
8. Proposes and advocates appropriate agency IT security standards and guidelines.
9. Guides security process maturity within the NRC and advocates these concepts to NRC organizations.
10. Identifies the list of common controls for the agencywide Cyber Security Program.
11. Serves as the agency's liaison with external entities on mutual IT security interests.

12. Ensures cyber security incidents are reported to the Office of the Inspector General (OIG) to determine if criminal investigation is warranted.
13. Delegates to the Policy, Standards, and Training (PST) Senior IT Security Officer (SITSO) the responsibility for providing computer security policy, standards, guidance, procedures, awareness, and training. The PST SITSO has inherent U.S. Government authority and must be a Government employee.
14. Delegates to the FISMA Compliance and Oversight (FCO) SITSO the responsibility for providing NRC oversight of cyber security FISMA compliance and assisting NRC in achieving compliance. The FCO SITSO has inherent U.S. Government authority and must be a Government employee.
15. Delegates to the Cyber Situational Awareness, Analysis, and Response (CSAAR) SITSO the responsibility for responding to cyber security incidents and for keeping NRC apprised of current cyber security threats, vulnerabilities, and mitigation measures. The CSAAR SITSO must report all incidents to the CISO. The CSAAR SITSO has inherent U.S. Government authority and must be a Government employee.

#### **H. Director, Office of Nuclear Security and Incident Response (NSIR)**

1. Manages NRC non-IT information security programs that specifically deal with the classification, declassification, and handling of classified information and SGI.
2. Ensures operation and maintenance of NRC's classified computer networks.
3. Ensures secure operation of the secure classified communications center for organizational messaging and other secure classified transmissions.
4. Functions as the Central Office of Record for all COMSEC key, material, and equipment used for classified national security information processing.
5. Ensures the acquisition, distribution, and maintenance of secure classified information phones, faxes, and other secure equipment and cryptographic keying devices.
6. Ensures the acquisition, secure operation, and maintenance of NRC's secure classified information video telecommunications systems.
7. Delegates to the Chief, Information Security Branch, Division of Security Operations (DSO), the Office of Nuclear Security and Incident Response (NSIR), the following responsibility for—
  - (a) Appointing the COMSEC Control Officer with responsibility for operation of the NRC Central Office of Record and for specifying control criteria for all COMSEC material;



- (b) Authorizing the release of operational COMSEC material for the purpose of transmitting classified information or data;
- (c) Authorizing the use of contractor personnel to install, maintain, or operate a secure communications facility for NRC;
- (d) Performing oversight of all NRC COMSEC accounts and coordinating all COMSEC activities with the National Security Agency (NSA) for NRC, particularly the accounting of all COMSEC material and periodically inspecting all NRC COMSEC accounts as required by NSA;
- (e) Operating NRC's secure classified telecommunications programs; and
- (f) Operating NRC's Secure Classified Information Communications Center.

**I. Central Office of Record**

Operates the NRC Central Office of Record and specifies control criteria for all COMSEC material.

**J. Director, Office of Information Services (OIS)**

1. Manages non-IT information security policies for marking, handling, and protecting SUNSI.
2. Ensures cyber security requirements are properly incorporated into the agency's IT operations and System Development Life Cycle (SDLC) methodology.

**K. Office Directors and Regional Administrators**

1. Ensure that all individuals with significant IT security responsibilities complete computer security training in accordance with their role prior to assuming the role and at required intervals.
2. Ensure that all users complete required cyber security awareness courses and acknowledge the rules of behavior.

**L. Associate Director for Training and Development (ADTD), Office of the Chief Human Capital Officer (OCHCO)**

1. Provides assistance in the development and delivery of the computer security awareness and role-based training program for NRC IT users. Provides other computer security related training as requested.
2. Maintains security related training records for NRC IT users.
3. Maintains role-based training records for NRC personnel (for example: general users, system administrators, ISSOs, and users with significant IT responsibilities).

**M. Associate Director for Human Resources Operations and Policy (ADOP), OCHCO**

1. Ensures that a computer security briefing is included in the initial orientation for new employees.
2. Notifies system owners of NRC staff terminations and transfers.

**N. Director, Division of Facilities and Security (DFS), Office of Administration (ADM)**

1. Ensures that appropriate buildings and rooms are provided for NRC IT systems, and participates in planning, installation, and operations and maintenance of those buildings and rooms.
2. Coordinates, reviews, and approves, in conjunction with CSO, physical security proposals and plans for buildings and rooms that will be used for processing NRC electronic information.
3. Plans, develops, establishes, and administers policies, standards, and procedures for the overall NRC personnel security program, including clearing personnel so that system owners can authorize their access to NRC IT systems.

**O. Director, Division of Contracts (DC), ADM**

Ensures that Federal and NRC requirements for information protection, system availability, and continuity of operations, as documented in Volume 12 of the NRC MD catalog, are included in solicitations and contracts for the design, development, acquisition, or operation and maintenance of IT systems.

**IV. APPLICABILITY**

The policy and guidance in this directive and handbook apply to all NRC employees, support contractors, and other users that authenticate to NRC systems and who process, store, or produce classified national security information, SGI, SUNSI, or non-sensitive information using IT systems or IT facilities that are under the security jurisdiction of the NRC.

**V. DIRECTIVE HANDBOOK**

Handbook 12.5 facilitates implementation of the NRC Cyber Security Program. The handbook includes guidance regarding administrative, technical, management, operational, and physical security measures appropriate for the protection of NRC IT facilities and systems, and classified national security information, SGI, and SUNSI processed, stored, or transmitted using an NRC IT system.

## **VI. GUIDANCE DOCUMENTS**

### **A. Safeguarding of Non-electronic Safeguards Information (SGI)**

MD 12.7, "NRC Safeguards Information Security Program," pertains to the safeguarding of non-electronic SGI.

### **B. Safeguarding of Non-electronic Sensitive Unclassified Information (SUNSI)**

Refer to the "NRC Policy and Procedures for Handling, Marking, and Protecting Sensitive Unclassified Non-Safeguards Information (SUNSI)," available on the internal NRC Security Web site at <http://www.internal.nrc.gov/security.html>, and MD 12.6, "NRC Sensitive Unclassified Information Security Program."

### **C. Glossary**

MD 12, "Glossary of Security Terms," is a listing of defined security terms used in the MD Volume 12, "Security," series.

## **VII. FEDERAL INFORMATION SECURITY MANAGEMENT ACT OF 2002 (FISMA) AND OTHER FEDERAL GUIDANCE**

FISMA directs the Department of Commerce, NIST, to prescribe standards and guidelines pertaining to cyber security. These standards and guidelines are required at NRC for unclassified systems. The NRC shall follow NIST guidance to the maximum extent practicable, ensuring that such standards and guidelines provide for sufficient flexibility to permit alternative solutions that provide equivalent levels of protection for identified cyber security risks. Compliance with NIST standards and guidelines includes information pertaining to the preparation of documentation (such as system security plans, IT risk assessments, and IT contingency plans) and other applicable NIST guidance for IT security processes, procedures, and testing. FISMA also directs agencies to implement information security policies and practices as required by standards and guidelines for national security systems issued in accordance with law and as directed by the President. Currently, the guidelines and standards for national security systems are issued by the CNSS, Director of National Intelligence (DNI), and system owners. The NRC shall comply with the CNSS policy and guidance to include guidance related to the preparation of cyber security documentation and other applicable CNSS guidance for IT security processes, procedures, and testing.

## **VIII. INFORMATION TECHNOLOGY ROLES AND RESPONSIBILITIES**

### **A. System Owner**

A system owner is an office director, regional administrator, or OIS division director that has overall responsibility for the security of NRC systems owned by his or her

organization or operated on behalf of his or her organization by another agency or by a contractor. The system owner is an agency official who has inherent U.S. Government authority and must be a Government employee.

#### **B. Common Control Provider**

A common control is a security control that is inherited by one or more IT systems. A common control provider is an office director, regional administrator, or OIS division director with overall responsibility for the development, implementation, assessment, and monitoring of a set of common controls. Common control providers, as the system owners for these systems, are accountable for the security risk associated with operating his/her system/common controls. The common control provider is an agency official who has inherent U.S. Government authority and must be a Government employee.

#### **C. Information Owner**

An information owner provides requirements to IT system owners regarding the security controls for the IT systems where the information resides. The information owner is an agency official who has inherent U.S. Government authority and must be a Government employee

### **IX. EXCEPTIONS**

Exceptions to or deviations from this directive and handbook may be granted by the DAA, except for those areas in which the responsibility or authority is vested solely with the EDO or ADM and cannot be delegated, or for matters specifically required by law, Executive Order, or directive to be referred to other management officials. For national security systems, nothing in this directive and handbook shall supersede any authority of the DNI, NSA, Secretary of Defense, or other agency head, as authorized by law and as directed by the President, with regard to the operation, control, or management of national security systems. Nothing in this directive or handbook shall supersede any requirement made by or under the Atomic Energy Act of 1954. Restricted data or formerly restricted data shall be handled, protected, classified, downgraded, and declassified in conformity with the Atomic Energy Act of 1954.

### **X. REFERENCES**

#### ***Code of Federal Regulations***

32 CFR Part 2001, "Classified National Security Information."

#### ***Committee on National Security Systems***

Committee on National Security Systems (CNSS) Policies, available at <http://www.cnss.gov/policies.html>.

CNSS Directives, available at <http://www.cnss.gov/directives.html>.

CNSS Instructions, available at <http://www.cnss.gov/instructions.html>.

CNSS Web site, available at <http://www.cnss.gov>.

### ***Department of Commerce, National Institutes of Standards and Technology***

National Institutes for Standards and Technology (NIST), Computer Security Division, Computer Security Resource Center, available at <http://csrc.nist.gov>.

NIST Federal Information Processing Standards (FIPS) Publications, available at <http://csrc.nist.gov/publications/PubsFIPS.html>.

NIST Publications, available at <http://csrc.nist.gov/publications/>.

NIST Special Publications, available at <http://csrc.nist.gov/publications/PubsSPs.html>.

### ***Executive Orders***

Executive Order 13526, "Classified National Security Information," December 29, 2009.

### ***Nuclear Regulatory Commission Documents***

"Agencywide Rules of Behavior for Authorized Computer Use," available at <http://www.internal.nrc.gov/CSO/documents/ROB.pdf>.

Management Directives—

2.7, "Personal Use of Information Technology."

2.8, "Project Management Methodology (PMM)."

Vol. 3, Part 2, "Records Management."

3.51, "Library Services."

3.52, "Availability, Retention, and Indexing of Codes and Standards."

3.53, "NRC Records and Document Management Program."

3.54, "NRC Collections of Information and Reports Management."

3.55, "Forms Management Program."

3.57, "Correspondence Management."

12, "Glossary of Security Terms."

12.1, "NRC Facility Security Program."

12.2, "NRC Classified Information Security Program."

12.3, "NRC Personnel Security Program."

12.4, "NRC Telecommunications Systems Security Program."

12.6, "NRC Sensitive Unclassified Information Security Program."

12.7, "NRC Safeguards Information Security Program."

13.1, "Property Management."

#### NRC CSO Documents—

Checklists, available at: <http://www.internal.nrc.gov/CSO/checklists.html>.

Incident Response, available page at:  
<http://www.internal.nrc.gov/CSO/incident-resp.html>.

Policies, available at <http://www.internal.nrc.gov/CSO/policies.html>

Procedures, available at <http://www.internal.nrc.gov/CSO/procedures.html>.

Processes, available at <http://www.internal.nrc.gov/CSO/processes.html>.

Standards, available at <http://www.internal.nrc.gov/CSO/standards.html>.

Templates, available at [http://www.internal.nrc.gov/CSO/security\\_templates.html](http://www.internal.nrc.gov/CSO/security_templates.html).

Web site, available at <http://www.internal.nrc.gov/CSO/>.

NRC General User Remote Access Computer Security Checklist, available at  
[http://www.internal.nrc.gov/CSO/documents/CSO-CHLT-1003\\_Telework\\_Checklist.pdf](http://www.internal.nrc.gov/CSO/documents/CSO-CHLT-1003_Telework_Checklist.pdf).

NRC Interconnection Security Agreement can be found at  
[http://www.internal.nrc.gov/CSO/documents/Interconnection\\_Security\\_Agreement.doc](http://www.internal.nrc.gov/CSO/documents/Interconnection_Security_Agreement.doc).

NRC/National Treasury Employees Union (NTEU) Collective Bargaining Agreement,  
available at <http://www.internal.nrc.gov/HR/>.

"NRC Policy and Procedures for handling, Marking, and Protecting Sensitive  
Unclassified Non-Safeguards Information (SUNSI)," available at  
<http://www.internal.nrc.gov/security.html>.

NRC Personally Identifiable Information guidance can be found at  
<http://www.internal.nrc.gov/ois/divisions/irsd/privacy/index.html>

NRC Telework Information, available at <http://www.internal.nrc.gov/HR/telework.html>.

#### **Office of Management and Budget Documents (OMB)**

OMB Circular A-11, "Preparation, Submission, and Execution of the Budget,"  
August 18, 2011.

OMB Circular A-123, "Management Accountability and Controls," June 21, 1995.

OMB Circular A-127, "Financial Management Systems," July 23, 1993.

OMB Memoranda, available at <http://www.whitehouse.gov/omb/memoranda/>.

### ***United States Code***

Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.).

Gathering, Transmitting or Losing Defense Information (18 U.S.C. 793).

Federal Information Security Management Act (FISMA) of 2002 (44 U.S.C. 3541 et seq.).

Inspector General Act (5 U.S.C. App 3).

Information Security (44 U.S.C. 3542).

### ***International Standards***

International Organization for Standardization (ISO)/International Electrotechnical Commission (IEC) Standard 27002:2005(E), "Code of Practice for Information Security Management," June 15, 2005.

United States Computer Security Readiness Team (US-CERT) Federal Incident Reporting Guidelines, available at <http://www.us-cert.gov/federal/reportingRequirements.html>.

**U.S. NUCLEAR REGULATORY COMMISSION DIRECTIVE HANDBOOK (DH)**

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## I. NRC CYBER SECURITY PROGRAM

### A. Introduction

The U.S. Nuclear Regulatory Commission Cyber Security Program protects information and information technology (IT) systems from unauthorized access, use, disclosure, disruption, modification, or destruction. The Cyber Security Program determines the threats to NRC's IT resources, defines the vulnerabilities related to those threats, and then mitigates risks in light of the mission needs.

#### 1. Definitions

(a) Information security is defined as protection of the confidentiality, integrity, and availability of information from unauthorized access, use, disclosure, disruption, modification, or destruction.

(b) Cyber security is the application of information security to IT systems.

#### 2. Federal Information Security Management Act (FISMA) (44 U.S.C. 3541 et seq.)

FISMA directs agencies to identify and provide information security protections commensurate with the risk and magnitude of the harm resulting from the unauthorized access, use, disclosure, disruption, modification, or destruction of (1) information collected or maintained by or on behalf of an agency; or (2) IT systems used or operated by an agency or by a contractor of an agency or other organization on behalf of an agency.

#### 3. Components of the NRC Cyber Security Program

(a) Policies and procedures that are based on formal assessments of risk;

(b) Subordinate plans for providing adequate cyber security for networks, facilities, IT systems, and groups of IT systems;

(c) Periodic assessments of risk;

(d) A process for planning, implementing, evaluating, and documenting remedial actions to address any deficiencies in NRC computer security policies, procedures, and practices;

(e) Plans and procedures to ensure continuity of operations for IT systems that support NRC operations and assets;

(f) Periodic testing and evaluation of the effectiveness of computer security policies, procedures, practices, and security controls;

(g) Security awareness and training to inform personnel of the cyber security risks associated with their activities and their responsibilities in complying with organizational policies and procedures designed to reduce these risks; and

- (h) Procedures for detecting, reporting, and responding to cyber security incidents.
4. The Office of Management and Budget (OMB) principles that guide the efforts to incorporate security and privacy into NRC's IT systems are as follows:
- (a) Effective security for protecting information is an essential element of all NRC IT systems, regardless of the classification or sensitivity of the information being processed.
  - (b) Effective privacy protections are essential to all NRC IT systems, especially those that contain substantial amounts of personally identifiable information (PII). The use of new information technologies should sustain, and not erode, the privacy protections provided in all statutes and policies relating to the collection, use, and disclosure of personal information.
  - (c) The increase in efficiency and effectiveness that flows from the use of interconnected computers and networks has been accompanied by increased risks. The protection of NRC IT systems resources must be commensurate with the risk of harm resulting from any misuse or unauthorized access to such systems and the information stored, processed, or transmitted on them.
  - (d) Security risks and incidents must be managed in a way that complements and does not unnecessarily impede agency business operations. By understanding risks and implementing an appropriate level of controls, NRC can significantly reduce risk and potential loss.
  - (e) A strategy to manage security is essential. Such a strategy should be based on an ongoing cycle of risk management and shall be described in system security plans. The strategy should identify significant risks, clearly establish responsibility for reducing them, and ensure that risk management remains effective over time.
  - (f) The NRC must understand the risk to systems under NRC control and determine the acceptable level of risk, ensure that adequate security is maintained to support and assist the programs under NRC control, and ensure that security controls support program needs and appropriately accommodate operational necessities. In addition, security measures shall support the agency enterprise and security architectures.

## **B. Structure of the Handbook**

This handbook follows the internationally accepted information security policy framework identified in International Standards Organization (ISO)/International Electrotechnical Commission (IEC) 27002:2005, "Code of Practice for Information Security Management." This handbook consists of the following 11 sections:

1. Section I: NRC Cyber Security Program – Defines the NRC Cyber Security Program.

2. Section II: Organization of Cyber Security – Defines the framework that controls the implementation of cyber security within NRC.
3. Section III: Information Technology Asset Management – Identifies requirements for NRC IT asset management.
4. Section IV: Personnel Security – Identifies personnel security requirements related to cyber security.
5. Section V: Physical and Environmental Security – Identifies physical security and environmental security requirements related to cyber security.
6. Section VI: Communications and Operations Management – Identifies requirements for the correct and secure operation of IT facilities.
7. Section VII: Access Control – Identifies requirements to control access to information and IT systems.
8. Section VIII: IT Systems Acquisition, Development, and Maintenance – Identifies requirements for security to be an integral part of IT systems.
9. Section IX: Cyber Security Incident Management – Identifies requirements for reporting and mitigating security events and weaknesses associated with IT systems.
10. Section X: Business Continuity Management – Identifies requirements to counteract interruptions to business activities and protect business processes from major failures and disasters.
11. Section XI: Compliance – Identifies requirements to avoid breaches of legal, statutory, regulatory, or contractual obligations and of any security requirements.

### **C. Authorities and Other Guidance**

1. The references provided in Section X of this directive provide additional authority for the NRC Cyber Security Program. FISMA also directs the Department of Commerce, National Institute of Standards and Technology (NIST), to prescribe standards and guidelines pertaining to IT systems that do not process classified information. These NIST standards are mandatory within the agency. NIST cyber security information is available at <http://csrc.nist.gov> and can also be obtained by contacting the Computer Security Office (CSO) staff. NIST issues this information in the form of Federal Information Processing Standards (FIPS) and Special Publications (SP), which were considered in the preparation of this handbook.
2. Systems compliance is described as follows:
  - (a) Systems that process classified information must comply with Committee on National Security Systems (CNSS) direction. The CNSS Web site is located at <http://www.cnss.gov>.

- (b) Systems that process Sensitive Compartmented Information (SCI) must adhere to Director of National Intelligence (DNI) policy, standards, and guidance. The DNI Web site is located at <http://www.dni.gov/>.
3. System owners should consult with the CSO/Policy, Standards, and Training (PST) Senior IT Security Officer (SITSO) for information related to SCI processing.
  4. When NRC uses another Federal agency-provided system, the NRC Designated Approving Authority (DAA) must do one of the following:
    - (a) agree to accept the risk associated with operating the system with the controls provided by the other agency,
    - (b) negotiate with the other agency to provide additional controls for NRC information, or
    - (c) decide not to use the system based upon an assessment of risk.
  5. CSO provides additional direction for cyber security in the form of standards, processes, procedures, and guidelines. CSO direction can be found on the CSO Web site at <http://www.internal.nrc.gov/CSO/>.
  6. Some NRC guidance types are mandatory and some are advisory; each type goes through its own approval process. These differences are detailed as follows:
    - (a) NRC cyber security standards are mandatory and are developed and approved by the DAA. Standards generally define items like mandatory agencywide software configurations and technology specifications.
    - (b) NRC cyber security procedures are mandatory and are developed and approved by the CSO in coordination with appropriate office directors through the Information System Security Officer (ISSO) Forum. Procedures are based on this policy and generally define business processes that have agencywide security implications.
    - (c) NRC cyber security guidelines are not mandatory, are developed and approved by the CISO, and generally provide agencywide guidance for the implementation of security best practices within the NRC.
  7. CSO standards, processes, procedures, and guidelines may address infrastructure that supports all of the NRC or address specific items that may or may not be applicable to the entire agency. Therefore, in addition to this handbook, users must be aware of other guidance that may affect the use of IT systems within the NRC. All CSO provided guidance is available via the [CSO Web site](#).
  8. Some cyber security guidance documents are specific to a particular system. This type of guidance is developed by various offices and system owners within NRC as they develop operational and business processes and needs to include security. For

example, system-specific procedures are the responsibility of system owners. Those system owners are also responsible for ensuring that system-specific procedures are available to users and for ensuring all developed procedures are compliant with this directive and handbook. System owners and their representatives can contact the PST SITSO for assistance in the preparation of cyber security guidance documents.

#### **D. Authorization to Operate Process**

1. An IT system is authorized for operation at a specific point in time based on the risk associated with the current security state of the system. NIST, the U.S. Department of Defense (DOD), and the intelligence community have collaborated in the development of a Government-wide system authorization process. This process is an integral part of the system development life cycle (SDLC) and the Risk Management Framework (RMF). The authorization process provides a well-defined and comprehensive process to ensure that responsibility and accountability for managing IT system-related security risks are determined and assigned appropriately.
2. An IT risk executive (function) is incorporated into the security authorization process to ensure that managing IT system-related security risks:
  - (a) is consistent across the agency;
  - (b) reflects the agency's risk tolerance; and
  - (c) performs as part of an agencywide process that considers other agency risks affecting mission/business success.
3. The IT risk executive function is assigned to the CISO.
4. In order to be most effective, IT system monitoring activities are integrated into all life cycle management processes carried out by the organization and not executed as standalone, security-centric activities.
5. The SDLC process, including obtaining an Authorization to Operate (ATO), is described in Section VIII.D, "Security in the System Development Life Cycle: Risk Management Framework (RMF)," of this handbook.

#### **E. Managing Risk**

1. The foundation of the NRC Cyber Security Program rests on the identification and management of risk. The program—
  - (a) determines threats to the NRC's IT resources,
  - (b) defines the vulnerabilities related to those threats, and

- (c) mitigates risks in light of the mission needs, the business case, good security practices, Government and agency governance, and contractual and legal requirements.
2. FISMA requires the head of each Federal agency to determine “the levels of information security appropriate to protect information and IT systems.” To effectively perform this function, NRC considers several factors:
    - (a) The importance of the IT system and the information stored on, processed, or transmitted by that system;
    - (b) The threats against the IT system;
    - (c) The likelihood of the threat being applied to the system;
    - (d) The damage to human life or property, NRC reputation, NRC financial loss, harm to NRC programs, or civil/criminal liabilities that could occur by a compromise of the confidentiality, integrity, or availability of the information stored, processed, or transmitted by the system;
    - (e) Actions that protect against the threats; and
    - (f) Costs associated with risk mitigation.
  3. Senior executives, known collectively as the DAA, decide whether the risks are acceptable.
  4. NIST has published guidance, including documents on risk management, to help agencies standardize their approach. These documents are online at the NIST Web site: <http://csrc.nist.gov/publications/>.

#### **F. Defense-in-Depth**

When using this handbook as a guide to establish or administer a security environment for an IT system, defense-in-depth should be the primary approach. Specifically, the system owner should establish multiple layers of security protection to mitigate the impact of an independent security control failure.

#### **G. Waivers and Exceptions**

When existing policy presents an unacceptable barrier to the accomplishment of business requirements, the system owner may submit a written request to the DAA to waive a particular policy requirement. CSO will review these requests and make a written recommendation to the DAA regarding the request. The DAA makes the final determination regarding a policy waiver and indicates if the waiver is a one-time, single purpose waiver, or if the waiver will become a modification to this management directive



(MD). CSO tracks waiver decisions and will incorporate them, as appropriate, into future updates of this MD.

#### **H. Reporting Violations**

Anyone who violates or witnesses a violation of this policy must report the incident to the PST SITSO or CISO by email at [CSO-Policy@nrc.gov](mailto:CSO-Policy@nrc.gov).

## **II. ORGANIZATION OF CYBER SECURITY**

### **A. Internal Organization**

This handbook, in combination with the directive, provides the management framework for the NRC's Cyber Security Program.

#### **1. Computer Security Office**

- (a) The CSO is responsible for planning, directing, and overseeing the implementation of a comprehensive, coordinated, integrated and cost-effective NRC Cyber Security Program, consistent with applicable laws, regulations, Commission, Executive Director for Operations, and Deputy Executive Director for Corporate Management direction, management initiatives, and policies.
- (b) The Director of the CSO functions as the NRC CISO and ensures appropriate, effective, and efficient NRC-wide integration, direction, and coordination of IT security planning and performance within the framework of the NRC IT Security Program. CSO is divided into three functional areas: Policy, Standards, and Training; FISMA Compliance and Oversight; and Cyber Situational Awareness, Analysis, and Response.

#### **2. Management Commitment to Cyber Security**

NRC management at all levels must ensure that—

- (a) Cyber security requirements are identified for IT systems for which they are responsible and that adequate resources are obligated to meet these requirements.
- (b) All IT systems meet the requirements identified within this MD and support the agency mission.
- (c) IT processes and procedures reflect cyber security requirements identified within this MD.
- (d) The process for authorizing IT systems to operate is an integral part of the SDLC and the RMF.

- (e) An IT risk executive function is incorporated into the security authorization process to ensure that management of IT system-related security risks:
  - (i) Is consistent across the NRC,
  - (ii) Reflects agencywide risk tolerance, and
  - (iii) Is performed as part of an organization-wide process that considers other agency risks affecting mission/business success.
- (f) System authorization is part of a methodical, yet dynamic, risk management process.

### 3. Cyber Security Coordination

The Cyber Security Program is led by CSO and coordinated across the agency by personnel assigned to cyber security roles. The NRC cyber security roles are described in this directive. In addition, CSO collaborates with OIS and the ISSO Forum to ensure the NRC Cyber Security Program is effectively implemented and monitored and business solutions support requirements.

### 4. Delegation of Cyber Security Responsibilities

This MD identifies cyber security responsibilities across the NRC. Individuals with allocated security responsibilities may delegate security tasks; however, those individuals retain ultimate responsibility for cyber security and must ensure that all delegated tasks are correctly performed. The explicit acceptance of risk is the responsibility of the DAA and cannot be delegated to other officials within the organization.

### 5. Authorization to Use Information Processing Facilities and Cloud Services

Facilities and cloud services used to host NRC IT systems or process/store NRC data must be approved and meet federally mandated and NRC-defined security requirements.

### 6. Home Computing

- (a) Staff may work from home with approval from their management in accordance with agency policy and the NRC/National Treasury Employees Union (NTEU) Collective Bargaining Agreement.
- (b) The processing of NRC data in the home is authorized, but is restricted as follows:
  - (i) Safeguards Information (SGI) and classified information must not be processed at a home facility. Only facilities specifically approved for processing this type of information may be used for such processing.
  - (ii) Home processing of sensitive unclassified non-Safeguards information (SUNSI) is permitted with supervisor approval, and when using NRC's approved methods for

accessing or processing this type of data. CSO-CKLT-1003, "NRC General User Remote Access Computer Security Checklist," available at [http://www.internal.nrc.gov/CSO/documents/CSO-CKLT-1003\\_Telework\\_Checklist.pdf](http://www.internal.nrc.gov/CSO/documents/CSO-CKLT-1003_Telework_Checklist.pdf), provides the required checklist for remote access. Additional information about telework can be found in Section VI.B.4 of this handbook and at <http://www.internal.nrc.gov/HR/telework.html>.

## 7. Contact with Authorities

### (a) Computer Security Incident Response Team (CSIRT)

All potential cyber security incidents must be reported to the Computer Security Incident Response Team (CSIRT) within 1 hour. The CSIRT is headed by the CSO Cyber Situational Awareness, Analysis, and Response (CSAAR) SITSO. The CSIRT provides a recommendation to the CISO stating whether or not the NRC Office of the Inspector General (OIG) needs to address a cyber security incident. If an investigation is required, the NRC OIG will work with other law enforcement agencies as needed to close the incident. Additional information on cyber security incident management can be found in Section IX of this handbook. The CSIRT also reports cyber security incidents to the United States Computer Emergency Readiness Team (US-CERT) when appropriate. The CISO briefs the CIO on the severity and impact that the incident has on the agency.

### (b) CIO and CISO

Liaison with relevant cyber security authorities outside the agency is the responsibility of the CIO and CISO.

### (c) System owners

System owners must ensure all federally mandated and NRC-defined cyber security requirements have been addressed by their systems. If the boundary of an IT system lies outside of an NRC facility, the system owners must coordinate with the appropriate parties to ensure NRC data and IT resources are properly protected from external parties (e.g., contractors or other Government agencies).

## 8. Contact with Cyber Security Special Interest Groups

The CSO is the NRC liaison with special interest groups that have an interest in cyber security. Other NRC organizations may participate as necessary after coordination with the CSO. OIG, as part of its statutory law enforcement authority, will interact with other law enforcement agencies and special interest groups, and will coordinate information developed with CSO, as necessary.

**B. NRC Roles and Responsibilities for Security Contacts**

## 1. System Owner

The system owner is responsible for the security of an NRC IT system and is accountable for the security risk associated with operating his or her system. The system owner is responsible for the following:

- (a) Ensuring that each IT system complies with the requirements of this directive and handbook.
- (b) Ensuring all new IT procurements include requirements to comply with this policy.
- (c) Ensuring that security requirements and planning are included in life cycle budgets for IT systems and in project screening forms and business cases that are completed in accordance with the Capital Planning and Investment Control (CPIC) policy.
- (d) Ensuring all implementations (e.g., scripts, code, databases) receive an authority to operate from the DAA before being put into operation.
- (e) Appointing an ISSO and alternate ISSO for each system.
- (f) Ensuring that required security documentation is prepared and maintained for each system.
- (g) Providing IT inventory information to OIS for all IT system assets.
- (h) Meeting another agency's security controls when the system's boundary contains an IT resource that is owned by another Federal agency.
- (i) Working in conjunction with the CSO to assess the risk and magnitude of the harm that could result from the unauthorized access, use, disclosure, disruption, modification, or destruction of information or computer systems under their control and implement policies, procedures, and security controls to cost-effectively reduce risk to an acceptable level.
- (j) Performing continuous monitoring of system computer security controls to determine if they are operating as intended and having the desired effect.

## 2. Common Control Provider

A common control provider is responsible for the security of a specific set of common security controls used to protect multiple IT systems. The common control provider is accountable for the security risk associated with operating his or her common controls. The common control provider is responsible for:

- (a) Ensuring that each common control complies with the requirements of this directive and handbook.
  - (b) Ensuring all entities within their organization and/or under their control that are involved in acquiring (e.g., either developing or procuring) common controls comply with the NRC system development and security authorization requirements.
  - (c) Ensuring all implementations receive an authority to operate from the DAA before being put into operation.
  - (d) Ensuring that required security documentation is prepared and maintained for each common control.
  - (e) Providing IT inventory information to OIS for all common control assets.
  - (f) Performing continuous monitoring of common controls to determine if they are operating as intended and having the desired effect.
3. Security Control Assessor
- (a) The security control assessor is a trusted position with special access to the security posture of an IT system. The security control assessor is any individual, group, or organization responsible for conducting a comprehensive, independent assessment of the management operational and technical security controls in an IT system to determine the extent to which the controls are implemented correctly, operating as intended, and producing the desired outcome with respect to meeting the security requirements for the system. The security control assessor is responsible for:
    - (i) Evaluating the system security plan before the system assessment is conducted to help ensure the plan provides a set of detailed security controls that is adequate to meet all applicable security requirements.
    - (ii) Conducting a comprehensive assessment of the management operational and technical security controls in an IT system to determine the extent to which the controls are implemented correctly, operating as intended, and producing the desired outcome with respect to meeting the security requirements for the system.
    - (iii) Providing a documented assessment of the severity of cyber security weaknesses or deficiencies discovered in the IT system.
    - (iv) Recommending corrective actions to address identified vulnerabilities in the system.
    - (v) Preparing the final security assessment report containing the results and findings from the assessment.

#### 4. System-Level Information System Security Officer

The system-level information system security officer is the designated security representative of an IT system owner. This is a trusted position with special access to and authority over an IT system. This role must not be assigned to an individual who has other trusted responsibilities (e.g., a system administrator should not be assigned ISSO responsibilities). In some cases, however, due to staffing limitations or other constraints, it may be necessary to assign responsibilities of multiple trusted positions to a single individual. System owners must consult with the CISO before assigning ISSO responsibilities to an individual with other trusted responsibilities. This individual—

- (a) Oversees the security aspects of the IT system and its day-to-day security operations.
- (b) May be responsible for more than one IT system.

#### 5. Office Information System Security Officer

- (a) Serves as the ISSO representative and single point of contact for ISSO responsibilities for one or more offices or regions and communicates ISSO relevant information to the rest of the office's system-level ISSOs and computer professionals.
- (b) Conveys office-specific system security information to CSO. The Office ISSO must be a system-level ISSO for at least one system within that office. The Office ISSO has inherent U.S. Government authority and, as such, must be a Government employee.
- (c) When system-level ISSOs are contractors, the Office ISSO must perform actions based upon information that cannot be provided to the contractor ISSO due to homeland security based restrictions. Information restricted from the contractor shall be so labeled.

#### 6. NRC Authenticated Users

- (a) An NRC authenticated user is an individual who has been authorized access to or use of an NRC IT system for any reason (e.g., support of an agency mission or developing or maintaining an IT system).
- (b) For the purposes of this management directive and handbook, individuals in the general public who only access the NRC public Web site for unauthenticated access are not considered NRC authenticated users.
- (c) NRC authenticated users must report all suspected attacks or other types of cyber security incidents within 1 hour to the CSIRT.

- (d) Users of an IT system are often the first to encounter an anomaly that may be indicative of an attack or actions associated with unauthorized execution of malicious program code. Thus, an IT system user community can serve as a control or countermeasure to identify potential attacks and mitigate the resulting adverse impacts through early recognition, reporting, and compliance with NRC security measures.
- (e) Each NRC authenticated user must follow the NRC's Agency-wide Rules of Behavior for Authorized Computer Use as well as any system-specific rules of behavior established by system owners. The rules of behavior can be found on the <http://www.internal.nrc.gov/CSO/documents/ROB.pdf>. See Section IV for detailed information on computer security rules of behavior.

#### 7. Business Area Leader

A business area leader is an office director, a regional administrator, or a deputy executive director responsible for an NRC business area, such as nuclear reactor regulation. A business area leader has inherent Government authority, must be a Government employee, and is responsible for the following as it relates to cyber security:

- (a) Identifying mission, business, operational requirements, and IT resources necessary for the business area to support the mission and for compliance with cyber security requirements;
- (b) Identifying resources required for critical business processes and determining the impact of unavailability of those resources;
- (c) Performing a business area risk assessment; and
- (d) Developing a business continuity plan (BCP) for the business area.

#### 8. Policy, Standards and Training Senior IT Security Officer (PST SITSO)

The PST SITSO has inherent Government authority, must be a Government employee, and is responsible for the following as it relates to cyber security:

- (a) Develops, coordinates, and maintains the NRC Cyber Security Program policy.
- (b) Develops policies in support of new requirements.
- (c) Ensures that cyber security policies, directives, and requirements are communicated to NRC staff to improve NRC's security posture, mitigate cyber security vulnerabilities, and combat cyber security threats.
- (d) Develops and maintains standards, processes, procedures, templates, and guidance that support the agency's goal of developing a robust Cyber Security Program.

- (e) Develops, coordinates, and maintains comprehensive and cost-effective cyber security awareness, training, and certification programs.

9. FISMA Compliance and Oversight (FCO) SITSO

The FCO SITSO has inherent Government authority, must be a Government employee, and is responsible for the following as it relates to cyber security:

- (a) Conducts cyber security risk analyses and reviews and ensures that actions are taken by system owners to address any identified vulnerabilities.
- (b) Serves as the Designated Representative to the DAA for systems authorization activities.
- (c) Oversees and assists organizations in completing and maintaining their individual system authorization programs.
- (d) Tracks and validates Plan of Action and Milestones (POA&M) items.
- (e) Analyzes POA&Ms for quality of content and practicality of remediation.
- (f) In coordination with the system owner, conducts risk assessments, tests cyber security, provides in-depth oversight and analysis, and ensures that all programs are making consistent progress in mitigating identified weaknesses.
- (g) Provides cyber security technical information, advice, support, and consultation services to system owners in the area of cyber security and compliance during system development and authorization activities.
- (h) Provides authoritative assistance, consultation, and guidance in the area of cyber security to ensure that agency programs comply with Federal guidance.

10. Cyber Situational Awareness, Analysis, and Response Senior IT Security Officer (CSAAR SITSO)

The CSAAR SITSO has inherent Government authority, must be a Government employee, and is responsible for the following as it relates to cyber security:

- (a) Serves as the focal point for the NRC for receiving, tracking, monitoring, and reporting of computer security incidents.
- (b) Monitors NRC's cyber security vulnerabilities, maintains an awareness of the threat to NRC's cyber infrastructure, and provides appropriate information to senior executives so they maintain an up-to-date awareness of a threat and NRC's vulnerability to that threat.
- (c) Provides a centralized capability for reporting of cyber-related security incidents against NRC's internal cyber infrastructure.



- (d) Maintains a cyber security incident response report database, conducts trending analysis of events, and recommends actions to minimize or prevent releases.
- (e) Reviews actions and conducts root cause analysis of NRC cyber security incidents.
- (f) Coordinates activities and responses to internal NRC cyber-related security incidents with appropriate offices.
- (g) Communicates relevant cyber security information such as security alerts, advisories and bulletins, software vulnerability data and reports, vendor patch notifications, virus alerts, and other relevant security information.
- (h) Serves as the primary reporting authority to the US-CERT, OMB, law enforcement, and criminal investigative groups in the reporting of cyber-related attacks against NRC's infrastructure.

### **C. External Parties**

NRC must maintain the security of sensitive information and information processing facilities with respect to parties external to the NRC. Risk must be identified and controls must be in place before access is granted to external parties.

#### **1. Public Access to NRC IT Systems**

Some NRC IT systems include a public access component. These systems must include architecture and design strategies as well as specific access controls that minimize the potential for IT system and infrastructure compromises.

#### **2. Visitors**

Personnel requiring access to IT systems and information processing facilities owned by NRC or operated on behalf of NRC must obtain access approval and follow visitor procedures as stated in MD 12.3, "NRC Personnel Security Program." Visitor access to NRC information processing facilities must be controlled by NRC authorized personnel and must reflect cyber security controls identified in the system security plan(s) for systems located within the facility.

#### **3. Cloud Computing and Hosted Solution Providers**

- (a) Business capabilities are increasingly being met using less conventional contracting vehicles and external services. As a result, NRC capabilities may be hosted by another Federal agency or a third party service provider. The hosting agency or provider must meet NRC cyber security requirements. All organizations contracted to host a shared service or provide a cloud-based computing capability must have a system security Terms of Service Agreement

with another Federal agency that applies to the NRC, or a system security Terms of Service Agreement with the NRC.

- (b) Use of shared systems and environments introduces shared risks, vulnerabilities, and exposures, and untrusted parties may have access to the same shared resources. All risks must be carefully considered, and then mitigated or accepted before using cloud computing and hosted solution providers.

#### 4. IT Contracts

- (a) All NRC IT-related contracts shall include cyber security requirements identifying the personnel security and system security requirements for the prime contractor and any subcontractors including, but not limited to, contractor background checks and access approval clauses. Additional requirements, such as the development and maintenance of security documentation and system vulnerability scans are to be added as appropriate. All contracts shall include the requirement to allow for the vulnerability scanning of systems, security documentation, and contractor background checks.
- (b) All contractors that use NRC computing resources must assume the same responsibilities as NRC staff as defined in this MD.

#### 5. Interagency Agreements

All NRC IT-related interagency agreements shall include cyber security requirements identifying the personnel security and system security requirements for the agency and any subcontractors used to support the effort including, but not limited to, contractor background checks and access approval clauses. Additional requirements, such as the development and maintenance of security documentation and system vulnerability scans are to be added as appropriate. All interagency agreements shall include the requirement to allow for the vulnerability scanning of systems, security documentation, and contractor background checks.

#### 6. Foreign Nationals

Foreign nationals that work at the NRC must have a security plan that clearly defines computer security requirements that apply to their NRC efforts. The office sponsoring the foreign national must submit a plan to the CISO for approval. This plan must be approved by the CISO before the foreign national is given access to NRC computing capabilities.

#### 7. System Interconnections within NRC

Connections between NRC IT systems that involve multiple system owners must be approved during the authorization process. Once approved, system owners are responsible for ensuring that the agreed upon set of security controls that govern these connections are maintained. The template for the Interconnection Security Agreement can be found at

[http://www.internal.nrc.gov/CSO/documents/Interconnection Security Agreement.doc](http://www.internal.nrc.gov/CSO/documents/Interconnection_Security_Agreement.doc).

#### 8. System Interconnections with External Systems

All connections and agreements related to connections between an NRC IT system and another Federal agency system or a system owned by another party must be approved during the authorization process and signed by the CIO. Once approved, system owners are responsible for ensuring that the agreed upon set of security controls that govern these connections are maintained.

### III. INFORMATION TECHNOLOGY ASSET MANAGEMENT

#### A. NRC Assets

1. An asset is anything that has value to NRC. MD 13.1, "Property Management," provides the definition of NRC property and identifies requirements for management of NRC property. The official NRC IT asset inventory is maintained by OIS. The IT asset inventory identifies all hardware and software that belongs to a specific system and serves to meet the FISMA requirement for a system inventory
2. NRC IT assets (e.g., hardware, software) vary greatly in purpose, use, complexity, sensitivity, criticality, and importance to the agency. Applying equal levels of security, management, resources, and control to all assets is not possible or cost-effective. Effective management of IT assets is performed based upon the value of the asset to NRC and asset characteristics. All assets that process, store, or transmit NRC information for or on behalf of NRC must be a part of a system that is identified in the IT system inventory.
3. OIS shall maintain a current and authoritative IT system inventory. If the information in the inventory is classified, then that part of the inventory shall be maintained in a classified system. Information within the inventory shall only be added, modified, or deleted by the information owner or designee. Where possible, information shall be captured from an automated inventory capability and used to populate the inventory information fields.

**B. Information Classification**

1. IT systems are categorized based upon the sensitivity of information processed by the system and upon the intended purpose of the system. Information used within NRC falls within four major categories: Classified Information, SGI, SUNSI, and publicly available information. MD 12.3, "NRC Personnel Security Program," governs an individual's authority to access information, along with the individual's job requirements to access the information and a need to know the information. OIG, in accordance with the Inspector General (IG) Act of 1978 (5 U.S.C. App 3), is authorized access to agency information for the purpose of carrying out the OIG audit and investigative functions.
2. All IT systems must be categorized at the highest level of sensitivity of any information processed, stored, or transmitted by the system. This concept is referred to as "system high" categorization. System high mode is distinguished from other modes (such as multilevel security) by the lack of trust of the host IT system to separate classifications. As a result, all information in a system high IT system is treated as if it were classified at the highest security level of any data in the system. For example, unclassified information can exist in a secret system high computer, but the information must be treated as secret, and cannot therefore be declassified by the system. Electronic output must be manually reviewed and approved before the classification level can be changed.
3. Any information pertaining to the security posture of an IT system must be protected at the level of the system to which it applies.
4. Any information that reveals techniques used within an IT system, the knowledge of which may enable a malicious user to exploit the system, must be protected at the level of the system to which it applies.
5. Automated declassification of information introduces a serious risk of system exploitation and is therefore not allowed within NRC.

**(a) Classified Information**

- (i) Information is determined to be classified information by a trained and authorized original or derivative classifier (defined in MD 12.2). MD 12.2, "NRC Classified Information Security Program," provides direction for appropriate classification and non-IT handling of classified information. IT processing, storage, and transmission of classified information must follow CNSS direction and this MD. Classified information may NOT be processed, transmitted, or stored on an unclassified system or network. Classified information must only be stored, processed, or transmitted using systems that have been provided an NRC authority to operate for classified information processing.

- (ii) The program used to protect classified information is Communications Security (COMSEC). The term COMSEC material, as used in this handbook, includes items designed to secure or authenticate telecommunications of national security information. COMSEC material includes, but is not limited to, keys, equipment, devices, documents, firmware, or software that embodies or describes cryptographic logic and other items used to perform COMSEC functions. MD 12.4, "NRC Telecommunications Systems Security Program," provides NRC policy for COMSEC.
- (b) Safeguards Information (SGI)
- (i) Sensitive unclassified information that specifically identifies the detailed security measures of a licensee or an applicant for the physical protection of special nuclear material or security measures for the physical protection and location of certain plant equipment vital to the safety of production or utilization facilities must be protected pursuant to Section 147 of the Atomic Energy Act (AEA) of 1954, as amended (42 U.S.C. 2011 et seq.) and is referred to as SGI. Requirements for protecting SGI data are similar to those requirements for classified information at the "Confidential" classified information level. SGI must be protected and unauthorized disclosures of SGI are subject to civil and criminal sanctions.
  - (ii) Information is designated to be SGI by certified SGI designators. MD 12.7, "NRC Safeguards Information Security Program," provides direction for appropriate designation and non-IT handling of SGI. IT processing, storage, and disposal of SGI must follow MD 12.5. SGI shall NOT be processed, transmitted, or stored on an IT system or network that has not been approved by the NRC DAA for SGI processing.
- (c) Sensitive Unclassified Non-Safeguards Information (SUNSI)
- (i) SUNSI is information that is not classified and not SGI; however, a compromise of the confidentiality, integrity, or availability of the information could cause an adverse effect on NRC operations, NRC assets, or individuals.
  - (ii) IT processing, storage, and transmission of SUNSI must follow MD 12.5.

### **C. Asset Accountability and Ownership**

The purpose of IT assets is to support the NRC mission and objectives. All IT assets shall be identified and have a responsible owner. Asset owners do not have to be IT system owners or information owners. An asset owner is an individual or entity that has been assigned responsibility by management for controlling the production, development, maintenance, use, and/or security of an IT asset. Asset owners shall establish and maintain the security controls necessary to provide protection for IT assets. Asset accountability is important to help control costs, ensure that threats to

NRC assets are correctly identified, and ensure adherence to licensing restrictions. NRC authenticated users shall not use NRC IT assets for any non-Government activity, except in accordance with the NRC limited personal use policy (see MD 2.7, “Personal Use of Information Technology”).

#### **IV. PERSONNEL SECURITY**

This section discusses staff responsibilities for cyber security.

##### **A. Personnel Screening**

1. MD 12.3 provides information on the pre-employment screening of NRC applicants and contractors, national security clearance processing, visitor requirements, and individual information and facility/system access authorizations.
2. NRC management shall assign a risk designation to all positions, establish screening criteria for individuals filling those positions, and annually review and revise position risk designations. NRC shall screen individuals before authorizing access to the IT system in accordance with CSO-STD-0020, “Organization Defined Values for System Security Controls.” This standard is available at <http://www.internal.nrc.gov/CSO/standards.html>.

##### **B. Computer Security Rules of Behavior**

1. Federal directives require agencies to establish rules of behavior for individual users to govern the secure use of IT resources. The NRC rules of behavior for all users are called the “Agency-wide Rules of Behavior for Authorized Computer Use” (available on the [CSO Web site](#) and are referred to in this document as the “rules of behavior.” The rules of behavior specify user-level rules for the secure use of all IT resources used to process or store sensitive information. Each NRC authenticated user must follow the rules of behavior and sign the acknowledgement statement to indicate an understanding and acceptance of the rules of behavior before gaining access to any system that processes sensitive information, whether at the primary workplace, an alternative workplace (e.g., teleworking from home or from a satellite site), or on official travel.
2. CSO-STD-0020 provides information on the frequency of acknowledgement, review, and update of rules of behavior.
3. Office directors and regional administrators are responsible for ensuring that all users acknowledge the rules of behavior in accordance with the frequency defined in CSO-STD-0020.
4. Individual systems may require separate acknowledgement of additional rules depending on the nature of the system and of the information processed by that system. For these systems, users are required to acknowledge that they will abide by

system-specific rules of behavior in addition to the agency rules of behavior as a condition of gaining and retaining access to the system.

5. If an individual violates or observes a violation of the rules of behavior, he or she must report the violation to the CSIRT, the violating user's management or project officer, and system ISSO.

### **C. Computer Security Awareness, Training, and Education**

#### 1. Objective

The objective of NRC cyber security awareness, training, and education is to develop and maintain an NRC IT security workforce with a common understanding of the concepts, principles, and applications of cyber security to enhance the confidentiality, integrity, and availability of NRC's IT systems and IT resources.

#### 2. New NRC Employees and Authenticated Users

All new NRC employees shall receive an initial cyber security awareness briefing. All NRC authenticated users are required to take the annual cyber security awareness course within one week of obtaining access to NRC electronic information and annually thereafter.

#### 3. Office Directors and Regional Administrators

(a) Office directors and regional administrators shall ensure that all individuals with significant IT security responsibilities receive cyber security training in accordance with the NRC IT Security Role Based Training Plan available on the [CSO Web site](#). Training requirements for individuals with classified system responsibilities are defined by the CNSS.

(b) Office directors and regional administrators are responsible for tracking and reporting to the CISO and to the Office of the Chief Human Capital Officer (OCHCO) the requisite role-based IT security training received by those identified with significant IT security responsibilities.

(c) Office directors and regional administrators shall ensure that staff cyber security training activities are recorded, monitored, and retained in accordance with MD Vol. 3, "Information Management," Part 2, "Records Management."

#### 4. Individuals with Significant Cyber Security Responsibilities

In compliance with OMB policy, individuals with significant cyber security responsibilities, e.g., ISSOs, System Administrators, must complete required role-based training before assuming the role. NRC contractors must ensure that their staff received the requisite role-based cyber security training at the contractor's expense.

**D. Consequences of Non-compliance**

1. Failure to comply with this MD may result in action including but not limited to the following:
  - (a) removal of system access for a specific period of time,
  - (b) discipline up to and including removal from the Federal service, and
  - (c) prosecution under applicable law.
2. Allegations of violation must be reported to the OIG.

**E. Termination or Change of Employment**

As duties and responsibilities of IT users change, cyber security controls and information access rights associated with the individual are changed accordingly.

1. Associate Director for Human Resources Operations and Policy, OCHCO
  - (a) The Associate Director for Human Resources Operations and Policy shall notify system owners of expected NRC staff terminations and transfers, and changes as specified in CSO-STD-0020. For terminations, a notification shall indicate whether or not the termination is voluntary.
  - (b) The Associate Director for Human Resources Operations and Policy shall notify system owners of unexpected NRC staff terminations, transfers, and changes immediately. For terminations, a notification shall indicate whether or not the termination is voluntary.
2. System Owners
  - (a) System owners, in coordination with information owners, shall review with exiting personnel the information they can and cannot share with others.
  - (b) System owners shall ensure an exit interview is conducted with employees whose employment is terminated to obtain important system information from the employee and to ensure access to information and IT systems is not disrupted.
  - (c) System owners shall ensure the return of all IT system-related property (e.g., keys, identification cards, mobile devices), and ensure that appropriate personnel have access to official records created by the transferring or terminated employee that are stored on organizational IT systems.
  - (d) System owners shall ensure the continued availability of information and IT systems upon employee or contractor termination.
  - (e) System owners shall ensure that departing personnel records of physical access, system user accounts, application and information access data, the identity of



hardware and software assets that were individually “owned” or used by the individual (non-privileged), and privileged accounts are retained in accordance with CSO-STD-0020. This ensures that historical information will be available as needed.

## **V. PHYSICAL AND ENVIRONMENTAL SECURITY**

Physical and environmental security protects facilities, equipment, and information from damage and compromise. This section describes physical and environmental security functions within the NRC that are required to ensure that IT assets are physically protected from damage, theft, or physical invasion that could result in compromise of sensitive information.

### **A. Secure Areas**

1. Facility physical security is the responsibility of the Office of Administration (ADM) Division of Facilities and Security (DFS), and overall NRC facility physical security policy is provided in MD 12.1, “NRC Facility Security Program.” MD 12.1 also identifies physical security requirements for non-NRC facilities that handle sensitive information. MD 12.1 does not address requirements for electronic processing of sensitive information.
2. The NRC DAA must approve facilities for non-public information processing before use of the facilities for this purpose. The facility must meet all facility-level computer security requirements for non-public information processing.
3. In addition to the requirements for facility physical security as outlined in MD 12.1, external facility doors and windows to locations housing NRC computers and/or computers that process, store, or transmit NRC non-public electronic information must be locked when unattended and external protection is required for windows, particularly at ground level.
4. Access to secure areas where non-public information is processed or stored must be controlled and restricted to authorized persons only. Authentication controls, such as access control cards, must be used to authorize and validate access to those areas. An audit trail of access shall be securely maintained.

### **B. Equipment Security**

1. NRC equipment must be protected from physical and environmental threats so as to prevent loss, damage, theft, or compromise of IT assets and interruption to the organization’s activities.

2. Protection of IT equipment, including equipment that is off-site, unused, or in disposal, is necessary to reduce the risk of unauthorized access to information and to protect against loss or damage.
3. IT equipment must be cleaned of all information using approved data wiping tools before the resource is decommissioned or re-purposed for another use. Only data wiping tools approved by the CISO and the Director of OIS can be used.

## **VI. COMMUNICATIONS AND OPERATIONS MANAGEMENT**

### **A. Overview**

Sensitive information shall only be processed, stored, or transmitted on equipment using a DAA-approved business solution, such as the approved use of personally-owned devices that are NRC-configured.

### **B. Requirements for Approved Systems or Business Solutions**

The following are requirements for DAA-approved systems or business solutions:

1. Classified System Connectivity
  - (a) Classified systems must only connect to classified systems operating at the same classification level, except where using approved encrypted connections that permit transmission over lower level networks.
  - (b) Classified systems must only connect to other systems using techniques and capabilities specifically approved by the DAA for connecting to the classified system.
2. SGI System Connectivity
  - (a) SGI systems must only connect to other SGI systems, except where using approved encrypted connections that permit transmission over lower level networks.
  - (b) SGI laptops must only connect to SGI systems using techniques and capabilities specifically approved by the DAA for connecting to the SGI system.
3. General Laptop Connectivity
  - (a) General laptops may only access the NRC operational environment using business solutions approved for this purpose. Other connections must be via specific remote access implementations approved by the DAA.
  - (b) Before connecting to the NRC network, a general laptop must have the latest critical updates installed.

#### 4. NRC User Information Access

- (a) Users shall only download or store SUNSI to the hard drive of a computer or other media that is approved by NRC for sensitive information storage. This includes computers provided at teleworking centers.
- (b) Users shall only process SUNSI on NRC computers approved for such processing, even when the storage media is a floppy disk, CD, DVD, thumb drive, or any other external media. Employees who work at home or at approved telework locations must perform electronic processing of SUNSI on either:
  - (i) a home computer or provided telework location computer using a business solution approved for this use (e.g., a Citrix connection where actual processing is occurring on the Citrix server rather than the home computer or NRC-provided telework location computer); or
  - (ii) an NRC-issued computer that is compliant with the NRC requirements.

### C. Operational Procedures and Responsibilities

#### 1. General

- (a) NRC requires standard operating procedures for similar IT platforms located across NRC business organizations to ensure that security settings or features are uniformly applied. A central change management board shall be responsible for approving and managing changes to system procedures across the enterprise. Moreover, system owners must document procedures and configurations to help the board appropriately handle system interdependencies. System operating procedures and configurations are formal documentation and official agency records.
- (b) When outside of a facility that has been approved for IT processing by the DAA, system owners shall ensure electronic sensitive information is encrypted using CISO-approved encryption methods.

#### 2. Documented Operating Procedures

- (a) System owners shall ensure operating procedures for processes that support the secure operation of their IT systems are developed, documented, maintained, and made available upon request to users in need of such procedures. At a minimum, system owners shall ensure development of system-specific operating procedures for each IT system and facility that meet CSO-STD-2001, "System Documented Operating Procedures," which is available on the [CSO Standards](#) Web page.

- (b) Other operating procedures for significant IT system and facility activities shall be developed as necessary. If the failure or malfunction of an IT system could greatly impact execution of the NRC mission, the system is considered a significant IT system.

### 3. Separation of Duties

- (a) Separation of duties is a key internal control concept that reduces the opportunity for unauthorized or unintentional modification or misuse of NRC IT system resources or data. Separation of duties is achieved by distributing privileges to complete an activity across multiple individuals serving in different roles such that more than one person is required to complete significant tasks. Four different types of activities require separation of duties:

- (i) Authorization. User activities that involve the review and approval of transactions or operations. For example, authorization processes for IT systems include approving change requests, IT system design, or programming changes.
- (ii) Custody. User activities that involve the physical control of an asset. An asset's custodian is not necessarily responsible for maintaining records relating to the asset.
- (iii) Recordkeeping. User activities that create and maintain transaction information.
- (iv) Reconciliation. User activities that verify transactions to ensure that the transactions are valid, authorized, and recorded in a timely manner and on a regular basis.

- (b) No one person should perform more than one of these activities.

- (c) If a single person is able to hide malicious behavior or inappropriate use of resources using his or her authority, separation of duties has not been exercised.

### 4. Separation of Development, Test, and Operational Environments

#### (a) General

Three different environments (development, test, and operational) are used to implement and deploy IT systems. These environments shall be physically or logically independent of each other. Security controls shall be put in place to ensure that these environments cannot be accessed from one another.

#### (b) Development, Test, and Operational Environments

- (i) Firewalls, access control lists, boundary routers, etc. shall be employed to ensure that all NRC IT environments (including those operated for or on behalf of NRC) are properly separated. System owners must ensure each

environment is protected at the level of sensitivity of the information stored or processed within that environment.

- (ii) CSO authorization shall be required for all hardware and software used within NRC's IT environments.

(c) Development Environment

- (i) This is the environment in which a system is created. Developers have significant privileges on the development systems they used to create and integrate software and hardware capabilities. The primary form of control associated with the development environment is a configuration management (CM) system that is used to control access to code and track changes to the code.
- (ii) System owners shall ensure development activities are performed only within the development environment and are not performed within the test or operational environment.

(d) Test Environment

- (i) This is the environment in which each system release is tested before being placed into an operational environment.
- (ii) System owners shall ensure only test information/dummy data is used within the test environment wherever technically and operationally feasible. If system owners cannot use test information/dummy data, they shall enforce the same information access restrictions on the test environment as they enforce in the operational environment. Interface testing with other systems is performed in the test environment.
- (iii) System owners shall ensure release testing occurs within the test environment.
- (iv) Releases from the test environment to the operational environment shall follow established agencywide CM processes and procedures.

(e) Operational Environment

This is the environment in which mission functions are performed. This environment is stable and requires DAA authorization before this environment is modified. Performing testing or development on operational networks or within operational environments increase the risk for data corruption, modification, and introduction of false data into the operational environment and is not permitted without DAA authorization. All tools installed or used within the operational environment must be approved by the DAA. System owners are encouraged to identify and obtain approval for tools in advance of planned use.

## 5. Security of System Documentation

- (a) System documentation contains details that can be used to exploit the system. In addition, unauthorized modification to system documentation can result in inappropriate action that could enable system destruction or compromise.
- (b) System owners shall ensure access to system documentation is controlled to protect against unauthorized access.

## 6. Copying, Scanning, Printing, and Faxing

- (a) Only approved copiers, scanners, printers, and fax machines may be purchased at the NRC. These devices are analyzed and assessed for potential cyber security risks. Only those devices that do not pose an undue risk are approved. The information needed for these assessments shall include but will not be limited to the following: the exact device to be purchased, the intended use of the device, and the device's capabilities.
- (b) Top Secret information shall not be copied or reproduced without approval from the Top Secret Control Officer (defined in MD 12.2).
- (c) Copiers, scanners, printers, and fax machines that are connected to an unclassified, non-safeguards information (non-SGI) network shall not be used for either SGI or classified information.
- (d) Copiers, scanners, printers, and fax machines that are connected to an SGI network may be used for SGI. Printers must have a banner or separation page either before or after each print job and/or a blank page printed at the end of the print job. Each machine shall be labeled as an SGI device.
- (e) Copiers, scanners, printers, and fax machines that are connected to a classified network may be used for classified information at the level of the network. Printers must have a banner or separation page either before or after each print job and/or a blank page printed at the end of the print job. Each machine shall be labeled to match the level of classified processing. Copier output shall be handled consistent with the markings on the original and should be considered classified until verified by an Authorized Derivative Classifier or Authorized Original Classifier (defined in MD 12.2).
- (f) Copiers that are not connected to a network and do not have disk storage may be used for multi-level processing as long as the operating procedures for use of the copier for the level of the computer or network are followed. Printers must have a banner page before each print job indicating the classification level of the print job. The copier shall be labeled for multi-level processing and the procedures for each level of processing shall be posted in clear view at the copier.

- (g) Copiers that are not connected to a network that have disk storage or persistent memory may be used for multi-level processing as long as there is a CSO-approved method of clearing the disk storage and persistent memory and the operating procedures for use of the copier for the level of the computer or network are followed. Printers must have a banner page before each print job indicating the classification level of the print job. The copier shall be labeled for multi-level processing and the procedures for each level of processing shall be posted in clear view at the copier.
- (h) Copying, scanning, printing, and faxing of SGI and classified information require constant monitoring by a properly authorized individual and the machines shall be continuously attended by a properly authorized individual until completion of the process. A properly authorized individual for—
  - (i) Classified information at the Secret Restricted Data (SRD) level has a "Q" clearance.
  - (ii) Confidential Restricted Data (CRD) and National Security Information at the Secret (SNSI) and Confidential (CNSI) levels require an "L" clearance.
  - (iii) Safeguards Information (SGI) has an "L" or "Q" clearance or has been appropriately processed and approved by ADM/DFS.
- (i) All extra copies and waste must be treated at the same level as the information being processed.
- (j) Printers without disk storage and without persistent memory may be used for multi-level processing. The printer may be directly attached to a computer or network operating at the SGI or classified level as long as the operating procedures for use of the printer for the level of the computer or network are followed. Printers must have a banner page before each print job indicating the classification level of the print job. The printer shall be labeled for multi-level processing and the procedures for each level of processing shall be attached to the printer.

#### **D. Configuration Management and Change Control**

##### **1. Function of Configuration Management (CM)**

Configuration Management (CM) represents the disciplines and approaches associated with managing the design and operating characteristics of a technical environment and the effects of changes in configurations of IT systems and infrastructure components. CM assists in streamlining change management processes and helps to prevent changes that could detrimentally affect the security posture of a system. CM also reduces the risk of confusion, problems, and unnecessary spending by eliminating potential problems.

##### **2. Implementation of CM**

CM is implemented through a combination of appropriate organizational roles and governing policies, processes, and procedures. MD 2.8, "Project Management Methodology (PMM)," contains the structure for authorized IT system changes at the NRC and references the cyber security requirements on the [CSO Web page](#). Defined roles enable the NRC to establish appropriate oversight over CM and provide visibility into the effectiveness and performance of CM activities. Applicable policies, processes, and procedures ensure compliance with the organization's intended approach to CM.

### 3. System Owners

System owners shall ensure that any system modification that impacts the system's security posture has been approved by the CISO in advance using the Security Impact Analysis process.

## E. Third Party Service Delivery Management

### 1. Security

Security is a critical component of third party services. System owners are ultimately responsible for the security of information processed by a third party. The agreement between the NRC and the third party shall:

- (a) Provide guidance for the implementation and maintenance of cyber security controls when NRC IT owners use third party services.
- (b) Define the service that is being provided, describe how the service will be monitored and reviewed, and specify the ways the service can be modified if both parties agree.
- (c) Ensure proper escort and oversight of maintenance personnel that service NRC IT equipment.

### 2. System owners

System owners shall ensure that the services, reports, and records provided by the third party are regularly monitored and reviewed. System owners shall conduct annual assessments and ensure the service provider adheres to the cyber security terms and conditions of the agreements, properly manages cyber security incidents, and adequately addresses all deficiencies.

### 3. Requirements

Specific cyber security requirements on securing third party services can be found on the [CSO Web site](#).



**F. System Planning and Acceptance**

1. System owners shall ensure that effective system planning and acceptance processes are followed to minimize the risk of system failure or service interruption. Advance planning and preparation is required to ensure that NRC IT systems meet business requirements and comply with requirements to protect confidentiality, ensure system and data integrity, and provide resource capacity to ensure availability. System owners shall ensure that any risks to their IT systems are properly managed.
2. System owners shall ensure non-NRC facilities hosting NRC IT systems shall meet federally mandated and NRC-defined security requirements, and this information shall be incorporated in system security documentation.
3. IT system security controls shall be included in the initial planning phase of system development. System owners must verify implementation of controls before system acceptance.
4. All connections between NRC IT systems owned by different system owners must be approved by the respective system owner and interconnection agreements must be signed by the system owners.
5. All systems must obtain a security ATO before being placed into the operational environment. All IT resources must belong to an NRC IT system, and must therefore be part of a system ATO before being placed into operation. This includes all new systems and major modifications to existing systems. To maintain a system authorization, all systems must adhere to any specified ATO conditions and maintain a continuous monitoring program that:
  - (a) addresses effectiveness of deployed security controls;
  - (b) addresses changes to IT systems and the environments in which those systems operate (through formal security impact analyses); and
  - (c) complies with Federal legislation, directives, policies, standards, and guidance with regard to cyber security and risk management.
6. System owners shall ensure a classified system determination is made using NIST Special Publications (SP) 800-59, "Guideline for Identifying an Information System as a National Security System" (available on the [NIST Special Publications Web page](#)) before performing any other system actions.
7. The intelligence community retains authority for all systems that process sensitive compartmented information and their policies, directives, and instructions shall be used for those systems. Intelligence Community Directive 503, "Intelligence Community Information Technology Systems Security Risk Management, Certification and Accreditation," provides the requirements for obtaining an ATO for these systems.

8. CNSS policies, directives, and instructions, available on the [CNSS Web site](#), shall be used for all other classified systems. CNSSP 6, “National Policy on Certification and Accreditation of National Security Systems,” provides the requirements to be followed to obtain an authority to operate for a classified system not under the jurisdiction of the intelligence community.
9. When NRC uses a system owned by another agency that processes classified information and does not follow CNSS policies, directives, and instructions, the NRC DAA shall determine if the implemented controls are sufficient to accept the risk of using the system.

### **G. Protection Against Malicious and Mobile Code**

#### **1. NRC Authenticated User Responsibilities**

NRC authenticated users must be cognizant of their responsibilities for preventing the introduction of potentially damaging software into the NRC infrastructure and for applying protective measures to protect against such introduction. Protection mechanisms against malicious and mobile code require multiple protection mechanisms at the network, operating system, and application layers. These protection mechanisms must detect and repair effects of undetected malicious and mobile code, and educate users on the dangers of such code. Malicious and mobile code, in combination with social engineering techniques, can successfully target the user community because they receive the least amount of technical training and are most likely to be targeted by attackers.

#### **2. Malicious Code**

##### **(a) Protection**

Protection against malicious code is a multi-pronged defense, involving prevention, detection, and recovery. System owners shall ensure that protections employed against malicious code adhere to all federally mandated requirements, NRC-defined security requirements, and organizationally defined values. First, technical controls are employed to prevent malicious code from entering NRC networks and systems. Second, technical controls are used to detect and repair malicious code that manages to get past the first set of controls. Next, continuing education and awareness are used to remind users of threats to NRC assets. Last, comprehensive procedures are employed for access and change management.

##### **(b) NRC IT systems shall employ malicious code protection mechanisms—**

- (i) at IT system entry and exit points and at workstations, servers, or mobile computing devices on the network to detect and eradicate malicious code;
- (ii) for electronic mail, electronic mail attachments, Web accesses, removable media, or other public Internet access mechanisms;

- (iii) to protect against malicious code inserted through the exploitation of a system's vulnerabilities;
- (iv) to protect against malicious code that may be resident on media and devices connected to an NRC IT system; and
- (v) to allow only DAA-approved active media to be used with NRC equipment.

### 3. Mobile Code

Mobile code is software that transfers from one computer to another and then executes automatically to perform a specific function with little or no user interaction. System owners shall ensure that only authorized implementations of mobile code are used in their systems.

### 4. Peer-to-Peer Software

The installation of Peer-to-Peer (P2P) capability on NRC computers without explicit written approval of the NRC DAA is strictly prohibited.

## H. Data Back-up

System owners shall ensure their system back-up strategy provides data confidentiality, integrity, and availability (C-I-A) after a local system failure or site disaster. System owners are ultimately responsible for ensuring that restored backups provide C-I-A, even when service providers execute the backups.

## I. Classified Telecommunication

### 1. Transmittal

Classified information may be discussed or transmitted only over those secure systems that have obtained an authority to operate for classified information from the DAA. MD 12.4, "NRC Telecommunications Systems Security Program," describes the requirements for classified telecommunications.

### 2. Requirements and Procedures

Any telecommunication system that receives, processes, transmits, or safeguards classified data or information must be surveyed by ADM/DFS in accordance with the requirements and procedures of MD 12.1, "NRC Facility Security Program." The Director of DFS must furnish a statement of the proposed corrective actions resulting from the survey results to the responsible headquarters office, division, regional office, or contractor.

## J. Network Services

Network services provided in-house by NRC, other Government agencies, or by vendors must comply with NRC policies and directives and the relevant authoritative laws,

Executive Orders, directives, policies, standards, or regulations. System owners shall ensure that all network services comply with CSO-STD-2003, "Network Services Standard," available on the [CSO Standards Web page](#).

#### **K. Electronic Media and Device Handling**

All electronic media must be protected from unauthorized disclosure, modification, removal, and destruction. Electronic media can be either active (can manipulate information) or passive (simply provides a container.) System owners shall ensure system media is either destroyed or cleaned of all information using NRC-approved data wiping techniques before the media leaves NRC control. System owners shall ensure electronic media use complies with CSO-STD-2004, "Electronic Media and Device Handling Standard," available on the [CSO Standards Web page](#).

#### **L. Exchange of Electronic Information**

Exchange of electronic information requirements are design to protect NRC data as it flows internally within the NRC and to external parties. These requirements govern all forms of electronic communication including phone, fax, email, and network communications. NRC users must protect information according to the information sensitivity level, regardless of the method of exchange.

##### **1. Information Exchange Policies and Procedures**

- (a) NRC network users shall be aware of the content of the information they are communicating, who they are communicating the information with, how they are communicating the information, and where they are communicating the information, both physically and electronically.
- (b) Exchanges of information and software between the NRC and other organizations should follow a formal exchange policy carried out in accordance with formal exchange agreements that comply with pertinent laws and regulations. NRC users shall follow prescribed requirements to protect the sensitivity of information exchanged with others, be they individuals associated with the NRC or external parties.
- (c) Electronic transmissions, such as electronic mail, unauthorized cloud storage, and file transfer solutions (e.g., dropbox), shall not be automatically forwarded to non-NRC electronic destinations.
- (d) Sensitive information shall not be forwarded to personal (non-NRC) accounts.
- (e) Personal (non-NRC) accounts shall not be used to process sensitive information.
- (f) An NRC e-mail address shall not be used in a manner that may give the false impression that an individual's otherwise personal communication is authorized

by the NRC. If a personal e-mail or other electronic message could be misunderstood to be an official communication, a disclaimer must be used in the message. A disclaimer might be: "The following message is personal and does not reflect any official or unofficial position of the United States Nuclear Regulatory Commission."

- (g) Only NRC e-mail accounts shall be used to conduct official business on behalf of the agency. Personal e-mail accounts (e.g., Hotmail, Yahoo, or Gmail) shall not be used to conduct official business.
- (h) Transmission of confidentiality sensitive electronic information onto networks that are not controlled by NRC (e.g., the Internet) must be encrypted, including but not limited to electronic mail.
- (i) System owners shall ensure the nature of communications exchanges are formally documented in written exchange agreements to reduce the risk that attackers may compromise the information. System owners shall ensure that sensitive unclassified information is encrypted using FIPS 140-2 validated encryption modules operated in FIPS mode in accordance with CSO-STD-2009 Cryptographic Control Standard. NRC information is exchanged electronically via networks such as NRC's Intranet, NRC's email system, and the Internet. The following guidelines apply to all NRC users when exchanging information electronically. NRC users shall:
  - (i) ensure that electronic information is only sent to appropriate parties;
  - (ii) ensure that rules of behavior for personnel, contractors, and business partners authorized to use the system and the locations at which the system may be used are followed;
  - (iii) ensure verification of the recipient list prior to sending email messages and that the recipients have access rights to the information;
  - (iv) ensure information stored electronically on NRC systems is protected from authorized access using system controls such as shared drives that can only be accessed by specific individuals or groups;
  - (v) ensure that all sensitive information sent via untrusted networks (including email sent to non-NRC email addresses) is encrypted;
  - (vi) ensure information is only provided over networks and systems approved for the level of information; and
  - (vii) comply with remote access requirements.
- (g) System owners shall ensure that connections to other systems are monitored and that communication is controlled at the external boundary of the system and at key internal boundaries within the system. System owners shall ensure that

systems connect to external networks and information systems only through managed interfaces consisting of boundary protection devices arranged in accordance with the NRC enterprise architecture framework.

2. Additional requirements for exchanging electronic information can be found on the [CSO Web site](#).

#### **M. Electronic Commerce Services**

1. Electronic commerce services applications, including cloud storage services, shall use encryption to protect sensitive data at rest and in motion and shall provide protections commensurate with the level of the risk associated with the value of the transaction and the application.
2. NRC IT system and network users shall only use NRC-owned or -operated IT systems that have been authorized by appropriate officials to provide electronic commerce services.
3. System owners shall ensure the integrity of NRC information that is publicly available. System owners shall ensure NRC content on publicly accessible systems is monitored for non-public information.
4. Specific security requirements on securing electronic commerce services can be found on the [CSO Web site](#).

#### **N. Monitoring**

The purpose of monitoring IT systems is to detect suspicious or unauthorized activity in computer IT systems and their underlying platforms. Monitoring requires maintaining sufficient system audit log information to allow NRC to conduct forensic investigations in the event of a system or network breach. Monitoring is used to check the status and health of NRC assets, to affirm the effectiveness of the security controls in place, to verify conformity of identification and authentication policies, and support security inquiries and investigations. System owners shall ensure monitoring addresses all federally mandated requirements, NRC-defined security requirements, and organizationally defined values.

### **VII. ACCESS CONTROL**

#### **A. Overview**

Access controls determine how users, resources, and systems interact with data and each other. Access control systems and security features are usually considered the first line of protection. These systems and features dictate how subjects access objects and resources, and the main goal is to protect the objects and resources from unauthorized access.

**B. Logical Access Control**

1. All electronic sensitive information shall be encrypted using CISO-approved encryption methods when outside of a facility that has been approved for IT processing by the DAA. Logical access controls are computer-based access controls that provide a technical means of controlling what information users, devices, and other systems can use, the programs they can run, and the modifications they can make to NRC information and IT systems. Controlling access applies to human users as well as devices and systems.
2. To receive an ATO, an unclassified IT system must be Personal Identity Verification (PIV) enabled. An IT system is said to be PIV enabled when authorized users are able to access the system using a PIV card.
3. Logical access controls protect—
  - (a) operating systems and system software from unauthorized modification or manipulation (and thereby help ensure the system's integrity and availability);
  - (b) the confidentiality, integrity, and availability of information by restricting the number of users and processes with access; and
  - (c) sensitive information from being disclosed to unauthorized individuals.

**C. A Layered Approach to Security**

1. Access control requires a layered approach to security (defense-in-depth) where each possible vulnerability or attack vector (method) is identified and appropriate countermeasures are employed.
2. Access controls include:
  - (a) limiting network user access to drives, folders, and files;
  - (b) user role restrictions;
  - (c) network perimeter access restrictions;
  - (d) controlling internal network communication devices;
  - (e) implementing filters and monitoring techniques on internal networks,
  - (f) implementing application security, and
  - (g) implementing inbound and outbound data flow controls.
3. At the NRC, access is determined on a need-to-know basis.
4. System owners shall ensure network compliance with CSO-STD-2007, "Network Access Control Standard," available on the [CSO Standards Web page](#).

## VIII. IT SYSTEMS ACQUISITION, DEVELOPMENT, AND MAINTENANCE

### A. Overview

1. Cyber security is a critical aspect to consider during all phases of an IT system's life cycle, including but not limited to acquisition, development, and maintenance. Adequate consideration of cyber security during the early stages of an IT system's life cycle helps to ensure the IT system and the information it processes are properly protected and potential costs are identified early.
2. To ensure that necessary cyber security requirements have been considered, CSO involvement is required in all phases of an IT system's life cycle, especially prior to development. All IT systems, regardless of the information that they process, store, or transmit must be authorized to operate by the DAA before being used in a production capacity.
3. Cyber security investments are made for both enterprise-wide and system-level efforts. Enterprise-wide investments are made for efforts that benefit all or most agency systems and improve NRC's overall security posture (e.g., boundary protection, identity management). System-specific investments are made for system level security concerns (e.g., security control assessment, vulnerability mitigation).

### B. Enterprise Architecture (EA)

1. Security considerations must be included as an integral component of the NRC Enterprise Architecture (EA). Federal EA guidance can be found at <http://www.whitehouse.gov/omb/e-gov/fea/> Information on the NRC's EA is available on NRC's internal Web site at <http://www.internal.nrc.gov/ois/divisions/bpiad/stand-qual-assurance/ea.html>.
2. The Security Architecture (SA) ensures identification of appropriate cyber security products, controls, services, and solutions to meet NRC's business security needs while minimizing the operation and maintenance burden to the agency and is documented as the NRC Enterprise Security Segment Architecture. The SA applies security considerations to NRC resources, IT investments, and system development activities in a uniform and cost-effective way. The NRC Enterprise Security Segment Architecture contains key NRC requirements, processes, and common service attributes of the current SA, the future/target SA, and the transition plan. As shared security services are implemented (such as the reduced sign-on infrastructure), they should be incorporated as common controls by system owners.
3. CSO shall develop, integrate, and maintain NRC's segmented cyber security architecture in coordination with stakeholders using the Federal Segment



Architecture Framework. New technology approvals shall follow the CM process defined in MD 2.8.

4. System owners shall only acquire and incorporate into their systems components that are part of the NRC current or target architecture.

### **C. Capital Planning: Roles and Responsibilities for IT Acquisition**

#### 1. CISO

The CISO shall review and approve all IT acquisitions to ensure that cyber security is adequately addressed.

#### 2. System owners

- (a) Ensure a capital asset budget planning process that is consistent with OMB Circular A-11, "Preparation, Submission, and Execution of the Budget," is followed and includes cyber security explicitly in IT investments and capital planning.
- (b) In coordination with the Director of OIS and CISO, ensure that all IT resources are identified during the capital planning process.
- (c) Ensure the resources required to adequately protect the system are determined, documented, and allocated as part of the capital planning and investment control process.
- (d) Ensure the funding required to implement and maintain applicable IT cyber security requirements throughout the system life cycle is included in all capital investments.
- (e) Ensure specific funds for the development, modernization, or enhancement efforts required to correct cyber security deficiencies identified for the system are included in system funding requests and are allocated. Correction of cyber security deficiencies categorized as critical or high shall take precedence over other system modifications.

#### 3. Information Technology Executive Governance

An organization co-chaired by the NRC CIO and CFO shall be established to direct NRC IT investment decisions and ensure appropriate consideration of cyber security in those investments. This organization must:

- (a) Establish cyber security priorities and prioritization criteria, ensuring NRC mission and vision alignment consistent with IT security priorities and criteria.

- (b) Evaluate existing and proposed IT investments against NRC's cyber security priorities, using prioritization criteria as a factor in determining which NRC investments to fund.
  - (c) Ensure the resources required to adequately protect NRC IT systems are documented and allocated as part of the capital planning and investment control process.
  - (d) Establish appropriate NRC IT boards to perform IT analyses and make recommendations to executive governance personnel.
  - (e) Assign detailed IT investment review and security analyses, including IT investment recommendations, to appropriate NRC IT boards.
4. Information Technology Boards

Established information technology boards shall conduct detailed IT investment review and security analyses (including business case reviews) and make IT investment recommendations to the Information Technology Executive Governance Organization. This analysis includes the appropriate consideration of NRC cyber security priorities and prioritization criteria.

#### **D. Security in the System Development Life Cycle (SDLC): Risk Management Framework (RMF)**

##### 1. NRC Risk Management Strategy

- (a) The NRC uses a framework to identify, categorize (i.e., low, moderate, high), mitigate, accept, and manage IT system risk throughout the agency. Through the Risk Management Framework (RMF), the agency defines acceptable risk assessment methodologies and risk mitigation strategies. The NRC SDLC, known within NRC as the PMM, shall be consistent with NIST SP 800-64, "Security Considerations in the System Development Life Cycle," NIST SP 800-39, "Managing Information Risk" (available on the [NIST SP Web page](#)), and CNSS Instruction (CNSSI) 1253, "Security Categorization and Control Selection for National Security Systems," available on the CNSS Instructions Web page at <http://www.cnss.gov/instructions.html>. The security assessment and authorization process integrated with the PMM shall define the agency's processes for consistently evaluating risk across the agency with respect to the agency's risk tolerance, as well as approaches for the continuous monitoring of risk over time. The use of an IT risk executive function shall facilitate consistent, agencywide application of the risk management strategy.
- (b) System owners, ISSOs, project officers, project managers, contracting officers, and others must follow the PMM for all system development and comply with this MD.

- (c) The RMF is a security life cycle that operates within the PMM to manage IT system-related security risks. Tasks associated with the security assessment and authorization of IT systems are an integral part of the RMF and relate directly to the PMM. The PMM and the security assessment and authorization processes are the means for implementing the RMF within NRC.

## 2. Security Authorization Tasks

- (a) The security authorization tasks directly support the determination of risk to agency operations and assets, individuals, other organizations, and the Nation that may result from the operation and use of IT systems, and ultimately, deciding if these risks are acceptable. The IT system security authorization process requires a well-defined RMF and a comprehensive set of approved IT security standards and guidelines.
- (b) The following activities describe the security authorization process:
  - (i) Initiation – System boundaries along with system inputs and outputs are defined, information to be processed by the system is identified and categorized, and security requirements are documented.
  - (ii) Development/acquisition – System architecture and design are completed and the system is built and tested, ensuring cyber security controls are appropriately implemented.
  - (iii) Implementation/assessment – The system is deployed, ensuring cyber security controls are in place, operating as intended, and having the desired effect.
  - (iv) Operations/maintenance – Continuous monitoring of security controls is performed along with vulnerability mitigation, and modifications are assessed to ensure the system security posture is not negatively impacted.
  - (v) Disposal – The system is no longer operational and all components and information are disposed of securely.
- (c) Other Considerations
  - (i) It is important to note that while these phases and steps may appear to be sequential, many activities are cyclical. Findings and recommendations from the security controls assessments may trigger remediation, which in turn may require reassessment of selected security controls. The level of effort and resources expended for security authorization activities should be commensurate with the security category of the system.
  - (ii) The development of the system risk assessment occurs in phases. A preliminary system risk assessment must be completed before the implementation of other controls in order to complete the first two steps in the

RMF. Risk assessments can play an important role in the security control selection process during the application of tailoring guidance for security control baselines and when considering supplementing the tailored baselines with additional security controls or control enhancements. Exhibit 1, the PMM/SDLC Map, maps the phases of both the NIST SP 800-64 and the PMM.

#### **E. Correct Processing in Application**

Correct processing protects information from unauthorized modification and deletion, and prevents information misuse and errors in all aspects of information processing. Applications should be designed to correctly process information, including information validation at critical points within the application, such as data input and output.

#### **F. Cryptography Controls**

##### **1. Use of Cryptography at NRC**

- (a) Cryptography can be used to protect the confidentiality and integrity of information. However, encrypted information is not considered to be non-sensitive. Cryptography protects information for a limited period of time. Increases in computing power have resulted in the ability to break encryption previously thought to be effective for a much longer period of time. As a result, if encrypted information is available to malicious actors, that information will be accessible by those actors over time.
- (b) Cryptography, such as encryption, is performed using cryptographic modules. Those cryptographic modules must be validated by an appropriate Federal authority for the level of information being processed.

##### **2. Cryptographic Requirements**

- (a) Cryptography used for SUNSI and SGI must use FIPS 140-2 validated cryptographic modules operated in FIPS mode. Cryptographic modules used for SUNSI must be FIPS 140-2 validated to at least an overall level 2. Cryptographic modules used for SGI must be FIPS 140-2 validated to at least an overall level 2 with the validation subcategories of Roles, Services, and Authentication; electromagnetic interference/electromagnetic compatibility; and Design Assurance validated to at least level 3.
- (b) Cryptographic modules used for classified information must be encrypted using encryption modules approved by the National Security Agency (NSA) and operated as directed by NSA for protecting classified information.
- (c) Additional information on cryptographic actions, uses, key strengths, and key management can be found in CSO-STD-2009, "Cryptographic Control Standard,"

available on the [CSO Standards Web page](#). System owners shall ensure all use of cryptography complies with CSO-STD-2009.

- (d) The PST SITSO should be consulted when determining cryptographic specifications. The Office of the General Counsel (OGC) should be consulted when cryptographic constructs, such as electronic or digital signatures, are to be used for legal purposes.

## **G. Security of System Files**

### **1. General**

The confidentiality, integrity, and availability of system files must be protected. System files may contain information such as audit logs or they may contain information about the business of the organization. These files may contain information that, if released to malicious users, could result in an adverse impact to the NRC, individuals, or the public. In other cases, the confidentiality is not an issue, but the loss of integrity or availability could result in an adverse impact.

### **2. Control of Operational Software**

- (a) Operational software is executable software that is either interpretable code or executable code. Interpretable code is computer code where the source language is translated into machine language one line at a time and then executed, all within the operational environment. Executable code is computer code that has been compiled into binary machine code.
- (b) System owners shall ensure that formal procedures for system software installation, including identification of roles and responsibilities, are documented. System owners shall ensure the procedures are reviewed and updated as necessary on an annual basis.
- (c) Operational systems shall not contain compilers, unless specifically approved by the DAA.
- (d) All code on operational systems shall be executable or interpretable code.
- (e) System owners shall ensure a current baseline configuration of the system that includes communications and connectivity-related aspects of the system, system components, network topology, and the logical placement of the component within the system architecture, is formally documented and placed under configuration control. Additional information related to system configuration control is described in Section VI.D, "Configuration Management and Change Control" of this handbook.

- (f) System owners shall ensure that:
  - (i) Software installed on the system is properly licensed for the intended use.
  - (ii) Unauthorized software programs are not installed on the system.
  - (iii) Modifications to the system explicitly include a security impact analysis.
  - (iv) Changes to the system are analyzed by cyber security personnel as part of the change approval process to determine potential security impacts.

### 3. Protection of System Test Data

- (a) Sensitive information shall not be stored, processed, or transmitted within the development or test environments.
- (b) Test data shall not include sensitive information.
- (c) Only test data may be used in systems that have not received an authority to operate.

### 4. Access Control to Program Source Code

Access to NRC program source libraries shall be restricted such that individuals only have the required level of access to the specific library entries needed to perform legitimate business functions. System owners shall ensure source code is protected at the sensitivity level of information to be processed by the code.

## H. Security in Development and Support Processes

Classified system owners shall ensure a security concept of operations (CONOPS) is developed for the IT system that contains, at a minimum:

1. the purpose of the system;
2. a description of the system architecture;
3. the security authorization schedule; and
4. the security categorization and associated factors considered in determining the categorization.

## I. Technical Vulnerability Management

1. CSO shall monitor cyber security vulnerabilities identified by both Federal and private sources and shall notify system ISSOs of vulnerabilities that may impact their systems.
2. CSO shall lead efforts to identify and mitigate vulnerabilities and deficiencies that are found in NRC IT systems. To support the identification of these vulnerabilities, system owners and ISSOs shall scan their NRC IT systems in accordance with

- federally mandated requirements, NRC-defined security requirements, continuous monitoring requirements, organizationally defined values, and whenever new vulnerabilities potentially affecting the system are identified. CSO shall work with the system owners and ISSOs to ensure a proper mitigation strategy is developed and executed for each finding. System owners and ISSOs shall ensure vulnerability scanning mechanisms are updated whenever new vulnerabilities are identified or reported
3. Critical updates are fixes for security defects in operating systems and applications as well as current anti-virus definitions and other intrusion detection and prevention information. System owners shall ensure critical updates for all software are applied to systems in accordance with CSO configuration standards located on the [CSO Standards Web page](#).
  4. The need to apply critical updates more frequently shall be evaluated by the system ISSO at least monthly. This evaluation will take into account the nature of the critical updates issued by the operating system and software vendors, the risk to the system, and the ISSO operational experience with and knowledge of the system.

## **IX. CYBER SECURITY INCIDENT MANAGEMENT**

### **A. Overview**

1. The goal of Cyber security incident management is to ensure incident resolution affords the maximum system and information protection and incident recovery possible. Timely notification and mitigation is essential in achieving this goal.
2. FISMA requires that Federal agencies establish a cyber security incident response capability and designate a primary and secondary point of contact with the US-CERT. The NRC is responsible for reporting all incidents and internally documenting corrective actions and their impact. OMB requires reporting on any unauthorized release of PII, either in electronic or physical form, in which that information may be accessed by those without a need-to-know the information. NIST SP 800-61, "Computer Security Incident Handling Guide," available on the [NIST SP Web page](#), provides guidelines for Federal agencies on how to implement a cyber security incident handling capability.
3. The CSAAR SITSO shall develop formal, documented procedures to facilitate the implementation of the incident response policy and associated incident response requirements. NRC IT system owners shall ensure host and network based intrusion detection tools are employed for moderate unclassified, high unclassified, and classified systems. As part of the NRC monitoring program, described in Section VI.M, "Monitoring," of this handbook, the intrusion detection tools shall be configured to detect and automatically alert appropriate personnel

of vulnerabilities, changes to the network, known and unknown attack signatures, and traffic anomalies.

4. NRC shall employ automated mechanisms to support the incident handling process, to increase the availability of incident response-related information, and for support.
5. Cyber security incidents will be handled at the appropriate level of classification, but will allow for redacted (unclassified) notification to the appropriate NRC incident management group. All incident related information containing SGI or classified information that is necessary for incident remediation will be handled on a system authorized and at the level appropriate to the information contained therein. All users and incident response persons are required to discuss, document, or otherwise process incident information in accordance with the appropriate classification guide and NRC MDs.

## **B. User Reporting Cyber Security Incidents**

### 1. Users

- (a) Must report any actual or potential incidents within 1 hour to the CSIRT by telephone on 301-415-6666 or by e-mail at [CS\\_IRT@nrc.gov](mailto:CS_IRT@nrc.gov).
- (b) Must report lost, damaged, or stolen computing resources (e.g., desktop computer, cell phone, BlackBerry, laptop, thumb drive) either actual or suspected, immediately to the CSIRT and to local management.

### 2. System Owners

- (a) Shall ensure malicious or suspicious events discovered by users, ISSOs, and system administrators are reported to the NRC in accordance with federally mandated requirements, NRC-defined security requirements, and organizationally defined values.
- (b) Shall ensure cyber security directives are implemented in accordance with CSO direction.

## **C. Report Cyber Security Weaknesses**

### 1. Users

- (a) Must report potential security weaknesses in IT systems or services to the CSIRT in accordance with federally mandated requirements, NRC-defined security requirements, and organizationally defined values.
- (b) Shall not attempt to correct potential weaknesses or test to determine if the weakness exists.



## 2. System Owners

- (a) Ensure identified weaknesses are recorded in a system POA&M.
- (b) Shall not attempt to correct potential weaknesses or test to determine if the weakness exists.

### **D. Report Information Spills**

1. An information spill is a type of incident where electronic information is placed on a system that is not approved to process that level of information. Information spills shall be reported as cyber security incidents to the CSIRT. The CSIRT shall report the spill immediately to ADM/DFS, OIG, the system owner, information owner, and the system ISSO.
2. The fact of an information spill is as sensitive as the information that was spilled. Consequently, reporting an SGI or classified information spill using NRC email or a standard telephone is considered a security violation. SGI and classified information spills must be reported in a secure manner in accordance with the level of information spilled. The CSIRT shall report the spill immediately to ADM/DFS, OIG, the system owner, information owner, and system ISSO.
3. CSIRT shall ensure classified system and data owners are contacted in a secure fashion and classified system owners shall ensure an assessment, in accordance with Executive Order 13526, "Classified National Security Information," and Code of Federal Regulations (CFR) Title 32 National Defense Part 2001, "Classified National Security Information," (Information Security Oversight Office Directive No. 1), is conducted to determine the potential impact of the spill on national security. System owners shall ensure that data owners are contacted for an assessment of impact of the spill.
4. System owners shall ensure development and maintenance of procedures to isolate and contain information spills to minimize damage and to preserve evidence that may be required for damage assessment, risk assessment, law enforcement, or counter intelligence purposes. Those procedures must be followed whenever an information spill occurs. All affected media must be classified/categorized at the same level as the spilled information until the information spill remediation process is completed.
5. Mitigation procedures, including disposition of affected media (i.e., sanitization, physical removal, or destruction), must be in accordance with the potential harm that may result from the compromise of spilled information.
6. Special techniques must be used to delete SGI information from electronic storage media. These techniques may include destruction of the physical media, obliteration of the sensitive information using a CISO-approved software product, or erasure of all information through use of a CISO-approved degaussing product and procedure.

Guidance on SGI removal from electronic media can be found on the CSO Incident Response Web page at <http://www.internal.nrc.gov/CSO/incident-resp.html>.

## **E. Computer Security Incident Response Plan**

### **1. Overview**

The CSAAR SITSO is responsible for ensuring development of an agencywide Computer Security Incident Response Plan (CSIRP). The CSAAR SITSO shall review the plan no less than annually, update as required, and communicate changes.

### **2. Standards for Prioritizing Cyber Security Incidents**

Cyber security incidents must be prioritized based on the criticality of the affected resources and the effect the incident has on the organization. Response expectations must be set by priority level. For example, the CSO incident response capability must respond to a high priority cyber security incident within 4 hours. The CSAAR SITSO shall identify and designate a list of near real-time alerts that indicate a high probability of intrusion and shall ensure intrusion detection systems are configured to monitor for those indications.

### **3. The Cyber Security Incident Response Process shall contain the following:**

- (a) Preparation – selecting tools, preventing and preparing for cyber security incidents, and annual training
- (b) Detection and Analysis – cyber security incident categories, signs of an incident, sources of precursors and indications, incident analysis, incident documentation, incident prioritization, and incident notification
- (c) Containment – containment strategy, evidence gathering and handling, identifying the attacker
- (d) Eradication – deleting malicious code, disabling breached user accounts
- (e) Recovery – restoring the system to normal operation and hardening the system to prevent similar cyber security incidents
- (f) Post-incident Activity – incorporating lessons-learned, using collected incident data, evidence retention, assessing residual risk, coordinating incident handling activities with contingency planning
- (g) Procedures for Testing Incident Response Capabilities
- (h) Recommendations for Improvement

### **4. Federal Incident Reporting Guidelines**

- (a) NRC staff must comply with Federal incident reporting guidelines on the US-CERT Web site available at <http://www.us-cert.gov/federal/reportingRequirements.html>.
- (b) Cyber security incidents shall be tracked by the CSIRT. Tracking information shall include type, volume, and cost of incident. Tracking information shall be used to identify recurring and high impact incidents along with mitigation strategies.

#### 5. Testing

System owners shall ensure development of system-specific incident response plans. Agencywide and system-specific incident response plans shall be tested annually.

### **F. Cyber Security Incident Response Team (CSIRT)**

#### 1. Purpose

- (a) The CSO provides a centralized incident response capability that includes assembling resources as needed from appropriate parts of NRC. The CSIRT leader and alternate are dedicated staff whose primary purpose is to ensure a quick, effective, and orderly response to address cyber security incidents.
- (b) The CSIRT is staffed by:
  - (i) CSO
  - (ii) OIS
  - (iii) ADM/DFS, as needed
  - (iv) Office of Nuclear Security and Incident Response (NSIR) Information Security representatives, as needed
  - (v) OIG Investigations Cyber Crime Unit (CCU), as needed.

#### 2. Responsibilities of the CSIRT

- (a) The CSIRT responsibilities are a higher priority for the CSO and OIS team members than their other duties. Staff from NSIR and ADM shall be available, as necessary, in an expeditious manner to support the CSIRT efforts. The CSAAR SITSO shall provide specialized training annually to the CSIRT, including simulated events, to facilitate an effective response by personnel during crisis situations. Annual training shall include automated mechanisms to provide a more robust and realistic training environment, as appropriate.
- (b) The CSIRT shall develop a report summarizing all cyber security incidents and all PII incidents (whether the compromise was electronic or physical),

transmitting this report to the CSAAR SITSO and CISO for approval, and shall notify US-CERT about malicious or suspicious activity. Cyber security incidents are reported to US-CERT based upon Federal incident reporting guidelines and standards.

- (c) All potential or confirmed incidents involving PII must be reported to the NRC senior agency official for privacy and to US-CERT within one hour of discovery, and all known or suspected instances of spillages of classified information must be immediately reported.
- (d) Classified cyber security incidents must follow the CNSS policies, including but not limited to CNSS Policy (CNSSP) 18, "National Policy on Classified Information Spillage," available on the [CNSSP Web page](#), and CNSS Instruction (CNSSI) 1001, "National Instruction on Classified Information Spillage," available on the [CNSSI Web page](#).
- (e) The CISO shall notify the OIG of all incidents that warrant their attention. Once notified, the OIG will determine their level of involvement. The OIG will coordinate with other law enforcement agencies as needed to ensure the incident has been properly addressed. If an action against a person or organization involves a matter under investigation by the OIG, then the OIG shall collect and retain the evidence for its investigation. The CSIRT shall retain and collect all other evidence that may need to be presented to law enforcement.
- (f) The CSAAR SITSO shall test the incident response capability in accordance with CSO-STD-0020, "Organization Defined Values for System Security Controls," available on the [CSO Standards Web page](#), to determine its effectiveness and shall document test results. When possible, the CSAAR SITSO's evaluation of the organization's computer security incident response capability employs automated mechanisms to assist in the reporting of security incidents and to more thoroughly test the organization's incident handling process.

## **X. BUSINESS CONTINUITY MANAGEMENT**

### **A. Requirements for Business Continuity Management**

Business Continuity Management (BCM) includes consideration of cyber security requirements for continued business operations subsequent to the occurrence of unplanned events that disrupt computerized business processes. For example, a disruption could be a server disk failure resulting in the loss of all information on the disk, a network failure resulting in an inability to communicate with NRC partners, or a building failure resulting in complete loss of an NRC facility.

1. System owners and common control providers must plan and prepare for disruptions.

2. Business area leaders shall annually identify all IT systems and assets that are required to perform their business functions and shall identify those specifically required to continue critical business processes.
3. Business area leaders shall identify the length of time each IT system and asset can be unavailable before critical business processes are impacted.

#### **B. Identifying NRC Business Areas and Business Area Leaders**

1. The Executive Director for Operations (EDO) shall identify NRC business areas and a business area leader with responsibility for the business area.
2. Business area leaders must identify the IT systems upon which the business area operations rely. In addition, business area leaders also must identify critical business functions and the supporting systems that must be sustained in the event of an interruption. NRC business areas are typically supported by multiple systems.
3. A business area leader must consider the following factors:
  - (a) Almost all business areas rely upon an internal network, the Internet, and e-mail.
  - (b) Some business areas have systems dedicated to their business needs and some require isolated systems and networks.
  - (c) Still others may require multiple systems that support multiple functional areas. For example, NRC financial systems specifically support the Office of the Chief Financial Officer (OCFO) business operations. Other business areas may also depend upon the OCFO business area.

#### **C. Examples of Events (Threats)**

Examples of events (threats) that may affect IT system availability that may lead to business disruptions include the following:

1. natural (e.g., hurricane, tornado, flood, and fire),
2. human (e.g., operator error, sabotage, implant of malicious code, and terrorist attacks), and
3. environmental (e.g., equipment failure, software error, telecommunications network outage, and electric power failure).

## **XI. COMPLIANCE**

### **A. Legal Requirements (Seeking Legal Advice)**

If consultation with OIS or CSO does not resolve a question, staff should seek advice from OGC on the following:

1. identification of applicable law,
2. intellectual property rights,
3. protection of agency records,
4. data protection and privacy of personal information,
5. prevention of misuse of computer processing facilities, and
6. export restrictions and restrictions on sharing cryptographic information with foreign entities.

### **B. Compliance with Computer Security Policies and Standards, and Technical Compliance**

#### 1. Computer Security Office (CSO)

CSO provides oversight to verify that all IT systems comply with agency IT security policies, guidance, standards, and procedures.

#### 2. System owners

- (a) System owners conduct assessments of the security controls in their IT systems at least annually to determine the extent to which the controls are implemented correctly, operating as intended, and producing the desired cyber security outcome.
- (b) System owners, in accordance with CSO-PROS-1323, "U.S. Nuclear Regulatory Commission Agencywide Continuous Monitoring Program," available on the [CSO Processes Web page](#), shall ensure continuous monitoring of computer security controls is performed such that the controls are implemented correctly, operating as intended, and producing the desired outcome on a continuous basis.
- (c) CSO-STD-0020, "Organization Defined Values for System Security Controls," contains NRC-defined values for NIST SP 800-53 security controls.
- (d) System owners shall ensure the security state of their systems adhere to NRC continuous monitoring requirements.

### C. IT Systems Audit Considerations

The NRC recognizes the potential for interference in IT systems operations as part of the system auditing process as well as the requirement to prevent any misuse of auditing tools.

#### 1. Responsibilities

- (a) System owners shall ensure their systems produce audit records that contain sufficient information to, at a minimum, establish—
  - (i) what type of event occurred,
  - (ii) when (date and time) the event occurred,
  - (iii) where the event occurred,
  - (iv) the source of the event,
  - (v) the outcome (success or failure) of the event, and
  - (vi) the identity of any user/subject associated with the event.
- (b) The ISSO shall review the audit logs to determine if there is evidence of a suspicious event or the system has undergone an attack. Suspicious events include but are not limited to the following: users who have misused the system, privileges accidentally given to a user who does not need them, and the system changed without authorization. The ISSO needs to ensure that everyone using the system is doing so within their defined roles, only users that have been given access to the system are using it, and the changes to the system have been properly approved.
- (c) The CISO determines, based on current threat information and ongoing assessment of risk, specific events that must be audited within systems and identifies the required frequency of audits or the circumstances that require auditing.

#### 2. Access to Audit Tools and Information

- (a) Access to IT system audit tools and the information generated by these tools must be protected to prevent misuse.
- (b) Access to IT system audit tools and generated information shall be restricted to ISSOs, CSO personnel, and OIG CCU personnel.
- (c) Auditing contractors shall be provided with access only for the duration of their auditing period.
- (d) The audit tools and generated information shall be separated from development and operational systems when not in use.

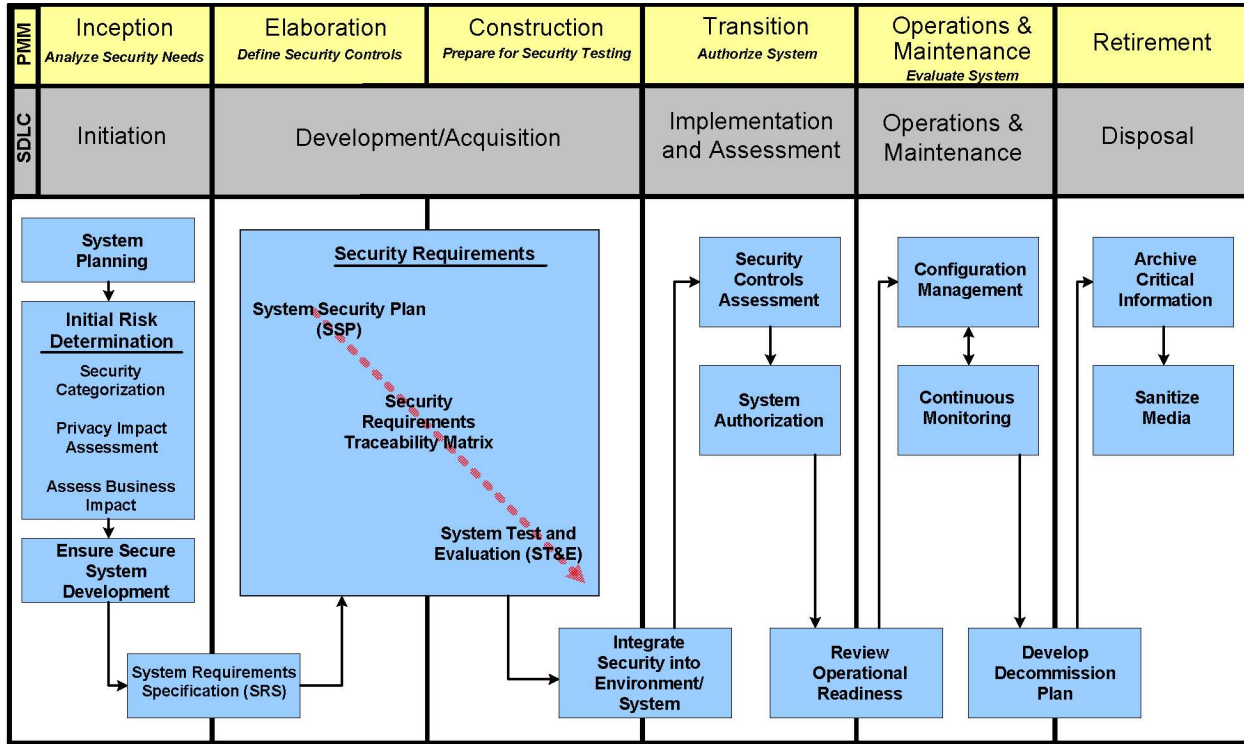
- (e) Audit results shall be protected at the FIPS 199, "Standards for Security Categorization of Federal Information and Information Systems," available on the NIST Federal Information Processing Standards (FIPS) Publications Web page at <http://csrc.nist.gov/publications/PubsFIPS.html>, overall sensitivity level of the target system and shall be encrypted for long-term storage.



**U.S. NUCLEAR REGULATORY COMMISSION DIRECTIVE HANDBOOK (DH)**

**EXHIBITS**

**Exhibit 1 Crosswalk Between Project Management Methodology and the Software Development Life Cycle (PMM/SDLC Map)**



**Exhibit 2      Abbreviations**

ADM	Office of Administration
ADOP	Associate Director for Human Resources Operations and Policy
AODR	Authorizing Official Designated Representative
ATO	Authorization to Operate
BCM	Business Continuity Management
BCP	Business Continuity Plan
CCU	OIG Investigations Cyber Crime Unit
CD	Compact Disk
CFO	Chief Financial Officer
CFR	Code of Federal Regulations
C-I-A	Confidentiality, Integrity, and Availability
CIO	Chief Information Officer
CISO	Chief Information Security Officer
CRD	Confidential Restricted Data
CM	Configuration Management
CNSI	Confidential National Security Information
CNSS	Committee on National Security Systems
CNSSI	CNSS Instruction
CNSSP	CNSS Policy
COMSEC	Communications Security
CONOPS	Concept of Operations
CPIC	Capital Planning and Investment Control

CSAAR	Cyber Situational Awareness, Analysis, and Response
CSIRP	Computer Security Incident Response Plan
CSIRT	Computer Security Incident Response Team
CSO	Computer Security Office
CSS	Central Security Service
DAA	Designated Approving Authority
DFS	ADM Division of Facilities and Security
DNI	Director of National Intelligence
DoD	Department of Defense
DSO	Division of Security Operations
DVD	Digital Video Disk
EA	Enterprise Architecture
EDO	Executive Director for Operations
FAR	Federal Acquisition Regulation
FCO	FISMA Compliance and Oversight
FIPS	Federal Information Processing Standard
FISMA	Federal Information Security Management Act
GPEA	Government Paperwork Elimination Act
IEC	International Electrotechnical Commission
IG	Inspector General
ISO	International Organization for Standardization
ISSO	Information System Security Officer
IT	Information Technology

LAN	Local Area Network
MCSE	Microsoft Certified Systems Engineer
MD	Management Directive
NISPOM	National Industrial Security Program Operating Manual
NIST	National Institute of Standards and Technology
NSA	National Security Agency
NTEU	National Treasury Employees Union
NSIR	Office of Nuclear Security and Incident Response
OCHCO	Office of the Chief Human Capital Officer
OCFO	Office of the Chief Financial Officer
OGC	Office of the General Counsel
OIG	Office of the Inspector General
OIS	Office of Information Services
OMB	Office of Management and Budget
P2P	Peer-to-Peer
PED	Portable Electronic Device
PII	Personally Identifiable Information
PIV	Personal Identity Verification
PMM	Project Management Methodology
POA&M	Plan of Action and Milestones
PST	Policy, Standards, and Training
RMF	Risk Management Framework
SA	Security Architecture

SCI	Sensitive Compartmented Information
SCIF	Sensitive Compartmented Information Facilities
SDLC	System Development Life Cycle
SIG	Safeguards Information
SITSO	Senior Information Technology Security Officer
SNSI	Secret National Security Information
SP	NIST Special Publication
SRD	Secret Restricted Data
SUNSI	Sensitive Unclassified Non-Safeguards Information
US-CERT	United States Computer Emergency Readiness Team