Canadian Nuclear Safety Commission | Commission canadienne de sûreté nucléaire

Canada : Integrated Regulatory Approach to Safety, Security and Safeguards (3S)

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nuclearsafety.gc.ca

Canadian Nuclear Safety Commission

Established May 2000, under the *Nuclear Safety and Control Act*

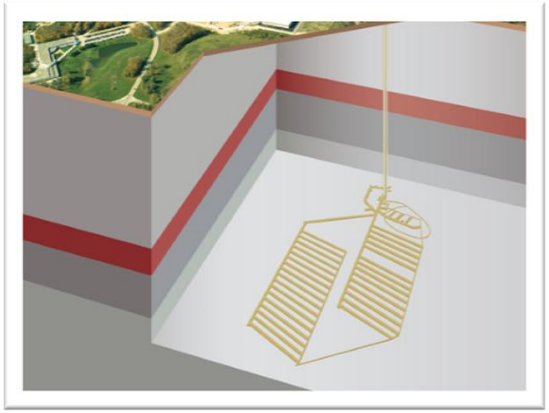
Replaced the AECB, established in 1946 by the *Atomic Energy Control Act*

Our Mission:

To protect the **health, safety** and **security** of persons and the **environment**; and to implement Canada's **international commitments** on the peaceful use of nuclear energy

Regulates all Fuel Cycle Facilities & Activities

- Uranium mines and mills
- Uranium fuel fabricators and processing
- Nuclear power plants
- Waste management facilities
- Nuclear substance processing
- Industrial and medical applications
- Research, academic and commercial
- Export/import control



…From Cradle To Grave

CNSC Staff Located Across Canada

Nuclear Safety and Control Act

- The NSCA created the Commission
- The Objects of the Commission are

(a) to regulate the development, production and use of nuclear energy and the production, possession and use of nuclear substances, prescribed equipment and prescribed information in order to

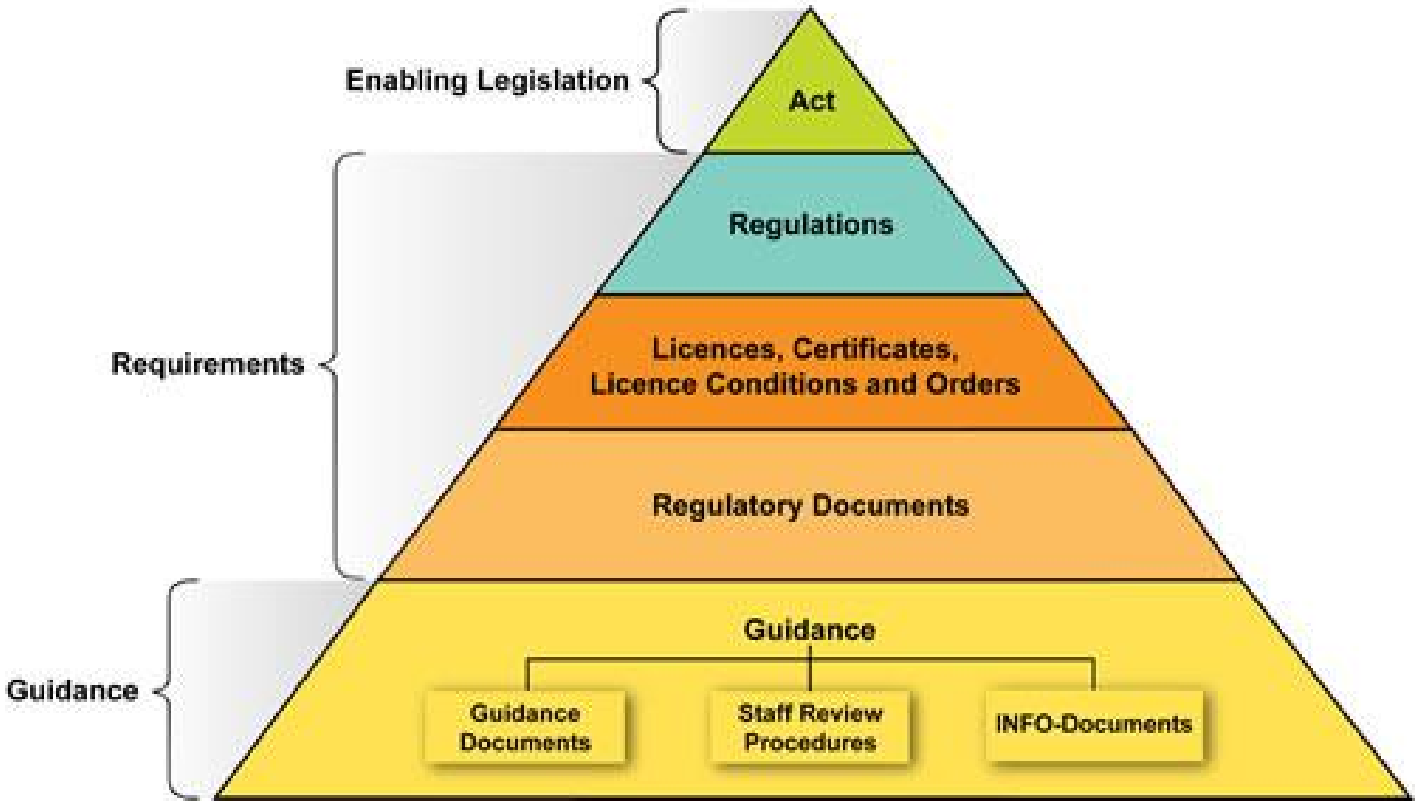
(i) prevent unreasonable risk, to the environment and to the health and safety of persons, associated with that development, production, possession or use,

(ii) prevent unreasonable risk to national security associated with that development, production, possession or use, and

(iii) achieve conformity with measures of control and international obligations to which Canada has agreed; and

(b) to disseminate objective scientific, technical and regulatory information to the public concerning the activities of the Commission and the effects, on the environment and on the health and safety of persons, of the development, production, possession and use referred to in paragraph (a)

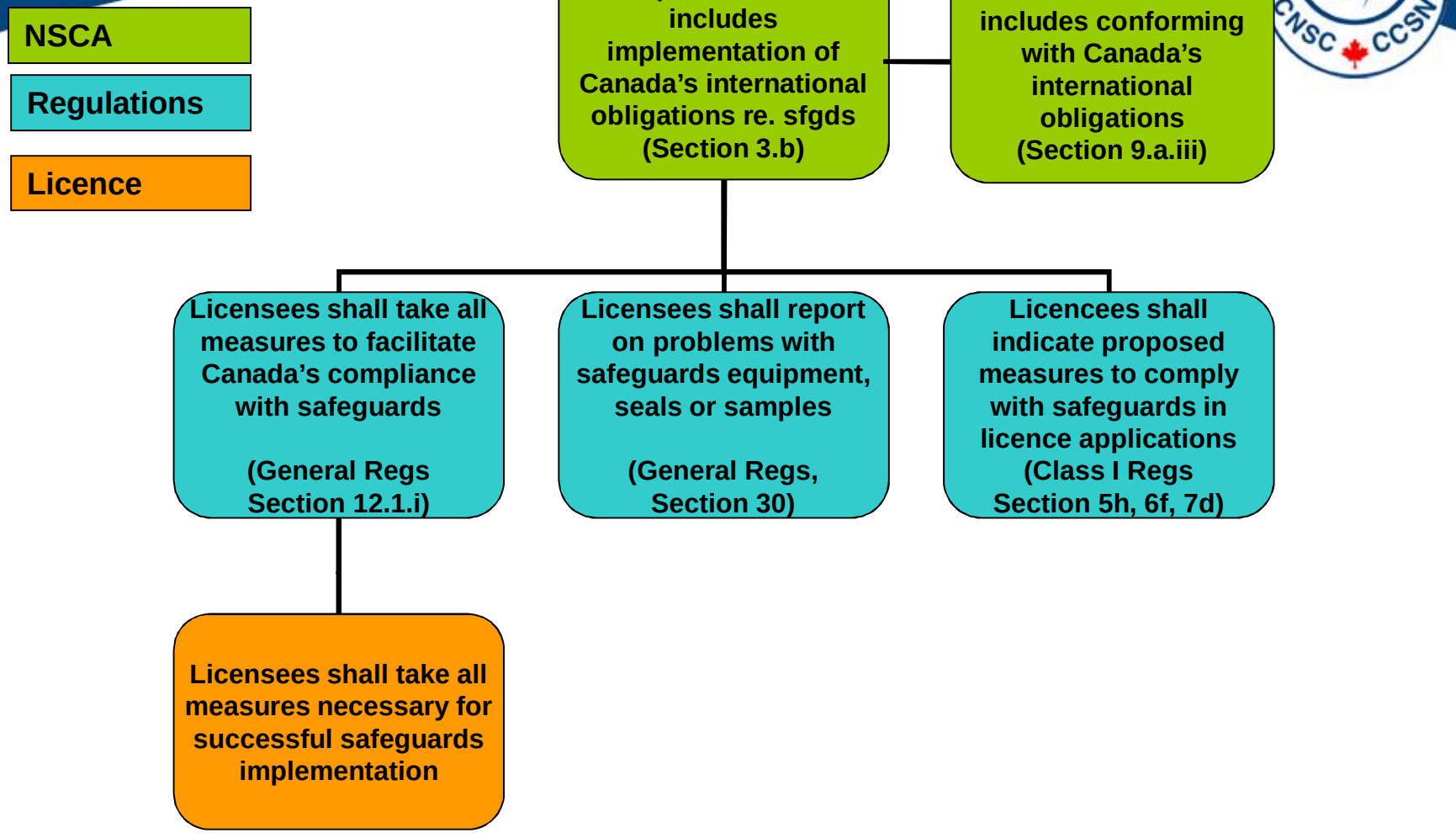
CNSC Regulatory Framework



Safety Security and Safeguards Requirements

- General Nuclear Safety and Control Regulations
  - outlines specific obligations for licensees for safety, security and safeguards for any nuclear facility in Canada that is licensed by the CNSC
- Class I Facilities Regulations (NPPs)
- Nuclear Security Regulations
- Regulatory Documents and Guidance Documents based on IAEA and other international best practices
- Facility-specific requirements as Licence Conditions; guidance given in Licence Condition Handbook

Domestic Basis for Safeguards



Safeguards in Canada

U3O8

UO3

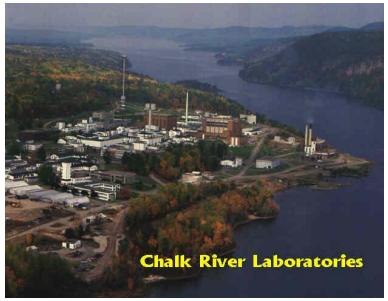
UO2

Uranium Mining and Milling

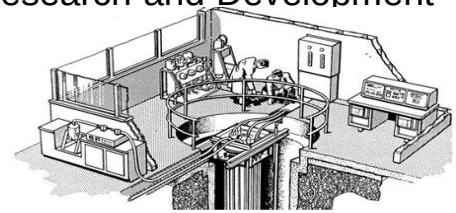
Uranium Refining

Uranium Conversion

Uranium Fuel Fabrication



Research and Development

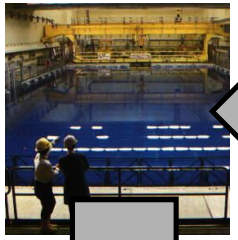


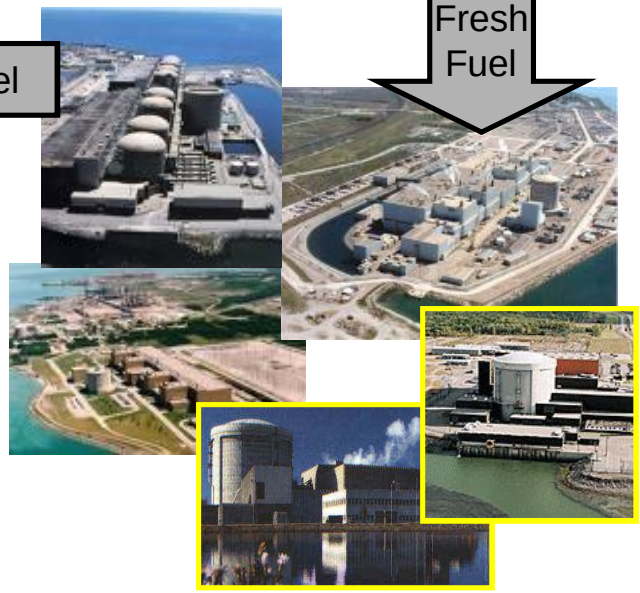
Locations Outside Facilities and Research Reactors

Fresh Fuel

Spent Fuel

Spent Fuel





Power Reactors

Safeguards in Canada

Enabling Verification

- Comprehensive Safeguards Agreement Requirements
  - Provide timely access to facilities to verify State nuclear material reports
  - Provide timely access to verify design information
  - Provide timely access to install and service containment and surveillance equipment
- Additional Protocol Requirements
  - Provide access to locations to assure absence of undeclared nuclear material and activities
  - Provide access to locations to resolve a question or inconsistency
  - Provide access to locations to confirm decommissioned status

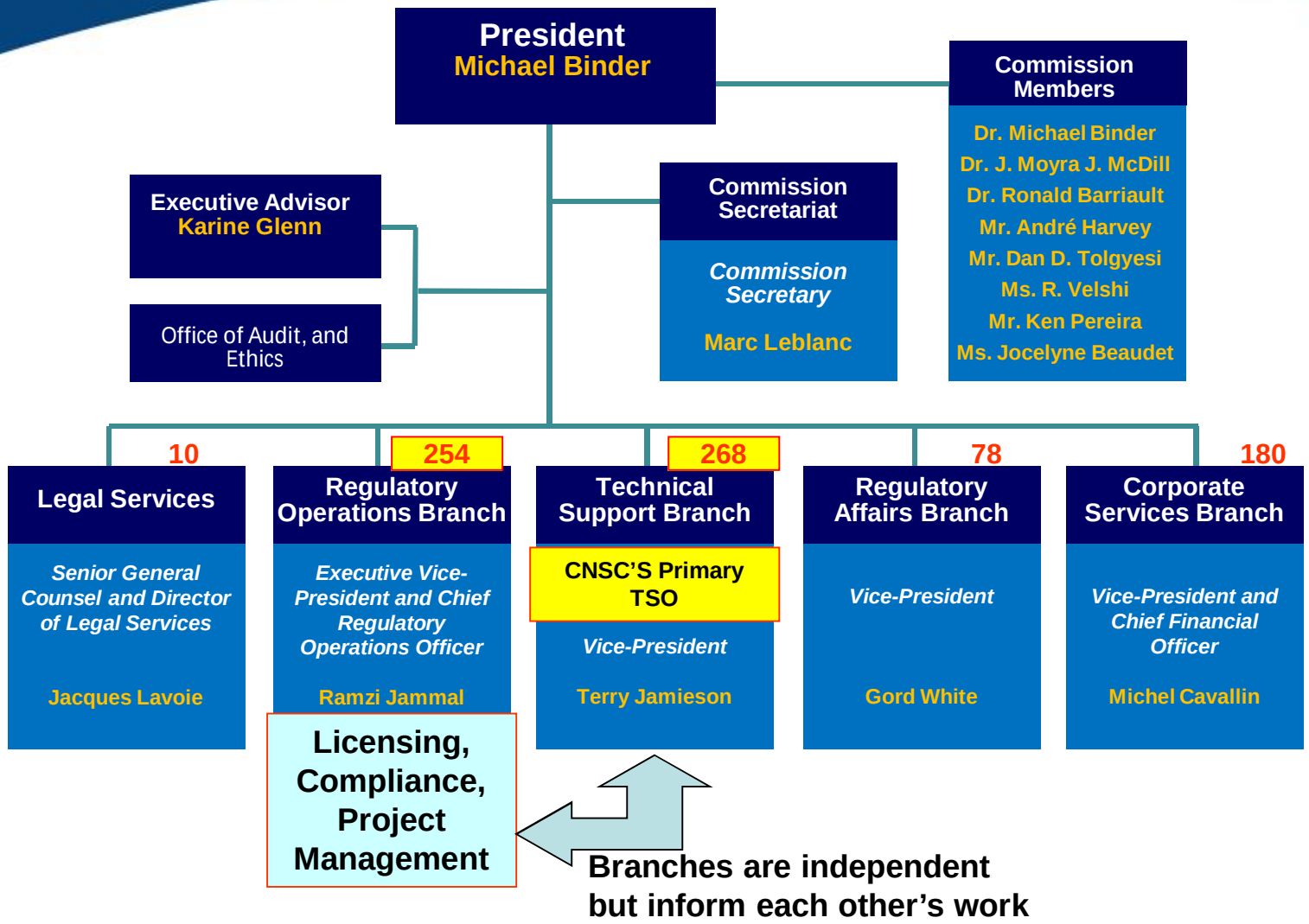
Integrated Approach to 3S

- How to bring all 3 S into a manageable set of programs?
  - Governmental Direction
  - Organizational Structure
  - Include all elements in Licensing & Compliance
  - Management processes
  - Roles & Responsibilities

Governmental Direction

- Direction from Parliament of Canada is clear in the Legislation
- Legislation mandates that the CNSC be responsible for 3S (with important precision that it is the "implementation" of international agreements)
- Other Government departments understand and acknowledge the CNSC's role

CNSC Organizational Structure



Include all Elements in Licensing/Compliance

Functional Area	Safety and Control Area
Management	Management Systems Human Performance Management Operating Performance
Facility and Equipment	Safety Analysis Physical Design Fitness for Service
Core Control Processes	Radiation Protection Conventional Health and Safety Environmental Protection Emergency Management and Fire Protection Waste Management Security Safeguards and Non-Proliferation Packaging and Transport

Management Processes

Operational Branches use matrix management:

- ROB: manages regulatory activities as well as licensing and compliance decision-making; has generalist experience.
- TSB: provides specialist advice, reviews licensee submissions, participates in inspections; has specialist expertise in safety, environment, security and safeguards.
- Both branches help to develop regulatory framework, prepare Commission Member Documents, present to Commission.

Coordinated annual planning of 3S

Challenges in coordination and decision-making require checks and balances in the management system

Clarity of Roles and Responsibilities

- CNSC is responsible government agency for safety, security, safeguards
- CNSC through regulations and license makes 3S part of the responsibility of Licensees
- Licensee must ensure all 3S implemented at the facility
- CNSC is point of contact with IAEA
- Commission is responsible for balancing emphasis between each of 3S on behalf of the Government/Public

Public Review & Reporting on SSS

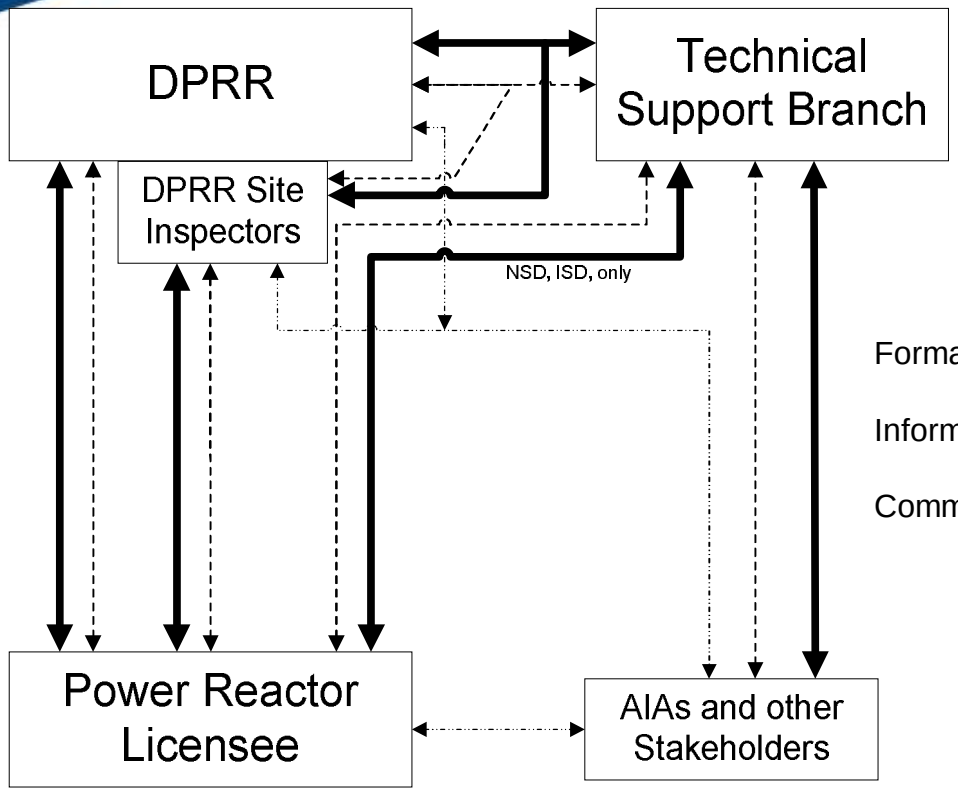
- Licence Renewal Decisions
  - http://www.nuclearsafety.gc.ca/eng/commission/pdf/2012-12-03-Decision-OPG-DarlingtonNGS-e-Edocs4095954-final.pdf
- Annual Performance Reports
  - http://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/2011-CNSC-NPP-Safety-Report-INFO-0823_e.pdf
- Similar for Fuel Cycle Facilities and Nuclear Substances

Example - NPP Performance 2011

Canadian nuclear power plant safety performance ratings for 2011

Safety and control area	Bruce A	Bruce B	Darlington	Pickering A	Pickering B	Gentilly-2	Point Lepreau
Management system	SA	SA	SA	SA	SA	SA	SA
Human performance management	SA	SA	SA	SA	SA	SA	SA
Operating performance	SA	SA	FS	SA	SA	SA	SA
Safety analysis	SA	SA	SA	SA	SA	SA	SA
Physical design	SA	SA	SA	SA	SA	SA	SA
Fitness for service	SA	SA	FS	SA	SA	SA	SA
Radiation protection	SA	SA	FS	SA	SA	SA	SA
Conventional health and safety	FS	FS	FS	SA	SA	SA	SA
Environmental protection	SA	SA	SA	SA	SA	SA	SA
Emergency management and fire protection	SA	SA	SA	SA	SA	SA	SA
Waste management	SA	SA	SA	SA	SA	SA	SA
Security	FS	FS	SA	SA	SA	SA	SA
Safeguards	SA	SA	SA	SA	SA	SA	SA
Packaging and transport	SA	SA	SA	SA	SA	SA	SA

Communication Process for NPP Licensees



Legend

Formal communication/correspondence

Informal communication/correspondence

Communication outside the scope of the protocol

Note:
Authorized Inspection Agencies (AIAs) and other Stakeholders include organizations and agencies, such as, CSA Standards Committee, Ministry of the Environment, Ministry of Labour, Fire Protection officials, etc.

Compliance Inspections

- Matrix approach to inspections
- Site Inspectors lead all inspections
  - For large facilities subject matter experts from specialist groups contribute to inspection guide and participate in inspection
  - For smaller facilities checklists include security component
  - Exception for Safeguards; ISD leads and performs
- Avoids ‘siloing’
- Recognizes that licensee programs cover whole facility
- Creates symbiosis by recognizing cross-cutting issues
- Verifies that safety is taken into account by licenses’ security group and vice-versa.

Example Safety /Security – Instrumentation and Control Requirement

- Need for new requirements associated with digital I&C
- New security concern associated with cybersecurity
- Solution: safety and security specialist work together to update the Regulatory Document on Design requirements to add section on Digitial I&C with requirements to protect against cyberthreat.

Example: Safety/Security – Releasing Information from PSA

- Operators are required to produce a Probabilistic Safety (Risk) Assessment (PSA/PRA) which identifies probability of failures, vulnerabilities and important combinations of events that could lead to accidents
- Safety philosophy is to share all information; Security philosophy is release information only to those who need to know
- Solution: the broad outline and results of PSA are presented to the Commission publicly but details that could be used for malevolent acts are not released.

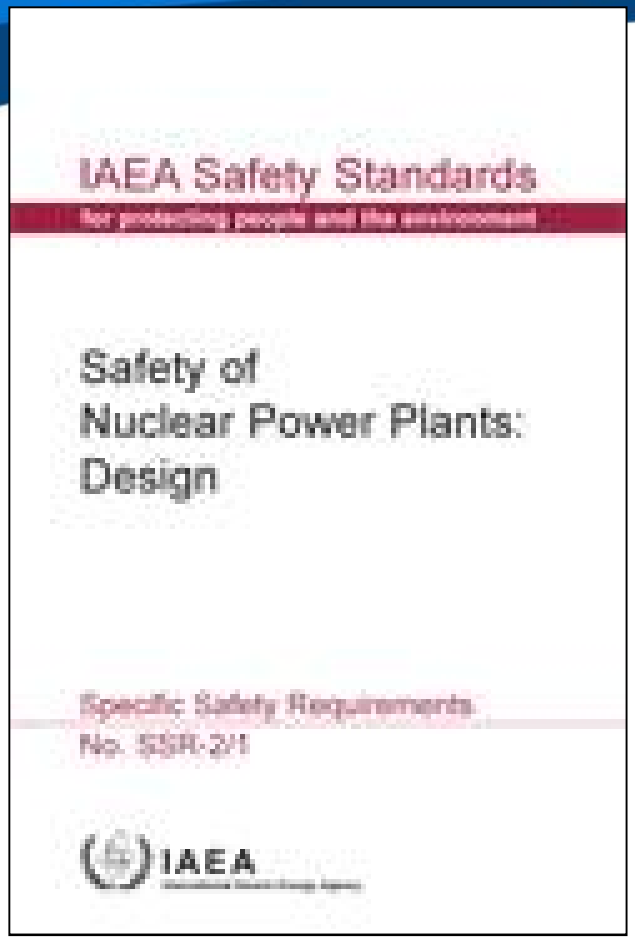
Example: Security/Safeguards - Site Access for IAEA Inspectors

- IAEA Inspectors want immediate access to facilities but security requirements do not allow access by individuals who have not been security cleared
- Solution: list of Inspectors that may come to Canada sent to CSNC and the Canadian Border Services at the beginning of the year.
- Appropriate security checks done and authorization obtained for all the IAEA Inspectors
- List of IAEA Inspectors provided to all facilities
- IAEA Inspectors may arrive unannounced, security personnel verify that they have been pre-authorized and inspection allowed to continue.

Example - New Build in Canada – 3S Requirements and Guidance

- Site Evaluation for New Nuclear Power Plants
  - http://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/RD-346_e.pdf
- Design of New Nuclear Power Plants
  - http://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/RD-346_e.pdf
- Pre-Licensing Review of a Vendor's Reactor Design
  - http://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/May-2012-GD-385-Pre-licensing-Review-of-a-Vendors-Reactor-Design_e.pdf
- Licence Application Guide for Licence to Construct
  - http://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/August-2011-RDGD-369-Licence-Application-Guide-Licence-to-Construct-a-Nuclear-Power-Plant_e.pdf

IAEA Integration of SSS



Requirement 8: Interfaces of safety with **security and safeguards**

Safety measures, nuclear security measures and arrangements for the State system of accounting for, and control of, nuclear material for a nuclear power plant shall be designed and implemented in an integrated manner so that they do not compromise one another

Safety of Nuclear Power Plants: Design
Specific Safety Requirements IAEA Safety Standards Series SSR-2/1 Subject Classification: 0603-Nuclear power plants STI/PUB/1534 (ISBN:978-92-0-121510-9) Language: English Date Published: 2012

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Thank you!

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