



Implementation of the Revised State Level Approach for Safeguards in Canada

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Implementation of the IAEA's Revised State Level Approach for Safeguards in Canada

- Context
- Safeguards Framework
- Evolution of Safeguards Implementation
- Revised IAEA State Level Approach
- Current Activities



- The IAEA's safeguards system is a key component of the international non-proliferation regime
- Safeguards implementation has evolved over time to improve effectiveness and efficiency
- The IAEA is now introducing a Revised State-Level Approach
 - Changes to safeguards measures
 - Introduction of additional safeguards equipment
- The CNSC and licensees are working with the IAEA to advance implementation

Progress has been made towards the implementation of the IAEA Revised State-Level Approach however more work needs to be done



International Safeguards

- Safeguards are measures that provide assurances that nuclear material remains in peaceful activities
- Declaration of **nuclear material** inventories and activities to the IAEA
- **Independent verification** by the IAEA of those inventories and activities

Safeguards are applied for 185 States with **safeguards agreements** in force with the IAEA



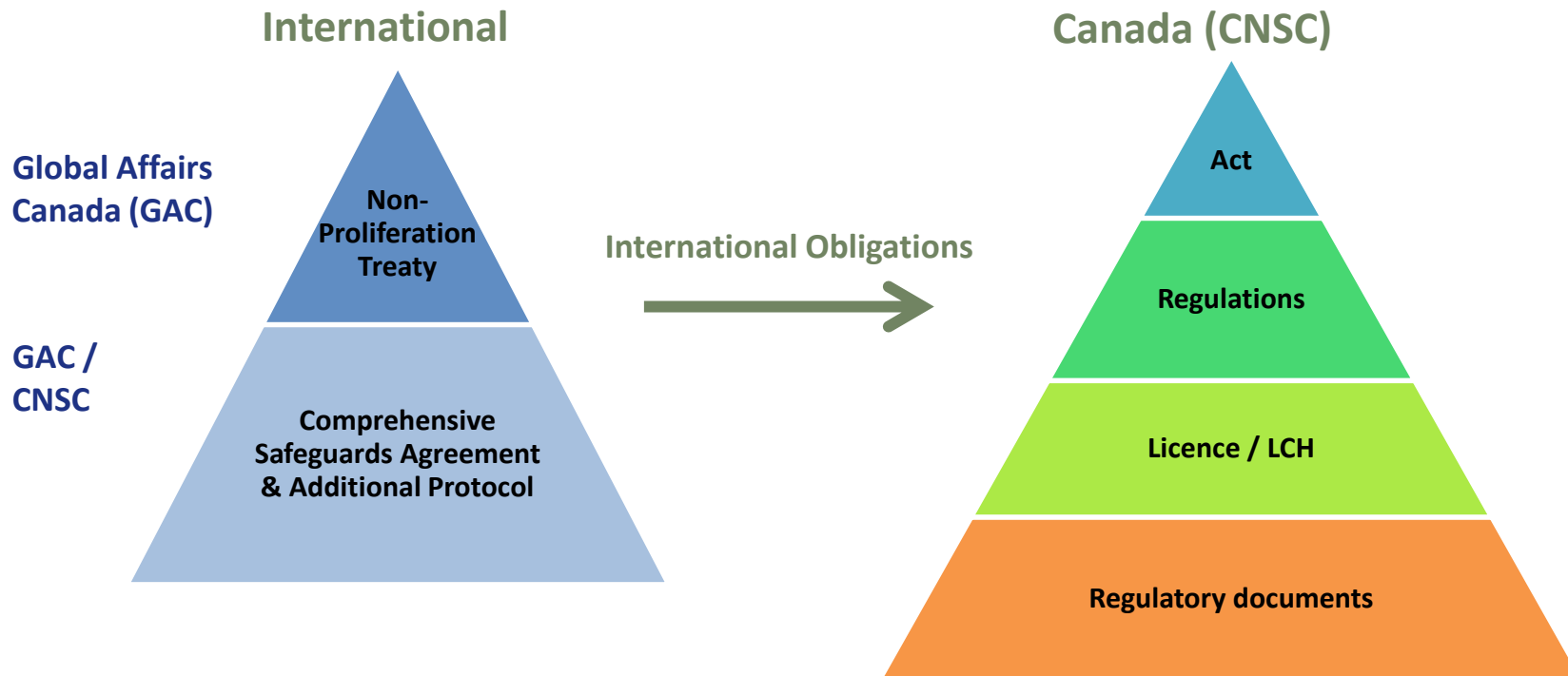
Photo: IAEA Headquarters in Vienna, Austria.
Source: IAEA



Safeguards Framework



Safeguards Regulatory Framework

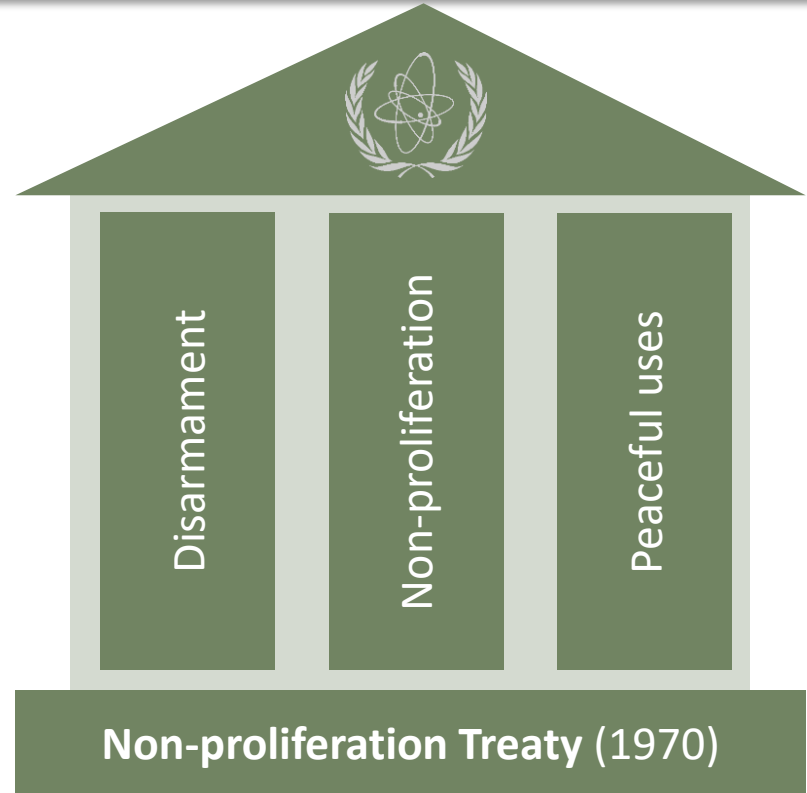




Non-proliferation of Nuclear Weapons

Treaty on the Non-proliferation of Nuclear Weapons (NPT)

- Establishes the concept of Nuclear Weapons States and Non-Nuclear Weapons States
- Non-Nuclear Weapons States undertake to accept safeguards and conclude an agreement with the IAEA





Authority under the *Nuclear Safety and Control Act*

Nuclear Safety and Control Act (NSCA), paragraph 3(b)

*The purpose of this Act is to provide for...
the implementation in Canada of measures
to which Canada has agreed respecting
international control of the development,
production and use of nuclear energy,
including the non-proliferation of nuclear
weapons and nuclear explosive devices.*





Canada's Safeguards Agreements

Comprehensive Safeguards Agreement (1972)

Requires Canada to:

- Accept safeguards on all nuclear material
- Establish a safeguards regulatory authority
- Allow IAEA to undertake inspections
- Focuses on **declared** nuclear material and activities

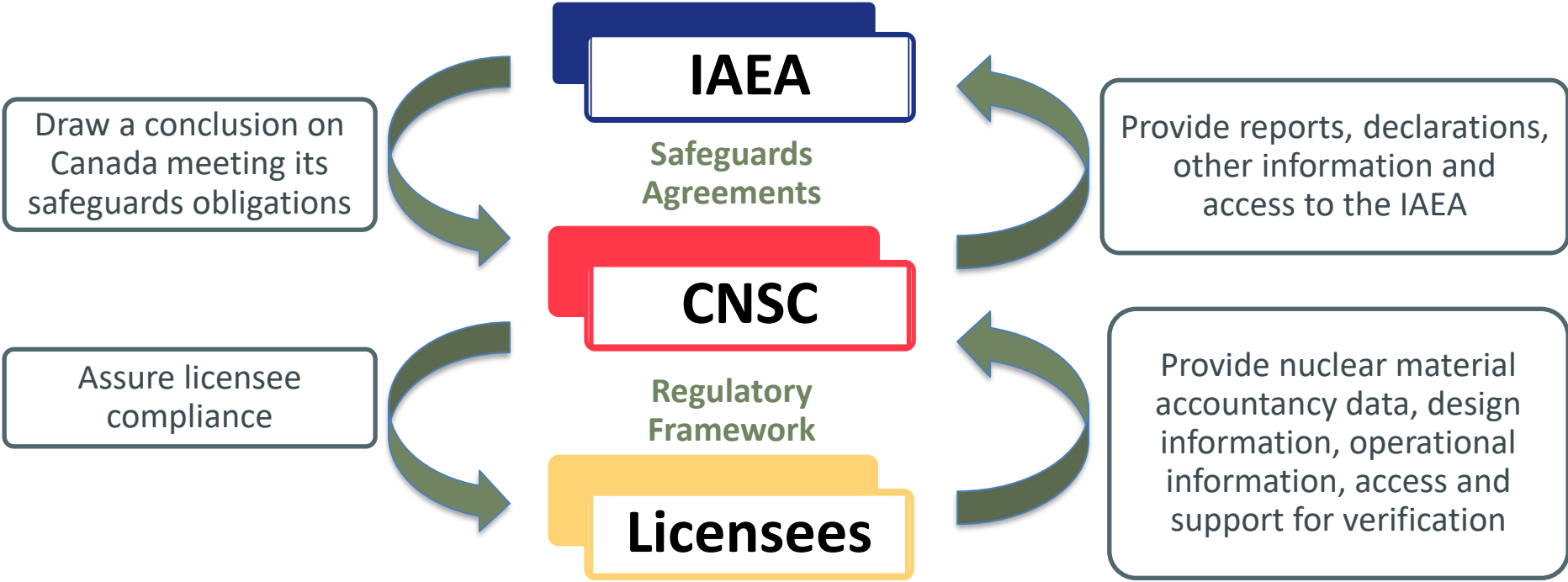
Additional Protocol (2000)

- Requires the provision of broader information to be submitted to the IAEA
- Provides the IAEA with the right to perform 'Complementary Accesses' on short notice
- Verifying the absence of **undeclared** nuclear material and activities

Canada is required to cooperate with the IAEA to facilitate the implementation of Safeguards



Safeguards Roles (1/2)





Safeguards Roles (2/2)

CANADA (State System of Accountancy and Control: CNSC and Licensees)	IAEA
Maintain and update Nuclear Material Accountancy information (near real-time) database and provide information to IAEA	Review and evaluate Nuclear Material Accountancy information
Develop and review Additional Protocol information	Review and evaluate Additional Protocol information
Develop and review Operational and Design information	Review and evaluate Operational and Design information and perform verification activities
Provide access to sites and other locations	Verify nuclear material inventories and transfers, and Additional Protocol and Design Information
Support installation, operations, and maintenance of IAEA equipment (e.g. detectors, cameras)	Review and evaluate data from equipment to ensure absence of undeclared activities
CNSC assures licensee compliance with CNSC safeguards requirements and robust licensee safeguards programs	IAEA evaluates all information provided by Canada, and results of in-field activities to draw a conclusion on Canada meeting its safeguards obligations



Evolution of Safeguards



Evolution of Safeguards in Canada

Traditional Safeguards (1972)

- Focus on declared nuclear material and activities

Strengthened Safeguards (2000)

- Provisions of broader information and access to the IAEA through **Additional Protocol** to ensure the absence of undeclared nuclear material and activities

Initial State Level Approach - Integrated Safeguards (2005)

- Optimum combination of safeguards measures to achieve effectiveness and efficiency

Revised State Level Approach (2016-)

- Systematic application of acquisition path analysis, technical objectives, and associated safeguards measures



New IAEA Spent Fuel Storage
Source: IAEA



The Initial IAEA State Level Approach – Integrated Safeguards

- **Only available to States with IAEA broader conclusion** that all nuclear material remained in peaceful activities
- Notion of implementing safeguards in a manner that considers a State's nuclear and nuclear-related activities and capabilities
- Allowed the IAEA to move away from traditional, mechanistic and criteria-driven safeguards based on facility and material types, towards a more risk-informed approach

Canada and the CNSC were strong proponents
of integrated safeguards



Revised IAEA State Level Approach



What is the IAEA Revised State Level Approach?

- Safeguards implementation by the IAEA continues to evolve to strengthen its effectiveness and to improve its efficiency
- Customized State-level approaches for individual States, consisting of:
 - Technical safeguards objectives
 - Safeguards measures

A robust, consistent, and impartial approach to implementation of safeguards



Revised State Level Approach (2/4)

- **Applicable to all member States with a safeguards agreement** in force
- No additional rights or obligations for either the State or IAEA
- State-specific factors are considered in developing the Approach
- Executed through the IAEA's annual implementation plan (safeguards activities and verification)



Seal – Equipment used in Safeguards
Source: IAEA

State-Specific Factors are considered in developing the Approach



What are the IAEA's State-Specific Factors?

- Type of safeguards agreement and IAEA conclusion
- The nuclear fuel cycle and related technical capabilities
- The technical capabilities of the safeguards regulatory authority
- Ability of the IAEA to implement certain safeguards measures
- Cooperation between the State and the IAEA
- The IAEA's experience in implementing safeguards in the State



What are some of the impacts on safeguards in Canada?

The IAEA has introduced:

- New Practical Arrangements
- An equipment-based approach for spent fuel transfers to dry storage
- Modified short notice random inspections for the verification of fresh fuel
- Return to annual physical inventory verifications

The IAEA's Revised State-level approach
has been customized for Canada



What are the IAEA's Practical Arrangements?

- The practical arrangements replace the IAEA's Integrated Safeguards procedures
- They contain the IAEA's safeguards measures and expectations for the CNSC and licensees for the planning, preparing and conducting IAEA in-field verification activities
- Separate practical arrangements for each facility group



Status of Practical Arrangements

- Five Practical Arrangements (PAs) have been finalized
- Discussions continue with IAEA and Licensees on three remaining PAs
 - Bulk Handling Facilities (Uranium Processing and Fuel Manufacture) – projected to March 2023
 - Multi-Unit CANDU Stations – projected to December 2023
 - Single-Unit CANDU Station – projected to December 2023

The CNSC is targeting the end 2023 to finalize the Practical Arrangements



CANDU Station Equipment-Based Approach

- Under the revised SLA, the IAEA has proposed complementing the existing Unannounced Inspection (UI) regime with an equipment-based approach at the CANDU stations
- The IAEA currently performs approximately 30 UIs per year at CANDU stations
- The new approach will be more effective and will be consistent with those implemented in other countries

Finalization
of the EBA is
a priority
for the
implementation
of the
revised SLA



CANDU Station Equipment-Based Approach (cont'd)

The IAEA has developed equipment infrastructure requirement documents for each of the four CANDU stations.

- Point Lepreau is finalized and includes an underwater bundle counter, additional cameras, a detector on the transport vehicle and no unannounced inspections
- The three multi-unit stations are still under review and include additional cameras, detectors on the transport vehicles and a continuation of unannounced inspections for loading verifications

CNSC is working with the IAEA and licensees to find a solution that meets IAEA's safeguards objectives while minimizing impact on facility's operations



Current Activities



Feedback from Licensees on the proposed Equipment-Based Approach

During the review process, licensees have raised concerns regarding:

- Safety: Additional movement of spent fuel bundles
- Financial: Capital, operational, and on-going costs to the operator
- Timelines: Engineering Change Control (2-3 years) and project management (approximately 5 years) processes
- Operational: Requirement for operators to connect IAEA mobile units

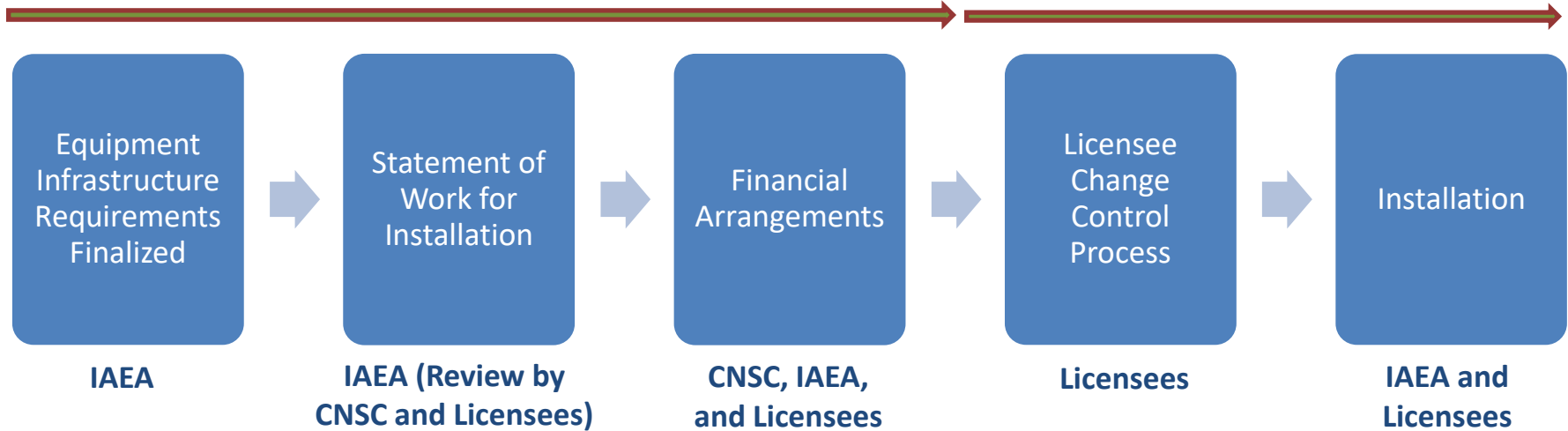
The IAEA has modified their approach and the proposed equipment based on licensee feedback



Next Steps for the Equipment-Based Approach

January 2023

December 2023



CNSC is targeting the end of 2023 to finalize the pathway forward for the Equipment-Based Approach with installation following



Other Safeguards Work

- Small Modular Reactors (SMR) Readiness
 - The application of safeguards-by-design concepts to new technologies
- Decommissioning Wastes
 - The application of safeguards measures on new wastes generated through decommissioning activities and legacy nuclear material
- Small Quantities of Nuclear Material
 - The creation of new Locations Outside Facilities e.g., Canadian Universities, to report small quantities of nuclear material to the CNSC and IAEA



Engagement and Collaboration

- Biannual Canada-Agency Safeguards Implementation Consultations
- Frequent engagement with IAEA and licensees on safeguards implementation issues
- Participate in international safeguards fora to promote and gather best practices
- Support other government departments on non-proliferation topics
- The Canadian Safeguards Support Programme

Engagement and Collaboration is a key function in the successful implementation of Safeguards in Canada



Conclusions

- The IAEA's safeguards system is a key component of the international non-proliferation regime providing mutual assurances that nuclear material remains in peaceful activities
- The IAEA safeguards system continues to evolve to adapt to new issues and new technologies
- The CNSC is working with the IAEA and stakeholders to implement the IAEA's Revised State Level Approach
- Safeguards are essential legal obligation related to Canada's global commitment to the peaceful uses of nuclear energy

Canada commitment and cooperation in safeguards implementation allow it to maintain the highest level safeguards conclusion

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