

International Workshop

# KOREA's "SMART" Road to SMR in CANADA

8 May 2024

Jeju ICC, Korea

Korean Nuclear Society

Division of Reactor System Technology

## Implementation of Safeguards by Design for the SMART100

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**2024 Spring Conference**



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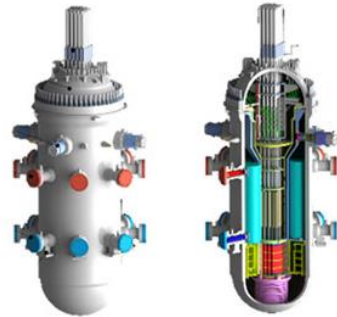
# 1 Safeguards by Design Task



# 01

## Main objectives of the SBD task

- Integration of safeguards considerations into the design process
- Simplify safeguardability of the SMART100 design
- Reduce future operator/IAEA safeguards related burden through optimization of safeguards measures
- Avoid conflicts and leverage synergies with safety and security
- Raise awareness of safeguards obligations among all stakeholders



A **voluntary engagement** that neither replaces a State's obligations under its safeguards agreement, nor introduces new safeguards requirements.

# 01

# SBD task milestones

- SBD task initiated in 2019
- 2019-2023 Initial safeguards assessment of design related specifications with subsequent updates as needed
- 2023 Final identification of potential safeguards measures and equipment needs
- 2023 IAEA provision of general technical requirements (e.g. power; cabling; lighting; space requirements)
- 2024 Finalization of Safeguards Technical Report

# 2 Safeguards Measures

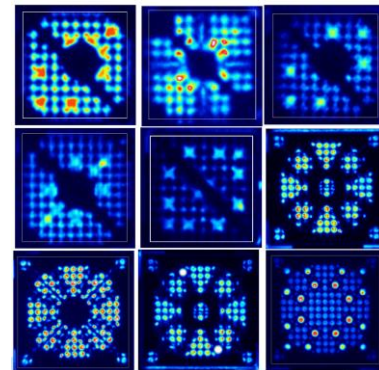


# 02 Safeguards Measures

## General safeguards considerations

Identification of:

- Diversion and misuse scenarios
- Proposed safeguards nuclear material accountancy structure, e.g. Material Balance Area (MBA) and Key Measurement Points (KMPs)
- Access requirements for safeguards verification activities (i.e. nuclear material verification; design information verification)



# 02 Safeguards Measures

## Safeguards strategies

Identification of:

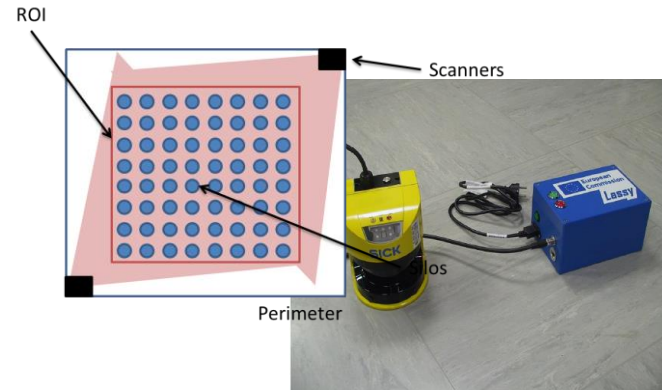
- Proposed containment and surveillance measures (resident equipment)
- Proposed fresh and spent fuel verification measures (non-resident NDA equipment)
- Proposed Design Information Verification activities

# 02 Safeguards Measures

## Containment measures

### Identification of containment measures:

- Locations for possible laser curtain use, including wall mounting locations
- Locations for possible safeguards sealing points, accommodating either active or passive seals types



## 02 Safeguards Measures

# Surveillance measures

Identification of surveillance measures:

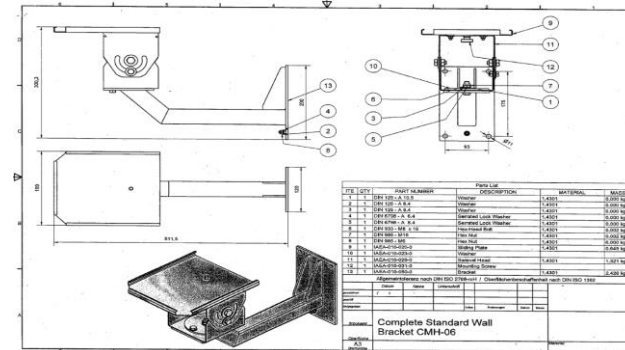
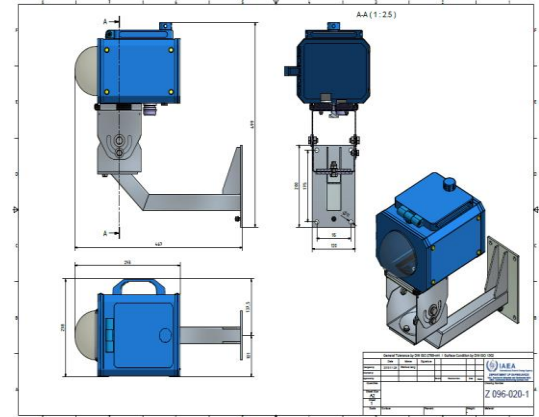
- Mounting locations, power supply, cabling, space requirements for cameras and camera brackets
- Potential locations for temporary systems for use during spent fuel transfers to dry storage
- IAEA supplied specifications for each type of equipment and its housing/brackets (manufacturer, mains and communications requirements, dimensions, weights, drawings)

# 02 Safeguards Measures IAEA statement of work

## Includes:

- Proposed SG measures
- SG systems technical characteristics
- General technical requirements
- Installation related tasks to be performed by the Operator (pulling cables/installing IAEA supplied brackets)
- Testing and acceptance tasks to be performed by the IAEA/Operator

Changes to the detailed design may require an update to the proposed SG measures and to the IAEA statement of work



# 3 Safeguards Technical Report



# Status and contents of the STR

- Draft Safeguards Technical Report (STR) now in finalization stage and provides:
  - **facility details** (e.g. design specifications, nuclear material flows, etc.)
  - a recommended **nuclear material accountancy structure** for nuclear material inventory and flows tailored for the SMART100 design
  - **diversion and misuse scenarios** and documents **SG measures** and activities to address these
- STR will be an IAEA document for internal use by State Evaluation Groups in preparing State Level Approaches

# 4 Conclusion



# 04

Conclusion

## Conclusion for the SMART100 SBD task

- STR for the SMART100 will be the first finalized under the SBD for SMRs task and is a model for future STRs
- Advanced consideration for required safeguards measures reduces risks and costs for both IAEA and for future States operating a SMART100
- STR provides IAEA State Evaluation Groups an early lead in preparing safeguards approaches for customer States
- Incorporation of SG requirements into the detailed design still pending

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**THANK YOU**



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