



Strengthening the 3S Framework in Embarking Countries – Emphasis on Nuclear Non-Proliferation through Technical Preparedness and International Cooperation

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What is the 3S Framework?

- Safety: Protecting people and the environment
- Security: Preventing unauthorized access and sabotage
- Safeguards: Ensuring peaceful use and compliance with non-proliferation treaties



Importance of Non-Proliferation

- Compliance with NPT
- Builds international trust
- Enables access to nuclear technology
- Facilitates international cooperation
- Fulfills State's obligations



Building a National SSAC (State System and accountancy & Control)

- Requirement of INFCIRC-153 (model Comprehensive Safeguards Agreement)
- Legal and regulatory frameworks
- Licensing and reporting systems
- Technical accountancy tools
- SSAC facilitates IAEA safeguards
- Effective and efficient SSAC demonstrates peaceful intent



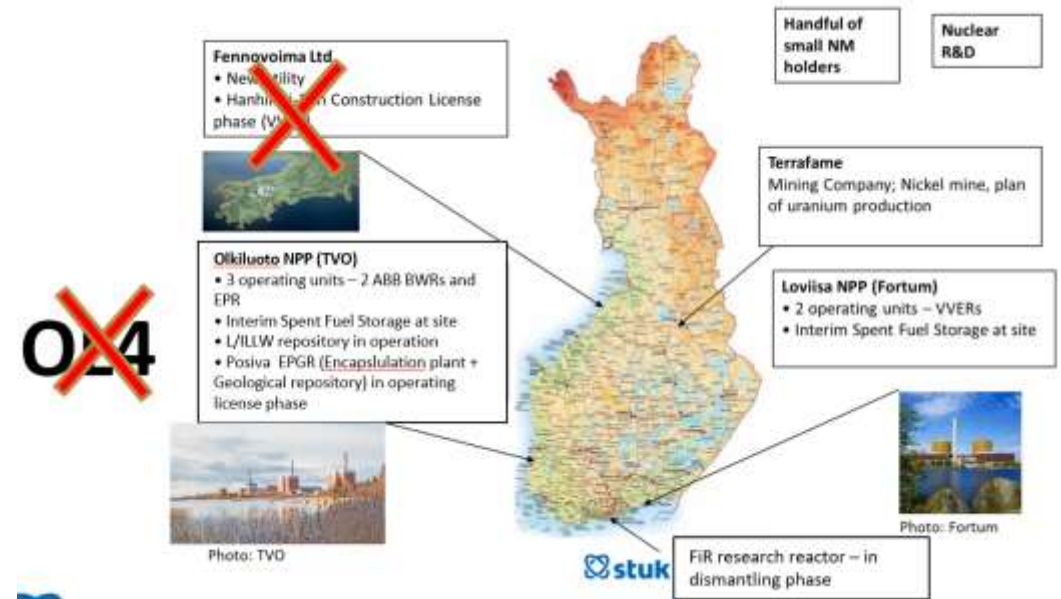
How to Integrate Safeguards Early in NPP Projects?

- Safeguards-by-design principles
 - Hint: include safeguards requirements into the bid
- Design information to IAEA
 - IAEA has a process for this
 - IAEA can start planning safeguards concept
- Verification infrastructure planning
 - Part of SbD process: Plan before you construct.



Lessons from Finland: Why Safeguards-by-Design Matters

- OL3 got construction licence in 2003
- SbD of OL3 faced challenges
 - However, the construction phase took so long that safeguards did not cause any extra delays to the project
 - Yet, costly retrofits had to be done
 - now all is well
- In further projects (OL4, Hanhikivi, Final repository) SbD was taken into account.
- **Key lesson:** The vendor must understand what safeguards requirements are and they must be taken into account in design.
 - Communication with the IAEA is essential



International Cooperation

- IAEA support: training, guidance, benchmarking
- Bilateral and multilateral programs
- Sharing best practices
- Developing 3S-aware workforce



Participants of Training Course on the Implementation of National Requirements for Nuclear Power Programmes - Finland from November 28 - December 2, 2022

Case Africa: Pelindaba treaty & AFCONE

The **Pelindaba Treaty**, formally the **African Nuclear-Weapon-Free Zone Treaty**, is a multilateral agreement that establishes Africa as a **nuclear-weapon-free zone (NWFZ)**.

- Signed: 11 April 1996 in Cairo, Egypt
- Entered into force: 15 July 2009
- Parties: 44 African states (as of now) & 55 signatories
- Named after: Pelindaba, South Africa's nuclear research facility location



Nyamosor Tuya, "NUCLEAR WEAPONS-FREE ZONES IN ASIA", NAPSNet Special Reports, February 08, 2022, <https://nautilus.org/napsnet/napsnet-special-reports/nuclear-weapons-free-zones-in-asia/>

Pelindaba Treaty - Articles

Article 3	• Renunciation of nuclear explosives (Abandonment /rejection)
Article 4	• Prevention of nuclear explosives devices
Article 5	• Prohibition of testing of nuclear explosives devices
Article 6	• Declaration, dismantling, destruction, or conversion of nuclear explosives devices and the facilities for their manufacturer
Article 7	• Prohibition of dumping of radioactive materials
Article 8	• Peaceful nuclear activities
Article 9	• Verification of peaceful uses
Article 10	• Physical protection of nuclear materials and facilities
Article 11	• Prohibition of armed attack on nuclear installations

Case Africa and Pelindaba Treaty:

Obligations to State Parties

- Nuclear disarmament – eliminating of nuclear weapons
- Safety – protect people and environment
- Security – preventing, detecting and responding malicious acts
- Safeguards – technical measures to ensure compliance with International agreements

AFCONE Mandate

- Nuclear Non-Proliferation – preventing the spread
- Nuclear Disarmament – elimination
- Promotion of peaceful application of NS&T
- Promotion of Regional and International Cooperation

AFCONE – Uplifting Safeguards in AFRICA

STUK & AFCONE are implementing a 5 years program to improve Nuclear Safeguards in Africa funded by EU and State of Finland. The program aims to:

- Establish and Strengthen the State Systems of Accounting and Control of Nuclear Material (SSAC)
- Improving reporting under Pelindaba Treaty and Comprehensive Safeguards Agreements (CSA).
- Improve ability of AFCONE, as a regional organization and knowledge hub, to support Pelindaba Treaty State Parties
- Program implementation is strongly supported by the IAEA



Institutional Roles and Responsibilities

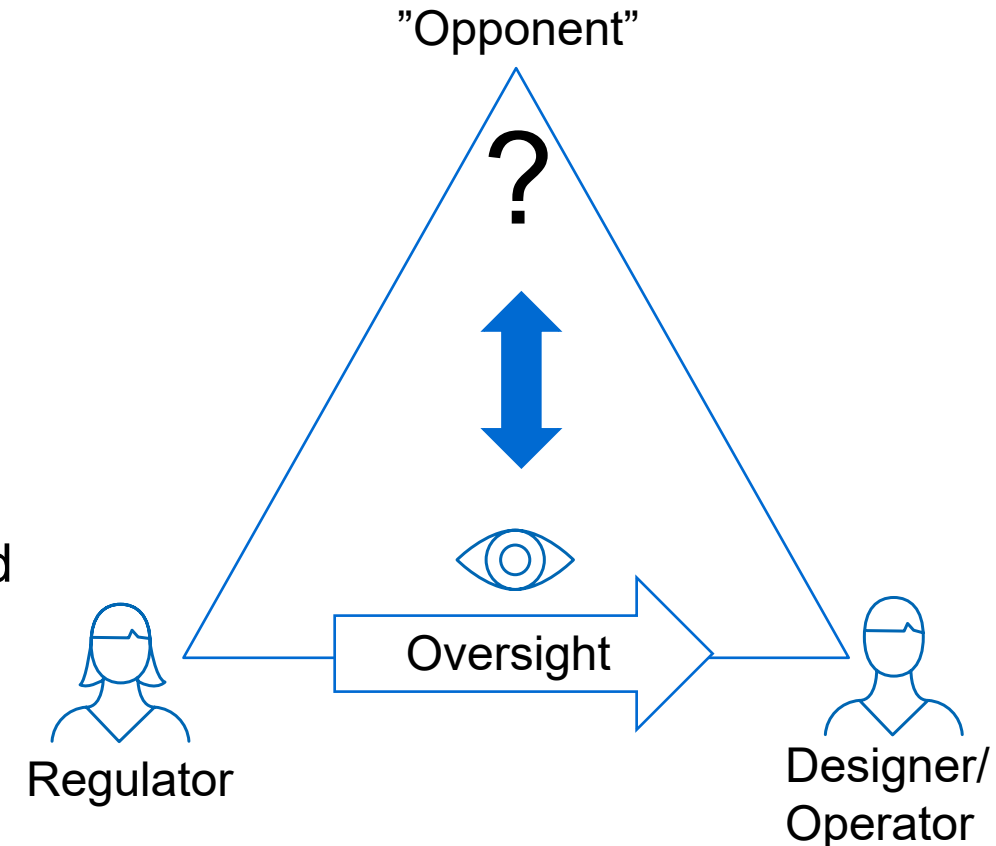
- Regulators, operators, stakeholders
- Clear role definitions
- Technical expertise and resources
- Coordination with international bodies



About regulator-designer/operator interface and roles

- Safety: Regulator oversees that the facility is designed and operated in safe manner
 - "Opponent"(*: Laws of physics. (No flexibility)
- Security: Regulator oversees that the facility is designed and operated in the manner that malicious acts are effectively prevented
 - Opponent : Perpetrator with malicious motives. (No chance for collaboration)
- Safeguards: Regulator oversees that the facility is designed and operated in the manner that IAEA can draw credible conclusions about the peaceful nature of the activity
 - Opponent : **IAEA safeguards department (something you can negotiate and cooperate with!)**

** Opponent is metaphor for describing oversight challenges*



Do not forget import/export control

- Safeguards and export control are like two sides of the same coin.
 - “Export control complements safeguards by ensuring responsible technology transfer
- Nuclear Suppliers Group (NSG) is navigating tensions between **nonproliferation goals** and **equitable access** to peaceful nuclear technology, especially in embarking countries.
- Nuclear transfers to non-nuclear-weapon states must be subject to International Atomic Energy Agency (IAEA) safeguards.
- Licensing authority shall be established



Conclusion

- Strategic safeguards integration
- Sustained international cooperation
- Strong national and regional institutions
- Anchoring in 3S principles ensures peaceful nuclear development



