

Safeguards and Verification

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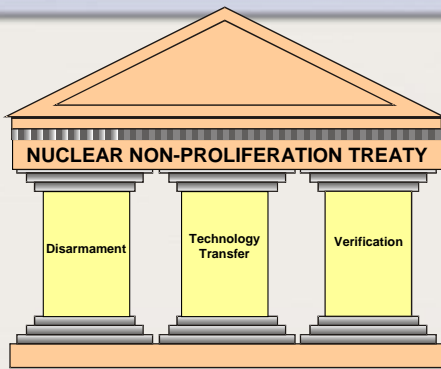
IAEA

International Atomic Energy Agency

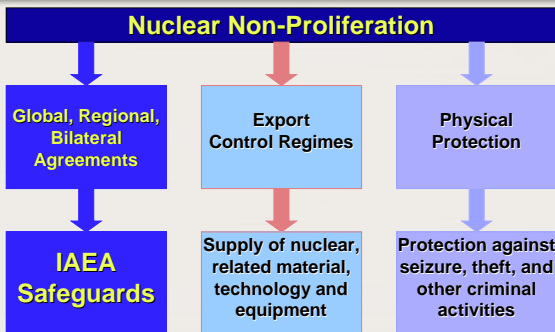
Outline

- What is the role of safeguards in the Non-Proliferation Regime?
- What is the scope of IAEA safeguards?
- How did our work evolve over the years?
- What is needed for an effective verification regime?
- Which technical tools do we have at our disposal?





Nuclear Non-Proliferation: Important Elements



IAEA Safeguards

Technical Mission

- System of technical measures entrusted to the IAEA to ensure that nuclear material and facilities are not used to further any military purpose

But other important elements

- To build confidence between parties
- To deter against non-compliance by risk of timely detection



IAEA Safeguards

“TRUST BUT VERIFY”



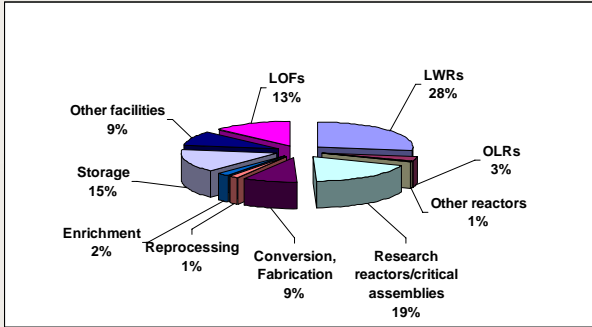
IAEA SG Implementation (2007)

	Total
No. of Facilities/LOFs*	1020
No. of Facilities/LOFs Inspected	605
No. of Person Days Inspection (PDI)	9402

*LOF = Locations Outside Facilities

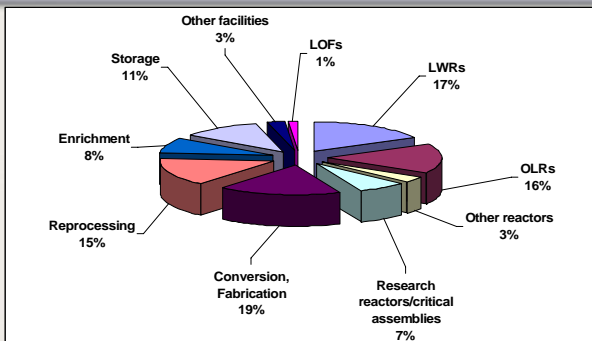


Facilities/LOFs under Safeguards (2007)



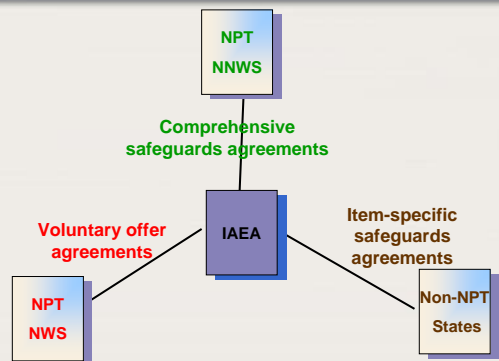
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Inspection Effort (PDI) per Facility Type (2007)



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Types of Safeguards Agreements



CSA Basic Obligations of the State

- Establish a State system of accounting for and control of nuclear material (SSAC)
- Provide information to the Agency
- Facilitate access by the Agency
- Cooperate with the Agency



Traditional Safeguards – Criteria Driven Approach

- Design information examination/verification visits
- Physical inventory verification (PIV)
- Interim inspections for timeliness
- Scheduled inspections for flow verification
- Confirmation of absence of undeclared activities in facilities
- Activities limited to declared nuclear facilities



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Traditional Safeguards

- Focussed on declared facilities and nuclear material
- Correctness of State declarations
- Mechanistic and criteria driven
- Objectives: detect diversion of 1 SQ and absence of undeclared activities at facilities

- Limited detection possibilities of undeclared activities in State
- Lack of complete State picture



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Changing needs 1991-95

- Trigger: Iraq, South Africa, DPRK
- Strengthening measures under existing legal authority
- Additional authority to cover undeclared nuclear material and activities
- Look at State as a whole
- Address the completeness of the State's declaration



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Strengthened Safeguards

- Increased access to information
- Increased access to locations (also beyond nuclear facilities)
- Use of advanced technology (e.g. Environmental Sampling, Remote Monitoring, Satellite Imagery Analysis)
- Enhanced transparency from and cooperation with States
- Holistic approach, State wide, information driven



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Model Protocol Additional to Safeguards Agreements (INFCIRC/540)

- New legal instrument approved by Board of Governors in May 1997.
- Provides Agency with more rights of access to information and to locations in a State.
- As of 23 January 2009, additional protocols (AP) have been approved by the Board for 128 States and 90 States have APs in force.



New Tool: Additional Protocol

- Additional access to information
- Additional access to locations
- Use of other information sources and techniques
- Efficiency measures: visa, communication means, ...



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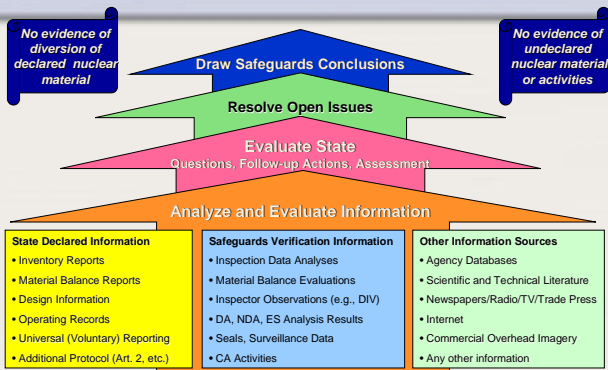
Safeguards Objectives at State level

- Detect undeclared nuclear material and activities (State Level)
- Detect undeclared production or processing of nuclear material (Declared Facilities)
- Detect diversion of declared nuclear material (Declared Facilities)

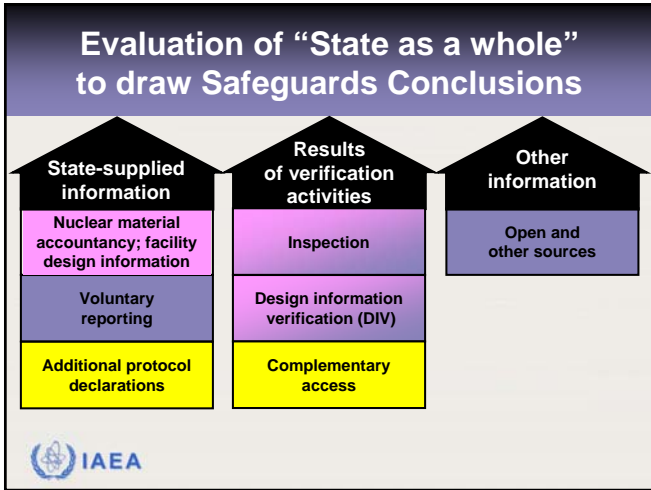


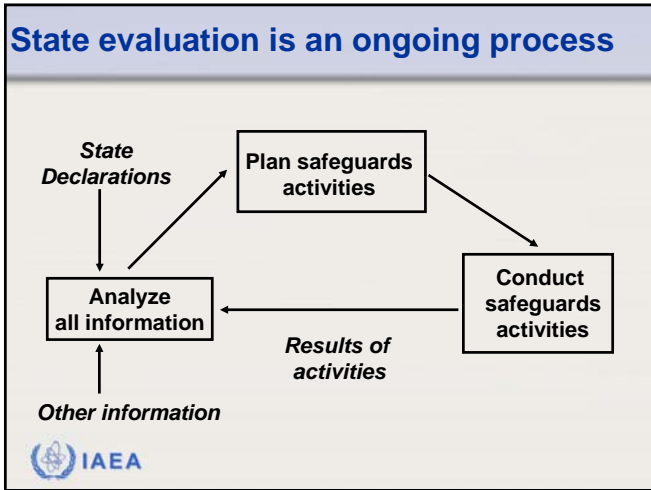
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State Evaluation Process



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- ### IAEA Safeguards has evolved
- From Facility based verification of declared nuclear material
 - To information driven State wide safeguards system
- IAEA

In Conclusion : Effective Nuclear Verification Requires

- Universal adherence to comprehensive safeguards agreements and additional protocols
- State-of-the-art verification technology must be made available
- Wider access to information and places
- Extended legal basis
- Enhanced transparency of and cooperation with States



Our technical toolbox

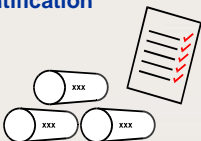


Nuclear Material Accountancy

Records Examination



Item Counting and Identification



Independent Measurements



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Verification of Nuclear Material (1)



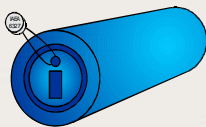
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Verification of Nuclear Material (2)

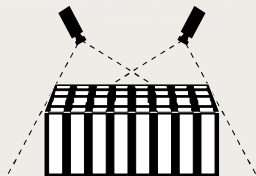


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Containment and Surveillance (C/S)



Seals



Cameras/Video



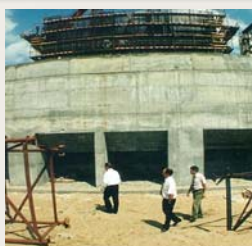
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Application of C/S Measures



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Design Information Verification (DIV)



Design information is verified to ensure that applied safeguards measures are appropriate and to detect misuse of a facility.



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Design Information Verification (DIV)



DIV must be performed prior to plant start-up and continues throughout the plant lifetime

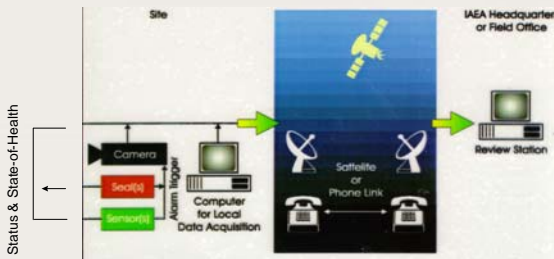


Environmental Sampling Analysis



Every nuclear process, no matter how leak tight, emits small amounts of process material to the environment.

Remote Monitoring System



Satellite Imagery Analysis

