

IAEA Safeguards and implementation in EU countries

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3 September 2026



Overview

- What are IAEA Safeguards?
- History of safeguards
- Key elements of IAEA safeguards
- How the IAEA implements safeguards
- IAEA Safeguards in EU countries
- Safeguards by Design and SMRs

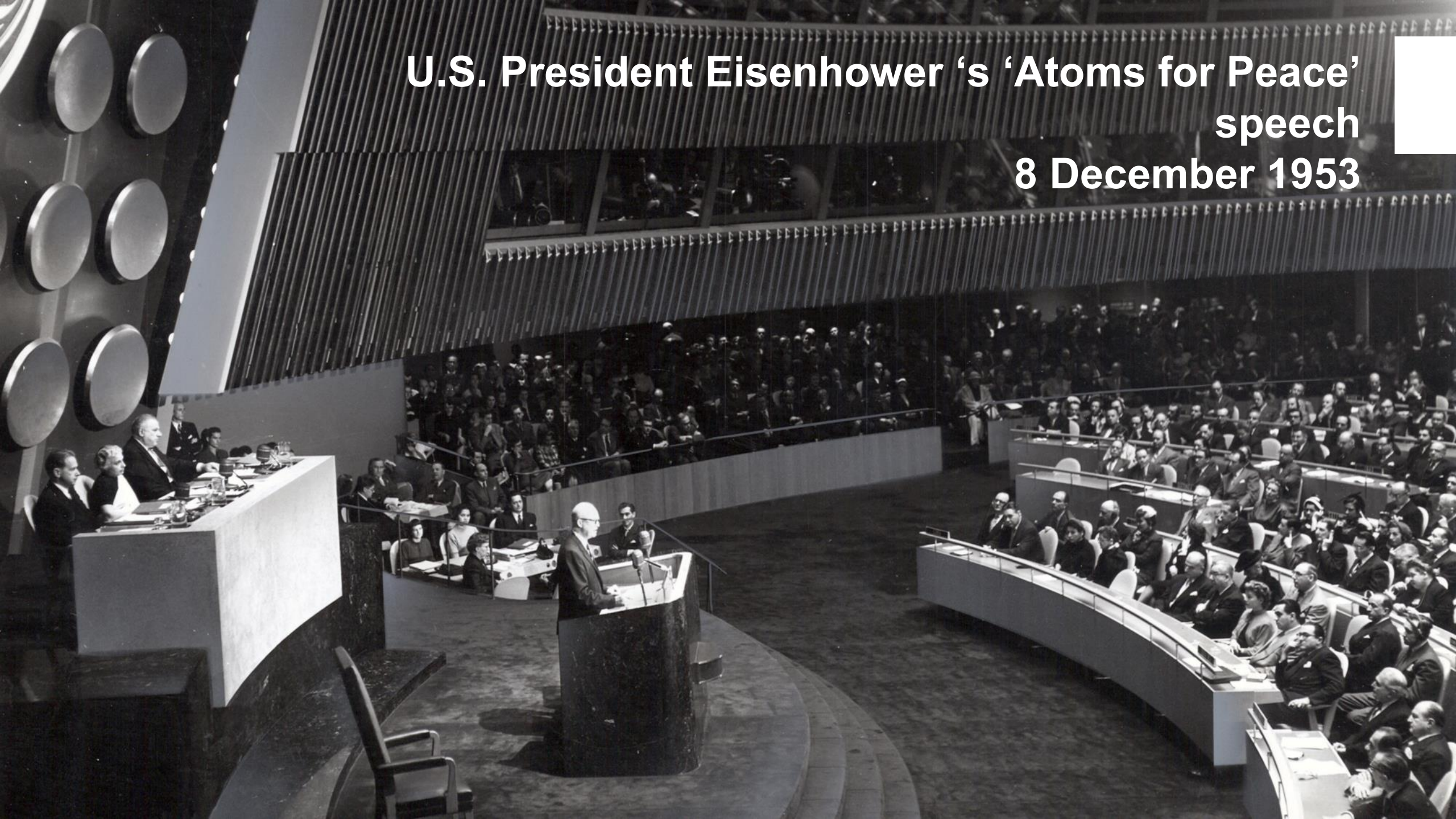
Safeguards - essential to international peace and security

- IAEA Safeguards are a set of **technical measures** applied on nuclear material and activities to independently verify it.
- The purpose of IAEA safeguards is to **deter the spread of nuclear weapons** by early detection of diversion from peaceful use.
- **Independent IAEA verification** provides assurance to the international community that States are fulfilling their commitments concerning the peaceful use of nuclear energy.



History of safeguards

**U.S. President Eisenhower 's 'Atoms for Peace'
speech
8 December 1953**



History of safeguards



IAEA Statute enters into force
Establishes the IAEA as an autonomous international
organization, authorized
“to establish and administer safeguards”

1957

History of safeguards

Comprehensive safeguards agreements:

- 1967: Treaty of Tlatelolco
- 1970: Treaty on the Non-Proliferation of Nuclear Weapons (NPT)
- 1972: INFCIRC/153 (Corrected)

1967-1972



History of safeguards

The IAEA embarks on a programme to strengthen safeguards and improve the Agency's capability to detect undeclared nuclear material and activities

1993-1995



History of safeguards



The Board of Governors
approves the Model
Additional Protocol,
providing **broadier access**
to information and
locations for verification

1997

History of safeguards



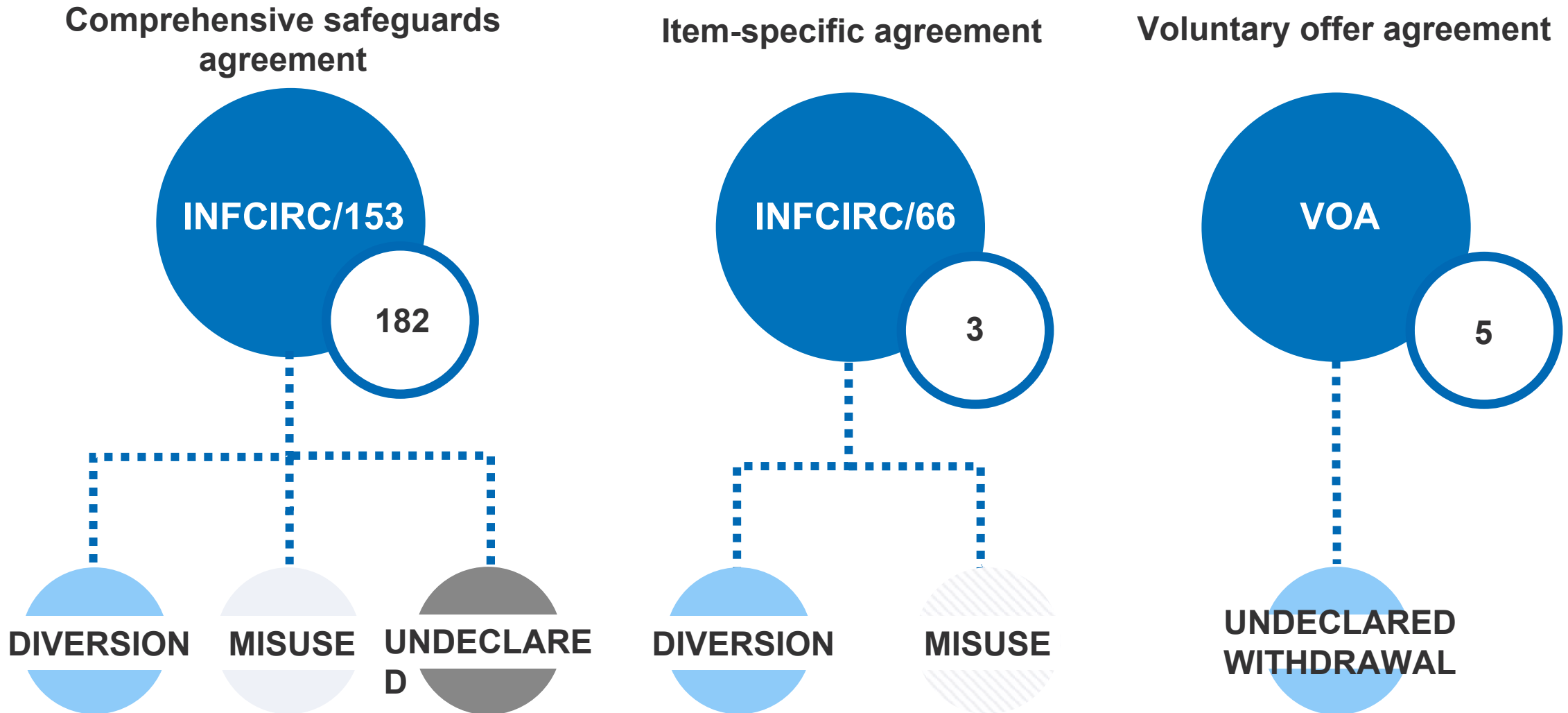
State-level safeguards implementation:

implementing safeguards in a manner that considers a **State's nuclear and nuclear-related activities and capabilities as a whole**, within the scope of the safeguards agreement

1997-today

Key elements of IAEA safeguards

Safeguards agreements: objectives



Additional Protocol (AP)

144

Additional verification measures

- Broader access to **information**
- Broader access to **locations**
- Improved **administrative arrangements**

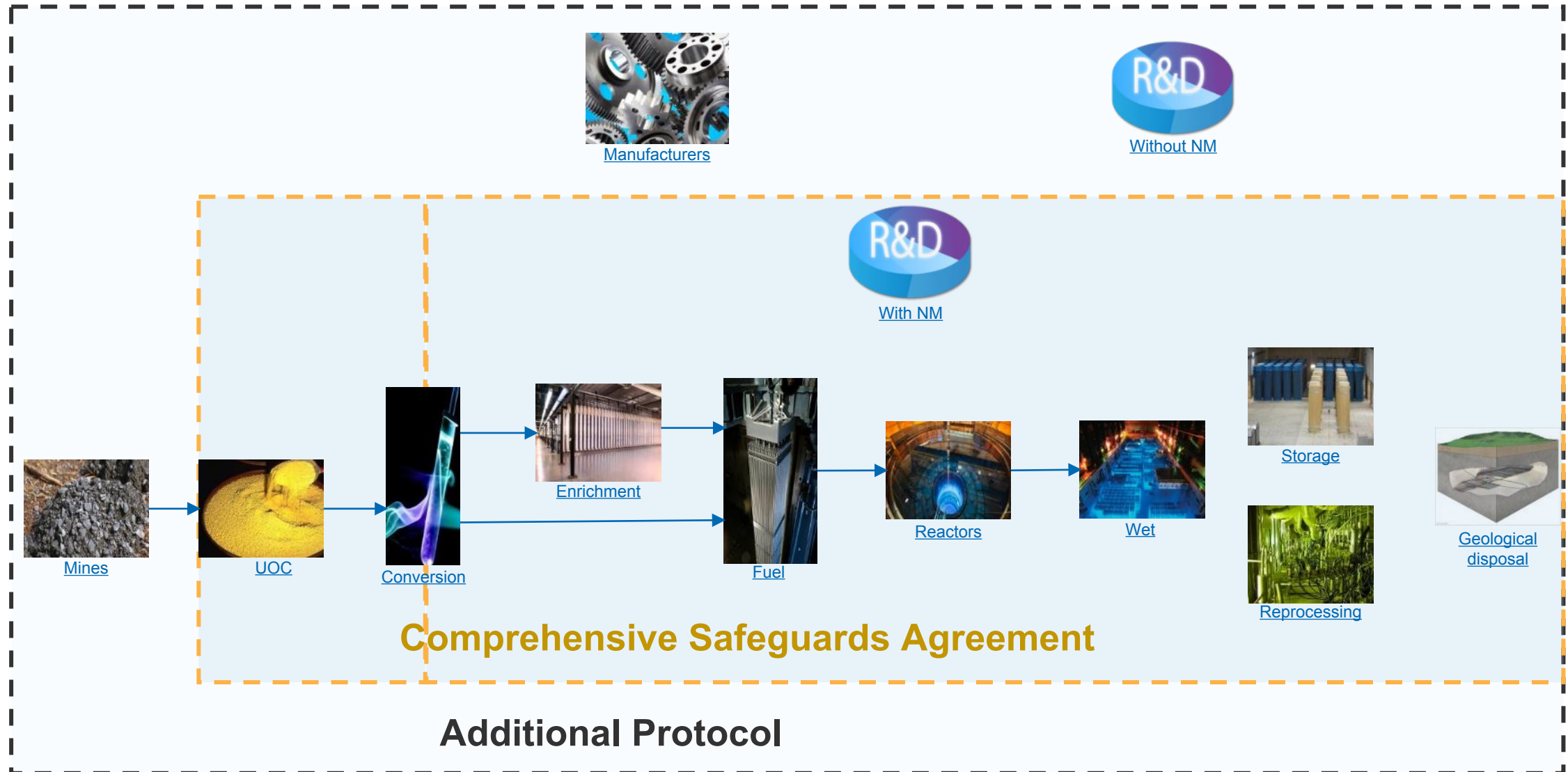
For States with a comprehensive safeguards agreement and an AP, the Agency can provide increased **assurance** regarding the absence of undeclared nuclear material and activities in the State

MODEL PROTOCOL ADDITIONAL TO THE AGREEMENT(S) BETWEEN STATE(S) AND THE INTERNATIONAL ATOMIC ENERGY AGENCY FOR THE APPLICATION OF SAFEGUARDS



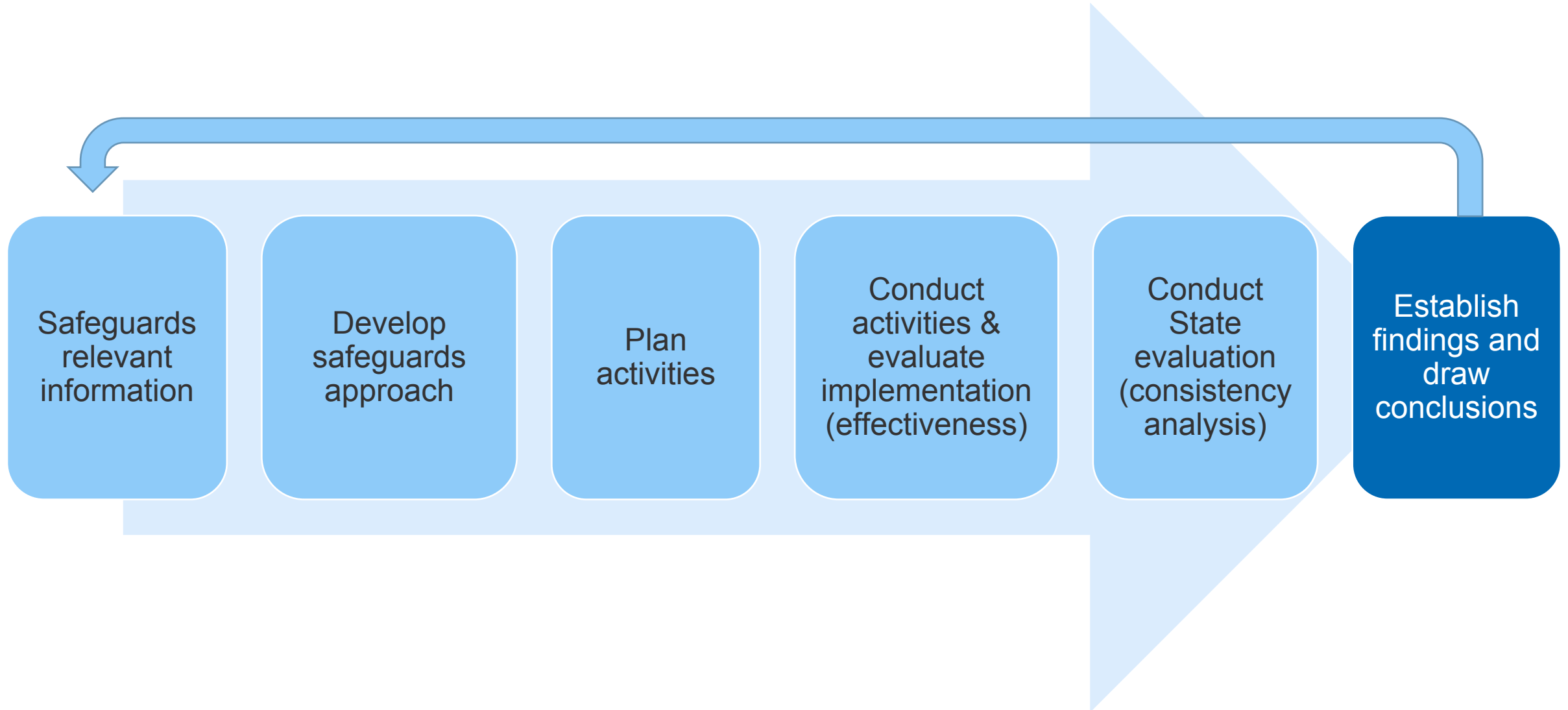
IAEA
International Atomic Energy Agency

Nuclear fuel cycle



How the IAEA implements safeguards

Annual safeguards implementation cycle



Safeguards
relevant
information

Develop
safeguards
approach

Plan activities

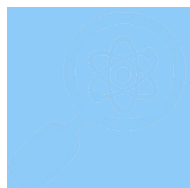
Conduct activities &
evaluate
implementation

Conduct State
evaluation

Findings and
conclusions



State-declared
information



Information
from Agency
verification activities



Other safeguards
relevant information

Processing
and
validation



Safeguards
relevant
information

Develop
safeguards
approach

Plan and
conduct all
activities

Evaluate
implementation

Conduct State
evaluation

Findings and
conclusions

- **Customised approach to implementing safeguards for a State** within the scope of the State's safeguards agreement
- Consists of safeguards' **technical objectives** and applicable **measures** to be implemented in the field and at headquarters



Safeguards
relevant
information

Develop
safeguards
approach

Plan and
conduct all
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Evaluate
implementation

Conduct State
evaluation

Findings and
conclusions

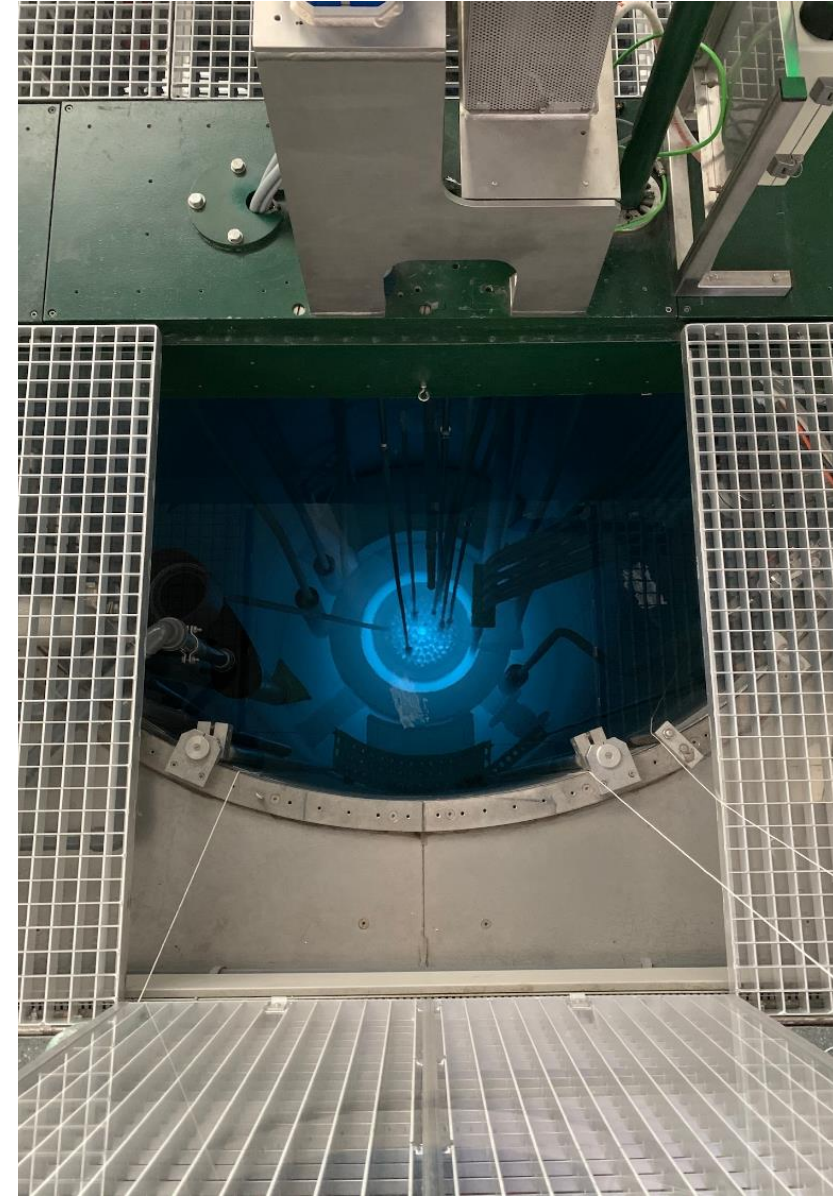
- **Safeguards activities** conducted in the field and at headquarters are planned to address the established technical objectives.
- **Intensity and frequency** of activities are determined by the Agency, in accordance with State-specific factors



Where do inspectors travel to?

Inspectors travel across the world to places such as:

- Power reactors
- Storage facilities
- Research reactors and critical assemblies
- Conversion plants
- Enrichment plants
- Fuel fabrication plants
- Reprocessing plants



Equipment for inspections

Equipping inspectors and facilities with the appropriate tools is key to effective safeguards implementation. IAEA inspectors use several types of equipment to verify nuclear material.



Surveillance cameras



Seals



Digital cameras or a laser-based system



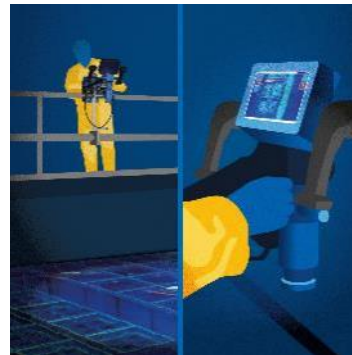
Environmental swipe sample kits



Destructive analysis vials



Portable surface radiation monitors



Next generation Cerenkov viewing device



Spectrometric gamma hand-held monitor



Personal protective equipment

Safeguards
relevant
information

Develop
safeguards
approach

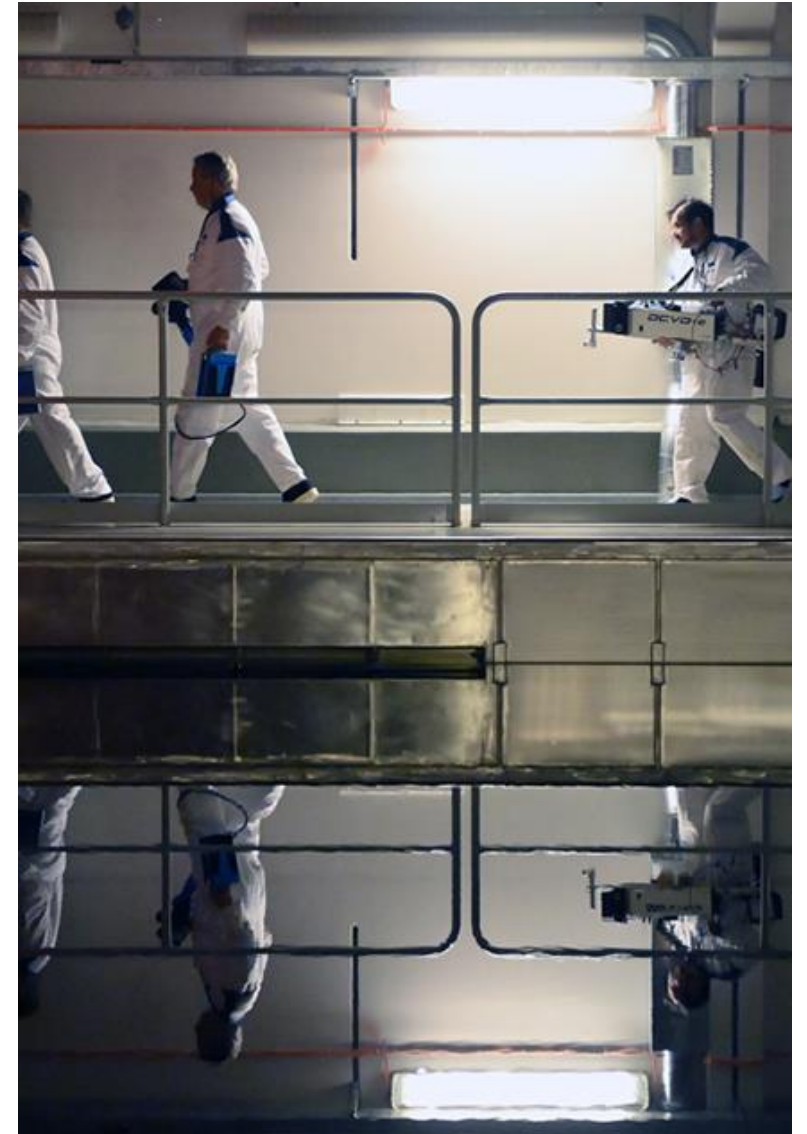
Plan and
conduct all
activities

Evaluate
implementation

Conduct State
evaluation

Findings and
conclusions

- ✓ All planned activities conducted in relevant timeframe?
- ✓ Verification objectives met?



Safeguards
relevant
information

Develop
safeguards
approach

Plan and
conduct all
activities

Evaluate
implementation

Conduct State
evaluation

Findings and
conclusions

- ✓ Consistency of safeguards relevant information
- ✓ Identifying follow-up activities
- ✓ Clarifying and resolving issues



Satellite imagery analysis

Safeguards
relevant
information

Develop
safeguards
approach

Plan activities

Conduct activities &
evaluate
implementation

Conduct State
evaluation

Findings and
conclusions

- Safeguards findings and conclusions are presented in the annual **Safeguards Implementation Report**
- Findings and conclusions are based upon an **evaluation of all safeguards relevant information** available to the Agency in exercising its rights and fulfilling its safeguards obligations for that year



2025



safeguards
implemented in
190 States of
which
144 States had
additional
protocols in force



1,406

nuclear facilities & locations
outside facilities under
safeguards



Offices

HQ Vienna, laboratories in
Seibersdorf, regional
offices in Canada & Japan

246,805

significant quantities of
nuclear material under
safeguards



791

staff
from 96
countries

2025



1,141

non-destructive assay
systems assembled



169

facilities with remote
monitoring systems



933

nuclear material &
environmental samples
collected



24,800

seals verified



2,899

in-field verifications
involving

14,132 days



1,387

Agency surveillance
cameras at nuclear
facilities

IAEA Safeguards implementation in EU countries

- Euratom is a community established under the Euratom Treaty (1958).
- Multilateral safeguards agreement INFCIRC/193 between Euratom, the IAEA and 26 non-nuclear weapon Member States (1978)
- The IAEA and EURATOM implements Safeguards through a partnership approach that provides for joint inspections with the objective to minimize duplication of activities.



IAEA Safeguards by Design (SBD)

SBD is the **early consideration** of safeguards technical measures in the **design process** of nuclear facilities

Collaborative risk management between the State, the IAEA, and the reactor vendor

Best practice, initiated by the technology holder/State



Safeguards by Design: *collaborative risk management*

Desired Outcomes of SBD

- Reduced risk to scope, schedule, budget, and licensing
- Reduced operator burden
- Reduced need for retrofitting
- Facilitation of joint or duplicate use equipment



Safeguards by Design: *collaborative risk management*

IAEA and technology holder engagement

- Most engagements take place through the framework of Member State Support Programmes (MSSP)
- Current MSSP tasks: Russia, RoK, US, Canada, Finland, France, China, UK, Belgium, Sweden
- Technologies include Floating Nuclear Power Plants, Transportable Nuclear Power Plants, integral PWR, Molten Salt Reactors, Pebble Bed-High Temperature Reactors, microreactors



Safeguards by Design: *collaborative risk management*

SBD Challenges and related actions

- In order for SBD to be implemented, vendors and technology holders must have the information and incentive to consider safeguards in their engineering design process
- Existing SBD guidance is only partially applicable to most advanced reactor designs
- The IAEA is developing new model safeguards approaches and new SBD guidance to address advanced reactor designs such as molten salt, pebble bed, and fast breeder reactors



Safeguards by Design: *collaborative risk management*



Thank you

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