

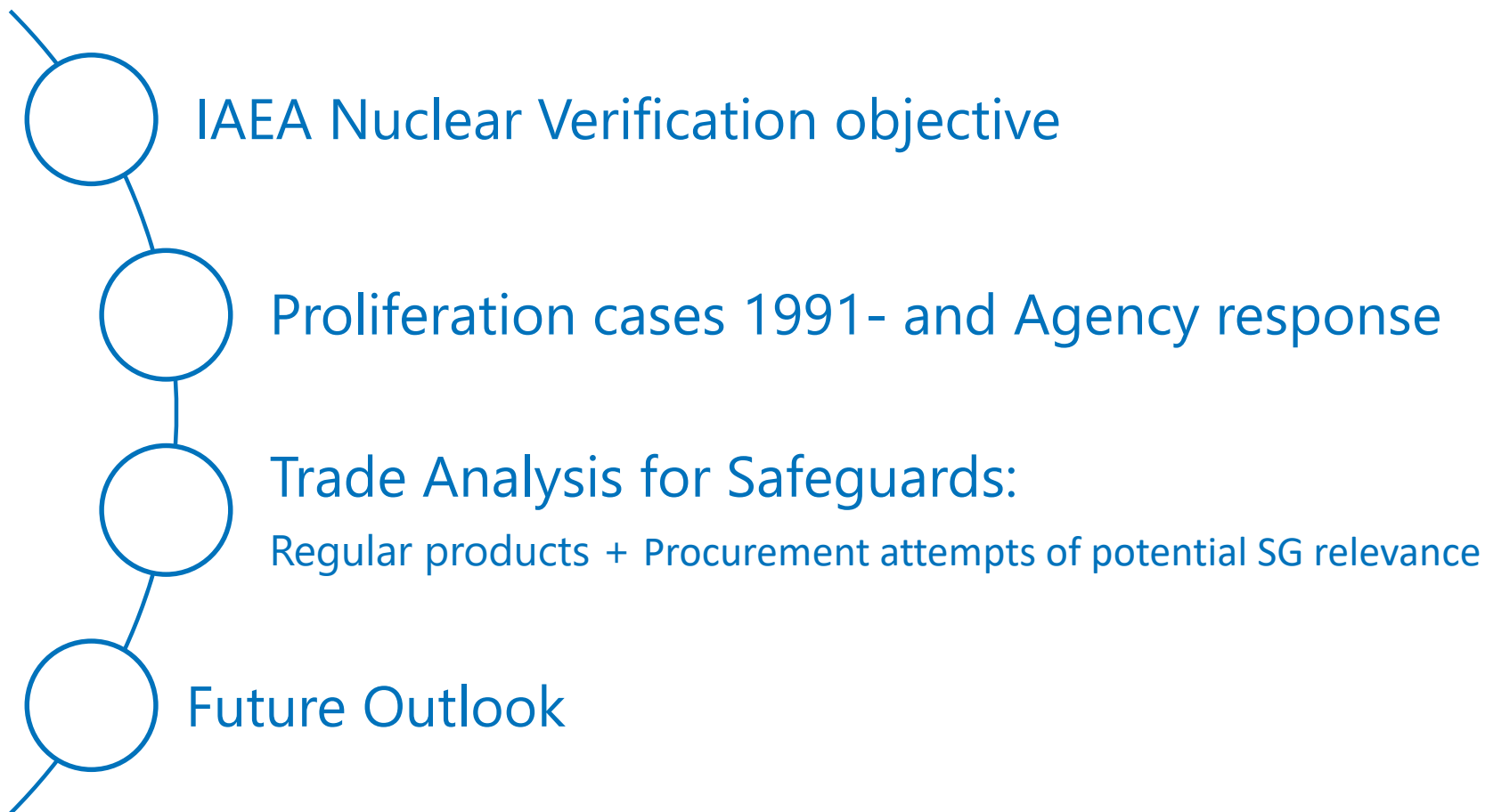
# Responding to Verification Challenges Caused by Increasing Nuclear-Related Trade

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M. Ardhammar, J. Baute, M. Tarvainen | 2018-11-06

# Outline

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# IAEA Nuclear Verification Objective

## IAEA safeguards objective:

- **Deter the proliferation** of nuclear weapons, by **detecting early the misuse of nuclear material or technology**, and by providing credible assurances that States are honoring their safeguards obligations: *to declare and allow the IAEA to verify all nuclear material in all peaceful activities (CSA)*

## Therefore, be able to detect early:

- **Diversion** of declared material, or **undeclared activities at declared nuclear facilities** >> Are States' declarations *correct*?
- Indicators of **undeclared nuclear material or activities** anywhere in the State >> Are States' declarations *complete*?



# Safeguards State Evaluation

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## Are the State's declarations correct?

- All declared NM verified?
- ✓ Non-diversion
- All declared nuclear activities as stated?
- ✓ No misuse

Sources/tools: analysis of State declarations, inspection and HQ results

## Are the State's declarations complete?

- No indications of undeclared NM? (anywhere in State)
- No indications of undeclared nuclear activities? (anywhere)
- ✓ No undeclared NM or activities

Sources/tools: analysis of all other SG-relevant information; e.g. nuclear-relevant R&D, patents, satellite imagery, trade and industry

# Safeguards-relevant information

- Information provided by the State
  - E.g. declarations, reports, other information
- Information from IAEA safeguards activities in the field and at Headquarters
  - E.g. inspections, design information verification, material balance evaluation
- Open source information
  - Including S&T publications, imagery, and **trade-related information**
  - Any other safeguards relevant information, including on **nuclear-related procurement**



**Irradiation and Cooling Process Effects on Material Barrier Analysis**  
 Based on Preliminary Comparison of DRE  
 Sub-Parameter: 'Material: Acid Waste, Gas Stack, Venturi  
 and Material Support'  
 The main purpose of this study is to assess the effects of irradiation and cooling processes on the material balance system (MBS) of the DRE. The study is based on a comparison of the results of the MBS analysis performed by the IAEA and the results of the MBS analysis performed by the DRE. The study is based on a comparison of the results of the MBS analysis performed by the IAEA and the results of the MBS analysis performed by the DRE. The study is based on a comparison of the results of the MBS analysis performed by the IAEA and the results of the MBS analysis performed by the DRE.



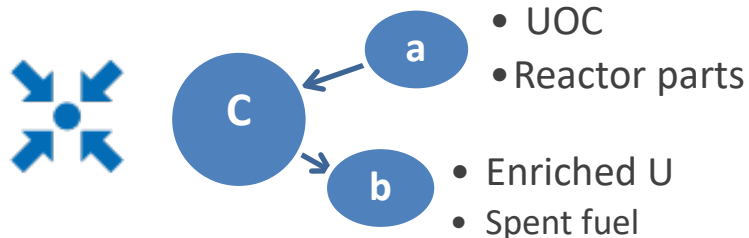
# Proliferation cases 1991- & Agency response

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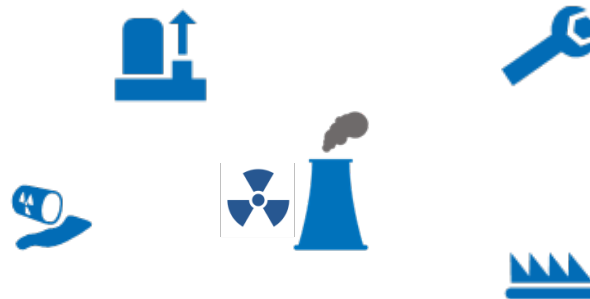
- ✓ **Undeclared nuclear activities/material** revealed in:  
Iraq (1991), DPRK (1992), Iran (2002), Libya (2003), Syria (2009)
- ✓ **Common elements to all cases:** Covert facilities, covert imports of **nuclear-relevant products**; IAEA tools limited to **CSA**
- ✓ **Response: Model Additional Protocol (1997) +** enhanced analysis of **all SG-relevant information**, including on **trade & procurement**

# Trade Analysis for Safeguards:

Regular analysis products



Analysis of safeguards-relevant trade flows



Nuclear-relevant industrial infrastructure review



Nuclear-relevant technical cooperation review



State export control assessments

# Trade Analysis for Safeguards:

Procurement attempts of potential SG relevance



- ✓ Traces are left behind by those trying to covertly acquire nuclear-related goods

Few traces in open sources: tenders, interdictions, court cases

- ✓ Information from places where traces might be found

Bilateral voluntary arrangements with **Member States and selected companies with products relevant to nuclear activities**

- ✓ Voluntary contributions from Member States and industry

**Endorsed by Member States** in each General Conference Safeguards resolution **since 2005 – GC(49)/RES/13**






# Trade Analysis for Safeguards:

Procurement attempts of potential SG relevance



## IAEA Procurement Outreach Programme

Collect and analyse information on stopped exports and unfulfilled procurement requests:

-  From primary sources
-  Nuclear-related goods/services
-  "Industry knows first"

## A fully voluntary programme

No obligation; no impact on verification in the participating Member State

Aimed at tracing covert procurement and potential indicators of undeclared nuclear activities



**Ultimately to identify early warnings of nuclear proliferation**

# Future outlook

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## Challenges:

- ✓ Increasing trade & evolving trading patterns
- ✓ Proliferators adapting in response to non-proliferation measures
- ✓ 'Disruptive' technologies
- ✓ Budget squeeze for Agency and counterparts

## Opportunities:

- ✓ Increasing trade data availability
- ✓ Improved tools for trade data analysis and visualization
- ✓ Cooperation synergies
- ✓ Increased willingness from Member States and others to support trade analysis for SG

## Possibilities (contingent on resources):

- ✓ Enhancing Member States' engagement in addressing the complex future
- ✓ Seeking further external partnerships (organisations with similar mandate, NGOs ...)

# Thank you - Current and future support

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UK Support Programme to IAEA Safeguards

EC Support Programme to IAEA Safeguards

GER Support Programme to IAEA Safeguards

HUN Support Programme to IAEA Safeguards

US Support Programme to IAEA Safeguards

Project Alpha, King's College London

Carnegie Corporation of New York

Vienna Center for Disarmament and Nonproliferation (VCDNP)

+ All current and future partners to the IAEA Procurement Outreach Programme