Nuclear Trade: Export /Import Control of specified Non Nuclear Material and equipment

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Tye Blackburn
Pacific Northwest National Laboratory
Additional Protocols and Export Controls
Summary of Interactions and Implications

- Significant opportunities for Additional Protocols and export controls to be mutually reinforcing.
  - The obvious: export controls facilitate AP export/import reporting
    - Export licensing requirements naturally result in collection of much of the data needed for the export/import reporting requirements of the AP.
  - The less obvious: the AP facilitates effective export control, too
    - The enterprises subject to Complementary Access inspections, especially those identified and declared as engaging in Annex I activities, are the very same enterprises that must have robust export control compliance programs
    - Government outreach initiatives to enterprises in preparation for Complementary Access inspections provide excellent opportunities to strengthen export control awareness and compliance
    - Enterprises may need to utilize managed access provisions to prevent the inadvertent transfer of export controlled technology during Complementary Access inspections
Outline

- Review of AP Import/Export Reporting Requirements
- Outreach to enterprises
- Controlling technology transfers through managed access
Export Control and Safeguards have always been intimately linked

- NPT Article III.2: “Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) equipment or material especially designed or prepared for the processing, use or production of special fissionable material, to any non-nuclear-weapon State for peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this article.”

- NPT Exporters (Zangger) Committee clarified the meaning of this by publishing the Zangger Trigger List

The Zangger Trigger List (INFCIRC/209), the NSG Trigger List (INFCIRC/254), and the AP Annex II list (INFCIRC/540) are essentially similar. These items should already be controlled by any NPT signatory.
The AP Import/Export Reporting Requirements pertain to:
- Certain source material – Article 2.a.(vi)
- Specified equipment and non-nuclear materials – Article 2.a.(ix)

The AP reporting requirements are additional to the requirements that already exist under the Comprehensive Safeguards Arrangement-CSA (INFCIRC 153).
Certain Source Material

- The CSA already requires reporting related to source material intended for or suitable for nuclear purposes.

- The AP deals with information regarding holdings, exports and imports of source material which is for specifically non-nuclear purposes and that has not reached the composition and purity suitable for fuel fabrication or for being isotopically enriched.
  - Source material definition in AP Article 18h complements Article 34 of INFCIRC/153.
  - Source material means:
    - Natural U, Depleted U, Thorium
    - Not ore; not ore residue
  - Unsuitable for enrichment or fuel fabrication means:
    - Not UF6 feed to enrichment or UO2 feed to fuel fabrication (which is already reported under 34c)
    - Examples: UO3, UF4
  - For non-nuclear purposes
    - Source material for nuclear purposes is already reported under 34c.
Reporting of Certain Source Material

- **Exports of large quantities**
  - >10 metric tons U (single export or total for same State/year)
  - >20 metric tons Th (single export or total for same State/year)

- Must report:
  - Quantities
  - Chemical composition
  - Destination

- **Imports of large quantities**
  - >10 metric tons U (single export or total for same year)
  - >20 metric tons Th (single export or total for same year)

- **Must report:**
  - Quantities
  - Chemical composition
  - Current location
  - Use or intended use
Reporting of Certain Source Material (cont’d)

## Highly Sensitive Safeguards Confidential Information

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<thead>
<tr>
<th>Name of State (or Party):</th>
<th>Rusitania</th>
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<tbody>
<tr>
<td>Safeguards Agreement INFCIRC:</td>
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<td>Protocol Article:</td>
<td>2a(vi)</td>
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<tr>
<td>Declaration Number:</td>
<td>20</td>
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<tr>
<td>Declaration Date:</td>
<td>2002-04-11</td>
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<tr>
<td>Declaration Period:</td>
<td>2001-05-01 through 2001-12-31</td>
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<tr>
<td>Comment:</td>
<td>Format of declarations for Article 2a(vi) (the first update with example entries) (Article 2a(vi) consists of three parts, (a), (b) and (c), and a separate declaration format, designated Parts (a), (b) and (c) should be used for each. The three parts should have a common header and a common Declaration number)</td>
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### Part(a) - Exports

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<th>Entry</th>
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<th>Destination</th>
<th>Interim Destination(s)</th>
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<th>Quantity (tonnes of element: U or Th)</th>
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### Part(b) - Imports

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<th>Entry</th>
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<th>Quantity (tonnes of element: U or Th)</th>
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Reporting of Certain Source Material (cont’d)

• Due date:
  - First full report due 180 days after Entry Into Force
  - Annual reports due May 15
  - Covers previous calendar year

• References:
  - Exports: Additional Protocol (AP) Article 2.a(vi)(b)
  - Imports: AP Article 2.a(vi)(c)
Specified Equipment and Non-nuclear Material

- **Listed in AP Annex II**
  - Reactors and major equipment
  - Non-nuclear material for reactors
    - *deuterium, heavy water, and nuclear-grade graphite*
  - Reprocessing plants and especially designed or prepared (EDP) equipment
  - Enrichment plants and EDP equipment
  - Heavy water production plants and EDP equipment
  - Conversion plants and EDP equipment
  - Fuel fabrication plants

- **Especially designed for nuclear use**
  - Not “dual-use” equipment (INFCIRC/254 Part 2)
Nuclear reactors and especially designed or prepared equipment and components therefor

- Complete nuclear reactors
- Nuclear reactor vessels (includes internals)
- Nuclear reactor fuel charging and discharging machines
- Nuclear reactor control rods
- Nuclear reactor pressure tubes
- Zirconium tubes
- Primary coolant pumps
Non-nuclear material for reactors

- **Deuterium and heavy water**
  - ratio of deuterium to hydrogen atoms exceeds 1:5000
  - for use in a nuclear reactor
  - quantities exceeding 200 kg of deuterium atoms for any one recipient country in any period of 12 months

- **Nuclear Grade Graphite**
  - quantities exceeding $3 \times 10^4$ kg (30 metric tons) for any one recipient country in any period of 12 months
Plants for the reprocessing of irradiated fuel elements, and equipment especially designed or prepared therefore

- Irradiated fuel element chopping machines
- Dissolvers
- Solvent Extractors and solvent extraction equipment
- Chemical holding or storage vessels
Plants for the fabrication of fuel elements

- Equipment which comes in direct contact with, or directly processes, or controls the production flow of nuclear material or
- Which seals the nuclear material within the cladding
Enrichment Plants and especially designed or prepared systems, equipment, and components

- Gas centrifuge…
- Gaseous diffusion…
- Aerodynamic…
- Chemical or ion exchange…
- Laser…
- Plasma…
- Electromagnetic…
Plants for the production of heavy water, deuterium and deuterium compounds…

- Water - Hydrogen Sulphide Exchange Towers
- Blowers and Compressors
- Ammonia-Hydrogen Exchange Towers
- Tower Internals and Stage Pumps
- Ammonia Crackers
- Infrared Absorption Analyzers
- Catalytic Burners
Especially designed or prepared systems for uranium conversion…

- Reporting requirement applies to "especially designed or prepared systems" for various conversion processes.
  - It does not actually itemize equipment.

- Some of the equipment required includes
  - Reaction vessels (reactors)
  - Furnaces
  - Purification and collection equipment (liquid-liquid extraction columns, sublimation stills, filters, hoppers, etc.)
  - Ancillary equipment (heat exchangers, gas metering equipment, powder handling equipment, etc.)
**Report Specified Equipment and Non-nuclear Material**

### Exports
- Must report:
  - Identity
  - Quantity
  - Location of intended use
  - Date of export
  - Already done by some States under voluntary reporting
- **Due date**
  - 60 days after end of each quarter
- **Reference**
  - AP Article 2.a(ix)(a)

### Imports
- There is no requirement to report imports, except upon Agency request
- **Must confirm:**
  - Identity
  - Quantity
  - Location of intended use
  - Date of export/import
- **Due date**
  - 60 days after IAEA request
- **References:**
  - AP Article 2.a(ix)(b)
### Highly Sensitive Safeguards Confidential Information

**Name of State (or Party):** Exportania  
**Safeguards Agreement INFCIRC:** WXY  
**Declaration Number:** 24  
**Declaration Period:** 2001-04-01 through 2001-06-30  
**Comment:** Format of declarations for Article 2.a(ix) (a quarterly declaration with example entries) (The format provided should be used for submission of the Article 2.a(ix)(a) declarations on exports. The header provided here should also be used for the response to each Agency request, pursuant to Article 2.a(ix)(b), for confirmation of receipt of a particular export declared to the Agency by another State, together with the appropriate confirmation or non-confirmation)

#### Part(a) - Exports

<table>
<thead>
<tr>
<th>Entry</th>
<th>Reference</th>
<th>Annex II Paragraph</th>
<th>Identity of Specific Item(s)</th>
<th>Quantity (no. or wt.)</th>
<th>Location of Intended Use</th>
<th>Export Date</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>2.2</td>
<td></td>
<td>Nuclear grade graphite, less than 4 ppm boron equivalent; 1.63 g cm³ density; produced by United Carbon, Inc., 401 East Columbia Street, EX-220, Carbondale, Exportania</td>
<td>34 t</td>
<td>Western reactor Products, 44 South Place, R-2287 Centerville, Ruritania</td>
<td>2001-06-01</td>
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#### Part(b) - Imports

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<thead>
<tr>
<th>Entry</th>
<th>Reference</th>
<th>Annex II Paragraph</th>
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<th>Quantity (no. or wt.)</th>
<th>Location of Intended Use</th>
<th>Import Date</th>
<th>Comments</th>
</tr>
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</table>
What Is Needed to Meet AP Export/Import Requirements?

- National law and regulations
  - Legislation authorizing government to collect declarations and require IAEA access
    - Many countries already require export licenses, so basic laws and regulations may be in place
    - Information on all reportable exports/imports
  - Timing must be sufficient to meet AP requirements
  - Regulations requiring government and private sector to report
  - Regulations on IAEA access
    - Require locations of imported Annex II items to permit IAEA access

- System for tracking and reporting information
  - Identify State authority for receiving information
  - Establish government process for approving information and reporting to IAEA, for example
  - The Agency has developed a Protocol Reporter program to assist States in maintaining the information required under the Additional Protocol and reporting it to the Agency

- Commodity Identification Training can help to make lists like AP Annex II more accessible and practicable
Commodity Identification Training

• **Purpose**
  - To personnel associated with enforcing or implementing export controls, with WMD-related materials and equipment as identified on the control lists
  - To familiarize licensing personnel with the items and their civil and WMD uses
Outline

• Review of AP Import/Export Reporting Requirements
Outreach to Enterprises

- AP requires States to identify locations not traditionally subject to safeguards, that are highly significant from an export control perspective, such as
  - Locations of **Annex I activities**
    i. The manufacture of *centrifuge rotor tubes* or the assembly of *gas centrifuges*.
    ii. The manufacture of *diffusion barriers*.
    iii. The manufacture or assembly of *laser-based systems*.
    iv. The manufacture or assembly of *electromagnetic isotope separators*.
    v. The manufacture or assembly of *columns or extraction equipment*.
    vi. The manufacture of *aerodynamic separation nozzles or vortex tubes*.
    vii. The manufacture or assembly of *uranium plasma generation systems*.
    viii. The manufacture of *zirconium tubes*.
    ix. The manufacture or upgrading of *heavy water or deuterium*.
    x. The manufacture of *nuclear grade graphite*.
    xi. The manufacture of *flasks for irradiated fuel*.
    xii. The manufacture of *reactor control rods*.
    xiii. The manufacture of *criticality safe tanks and vessels*.
    xiv. The manufacture of *irradiated fuel element chopping machines*.
    xv. The construction of *hot cells*.
  - Locations of **imported Annex II items**
Outreach to Enterprises

• Enterprises and the individuals within them are on the front lines, dealing directly with potentially illicit procurement attempts and interacting with foreign collaborators. Their awareness, vigilance, and export control compliance is critical to the overall effectiveness of a State’s export control system.

• The AP Annex I and Annex II locations are especially important as they work with commodities and technologies functionally related to the nuclear fuel cycle.

• Since these locations have not traditionally been subject to safeguards inspections, States implementing the AP have found it essential to conduct outreach to prepare them, offering the State an excellent opportunity to conduct export control outreach as well.
Managed access and export controls

- Export controls generally apply not only to commodities, but also to technology for their development, production, or use.
- IAEA complementary access under the AP could result in inadvertent exports of technology to inspectors, and hence their home countries.
- The AP provides for “Managed Access” of inspections to prevent the disclosure of:
  - Sensitive information
  - Proprietary information
  - Export controlled technology
- Managed access permits:
  - Shrouding sensitive displays and equipment unrelated to the inspection
  - Turning off computers and data indicators/loggers
  - Removing sensitive papers
  - Selecting access routes
  - Ceasing sensitive operations and removing employees from area
  - Restricting IAEA verification measures to those relevant to inspection purposes
Conclusion

• Export/Import requirements are not extensive
  - May need to revise some national regulations
  - Need to implement secure reporting system
• Export Licensing facilitates AP export/import reporting
• Government outreach to key enterprises/locations is essential for both AP and export control
• Commodity Identification Training can help familiarize personnel with lists like AP Annex II
• Universality is the goal