Abstract:
Export control of dual use goods developed since the early 70’s to counter nuclear proliferation.
The paper provides an overview of dual-use export control issues also in relation with the Additional Protocol
to the Comprehensive Safeguards Agreement, which requires States to provide declarations of the export of
the controlled items listed in its Annex II, derived from the Nuclear Suppliers Group Trigger list. Recommendations for improvement are proposed.

On the EU level, the paper summarises the framework set by the European Council Regulation 428/2009,
requiring Member States to impose control on exports, brokering and transit of dual use goods. The
Regulation includes the so-called “EU dual-use control list” integrating the lists of dual-use items defined by
the international regimes and requires also the control on intangible technology transfers as foreseen by UN
Security Council Resolution 1540.

ESARDA has recently launched a new sub-Working Group on export control, which raised large interest and
may evolve to a full-fledged WG. Export control may provide an opportunity of technical collaboration
between ESARDA and INMM.

1. Background
Following COCOM [1], export control of dual-use goods developed further after the entry into force of the
Non Proliferation Treaty in 1970, with the establishment of Zangger Committee (ZC), followed by the Nuclear
Suppliers Group (NSG, 1974) after the first Indian nuclear test. Like ZC, the NSG defined a “Trigger List” in
1978, published as IAEA INFCIRC/254/Part 1 [2].
The NSG was followed in the 80’s by the establishment of the Missile Technology Control Regime (MTCR)
and the Australia Group (AG), with their respective control lists.

The detection of the Iraqi proliferation programme in 1991 outlined the importance of nuclear dual-use items
as well as the limits of the inspection framework within the Comprehensive Safeguards Agreements (CSA).
This triggered the need for an Additional Protocol to the CSA, as well as the definition of the NSG dual-use
list (published as INFCIRC/254/Part2, 1998 [3]).

A comprehensive dual use control list addressing the overall WMD threat (nuclear, biological, chemical and
delivery means) was then defined by the Wassenaar Arrangement in 1996.

The European Union export control framework for dual-use goods is set by Council Regulation 428/2009,
which defines the legal requirements and includes also the European Union “dual-use control list” (Annex I),
resulting from the integration of the four international export control regimes’ lists (plus items from the CWC)
and constantly updated to include their amendments. The “dual-use control list” constitutes also the basis for
the US EAR list.

2. Additional protocol and Information driven safeguards and export control
The goal of the IAEA’s “State level approach” is reaching the broader conclusion on the absence of
proliferating activities. The Model Additional Protocol of 1997 enabled the IAEA to gain access to a much
wider range of information and locations, setting up the integrated safeguards system and developing a fully “information driven” State evaluation process, with information derived from obligatory State declarations, Agency’s own verification activities (Short-Notice, Unannounced Inspections, Complementary Access inspections) and all relevant sources.

The detection of clandestine nuclear activities is supported also by “non-classical” indicators provided by satellite imagery, environmental sampling, forensics and information analysis, including also R&D activities, patents, publications and trade data.

The Model Additional Protocol clearly outlines the close relation between nuclear safeguards and export control. As set out in art. 2.a.(ix), States are also due to declare the status and size of the 15 nuclear fuel cycle related activities listed in AP Annex I (see tab. 1) and provide declarations of exports of the Trigger List items listed in AP Annex II, adding upon request also the ad-hoc confirmation of certain imports to match an export declaration of another State.

Export declarations can be usefully complemented by data on denied exports, as well as enquiries denied by suppliers, as provided by States under the Voluntary reporting Scheme of the IAEA.

The resulting overall information is key to the verification of completeness and correctness of States’ declarations.

Tab. 1 – List of AP Annex I’s activities

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<tr>
<td>I.</td>
<td>The manufacture of centrifuge rotor tubes or the assembly of gas centrifuges.</td>
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<td>II.</td>
<td>The manufacture of diffusion barriers.</td>
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<td>III.</td>
<td>The manufacture or assembly of laser-based systems.</td>
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<td>IV.</td>
<td>The manufacture or assembly of electromagnetic isotope separators.</td>
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<td>V.</td>
<td>The manufacture or assembly of columns or extraction equipment.</td>
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<td>VI.</td>
<td>The manufacture of aerodynamic separation nozzles or vortex tubes.</td>
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<td>VII.</td>
<td>The manufacture or assembly of uranium plasma generation systems.</td>
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<td>VIII.</td>
<td>The manufacture of zirconium tubes.</td>
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<tr>
<td>IX.</td>
<td>The manufacture or upgrading of heavy water or deuterium.</td>
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<td>X.</td>
<td>The manufacture of nuclear grade graphite.</td>
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<td>XI.</td>
<td>The manufacture of flasks for irradiated fuel.</td>
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<td>XII.</td>
<td>The manufacture of reactor control rods.</td>
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<td>XIII.</td>
<td>The manufacture of criticality safe tanks and vessels.</td>
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<td>XIV.</td>
<td>The manufacture of irradiated fuel element chopping machines.</td>
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<td>XV.</td>
<td>The construction of hot cells.</td>
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Tab. 2 – Structure of AP Annex II

List of equipment and non-nuclear material derived from IAEA INFCIRC/254/Part1 Trigger List of 1995

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<tr>
<td>I.</td>
<td>Reactors and major equipment</td>
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<td>II.</td>
<td>Non-nuclear material for reactors (deuterium, heavy water, and nuclear-grade graphite)</td>
</tr>
<tr>
<td>III.</td>
<td>Reprocessing plants and especially designed or prepared (EDP) equipment</td>
</tr>
<tr>
<td>IV.</td>
<td>Fuel Fabrication plants</td>
</tr>
<tr>
<td>V.</td>
<td>Enrichment plants and EDP equipment</td>
</tr>
<tr>
<td>VI.</td>
<td>Heavy water production plants and EDP equipment</td>
</tr>
<tr>
<td>VII.</td>
<td>Conversion plants and EDP equipment</td>
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</tbody>
</table>
2.1 Suggestions for improving AP-related export controls

The NSG has issued ten revisions of the Trigger List since 1995, the most recent in 2011. The TL is now more extensive and includes more items than the current AP’s Annex II, still based on the older Trigger List’s version of 1995. There are small but not negligible differences between the two revisions, including i.a.: core internals, heat exchangers, neutron detection and measuring instruments; equipment for fuel element fabrication; gas centrifuge materials (modified properties); plants for the conversion of plutonium and EDP equipment (7.2).

Moreover, the events showed the clear importance of the “nuclear” dual use items identified by NSG (but also in other regimes), functionally related to the nuclear fuel cycle. One example is Annex I’s Activity iii “manufacture or assembly of laser-based systems”, where various dual use laser controls could be added to better describe the activity. The NSG dual-use control list is published as [3].

These considerations support the fact that Annex II should be refreshed and completed both with an updated Trigger List and all (or most) of NSG Dual Use items to provide a more complete and up-to-date set of indicators.

The NSG has just started an extensive review of both lists, due to be completed in 2013, which will result in modified controls, either in terms of additional items, in parameters' modifications or also decontrol of items. The EU legislation will adopt these changes and incorporate them in Annex I of EC Regulation 428/2009 (category 0 and others).

Updating AP’s Annex II should hence be the logical consequence, to remove present and future inconsistencies. Authorities and exporters have indeed to work with two different lists of equipment: the dual-use one covering equipment that needs an export authorisation and AP’s Annex II to target items whose exports need to be reported to IAEA. This creates a confusing situation, common not only to EU member states, but also to all States using the EU dual-use list and having a Model protocol AP in force. To simplify the AP updating process, a direct reference to the latest INFCIRC/254 version could be inserted in AP Annex II.

Updating the Annex II of the Additional Protocol requires a specific decision, which may be criticized for the inevitable increase of export (and occasionally import) data to be retrieved and communicated to IAEA.

The burden on States’ administrations would relatively increase, in order to collect more data concerning the exports actually performed. There may indeed be differences between the issued export authorisations and the actually performed shipments. A paper on the AP export control experience of some ESARDA members was presented at the 33rd ESARDA symposium [4].

It is also a fact that not all “indicators” and data are relevant to the analysis, which might become overloaded by less meaningful information. An alternative but even more complicated solution could be found by defining an expanded but tailored list of items for Annex II.
A second suggestion would be to expand the list of AP Annex I activities to include more processes functional to the nuclear fuel cycle (NFC) like e.g. pyro-reprocessing.

Eventually, as already proposed in [5], a recommendation is made to also foresee declarations of import data related to Annex II’s items. This would help to systematically match States’ declarations.

3. The EU export control legal framework

The European Union WMD Strategy of 2003 [6] and the subsequent New Lines of Actions for combating proliferation [7] clearly stress that export control on dual use goods is an important barrier against proliferation. At the same time, dual-use export controls have a very prominent economic dimension as export control decisions have a direct impact on trade flows and competitiveness.

The common framework on export control in the European Union is formed by:


EU Regulations are directly applicable in the European Union. Member States are responsible for their practical implementation, issuing export authorisations or denials and enforcing the controls. National security exceptions are allowed on a case-by-case basis.

The entry into force of the Treaty of Lisbon on Dec. 1, 2009 has strengthened the role of the European Parliament in the export control field by making it a key player in the adoption of EU legislation in the area. Dual-use export controls, as part of the EU’s Common Commercial Policy, are an exclusive competence of the European Union.

3.1 Export control on Dual Use goods: main points of Regulation 428/2009

Council Regulation 428/2009 includes the following main elements:

- it foresees 4 types of export authorisations (EU General Export Authorisations, National General Export Authorisations, global export authorisations, individual export authorisations);
- it foresees controls on export transactions as well as on brokering and transit, as required by UNSCR 1540 [11];
- it covers intangible transfers of technology (ITT);
- it sets out the general criteria that need to be taken into account when deciding whether or not to authorise an export;
- it foresees various consultation and information exchange procedures, including in particular concerning denials;
- it foresees the cases where Member States may impose controls on non-listed items through so-called ‘catch-all’ controls (‘end-use’ controls);
- it allows Member States to extend controls in certain specific cases.
- Annex I contains a list of all items subject to export controls;
- Annex II sets out the EU General Export Authorisations currently in force;
- Annex IV lists the items that are subject to intra-EU transfer controls.

3.2 The EU Dual-use control list (Annex I)

As said in the introduction, the EU list of dual-use goods constitutes a consolidated version of the control lists agreed by the international export control regimes:

- Wassenaar Arrangement (WA), addressing dual use items in general
- Nuclear Suppliers Group (NSG), addressing Trigger List and dual use items functional to the nuclear fuel cycle
- Missile Technology Control Regime (MTCR)
- Australia Group (AG), covering chemical and biological weapons materials and components and includes also the chemical precursors derived from the Chemical Weapons Convention.

The resulting list was first created in the 90’s by the Council Working Party on Dual Use goods (WPDU) and constitutes also the basis for the US EAR list. It is continuously updated to integrate the amendments introduced by the regimes.
3.3 Annex II
Annex II contains the EU General Export Authorisations (EU GEAs). With the recent entry into force of five new ones, it contains a total of six GEAs. EU GEAs facilitate export transactions as they eliminate the need to apply for individual or global licenses, which often take considerable effort. Each country’s administration sets up instruments for verification of the correct use of these licenses. Some countries have also National General Authorisations (NGA) in place similar in nature to EU General Export Authorisations, but covering different items and destinations, and are only available to exporters in the issuing country. A broader number of EU GEAs would enable exporters in all EU-27 to benefit of the same facilitated export conditions.

An updated list of Annex I and II as well as useful information on EU dual-use goods export control can be found at [12].

3.4 Intra-EU transfers
According to the Regulation, a limited set of items listed in Annex IV is controlled also when transferred between two EU Member States. The controls applies in particular to Category 0 (or trigger List) items, but not only. This requirement is the consequence of the historical national security origin of controls, now covered by the Common Commercial Policy. Intra-EU transfer controls are still in place to fulfil the international obligations of Member States with regard to reporting of transfers. However they continue to be a burden for EU multi-national suppliers, which encounter more difficulties than competitors from other countries. There may hence be scope for certain reforms in this area.

3.5 Sanctions
Sanctions are dealt by the Foreign Policy Instruments (FPI) service of the European Commission. Some Council Regulations adopting restrictive measures (embargos) against countries or non-states actors contain also lists of dual use items, additional to Regulation 428/2009 Annex I. This is e.g. the case of the Council Regulation with restrictive measures against Iran as recently amended [13], and Council Regulation 1283/2009 against DPRK [14]. These regulations include lists of dual use goods, as well as entities to which exports cannot be authorised.

3.6 Issues and improvements
Not all EU-27 have access to information shared within the international export control Regimes. 8 MS are not members of the Missile Technology Control Regime, and Cyprus is not member of Wassenaar Arrangement. This does not allow them to access information and denials issued by non-EU members. The denials issued by EU countries are shared within the DUES system of DG TRADE.

The “Article 23 Coordination Group”, chaired by DG TRADE, is working to define Guidelines for the
harmonised interpretation of DU goods export control, based also on the comments received to a GREEN PAPER in 2011 [15].

To provide a broader access to expertise an EU “Pool of Experts” on Dual Use goods was informally set-up in 2005, and is about to being reshaped with a new approach proposed by the JRC for DG TRADE. The proposal currently discussed at Council’s Working Party on Dual use goods foresees a central point of contact at JRC, supported by Commission’s and national experts.

![EU Pool of Experts on Dual-Use goods](image)

**Fig. 3 – The proposed new EU dual-use Pool of experts**

4. Export control and ESARDA

ESARDA membership includes various types of members and contributors, all with different views and needs related to export control:
The first ESARDA export control workshop was organised at JRC Ispra in 2006 by the Verification Technologies and methodologies Working Group. On that occasion, various aspects were discussed and the JRC established contacts and collaboration with various EU actors, IAEA and US DOE NNSA.
Five export control technical workshops were jointly organised by JRC-NNSA in Ispra in the period 2007-2012.
Export control has since then often been present in VTM’s portfolio of presentations, as e.g. in Luxembourg 2010 meeting, and is also firmly included in the programme of ESARDA Course on Non-Proliferation.

Based on the findings of the ESARDA Reflection Group 2010, ESARDA recently started a sub-Working Group on export control (EXP-SWG), within the Verification Technologies and Methodologies WG.
A large interest was raised, and the group set itself the goal of becoming a forum of technical exchange and information sharing for various nuclear stake-holders, including nuclear regulators, suppliers and international organisations (IAEA and European Commission).
This might lead to the possible evolution towards a full-fledged ESARDA Working Group.

In the light of the new Letter of intent between ESARDA and INMM, the technical aspects of export control could be a collaboration topic between the two associations.

5. Conclusions

Nuclear safeguards and export control are two key barriers against nuclear proliferation. They are closely inter-twinned, as witnessed by their parallel evolution and the NSG guidelines requiring safeguards and physical protection as a condition for supply.

The Model Additional Protocol to the Comprehensive Safeguards Agreement requires export control declarations on a limited number of “nuclear” items contained in its Annex II, which should be expanded to
systematically give a more informative picture to the IAEA.

To seek a trade-off between increased burden and effectiveness, proposals are made to consider a tailored control list, possibly not including all nuclear-related items, but also other dual use ones.

The EU export control framework with issues and improvement actions supported by the JRC were presented.

ESARDA recently started activities on export control. Technical aspects of export control could become a collaboration topic between the two associations.

9. References
1. Coordinating Committee for Multilateral Export Controls, 1949