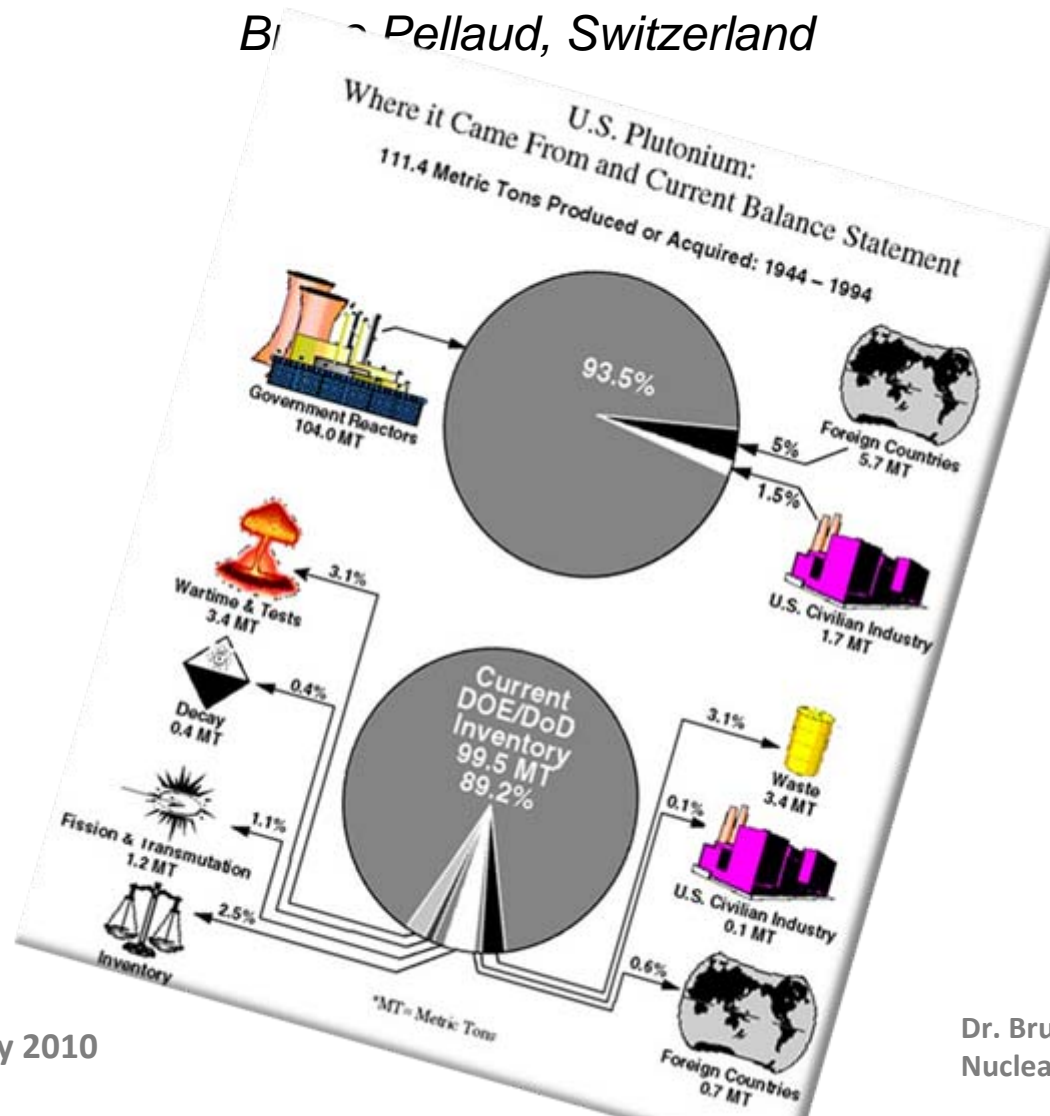


# FMCT: Verification options

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# From the IAEA scope to the FMCT scope

- **IAEA inspection of a single facility:** well-identified facility verified *singly* with standard accounting and technical means, from item counting to indoor environment sampling (Type 66);
  - **IAEA inspects the *comprehensive* State list of declared facilities:** all facilities are verified with standard accounting and technical means, from item counting to outdoor environment sampling (Type 153);
  - **IAEA under Additional Protocol:** in addition, verification of potential unidentified, undeclared facilities with expanded information gathering, more intrusive access and technologies (Type 153+540).
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- **FMCT scope:** to be negotiated! At the very minimum: declared facilities previously dedicated to weapon programmes, that is an estimated *100 facilities in the P5+3 States*. To include all other nuclear facilities in those countries would bring the total to *1000 facilities or more*.
  - **FMCT verification efforts: depends on the scope, on the definitions and also on the desired degree of assurance.**



# 1. Focussed verification scope

- A **focused scope**, concentrating on the most proliferation-sensitive fissile material production facilities - i.e. spent fuel reprocessing and enrichment facilities (for HEU and LEU) - and the relevant outputs from those facilities.
- Verification of fissile material subject to the FMCT , that is separated plutonium, U-233, HEU and separated neptunium produced after EIF. This would require verification measures at downstream facilities handling these materials. *No verification of irradiated fuel, since irradiated plutonium is deemed to be of no further strategic value until reprocessed.*
- In addition, the FMCT verification regime will need to include measures aimed at the detection of related **undeclared** production activities.
- Model proposed by Australia – covering an estimated 195 facilities.
- This scope can provide a **reasonable level of assurances**.



## 2. Broad verification scope

Some observers believe that it is insufficient to deal only with directly related sensitive facilities and separated fissile materials (as in the previous first level of a focused scope).

In addition, they want to include from the onset:

- **Civilian nuclear power plants,** and
- **Irradiated spent fuel from civilian plants,**

bringing the total to 645 facilities in the P5+3 States.

This is still not enough for others, since there is *no assurance against the diversion or misuse of low enrichment, natural or depleted plutonium, and thorium*, as in the following third level of a comprehensive scope.

This second level provides for a **high level of assurances**



# 3. Comprehensive scope

“Comprehensive scope” means applying safeguards-type measures to all nuclear materials in a State or under its control, *except* those acknowledged as military stocks of fissile material which would exist at the date of entry into force of the treaty. For the P5+3 States together, this would correspond to 995 facilities.

***The comprehensive scope corresponds to that of safeguards applied in non-nuclear weapons States.***

This provides for a **very high level of assurances.**



# Costs: Three levels of verification

<b>Level 1</b>	Australia's model - Enrichment and reprocessing facilities, and those facilities containing separated fissile materials (an estimated 195 facilities in P5+3 States)	<b>90 million €/a</b> (16'271 PDIs) <i>(IAEA Case B)</i>
<b>Level 2</b>	All the above facilities and separated materials, with in addition all large nuclear plants and reactors and all irradiated spent fuel (645 facilities)	<b>130 million €/a</b> (22'113 PDIs) <i>(IAEA Case C)</i>
<b>Level 3</b>	Comprehensive , that is everything, that is as level 2, and thorium and LEU and below uranium (995 facilities)	<b>150 million €/a</b> (25'398 PDIs) <i>(IAEA Base case)</i>

Figures from a 1995 IAEA publication, except for an updating of the PDI unit cost and an approximate PDI effectiveness correction (PDI=Person-Day of Inspection)

**IAEA scope in 2008: Budget €96 million; 8220 PDI/a; and 1131 facilities inspected**



# Bottom line: costs vs. assurances

- **Extreme low model** : e.g. the consideration of only the 100 core facilities. Small scope and low assurance mean limited verification and low costs. But, such a treaty may have little political relevance.
- **Extreme high model**: a very comprehensive scope coupled with demand for very high assurances would mean stringent verification and thus very high costs. Too high political demands could scuttle the FMCT.
- Finding **the right balance**, finding the compromise!
- **Verification agency**: in Vienna to build on the synergies with the IAEA NPT activities. IAEA or a new agency? Will depend on the negotiated composition of the FMCT Board of Governors (same or different).



# Verification: two approaches

1. A **single treaty** containing both the basic treaty objectives and the details of the verification system – the approach taken with the Chemical Weapons Convention (CWC). Difficult to negotiate and inflexible.
2. Basic political commitments in a **principal treaty**, with the verification system in a **secondary agreement** – in the NPT's case, the safeguards agreement with the IAEA based on the model INFCIRC/153. This approach separates largely political from largely technical subject matters, and allows for an adaptable verification system.

The NPT was concluded in 1968, entered into force in 1970, while the model safeguards agreement, INFCIRC/153, was not concluded until 1972 and the model Additional Protocol (INFCIRC/540) was agreed in 1997, that is, flexibility for major updates of the verification system.

*(from John Carlson, Australia, in “Arms Control Today”, January 2005)*

