

Panel 1-2: Application of Safeguards  
Technologies to Nuclear  
Disarmament Verification  
- Activities of IPFM -

Comment

By

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# International Panel on Fissile Materials (IPFM)

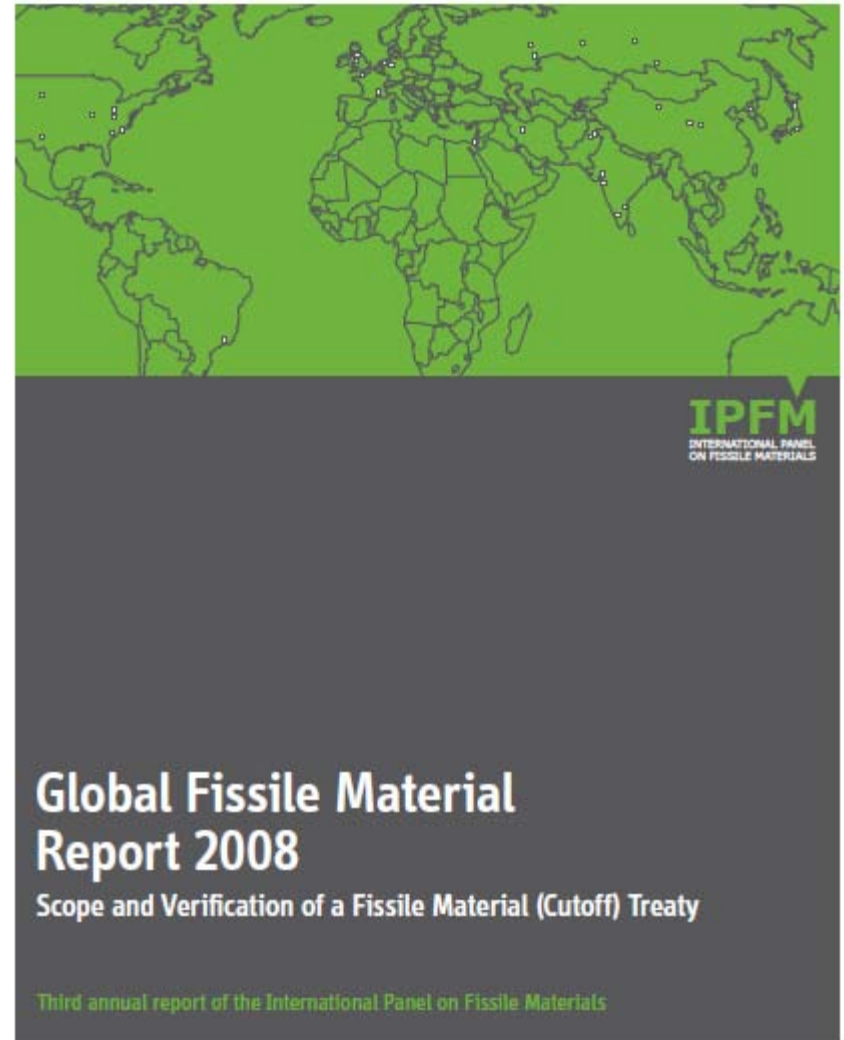
[http://www.fissilematerials.org/ipfm/pages\\_us\\_en/about/about/about.php](http://www.fissilematerials.org/ipfm/pages_us_en/about/about/about.php)

- Founded in 2006. Independent group of experts on non-proliferation/arms control from 16 countries\*
- Its main mission is to analyze the technical basis for practical and achievable policy initiatives to secure, consolidate, and reduce stockpiles of highly enriched uranium and plutonium.
- Co-chaired by Dr. R. Rajaraman, Professor Emeritus of Jawaharlal Nehru University, New Delhi, India and Professor Frank von Hippel of Princeton University.

\* Brazil, China, France, Germany, India, Japan, the Netherlands, Mexico, Norway, Pakistan, South Korea, Russia, South Africa, Sweden, the United Kingdom, and the United States.

# IPFM Reports on FMCT

- Global Fissile Material Report 2008, Scope and Verification of a Fissile Material (Cutoff) Treaty  
[http://www.fissilematerials.org/ipfm/site\\_down/gfmr08.pdf](http://www.fissilematerials.org/ipfm/site_down/gfmr08.pdf)
- “A FMCT” Draft for Discussion by IPFM (March 2009)  
[http://www.fissilematerials.org/ipfm/site\\_down/fmct-ipfm\\_mar2009draft.pdf](http://www.fissilematerials.org/ipfm/site_down/fmct-ipfm_mar2009draft.pdf)
- IPFM Research Report #6: The Safeguards at Reprocessing Plants under a Fissile Material (Cutoff) Treaty, by Shirley Johnson (Feb, 2009)  
[http://www.fissilematerials.org/ipfm/pages\\_us\\_en/about/about/about.php](http://www.fissilematerials.org/ipfm/pages_us_en/about/about/about.php)
- Draft of the IPFM Fissile Material (Cutoff) Treaty (including an article-by-article discussion) (September 2009 )  
[http://www.fissilematerials.org/ipfm/site\\_down/fmct-ipfm-sep2009.pdf](http://www.fissilematerials.org/ipfm/site_down/fmct-ipfm-sep2009.pdf)



# Main Points

- IPFM believes that FMCT is a verifiable treaty
  - *Safeguards technologies of civilian facilities (like Rokkasho reprocessing plant) can be applied*
  - *The costs of verification could be less than that of civilian facilities*
- FMCT should focus **on future production of fissile material**, and could include not to use for weapons **pre-existing non-weapon stocks of fissile materials**, including civilian stocks, stocks declared excess to military purposes, and stocks of highly enriched uranium declared for use as fuel for naval-propulsion and other military reactors.

# Definitions

## II.1. “Fissile material” means:

- i) Plutonium of any isotopic composition except plutonium that contains 80 percent or more plutonium-238
- ii) Uranium containing uranium-235 and/or uranium-233 in a weighted concentration equivalent to or greater than 20 percent uranium-235.
- iii). Any other fissile material suitable for the manufacture of nuclear weapons as agreed to in a protocol to this Treaty.
- iv. Material containing any combination of the foregoing.

## II.2. “To produce fissile material” means:

- i. To separate fissile materials from irradiated nuclear material through reprocessing or any other process
- ii. To increase the weighted concentration of uranium-235 and uranium-233 of any mixture of uranium isotopes to a level equivalent to or greater than 20 percent
- iii. To increase the fraction of plutonium-239 in plutonium by any isotopic separation process.

II.3. A “production facility” means **any facility capable of producing more than [one tenth] of a significant quantity of fissile material per year.**

# Verification

## Article III: Verification

III.1. Each State Party undertakes to accept IAEA safeguards to verify compliance with its obligations under Article I as described in this Article.

III.2. States Parties that have in force with the IAEA a comprehensive safeguards agreement that satisfies the requirements of IAEA-document INFCIRC/153 (corrected) and an Additional Protocol that satisfies the requirements of INFCIRC/540 (corrected), have no further verification obligations under this Treaty, unless that State Party intends to use fissile materials for military non-explosive purposes, or that state has more than [one tenth] of a significant quantity of the fissile materials referred to in Article II.1.iii, in which case additional safeguards or arrangements are needed.

III.3. States Parties not having a comprehensive safeguards agreement with the IAEA and possessing at least one significant quantity of unsafeguarded fissile material undertake to accept safeguards in an appropriate safeguards agreement to be concluded with the IAEA to verify their obligations under Article I, including:

- i) **The non-production of fissile materials** for nuclear weapons or other nuclear explosive devices and to that end:
  - a) The disablement, decommissioning and dismantlement of production facilities or their use only for peaceful or military non-explosive purposes, and
  - b) The absence of any production of fissile materials without safeguards.
- ii) **The non-diversion to nuclear weapons, other nuclear explosive devices or purposes** unknown of:
  - a) All civilian fissile materials, including in spent fuel,
  - b) All fissile materials declared excess to any military purpose.
  - c) All fissile materials declared for military non-explosive purposes

# Rokkasho Safeguards and Simplified version for FMCT

- Short-Notice Random Inspections (SNRI) would replace continuous inspector presence at reprocessing plants
- Use a random number of measurements during the SNRIs to replace the 100 % verification of major inventory changes in the MBAs
- Focus primarily on establishing materials balances for plutonium and highly enriched uranium.
- Verify waste transfers only in cases of large discrepancies between operator declarations and declared and verified design and operational production values

# Rokkasho Safeguards and Simplified version for FMCT

- *The cost of the proposed FM(C)T Safeguards Approach for a large operating reprocessing plant would be significantly less than estimated in the 1996 Brookhaven Report and far less than cost of NPT safeguards at the Rokkasho Reprocessing Plant.*
  - *Equipment and software costs: \$ 15 million (1/5 of Rokkasho)*
  - *Inspection costs: 1/5 or less of Rokkasho plant*



# Estimated Inspection Days for reprocessing plant under the FMCT

Inspection or Visit	Visits per Year	Inspection Days	Number of Inspectors	Person Days
Short Notice Random Inspection	8	5	3	120 PDI
Physical Inventory Inspection	1	10	5	50 PDI
Other Activities				30 PDI
<b>TOTAL</b>	<b>9</b>	<b>15</b>	<b>8</b>	<b>200 PDI</b>
<b>COST</b>	<b>200 PDI x \$2000/PDI/year = \$400,000/year</b>			

Table 5.2. Annual inspection effort in Person-Days of Inspection (PDI) and cost.