Challenges of HEU minimization

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Challenges of HEU minimization

- Declarations of stocks
- Approaches to elimination
- Nuclear disarmament vs. nuclear security
Declarations of stocks

- **Complete declarations**

- **Annual declarations**
  - INFCIRC/549
  - Civilian HEU
  - France, Germany, U.K.

- **No agreement on scope or format**
  - France – ~31 tonnes total, 4.85 civilian
  - U.K. – 21.2 tonnes total, 4.4 excess, 1.4 civilian
## Russia’s HEU stock

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Production</strong></td>
<td><strong>1470±120 tonnes</strong></td>
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<tr>
<td><strong>Removals</strong></td>
<td><strong>742 tonnes</strong></td>
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<td>Naval fuel, reactor fuel, tests, etc.</td>
<td>286</td>
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<tr>
<td>HEU-LEU deal (end of 2011)</td>
<td>442.5</td>
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<td>MCC (end of 2011)</td>
<td>13.5</td>
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<tr>
<td><strong>Removal commitments</strong></td>
<td><strong>61 tonnes</strong></td>
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<tr>
<td>HEU-LEU deal (by 2013)</td>
<td>57.5</td>
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<td>MCC (by 2015)</td>
<td>3.5</td>
</tr>
<tr>
<td><strong>Available HEU</strong></td>
<td><strong>666±120 tonnes</strong></td>
</tr>
<tr>
<td>In weapons</td>
<td>~250</td>
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<tr>
<td>In storage and other uses</td>
<td>~400</td>
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Russia’s nuclear weapons

- ~10,000 nuclear warheads (FAS/NRDC estimate)

- Operationally deployed and in active arsenal
  - ~2,500 deployed and nondeployed strategic warheads

- Active reserve in centralized storage
  - ~3,700-5,400 non-strategic weapons

- In storage awaiting dismantlement
  - 200-300 warheads/year dismantled
  - ~200 warheads/year remanufactured
Nuclear material in storage

- **Large material storage facilities**
  - From 10 to 100 tonnes of HEU and WgPu, components
  - Ozersk, Seversk, Sarov, Snezhinsk, Zheleznogorsk

- **Monitored storage**
  - Excess Pu and Pu produced after 1994
  - Fissile Material Storage Facility at Mayak
  - Zheleznogorsk?

- **Weapon assembly facilities**
  - Lesnoy, Trekhgorny

- **Small facilities**
  - Fuel fabrication, research facilities, naval fuel
Small facilities

- ~106 out of world’s 130 HEU facilities are in Russia
- Fundamental and applied research
- Isotope production
  - Tritium, Mo-99, other isotopes
- Icebreakers and civilian ships
- Military naval reactors
- Military-related research
  - Weapon labs, weapon effects studies
- Fuel fabrication
HEU elimination

- HEU-LEU deal
  - Down-blending weapon-origin HEU
  - LEU for U.S. power reactors

- Material Conversion and Consolidation project
  - Removal HEU at small facilities
  - Down-blending at two sites in Russia

- Federal Program “Nuclear and Radiation Safety Provision for the Year 2008 and for the Period until 2015”
HEU-LEU deal

- 500 MT of HEU to be down-blended by 2013
- 442.5 tonnes eliminated as of end of 2011
- Russia will not extend the deal beyond 2013
- Down-blending might continue as an internal program
HEU-LEU deal: HEU flows

LEU transfers are not shown
HEU-LEU deal: Security risks

- Annual shipments of ~30 tonnes of HEU/year
- Most HEU shipped in bulk form
- Program creates additional risks
- Does eliminate military HEU, but at high security cost