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
  - U.S. – Pu (1996), HEU (2001)
  - U.K. – Pu and HEU (2006)
- 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

Production	**1470±120 tonnes**
Removals	**742 tonnes**
Naval fuel, reactor fuel, tests, etc.	286
HEU-LEU deal (end of 2011)	442.5
MCC (end of 2011)	13.5
Removal commitments	**61 tonnes**
HEU-LEU deal (by 2013)	57.5
MCC (by 2015)	3.5
Available HEU	**666±120 tonnes**
In weapons	~250
In storage and other uses	~400

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

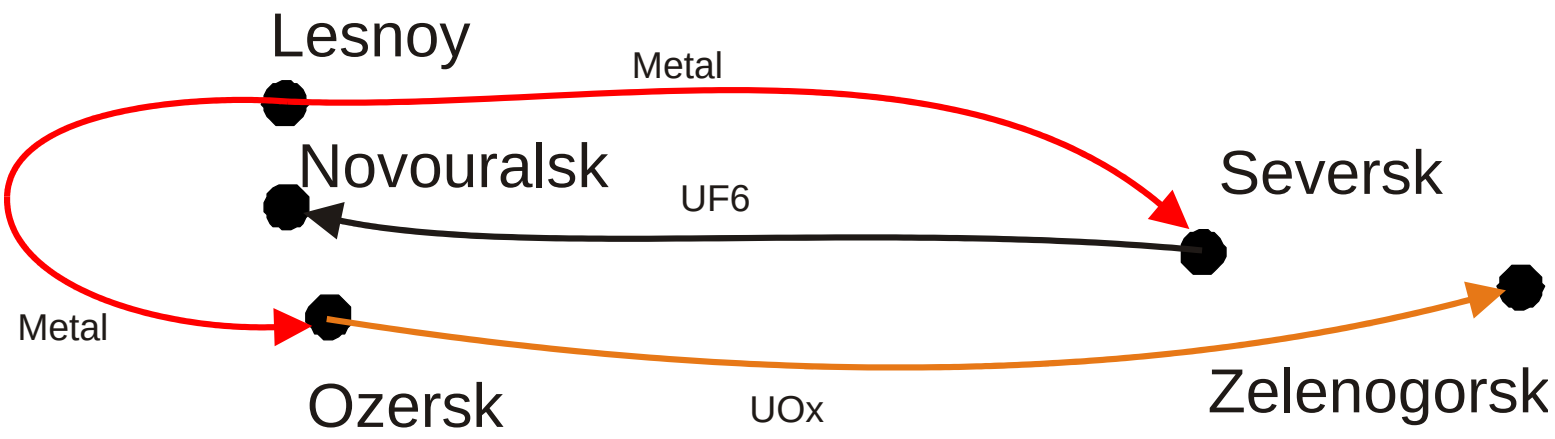
HEU elimination

- 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