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HEU Minimization Constraints in Russia

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Russia: HEU Minimization Constraints

- Scale of the task
- Financial
- Administrative
- Technological
- Economic

Scale of the task

- Diversity of applications
  - Targets for medical isotopes production /research reactor fuel/icebreaker propulsion fuel
- Tens of RRs, incl. critical assemblies
  - Russia has not announced the numbers; 39 RRs, according to WNA; many more in reality;
- Diversity of fuel types
  - Russia uses three types of fuel for energy reactors; many more types for RRs

A program of a similar scale to reactor conversion in the past

- Submarine dismantlement
- Part of the G8 Global Partnership program:
  - ~ 100 submarines
  - 50+ had SNF on board
  - 4.5bn+ USD

Financial constraints

- Conversion of HEU-fueled reactors in Russia – a multi-billion (USD) project
- SC Rosatom has other, more urgent priorities for federal budget spending
- GP-type of projects in Russia come to an end; all further major nonproliferation projects to be funded from the federal budget

Financial constraints

- The priority task is rehabilitation of the population, clean-up of contaminated territories and launch of SNF and radioactive waste treatment facilities
  - Federal program “Nuclear and radiation safety in 2008-2015” (~5bn USD)
  - Federal program “Overcoming the consequences of radiation release incidents in the 2015 timeframe”

Administrative Constraints

- Variety of RRs owners
  - Reactors belong to different state owners (SC Rosatom, Ministry of Education and Science, Cabinet, etc.)
- Six reactors, which are subject to Russian-US feasibility studies, belong to three different owners:
  - IR-8 –> RRC Kurchatov Institute –> Cabinet of Ministers
  - OR-M –> RRC Kurchatov Institute -> Cabinet of Ministers
  - ARGUS –> RRC Kurchatov Institute -> Cabinet of Ministers
  - IRT –> MEPhI –> Ministry of Education and Science
  - IRT-T –> Tomsk Polytechnic University - >Ministry of Education and Science
  - MIR-M1 –> NIIAR -> SC Rosatom
- Coordination and harmonization of efforts between state owners is needed

Administrative Constraints

- Reform of the nuclear industry is ongoing; its consequences:
  - Change of legal status of companies/organizations which have HEU-fueled RRs on their territory
    - MEPhI has changed its legal status 4 times in 2003-2011
  - These companies/organizations are being subordinated to different state owners
  - The focus of their research priorities is shifting

Technological and Economic Constraints

- In general, similar to the constraints faced by other countries, but compounded by the sheer size of the Russian nuclear industry

Addressing Constraints

- To draft a master program on nuclear science and technology development, 2015-2030; as part of this process:
  - Better understand the needs to supports plans in nuclear power and fundamental science;
  - To identify how many RR/ what type of RRs Russia is needed?
  - To make an inventory of operational research reactors
  - To make case-by-case decision on future of operational reactors

Addressing Constraints

- Quick deliveries in HEU minimization are desirable, but a long-term strategy is more important
  - To make the HEU use reduction sustainable and irreversible, especially when the industry is under reform
  - To allocate federal funding for the project
  - To synchronize different ministries/ agencies activities and policy
- In parallel with drafting a master plan, pilot projects to convert HEU-fueled reactors could start, based on conclusions made as result of Russian-US feasibility studies (6 reactors)