Possible New Framework for the Utilization of Nuclear Energy: Options for Assurance of Supply of Nuclear Fuel

Tariq Rauf

(Head, Verification and Security Policy Coordination)

Cluster 3: NPT PrepCom
New York, 8 May 2009

Nuclear share of electricity (2005)
Nuclear Power Reactors Worldwide

436 Nuclear Power Reactors are in operation in 30 Countries: ~372GWe ~ 14% global electricity; 45 reactors are under construction

Projection in 2030
low 473 GWe
high 748 GWe

TONS OF CO$_2$ PER GIGAWATT HOUR

- Coal: 1.041
- Natural Gas: 622
- Biomass: 46
- Solar PV: 39
- Hydro: 18
- Nuclear: 17
- Geothermal: 15
- Wind: 14
Projection of increased number of countries planning to introduce their first nuclear power plants (NPPs)

Operation of their first NPPs

• 23 new countries by 2030 (high est.) (IAEA Ref Data Series-1, 2007)
• 8 new countries by 2020 (high est.) (IAEA RDS-1)
• Estimation from the progress of countries : 11 new countries by 2020
New roles – new fuel cycle framework

- Fuel cycle technology
  - Enrichment
  - Reprocessing
- Facilitate nuclear power
- Reduce proliferation risks
IAEA SPECIAL EVENT AT GC 50:
Chair’s Summary (Sept. 2006)

An assurance of supply mechanism needed to address:

- interruptions of supply of nuclear fuel due to political considerations that might dissuade initiation or expansion of nuclear power programmes, and
- the vulnerabilities that create incentives for building new unnecessary enrichment and reprocessing capabilities

- solely a back-up to commercial market
- no curtailment of States’ rights to peaceful uses of nuclear energy – will create additional options

www.iaea.org/About/Policy/GC/GC50/SideEvent/report220906.pdf

DIRECTOR GENERAL

New Framework and Assurance of Supply Mechanisms

...assurance of supply of nuclear fuel ... should be formulated in a manner that is equitable and accessible to all users of nuclear energy (Nov. 2006)

...such a framework is voluntary and States are free to choose their fuel options - no rights of States compromised (June 2007)
...a multilateral approach has great potential to facilitate the expanded safe and secure use of nuclear energy for peaceful purposes, while reducing the risk of proliferation ... on the following principles:

1) any such mechanism should be non-political, non-discriminatory and available to all States in compliance with their safeguards obligations

2) any release of material should be determined by non-political criteria established in advance and applied objectively and consistently

3) no State should be required to give up its rights under the NPT regarding any parts of the nuclear fuel cycle

4) all new enrichment and reprocessing activities should be placed exclusively under multilateral control -- followed by conversion of all existing facilities from national to multilateral control

*+ verifiable FMCT

2 March 2009

Proposals received to date

- 17.4 MT of excess HEU for down-blending as LEU fuel and used as part of a fuel bank under an assurance of supply scheme – USA (Sept. 2005) INFCIRC/659
- Global Nuclear Energy Partnership – USA (Feb. 2006)
- World Nuclear Association – TENEX, AREVA, URENCO, USEC (May 2006)
- Six-Country Proposal for Assured Access to Nuclear Fuel (June 2006)
- IAEA Standby Arrangements System for Assurance of Nuclear Fuel Supply (Sept. 2006) INFCIRC/683
- IAEA Administered Nuclear Fuel Reserve (NTI offer of US $50m) (Sept. 2006)
- International Uranium Enrichment Centre at Angarsk (Jan and May 2007) INFCIRC/708
- German Proposal for an International Nuclear Fuel Centre (May 2007) INFCIRC/704
- Austrian proposal for a International Nuclear Fuel Bank (May 2007) INFCIRC/706
- Nuclear Fuel Cycle (EU) (June 2007)
- Multilateral Cooperation on Energy Security (Sept. 2007) INFCIRC/713
Possible New Framework for the Utilization of Nuclear Energy: Options for Assurance of Supply of Nuclear Fuel

Report of the Director General (June 2007)

Legal basis

- Statute … sufficiently broad to allow Agency to provide fuel cycle services
- the Agency is regularly providing such services
POSSIBLE FRAMEWORK FOR ASSURANCE OF SUPPLY OF NUCLEAR FUEL (LEU)

- For LEU, a suggested possible framework might have three levels:
  - **Level 1:** existing global market arrangements for nuclear fuel supply
  - **Level 2:** back-up commitments provided by suppliers of enrichment services and governments, and
  - **Level 3:** a physical LEU reserve under IAEA control, or a virtual LEU reserve based on commitments by governments

POSSIBLE FRAMEWORK FOR ASSURANCE OF SUPPLY OF NUCLEAR FUEL: CRITERIA

- Possible Framework for Criteria for Assurance of Supply
  - Open to participation by all Member States of the Agency
  - Criteria would need to be the same for all States and applied in a consistent manner without prejudice to any State’s future fuel cycle options in the context of multilateral approaches
  - Board of Governors to establish supply criteria in advance, to ensure consistency for all States wishing to make use of the framework
  - Once a request for supply is received by the Agency, the Director General would decide whether it meets the supply criteria – and to trigger supply
POSSIBLE FRAMEWORK FOR ASSURANCE OF SUPPLY OF NUCLEAR FUEL: CRITERIA

Possible Criteria for Assurance of Supply

The criteria listed below are not meant to be definitive or exhaustive:

- The disruption must be unrelated to commercial, technical or non-proliferation reasons
- Consumer State should have in force a safeguards agreement that applies to the material that will be supplied through such a framework
- Conclusion drawn on the non-diversion of declared nuclear material in the most recent Safeguards Implementation Report (SIR), and no safeguards issues before the Board of Governors for that State
- Any other criteria as prescribed by the Board

ASSURANCE OF SUPPLY OF NUCLEAR FUEL: BENEFITS

Assurance of supply has the potential to:

- facilitate the continued and expected increased use of nuclear energy for peaceful purposes
- provide the benefits of cost-effectiveness and economies of scale in the use of nuclear technologies
- provide additional assurance to the international community that the sensitive parts of the civilian nuclear fuel cycle are less vulnerable to misuse for non-peaceful purposes

Thus, non-proliferation and economic considerations can coincide and be mutually reinforcing, while providing security of supply of nuclear fuel to consumer States
ASSURANCE OF SUPPLY OF NUCLEAR FUEL: FLEXIBILITY

- Different States may develop different policies and solutions to improve their fuel supply security based on geography, resources, technical abilities, historical links, regional economic integration, and other strategic factors.

- Hence, flexibility would be desirable by taking into account a variety of views of consumer and supplier States.

- States are free to choose their fuel options - no rights of States would compromised rather their rights would be strengthened through additional options for back-up fuel supply.

LEU Bank Proposal

What it is:
- Insurance
- Last-resort
- Small
- LEU as UF$_6$
- Transparent
- Reliable

What it is not:
- Constraint
- Abridging rights
- Market alternative
- Fabricated fuel
- Political
LEU Bank: sequence

- Ruritania contracts with Multinational Nuclear Company (MNC) for nuclear reactors and fuel supply
- Zorovia-Ruritania political dispute causes MNC to cancel fuel delivery
- Ruritania unable to identify other commercial suppliers
- IAEA considers request and approves LEU provision from fuel bank
- LEU (UF₆) sent to fabricator
- Fuel delivered to Ruritania