R&D Priorities
For the
Global Nuclear Energy Partnership

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Comments on GNEP

- US nuclear power plants (103 of them) provide almost 20% of US electricity. First, do no harm.
- GNEP includes provision of reactor fuel to international partners and take back of spent fuel for disposal. Need to create an international system.
- Reprocessing can extend uranium resource for light-water reactors (LWR) by 20% at most, at a cost per kg of $130-1000. DOE purpose is primarily to save repository resource; at what cost and risk?
- Yucca Mountain can be extended and replicated; dry cask storage is cheap and safe for 50-100 years.

Comments on GNEP (2)

- GNEP does not propose reprocessing and recycle into LWRs, and for good reason.
- Once-through US fuel cycle is far more proliferation resistant than is the proposed UREX+ reprocessing
  - To obtain 10 kg of Pu, must steal and reprocess 1000 kg of self-protecting spent fuel; vs.
  - UREX+: must steal 11 kg of separated Pu
- GNEP's proposed UREX+ separation for LWR fuel and burning in fast-neutron Advanced Burner Reactors—ABR—is far more costly than enhancing the repository space. YM estimated at 200,000 tons.

Comments on GNEP (3)
(Reprocessing and Burning of Transuranics)

- Defining the GNEP program without the promised systems analysis tool is like driving without a map
- The $155 M first-year UREX+ program is misguided
  - UREX not significantly better than PUREX
  - It is ABR-fuel reprocessing that needs 99+% efficiency, not the LWR that is done just once
- The ABRs (at least 30% of the LWR population) will need to be government operated or heavily subsidized.
- Big gamble is the ABR, fuel form, fuel reprocessing; needs extended design competition (decades).

What to do?

- Lift arbitrary 62,000 ton cap on Yucca Mountain
- Commit to dry-cask interim storage for up to 100 yr
- USG take the lead in creating an international system for assured supply of LEU reactor fuel, and assured disposal
- USG lead in institutional design to encourage commercial, competitive mined geologic repositories, certified by IAEA, to accept IAEA-certified spent fuel forms and IAEA-certified high-level waste packs such as vitrified fission products.

Outsource to repositories elsewhere, not just in the U.S..

What to do? (2)

- USG fund worldwide evaluation of resource vs. cost of currently uneconomic terrestrial and seawater uranium resources, e.g.,
  - 170 million tons terrestrial at $260/kg?
  - 2,000 million tons from seawater at $??/kg
- Complete and use the systems analysis tool to guide decisions—not to justify them after the fact