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U.S. Role in the Global Nuclear Fuel Cycle

Dan Collier

Why Is it Important?

- U.S. has Agreements for Cooperation with about 50 countries
- All of these require the importing country to track the usage and location of nuclear materials received from the exporting country
- Several agreements require reports to be submitted that provide details on the quantities and forms of nuclear materials by location
- Compliance is a condition of continued exports

Relevance

- Importing materials and services requires the U.S. to report to other countries
- More U.S. imports, the more material we must track and report
- Less U.S. exports means less U.S. influence on other country nuclear programs

Global Industry

- Through the early to mid-1980's
  - U.S. commercial nuclear fuel was supplied from virtually 100% domestic sources
  - U.S. Supplied a large portion of the global markets
- The U.S. now relies heavily on foreign sources
- U.S. supply to the global market reduced substantially

Global Industry

- The U.S. has used nuclear fuel as a means to support U.S. non-proliferation policy, no longer much of an impact
- In the 1970's U.S. had a virtual monopoly on enrichment supply outside of the east block
- Inconsistent policies were a major contributor

Global Industry

- U.S. decided to privatize enrichment and not expand capacity
- Europeans decided that they needed to develop their own capacity
- U.S reversed its position and decided to expand enrichment capacity in the mid-1970's, specifically to support U.S. nonproliferation objectives

Global Industry

- Europeans expanded capacity with newer, more efficient capacity
- Russia became an acceptable, low priced supplier
- Other countries also developed enrichment for security of supply and other reasons
- As a result U.S. share of the global market has fallen dramatically

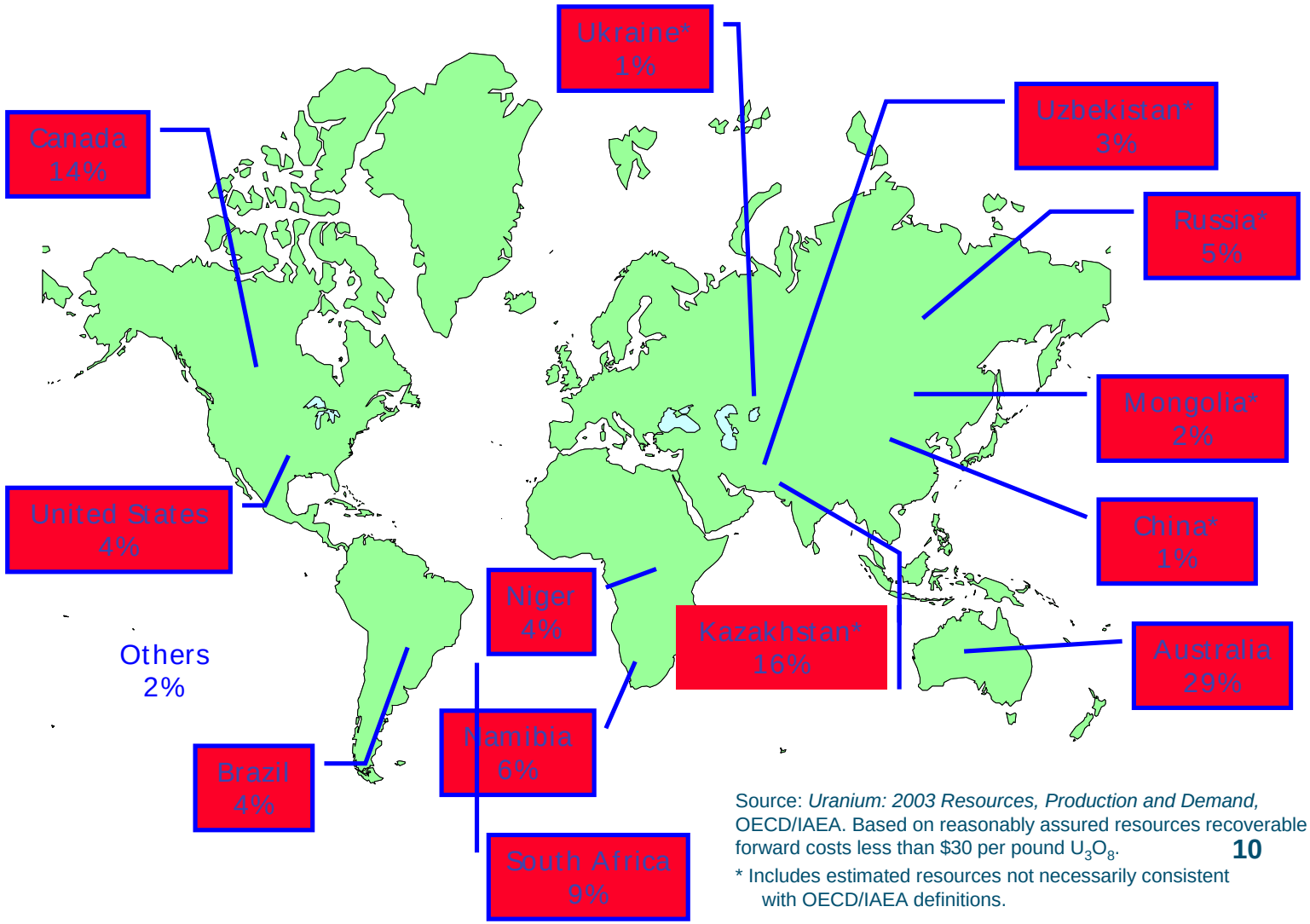
Global Industry

- In 2004
  - Greater than 80% of U.S. needs came from foreign sources
  - 88% of enrichment was from foreign production, with about 40% coming from Russia
  - Virtually 100% of fabrication was from domestic sources
  - U.S. supplies only about 15% of foreign markets

Global Industry

- Not only has there been a shift to more foreign supply, but the number of countries producing nuclear fuel has also increased

Uranium Resources

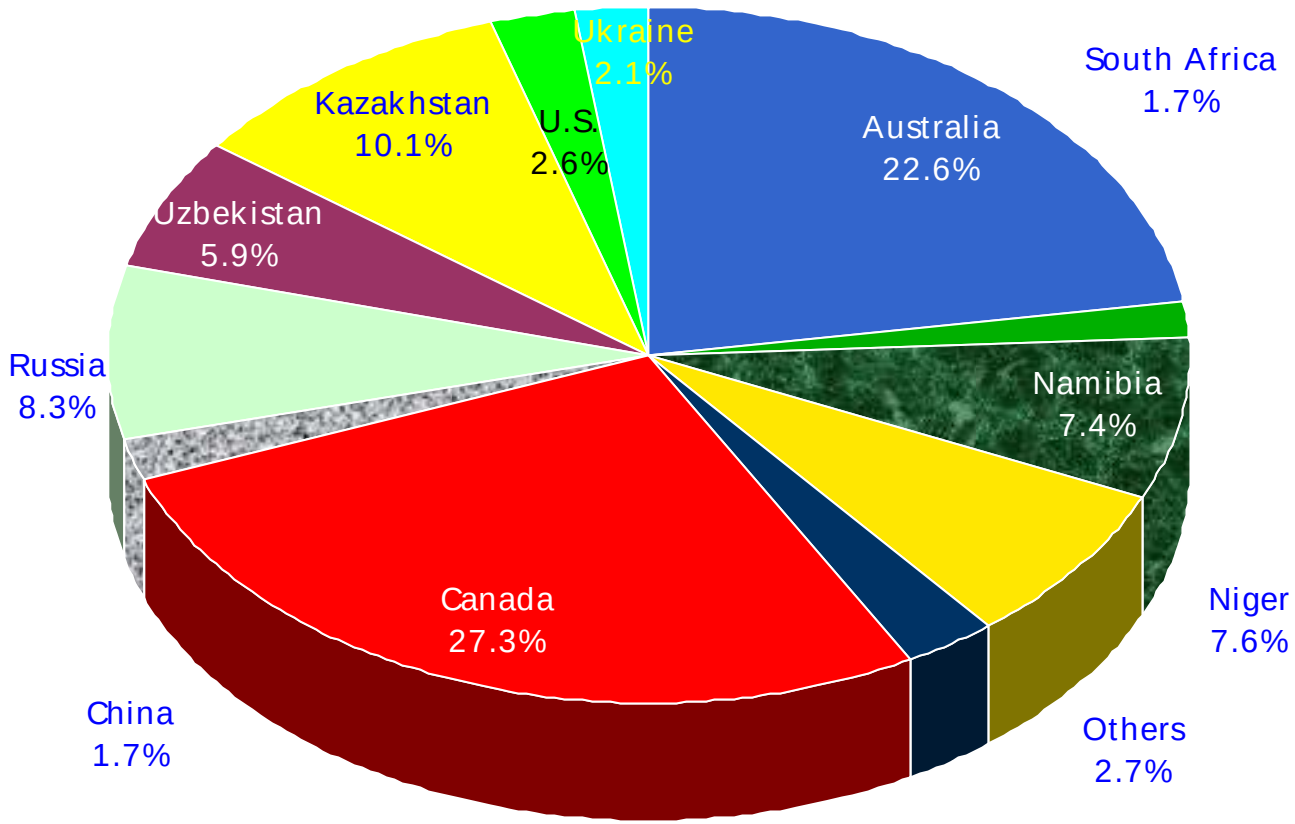


Source: *Uranium: 2003 Resources, Production and Demand,* OECD/IAEA. Based on reasonably assured resources recoverable at forward costs less than $30 per pound U_3O_8.

* Includes estimated resources not necessarily consistent with OECD/IAEA definitions.

Estimated 2005 Worldwide U_3O_8 Primary Production

Total = 110.8 million pounds U_3O_8

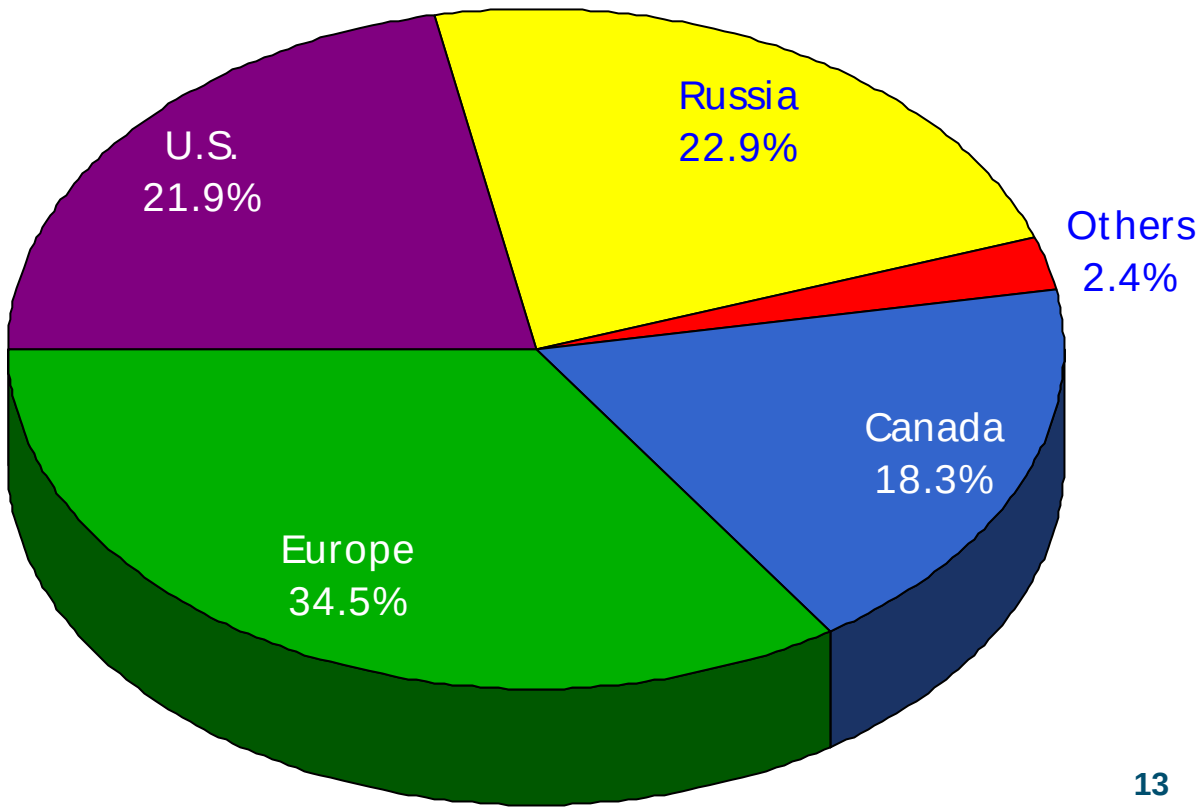


Commercial Conversion Facilities (Operating, Under Construction, Planned)

Source: NAC International, Fuel-Trac Database

Estimated 2005 Worldwide U_3O_8-to-UF_6 Primary Production

Total = 50,300 MTU as UF_6

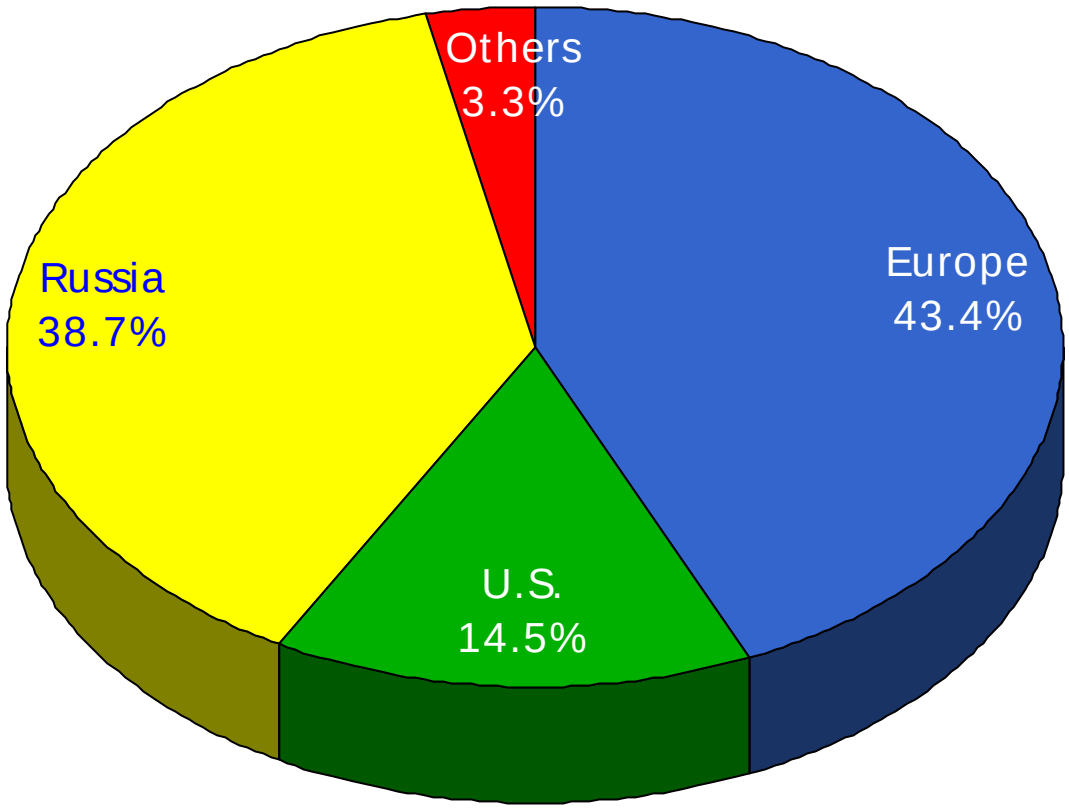


Commercial Enrichment Facilities (Operating, Under Construction, Planned)

Source: NAC International, Fuel-Trac Database

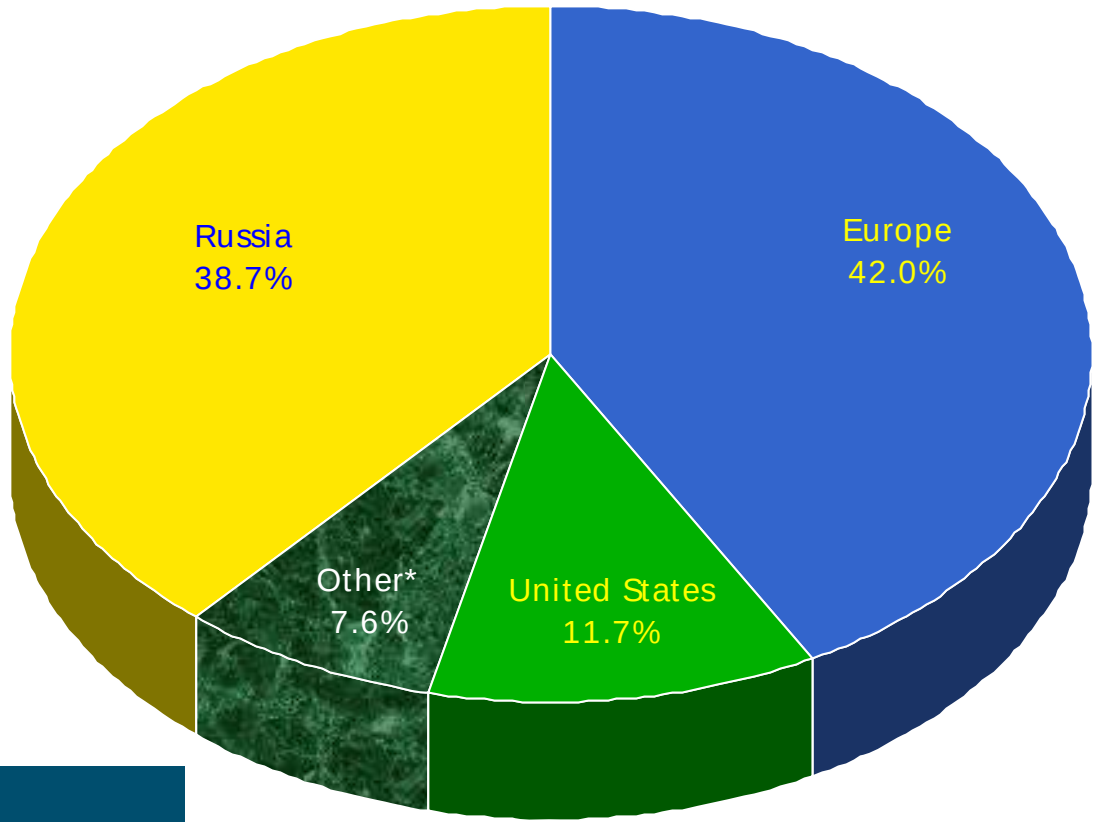
Estimated 2005 Worldwide SWU Primary Production

Total = 37,600 MTSWU



2004 Deliveries of Enrichment Services to U.S. Utilities by Origin Country

Total = 11,785 MTSWU



* Includes quantities for which specific country in Europe was not reported

Source: U.S. Department of Energy – Energy Information Administration

Commercial LWR Fabrication Facilities (Operating, Under Construction, Planned)

Source: NAC International, Fuel-Trac Database

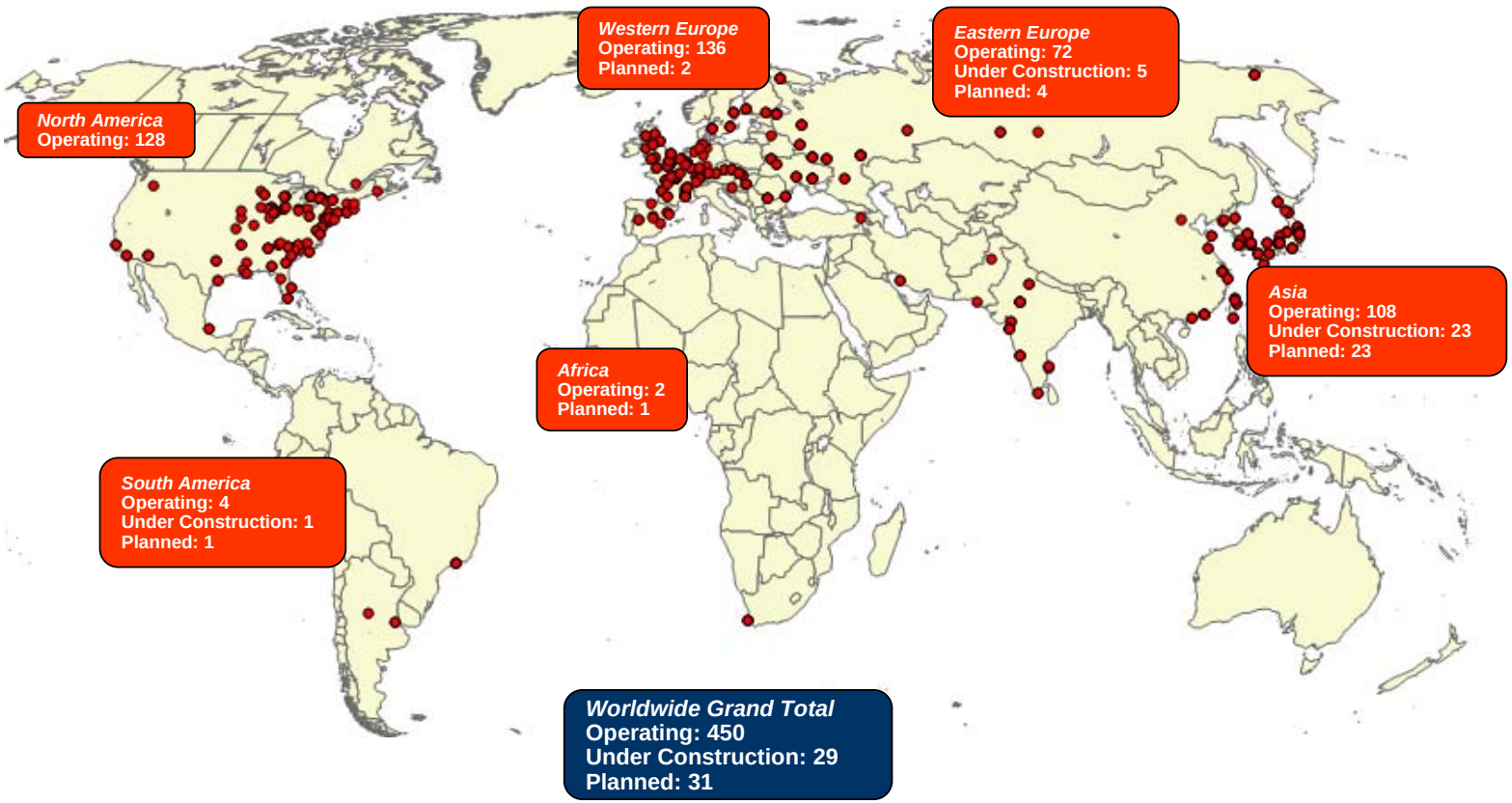
Commercial Reprocessing Facilities (Operating, Under Construction, Planned)

Source: NAC International, Fuel-Trac Database

Commercial MOX Fabrication Facilities (Operating, Under Construction, Planned)

Source: NAC International, Fuel-Trac Database

Commercial Reactor Data By Region (Operating, Under Construction, Planned)



Source: NAC International, Fuel-Trac Database

Implications for the U.S.

- Transportation has become more important and more complicated
- Instead of the U.S. controlling nuclear most materials in other countries, other countries largely control the privately-owned nuclear materials in this country

Role of Transportation

- Until recently the importance of transportation was reduced by the substantial domestic production in the U.S. and large inventories of fuel stored around the world
- These inventories have been reduced significantly in recent years (over 600 million lbs. of uranium in the last 10 years)
- Privately owned nuclear fuel is largely imported
- As a result transportation has become increasingly important

Role of Transportation

- In order to maintain a reliable global transportation network
  - Transportation infrastructure
    - Licensed containers
    - Carriers
    - Acceptable ports
  - Government agreements
    - Limit usage
    - Require tracking and reporting

U.S. Tracking

- Nuclear Materials Management and Safeguards System (NMMSS) is the U.S. system for nuclear materials accountancy
- Requirements are continually increasing

U.S. Tracking

- To operate effectively U.S. users and processors of nuclear fuel must report timely and accurate information
- Some countries perform annual reconciliations
- Improving reporting
  - More uniform NRC/DOE requirements
  - More flexible software
  - Better service and more efficient system operations
  - Improved data quality

Conclusion

- An essential part of the global nuclear fuel market is the compliance with our international obligations to track and report on nuclear materials under U.S. control
- To do this effectively we need industry cooperation and a government responsive to the changing environment