



# URANIUM SUPPLY PROCESS FOR RESEARCH AND ISOTOPE PRODUCTION REACTORS

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# Presentation Outline

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- Foreign Research Reactor (FRR) Uranium Supply Program Overview
- LEU Production Process
- LEU Supply Process
- Summary

# Y-12 FRR Uranium Supply Program Overview

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- The Y-12 National Security Complex (Y-12) supports the Department of Energy (DOE)/National Nuclear Security Administration (NNSA) in supplying LEU metal at 19.75 wt. %  $^{235}\text{U}$  to FRR community.
- LEU is produced by down blending surplus U.S.-origin highly enriched uranium (HEU).
- In 1995, ~174 MTU HEU were declared surplus to national security needs.
- In 2005, an additional 200 MTU HEU were declared excess to national defense purposes.

## Overview (cont.)

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- ~ 20 MTU of the total surplus HEU are designated for research and test reactor fuel and targets for medical isotope production
- As of the end of February 2013, over 141 MTU of the surplus/excess HEU have been delivered for down blending and ~135 MTU have been down blended.
- >4.5 MTU have been down blended at Y-12 to 19.75 %  $^{235}\text{U}$  for research reactor needs.
- ~11 MTU LEU have been produced and ~9 MTU have been delivered to FRR customers.

# Nonproliferation Commitment

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- LEU for FRR supports the Surplus HEU Disposition Program  
Record of Decision:
  - Non-weapons usable
  - Recover economic value to extent possible
- RERTR – reliable and cost-effective uranium supplier for research reactors converting to LEU
- GTRI, FRR Spent Nuclear Fuel Acceptance & RRRFR Programs – returned /removed HEU may be exchanged for LEU credits under an NNSA supply contract
- American Medical Isotopes Production Act of 2012

# NNSA Authorizations

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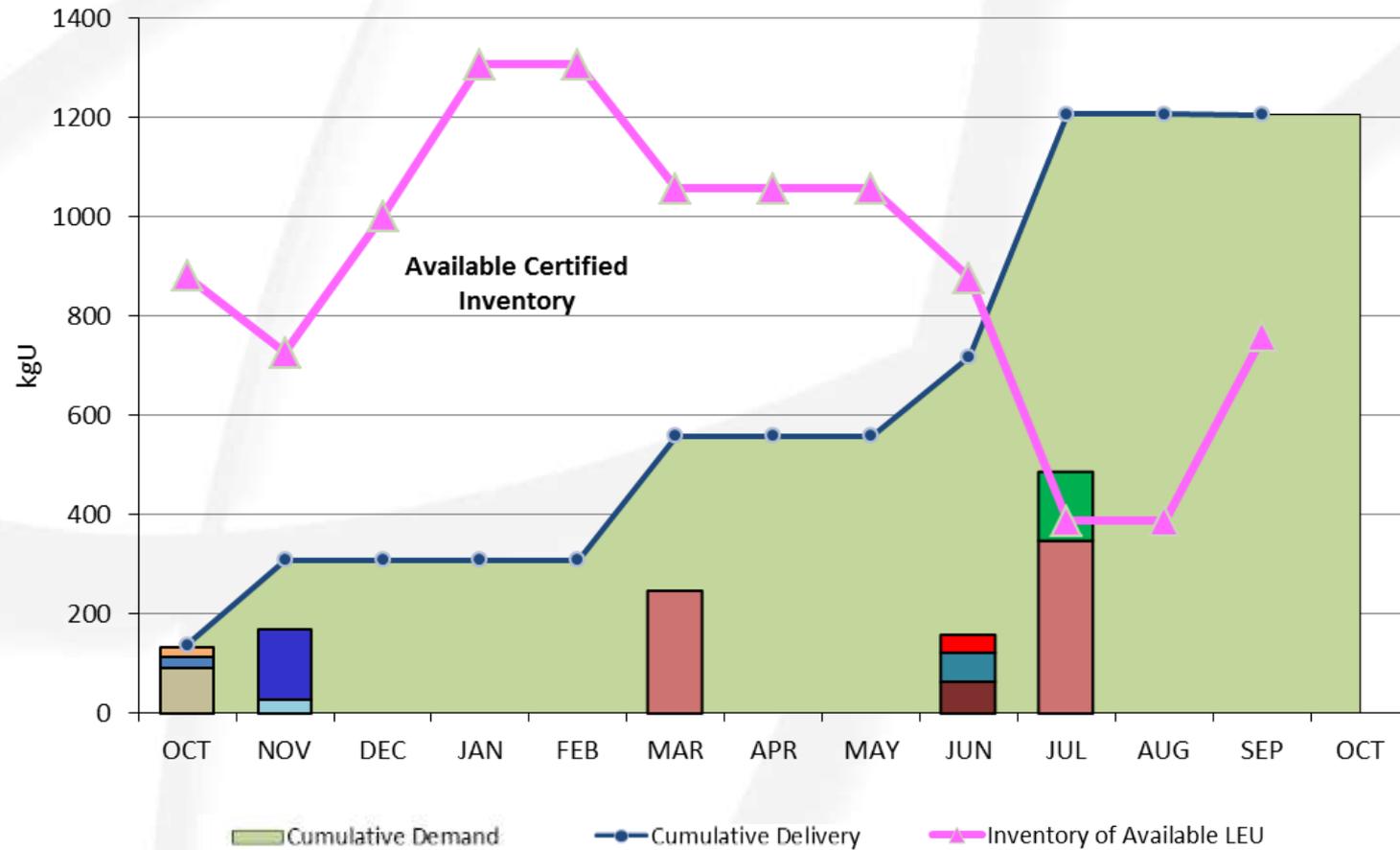
- Atomic Energy Act of 1954, as amended
  - Agreements for Cooperation
  - Project and Supply Agreements
- USEC Privatization Act of 1996
  - Secretary of Energy determination for uranium sales
- Energy Policy Act of 1992 and 2005
  - More stringent requirements for HEU exports
  - Medical isotope production

# LEU Production Process

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- LEU demand forecast for foreign research, test and isotope production reactors ~1200-1500 kgs per year
- Establish LEU production schedule based on this demand and delivery timeframes
- Maintain an on-the-shelf LEU inventory to meet customer orders and for more efficient processing.

# LEU Deliveries and Inventory





# LEU Production Process



# LEU Production Process



# LEU Production Process



# Enriched Uranium Supply Process

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- Customer submits an expression of interest specifying EU requirements
- Y-12 provides cost proposal
- Customer issues a letter of intent to purchase
- Y-12 drafts a supply contract
- Export license application submitted to U.S. Nuclear Regulatory Commission (NRC)
- Transportation logistics arranged
- Contract finalized and export license issued
- EU delivered to customer/fuel /target fabricator

# Low Enriched Uranium Lease Program Status

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- NNSA developing lease agreement approach, such as
  - Program management
  - LEU charging methodology
  - Contract language
  - Scrap take back provisions
- Request for Information from domestic producers
  - Contact information
  - LEU feedstock physical form and chemical specifications
  - Annual LEU feedstock demand
  - Composition of fresh LEU scrap, recycled LEU, spent fuel/irradiated scrap, etc. to be returned
  - LEU return quantities and frequency



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