Global Security and Strategic Partnerships

Presenter Name

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Presenter title

Presenter job area

National Nuclear Security Administration

Pantex

Y-12 National Security Complex

Y/PM-21-041

Mission Focus. Customer Alignment. Global Impact.

With decades of hands-on experience and expertise, the Pantex Plant and Y-12 National Security Complex are global leaders in:

- Nuclear Nonproliferation
- Advanced Manufacturing
- Global Security
- Nuclear Material Initiatives
- Material Innovation

Valued Partners

NNSA

- Defense Programs
- Defense Nuclear Nonproliferation
- Counterterrorism & Counterproliferation
- Naval Reactors

DOE

- Office of Intelligence/ Counterintelligence
- Office of Science
- Other National Laboratories and Sites

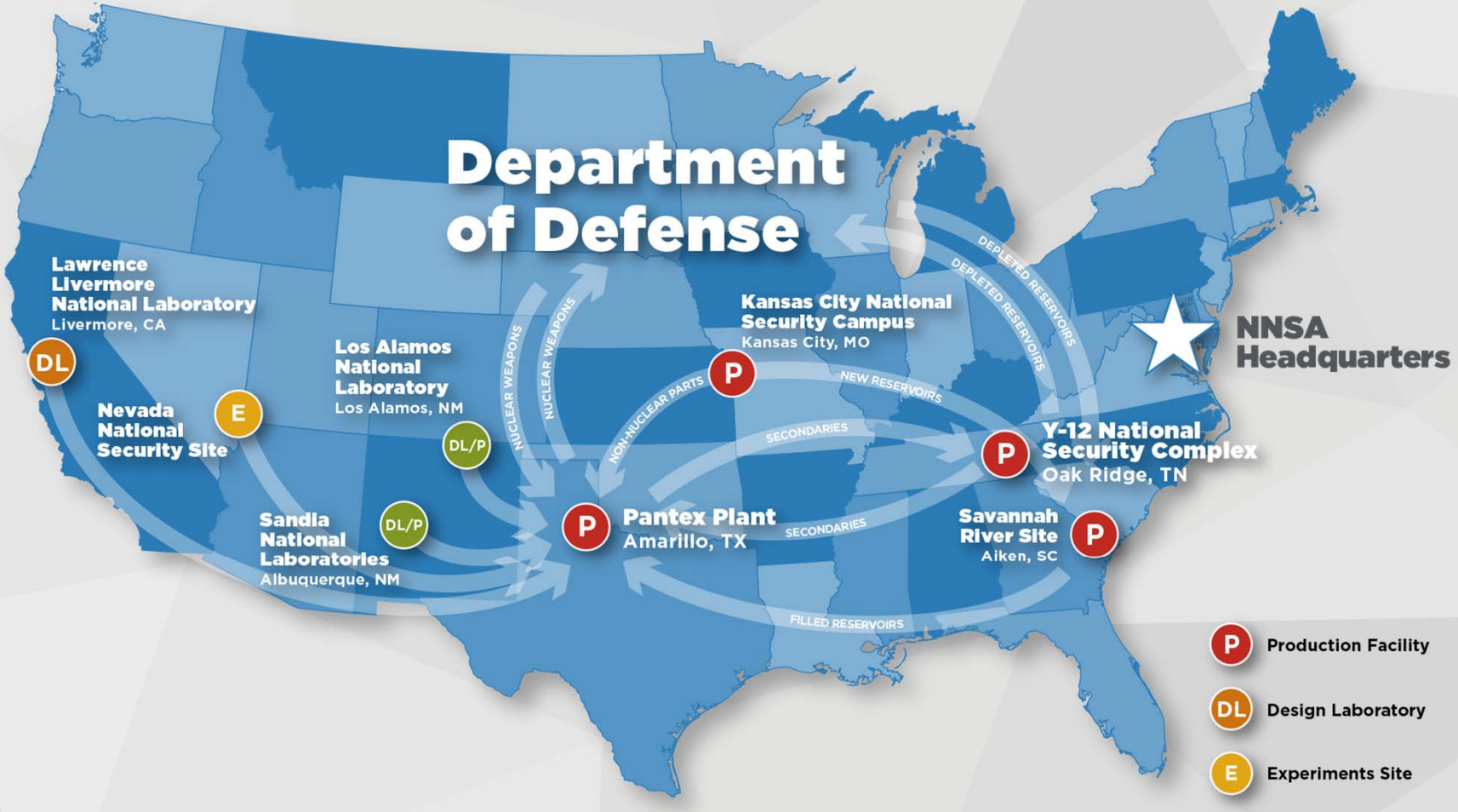
U.S. Federal Agencies

- Department of Homeland Security
- Department of Defense
- Department of Justice
- Office of Personnel Management
- National Aeronautics and Space Administration
- Intelligence Community

Non-Federal Entities

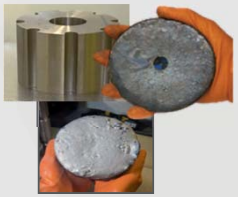
- Mutual Defense
- Foreign Government Research Reactors
- Academic Institutions
- Commercial Companies

Nuclear Security Enterprise



Overview of Capabilities

Nuclear Weapon Component Manufacturing, Assembly, Disassembly, Testing and Surveillance



SPECIAL MATERIAL

- Cradle-to-grave enriched uranium weaponization processes
- EU machining, fabrication, processing, recycle, & salvage
- Specialty nuclear fuel fabrication
- Packaging
- Reactor and fuel supply
- Lithium processing
- Lithium component manufacturing
- Lithium R&D
- Distribution of Certified Reference Materials

ENERGETIC MATERIAL

- Cradle-to-grave capabilities
- Synthesis
- Formulation
- Pressing
- Machining
- Extrusion
- Custom components
- Chemical & mechanical testing
- Test-fire and disposition
- Blast effects engineering & analysis
- Forensics
- Characterization

SECURITY & RESPONSE

- International Nuclear Security
- Nuclear smuggling detection & deterrence
- Vlunerability assessment
- Radiological/nuclear detection & response training
- Secure storage/transportation
- Remove and secure missions
- Counter-Terrorism Response & Training
- Radiological control / response

MATERIALS CHARACTERIZATION

- Analytical chemistry
- Material evaluation
- Nuclear forensics
- National Material Information Center
- Destructive and Non-Destructive Testing, evaluation, and surveillance
- Nuclear Materials Information Program

DETECTION & ANALYSIS

- Dedicated measurement sites
- HEU components and assemblies
- Monitored Dismantlement
- Technology Testing
- EU-HEU metallic enrichment standards
- Specialized Test & Evaluation Equipment
- Nuclear forensics
- Treaty verification

MANUFACTURING & PROTOTYPING

- Classified, precision machining and metal metrology
- Additive in polymer, metals, & special materials
- Large-scale
- Advanced prototyping
- Thermo-mechanical processing
- Welding and joining
- Design for manufacture
- Machine design
- Specialized tooling, enclosures & molds
- Manufacturing Supply
- Chain Cybersecurity

OTHER WEAPON CAPABILITIES

- Nuclear production hands-on expertise
- Inert trainer design, development, manufacturing & refurbishment
- Intrinsic radiation units
- Component availability
- High consequence test equipment
- High consequence facilities
- Specialized handling equipment design & manufacture

Special Manufacturing, Nuclear Nonproliferation, Global Security, Intelligence Analysis and Training

PANTEX

Amarillo, Texas

Key Mission Areas:

- Providing the nuclear deterrent for our nation and allies
- Ensuring our stockpile is strong and viable
- Reducing the total nuclear weapons in the stockpile
- Supporting the stockpile as the High Explosives Center of Excellence

Y-12 National Security Complex

Oak Ridge, Tennessee

Key Mission Areas:

- Maintaining the U.S. nuclear stockpile
- Reducing global threats
- Fueling the U.S. nuclear navy

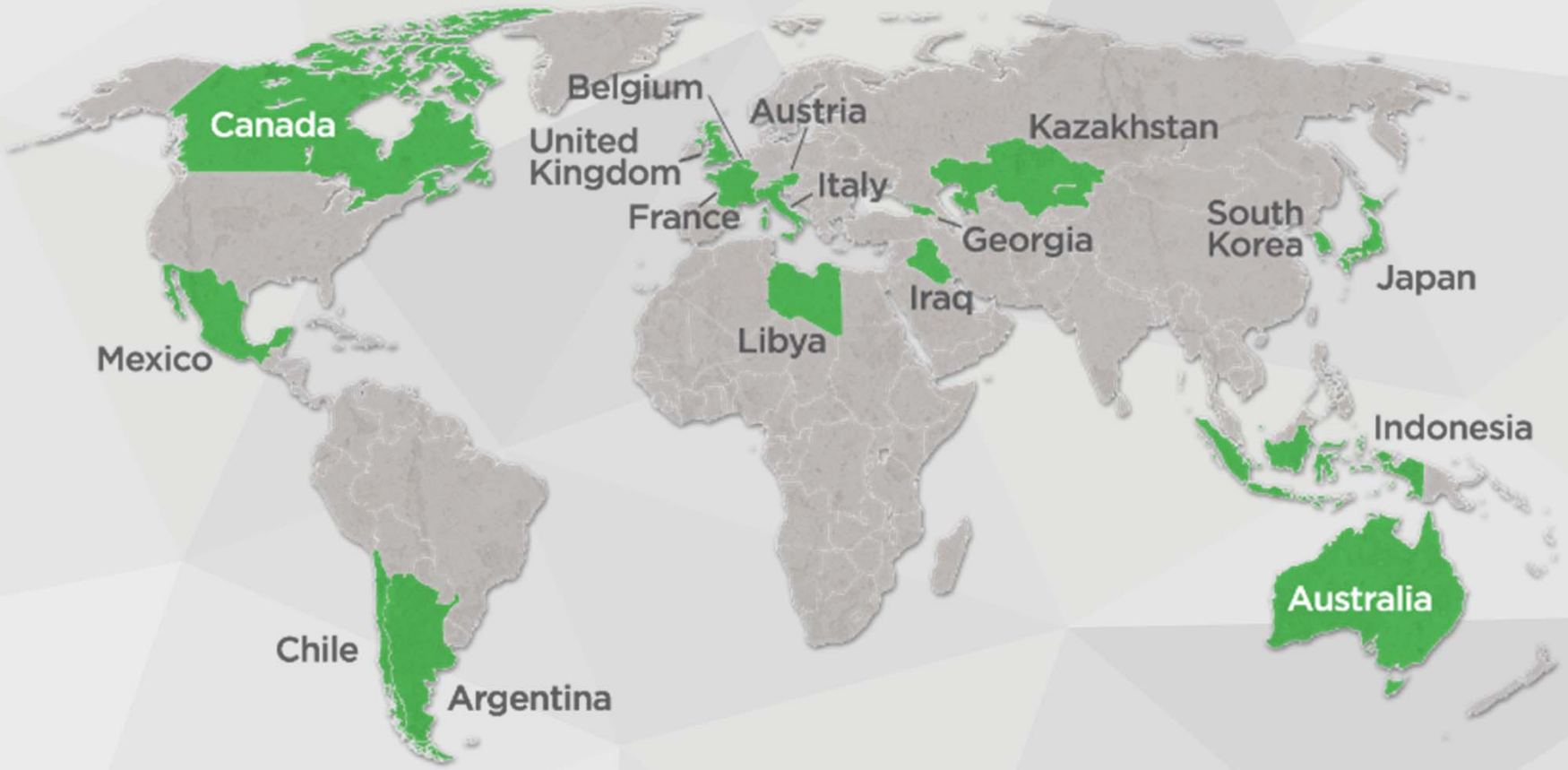
Focus Area One:

Nuclear Nonproliferation

Nonproliferation and Arms Control Research and Development

- Advancing the country's capabilities to detect and characterize nuclear weapon development activities globally
- Supporting the development and testing of policy options and technical capabilities
- Utilizing material expertise to support national-level activities in nuclear forensics and nuclear detection technology testing and evaluation
- Providing unique training and capacity-building programs
- Engaging internationally to promote nonproliferation and arms control norms and best practices

Reducing Nuclear Threats



Reducing Nuclear Threats

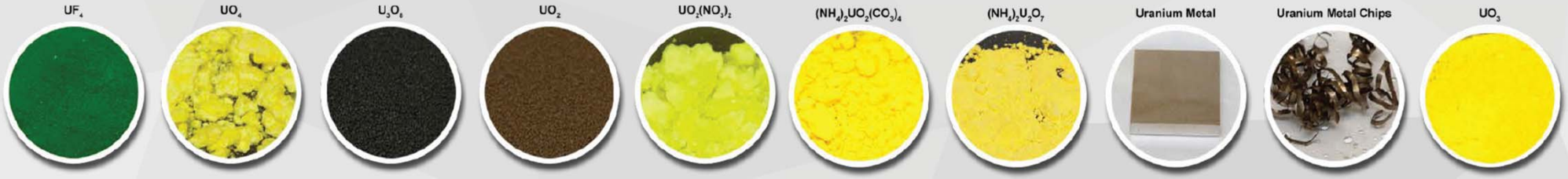
Nuclear Nonproliferation

Advancing U.S. Technical capabilities for:

- Highly enriched uranium and weapons-grade plutonium production detection
- Warhead and weapons material monitoring and verification
- Weapons development detection
- International nuclear safeguards
- Arms control/treaty verification
- Radiation detection
- Emergency response
- Nuclear forensics
- Scenario-based exercises and training
- Nuclear export controls
- Enhanced surveillance

Nuclear Detection and Analysis

- Nuclear Detection and Source Testing Center (NDSTC) Site 1: Y-12 Category 2 Nuclear Facility within High Security Area
- NDSTC Site 2: Y-12 Development Laboratories
- NDSTC Pantex: Weapons Cell, High Explosives Range
- National Uranium Forensics Archive at Y-12
- New Brunswick Laboratory Center certified reference materials



Current Customers

- Defense Nuclear Nonproliferation R&D (NA-22)
- Nonproliferation and Arms Control (NA-24)
- Stockpile Stewardship and Surveillance (NA-10)
- Department of Homeland Security (DHS)
- Defense Threat Reduction Agency (DTRA)
- Joint Product Leader for Rad & Nuc Defense (DoD JPdL-RND)
- Nuclear Forensics (NA-83)
- Nuclear Incident Response (NA-84)

Focus Area Two:

Advanced Manufacturing

Manufacturing Excellence

An enduring national asset for innovation in manufacturing:

- Transitioning from prototype design to the manufacturing floor
- Subject-matter expertise in precision manufacturing
- Solutions to solve manufacturability and commercialization challenges in a secure environment
- Technology transfer and industrialization of new technologies and designs
- National Prototype Center
- Materials development

Additive Manufacturing

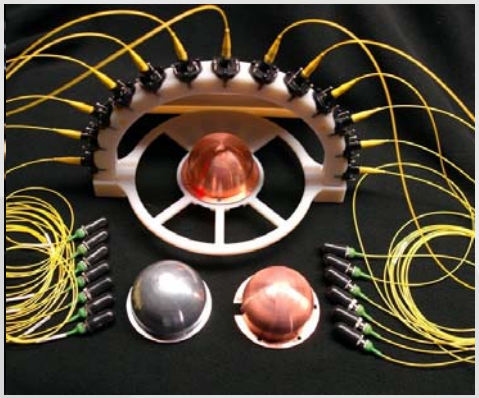
Expertise in additive manufacturing (AM) for national security applications:

- Firm understanding of AM
- Experience and expertise in precision manufacturing and design
- Concept-to-completion expert guidance
- Efficient and flexible process
- Knowledge of techniques for proper design and part setup
- Secure environment suitable for classified and compartmented projects

Development, Manufacturing, and Testing of High Explosives

Over 70 Years of HE manufacturing experience

- Production of stockpile components
- Training and Mock materials
- Blast effects engineering and analysis
- Forensics and technical support
- Characterization and qualification
- Custom formulations, components, and shaped charges



American Manufacturing Center – Quick Reaction Cell (AMC-QRC)

- Rapid and effective prototyping for smart design and fabrication
- Design-for-manufacturability, prototyping, and full-scale manufacturing
- Effective collaboration and integration to enable the success of complex manufacturing projects
- Education and workforce development
- State-of-the-art, cyber-secure manufacturing environment

Focus Area Three:

Global Security

Global Security Analysis and Training

Y-12 experts ensure safe, secure, and efficient operations for nuclear security around the world:

- Alarm Response Training
- Radiological Operations
- Defense Radiological Response Techniques
- Materials Protection
- Control and Accountability
- Nuclear Materials Production and Processes

Specialized Skills for Distinctive Challenges

Program expertise:

- Vulnerability and risk assessment
- Testing, evaluation, and demonstration
- Nuclear and radiological training
- Material control and accountability
- Nuclear safety capabilities
- Emergency management
- Physical security

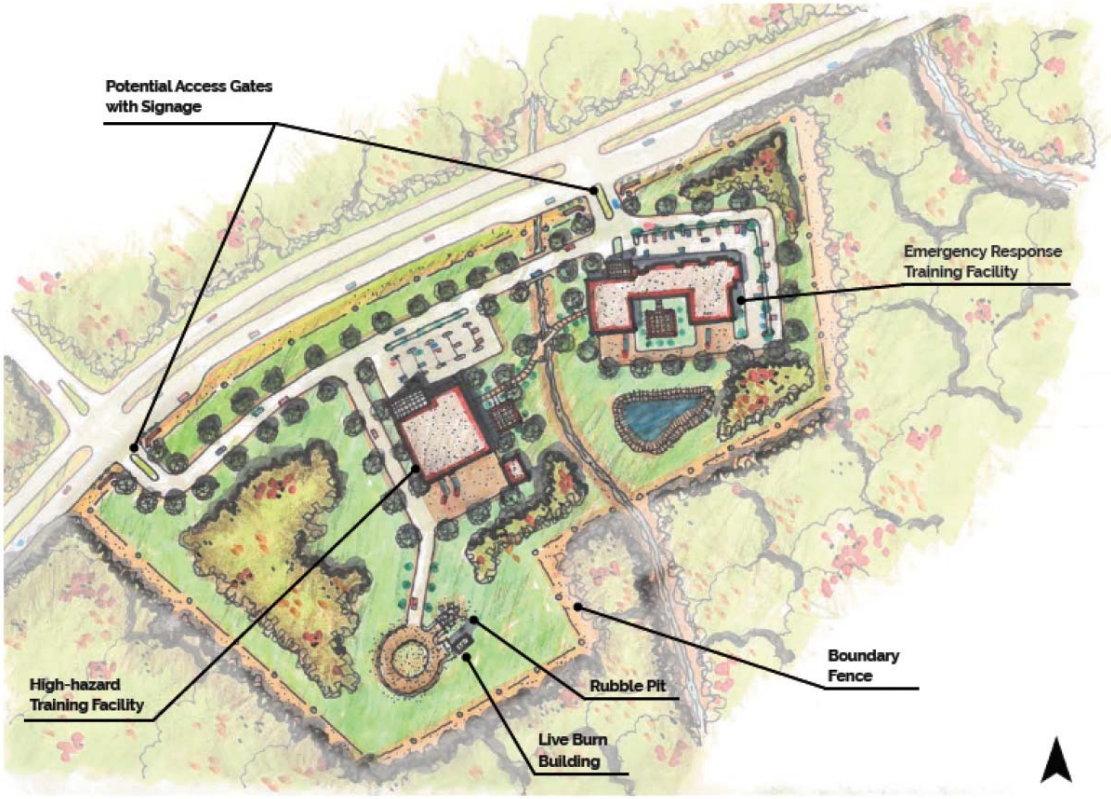
Oak Ridge Enhanced Technology and Training Center

- Joint federal- and state-fund investment
- First-of-its-kind training and demonstration venues for global collaborators
- Two main facilities:
  - Simulated Nuclear and Radiological Activities Facility
  - Enhanced Emergency Response Facility

Oak Ridge Enhanced Technology and Training Center

World-class expertise

- High-consequence operations
- Nuclear safeguards
- Nuclear detection
- Nuclear and radiological security
- Emergency management
- New technology performance testing and demonstration
- Other advanced technical and tactical training areas



The preferred plan is notional and will be updated throughout the planning process. Site amenities and support areas such as stormwater mitigation and gathering areas are included for illustative purposes and will be sized and refined during the design/build process.

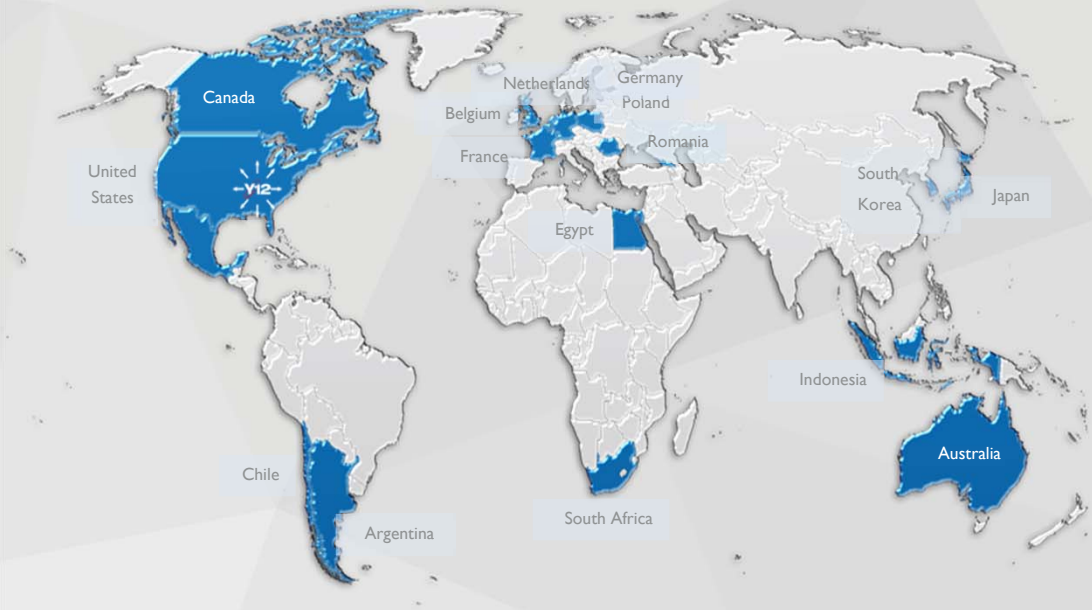
Focus Area Four:

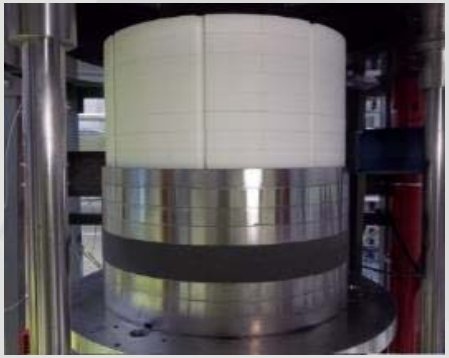
Nuclear Material Initiatives

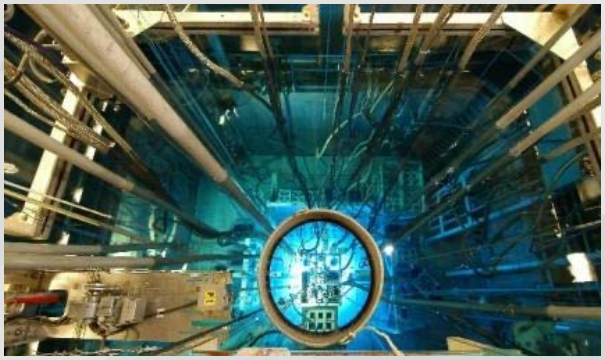
Decades of Expertise and Experience

- Expertise in enriched uranium processing, handling, and storage
- Full chemical and metallurgical processing of uranium
- Maintains and stores the nation's strategic reserve of highly enriched uranium
- An enduring mission to ensure support for long-term projects and programs
- Significant community support and local resources to call upon when needed
- Successful retrieval of nuclear material from around the globe
- Routine, on-schedule feed supply to customers

Supplying Enriched Uranium Fuel







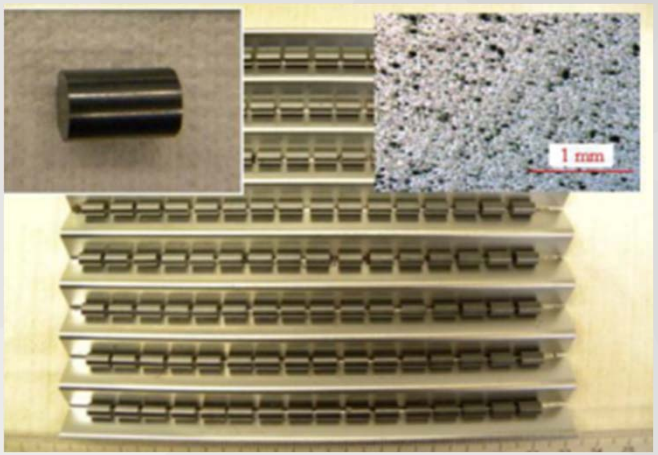
Protecting Materials and Capabilities

Pantex and Y-12 are fortresses for staging and storing weapons components, weapons materials, and production processes:

- Highly Enriched Uranium Materials Facility
  - Central repository for highly enriched uranium (HEU).
  - Provides maximum security for HEU
- Uranium Processing Facility
  - Built to ensure long-term viability, safety, and security of enriched uranium capabilities
  - Multi-building, $6.5B complex to be complete by the end of 2025

High Assay Low Enrich Uranium (HALEU)

- Currently supply HALEU (235U% >5%<20%), HEU, DU
- Relocating, upgrading, and optimizing HALEU production
- Recent and current fuel projects



A Notable Partnership: KRUSTY Core

- KRUSTY, or Kilopower Reactor Using Stirling Technology, is a kilopower reactor using Stirling technology
- KRUSTY is currently being tested by NASA to support deep space travel
- Y-12 experts manufactured and delivered the uranium reactor core in 2017

Focus Area Five:

Material Innovation

Uranium Center of Excellence

- Purified HEU metal production
- Uranium machining, fabrication, processing, recycle, and salvage operations
- HEU storage and inventory management
- EU supply and fuel component development

Lithium Center of Excellence

- Supply high-precision components from lithium and other special materials
- Lithium processing in all forms
- Technical expertise in all things lithium and other special materials
- Store the national supply of enriched lithium
- Produce deuterium gas for the production of lithium-deuteride
- Supply Y-12 operations with rubber and foam components

High Explosives Center of Excellence

- HE synthesis
- HE formulation
- HE pressing
- HE machining
- HE chemical/physical testing
- HE performance/safety testing

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Mission Focus.
Customer Alignment.
Global Impact.

- Hands-on experience and decades of experience
- Integral role in reducing global nuclear threats
- Skilled in solving national security problems
- Ready for new national security challenges

NNSA National Nuclear Security Administration

Department of Energy, United States of America

Pantex

Y-12 National Security Complex