

NBL PROGRAM OFFICE UPDATE

Pete Mason
Acting Director

<https://science.energy.gov/nbl>

Contact: NBLSales@science.doe.gov



Mission - Serve as US certifying authority for nuclear reference materials

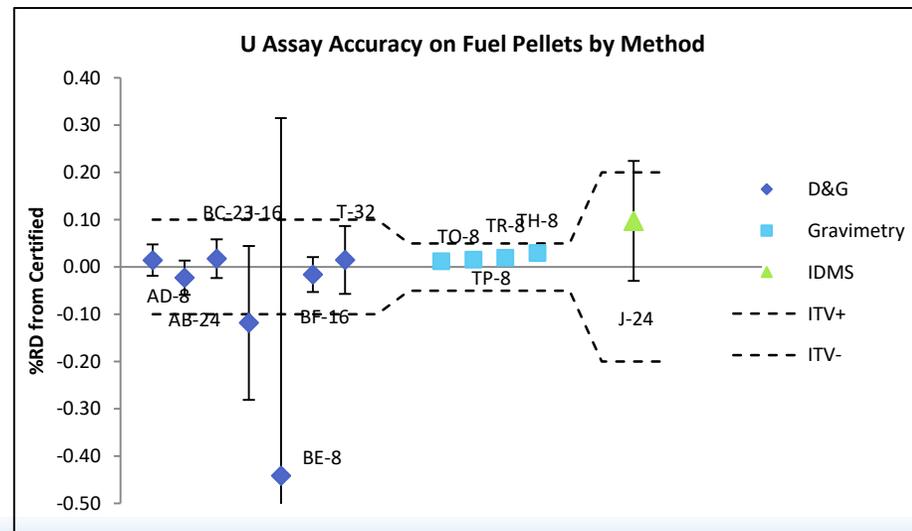
1. Ensure sales/distribution of nuclear reference materials
2. Produce and certify new/replacement RMs
3. Conduct proficiency testing exercises and provide measurement quality services



Reference materials are used for calibration, method validation, QA/QC, and performance testing

NBL Products Overview

- Catalog of 56 nuclear reference materials – uranium, thorium, plutonium
- Major supplier of the worlds nuclear CRM's
- NBL's largest programmatic customers reside in the NNSA
- Proficiency testing service (SME program)
- Technical support relating to CRM's and measurement quality
- Annually: 60-120 CRM shipments, 300-800 units
- Approximately 50% US, 50% international



FY18 DOE Sales

Laboratory	Purpose / Use of CRMs
DOE Labs use:	Programmatic work, Proficiency Testing (PT) program, Research
	DHS Projects, DHS Benchmarking, PT program, Isotopes Pgm, research
	U-233 for Uranium content of production line; PT program
	Quality Control, Environmental, Particle Analysis, PT program, Forensics
	Quantification of Plutonium, DHS project
	Particle Production for NA-24, PT program
	Uranium assay and isotopic determinations of Naval Fuels
	Calibration/validation of burn-up and other analyses of Naval Fuels
	Uranium analyses of product/feed for Naval Fuels
Other DOE lab	Calibration for DOE-mandated lab proficiency testing
NNSA Sponsored Sales	IAEA Safeguards in Japan
	Euratom safeguards
	Euratom Safeguards

FY18 Interagency Sales

Agency	Laboratory / Office	Purpose / Use of CRMs
US EPA	EPA Laboratory	Environmental Research
U.S. Army	U.S. Army Public Health Center	U-233 for urinalysis of US soldiers and DOD civilians
FDA	FDA Laboratory	Uranium quantification
DOD	Contractor lab	Development of neutron detectors for U.S. military
DOD	Contractor lab	Gamma spec calibration
DOD	Contractor lab	CZT detector development for U.S. military application
DOD	Contractor lab	R&D for Department of Defense program
DOD	Contractor lab	Nuclear Forensics; Research
DHS	Contractor lab	Forensics Reference Materials; Research
State	IAEA Laboratories and Offices	U and Pu for safeguards and Forensics Analyses
Interior	US Geological Survey	Environmental Research

FY 18 University or Research Sales

Company/University	End-Use Statement
US University	Geochemical research
US University	Research of sediment and water samples
International research institute	Calibration of mass spectrometer
Canadian University	Geochemical research on solubility of uranium in hydrothermal fluids
Canadian Research Institute	QC for the analysis of a uranium ore concentrate
German metrology institute	Calibration of ICP-MS for environmental analyses
Chinese Research Institute	Th CRM for QC
UK University	Natural salt marsh samples for stable uranium isotope composition
US University	Materials are measured as part of geochronology investigations.
Australian University	To measure U extraction isotherms
Canadian University	Mass spectrometer instrument calibration
US University	DHS and DOD projects

FY 18 Other Sales

Country	End-Use Statement
Romania	QC for U conversion for CANDU reactor fuel
US	Used in the production of calibration sources
US	QC and calibration of environmental measurements
South Africa	Calibration of Olympus Vanta & Olympus Delta XRF Analyzers.
Korea	Calibration for Safeguards equipment
Brazil	Proficiency test exercise, organized IAEA Safeguards
Spain	QC and calibration for environmental samples for geochemistry
Namibia	Analysis QC of the quality of our product before shipment to clients
Romania	Calibration and QC
US	XRF calibration for U and Th and QC
US	Pu-242 tracer in the analysis of samples
Italy	Method development and validation

Brief History

- 1949: NBL founded
- 1976: NBL re-located to Argonne site
- 1981-1987: NIST transferred U & Pu materials and functions to NBL
- 2004-2012: Stand downs, A76 competition
- 2014-2015:
 - Stand-down of operations
 - SC Committee of Visitors recommendation for reorganization
- 2016: NBL reorganized into NBL Program Office & B350 Legacy Project
 - NBL PO: Provide CRM's by contracting to DOE lab for storage, shipping, production, measurements
 - B350 Legacy Project: disposition of equipment and material+ clean-up and reuse of facility

NBL PO Activities 2016-now

- Digitization of 60+ years of records, publications on-going
- Oversee construction and operation of new distribution center while continuing pack/ship from B350
- B350 deinventory and clean up
- Project Activities
- SME proficiency testing resumed at key labs
- Ground-up restructure of program/business systems
 - Inventory, sales & customer service
 - New Quality Management System

U.S. Department of Energy

A Documentary History of the United States' First Plutonium Isotopic Reference Materials

NBL-RM-2010-NBL-Pu-History

Quality Management System (NIST/RESL)

- General, Structural and Resource Requirements (personnel, subcontractors, privacy)
- Management System (equivalent to ISO 9001)
 - Quality policy
 - Records control
 - Assessments, audits, corrective actions
- Technical and Production Requirements
 - Prod planning & control
 - Handling, storage, distribution, stability testing
 - Measurements, QC, records management, labels, complaints
- All RMs at a minimum require:
 - Homogeneity
 - Stability
- In addition to above Certified RMs require:
 - Critically evaluated methods (Modes doc)
 - Traceability
 - Data evaluation and uncertainty

INTERNATIONAL
STANDARD

**ISO
17034**

First edition
2016-11-01

**General requirements for the
competence of reference material
producers**

Modes of Certification

Mode	Description	Certified Value	Reference Value	Info Value
1	Certification based on measurements made in a designated laboratory using a single primary method with confirmation by other method(s)	X		
2	Certification based on measurements made in a designated laboratory using two independent critically-evaluated methods	X	X	
3	Certification/Value-Assignment using one or more critically evaluated methods at two or more collaborating laboratories	X	X	
4	Value-Assignment based on measurements by two or more laboratories using different methods		X	X
5	Value-Assignment based on a method-specific protocol		X	X
6	Value-Assignment based on measurements by a designated laboratory using a single method		X	X
7	Value-Assignment based on selected data from inter-laboratory comparison studies		X	X



NBL Center at Y12

- **Mission: The NBL Center at Y-12 provides a method to receive, store, and ship reference materials to domestic and international laboratories in support of nuclear safeguards, national security and nonproliferation programs.**
 - Occupies a small footprint — a 1,400-ft² modular building
 - Requires only a small crew (~6) to operate, making the first radiological shipment in April 2018
 - Formal ceremony June 2018
 - Operates within a high level of inventory control through the use of two computer systems
 - Is radiologically clean, with all radioactive materials in pre-packaged primary containers
 - Is designed to reduce the time and cost required for customers to receive radiological materials
 - Offers redundant verification of order filling for increased security and operates two to four times per month (on an as-needed basis), ensuring the most-efficient, low-overhead operation

Moving forward -

- Commitments In FY19:
 - Implement QMS and seek ISO 17034 & 17043 Accreditation
 - Program plan:
 - Comprehensive needs assessment of key US programs/labs
 - Pricing policy
 - Complete transfer of all items from B350 and full ops at Y12
 - Complete U method transfer to DOE laboratory
 - Complete transfer of all nuclear materials from B350
- FY20+:
 - Establish regular capability at DOE national lab
 - Budget and execute CRM priorities from program plan
 - Consolidate capabilities and focus on sustainability (personnel, budget, program)