National Nuclear Security Administration

# NBL PO News

Fiscal Year 2022 | Edition 2

INNOVATE. COLLABORATE. DELIVER.

## *From the Director*

Hello all. This is the second edition of the *New Brunswick Laboratory Program Office (NBL PO) Newsletter*, and I hope you're all doing well. We'd like to announce that our primary shipping/ packaging POC at the NBL Center at Y-12, Mr. Todd Hawk, retired on March 31st. Mickey Finch has been working with Todd and is taking over the shipping and management of the NBL Center. Todd has stayed on as a part-timer. We're happy to report that shipping turnaround times continue to decrease and we're looking forward to working with Mickey. And, of course, many thanks to Todd as he was instrumental in setting up the NBL Center, worked tirelessly to assist in the transfer of 1,000's of our items, and set up the systems and communication networks necessary to perform radioactive material shipments from Y-12. Thanks Todd! As always, we welcome any and all feedback. Comments, concerns, or complaints can be addressed to me at peter.mason@nnsa.doe.gov or to NBLSales@nnsa.doe.gov.

## *NBL PO Participates in International Consensus Committees for ISO, ASTM, and ANSI*

The NBL PO is an active participant in the work of ISO Technical Committee for Reference Materials, TC 334, by providing technical expertise to the U.S. Technical Advisory Group of this Technical Committee. The precursor to TC 334 was the ISO Committee on Reference Materials (ISO/REMCO). ISO/REMCO has been actively developing guidance documents aimed at promoting harmonized approaches to producing and using reference materials (RMs) for chemical analysis since the 1970s. ISO/REMCO was recently transformed from an advisory committee to the TC. Current activities include converting ISO/REMCO guides into other forms of ISO output such as international standards. These outputs encompass competence of RM producers, uses of RMs, terminology, RM documentation, quality control materials, and RM value assignment principles. The content of these documents is relevant to the production and use of Certified Reference Materials (CRMs) produced by the NBL PO as well as to the general use of RMs throughout the nuclear measurement community. The details of the change from ISO/REMCO to TC 334 and the attendant documentary standards work will be presented at the Institute of Nuclear Materials Management 63rd Annual Meeting in July 2022.

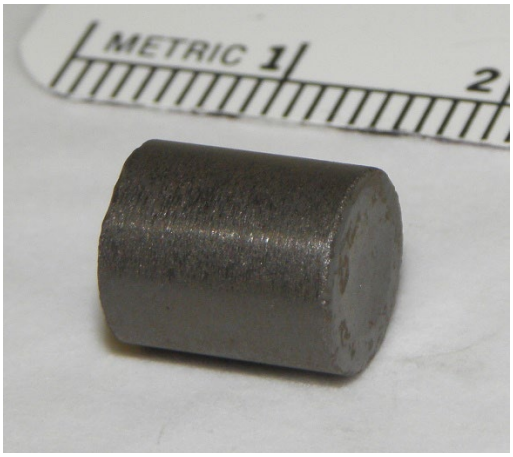
The NBL PO also participates in the revision and review of existing and new consensus standards for ISO TC 85, *Nuclear Energy, Nuclear Technology, and Radiation Protection*; ASTM C26, *Nuclear Fuel Cycle*; ASTM E10, *Nuclear Technology and Applications*; ASTM E11, *Quality and Statistics*; and ANSI N5, *Methods of Nuclear Material Control*. The NBL PO revised two test methods for the measurement of plutonium mass fraction by controlled-potential coulometry, C1108 and C1165, for committee ballot. These revised standards should be approved and published in the next few months. The NBL PO is leading the ANSI writing team for N15.41, *Derivation of Measurement Control Programs - General Principles*.

NBL PO continues to support the International Atomic Energy Agency's (IAEA) Nuclear Fuel Cycle Analysis Division with technical input for the revision of the International Target Values used to evaluate safeguards measurements.

## CRM Activities

**C137/C137A – Plutonium Isotopic Standard:** Two of the laboratories performing isotopic assay of C137A have completed their data collection and submitted data to the NBL PO. Three remaining laboratories participating in the C137A recertification effort are targeting April 2022 for completion of their respective measurement campaigns.

**C125A – $UO_2$ Standard:** The NBL PO recently made some editorial and informational updates to our C125A (5 gram) uranium oxide fuel pellet Certificate of Analysis. We added source and procurement information of the pellets and added informational values for impurity measurements performed as part of material production. We continue to update and evaluate our current Certificates of Analysis to ensure compliance with applicable international standards. When we make substantive changes to a certificate, we will inform customers who ordered the material in previous years. The updated Certificate of Analysis (and all of our certificates and reports) is available on the NBL PO website: NBL Program Office | Department of Energy




**C112A – Natural Uranium (NU) Metal Standard:** The Oak Ridge National Laboratory (ORNL) has been preparing to receive and repackage a number of our 26 gram C112A natural uranium metal standards in order to refresh our inventory. The NBL PO is currently preparing an uncertainty evaluation of the high-accuracy titrations that ORNL previously provided in order to issue an improved Certificate of Analysis for this material. Once complete, the NIST Statistical Engineering Division and Chemical Sciences Division will provide an independent review of NBL PO's evaluation prior to NBL's publication of the new certificate.

**Other Activities:**

The NBL PO is collaborating with several DOE laboratories to develop a replacement for depleted metal uranium standard C115 to issue a new neptunium standard certified for neptunium content, and to develop uranium radiochronometry standards with a 5 to 10 year 'age.'

Work continues at the ORNL and Savannah River National Laboratory (SRNL) on refurbishment of analytical laboratories in support of future NBL PO mission activities. In addition to analytical work, the ORNL will also store a sub-set of key NBL materials as an alternative to our primary storage and shipment site at the Y-12 National Security Complex.

## NBL PO Supports IAEA Nuclear Material Round Robin

The IAEA's Fiscal Year 2022 Nuclear Material Round-Robin (FY2022 NMRoRo) is intended to be a proficiency testing exercise conducted by the IAEA's Office of Safeguards Analytical Services (SGAS) within the Department of Safeguards of the IAEA. Although the intended participants are the IAEA's current Network of Analytical Laboratories (NWAL), other laboratories or commercial entities are encouraged to participate, provided the requested tests fit into their routine analytical practices. For the FY2022 NMRoRo, the agency has selected two samples, a low-enriched uranium oxide powder and a mixed plutonium/natural uranium dried nitrate, for distribution to participating laboratories. The NBL PO has funded several US participants to the FY2022 NMRoRo as part of our measurement quality mission.

## NBL PO Material Application Notes

NBL PO's RMs are used for a variety of purposes across the governmental and private spectrum. We are highlighting a few applications here for materials ordered this year.

- A DOE laboratory is using U630 enriched oxide in the production of particle standards to support international safeguards and nonproliferation efforts.
- Another DOE laboratory is using natural uranium metal C112A as starting material for evaluating the effects of radiological materials in biological systems (human tissue, bacteria, algae).
- Another DOE laboratory is utilizing enriched uranium oxide standards C969 and C146 to develop and demonstrate radiation detection instrumentation being developed.
- A commercial provider is providing packaging as a sealed source for the high enriched oxide.
- An oceanographic research facility is using our natural uranyl nitrate solution and a 50% enriched oxide material to calibrate a mixed uranium/thorium spike used for dating geological materials.
- A commercial standard provider is using our natural uranium oxide C129A to prepare custom instrument calibration standards and to provide spectral measurements.
- Two US universities are using NBL CRMs for environmental studies, including C106A for determining thorium in soil and C129A for studying migration of uranium through a natural wetland.
- An eastern European government laboratory is using C101A to produce radiations standards used to measure the radioactivity of building materials.

These demonstrate just a few of the applications of our materials. Future newsletters will detail specific applications.

## Standards/RM Community Meets In-Person

After a one-year postponement, the 12th edition of the Methods and Applications in Radioanalytical Chemistry (MARC) Conference, held every three years, took place in Kailua-Kona, Hawaii, April 3-8, 2022. At the conference, the NBL PO director Pete Mason provided a quick update on activities with a presentation titled, "NBL Program Office Nuclear Reference Materials Plans." Other presentations related to NBL PO programs and activities included, "Method Development in Support of Recertification of Plutonium CRMs 136, 137, and 138" by K.J Mathew from the Los Alamos National Laboratory; "Production and Characterization of NBL Plutonium Isotopic Standard CRM137A" by T. Parsons-Davis from Lawrence Livermore National Laboratory; and "Los Alamos National Laboratory's over 25 Years Efforts Supporting Standard Production and Characterization for Various National Security Programs" presented by L. Tandon from Los Alamos National Laboratory. The full program is available at the conference website located here: FinalProgram_20220322.pdf. Several conference attendees took advantage of the venue to discuss topics related to nuclear standards, RMs, proficiency testing, and new analytical methods, tools, and techniques. An outcome of these discussions is to plan for a workshop focused on community needs and priorities to be held at the Radiobioassay and Radiochemical Measurements Conference (RRMC) from October 31st through November 4th in Atlanta, GA. The goal of this workshop will be to solicit input from the community on needs and priorities. Conference attendance information can be found at the conference website here: https://www.rrmc.co/; those wishing to participate in the workshop should contact the NBL PO at NBLSales@nnsa.doe.gov.

# NBL Program Office

NNSA National Nuclear Security Administration

# Type B Shipping Container Update

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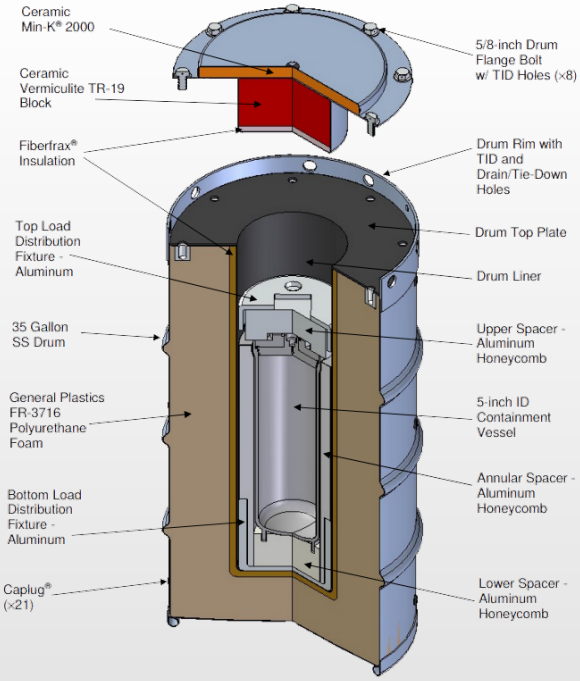


Figure 1 — Three-Dimensional Cut Away Illustration of the 9978

The New Brunswick Laboratory Program Office (NBL PO) has been working on improving the availability of Type B containers for our domestic plutonium reference material shipments, and we plan to make our containers available to other users within the NNSA Office of Defense Programs and for broader NNSA use as needed. In addition to taking ownership of nine 9978 containers, we are funding Safety Analysis Report for Packaging (SARP) revisions for both 9978 and 9977 shipping containers.

**9978 Actions Currently Underway/Planned:**

1. NBL PO has agreed to take ownership of nine 9978 drums currently staged at Argonne National Laboratory after current materials are shipped and unloaded at Los Alamos National Laboratory (LANL). To support this ownership transfer, NBL PO has funded the review of Docket 22-13-9978 to incorporate the letter amendment regarding their current contents into the SARP. This effort is in progress.
2. NBL PO is also planning to fund a second SARP revision to potentially expand the maintenance period beyond 1 year—possibly to between 3 to 5 years.
3. NBL PO plans to store the 9978 drums at LANL and make them available to other programs as needed.

**9977 Actions:**

1. The NBL PO submitted a Request for New Content form to the NNSA Office of Packaging and Transportation in September 2021 asking for glass and quartz to be added to the approved contents list. The NNSA Office of Packaging and Transportation indicated they would start on this request after SARP Revision 5 is completed.

Please contact the NBL Program Office at NBLsales@nnsa.doe.gov with questions, comments, or suggestions.

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