

Fuel Fabrication Standards

MPACT 2023 Annual Meeting Agenda

June 26-28, 2023

ORNL is managed by UT-Battelle LLC for the US Department of Energy

Key Personnel

Westinghouse Columbia Fuel Fabrication Facility

- Jeff Coleman
- Brian Crout

Oak Ridge National Laboratory

- Philip Gibbs
- Rachel Hunneke
- Bob McElroy
- Susan Smith

Motivation/Benefits

- Leverage national lab assets to solve challenges in industry
- Westinghouse CFFF does not maintain a formal NDA team outside of the NDA measurement technicians performing the measurements
 - Filling a technical gap to help industry
 - Transferring knowledge to commercial partners
 - Providing experience for junior staff to maintain US expertise

Scope

- Provide NDA expertise for fabrication, characterization, and statistical analysis of working standards for NDA systems in the URRS areas of CFFF
- NDA Equipment: Mirion **SGS** (with NDA 2000 Waste Assay Software and ISOCS) and **Q2** (with Genie 2000)
- Primary needs:
 - Standards to support measurements using SGS
 - Standards to support measurements using Q2

Primary NDA Equipment at CFFF

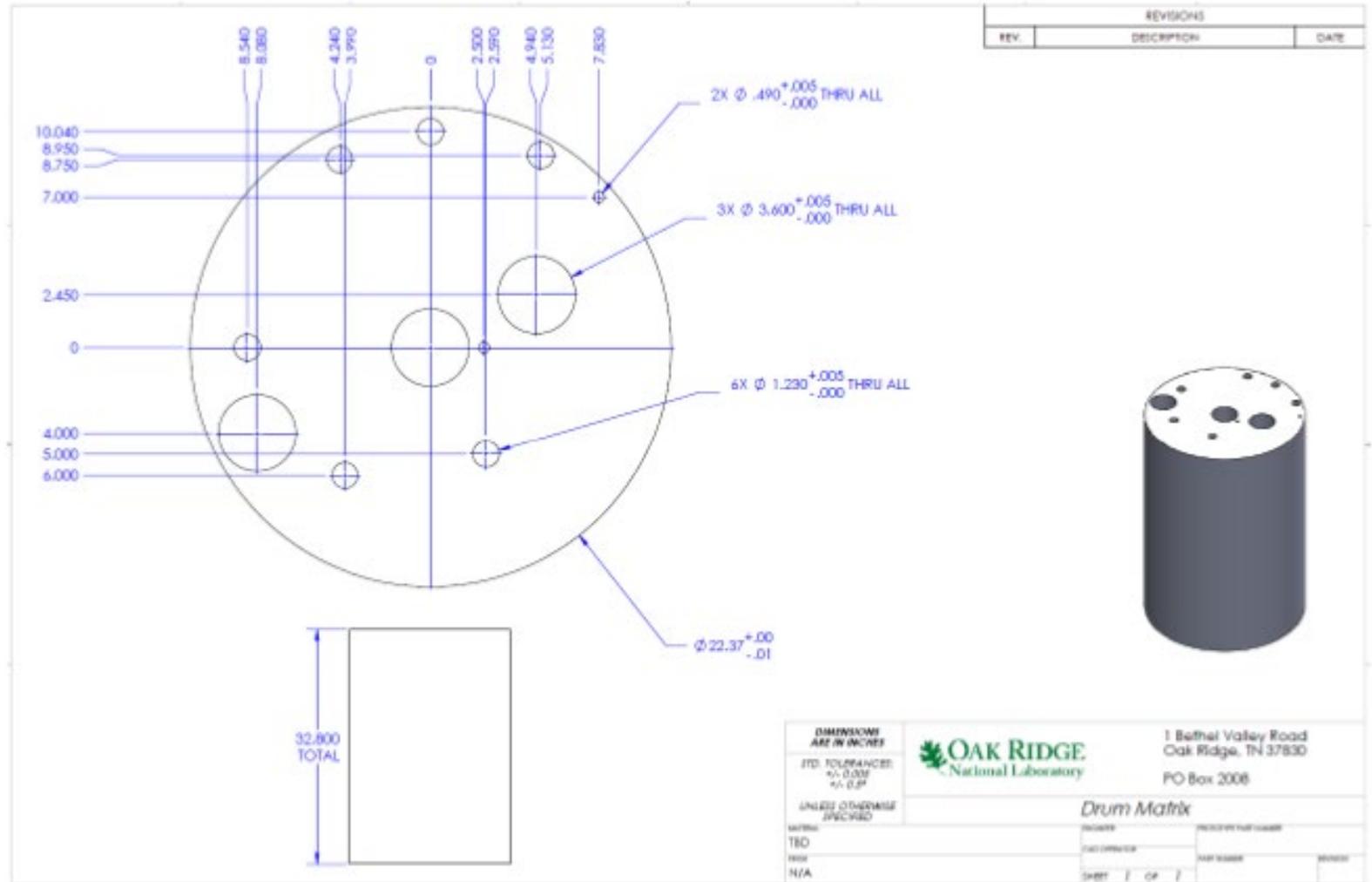


Working Standard Needs

- Needs for SGS →
 - Drum standards to represent Dry Active Waste
 - Standards to represent bagged HEPA filters using ISOCS
 - Standards to represent bagged Pre-filters using ISOCS
 - Wet standards “CUNO”
- Needs for Q2 → Trash Standards
 - Trash standards to support measurement of trash in Q2 system
 - Currently measurement data is sent to Mirion who provides calibration parameters
 - *Better characterized ash standards to extend calibration or new

Drum Standards

- Each “rod” contains 0.5g, 1g, or 2g of ^{235}U
- Combined to support mass range between 2g and 41.5g



Tasks

1. Development of work plan to outline fabrication specifications and characterization approach (ORNL/CFFF/NBL)
2. Fabrication of working standards (CFFF)
3. Characterization and validation of working standards (ORNL/CFFF)
4. Statistical analysis to complete the certification documentation (CFFF/ORNL/NBL)

Task Progress

- Task 1: Development of work plan to outline fabrication specifications and characterization approach
 - Work plan provided (October 2022)
 - Standards Design for Gamma Spectroscopy Measurements of HEPA Filters provided with more details for fabrication
- Task 2: Fabrication of working standards (CFFF)
 - Fabrication of HEPA Filter standards in progress
 - Fabrication of drum standards to begin soon

Task Progress (cont.)

- Task 3: Characterization and validation of working standards (ORNL/CFFF)
 - Draft characterization plan for the SGS with new drum standards
- Task 4: Statistical analysis to complete the certification documentation (CFFF/ORNL/NBL)
- If Task 2 (Fabrication of Working Standards) proceeds on time, Tasks 3 and 4 are planned to be completed by the end of the FY

Thank You

