

LA-UR-12-24010

Approved for public release; distribution is unlimited.

Title: Manufacturing/Production Steering Committee Meeting

Author(s): Castro, Richard G.

Intended for: Manufacturing/Production Steering Committee Meeting,
2012-08-13/2012-08-14 (kansas city, Missouri, United States)



Disclaimer:

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the Los Alamos National Security, LLC for the National Nuclear Security Administration of the U.S. Department of Energy under contract DE-AC52-06NA25396. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

JOWOG 22

Manufacturing/Production Steering Committee Meeting

Denise Korzekwa, US JOWOG Lead
Rich Castro, LANL UK Program Manager

Kansas City Plant
August 13-14, 2012

JOWOG 22: Nuclear Materials

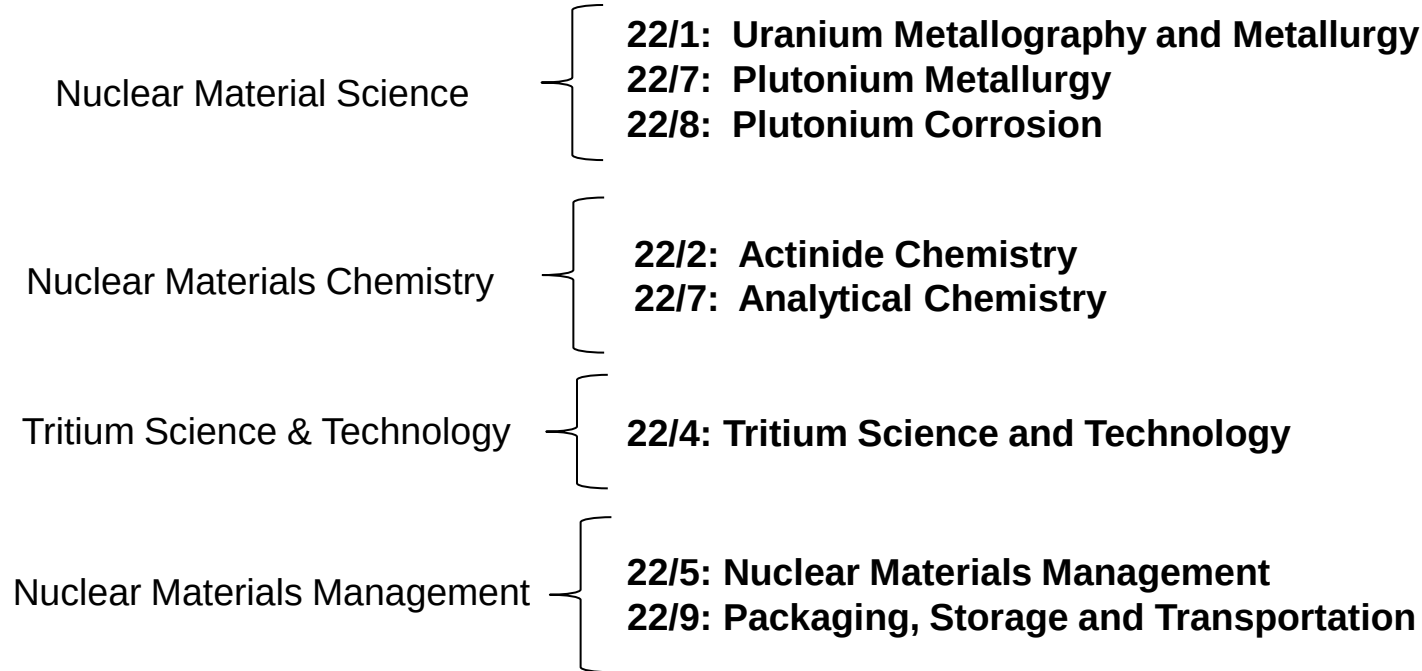


LANL: Deniece Korzekwa AWE: Paul Finnerty

Y-12: Bob Bridges

SNL: David Miller

LLNL: Kerri Blobaum



Responsible for the exchange and peer review of information as well as the fostering of collaborative programs on all aspects of nuclear materials, depleted uranium, tritium technology and chemistry.

JOWOG 22: Nuclear Materials

- Nuclear Materials Science

22/1: Uranium Metallography and Metallurgy

- Quantitative metallographic evaluation of uranium
- Focused exchange on alternate forming methods and microwave melting including experimental results.
- Information exchange on U-Nb aging.

- Ion polishing for metallography consistency - particularly dry preparation techniques
- Alternate forming methods at Y-12
- Exchanged detailed U-Nb aging data and model fitting that greatly enhances lifetime prediction of U-6Nb components.



22/7: Plutonium Metallurgy

- Homogenization, and its quantification
- Analysis of phase transformations in Pu-Ga alloys, morphological analysis, and its quantification
- Analysis of Pu-Ga materials using resonant ultrasound spectroscopy

- Manufacturing techniques exchange at AWE/LANL/LLNL (Joint J22 & J39 meeting)
- Exchange of casting simulation methodologies
- **UK samples arrived at LANL**

JOWOG 22: Nuclear Materials

- Nuclear Materials Science

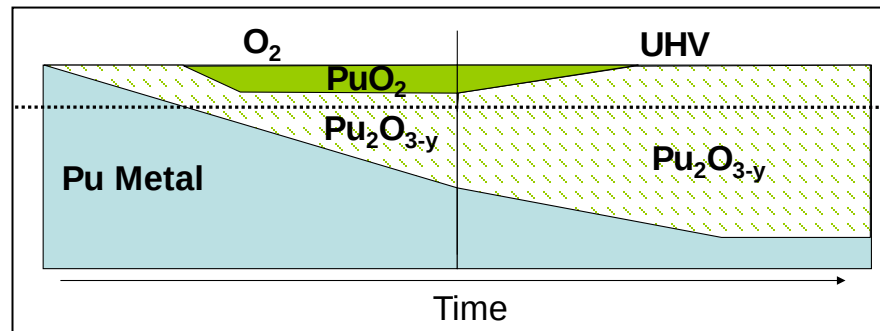
22/8: Plutonium Corrosion

Oxidation: Determining kinetics of oxidation using XPS and AES.

Modeling: Understanding actinide corrosion through the use of molecular modeling - hydrogen diffusion in UO_2

- Secondment at AWE focused on age-aware EOS modeling for Campaign 1 activities.
- UK samples arrived at LANL

Joint research program to determine kinetics and mechanism of the oxidation of Pu and the auto-reduction of Pu oxide over-layers.



More accurate representations of the plutonium/oxygen thin-film system based on the work conducted as part of a focused exchange within JOWOG 22/8.

JOWOG 22: Nuclear Materials

– Nuclear Materials Chemistry

22/2: Actinide Chemistry

- Pu metal preparation and residue recovery in support of manufacturing, certification and surveillance
- Treatment of legacy items and recovery / disposition as required
- Optimization of metal prep and recovery technologies through collaboration and peer review

➤ CaCl_2 electro-refined (ER) metal vs. NaCl-KCl salt. CaCl_2 ER testing at AWE provides a test case for LANL to verify manufacturability of the metal also examine recovery efficiencies using both aqueous nitrate and aqueous chloride.

22/6: Analytical Chemistry

- Analysis of Pu exchange samples by AWE (critical QC)
- New Technology Development (automation, TIMS, corrosion standards, radiochemistry techniques)
- Facility Infrastructure - CMRR
- Compatibility studies in Pu process

➤ New Technology Development - Automation of assay techniques being implemented through a collaboration with AWE.



JOWOG 22: Nuclear Materials

- Tritium Science and Technology

22/4: Tritium Science and Technology

Primarily a facility and capability based exchange.

The benefit is increased operating efficiency, better capabilities for process monitoring and improved process knowledge.

1. Material Characterization
2. Analytical Techniques
3. Tritium Processing
4. Target Loading
5. Disposal of Legacy Items

Planned Exchanges:

- *Focused Exchange: AWE mass spectrometer operator to visit LANL, SNL-CA and SRS, Summer 2012.*
- *Focused Exchange: Steel Sample Handling: AWE to SRS, CY 2013*
- *Exchange of tritiated samples for analysis (joint with JOWOG 31), CY 2013.*

Reinvigorate the exchange and identify an achievable path forward for increasing exchange activity on the topic of tritium science and technology.

JOWOG 22: Nuclear Materials

- Nuclear Materials Management and Transportation

22/5: Nuclear Materials Management

- System Audit and NDA Development
- MC&A Tracking System Development
- MC&A Support for Nuclear Material Exchange

22/9: Packaging, Storage and Transportation

- Design of Storage Containers, Storage Vault Concepts, Transportation and Disposition Paths
- Maintenance of international shipping procedure and points of contact and UK/US shipping forecasts
- Status of the development of PAT-1 Shipping Container

- Established a “Materials Channel” to facilitate the exchange of classified documents between the US and the UK such as shipping documents, etc.
- Working with DOE/NNSA to obtain a National Security Exemption for the AWG-630
- Managing the shipment of the Pu Loan account (J22 & J39)
- Providing information to NNSA/MoD on the PAT-1 Air Shipping Container
- Development of a system audit, an accountancy annex for MoD Shipping Procedure, the use of bar codes to track TIDs and the evaluation of commercial calorimeters.

JOWOG 22: Nuclear Materials

Scope of Current/Ongoing Exchanges

	Technical Topic	Work Scope	US Weapon Program
22/1	Quantitative Metallography Alternate Forming Microwave melting U6Nb Aging	Collection and exchange of independent quantitative data Exchange technical information on alternate forming methods Exchange microwave melting results Exchange U-Nb aging data and model fitting that greatly enhances lifetime prediction of U-6Nb components	Stockpile Stewardship
22/2	Tapered ER crucibles CeS crucible trials at AWE Evaluate switch to CaCl ₂ ER UK residue processing option:	Implementation of tapered casting crucibles at AWE, further trials of tapered ER crucibles. Trials of calcium chloride ER and subsequent material casting at LANL Focused exchange at AWE, Jul 2012 in concert with Pu Futures Meeting Residue Proposal - LANL to provide a cost estimate to AWE for processing electro-refine residues	Pu Sustainment

JOWOG 22: Nuclear Materials

Scope of Current/Ongoing Exchanges

	Technical Topic	Work Scope	US Weapon Program
22/6	Improvements to facilities and waste minimization. Method development and validation Actinide analysis related safety issues Quality improvement GUM uncertainty calculations	Transition of dissolution technology and separation science from glass to plastic containment Develop quantitative NDA methods Improve technologies for Pu & U Assay and Isotopics, and information exchange Exchange national security QA issues (eg. ISO17025) Improvements in analytical uncertainty calculations (eg. ISO / GUM)	Stockpile Stewardship facilities National security programs
22/7, 8	Round Robin analysis of AWE standards Hydrogen solubility	Analysis of AWE samples and secondment by AWE and LANL personnel.	Pu Sustainment/LDRD
22/5,9	Packaging for International Transportation of SNM	Prepare final Forward Action Plan	Enabling technology for other JOWOGS