LA-UR- 12-00055

Approved for public release;
distribution is unlimited.

Title:	JOWOG 39 Lead Meeting
Author(s):	Patrice A. Stevens ADPSM
Intended for:	JOWOG 39 Meeting at Nevada Facility Site Office Attendees: US DOE, NNSA, and Contractors UK Atomic Weapons Establishment Staff

Los Alamos
NATIONAL LABORATORY
EST. 1943

Form 836 (7/06)

Abstract
JOWOG 39 Lead Meeting
January 2012

This meeting will discuss the 2011 past highlights and planned events for the upcoming year. Topics include the Material Loan Repatriation Contract, Universal Solvent Enhanced Collaboration, and Plutonium Strategy.

JOWOG 39
Lead Meeting

Patrice A. Stevens
Associate Directorate
Plutonium Science and Manufacturing

January 2012

LA-UR XXXX

US/UK Exchange Summary for Reporting: JOWOG 39

Patrice Stevens (LANL) and Steve Allaway (AWE) (review period summary)

A total of 16 exchanges occurred during FY 2011 in the following areas:

- Material Repatriation deliverables and milestones on target.
- New collaboration in the area of LEP, Plutonium Grand Challenge (with JOWOG 22), Unique Materials, glovebox rekit and reinvestment, universal cleaning/ machining solvents, measurement technology, laser/electron beam welding, Plutonium Handbook.
- Two collaborative exchanges are planned for fall FY2011 (universal cleaning/ machining solvents and Welding).
- Plutonium Handbook work will begin FY12 with an international collaborative effort.
- Material Exchange of analytical samples continues.

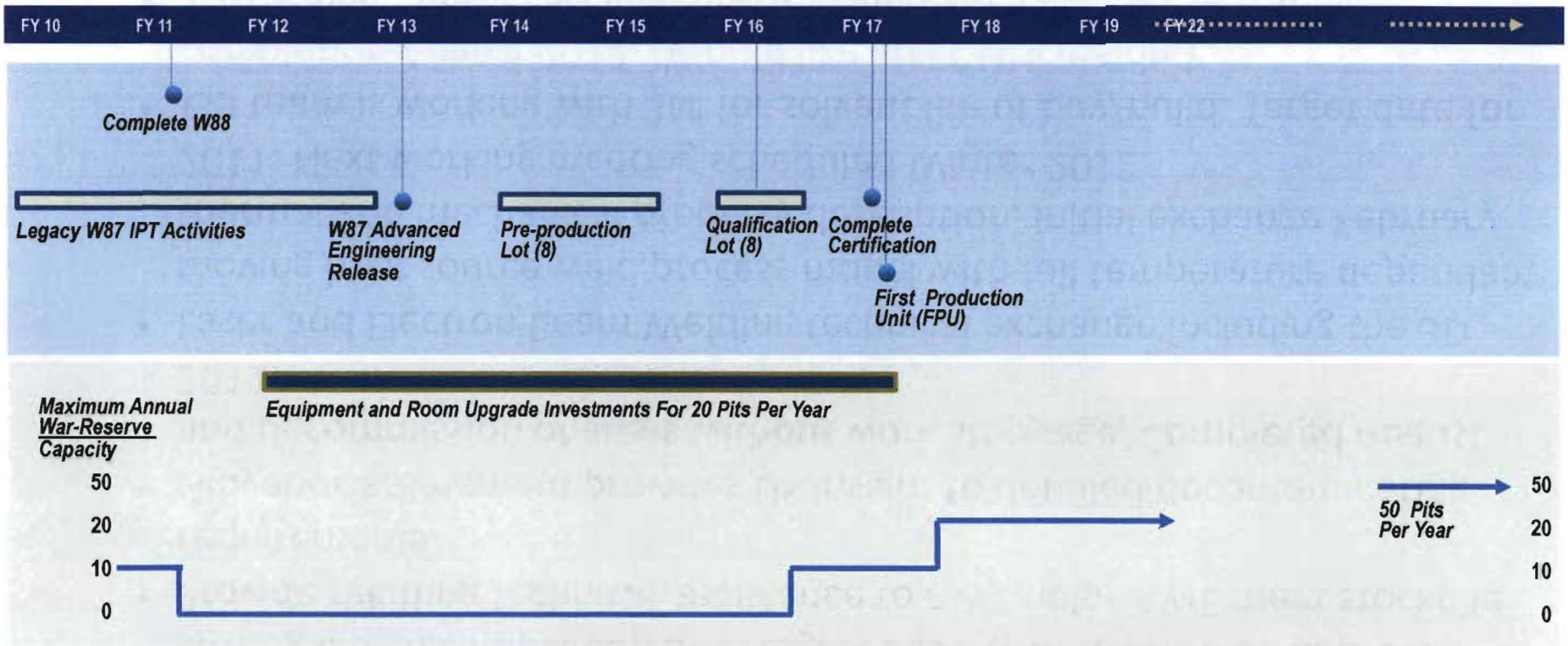
Secondary Technical Accomplishments:

- Plutonium Grand Challenges Classified Publication allows US/UK strategic collaboration in technical experiments and exchange of data. Final strategic plan compilation due August 2012 with NNSA/DOE approval.
- Provide rekitting technical assistance to AWE helps AWE meet stockpile requirements.
- Glovebox assessment provides US insight to detailed decontaminating and decommission of areas without work stoppage. Completed August 2011.
- Laser and Electron Beam Welding technical exchange including the 3D moving heat source weld process model with full temperature dependant thermal and mechanical property description. Initial exchange February 2011. Next working meeting scheduled Winter 2012.
- J39 team is working with 3M for solvent life of buy/build. Target date for completion August 2012. (Would like an EC discussion.)
- 3rd Turning Center received and installed at LANL. Center is fully operational. Completed August 2011. Open house completed September 2011.

US/UK Exchange Summary for Reporting: JOWOG 39

Patrice Stevens (LANL) and Steve Allaway (AWE) (accomplishments/impacts)

W87 Legacy Pit Development/Production Timeline



Secondary Technical Accomplishment:

- US/UK Universal Cleaning Solvents Life of Buy/Build in support of the US W87 LEP and UK manufacturing mission providing cost savings (development and prove-in) for both missions.

•The earliest physically possible FPU of a W87 legacy pit design is FY2017, as demonstrated above. LANL can be capable of producing 10 War Reserve pits per year (ppy) in the year of FPU (FY2017). With Congressional support for a sustained increase in funding to Pu Sustainment for additional equipment and room upgrades, LANL can attain and produce 20 ppy (War Reserve) by FY2018.

US/UK Exchange Summary for Reporting: JOWOG 39

Patrice Stevens (LANL) and Steve Allaway (AWE) (accomplishments/impacts)

Third Turning Center installation and prove-in complete in support of the US W87 LEP and UK manufacturing mission. This exchange is complete.

Plutonium Science and Research Strategy

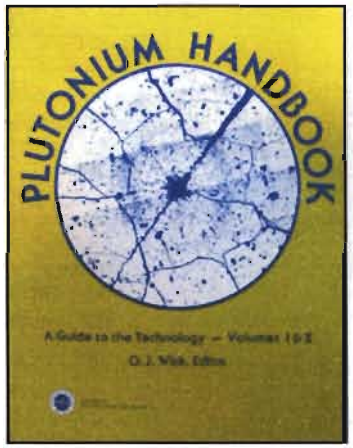
David L. Clark, INST: OFF
Patrice A. Stevens, ADPSM

27 October 2011

Update of the Plutonium Handbook (programmatic support)

The Chemistry of the Actinide Elements - 1957, 1986, 2006

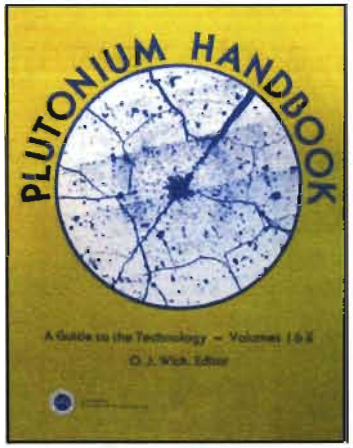
The Plutonium Handbook – 1967
Reprinted – 1980
<u>No updates in 43 years</u>



- Significant progress in plutonium science over 40 years clearly points to the need for an update to this reference work.
- An update will require international cooperation from many institutions including AWE.
- **Target publication date: 2015** Commemorate the 75th Anniversary of the discovery of plutonium (1940).

Update of the Plutonium Handbook (programmatic support)

The Plutonium Handbook



Deliverables

- Comprehensive outline for the plutonium handbook.
- Identification of a publisher.
- Invitations to authors
- Approval and assignment of a classification officer
- Transfer of rights to publish prior material and versions
- Draft Manuscripts from Authors
- Revised/contingency authors identified
- Receive revised or alternate author materials
- Review and edit compiled materials
- Delivery of edited and compiled material to the publisher
- Publication of the Revised Plutonium Handbook no later than Dec. 31, 2015

Milestones

06/11	Complete workshops and focus groups
08/11	Complete outline and identify authors
05/11	Identify and discuss sponsors
09/11	Complete identification of sponsors and secure funding
10/11	Issue invitation to authors
07/11	Review draft outline with classification and approve
03/12	Identify and commit to publisher
06/12	Obtain rights to prior work and publications
09/12	First drafts from authors
12/12	Identify missing materials/authors and invite alternates as required
03/13	Edited versions of initial manuscripts
12/13	Receive revised/alternate manuscripts
03/14	Edited versions of alternate/revised manuscripts
06/14	Transmittal of final materials to publisher
01/15	Review Drafts/Page Proofs as needed
06/15	Publication of the Plutonium Handbook

- Significant progress in plutonium science over 40 years clearly points to the need for an update to this reference work.
- An update will require international cooperation from many institutions including AWE.
- **Target publication date: 2015** Commemorate the 75th Anniversary of the discovery of plutonium (1940).

Our plutonium strategy will ensure we lead this important science for the nation (programmatic support)

Plutonium Center of Excellence

- Significant progress has been achieved since initiating the Plutonium Science Strategy including AWE and Russian collaboration in materials and chemistry. Strategy is on-going.
- Strategy has established a strong sense of intellectual community among scientists.
- Re-establish Pu science and engineering as a sustainable and desirable field of study.
- The *Plutonium Handbook* will encourage visible excellence and help attract and retain world-class scientists and engineers. Final publication 2015.

Integrated & Supporting Small Scale Plutonium Experiments

Bacchus (UK's aging assessment - old vs. new)

Well-characterized materials

- large vs small grain spall
- two 40mm gas gun - strength
- differences were observed

Barolo A vs. Barolo B (old vs. new)

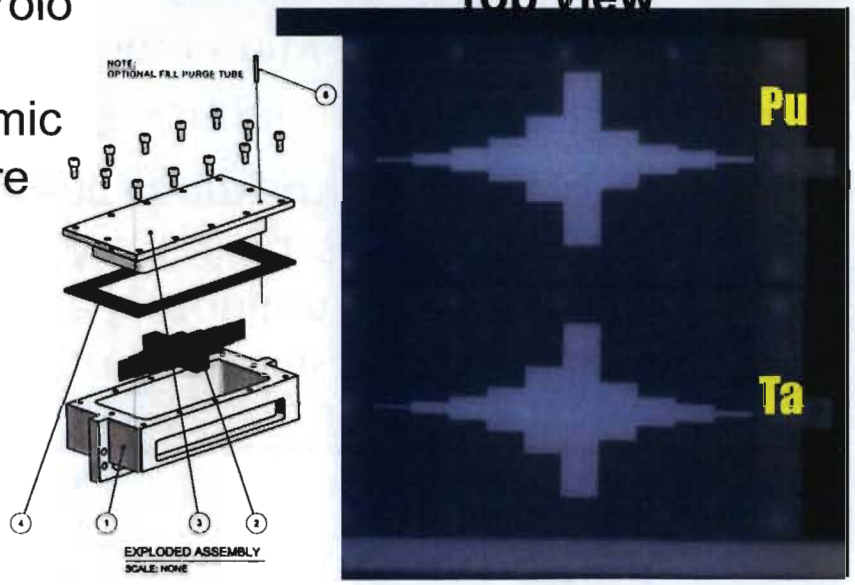
- differences seen
- two 40mm gas gun experiments each on Barolo B (complete) and Barolo A (planned)
- microstructural, mechanical and thermodynamic characterization will be conducted in the future (6-18 months) as priorities allow

Plutonium Stepwedge Radiography on Cygnus

(dual axis x-ray radiography for subcritical experiments)

- High precision machining and metallurgy

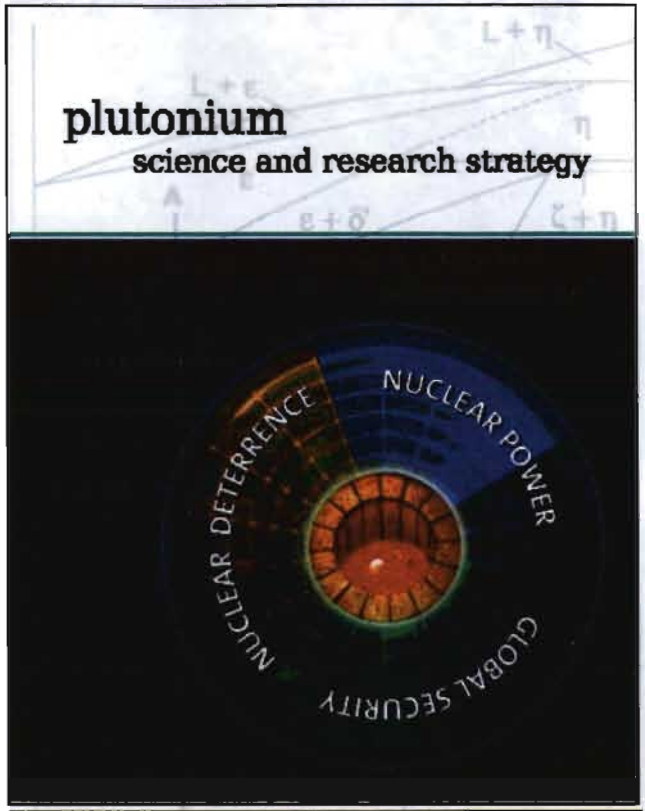
Top view



Some of the holts c t

Plutonium Science and Research Strategy

- Defines a road map for plutonium research and development efforts that share a common underpinning in *nationally* important missions
  - *Nuclear Deterrence*
  - *Nuclear Power*
  - *Global Security*
- Intended as a national vision for the science of plutonium
- Implementation will provide challenging work, build capability, and insure recruitment of top talent



We must develop a fundamental scientific understanding of Plutonium– one that can be more readily preserved and taught to future generations.

US/UK Loan Account
Project Status
PMOD 477

Patrice A. Stevens
Associate Directorate
Plutonium Science and Manufacturing
27 October 2011

US/UK Loan Account Program
Serves to repatriate material with a balance to zero by December 2012

Phase 1: Establish Formality of Operations

* Complete surrogate taskings to A90 through a Materials Channel and perform US/UK lessons learned.
* Complete the US/UK agreed Quality Acceptance Plan and establish the formal UK/US point of contacts.

Phase 2: Initial Material Manufacture, Packaging and Shipping

* Begin processing of material and store material as electrorefined metal (ER) rings, with initial assay and isotopic analysis, prior to manufacturing. Material will be made into accepted configuration and appropriate acceptance document for each aliquot will be generated.

Phase 3: Intermediate Material Manufacture, Packaging and Shipping

* Continue processing of the material in accepted configuration with appropriate acceptance documentation for each aliquot. Provide an initial tasking of the material owed to UK including appropriate quality acceptance documentation.

Phase 4: Complete Loan Account Balance

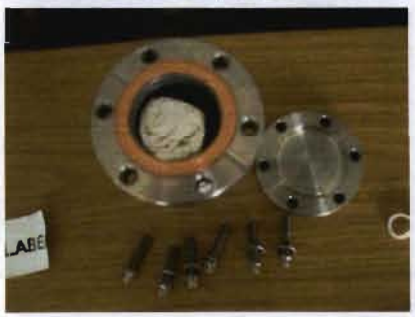
* Complete processing of material into accepted configuration with appropriate acceptance document for each aliquot. Provide the balance of material owed to UK including appropriate quality acceptance documentation.

CHANNEL, PROCEDURES, AND AUTHORITY FOR THE EXCHANGE OF ATOMIC INFORMATION REGARDING NUCLEAR MATERIAL TRANSFERS BETWEEN THE UNITED STATES DEPARTMENT OF ENERGY, NATIONAL NUCLEAR SECURITY ADMINISTRATION, CHIEF, SUBMARINE LAUNCHED BALLISTIC MISSILE BRANCH AND THE UNITED KINGDOM MINISTRY OF DEFENCE, DIRECTOR, STRATEGIC TECHNOLOGIES

SHORT TITLE: U.S./UK NUCLEAR MATERIALS CHANNEL

1. PURPOSE

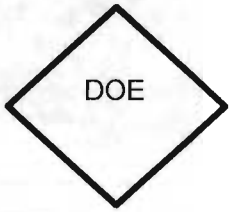
To establish an atomic information exchange channel, procedures, and authority for the exchange of atomic information on nuclear materials, including plutonium, uranium, and tritium, between the U.S. Department of Energy (DOE), National Nuclear Security Administration (NNSA), NA-122.22, and the UK Ministry of Defence (MOD), Director, Strategic Technologies (D STRAT TECH), in accordance with Section III of the Administrative Arrangements supporting the "Agreement Between the Governments of the United States and United Kingdom for cooperation on the Uses of Atomic Energy for Mutual Defense Purposes" of July 3, 1958, as amended.

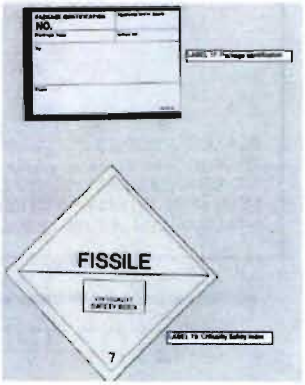


Progress to Date

- **Phase 1-3 completed tasks for first shipment October 2011**
  - Surrogate trial runs I and II.
  - Lessons learned.
  - Quality Assurance Plan, Memorandum of Agreement, Travelers.
  - Metal preparation, casting, machining.
  - Chemistry validation.
  - A2 Calculations validations.
  - Packaging, shipping and transportation.
  - Quality Product Acceptance Build Books.
  - Product Acceptance Diamond Stamping.
  - Shipment sent October 2011.
  - Waste processing FY2012.

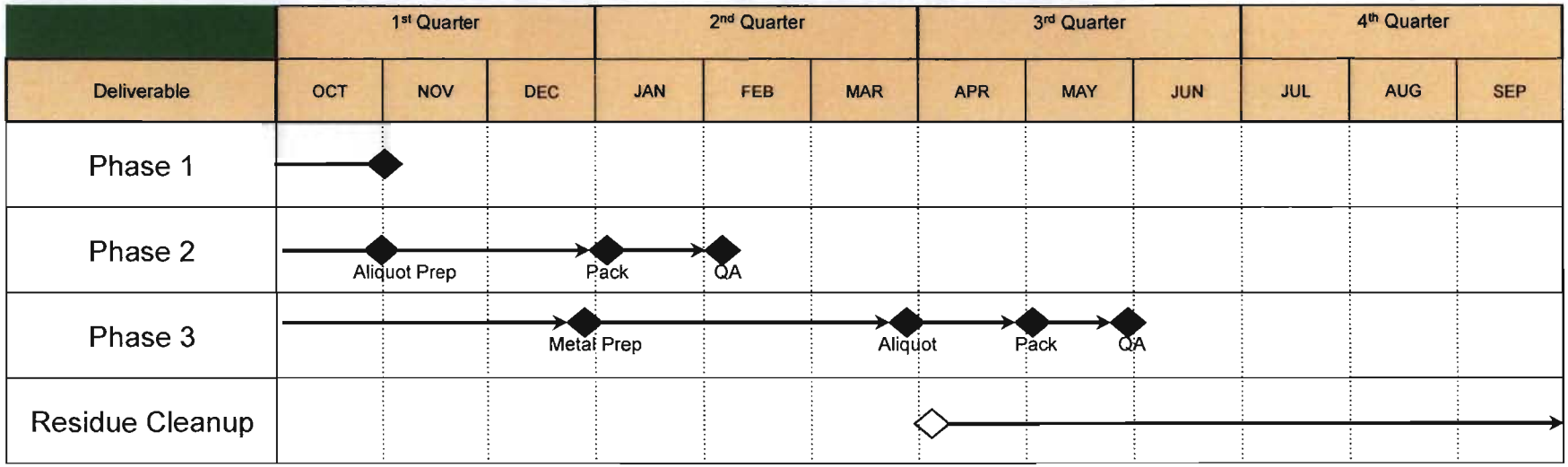
Quality Control/Quality Assurance





US/UK Exchange Summary for Reporting: JOWOG 39

Patrice Stevens (LANL) and Steve Allaway (AWE) (accomplishments/impacts)



Primary Technical Accomplishment:

- Meeting the Repatriation Contract deliverables meets a 25 year old outstanding US commitment. Completion scheduled December 2012.

US/UK Exchange Summary for Reporting: JOWOG 39

Patrice Stevens (LANL) and Steve Allaway (AWE) (issues/suggestions)

- Budget planning is not as robust today as in the past. Budget shortfalls will affect collaborations and deliveries. Without an official enhanced collaboration for universal solvent life/buy it will be difficult to secure legal contract.

- UK transmissibility authority will help; but need to have the classified approval in place for the red net.

- Shipment requirements are changing.