LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

LLNL-TR-417250

Campaign 2 Level 2 Milestone Review 2009: Milestone # 3132 Determine Sustainable TATB Source and Processing Options, and Potential Binder Options

A. J. Schwartz

September 29, 2009

Disclaimer

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Campaign 2 Level 2 Milestone Review 2009:

Milestone # 3132

Determine Sustainable TATB Source and Processing Options, and Potential Binder Options

Summary report

30 September 2009

Committee members:

Alexander E. Gash

Robert S. Maxwell

George E. Overturf III

Tri D. Tran

Kevin Vandersall

Summary report on the review of the L2 Milestone #3132 (Q4FY09): Determine Sustainable TATB Source and Processing Options, and Potential Binder Options

Review held 18 September 2009
Committee members: Alexander E. Gash
Robert S. Maxwell
George E. Overturf III
Tri D. Tran
Kevin Vandersall

A presentation was made to the Milestone review committee on September 18, 2009 that outlined the efforts making up the achievement of the Campaign 2, Level 2 Milestone #3132. After the presentation and review of the collective work, the committee determined that the milestone was successfully completed. Highlights from this review are discussed here.

A brief summary of the discussion points includes:

- It was clear that this work represents a comprehensive collection of experimental, modeling, literature review, and analysis activities with a thorough attention to the details. The deliverables include 2 technical presentations and 5 written reports describing this work.

- This is a joint LLNL/LANL milestone led by Campaign 2 with leveraging effort from other campaigns and activities at LLNL:
    - The contributing programs included Enhanced Surveillance Campaign (ESC) and Readiness Campaign. Key technical elements of this work were built on scientific advances from the Laboratory Directed Research and Development (LDRD) program.
    - Part of this work covers activities associated with the Enhanced Collaboration (EC) with the Atomic Weapons Establishment (AWE).

- This Milestone work has supported a high-level Directed Stockpile Work (DSW) Joint DoD/DOE TATB Production Initiative. This is an example of the strong relevance of this Milestone research to current stockpile issues.

A summary of the future direction in this research area includes:

- The Ionic Liquid (IL) re-crystallization process has been demonstrated to improve the performance of recrystallized TATB molecule. However, lower thermal stability of the IL crystallized material (compared to conventional TATB) warrants further study to understand the source of this effect.

- The compatibility issue needs to be addressed in upcoming work. One concern is how the new solvent and ionic liquid used in the formulation process might behave in the nuclear explosive assembly. Similarly, compatibility studies for the candidate binder must be performed. The future focus on R&D and additional scientific tools to address these areas is technically sound.

- Currently there is no defined process for advancing this milestone's research and development successes into a production scale effort. The committee recognizes that other campaigns (Readiness Campaign, Enhanced Surveillance Campaign) will need to consider additional leverage resources for that scale-up effort.
- We recommend that this effort continues to use modeling and experiment as complimentary paths to strengthen the scientific approach.

We look forward to the continued work in this area of Science Campaign research.