Department of Energy Technology Readiness Assessments – Process Guide and Training Plan

Steven Krahn, Kurt Gerdes  
Herbert Sutter  
Department of Energy  
Consultant, Department of Energy

2008 Technology Maturity Conference  
Virginia Beach, Virginia  
September 9-12, 2008
**Department of Energy Technology Readiness Assessments - Process Guide and Training Plan**

**Abstract**

See also ADM002183. Presented at the Technology Maturity Conference held in Virginia Beach, Virginia on 9-12 September 2008.
Outline

- TRA Background
- Methodology
- Pilot TRAs Conducted
- TRA/TMP Process Guide
- Training Plan
- Next Steps
Why Conduct a TRA?

• Provides tool for DOE-EM management to evaluate & communicate status of technology development in a consistent manner

• Provide information for DOE-EM management to assess maturity of technology to support design/construction projects
  – TRA process is a structured, systematic and well-documented methodology
  – Consistent with practice at other agencies with large, technologically complex projects (NASA, DoD)

• TRA process has proven to be a useful tool to support project management decisions and, thereby, potentially limit costs and schedule overruns

• GAO has recommended the technology readiness assessment process to DOE (GAO-07-336)

• Draft FY2008 House appropriation (HEWD) language directed TRA use
Methodology for Determination of TRA

• Based upon method in *Department of Defense, Technology Readiness Assessment (TRA) Handbook*, May 2005 (under revision)

• Steps in TRA

  1. Identification of Critical Technology Elements (CTEs)

  2. Completion of TRL Assessment for each technology/component

  3. Prepare a Technology Maturation Plan (TMP) for technologies with TRL lower than deemed appropriate
Pilot TRAs Conducted

To date, DOE-EM has conducted a number of pilot reviews a process patterned on the DOD guide:

- Hanford Waste Treatment and Immobilization Plant (WTP) Analytical Laboratory, Low Activity Waste (LAW) Facility and Balance of Facilities (3 TRAs)
- WTP High-Level Waste (HLW) Facility
- WTP Pre-Treatment (PT) Facility
- Hanford River Protection Project Low Activity Waste Treatment Alternatives
- Hanford K Basins Sludge Treatment Process
- Savannah River Tank 48H Waste Treatment Technologies
- U-233 Downblending Project
... and more are scheduled
Preparation of TRA Process Guide

• External criticism of DOE-EM’s lack of established procedure led to development of TRA/TMP Process Guide

• Working with participants of pilot TRAs, drafted TRA/TMP Process Guide
  – substantial effort went into tailoring the question set

• Draft TRA/TMP Process Guide sent to headquarters and field organizations for review/comment
Preparation of TRA Process Guide (cont.)

• Final TRA/TMP Process Guide issued 3/2008
• TRA/TMPs being incorporated into requirements for management of major projects (DOE Order 413.3, Project and Program Management of Capital Asset Projects)
• Federal Project Directors and contractors required to use guide as part of their project
• Plans to revise Guide on an annual basis
• Growing interest and support of Guide by other DOE offices
Suggested Technology Readiness Assessments and Other Review Requirements for Critical Decisions

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<th>Alternative Selection</th>
<th>Performance Baseline</th>
<th>Construction Start</th>
<th>Operations Start</th>
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- **TRA 1** *(TRL=4)*
- **TRA 2** *(TRL=6)*
- **TRA 3*** *(TRL=6)*

- Technology Requirements Review
- Conceptual Design Review
- Preliminary Design Review
- Final Design Review
- Operational Readiness Review

* TRA 3 required if there is technology modification/change on going from preliminary to final design.
## DOE Technology Readiness Levels

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**Technology Development**

**Commissioning**

**Operations**

**Cold**

**Hot**
Guide - Table of Contents

• Technology Readiness Assessment Process
  - Process Overview
  - Key Roles and Responsibilities
  - TRA Team Independence
  - Assessment Planning
  - Assessment Execution
Technology Readiness Assessment Process Flowchart (page 1 of 3)
Technology Readiness Assessment Process Diagram (cont.)
Typical TRA Timeline

- TRA Requested \hspace{2cm} Week 0
- TRA Plan Submitted to EM-20 \hspace{2cm} Week 2
- TRA Team Established by EM-20 \hspace{2cm} Week 8
- Critical Documents Distributed to Team \hspace{2cm} Week 12
- Onsite Assessment Activities Begin \hspace{2cm} Week 16
- Draft TRA Report Issued for Comment \hspace{2cm} Week 20
- Final TRA Report Issued \hspace{2cm} Week 24
Typical TMP Timeline

- Begin TMP: Week 0
- Draft TMP Completed: Week 8
- Review TMP: Week 10
- Final TMP: Week 12
- Prepare Test Plans Including Cost and Schedule: Week 20
- Approve Test Plans: Week 24
- Incorporate Test Plans Into Baseline: Project Dependent
Key Roles and Responsibilities

• Assistant Secretary of Energy for Environmental Management (DOE-EM)
• EM-20 (Office of Engineering and Technology)
• Federal Project Director (Field)
• DOE Liaison
• Contractor
• Contractor Liaison
• Team Leader
• Team Members
Training

• How do we standardize how TRAs are conducted in the future – Training Plan
• Need to Train: Trainers, TRA Team Leads, TRA Team Members
Training - Approach

• 2 Training Programs
  – Trainers – will be an established group, and will train Team Leads
  – Team Members – will be trained by Team Leads

Reviewing DoD experiences and courses
- Thank you Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (OSD-ATL)
- Institute for Defense Analysis (IDA)
Training Manuals

• DOE-EM will prepare training manuals for each of the two groups
• Training manuals to be revised as TRA/TMP Process Guide is revised
Next Steps

• Conduct TRA of Salt Waste Processing Facility at Savannah River
• Develop TRA Training documentation and conduct training pilot
• Revise TRA/TMP Process Guide
• Continue to work with other DOE offices, Federal Agencies, Foreign Research Institutes on TRAs