TECHNOLOGY NEEDS/OPPORTUNITIES STATEMENT

IMPROVED THROUGHPUT INSTRUMENTATION FOR NDA OF SNM ITEMS

Identification No.: RL-01-015-NM
Date: September 2000

Program: Nuclear Materials Stabilization
OPS Office/Site: Richland Operations Office/Hanford Site
PBS No.: RL-CP03
Waste Stream: N/A
TSD Title: N/A
Operable Unit (if applicable): N/A
Waste Management Unit (if applicable): N/A
Facility: Plutonium Finishing Plant

Priority Rating:

This entry addresses the "Accelerated Cleanup: Paths to Closure (ACPC)" Priority:

____ 1. Critical to the success of the ACPC
_X_ 2. Provides substantial benefit to ACPC projects (e.g., moderate to high lifecycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays)
____ 3. Provides opportunities for significant, but lower cost savings or risk reduction, and may reduce uncertainty in ACPC project success.

Need Title: Improved Throughput Instrumentation for Non Destructive Analysis (NDA) of SNM Items

Need/Opportunity Category: *Technology Opportunity*

Need Description:

- Description: During the stabilization and disposal campaigns for the SNM at the PFP, thousands of items will be transferred to and from storage and processing. Most of the transfers are accompanied by an NDA process to analyze the amounts of transuranics in the item for safeguards and accountability purposes. These NDA analyses are also required on periodic bases to support inventory update requirements. The counting processes are time consuming and in some cases are projected to become bottlenecks in the overall material handling time cycles.

  An improved NDA technology is desired to improve the throughput and support the aggressive processing and vault modification schedules to meet 2000-1 milestones. The new

technology must also deal with uranium in mixed oxides and chemical impurities (low Z elements) that have traditionally impacted accuracy in measurement.

- Background: The activities at the PFP over the next few years are focused on stabilization and disposition of the thousands of SNM items stored at the facility.

- Any technologies that improve throughput of NDA for SNM items can be used not only during the stabilization and disposition tasks over the next 5 years, but also in future waste handling during decontamination and decommissioning at the PFP. In addition, these technologies would also have broad applications at other DOE Sites.

Schedule Requirements: This technology is needed as soon as possible to attain the maximum benefit, but can contribute to cost savings and potential schedule acceleration anytime before FY 2005 for stabilization, and after that date for storage and shipping activities.

Earliest Date Required: 09/2000
Latest Date Required: FY 2005 or beyond

Problem Description: Current NDA counting of SNM items to determine the transuranic contents is time consuming, and potentially a bottleneck in the overall material processing time cycles.

Potential Life-Cycle Cost Savings of Need (in $000s) and Cost Savings Explanation: Assuming a current time cycle of approximately 1 shift per item, a technology that provides a 50% time savings, and 5,000 NDA cycles, a rough order of magnitude cost savings of $1.4 million can be projected. Acceleration in the overall PFP stabilization schedule or in future shipping schedules due to improved NDA throughput could also provide substantial cost savings.

Benefit to the Project Baseline of Filling Need: An improvement in the NDA throughput would provide increased confidence in the ability to meet baseline milestones.

Relevant PBS Milestone: TRP-05-500, Complete stabilization and packaging oxides >30wt% plutonium, 5/31/04

Functional Performance Requirements: Technology to provide NDA measurements of transuranics must meet facility requirements for accuracy and precision, and be qualified through a intersite standards exchange program. The equipment must be sized to fit effectively within the current NDA laboratory footprint.

Work Breakdown Structure (WBS) No.:	***TIP No.:***
1.04.05.01.13	N/A.

Justification For Need:

Technical: Improved throughput would avoid the potential for a bottleneck in the PFP stabilization project time cycles at a required, basic step in the overall SNM handling process.

Regulatory: There are likely no regulatory affects on this activity.

Environmental Safety & Health: Any equipment should consider ALARA goals, and improved throughput should contribute to dose avoidance due to less time for material to be present.

Cultural/Stakeholder Concerns: None.

Other: N/A

Current Baseline Technology: The current method consists of separate calorimetry and gamma scan cycles on each item to determine heat output, isotopic content, and back calculate transuranic mass contents. Uranium content in mixed oxides may also be determined by neutron coincidence counting.

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