READINESS ASSESSMENT FOR THE SHIPMENT OF TRU WASTE FROM WEST JEFFERSON, OHIO

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ABSTRACT

From 1943 through 1986, Battelle Memorial Institute (BMI) performed research and development work at its own facilities for the U.S. Department of Energy (DOE) and its predecessor agencies. The most highly contaminated facilities, comprising BMI's Nuclear Sciences Area, are located on 11 acres in West Jefferson, Ohio. Three buildings in this area were used to study nuclear reactor fuels, fuel element components, reactor designs, and radiochemistry analyses: one building contained nuclear hot cells, a second building contained a critical assembly and radiochemistry laboratory, and a third building once housed a nuclear research reactor.

The Columbus Environmental Management Project (CEMP), one of the DOE Ohio Field Office's radioactive cleanup sites, oversees the Battelle Columbus Laboratories Decommissioning Project (BCLDP) for the decontamination and decommissioning (D&D) of BMI's Nuclear Sciences Area. The BCLDP mission is to decontaminate the Nuclear Sciences Area to a condition that is suitable for use without restrictions and to dispose of or store the associated radioactive waste at a suitable DOE-approved facility. During decontamination work, the CEMP is expected to generate approximately 120, 55-gallon drums of transuranic (TRU) waste, or about 20 truckloads. This TRU waste will be transported to DOE's Hanford nuclear facility in Washington State for temporary storage, prior to its ultimate disposal at the Waste Isolation Pilot Plant (WIPP).

This paper presents a detailed approach for conducting readiness assessments for TRU waste shipments from any DOE site. It is based on demonstrating satisfaction of the 18 core requirements contained in DOE Order 425.1B, *Startup and Restart of Nuclear Facilities*, that are derived from the seven guiding principles of DOE's integrated safety management system.

As an illustration, a readiness assessment, implementing the proposed approach, was conducted to determine whether the CEMP was ready to begin TRU waste shipments to Hanford. The readiness assessment verified that the CEMP was indeed ready to prepare and ship TRU waste to Hanford without undue risk to the workers, the public, or the environment. Shipments began on December 18, 2002.

BACKGROUND

On April 16, 1943, BMI was contracted by the Manhattan Engineering District to perform atomic energy research and development activities. Since that time, BMI has continuously performed research and development work under contract at its facilities for the U.S. Department of Energy (DOE) and its predecessor agencies. The facilities used for these activities are located at BMI's Columbus Laboratories King Avenue site in Columbus, Ohio, and at its West Jefferson (WJ) site in West Jefferson, Ohio. As the result of these activities, fifteen buildings (in part or as a whole) and associated grounds became radioactively contaminated. Six of the buildings are at the WJ site, which is approximately 15 miles west of Columbus, Ohio. The Battelle Columbus Laboratories Decommissioning Project (BCLDP) for the cleanup of the King Avenue and WJ Sites was established in 1986 and must complete D&D activities by 2006, as directed by Congress. During decontamination work, the BCLDP is expected to generate

approximately 120, 55-gallon drums of TRU waste, or about 20 truckloads. TRU waste is classified as either contact-handled or remote-handled, depending on the radioactivity level.

- **Remote-handled TRU** (RH-TRU) waste has a radioactivity level requiring that it be shielded for safe handling. Cleanup work at the WJ site will result in approximately 882 cubic feet of RH-TRU waste requiring disposal.
- **Contact-handled TRU** (CH-TRU) waste has a lower level of radioactivity. It can be safely handled without special equipment if placed in containers. A relatively small amount of CH-TRU waste will be generated by the BCLDP.

Most of the TRU waste resulting from nuclear research is RH-TRU waste destined for disposal at the WIPP. Battelle, under a contract to the DOE's Ohio Field Office, received permission to ship the TRU waste to the DOE Hanford site for interim storage pending the completion of the regulatory process for WIPP RH-TRU waste certification and permitting.

Both CH- and RH-TRU waste are expected to be shipped in CNS 10-160B containers which are constructed to withstand severe accidents without releasing their contents and meet the requirements of the U.S. Department of Transportation. The Nuclear Regulatory Commission has issued a certificate of compliance for the use of the CNS 10-160B container.

PURPOSE

Although the DOE did not formally request the BCLDP to conduct an Operational Readiness Review, it was recommended that, prior to beginning these shipments, a Level II Readiness Review (1) be conducted to verify that it was safe to begin TRU waste shipments to Hanford, WA. The requirements for a readiness assessment prescribed in DOE Order 425.1B, *Startup and Restart of Nuclear Facilities* (2), were tailored to this application. This paper presents a description of the process that was followed, so that other sites needing to ship TRU waste may benefit from this experience.

READINESS ASSESSMENT PROCESS

Assessment Scope

The first step in any readiness assessment is to define the scope of operations that are to be evaluated. Figure 1 provides an overview of the entire BCLDP TRU waste program. The first five tasks had been completed prior to initiating the readiness assessment and, since the final three tasks are not the responsibility of the BCLDP, they were not a part of this assessment. Thus, this readiness assessment was limited to the readiness of the Battelle personnel, equipment, and procedures necessary to load BCLDP's TRU waste into the transport containers prior to being shipped to the Hanford site for receipt and temporary storage.

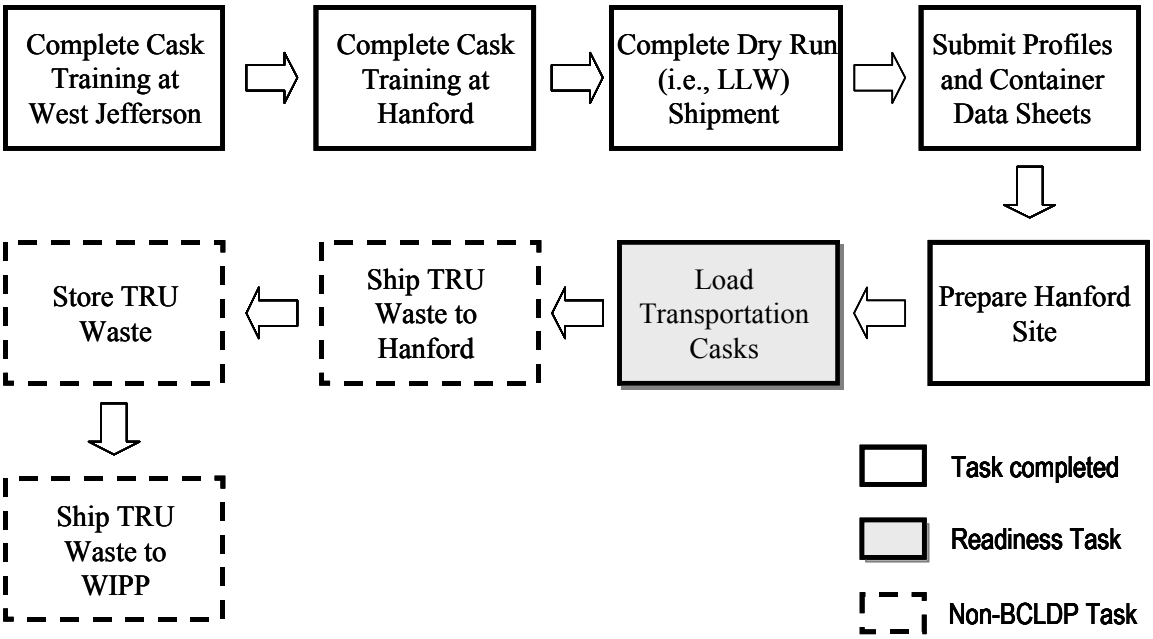

Fig. 1. Overview of the BCLDP TRU Waste Program

Action Plan

A Plan-of-Action was prepared, defining the proposed breadth of the readiness assessment, specifying the evaluation criteria, identifying the prerequisites for initiating shipments, selecting the readiness assessment Team, and describing the review methodology.

The breadth of the review was determined by analyzing the seven guiding principles of integrated safety management and their associated core requirements (2). Seventeen of the eighteen core requirements were determined to be applicable for ensuring the readiness of Battelle's personnel, programs, and equipment to load RH-TRU waste into shipping containers. Criteria were specified for evaluating the satisfaction of each of these core requirements.

Two prerequisites had to be satisfied before these shipments could begin:

- The Record of Decision for the DOE Programmatic Environmental Impact Statement addressing TRU waste had to be modified to include shipment of BCLDP TRU waste to the Hanford site.
- Notification of Shipment had to be received from DOE/EM-1 and, subsequently, DOE-RL had to approve the receipt of BCLDP TRU waste at the Hanford site.

Team members (but not the team leader) were selected from the BCLDP itself, although care was taken to ensure that they would not be evaluating areas for which they were responsible. Team members reviewed documents, interviewed BCLDP staff, and evaluated operations during multiple shifts, as necessary. The results of these investigations were documented on Criteria and Review Approach Documents (CRADs) that were grouped into six functional areas: management (M), training (T), facility safety (FS), emergency management (EM), operations (OP), and DOE (DOE). Each CRAD documents the investigation approach, results, conclusions, and issues (if any).

An issue could be either an observation or a finding. An observation is simply a suggestion for improvement, but not a real deficiency. A finding is an identified deficiency that could be classified as a

- Pre-start Finding – a finding that must be resolved before an activity can be started, or
- Post-start Finding – a finding that must be resolved, but may be corrected after the start of the activity.

This readiness assessment identified seven findings and only one observation.

Readiness Assessment Methodology

The readiness of the BCLDP to begin TRU waste shipments was analyzed for each of the guiding principles of integrated safety management and their applicable core requirements. For example, Guiding Principle #1 states:

> *Line management is responsible for the protection of employees, the public, and the environment. Line management includes those contractor and subcontractor employees managing or supervising employees performing work.*

The associated Core Requirement #1 states:

> *Line management has established programs to ensure safe accomplishment of work. Personnel exhibit an awareness of public and worker safety, health, and environmental protection requirements and, through their actions, demonstrate a high-priority commitment to comply with these requirements.*

The elements of Core Requirement #1 were evaluated on CRAD M-1 (see Table I). The objective is simply a re-statement of the core requirement, and the criteria provide the evaluators with a relatively simple means for determining whether the objective has been satisfied. There were three aspects to the evaluation approach for this core requirement: record reviews, interviews, and observance of shift performance. Once the evaluator completes all aspects of the approach, the results and a discussion of the results is documented. However, in the interest of space, neither of these is shown in Table I. The conclusion that all criteria have been met could not be made until the issue or post-start finding was resolved.

As soon as team members discovered a finding, an Issue Action Plan (see Table II) for resolving the finding was prepared. This particular finding ─ program reorganization has produced inconsistency in some program interfaces (responsibilities) ─ was resolved by aligning new organizational titles/roles with old organizational titles/roles (see Table II). Throughout the assessment, when all corrective actions associated with a particular CRAD were completed, the CRAD and corresponding Issue Action Plan forms were signed and approved by the team member and the team leader.

Table III provides a cross-reference between all the guiding principles, all the applicable core requirements, and the CRADs that address them. Table IV provides a summary of all findings and their status.

Table I. Criteria and Review Approach Document (Example)

FUNCTIONAL AREA: MANAGEMENT	CRAD: M-1 DATE:	CRITERIA MET	
		YES X	NO

OBJECTIVE: Line management has established programs to ensure safe accomplishment of work. Personnel exhibit an awareness of public and worker safety, health, and environmental protection requirements and, through their actions, demonstrate a high-priority commitment to comply with these requirements.

CRITERIA: Management system programs/processes are established and functioning to support BCLDP activities.

APPROACH:

Record Reviews: Review BCLDP Interface Documents that establish roles, responsibilities, and interfaces between BCLDP activities (e.g., training, deficiency program, calibration program, radiological program, records storage, container management, etc.)

Interviews: Verify that BCLDP project personnel have, at a minimum, read and understood the formal agreements/limits of authority and responsibilities established in the work instruction.

Shift Performance: While observing dry runs and drill scenarios, verify that personnel exhibit a level of awareness and commitment to ES&H requirements as well as requirements established in the work instruction. Observe personnel performance to determine if they are familiar with the extent of their roles, responsibilities, and interfaces.

RESULTS:

Records Reviewed:

Interviews Conducted:

Shift Performance Evaluation:

DISCUSSION OF RESULTS:

Record Review

Interviews

Shift Performance

CONCLUSION: The criteria have been met.

ISSUE(S):

M.1-1. Program reorganization has produced inconsistency in some program interfaces (responsibilities). (Post-start Finding)

Evaluator: _____ Date	Approved: _____ Date

Table II. Issue Action Plan (Example)

FUNCTIONAL AREA: Management	CRAD NO.: M-1	FINDING: Post-start OBSERVATION:	ISSUE NO.: M.1-1 DATE:

ISSUE: Program reorganization has produced inconsistency in some program interfaces (responsibilities).

REQUIREMENT: Review BCLDP Interface Documents that establish roles, responsibilities, and interfaces between BCLDP activities.

REFERENCE(S): DOE Order 425.1B, Core Requirement #1, was the suggested guideline.

DISCUSSION: Recent program reorganization has confused some of the interfaces defined in the otherwise functionally adequate program documentation. In general, titles of functional leaders need to correspond to those on the functional organizational chart issued 9/6/2002. Secondly, functional leadership titles must be revised through program document revision, or field change, so that all program interfaces are *clearly* defined.

ACTION PLAN: Prepare and issue a field change to all manuals aligning new organizational titles/roles (and specifically divided responsibilities) with old organizational titles/roles.

RESOLUTION: All actions completed.

Certified By: _____ Date:_____
RA Team Leader

Table III. Cross-Reference of Requirements for Readiness Assessment

Guiding Principle #	Core Requirement #	Criteria and Review Approach Document
1	1	M-1
2	2	M-2
3	3, 4, 5	T-1, T-2, T-3
4	6	M-3
5	7, 8, 9	FS-1, FS-2
6	10, 11, 12, 13	EM-1, OP-1, OP-2
7	14, 15	M-4
	16	DOE-1
	17	N/A
	18	DOE-2

Table IV. Summary of Findings

Finding	Description	Type	Resolution
EM.1-1	Emergency Action Levels need to be developed	Pre-start	Resolved
EM.1-2	Procedures for transit emergencies need to be identified and drilled	Pre-start	Resolved
FS.1-1	Need to finalize Work Instruction 1093 and brief	Pre-start	Resolved
FS.1-2	No official weight limit for culvert /bridge system	Pre-start	Resolved
FS.2-1	Crane deficiencies which have not been corrected as of 10/11/02	Pre-start	Resolved
M.1-1	Inconsistency in some program interfaces	Post-start	Resolved
T.1-1	No training documentation for CNS staff on CNS Cask Procedure	Pre-start	Resolved

Lessons Learned

Table V contains a list of the most important lessons learned as a result of conducting this readiness assessment. Other sites preparing for TRU waste shipments may find them useful in conducting their own readiness assessments.

Table V. Lessons Learned from the BCLDP Experience

Lessons Learned
A well-managed program with a detailed baseline, like the BCLDP, facilitates the assessment.
A flowchart of project tasks helps team members place the focus of the assessment within the context of the overall project.
Ready availability of all relevant project documentation that needs to be reviewed by team members facilitates the assessment.
Project staff make knowledgeable team members, but if they are not relieved of other project responsibilities, it can interfere with a timely assessment.
Beware of Parkinson's Law – work expands to fill the time available. If the priority isn't established, action plans for issues could be procrastinated. It is important to continually emphasize the necessity for meeting the schedule.
Don't underestimate the importance of a formal plan of action, a kickoff briefing with all team members, and a stated commitment from top-level management regarding the importance of the readiness assessment.
Providing team members with generic forms for CRADs and findings simplifies the data collection efforts and the preparation of the final report.

CONCLUSIONS

Since all findings, both pre-start and post-start, were satisfactorily resolved, the readiness assessment team concluded that the CEMP was indeed ready to begin TRU waste shipments (shipments began on December 18, 2002). The process implemented by the team to support this conclusion (see Figure 2) was both comprehensive and efficient. It was comprehensive in that it addressed all applicable requirements of DOE Order 425.1B, and efficient in that it minimized disruptions to the ongoing work, even though the evaluators were BCLDP staff. Other DOE sites that will need to ship TRU waste off site and are not requested to conduct a full-scale Operational Readiness Review should be able to tailor this process to their own requirements.

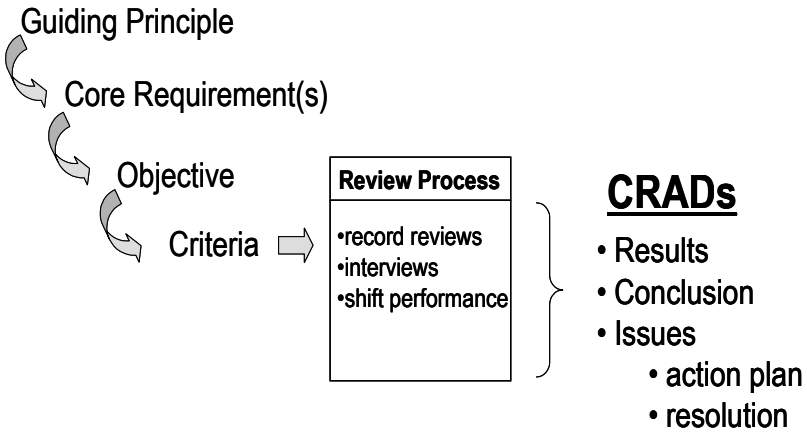

Figure 2. Readiness Assessment Evaluation Process

REFERENCES

1. DD-92-04, "Readiness Reviews", Battelle Columbus Laboratories Decommissioning Project (1992).
2. DOE Order 425.1B, "Startup and Restart of Nuclear Facilities", (2000).
3. DOE-STD-3006-2000, "Planning and Conduct of Operational Readiness Reviews", (2000).