

## SITE NEED STATEMENT

### General Reference Information

**Need Title:** In-Situ Characterization of Low-Level Waste  
**Need Code:** NV24-0200-06  
**Need Summary:** A less expensive, faster, or safer method for characterizing the following items is needed: complex geometries and porous surfaces (to verify decontamination prior to disposal); and waste containers (to dispose of them). At present, characterizing contaminated objects or waste containers involves swipes, sample collection and analysis, and hand-held instruments, and is extremely time-intensive and labor-intensive. The innovative technology would support the Environmental Restoration (ER) Life-cycle Baseline for Industrial Sites deactivation and decommissioning (D&D) and other non-D&D ER sites.

**Origination Date:** January 1, 2001  
**Need Type:** Technology Need  
**Operations Office:** NNSA/NV  
**Geographic Site Name:** Nevada Test Site  
**Project:** NV214/Industrial Sites  
**National Priority:** Medium  
**Operations Office Priority:** 6 of 13

### Problem Description Information

**Operations Office Program Description:** The NNSA/NV Environmental Restoration Program encompasses activities that assess the degree of contamination resulting from the testing program at the Nevada Test Site, the Nellis Air Force Range, the Tonopah Test Range, and eight offsite locations, and performs actions required by federal and state regulations. The objects of the Program are to: (1) identify the nature and extent of the contamination, (2) determine its potential risk to the public and the environment, and (3) perform the necessary corrective actions in compliance with applicable regulatory guidelines and requirements.

**Need/Problem Description:** A less expensive, faster, or safer method for characterizing the following items is needed: complex geometries and porous surfaces (to verify decontamination prior to disposal), and waste containers (to dispose of them). At present, characterizing contaminated objects or waste containers involves swipes, sample collection and analysis, and hand-held instruments, all of which are extremely time and labor-intensive.

**Functional Performance Requirements:** The requirements for this need include the following:

- \$ Portable, self-contained system operable on batteries.
- \$ Real-time data collection and direct data downloading capability.
- \$ Ability to characterize items having complex geometries and low-level soil in containers of various sizes.
- \$ Ability to detect the following primary radioisotopes: cobalt, cesium, plutonium, and uranium below free-release limits and low-level waste disposal limits.

**Definition of Solution:** Deployment of a portable self-contained characterization system having real-time data collection. The system must have the selectivity and sensitivity performance defined above.

**Targeted Focus Area:** Deactivation and Decommissioning

**Potential Benefits:** In situ characterization would reduce the risk of exposure of characterization workers to radiation.

**Potential Cost Savings:** \$1 million in present day dollars.

**Potential Cost Savings Narrative:** The cost savings for in situ characterization of low-level waste from just a portion of the D&D scope is estimated at over \$1 million in present day dollars.

**Technical Basis:** The baseline technology is extremely time-intensive and labor-intensive. Time is spent waiting for laboratory results to be produced. The baseline technology also results in the unwanted production of low-level waste because of the inability to sufficiently characterize equipment and other items for free release.

**Cultural/Stakeholder Basis:** D&D at the NTS is of general concern to the stakeholders.

**Environment, Safety, and** In situ characterization would reduce the risk of exposure of characterization

**Health Basis:** workers to radiation.  
**Regulatory Drivers:** No application in characterization phase.  
**Milestones:** Not applicable.  
**Material Streams:** Not applicable  
**TSD System:** Not applicable  
**Major Contaminants:** Cobalt, cesium, plutonium, and uranium below free-release limits and low-level waste disposal limits.  
**Contaminated Media:** Complex geometries and porous surfaces and waste containers.  
**Volume/Size of Contaminated Media:** Not applicable  
**Earliest Date Required:** 2001  
**Latest Date Required:** 2006

### **Baseline Technology Information**

**Baseline Technology Process:** Verification of decontamination is performed by conducting an instrument dose rate survey and collecting numerous survey swipes for loose contamination. For objects where the interior cannot be surveyed, it is assumed that the objects are radiologically impacted and, therefore, disposed-of as low-level waste. Waste container characterization is achieved by laboratory analysis of many samples from each container. The containers must be handled twice because of the time lapse between collecting the samples and receiving the laboratory results.

**Life-Cycle Cost Using Baseline:** The estimated cost for the D&D program for the five facilities is approximately \$40 million in escalated dollars according to the ER Life-cycle Baseline dated May 2000.

**Uncertainty on Baseline Life-Cycle Cost:** The project has low technical risk, therefore uncertainties are not a significant factor in the baseline.

**Completion Date Using Baseline:** 2010

### **Points of Contact (POC)**

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