Technical Discussion for May 12, 2014, USDA License Amendment Request for Decommissioning Plan Changes

Licensee : United States Department of Agriculture, BARC site
License No.: 19-00915-03
Docket No.: 03004530
Mail Control No.: 584055

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Introduction

The United States Department of Agriculture is nearing the completion of decommissioning activities at its Low-level Radioactive Burial Site Remediation Project at the Beltsville Agricultural Research Center (BARC) in Beltsville, Maryland. As a result of a recent change in the waste exhumation process, where the labor-intensive waste-sorting process is now to be performed offsite at the burial facility, the contractor will be initiating the Final Status Survey process earlier than originally anticipated. Based on an evaluation of the NRC-approved Final Status Survey Plan (FSSP) that is part of the Decommissioning Plan (DP) (ADAMs Accession No. ML120600551); the USDA has identified some suggested modifications to the FSSP that should enhance the final FSSP results and result in a plan that is more consistent with the guidance in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG 1575, Rev.1. (NOTE: The DP and FSSP were prepared and provided by a different contractor under an earlier USDA contract evolution).

USDA staff and contractors involved in the decommissioning project reviewed the DP/FSSP and identified modifications that it would like to immediately implement in order to have more consistency with the MARSSIM guidance and complete the project in a more timely manner. The USDA staff and contractors prepared a document, "BARC Technical Memo – Final Status Survey Plan Improvements," to provide a technical basis for making the DP/FSSP modifications. This document is attached. Any of the modifications to the FSSP and DP will be issued in an amendment to the USDA license.

Background

The BARC burial site consists of an array of approximately 50 burial pits where laboratory wastes from research activities were disposed from 1949 through 1987. Buried wastes primarily consist of contaminated laboratory containers, liquid scintillation vials (and fluids), animal carcasses and wastes, and laboratory trash. Wastes were generally packaged in bags, boxes, bottles, and/or drums. Each burial pit is approximately 10 feet wide by 12 feet long by 10 feet deep. Successive burials are separated by approximately 6 feet and there is approximately 5 feet of clean fill covering each pit. The actual burial footprint covers an area of approximately 0.7 acres. A contiguous field of approximately the same size had been designated for use, but waste was never disposed in the adjacent area. Radiological contaminants are primarily H-3 and C-14, with considerably lesser amounts of Ni-63, Pb-210, Ra-226, Sr-90, Cs-137, and Cl-36. Short-lived radionuclides (e.g. P-32) were also disposed in the burial site, but are not considered further because decay-corrected activities are zero. Both Ra-226 and Pb-210 are also present in the reference area.

The process for uncovering the pits and waste exhumation followed a general plan of: removing, segregating, and surveying the clean cover; removing segregating, and surveying the soil immediately above the waste pits; exhuming the waste from the pits and placing it in intermodal shipping containers for offsite disposal; and removing, segregating, and surveying the interstitial soil (i.e. the soil between successive burial pits. Initially, wastes were sorted in order to remove all containers and liquid scintillation vials, but this process proved to be time-consuming and cost-ineffective and was modified to have most of the sorting process conducted at the burial facility. During the uncovering and exhumation process, the waste was found to be generally in fairly well-defined pits, but variability in cover depth (often less cover), interstitial spacing (some pits were closer together than six feet), and pit depth (some pits were shallower) were apparent. Additional soil also had to be removed from the edges of the burial footprint to maintain a safe slope along the burial perimeter. Based on the anticipated areal footprint of the final exhumed area, the contractor plans for two MARSSIM class 1

survey units. In lieu of the 20 samples specified in the FSSP, the MARSSIM Table 5.3 value for N/2 o 16 is being requested. In addition, the contractor desires to add a MARSSIM class 3 survey unit surrounding the exhumed area.

All of the non-waste soil that was removed from the burial area is being considered for re-use as clean fill if surveys and sampling indicate that the material is not contaminated above the Derived Concentration Guideline Limit (DGGL) criteria (the soil must also be acceptable for non-radiological contaminants). The clean cover soil that was removed from above the waste pits was placed in a defined area and surveyed in six-inch lifts using a mobile array of FIDLER detectors to identify any potential gamma-emitting radionuclides. Samples were taken for subsequent radiochemical and gamma spectrometry analyses. The soil from immediately above the pits, the interstitial soil, and the soil along the perimeter of the exhumation was placed in a separate defined area, but surveyed and sampled in a similar manner as the clean cover soil. Although the MARSSIM guidance does not strictly apply to these soils that will be re-used if found clean, the USDA project staff wanted to treat these soils in a manner similar to MARSSIM by considering the clean overburden as similar to a MARSSIM class 3 survey unit and considering the remaining soil as similar to a MARSSIM class 1 survey unit. Each of the successive lifts is to be surveyed and sampled as separate survey units. Current sampling for backfill is one sample per 398 cubic yards of soil.

Discussion and Recommended Actions

The Region I inspector has held discussions on many of these items during inspection visits and has reviewed the Technical Memo. The issues are summarized below:

1.a. Interstitial Soils Sampling - The interstitial and perimeter soil has been carefully removed from the excavation following removal and disposal of the buried waste. This soil that has been removed has the potential for being impacted and should be sampled and confirmed to be less than the soil DCGLs before it can be considered for use as backfill. Although the MARSSIM guidance does not strictly apply to these materials because they are no longer in situ, consistent with MARSSIM guidance, the USDA suggests increasing the number of samples (N/2) to a value of. The number of samples, which will be used for statistical testing, that are collected from each Class 1 interstitial soils survey unit should be increased from 1 sample to 16 samples.

1.b. MARSSIM class 1 survey units and class 3 survey units - In lieu of the 20 samples specified in the FSSP, the MARSSIM Table 5.3 value for N/2 of 16 is being requested. In addition, the contractor desires to add a MARSSIM class 3 survey unit The number of samples, which will be used for statistical testing, that are collected from all other survey units should be decreased from 20 samples to 16 samples.

2. Walkover Surveys - The requirement to perform beta and gamma walkover surveys as part of the final status survey should be modified to require only gamma scan surveys of land areas. The principal radionuclides of concern (H-3 and C-14) will not be detected or reliably detected by beta scans. Sampling and analysis for H-3, C-14, and other radionuclides of concern and gamma walkover (or drive over) surveys will identify.

3. Excavation depths - Throughout the DP and FSSP, the burial depths have been estimated to be approximately 15 feet. Based on the as found depths of the burial pits, many of the pits are significantly less than 15 feet deep. The exhumation practice has been to remove all observable/identifiable waste and a buffer of approximately 1 foot of additional soil. In lieu of excavating the entire project footprint to a depth of 15 feet, the requirement to excavate to a depth of 15 feet below grade should be modified to require excavation to a relative depth of 1 foot below each waste pit with the excavation bottom contoured as necessary to provide a relatively smooth surface suitable for the performance of planned survey and sampling activities.

4. Survey Design - The survey design described in Section 3.5 of the Technical Memorandum, consisting of two Class 1 survey units surrounded by one Class 3 survey unit, should be adopted for the final status survey of the excavation bottom. This adds a Class 3 survey unit around the excavation footprint, and the Class 3 designation allows for bias sampling on the down-gradient edge of the excavation.

Action Requested

The Region I staff requests an expedited review of this memorandum and the referenced USDA Technical Memorandum and independently confirm that these changes can be accepted. This review should be documented in enough detail so that the information can be used to prepare an amendment to the USDA license.