

Final Status Survey Plan For the Former Salmon River Uranium Development Processing Mill

Introduction

The U.S. Nuclear Regulatory Commission (NRC) plans to conduct a final status survey of areas that will be remediated by the U.S. Environmental Protection Agency (EPA) at the Salmon River Uranium Development (SRUD) site in North Fork, Idaho. EPA will use a contractor for planning and completion of remediation activities at the site.

The purpose of this final status survey is to gather sufficient data to quantify the levels of residual contamination at the site after EPA's remediation activities are complete in order to conduct an independent dose assessment and to determine if EPA's actions resulted in the site meeting the NRC criteria for unrestricted release, in accordance with Title 10 of the Code of Federal Regulations (CFR), Part 20, Subpart E.

The inspection will be conducted using the general guidance provided in NRC Inspection Procedure 83890, "Closeout Inspection and Survey." The objectives of this final status survey are: i) to determine if remediation has been conducted as stated in the EPA's Removal Action Work Plan, and ii) to determine if the site has been decontaminated to acceptable radiological criteria. The inspection will include a review, walk-down and radiation surveys of the remediated areas of the site. Additional surveys may be conducted in areas that were not remediated to gather information necessary to conduct an independent dose assessment.

The SRUD Removal Action Work Plan indicates that outside areas to be excavated of contaminated soils include the pond, corrosive tanks, and five areas around the buildings for Thorium/Uranium soil contamination. Several areas will be excavated outside the building to remove chromium/arsenic and lead soils, and the pump house on the Salmon River will be demolished.

It is anticipated that EPA will remediate areas inside the buildings or remove radiological contaminated debris, etc. that exceed the EPA's acceptance criteria of 120 μ R/hr.

The radionuclides of concern are uranium and thorium which are present in various stages of processing including the natural, partially processed, and processed forms. Several areas outside the buildings are expected to require remediation or excavation of soils for removal of radiological contamination. The SRUD Removal Action Work Plan also indicates that areas will be excavated for removal of soils contaminated with metal and chemicals.

Acceptance Criteria

EPA has designated a target radiological criterion of 120 $\mu\text{R/hr}$ which is intended to assure that the clean-up radiological criteria of 200 $\mu\text{R/hr}$ is achieved. EPA is assuming a recreational scenario for purpose of regulatory compliance.⁽¹⁾

Final survey acceptance criteria may be established by the FSME project manager based on guidance provided in NUREG-1757, Volumes 1 and 2. Alternatively, the final status survey data will be used as input into the RESRAD or DandD programs to conduct a dose assessment and compare the results obtained against the NRC's 25-millirem per year release criteria provided in 10 CFR Part 20, Subpart E.

Radiological Characterization Reports

The SRUD Action Work Plan⁽²⁾ indicates that at least five locations around the building, under the corrosive tanks, and 200 ft west of the building have thorium and uranium contamination.

The ORISE radiological survey report⁽³⁾ in Figure 16 indicates that four (4) outside areas exceed the radiological criterion based on elevated direct radiation locations, and these areas could require remediation. ORISE used a grid system that could be used by NRC to identify and document its direct measurement and soil sample locations.

The TechLaw radiological survey report⁽⁴⁾ also identifies areas requiring soil excavation or remediation, but the data are more difficult to review to identify radiation trends and patterns.

NRC Instrumentation

Survey meters to be used for the confirmatory survey may include the Eberline E-600 with alpha/beta probe for measuring total surface contamination, a GM survey meter with beta/gamma detector for surface scanning and locating "hot spots," a sodium iodide detector for measuring ambient gamma exposure rates, and a micro-R survey meter for measuring exposure rates. A portable (in-situ) gamma spectroscopy meter will be used to identify the radionuclides in the field. Supplies will also be available for collection of swipe and soil samples.

Background exposure rates will be measured and soil samples will be collected. The background location will be chosen during the inspection but most likely will be the same location used by the removal action contractor to collect background samples. Instrument Lower Limits of Detection (LLDs) will be calculated based on background measurements.

NRC Confirmatory Sampling

The inspectors will select the areas to conduct confirmatory survey during the inspection with the assistance of FSME project manager. As a minimum, the radiation survey will consist of a number of systematic and biased samples in MARSSIM Class 1 areas. Radiation surveys of Class 2 and 3 areas will be conducted based on radiation survey findings. Interior surfaces of buildings may be selected for survey and sampling, although these areas may not be classified as Class 1 areas. Locations of surveys and sampling protocols will be developed using the ORISE grid system. Alternatively, the NRC staff can develop its own grid system using the protocols outlined in the Multi-Agency Radiation Survey Site and Site Investigation Manual (MARSSIM) (2000). Using the information from Table 5.5 in MARSSIM (2000), the NRC staff has determined that a total between 30 to 40 samples will be collected during the final status survey. The specific amount of samples to be collected will be established based on field conditions. If "hot spots" (or exposure rates exceeding 120 $\mu\text{R/hr}$ + background) are identified during the radiation survey, they will be evaluated to identify the boundaries of the elevated radiation levels.

Based on fixed surface sample results, the inspectors may elect to collect swipe samples. If fixed surface sample results are below the release criteria or below the LLD of the meter, then the inspectors may elect to not conduct swipe sampling. If collected, the swipe samples will be shipped to ORISE for analysis.

The NRC will conduct ambient gamma surveys using a sodium iodide detector. EPA has acceptance criteria for gamma exposure rate, and any area that exceeds 120 $\mu\text{R/hr}$ + background is subject to further remediation and subsequent sampling.

The inspectors may elect to conduct limited soil sampling based on review of the ORISE or TechLaw outdoor gamma survey results, or at the request of the FSME project manager. Although no specific number of soil samples is planned in advance, the projected number is not expected to exceed 15 samples per survey unit. If collected, the samples will be submitted to ORISE for gamma spectroscopy analysis. The inspectors should consider an option to split the samples with the EPA remediation contractor.

References:

1. Greg Weigel, Federal On-Scene Coordinator, e-mail dated August 8, 2007, to Rafael Rodriguez entitled – "Re; Revised Version of EPA's Action Memo" (ADAMS Accession Number ML072700761).
2. Salmon River Uranium Development Removal Action Work Plan. Contract No. EP-R7-07-02, ERRS 3 R10. (ADAMS Accession Number ML072880344).

3. ORISE – “Final Report – Radiological Scoping Survey of the Salmon River Uranium Development, Inc. Processing Mill, North Fork, Idaho” [Docket No. 040-03400, RFTA-03-020]. January 2, 2004. (ADAMS Accession Number ML040200577).
4. TechLaw – Contract Number EP-S7-06-03, Technical Direction Document (TDD) Number 06-03-0013; Salmon River uranium Development Mill Removal Assessment Report. Dated April 13, 2007. (ADAMS Accession Number ML071560458).