RECEIVED
MAY 30 2014
EDMC

AIR MONITORING PLAN FOR THE 100-D/DR AREA REMAINING SITES REMEDIAL ACTION

MAY 2014

1.0 INTRODUCTION

Remedial action (i.e., cleanup) of the remaining sites located in the 100-D Area has the potential to emit radionuclides. These activities are being conducted under two *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) Record of Decisions (EPA 1999, 2003). Quantification of radioactive emissions, implementation of best available radionuclide control technology (BARCT) pursuant to *Washington Administrative Code* (WAC) 246-247-040(3), "General Standards," and air monitoring pursuant to WAC 246-247-075(3) and (8), "Monitoring, Testing, and Quality Assurance," have been identified as substantive requirements (i.e., applicable or relevant and appropriate requirements) for the remedial action.

This air monitoring plan (AMP) describes how the substantive portions of these requirements will be implemented for this remedial action.

1.1 PLANNED ACTIVITIES

This remedial action work scope is for the removal and disposal of waste material and associated soil and debris from remaining waste sites located in the 100-DR-1 and 100-DR-2 Operable Units. The remedial action operations include characterizing, excavating, sorting, size reducing, stockpiling, treating (if necessary), decontaminating, containerizing, staging, loading, and transporting materials from the waste sites. The equipment being used is considered standard equipment for size reduction (e.g., shears, cutting torch), as well as excavating, segregating, loading, and hauling. Decontamination activities such as scabbling (e.g., removal of the surface layer) may be employed to remove radioactive contamination. Characterization activities may include, but are not limited to, sampling, test pitting, trenching, and drilling to further define the waste and/or determine the limits of some of the waste sites. Characterization activities may begin before remediation to assist in verifying design parameters and will continue for the life of the remediation project.

The loading of contaminated soil and debris into waste containers may result in soil spilled on the waste containers and/or haul trucks. Haul trucks with loaded containers will be surveyed to detect exterior contamination. A decontamination station may be established to decontaminate containers, haul trucks, and equipment, as required. Waste containers, haul trucks, and/or equipment will be decontaminated by conventional means (e.g., brushing or wiping) or with high-efficiency particulate air (HEPA)-filtered vacuum cleaners. The HEPA-filtered vacuum cleaners may also be used (as needed) to decontaminate other equipment or to pick up other loose contaminated materials. More aggressive decontamination methods (e.g., grinding or wet-grit blasting) may be used for decontamination if the other methods fail. Decontaminated trucks and containers will then proceed to the container staging area where the transportation

subcontractor will pick up the containers for transport to the Environmental Restoration Disposal Facility (ERDF) or other approved disposal location.

The work scope includes remediation of the following waste sites in the 100-D Area: 100-D-85:2, 100-D-86:1, 100-D-86:3, 100-D-102, 100-D-104, 100-D-105, and 1607-D2:5. Removal of 147-D, the In Situ Redox Manipulation (ISRM) Evaporation Pond, is also included in the scope of this AMP. The locations of the sites discussed in this AMP are shown in Figure 1.

Characterization sampling (e.g., confirmatory sampling, remedial investigation sampling) at radiological contaminated sites is included in the scope of this plan since these activities (e.g., surface sampling, potholing) will generate negligible emissions. The Washington State Department of Ecology (Ecology) will be notified of confirmatory sampling activities at the 100-D Area via the confirmatory sampling work instruction approval process already in place. Additional sites may be added to this AMP through agreement in the Unit Managers' Meeting. Additionally, if any of the nonradioactive sites in the 100-D Area are determined to contain radioactive contamination based on additional information, this AMP will cover those sites based on concurrence from Ecology.

2.0 AIRBORNE SOURCE INFORMATION

There is a potential for particulate radioactive airborne emissions to result from remediation of waste sites in the 100-D Area. The concentrations of the isotopes listed in the *Total Effective Dose Equivalent (TEDE) for 100-D/DR Waste Sites* (WCH 2014) represent those that were determined to exist in the waste sites and 147-D, the ISRM Evaporation Pond. Other isotopes may also be encountered in negligible amounts during remedial action activities; however, it is expected that the total estimated dose listed in the total effective dose equivalent (TEDE) calculation is conservative and represents the upper bound of what will actually be found during remedial actions.

2.1 INVENTORY

The waste sites and 147-D, the ISRM Evaporation Pond, are likely to contain contaminated soil or soil mixed with piping and other debris. For conservatism, it was assumed that the inventory for this material is generally in the form of particulates (soil, debris, oxides). The particulate form of the inventory, for calculation purposes, is assumed to have rubbed off into the soil, and a release fraction of 1.0×10^{-3} is applied. For calculation purposes, it is conservatively assumed that tritium is present as a gas, and a release fraction of 1 is applied.

It is assumed at this time that no scabbling will be performed, although it is an activity that may be necessary. Should it become necessary, concurrence from Ecology will be obtained. In addition, it is assumed that 0.1% of the particulate inventory will be picked up through a HEPA-filtered vacuum. A release fraction of 1 is applied to the HEPA vacuum inventory.

The CAP88-PC model (Version 3.0) was used to determine the annual TEDE to the maximally exposed individual (MEI). The appropriate release fraction was applied to the inventory of the

various waste sites and 147-D to calculate the potential to emit. The calculated potential to emit (curies per year) was the input used for the computer model, and the model generated the annual unabated dose. The distance to the MEI used in the model was approximately 9,714 m (31,872 ft) west-northwest. The CAP88-PC model summary and synopsis are presented in WCH (2014). The calculated total unabated annual TEDE to the MEI for the inventory in the calculation is 5.62E-03 mrem/yr.

3.0 BEST AVAILABLE RADIONUCLIDE CONTROL TECHNOLOGY

The following is the BARCT to be implemented during remedial actions.

- Water will be applied during excavation, container loading, and backfilling processes to minimize and control airborne releases.

- Soil fixatives will be applied to any contaminated soils and debris that will be inactive for more than 24 hours. Periodic monitoring (visual observation) of the contaminated soils and debris that remain inactive for greater than 1 month should be performed. Reapplication of fixatives or other control measures shall be performed if warranted by the periodic monitoring.

- Fixatives will be applied to contaminated soils and debris that will be inactive less than 24 hours at the end of work operations if the sustained wind speed is predicted overnight to be greater than 32 km/hr (20 mi/hr) based on the Hanford Meteorological Station morning forecast. This will allow the project enough time, if necessary, to prepare for the application of dust control measures. If a soil fixative has already been applied and the soil will remain undisturbed, further use of fixatives will not be needed. The fixatives or other controls will not be applied when the contaminated soils are frozen or it is raining, snowing, or other freezing precipitation is falling at the end of work operations.

- Appropriate documentation on the application of fixatives to comply with BARCT shall be maintained (e.g., logbook or other project-specific documentation).

- The haul trucks will be covered to contain the materials while in transit to ERDF.

- Vacuum cleaners for radiological work will be used when needed and equipped with HEPA filters, which are considered BARCT for radioactive emissions at the Hanford Site. HEPA filters are efficiency tested upon installation and on an annual basis thereafter. HEPA filters must be demonstrated to have a 99.95% removal efficiency.

- Additional measures for controlling small debris in waste piles may be prudent based on waste site conditions as determined by project personnel. Additional measures that may be used are as follows: (1) apply a thin layer of contaminated soil from the same waste site (that is free of debris) on the surface and follow normal fixative application, (2) apply a thin layer of uncontaminated soil on the surface and follow normal fixative applications, (3) apply

bonded fiber fixative, and (4) cover the area containing small debris that is easily resuspended with a tarp or other appropriate material.

4.0 MONITORING

The *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE-RL-2009), Section 3.4.6, "Air Monitoring Plans," notes the following:

> "The substantive requirements applicable to radioactive air emissions resulting from remediation activities are to quantify potential emissions, monitor the emissions, and identify and employ best available radionuclide control technology. Exemptions from these requirements may be requested if the potential-to-emit for the activity or emission unit would result in a total effective dose equivalent of less than 0.1 mrem/yr."

Section 2.0 above quantifies the potential emissions that may result from these remediation activities. Because the calculated total unabated annual TEDE to the MEI from these activities is 5.62E-03 mrem/yr, which is less than 0.1 mrem/yr, it qualifies as a minor emissions unit that does not require continuous monitoring. Therefore, no near-field monitors are proposed for these activities. Routine radiological control surveys will continue to be performed as part of the radiological control program for these sites. Environmental soil samples remain to be collected after remediation activities are complete near the previously utilized downwind air monitors and analyzed for gamma energy analysis, strontium-90, plutonium-238, plutonium-239/240, and isotopic uranium. The soil samples will be taken to evaluate the long-term trends in the environmental accumulation of radioactivity. The data from these activities will be included in the appropriate annual reports prepared for the Hanford Site.

HEPA-filtered vacuums may also be utilized infrequently during remediation activities. Exhaust points from HEPA filters will be monitored on a routine basis for potential radionuclide releases and the results recorded (e.g., post-survey results negative) during vacuuming. Any positive survey results will require appropriate maintenance on the unit to ensure that continued releases do not occur. Records of routine monitoring and necessary maintenance will be provided to Ecology staff upon request.

Characterization (e.g., test pitting and trenching, or surface soil sampling) may be conducted prior to the start of remediation or as needed to support confirmatory or risk assessment activities. If near-facility air monitoring is not being conducted during these characterization activities, then only routine radiological control surveys will be performed.

5.0 REFERENCES

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601, et seq.

DOE-RL, 2009, *Remedial Design Report/Remedial Action Work Plan for the 100 Area*, DOE/RL-97-16, Rev. 6, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

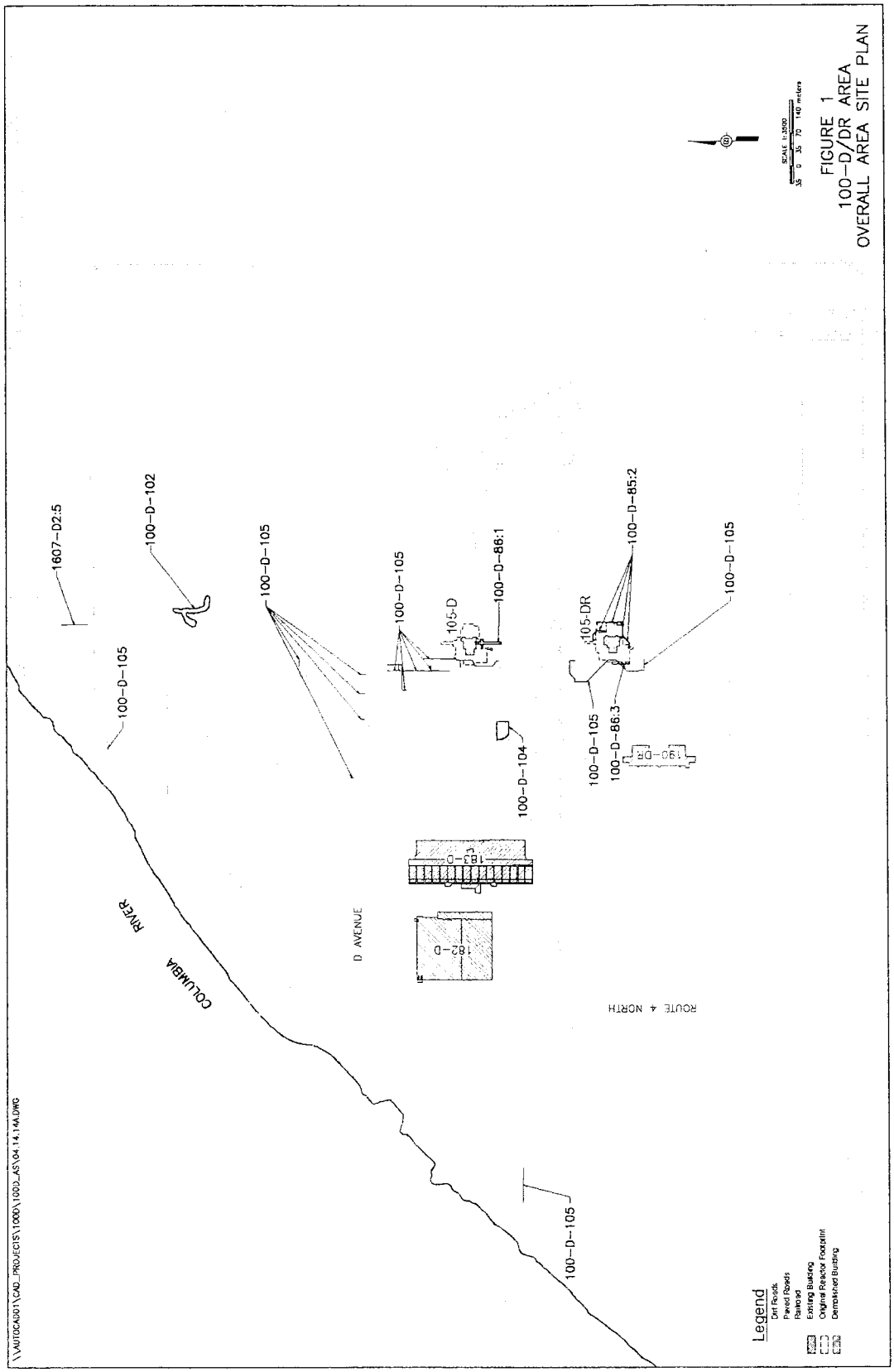
EPA, 1999, *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

EPA, 2003, *Explanation of Significant Difference for the 100-HR-3 Operable Unit, Record of Decision, Hanford Site, Benton County, Washington,* U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

WAC 246-247, "Radiation Protection – Air Emissions," *Washington Administrative Code*, as amended.

WCH, 2014, *Total Effective Dose Equivalent (TEDE) for 100-D/DR Waste Sites,* Calculation 0100D-CA-V0459, Rev. 1, Washington Closure Hanford, Richland, Washington

Figure 1. 100-D/DR Area Overall Site Plan.



Concurrence:

M. S. French 5/20/14
M. S. French Date
U.S. Department of Energy,
Richland Operations Office

Nina M. Menard 5/22/14
Nina Menard Date
Washington State Department of Ecology

Distribution:

Administrative Record	H6-08
Stacey Callison	X8-02
Chad Dobie	H4-21
Artie Kapell	H0-57
Nina Menard	H0-57
Tom Post	A3-04
Dan Saueressig	N3-30
Dean Strom	X8-02
Steve Wilkinson	H4-21