

SITE CHARACTERIZATION

OPERATING PROCEDURE

***FACILITY POST-DECONTAMINATION FINAL
STATUS SURVEY FOR BASELINE AREAS***

**BATTELLE
505 King Avenue
Columbus, Ohio 43201**

Procedure Status:

- Non-Critical Procedure**
- Critical Procedure—Procedure
Qualification Packet (PQP)
Required**

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No. SC-OP-002
Page i of ii

INDEX OF PAGE REVISIONS

Page No.	i	ii								
Rev. No.	0	0								

Page No.	1	2	3	4	5	6	7	8	9	10
Rev. No.	0	0	0	0	0	0	0			

Page No.	11	12	13	14	15	16	17	18	19	20
Rev. No.										

Page No.	21	22	23	24	25	26	27	28	29	30
Rev. No.										

Page No.	31	32	33	34	35	36	37	38	39	40
Rev. No.										

REVISION RECORD	
Rev. No.	Date

REVISION RECORD	
Rev. No.	Date

REVISION RECORD	
Rev. No.	0
Issue Date	
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PROCEDURE APPROVAL PAGE

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Date

This procedure, SC-OP-025, *Facility Post-Decontamination Final Status Survey for Baseline Areas*, has been reviewed and approved by the following.

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FACILITY POST-DECONTAMINATION FINAL STATUS SURVEY FOR BASELINE AREAS

1.0 Scope

This document discusses the requirements for performing a final status survey on facility surfaces following completion of Battelle Columbus Laboratories Decommissioning Project (BCLDP) decontamination operations in baseline areas.

2.0 Purpose

The purpose of this document is to identify, describe, and establish procedures for the monitoring and documentation of residual contamination levels on the surfaces of a facility following decontamination in baseline areas. The final status survey will determine if the radiological conditions are within the limits established in References 3.1.1 and 3.1.2.

3.0 References, Definitions, and Developmental Resources

3.1 References

- 3.1.1 DD-93-02, Surface Release Criteria Technical Basis Document
- 3.1.2 NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination – Draft Report for Comment, 1992
- 3.1.3 HS-OP-001, Completion of Industrial Safety Checklist
- 3.1.4 QD-AP-05.2, Work Instructions
- 3.1.5 WA-OP-020, Identification, Segregation, Separation, and Documentation of Low Level and Radioactive Mixed Waste
- 3.1.6 SC-OP-007, Baseline Reference Values for Facility Radiological Characterization Surveys
- 3.1.7 SC-OP-010, Establishing a Surface Reference Grid for Walls, Floors and Ceilings for a Detailed Characterization Survey
- 3.1.8 PR-AP-17.1, Operation of the Project Records Management System
- 3.1.9 Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for By-Product, Source or Special Nuclear Material, U.S. Nuclear Regulatory Commission

3.1.10 SC-OP-004, Radioactive Contamination Monitoring Requirements for Facility Surface Characterization

3.2 Definitions

Refer to the BCLDP Procedures Directory for definitions of the following terms:

Adjacent Grid	Minimum Detectable Activity (MDA)
Baseline Area	Non-Designated Grid
Decision Level Value (DLV)	Static Count
Designated Grid	

3.3 Developmental Resources

None

4.0 General

4.1 Equipment

- 4.1.1 Gas proportional detectors and associated electronics sensitive to alpha and beta/gamma radioactivity and equipped with an aural indicator. These instruments may be operated in gas flow or static gas configuration and will be capable of detecting alpha-only and alpha-plus-beta activity. Some electronics may also allow beta-only readings. Examples of gas proportional detectors are the Eberline ESP-2 meter with a Ludlum 239-1F detector (floor monitor) and the Eberline ESP-2 meter with a Ludlum 43-20 detector.
- 4.1.2 Scintillation detectors and associated electronics sensitive to alpha, beta, or gamma radiation. These instruments may be capable of detecting both alpha and beta activity and discriminating between them. Examples of scintillation-type instruments are the Delta 3/DP6 combination for alpha and beta detection/discrimination and a NaI crystal (Ludlum 12S Micro R meter) for gamma detection.
- 4.1.3 A pressurized ionization chamber, Micro R meter, or Geiger-Mueller instrument may be used to measure external penetrating radiation (gamma) and to estimate exposure rates.
- 4.1.4 Smears to quantify removable contamination.

- 4.1.5 Scaffolding equipment, ladders, and related elevated or remote access equipment.
- 4.1.6 Personal protective clothing and/or equipment and monitoring equipment as required by the Work Instruction and Radiation Work Permit.

5.0 **Procedure**

Unless otherwise specified, the **Surveyor(s)** shall be responsible for completing the steps of this procedure.

5.1 **Start-Up Documentation**

- 5.1.1 The **Project Manager** or designee will initial Work Instruction (DDO-104) and Industrial Safety Checklist (DDO-195) in accordance with References 3.1.3 and 3.1.4.
- 5.1.2 The **Project Manager** or designee will request Waste Management Checklist (DDO-164) in accordance with Reference 3.1.5.
- 5.1.3 **Surveyors** will, under the direction of the **Project Manager** or designee, establish a DLV and attach to the Work Instruction, in accordance with Reference 3.1.6.
- 5.1.4 **Surveyors** shall complete DDO-380, Field Instrument Check Source, prior to beginning surveys.

5.2 **Scanning – Surveys**

- 5.2.1 Refer to the logic chart in Exhibit 1 for the basic steps of the final status survey.
- 5.2.2 Grid rooms/areas in accordance with Reference 3.1.7.
- 5.2.3 Consider inaccessible areas contaminated and not ready for final status unless documentation is provided by the **Remedial Action Manager** stating that the contamination levels are below the release criteria in References 3.1.1 and 3.1.2.
- 5.2.4 Perform the final status survey in compliance with References 3.1.8 and 3.1.9. The general survey procedure is outlined in Reference 3.1.10.
- 5.2.5 Scan the entire surface area of each adjacent and designated grid section with an alpha/beta survey instrument as the fundamental survey technique.

Perform a scan in the alpha-plus-beta mode (or beta-only mode). Also perform an alpha-only scan unless the MDA of the instrument in the alpha-plus-beta mode is less than the surface release criteria specified in Reference 3.1.1.

- 5.2.6 Perform scans for each category of surface material (e.g., metal, solid concrete, concrete block).
- 5.2.7 Scan manually or by some mechanically driven device.
- 5.2.8 Check the instrument's operation at least once per hour (or as needed by instrument usage and experience) using a check source of established count rate. Document source check readings on DDO-380. Discontinue use of the monitoring instrument if the check source reading varies more than 10% of the established rate (i.e., reading does not fall within the source check range listed on the detector). If source check is failed, the **Characterization Project Manager** shall evaluate all data collected since the last acceptable source check for validity.
- 5.2.9 Do not separate surface materials less than 10 centimeters in width from the predominant surface material in the grid.
- 5.2.10 Perform scanning slowly (~5 cm/sec) at ~.5 cm passing the detector over the surface of interest. Record the maximum value displayed by the instrument for the entire surface on DDO-376 (Characterization Radiological Survey Report) if the DLV is not exceeded.
- 5.2.11 For areas where measurements exceed the DLV, provide precise identification of the area and additional information.
 - 5.2.11.1 Provide identification of the area in accordance with Reference 3.1.7 and include additional data collection: (1) a static alpha-plus-beta measurement, (2) a static alpha-only measurement, and (3) a smear sample.
 - 5.2.11.2 Take static measurements in the ratemeter mode of the instrument. If the instrument is capable of storing the highest measurement (i.e., peak trap), use this mode.
 - 5.2.11.3 Designate grids in which dpm values exceed 80% of the values stated in Reference 3.1.1 shall be designated for further evaluation by the **Characterization Project Manager (or designee)**. Calculation of the dpm values shall be performed as follows:

$$\text{dpm}/100 \text{ cm}^2 = \frac{C_i - \bar{x}_{\text{bkg}}}{(\text{Eff}) \times \left(\frac{180 \text{ cm}^2}{100 \text{ cm}^2}\right)}$$

where:

- C_i = instrument reading (cpm/180 cm²)
 \bar{x}_{bkg} = mean value for background (cpm/180 cm²)
Eff = instrument efficiency expressed as a decimal (cpm/dpm)

5.2.12 Record all readings and locations on DDO-376.

5.3 Population Surveys

5.3.1 Perform a large population statistical survey for designated, adjacent, and non-designated grids according to the following.

Total Number of Grids ^a	Number of Grids to Receive Static Counts
< 30	100% of total grids
30 to 300	30 grids
> 300	10% of total grids

^a Grids are normally 1 m².

5.3.2 Ensure that population measurements consist of (a) static, one minute, alpha-plus-beta integrated count; (b) static, one minute, alpha-only integrated count; and (c) a smear sample.

5.3.3 Record all readings and locations on DDO-376.

5.4 Summarize each work day's survey/sampling activities, including any atypical events, on DDO-382.

6.0 Records

Records generated by implementation of this procedure are completed data sheets, which are compiled and submitted to Project Records as referenced in PR-AP-17.1, (Reference 3.1.8).

- Work Instruction
- Waste Management Checklist
- Industrial Safety Checklist

- Characterization Radiological Survey Report
- Field Instrument Source Check
- Daily Summary Report Form

7.0 Forms, Exhibits and Attachments

7.1 Forms

- DDO-104, Work Instruction (Reference 3.1.4)
- DDO-164, Waste Management Checklist (Reference 3.1.5)
- DDO-195, Industrial Safety Checklist (Reference 3.1.3)
- DDO-376, Characterization Radiological Survey Report (Reference 3.1.10)
- DDO-380, Field Instrument Source Check (Reference 3.1.10)
- DDO-382, Daily Summary Report Form (Reference 3.1.10)

7.2 Exhibits

- Exhibit 1, Logic Chart

7.3 Attachments

- None.

EXHIBIT 1 LOGIC CHART

