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HP-OP-011
Revision 5

DECONTAMINATION AND DECOMMISSIONING OPERATIONS

HEALTH PHYSICS OPERATING PROCEDURE

RELEASE OF MATERIALS FROM CONTROLLED AREAS

BATTELLE
505 King Avenue
Columbus, Ohio 43201

Procedure Status:

[ ] Non-Critical Procedure

[X] Critical Procedure—Procedure Qualification Packet (PQP) Required

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REVISION RECORD INDICATING
LATEST DOCUMENT REVISION

Title Release of Materials from Controlled Areas No. HP-OP-011

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REVISION RECORD	
Rev. No.	Date
0	4/7/92
0.1	5/28/92
1	8/4/92
2	10/20/92
3	1/25/93
4	7/28/99

REVISION RECORD	
Rev. No.	Date

CURRENT REVISION	
Rev. No.	5
Issue Date	
Issued By	

PROCEDURE APPROVAL PAGE

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RELEASE OF MATERIALS FROM CONTROLLED AREAS

1.0 Scope

This procedure establishes the specific requirements for the unconditional release of materials from controlled areas. This procedure is not applicable to the volumetric release of certain materials, e.g., liquids, soils, slurries. This procedure is applicable to all personnel who enter Battelle Columbus Laboratories Decommissioning Project (BCLDP) controlled areas, , the Radiological Field Operations (RFO) Manager, and the Health Physics Technicians who perform the surveys necessary for the unconditional release of materials from controlled areas applicable to BCLDP.

2.0 Purpose

The purposes of this procedure are to

2.1 Specify the survey and control requirements for the unconditional release of material from BCLDP controlled areas

2.2 Specify the qualification standard for Health Physics Technicians who perform the surveys and evaluations of the materials to be unconditionally released from BCLDP controlled areas

2.3 Specify the types of surveys necessary for unconditional release of material from BCLDP controlled areas

2.4 Specify the documentation necessary to provide an auditable record of all unconditionally released material from BCLDP controlled areas

2.5 Minimize the potential for unintentional release of contaminated items into uncontrolled areas and satisfy the requirements of References 3.1.1 and 3.1.10 of this procedure.

3.0 References, Definitions, and Developmental Resources

3.1 References

3.1.1 10 CFR 20, Standards for Protection Against Radiation

3.1.2 HP-OP-014, Control of Radioactive Material

3.1.3 HP-AP-1.0, Issue and Use of Radiation Work Permits

3.1.4 HP-OP-106, Volumetric Release Permitting Requirements

3.1.5 HP-OP-012, Radiological Area Posting and Access Control

3.1.6 HP-AP-29.0, Control of Radioactive Measuring and Test Equipment and Instruments (RMTEI)

3.1.7 HP-OP-019, Radiation and Contamination Survey Techniques

3.1.8 American National Standards Institute (ANSI) N3.1-1987, Selection, Qualification and Training of Personnel for Nuclear Power Plants

3.1.9 PR-AP-17.1, Operation of the Project Records Management System

3.1.10 DD-90-02, Radiation Protection Program for the Battelle Columbus Laboratories Decommissioning Project

3.1.11 EL-TP-006, Determination of Gross Alpha and Beta-Gamma Activities Using the Tennelec LB5100

3.1.12 HP-OP-105, Operation and Calibration of the Ludlum 2929

3.1.13 HP-OP-131, Operation and Calibration of the Nuclear Enterprise Delta 3 and Electra Models

3.1.14 WA-OP-20, Identification, Segregation, Separation, and Documentation of Low Level and Radioactive Mixed Waste

3.1.15 QD-AP-05.2, Work Instructions

3.1.16 HP-OP-150, Operation and Calibration of the Canberra 2400

3.2 Definitions

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

Activity	
Clean Trash	Survey-Exempt Materials
Contamination (Radioactive)	Large-Area Smears
Controlled Area	Minimum Detectable Activity (MDA)
Evaluator	Release for Unrestricted Use
Fixed Contamination	Transferrable (Loose) Contamination
	Static Measurements

3.3 Developmental Resources

3.3.1 NUREG/CR-5849, Manual for Conducting Radiation Surveys in Support of License Termination

3.3.2 Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors

3.3.3 DD-93-02, Surface Release Criteria Technical Basis Document for BCLDP

3.3.4 U.S. Department of Energy (DOE) Order 5400.5, Radiation Protection of the Public and the Environment

3.3.5 DOE/CH-9401, RADWG Standard Guidance for Survey of Materials and Equipment for Unconditional Release

4.0 General

4.1 Items identified as radioactive material during the release survey shall be controlled in accordance with the provisions of Reference 3.1.2 of this procedure.

4.2 Personnel performing release surveys shall be logged in on a Radiation Work Permit in accordance with the provisions of Reference 3.1.3 of this procedure.

4.3 All releases of sludges, slurries, soil, liquids, or similar materials shall be performed in accordance with the provisions of Reference 3.1.4 of this procedure.

4.4 Release surveys are valid for fixed time intervals dependent upon the storage location posting. Exhibit 1 shall be used as a guide for these time intervals.

4.5 Posting and access control of controlled areas shall be performed in accordance with the provisions of Reference 3.1.5 of this procedure.

4.6 If a radiation detection instrument used to perform release surveys fails any operational check, it shall be removed from service in accordance with Reference 3.1.6. All data collected during the period of instrument failure must be evaluated by the RFO Manager or designee.

4.7 Radiation and contamination surveys shall be performed in accordance with the provisions of Reference 3.1.7 of this procedure.

4.8 Radiation detection instrumentation with audible-response capability shall be utilized for direct contamination surveys.

5.0 Procedure

5.1 Personnel Qualifications

5.1.1 **Health Physics Technicians** shall be qualified in accordance with the requirements of Reference 3.1.8 to perform release surveys of materials.

5.1.2 **Health Physics Technician** trainees may perform release surveys under the direct supervision of a Health Physics Technician meeting the requirements of Section 5.1.1.

5.1.3 The **Radiological Field Operations (RFO) Manager** shall assess the qualifications of evaluators, who are Battelle staff members. The **RFO Manager** shall designate evaluators in writing and authorize them to evaluate materials and items that have been radiologically surveyed for unconditional release. These items typically have internal or inaccessible surfaces. Evaluation shall be performed in accordance with the provisions of Section 5.5.1 of this procedure. **Evaluators** shall be selected in accordance with the following criteria:

5.1.3.1 Shall be an ANSI N3.1 (Reference 3.1.8) Senior Health Physics Technician *and* have at least five years of experience in operational health physics

5.1.3.2 Shall have at least two years of Battelle Memorial Institute/BCLDP operations experience

5.1.3.3 Should be a Health Physics Manager, Health Physics Supervisor, or have health physics supervisory experience.

5.2 Release Limits

EMISSION	REMOVABLE (dpm/100 cm^2)	TOTAL (Fixed and Removable) (dpm/100 cm^2)
Alpha	20 *	100 *
Beta - Gamma	200 **	1000 **

* Based on TRU, Ra-226, and Th-230
** Based on Sr-90 and Th-232

NOTE: If *all* of the actual isotopic constituents of the contamination are known *and* documented on the release survey, the release limits of Table 6.1 of Reference 3.1.10 may be applied.

5.3 Survey Process

5.3.1 Upon receipt of an item presented for release, the **Surveyor** shall attempt to determine the history:

5.3.1.1 Purpose of the item

5.3.1.2 The current and past use of the item

5.3.1.3 The location(s) in which the item was used or stored

5.3.1.4 If the item was ever used for work with radioactive material or used in an area where radioactive material was used or stored.

This knowledge of the item history should provide the Surveyor with information helpful in performing the release survey.

5.3.2 The instrument used to perform unconditional release surveys must have a minimum detectable activity (MDA) value at or below the release limit values as found in Section 5.2 of this procedure. MDA for the Tennelec LB5100 (or equivalent) shall be in accordance with Reference 3.1.11, the MDA for the Ludlum 2929 shall be in accordance with Reference 3.1.12 and the MDA for the Canberra 2400 shall be in accordance with Reference 3.1.16.

5.3.3 Materials considered hazardous due to their physical or chemical nature and fragile items (e.g., gases, pyrophoric materials, easily damaged electronic devices, or other easily damaged materials that cannot be directly or indirectly surveyed) shall not be unconditionally released unless evaluated. These materials will be evaluated on a case-by-case basis for release in a manner consistent with Section 5.5.1.2. Evaluation for release shall be performed only by a designated evaluator.

5.3.4 The instruments used for release surveys shall be within current calibration and shall be operated and performance test checked daily or prior to use in accordance with the instruments' respective operating procedures:

5.3.4.1 Ludlum 2929—Reference 3.1.12.

5.3.4.2 Delta 3 and Electra—Reference 3.1.13.

5.3.4.3 Tennelec LB5100—Reference 3.1.11.

5.3.4.4 Canberra 2400-Reference 3.1.16.

5.3.5 To maximize instrument detection capabilities, release surveys shall be conducted in as low a background as is feasible. Record Background and Efficiency on DDO-138.

5.3.6 Large area smears may be used to augment (but not replace) the 100 cm^2 smear survey. Large area wipes may be counted with the Electra or equivalent. Large area smears are used to obtain immediate information concerning loose contamination for the purpose of radiological protection and to minimize time spent performing disc smears on an item easily identified as contaminated.

5.3.7 The **Health Physics Technician** shall perform large area smears of 100% of the accessible surfaces of the item.

5.3.7.1 Determine if transferrable radioactive material is present by measuring the amount of activity on the surface of the cloth.

5.3.7.2 If the presence of radioactive material is indicated by a count rate above background, use protective clothing such as gloves to complete the survey. In addition, treat the item as contaminated until the results of the disc smear survey are obtained and determination is made concerning the actual 100 cm^2 loose contamination levels. Control and label the material in accordance with Reference 3.1.2.

5.3.8 The **Health Physics Technician** shall perform a direct scan of 100% of all accessible areas of the item in accordance with the applicable instrument's operating procedure.

5.3.8.1 During the direct scan of the accessible surfaces of the item, take a static measurement:

- If an increase in the audible count rate is detected
- After each minute of scanning
- When determining that an indication of fixed activity less than 10 cm^2 may be present.

5.3.8.2 During the static measurement, hold the meter probe at ¼" to ½" from the surface being surveyed for the proper response period of not less than 60 seconds to allow the meter reading to stabilize, in accordance with the instrument's operating procedure.

5.3.8.3 If the scan indicates that radioactive material on the surface of the item is less than the limits for release for total activity, proceed to 5.3.9.

5.3.8.4 If the scan indicates that radioactive material on the surface of the item is greater than regulatory limits for total activity, do not release the item. Control the item in accordance with the provisions of Reference 3.1.2 of this procedure.

5.3.8.5 Perform a response check at least once during the work shift and at the completion of the work day for instruments used for direct surveys in accordance with the instruments' operating procedures. Record

meter response check data on DDO-138 that is used to document the release survey.

5.3.9 The **Health Physics Technician** shall perform disc smears of 100% of the effective accessible surface area, which means performing a 100 cm^2 disc smear on all accessible areas of the item *suspected* of being contaminated.

5.3.10 The **Health Physics Technician** shall count the disc smears in accordance with Reference 3.1.7.

5.3.10.1 Record smear data and the MDA values on DDO-134 unless the Tennelec LB5100 (or equivalent) was used. If the Tennelec was used, attach the laboratory results to DDO-138.

5.3.10.2 Record the count data for a pair of blank "control" planchets: the first count prior to the start of counting; the second upon cessation of smear counting.

5.3.10.3 If the smear results indicate transferrable activity below the release limits, proceed to Step 5.3.11.

5.3.10.4 If the smear results indicated transferrable activity above the release limits, do not release the item.

5.3.11 If the item has internal or inaccessible surfaces, the **Health Physics Technician** shall have the individual requesting release disassemble the item and repeat Steps 5.3.7 through 5.3.10 or have the item evaluated for release by a designated evaluator.

5.3.12 If the item meets the release limits or is evaluated as meeting the unconditional release criteria, the **Health Physics Technician** shall complete the DDO-300. the **RFO Manager or designee** shall review the release documents and approve the release prior to allowing the item to leave the controlled area.

5.3.13 Items identified as radioactive during the release survey shall be controlled in accordance with Reference 3.1.2.

5.4 Documentation

5.4.1 A release document package shall include the following forms:

5.4.1.1 A Health Physics Survey Report (DDO-138) with a Counting Room Analysis Report (DDO-134) or Tennelec/isotopic printout

5.4.1.2 A Material Release Log (DDO-300)

5.4.1.3 A Health Physics daily log (Chronological record)

5.4.1.4 A Summary and/or Special Report Form (DDO-103) used to record additional information.

5.4.2 The release log (DDO-300) shall include the following information:

5.4.2.1 Date of the release radiation survey

5.4.2.2 HPS number of the release survey

5.4.2.3 Description or identification of the item

5.4.2.4 Identity of the Health Physics Technician performing the release survey

5.4.2.5 Signature of the evaluator (Section 5.3.3) of the material for release

5.4.2.6 Release approval of the RFO Manager or designee.

5.5 Special Conditions

5.5.1 Inaccessible Surfaces

5.5.1.1 Items with inaccessible surfaces should be disassembled as completely as possible to facilitate release surveys. Items with inaccessible surfaces will not be unconditionally released unless evaluated by a designated evaluator who authorizes and documents the release.

5.5.1.2 The following guidance will be used when performing evaluations:

- History of the item should be reviewed
- Actual release survey shall be reviewed
- Determination of the radiological conditions in the area the item has been used or stored shall be reviewed
- Removal of oil, dirt, and other materials that might attenuate the surface activity
- Use of sensitive detectors such as NaI(T1) should be considered.

[These detectors may indicate internal contamination that the NE Delta or Electra may not detect due to the lack of sensitivity to photon emissions.]

5.5.2 Survey-Exempt Materials

5.5.2.1 The contents of sealed containers which remain unopened while in a controlled area are exempt; the outside surfaces are not exempt.

5.5.2.2 Items entering the BCLDP controlled areas that are continuously escorted or otherwise controlled by Health Physics are exempt from the health physics release survey requirements of this procedure; however, **Health Physics** shall perform a survey allowing release from the controlled area , e.g., forklifts. An evaluator shall approve the release of items from controlled areas in this manner and shall document authorization on the BCLDP HP Control Point Log

5.5.2.3 Items such as briefcases, pens, papers, personal clothing, etc., are exempt from the health physics release survey requirements of this procedure. Individuals shall survey the personal exempt items in the same manner as a whole body frisk when leaving a controlled area or have a Health Physics Technician perform the survey.

5.5.3 Clean Trash

For purposes of segregation, clean trash shall have clear plastic bags reserved for this use to distinguish it from radiological trash which will be in yellow bags or clear plastic with yellow and magenta bordering.

5.5.3.1 No radiologically controlled material shall be discarded into clean trash (e.g., masslin cloth, yellow herculite, radioactive stickers/signs, radiation rope/ribbon, rad bags).

5.5.3.2 Clean trash from within a Controlled Area shall be unconditionally released consistent with the following:

- **Radiation workers** shall bag all “clean” trash in clear plastic bags. At no time shall non-radiation workers handle or dispose of yellow bags or any other material marked “Radioactive Material” or marked with yellow and magenta tape. All yellow bag trash and “Radioactive Material” will be handled only by qualified personnel. Clean trash will not be placed in black bags or bags of any other color. Clear

plastic bags of 6-mil thickness should be the only bags used for clean trash.

NOTE: Clean trash containing asbestos shall be bagged in black colored bags.

- After the clean trash has been collected and bagged, the bags should be taped shut and left inside the designated staging area. The bags shall be neatly stacked.

- Each morning, or as needed, an **assigned radiation worker** shall transfer the bags of trash into the staging area. Weekly, or as needed, a qualified **Health Physics Technician** will survey the bags. A micro-R meter, or similar state-of-the-art meter, will be used to perform the radiation survey of the bags. The meter should show no deflection and background should be less than 25µR. The **Health Physics Technician** will mark as "clean" and transfer the bags into the staging area. All materials removed from the clean bags and any suspect rejected bags should be rebagged into yellow bags, surveyed, labeled, and transferred to the Waste Handling Area in accordance with Reference 3.1.14.

- As needed, **Health Physics** will be notified and will assist in the transfer of the bags across the Controlled Area boundary.

- After transferring the bags to the outside of the Controlled Area, personnel shall dispose of them in a routine manner.

6.0 Records

The following records are created by use of this procedure. These records will be maintained and submitted monthly to Project Records in accordance with Reference 3.1.9.

- Summary and/or Special Report Form
- Counting Room Analysis Report
- Health Physics Survey Report
- Material Release Log
- HP Daily Log.

7.0 Forms, Exhibit, and Attachments

7.1 Forms

- DDO-103, Summary and/or Special Report Form (Reference 3.1.15)
- DDO-134, Counting Room Analysis Report (Reference 3.1.7)
- DDO-138, Health Physics Survey Report (Reference 3.1.7)
- DDO-300, Material Release Log

7.2 Exhibit

- Exhibit 1, Time Intervals Between Release Surveys and Actual Release

7.3 Attachments

None.

Date _____ **HPS # J**_____

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Material Release Log
Section A

Item #	Item Discription	Technician (Print/Sign)	Evaluator (Signature or NA) (Print/Sign)	Release Approval (H.P. Supervisor Signature) (Print/Sign)

☐ Page 2 of 2 not required and not attached if box checked

Reviewed By: (Print/Sign)_____ Date:_____

EXHIBIT 1

TIME INTERVALS BETWEEN RELEASE SURVEYS AND ACTUAL RELEASE

After an item or material has been surveyed for unconditional release, the person requesting the release has a certain amount of time to remove the item before the release survey becomes invalid. The following conditions and associated time intervals will be used. The "AREA" is the storage location in which the item is kept after the release survey is completed and before it is physically removed from the controlled area.

AREA	ALLOWED INTERVAL
Controlled Areas	30 days with a cursory survey for loose contamination prior to removal
Posted Quarantine Areas Within a Controlled Area Note (1)	30 days with no survey necessary
Radioactive Material Storage Area	48 hours
Contaminated Areas	Release from contaminated areas directly to uncontrolled areas is not permitted
Staging Areas Within the Controlled Area Note (2)	30 days with a cursory survey for loose contamination prior to removal

(1) Quarantined areas should be clearly marked and posted to prevent the addition of unsurveyed materials, cross-contamination of surveyed items, and unauthorized removal of items that have been released.

(2) Staging areas should have clearly marked sections for storage of released materials to prevent mixing of surveyed and unsurveyed items.