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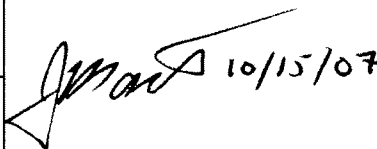
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# PADUCAH

## Remediation Services

A Portage Shaw Joint Venture Company

OWNER: Radiological Control	PRS-RAD-1108	REV. NO. 0
SUBJECT MATTER AREA: Posting	PREPARER: Keith Miller	Page 1 of 12
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REVISION LOG		
Revision Number	Description of Changes	Pages Affected
0	Initial Release. Intent Change. Changed numbers and headings to define the beginning point of Paducah Remediation Services documentation and to establish Document Control as the control point for tracking document numbers. This document replaces Blue-sheeted EH-4517, Posting and Labeling procedure.	All

**CAUTION**

This procedure describes specific safety basis requirements for safety significant items used by the Paducah Project. Any proposed changes must be processed in accordance with the procedure change control process defined in PRS-DOC-1107 and all changes shall be reviewed by the USQD process and approved by PRS Nuclear/Facility Safety. Specific safety basis requirements are noted in this document in the following format: <SB DOCUMENT REFERENCE>.

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## 1.0 PURPOSE

This procedure establishes requirements for classifying, posting and/or labeling areas, items, materials, and equipment according to radiological conditions. The requirements in this procedure are the minimum steps necessary for compliance with the applicable regulatory requirements for posting and labeling specified in Title 10, Code of Federal Regulations, Part 835 (10 CFR 835), *Occupational Radiation Protection*, and for conformance with mandatory contractual and administrative requirements.

## 2.0 SCOPE

This procedure applies to all Radiological Controls (RADCON) personnel involved with the evaluation and placement of postings for Radiological Areas and labels/tags for radioactive materials managed by Paducah Remediation Services LLC (PRS) at any sites or facilities where PRS conducts radiological operations for the U.S. Department of Energy (DOE) Portsmouth/Paducah Project Office.

## 3.0 PROCEDURE

Radiological  
Protection  
Programs  
Manager (RPPM)

### 3.1 Routine Activities

- 3.1.1 Perform and document inspections of radiological postings and labeling at least annually.
- 3.1.2 Ensure that radiological postings and labels are displayed properly and are appropriate as part of the routine workplace monitoring activities.

### 3.2 Classification and Posting of Radiological Areas

3.2.1 Provide recommendations to Facility Managers and line organizations as needed to assist them in reducing radiological conditions in their areas to levels that are As Low As Reasonably Achievable (ALARA). The goals for these activities should be:

- To reduce radiation source terms to levels that are consistent with the area mission.
- To reduce the size of Contamination Areas (CA) through decontamination and down posting.

Radiological  
Control  
Technician (RCT)

3.2.2 Perform surveys to assess the radiological hazards of the area in accordance with applicable RADCON procedures.

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- 3.2.3 Evaluate and specify posting, labeling, and radiological controls required for the area surveyed.
- 3.2.4 Obtain posting materials, signs, ropes, chains, etc.
- 3.2.5 Install or remove, as appropriate, radiological signs and physical barriers (i.e., posting stanchions, chain, and perm-a-signs) at area boundaries.
- 3.2.6 Assist in the coordination of installation or removal of permanently affixed signs or barriers, as applicable.
- 3.2.7 Ensure postings can be seen from all approaches, from the appropriate elevation, angle of approach, and with associated doors open or closed.
- 3.2.8 Ensure signs and physical boundaries do not interfere with the rapid evacuation of personnel in the event of an emergency.
- 3.2.9 Replace signs, labels, and tags that are missing or not legible.
- 3.2.10 Follow posting requirements as specified in Section 3.4, "General Posting and Labeling Requirements."

**3.3 Radioactive Material Labeling and Tagging**

RCT

- 3.3.1 Perform the surveys to assess the radiological conditions of the material/items in accordance with applicable RADCON procedures.
- 3.3.2 Label and/or tag the surveyed items as specified in this procedure.
- 3.3.3 Verify that the area postings are correct, following the completion of survey and labeling/tagging activities.
- 3.3.4 Follow posting instructions as specified in this procedure, if postings are needed.

**3.4 General Posting and Labeling Requirements**

- 3.4.1 Except as otherwise provided in this procedure:
  - Posting and labels shall include the standard radiation warning trefoil in black or magenta on a yellow background [§835.601(a)].
  - Signs required by this procedure shall be conspicuously posted at each access point to the specified area and may include appropriate radiological protection instructions [§835.601(b)].
  - All radiological posting shall be placed in a manner that does not interfere with the operation of emergency exits.

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**3.4.2** The posting and labeling requirements may be modified to reflect the special considerations of DOE activities conducted at private residences or businesses [§835.601(c)].

- Such modifications shall provide the same level of protection to individuals as those specified in this procedure [§835.601(c)].
- The RPPM shall approve modifications to postings.

### **3.5 Controlled Area Posting Requirements**

**3.5.1** Individuals who enter only the Controlled Area without entering Radiological Areas or Radioactive Material Areas are not expected to receive a total effective dose equivalent of more than 100 mrem in a year [§835.602(a)].

**3.5.2** Each access point to a Controlled Area shall be posted identifying it as a Controlled Area, whenever Radiological Areas or Radioactive Material Areas exist in the area [§835.602(a)].

**3.5.3** The posting shall contain wording equivalent to “Controlled Area.”

**3.5.4** Signs used for this purpose may be selected to avoid conflict with local security requirements [§835.602(b)]. The PRS President must approve deviations from the specifications in this procedure.

### **3.6 Radiological Area Posting Requirements**

**3.6.1** The words “Caution, Radiation Area” shall be posted at any area accessible to individuals in which radiation levels could result in an individual receiving a deep dose equivalent in excess of 5 mrem in one hour at 30 cm from the radiation source or from any surface that the radiation penetrates [§835.603(a)].

**3.6.2** The words “Caution, High Radiation Area” or “Danger, High Radiation Area” shall be posted at any area accessible to individuals in which radiation levels could result in an individual receiving a deep dose equivalent in excess of 100 mrem in one hour at 30 cm from the radiation source or from any surface that the radiation penetrates [§835.603(b)].

**3.6.3** The words “Grave Danger, Very High Radiation Area” shall be posted at any area accessible to individuals in which radiation levels could result in an individual receiving an absorbed dose in excess of 500 rads in one hour at one meter from the radiation source or from any surface that the radiation penetrates [§835.603(c)].

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**3.6.4** The words “Caution, Airborne Radioactivity Area” or “Danger, Airborne Radioactivity Area” shall be posted for [§835.603(d)]:

- Any area accessible to individuals in which airborne radioactivity levels exceed, or are likely to exceed, the Derived Air Concentration (DAC) values listed in Appendix A or Appendix C of 10 CFR 835, or
- Any area where an individual present in the area without respiratory protection could receive an intake exceeding 12 DAC-hours in a week.

**3.6.5** “Caution, Airborne Radioactivity Area” or “Danger, Airborne Radioactivity Area” posting shall be implemented on all PRS projects by posting Airborne Radioactivity Areas (ARA) when the general area airborne radioactivity concentrations are likely to exceed 25 percent of the DAC. For facilities not covered under a Documented Safety Analysis (DSA) or Preliminary Hazard Screening (PHS), post areas where potential exits for airborne radioactivity concentrations exceed 10 percent of the DAC, or a peak concentration of 100 percent of the DAC, or soluble uranium concentrations exceeds 50 ug/m<sup>3</sup>. **<KY/EM-174, January 1997 – Section 7.6.2.3>**

- Except in extreme situations such as visibility impairment, heat stress, or overriding health and safety concerns, all individuals entering ARAs shall wear respiratory protection.
- In extreme situations, health and safety factors, the radiological work environment, and work options shall be evaluated.
- The RPPM working with PRS Industrial Hygiene shall approve exceptions to the use of respiratory protection, when applicable.

**3.6.6** The words “Caution, Contamination Area” shall be posted in areas accessible to individuals where removable surface contamination levels exceed values listed in Attachment A of PRS-RAD-1109, but are less than or equal to 100 times those values. The words “Caution, Contamination Area” shall be posted for any area containing contaminated soil if routine entry into the area could cause individuals, equipment, or material to become contaminated in excess of removable contamination limits specified in Attachment A of PRS-RAD-1109 [§835.603(e)].

**3.6.7** The words “Caution, High Contamination Area” or “Danger, High Contamination Area” shall be posted in areas accessible to individuals where removable surface contamination levels are greater than 100 times the values listed in Attachment A of PRS-RAD-1109 [§835.603(f)].

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### 3.7 Exceptions to Posting Requirements

**NOTE 1:** For the purposes of posting exceptions, Radiological Area access may be controlled by an RCT or a qualified representative. A qualified representative is a RWII trained individual that has been designated by title or position in an applicable Radiological Work Permit (RWP).

**NOTE 2:** Since a Radioactive Materials Area (RMA), and Radiological Buffer Area (RBA) are not Radiological Areas as defined in 10 CFR 835, an RCT may verbally authorize an individual to control the posted boundary when simple access control measures are required.

**3.7.1** Radiological Areas may be excepted from the posting requirements for periods of less than eight continuous hours when placed under continuous observation and control of an RCT or designated qualified representative who is knowledgeable of and empowered to implement required access and exposure control measures [§835.604(a)]. The following additional requirements must be satisfied:

- A single RCT or qualified representative may only control a single Radiological Area boundary or physical area; and
- If the area is a CA or High Contamination Area (HCA), the boundaries must be clearly defined (i.e., the rim of a B-25 box or drum opening, edges of a drip pan, open pipe end, flange, etc.).

**3.7.2** Open excavations that contain Radiological Areas may be excepted from posting provided:

- The area is under constant RCT attendance and control;
- The immediate vicinity around the excavation is posted as an RBA; and
- Ingress/egress points are clearly defined, as appropriate.

**3.7.3** RCTs may, at their discretion, remove part of an existing posting (i.e., drop a rope or chain) provided that the level of posting does not change, access to the area is well controlled, and that 8-hours is not exceeded.

**3.7.4** Areas containing only packages received from radioactive material transportation labeled and in non-degraded condition need not be posted, as stated in Section 3.6, "Radiological Area Posting Requirements," until the packages are monitored in accordance with PRS-RAD-1105 [§835.604(c)].



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**3.7.5** Posting exceptions should be documented in an applicable RWP when:

- Anticipated radiological conditions are not well defined;
- Posting exceptions are for ARA, HCA, High Radiation Areas (HRA) or Very High Radiation Areas (VHRA);
- Access control requirements are complex (multiple entries, etc.); or
- A qualified representative other than an RCT is going to control the area.

### **3.8 Other Posting**

**3.8.1** The words “Caution, Radioactive Material” shall be posted at any area accessible to individuals in which items or containers of radioactive material exist and the total activity of the radioactive material exceeds the applicable values in Appendix E of 10 CFR 835 [§835.603(g)].

**3.8.2** Areas may be exempted from the radioactive material area posting requirements when [§835.604(b)]:

- They are posted as a Radiological Area [§835.604(b)(1)] (in accordance with Section 3.6);
- Each item or container of radioactive material is labeled in accordance with Section 3.9 such that individuals entering the area are made aware of the hazard [§835.604(b)(2)]; or
- The radioactive material of concern consists solely of structures or installed components which have been activated (i.e., such as by being exposed to neutron radiation or particles produced in an accelerator) [§835.604(b)(3)].

**3.8.3** Installations where radiation-generating devices or sealed sources are used shall be posted according to the applicable mandatory industry standard procedure or federal regulation.

**3.8.4** Areas accessible to individuals where the measured total surface contamination levels exceed, but the removable surface contamination levels are less than, corresponding surface contamination values specified in Attachment A of PRS-RAD-1109 shall be controlled as follows when located outside of radiological areas [§835.1102(c)]:

- The area shall be routinely monitored to ensure the removable surface contamination level remains below the removable surface contamination values specified in Attachment A of PRS-RAD-1109 [§835.1102(c)(1)]; and
- The area shall be conspicuously marked to warn individuals of the contaminated status [§835.1102(c)(2)] as follows:
- Posting each access point to the area with the words “Caution, Fixed Contamination Area” provided the postings meet the

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requirements specified in Section 3.4, or

- Marking each access point to the area with the words “Notice, Fixed Contamination.” Such markings may contain additional information as to the location of the fixed contamination or other radiation protection instructions, or
- Painting or affixing coatings or other labels on the specific area of fixed contamination. If painting or coating is used instead of labels, the painting or coating shall be yellow or magenta.

**3.8.5** The words “Caution, Soil Contamination Area” should be posted for any area containing contaminated soil whenever the RPPM determines that it is prudent to delineate or otherwise control the area.

**3.8.6** The words “Caution, Underground Radioactive Material” should be posted for any area identified as having underground items or material containing radioactive material whenever the RPPM determines that it is prudent to delineate or otherwise control the area.

**3.8.7** The words “Caution, Radiological Buffer Area” or “Contamination Control Zone” should be posted to delineate the boundary of a buffer area around CA, HCA, or ARAs within which the spread of contamination is controlled.

**NOTE: Buffer areas are not required, but may be left in place, when no work is occurring in the Contaminated Area.**

**3.8.8** The words “Caution, Radiological Buffer Area” should also be posted adjacent to Radiation, High Radiation, or Very High Radiation Areas to indicate a buffer area boundary where external radiation exposure is limited.

**NOTE: An RBA need not be posted for external exposure control if other posted boundaries provide equivalent protection.**

**3.8.9** “TLD Required for Entry” shall be posted at the boundaries of all areas where the effective dose equivalent (EDE) (deep dose equivalent to the whole body may be used) rate exceeds 50  $\mu$ rem/hour. Ensure that all forms of penetrating radiation (i.e., gamma, neutron, and high-energy beta) are considered when determining the boundary dose rate.

- If impractical to post the area with “TLD Required for Entry,” due to area size (or other circumstances), an ALARA evaluation shall be performed. The ALARA evaluation must consider cost/benefit of actions and/or controls necessary to reduce the EDE rate to less than 50  $\mu$ rem/hour at the boundary. To allow a deviation from this posting requirement,

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the PRS Environment, Safety and Health Manager or designee must approve the ALARA evaluation.

### 3.9 Radioactive Material Labeling/Tagging Requirements

- 3.9.1** Except as provided below, each item or container of radioactive material shall bear a durable, clearly visible label bearing the standard radiation warning trefoil and the words "Caution, Radioactive Material," or "Danger, Radioactive Material." The label shall provide sufficient information to permit individuals handling, using, or working in the vicinity of the items or containers to take precautions to avoid or control exposures [§835.605].
- 3.9.2** Label radioactive waste containers using BJCF-283 or equivalent.
- 3.9.3** **IF** radioactive material is located or taken outside of an RMA, CA, HCA, or ARA, **THEN** the following items shall be individually labeled, tagged, or marked as radioactive material to alert personnel to contamination status including contamination levels and identified radioisotopes on a yellow tag (BJCF-285 or equivalent):
- Equipment, components, and other items that are contaminated or have been exposed to radioactive material contamination or activation sources and not released for unrestricted use.
  - Equipment, components, or other items that are contaminated or are potentially contaminated with radioactive material on internal surfaces.
  - Components, equipment, or other items that have fixed radioactive material contamination.
  - Components, equipment, or other items that have been surveyed and demonstrated to have removable radioactive contamination levels below unrestricted release limits but have not been surveyed adequately to provide assurance that fixed radioactive contamination levels are below unrestricted release limits.
- 3.9.4** Internally contaminated or potential internally contaminated materials or equipment shall be individually labeled with the words "Caution, Internal Contamination" or "Caution, Potential Internal Contamination," as applicable.
- 3.9.5** Radiological-use vacuum cleaners shall be uniquely marked and labeled to identify both their internal and external contamination characteristics.

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- 3.9.6** Sealed and unsealed sources or their associated storage containers shall be labeled as radioactive material. Storage containers and devices containing a sealed source shall be clearly marked.
- 3.9.7** Radioactive material labels applied to sealed radioactive sources may be exempt from the color specifications of this procedure [§835.606(b)].
- 3.9.8** Other than sealed or unsealed sources, items and containers may be exempt from the radioactive material labeling requirements when [§835.606(a)]:
- Used, handled, or stored in areas posted and controlled in accordance with Section 3.6 and 3.8.1 and sufficient information is provided to permit individuals to take precautions to avoid or control exposures [§835.606(a)(1)], or
  - The quantity of radioactive material is less than one tenth the values specified in Appendix E of 10 CFR 835 [§835.606(a)(2)], or
  - Packaged, labeled, or marked in accordance with the regulations of the Department of Transportation or DOE Orders governing radioactive material transportation [§835.606(a)(3)], or
  - Inaccessible, or accessible only to individuals authorized to handle or use them, or work in the vicinity [§835.606(a)(4)], such as color-coded portable tools or color-coded pallets maintained in a designated “hot” tool storage or distribution area, or
  - Installed in manufacturing, process, or other equipment, such as reactor components, piping, and tanks [§835.606(a)(5)], or
  - The radioactive material consists solely of nuclear weapons or their components [§835.606(a)(6)], or
  - Protective clothing and equipment when it meets the requirement in 3.9.3 of this section (except when potentially contaminated and packaged for shipment to laundry facilities), or
  - Radiological samples that are in the custody of Radiation Protection personnel or radiological workers, or
  - Radiation-generating devices and sealed sources used for medical purposes to the extent that they are subject to local, state, or federal licensing provisions.
- 3.9.9** **IF** material or equipment is taken from a Radiological Area or RMA and placed in the Controlled Area, **AND** has not been surveyed adequately to allow unrestricted release, **THEN** the material and equipment must be tagged as radioactive with a yellow tag as specified in step 3.9.3.

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### 3.10 Non-Radioactive Material Tagging Requirements

**3.10.1** All non-radioactive materials meeting the criteria for unrestricted release in PRS-RAD-1109 released from CAs, HCAs, and ARAs require a survey and release plan, a white tag (UCN-19688) or both, unless exempted by the RPPM or specified as exempt within this section of this procedure. Survey and release plans are discussed further in PRS-RAD-3117.

**3.10.2** White tags (UCN-19688) are not required for all material released for unrestricted use. White tags are a tool to be used at the discretion of the RPPM or designee or to meet the needs of specific projects

**NOTE:** There is no expiration date for white tags attached to an item meeting survey requirements for unrestricted release, provided they are legible and not in a degraded condition on the date the item is released without restrictions and the item has not been placed in a Radiological Area or RMA since it was white tagged.

**3.10.3** The following materials do not require a white tag or a survey and release plan to leave the controlled area:

- Incidental tools, small equipment, office supplies, office furniture, personal property, etc. that were never placed in a Radiological Area or RMA;
- Personal items (e.g., pens, clipboards, radios) surveyed by Radiological Workers or RCTs;
- Materials and equipment that are surveyed and released from a Radiological Area or a RMA that have been placed in the Controlled Area. However, a white tag should be applied if the items are likely to be released for unrestricted use.

## 4.0 RECORDS

Applicable records generated or received as a result of performing this procedure shall be managed in accordance with:

- PRS-RAD-1401, *Radiation Protection Program Records*

## 5.0 SOURCE DOCUMENTS

- 10 CFR 835, *Occupational Radiation Protection*
- PRS-RAD-0101, *Radiation Protection Program for 10 CFR 835 Occupational Radiation Protection*
- PRS-RAD-1105, *Receipt, Transport, and Movement of Radioactive Materials*
- PRS-RAD-1109, *Radioactive Contamination Control and Monitoring*
- DOE G 441.1-10, *Posting and Labeling for Radiological Control Guide for use with Title 10 Code of Federal Regulations, Part 835, Occupational Radiation Protection*
- DOE-STD-1098-99, *DOE Standard Radiological Control*