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Level 2 Administrative Procedure

Revision	Record of Issue/Revision	Affected Pages
0	Revision/Periodic Review: Initial Release under Southern Ohio Cleanup Company LLC (SOCCo) from FBP-RP-PRO-00040 Rev. 6 (replaced references to Fluor-BWXT Portsmouth LLC [FBP] with SOCCo; replaced references to FBP documents with DND documents; converted procedure and form to new SOCCo branding/template/formatting, including combining previous Section 9.0, *Source References*, with Regulatory Requirements so both are listed in Appendix A, and deleting previous statement in Section 1.0, *Purpose*); updated to current processes; minor grammatical/editorial changes made as needed.	All

Previous Record of Issue/Revision information is available from the history files.

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1.0 PURPOSE

1.1 This procedure provides direction and guidance for Radiation Protection (RP) controls for radiation generating devices (RGDs).

1.2 As specified in DND-RP-PL-00002, *Radiation Protection Plan Portsmouth Gaseous Diffusion Plant Piketon, Ohio*, this procedure has been developed to implement applicable requirements from the following:

- 10 Code of Federal Regulations (CFR) 835, *Occupational Radiation Protection*
- Department of Energy (DOE) Guide (G) 441.1-1C Chg 1 (Admin Chg), *Radiation Protection Programs Guide for Use with Title 10, Code of Federal Regulations, Part 835*, *Occupational Radiation Protection*

2.0 SCOPE AND APPLICABILITY

2.1 This Level 2 procedure applies to all site personnel, including contractors, subcontractors, and affiliates involved with the procurement, maintenance, and use of RGDs. It provides the requirements for supporting the safe operation of all RGDs during setup, use, and/or maintenance.

2.2 This procedure implements Integrated Safety Management System (ISMS) requirements as identified in DOE Policy (P) 450.4A Chg 1 (MinChg), *Integrated Safety Management Policy* (current revision).

2.3 As specified in DOE G 441.1-1C, medical RGDs are to be registered with the Ohio Department of Health.

2.4 Should any conflict exist between the requirements and guidance provided in the American National Standards Institute (ANSI)/Health Physics Society (HPS) standards and the requirements of 10 CFR 835, then the requirements of 10 CFR 835 take precedence.

2.5 **Exception:** This procedure does **not** apply to individual radioactive sealed sources which are utilized for site instrumentation. Individual radioactive sources are controlled by DND-RP-PRO-00028, *Radioactive Source Control*, with only one exception. This procedure should also be followed for those sealed radioactive sources that produce radiation fields exceeding 100 millirem (1 mSv) in one hour at a distance of 30 centimeters from the source.

3.0 GENERAL INFORMATION

Southern Ohio Cleanup Company LLC (SOCCo) does not currently utilize any industrial RGDs, with the exception of small scale nuclear moisture density gauges. It is not anticipated that will change for the duration of the contract. As part of the Decontamination & Decommissioning (D&D) process, several historical RGD components are stored on site, but have been dismantled or rendered permanently inoperable. The primary intent of this procedure is to assure that any functioning RGD brought on site by contractors or subcontractors, including any x-ray equipment, for fulfillment of a contract are adequately identified, secured, and utilized under DOE guidelines.

4.0 USE REFERENCES

A. DND-BS-PRO-00039, *Request for Purchase*

B. DND-BS-PRO-00062, *Records Management Process*

C. DND-RP-PRO-00004, *Release of Material and Equipment from Department of Energy Control*

D. DND-RP-PRO-00022, *Posting and Labeling*

E. DND-RP-PRO-00023, *Radiation Protection Program Records*

F. DND-RP-PRO-00028, *Radioactive Source Control*

G. DND-RP-PRO-00166, *Controls for Entry into Radiation and High Radiation Areas*

5.0 RESPONSIBILITIES

5.1 Radiation Protection Manager (RPM)

5.1.1 Evaluates and authorizes the purchase and use of all RGDs at the Portsmouth Gaseous Diffusion Plant (PORTS) in accordance with DND-BS-PRO-00039, *Request for Purchase*.

5.1.2 Maintains independent overview of RGD operations.

5.1.3 Ensures the technical qualification and approves the appointment of an RGD Coordinator.

5.2 Radiation Protection Section Manager (RPSM)

5.2.1 Provides radiological support to RGD operations as directed by the RPM.

5.2.2 Directs the performance of radiation monitoring of open installations to verify proper posting and control of boundaries during operations and removal of hazards (and associated temporary postings and barriers) after operations.

5.2.3 Directs the performance of surveys and monitoring of all RGD installations for unsafe operations or conditions and conformity to procedures.

5.2.4 Provides RP support in regard to any development as low as reasonably achievable (ALARA) reviews, radiological evaluations, radiological work permits (RWPs), or surveys and for any dosimetry guidance related to RGD operations.

5.2.5 Ensures all RGD equipment being removed from plant site is processed under the guidance of DND-RP-PRO-00004, *Release of Material and Equipment from Department of Energy Control*.

5.3 Radiation Protection Engineering Manager (RPEM)

5.3.1 Reviews and approves DND-RP-PRO-00040-F02, *Approval for Radiation Generating Device Procurement*, for assurance of site radiation safety and general ALARA concerns.

5.3.2 Ensures an ALARA review exists for new RGDs and ensures RGDs are within scope.

5.3.3 Coordinates with the cognizant RPSM for RWP development.

5.4 Radiation Generating Device (RGD) Coordinator

> **NOTE**
>
> The RGD Coordinator, named by the RPM, administratively supports and coordinates the RGD Program, as instructed by the RPM.

5.4.1 Evaluates adherence to procedures by conducting pre-operational and periodic inspections of RGD installations.

5.4.2 Maintains an inventory of all RGDs being utilized on site.

5.4.3 Reviews all requisitions and contracts which include the acquisition of any RGD on site and presents information to the RPM for approval.

5.5 Radiological Control Technician (RCT)

5.5.1 Performs radiation monitoring of open installations to verify proper posting and control of boundaries.

5.5.2 Monitors RGD installations for unsafe operations or conditions and conformity to procedures.

5.5.3 Surveys RGD equipment, as required, to meet the requirements of the procedure.

5.6 Procurement

5.6.1 Notifies RP of contracts which require the procurement of RGDs to be used on the DOE reservation.

5.6.2 Notifies RP of the shipping date and, if known, the shipping company's tracking number for the purchase of any known RGD.

5.7 Contract Technical Representative (CTR)

Ensures RP is informed of all RGD disposition changes associated with the project.

6.0 ACTIONS

6.1 General Operational Requirements for All RGDs

RPM

6.1.1 Evaluate and authorize, as appropriate, the purchase and use of all RGDs in accordance with DND-BS-PRO-00039.

6.1.2 Establish and maintain independent overview of RGD operations.

6.1.3 Review and approve the technical qualification and appointment of an RGD Coordinator for RGD operations.

RPSM

6.1.4 Ensure radiation exposure from the handling and use of RGDs is maintained ALARA through engineered and administrative controls:

10 CFR 835.1001

- The primary methods used shall be physical design features, such as remote handling and shielding.

10 CFR 835.1001(a)

- Administrative controls shall be employed only as supplemental methods to control radiation exposure, including for specific activities where the use of engineered controls is demonstrated to be impractical.

10 CFR 835.1001(a), (b)

6.1.5 Oversee the development of RWPs which support the safe operation for all RGDs under their purview.

6.1.6 Oversee the development of any ALARA reviews which support operation of all RGDs under their purview.

6.1.7 Provide necessary RCT support for all required surveys of RGD systems under their purview.

6.1.8 **IF** locked entryways are used, **THEN** verify the keys used for one RGD installation or storage facility do not provide access to another RGD installation or storage facility.

6.1.9 **IF** an individual can enter a container and access a physically controlled High Radiation Area (HRA), **THEN** implement one or more of the controls specified in DND-RP-PRO-00166, *Controls for Entry into Radiation and High Radiation Areas*, for the container (in this case, the walls of the container form the boundary of an accessible, physically controlled HRA).

A. Post or label the entryway(s) or access point(s) to the container consistent with DND-RP-PRO-00022, *Posting and Labeling*.

B. Verify the posting and/or label specify the entryways should not be opened without RP approval and significant levels of radiation may exist.

6.1.10 Verify doors and/or access panels in any exempt-shielded, shielded, and unattended installations are equipped with one or more fail-safe safety interlocks to prevent irradiation of an individual.

6.1.11 **IF** an area radiation monitor is incorporated into a safety interlock system, **THEN** confirm the circuitry is such that a failure of the monitor will either prevent normal access into the area or operation of the RGD.

6.1.12 Verify one or more physical control devices are used to secure RGDs to prevent unauthorized access and use.

A. Verify the control system governing the production of radiation is equipped with a lock and key to prevent unauthorized use.

B. Verify the key controlling the production of radiation in one RGD does not control the production in another.

C. **IF** the control system cannot be integrally locked, **THEN** verify the system is contained in a locked repository (or room) which is only accessible to trained and authorized personnel.

6.1.13 Confirm that administrative procedures are implemented to ensure the RGD installation and the RGD safety interlock control devices are such that:

- Radiation cannot be produced until the interlock system logic has been completely satisfied.
- Production of radiation cannot be resumed by merely re-establishing the interlock circuit at the location where an interlock was tripped.
- The safety circuit cannot be re-energized or re-established automatically (i.e., there should be a manual safety circuit reset on or near the main control console).

6.1.14 Verify all RGD warning lights are red or magenta for consistency.

6.1.15 Check that a sufficient number of lights is installed so at least one light is easily visible from all reasonably occupied areas which may have dangerous radiation levels and from reasonable avenues of approach to such areas.

NOTE

The interlocked warning light should provide visual indication which radiation is being produced and should be used in conjunction with any interlocked safety device which restricts physical access to a radiation beam or field.

When used in this fashion, the RGD should not be operable when the warning light is out.

6.1.16 Verify at least one interlocked warning light is used in all circumstances.

NOTE

Where feasible, such as for new or significantly modified RGDs which are capable of producing very high acute doses (i.e., that must be analyzed in the documented safety analysis, safety system hardware, and software), RGDs should provide additional safety via computer-assisted operations as well as indicate all abnormal events at the console and remotely notify cognizant personnel of abnormal events and conditions.

6.1.17 Verify that it is not possible to override the operation of any warning device activated by a fail-safe function without positive actions by the operator, such as resetting controls at the control console.

RCT

6.1.18 Verify that all personnel are wearing personnel dosimeters as stated in the applicable RWP.

6.1.19 Post all doorways leading to a room where x-ray RGDs are used with the standard radiological posting stating, as a minimum, “CAUTION, THERMOLUMINESCENT DOSIMETER (TLD) REQUIRED FOR ENTRY, X-RAYS IN PROGRESS” while x-ray operations are in progress.

6.1.20 For x-ray devices, maintain radiation dose from components, such as high voltage rectifiers with less than 2.5 mrem/hr in any accessible region 5 cm from the outside surface of the x-ray generator cabinet.

RGD Coordinator

6.1.21 Ensure all RGD users have current RadWorker training.

6.1.22 Ensure all RGD users have current RGD-specific training on the RGD to be utilized. This can be in the form of a training certificate or documentation supplied by a company safety representative.

6.1.23 Ensure contractors bringing RGDs on site can produce licensure or agreement-state license that documents their company’s RGD registration.

6.2 Procurement of RGDs

Requestor of RGD

> **NOTE**
>
> A requestor may include anyone who is procuring contracted site services that will include the use of an RGD in the execution of the contract (soil density gauges, etc.).

6.2.1 Complete DND-RP-PRO-00040-F02.

6.2.2 Submit completed DND-RP-PRO-00040-F02 to RP for approval **before** initiating procurement documentation.

RPEM

6.2.3 Review completed DND-RP-PRO-00040-F02 for assurance of site radiation safety and general ALARA concerns.

RPM

6.2.4 Review DND-RP-PRO-00040-F02; **IF** approved, **THEN** sign DND-RP-PRO-00040-F02.

6.2.5 **WHEN** approved, **THEN** provide DND-RP-PRO-00040-F02 to RGD Coordinator for completion and communication to the requestor.

RPEM

6.2.6 **IF** DND-RP-PRO-00040-F02 is approved, **THEN** perform the following:

A. Ensure an ALARA review exists and the new RGD is within scope.

B. Coordinate with the cognizant RPSM for RWP development.

Requestor of RGD

6.2.7 **IF** DND-RP-PRO-00040-F02 is approved, **THEN** continue the procurement process.

6.2.8 **IF** utilizing RGDs on site as part of a respective contract, **THEN** supply the following:

- A complete copy of their active licensure to possess and use the RGD that will be utilized in the execution of the contract. This may include their Nuclear Regulatory Commission (NRC) license and/or agreement state license.
- Specification documents/sheets that describe the RGD to be used. This may include specific radioactive source information if the RGD contains integrated sources.

- Active training documentation specifying that the intended RGD operators are adequately trained on the RGD to be utilized in the execution of the contract.

- Notification to RP each time a new RGD is brought on site or when an existing RGD is taken off site.

RGD Coordinator

6.2.9 Assign a unique ID to the RGD approval form that represents the RGD to be acquired.

6.2.10 For each specific RGD, maintain an inventory of the following, when applicable:

- RGD approval forms (DND-RP-PRO-00040-F02)

- ALARA review(s)

- Surveys

- Contractor licensure documentation

- RGD-specific training information

- Procurement information

- Supporting information

6.3 Relocation of RGD Equipment

CTR

6.3.1 Ensure RPSM is notified of all RGD relocations on site and removal from site.

RPSM

6.3.2 Ensure disposition changes of all RGDs are processed according to the guidance of DND-RP-PRO-00004.

7.0 RECORDS

7.1 Records Generated

DND-RP-PRO-00040-F02, *Approval for Radiation Generating Device Procurement*

7.2 Requirements

7.2.1 Records generated or received as a result of performing this procedure shall be managed according to DND-BS-PRO-00062, *Records Management Process.*

7.2.2 Maintain records as specified in DND-RP-PRO-00023, *Radiation Protection Program Records*.

8.0 DEFINITIONS/ACRONYMS

8.1 Definitions

Radiation Generating Devices (RGDs) – Devices which are electrically energized to produce ionizing radiation or devices containing sealed radioactive sources that are integrated into the equipment and emit radiation continuously. Specific examples of RGDs include:

- Sealed photon- or neutron-emitting radioactive sources (such as nuclear density gauges)
- X-ray producing radiography equipment
- Research and analytical x-ray or electron beam machines
- Sealed radioactive sources used as irradiators
- Electron microscopes
- Cabinet x-ray machines used for security applications

8.2 Acronyms

A. **ALARA** – As Low As Reasonably Achievable

B. **ANSI** – American National Standards Institute

C. **CFR** – Code of Federal Regulations

D. **CTR** – Contract Technical Representative

E. **DOE** – Department of Energy

F. **G** – Guide

G. **HPS** – Health Physics Society

H. **HRA** – High Radiation Area

I. **P** – Policy

J. **RCT** – Radiological Control Technician

K. **RGD**– Radiation Generating Device

L. **RP** – Radiation Protection

M. **RPEM** – Radiation Protection Engineering Manager

N. **RPM** – Radiation Protection Manager

O. **RPSM** – Radiation Protection Section Manager

P. **RWP** – Radiological Work Permit

Appendix A
SOURCE REFERENCES AND REGULATORY REQUIREMENTS

1. 10 CFR 34, *Licenses for Industrial Radiography and Radiation Safety Requirements for Industrial Radiographic Operations*
2. 10 CFR 835, *Occupational Radiation Protection*
3. ANSI/HPS N43.2, *Radiation Safety for X-Ray Diffraction and Fluorescence Analysis Equipment*
4. ANSI/HPS N43.3, *Radiation Safety for Installations Using Non-Medical X-Ray and Sealed Gamma-Ray Sources, Energies up to 10 MeV*
5. ANSI/HPS N43.5, *Radiological Safety Standard for the Design of Radiographic and Radioscopic Non-Medical X-Ray Equipment Below 1 MeV*
6. DND-RP-PL-00002, *Radiation Protection Plan Portsmouth Gaseous Diffusion Plant Piketon, Ohio*
7. DOE G 441.1-1C Chg 1 (Admin Chg), *Radiation Protection Programs Guide for Use with Title 10, Code of Federal Regulations, Part 835*, *Occupational Radiation Protection*, §7.0, *Radiation Generating Devices*
8. DOE P 450.4A Chg 1 (MinChg), *Integrated Safety Management Policy*

Attachment A
APPROVAL FOR RADIATION GENERATING DEVICE PROCUREMENT

SOCCo Southern Ohio Cleanup Company LLC

Approval for Radiation Generating Device Procurement

This form is completed by the Custodian of the Radiation Generating Device and is submitted to Radiation Protection for review and approval.

RGD ID		Machine No.:	

RGD Type

(Check RGD type in accordance with the RGD terminology)

☐ Sealed Gamma Ray	☐ Sealed Neutron Source	☐ Small Accelerator	☐ Research and Analytical X-Ray
☐ Electron Generating Device	☐ X-Ray for Radiography	☐ Particle Accelerator	☐ Neutron Generator
☐ Cabinet X-Ray	☐ Medical X-Ray		

RGD Information

Manufacturer:		Requisition No.:	
Location of Use:		Requested Delivery Date:	

Source Information

*The required radioactive source encapsulation integrity is determined based upon the classification number. Documentation confirming this integrity **MUST BE** provided upon delivery of the source. Refer any questions to Radiation Protection.*

Radionuclide:		Activity in Ci:		Dimensions of Source:	
Source Description:					

Description of RGD Use and Additional Description of the Unit if required

(If use is for replacement of an existing RGD please state. If this is a new type or use for an RGD then briefly outline the plans for use and any radiation safety considerations involved)

Requestor:		Badge No.:		Date:	

THIS SECTION TO BE COMPLETED BY RADATION PROTECTION

Conditions of use:	
Other Comments:	
RPM Approval Signature:	