

CCP-TP-075

Revision 0

CCP RTR #15 Operating Procedure

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1.0 PURPOSE

The purpose of this procedure is to provide instructions for the start-up, operations, and shut-down of the mobile real-time radiography (RTR) system Unit #15 located at the Savannah River Site (SRS).

1.1 Scope

This scope of this procedure is limited to start-up, operations, and shut-down RTR #15 located at SRS. Maintenance activities are outside the scope of this procedure.

2.0 REQUIREMENTS

2.1 Reference Documents

- CCP-PO-005, *CCP Conduct of Operations*
- SNT-TC-1A, *ASNT Nondestructive Testing, Personnel Qualification, Testing, and Certification*
- CCP-QP-008, *CCP Records Management*
- CCP-TP-053, *CCP Standard Real-Time Radiography (RTR) Inspection Procedure*
- CCP-TP-066, *CCP Radiography Screening Procedure for Prohibited Items*
- AHA: BG-2637, *Operation of RTR on Pad #4*
- MP1 Type 2 Technical Manual
- Manual 5Q1.1, *Radiation and Contamination Control Procedures*
 - Procedure 524, Ionizing Radiation Generating Device (RGD) Control Program
 - Procedure 525, Inspection and Survey of RGDs

2.2 Training Requirements

2.2.1 Personnel performing this procedure will be trained and qualified in accordance with SNT-TC-1A, *ASNT Nondestructive Testing, Personnel Qualification, and Certification* prior to performing this procedure.

2.3 Equipment List

2.3.1 RTR System

2.4 Software

2.4.1 None

2.5 Precautions and Limitations

- 2.5.1 If during the course of performing this procedure a change occurs that causes deviation from the normal process, **AND** this condition can **NOT** be corrected as directed by this procedure, RTR Operators shall **IMMEDIATELY STOP WORK** and notify the Vendor Project Manager (VPM) and the RTR Lead Operator (LO) or designee.
- 2.5.2 Employees may use copies of this procedure printed from the controlled document file; however, employees are responsible for assuring that the correct revision of this procedure is used.
- 2.5.3 The personal protective equipment (PPE) for normal operations is leather gloves, steel toe shoes, and safety glasses (when handling containers). Additional PPE may be specified by a Host site Radiological Control Technician (RCT) or in a site-specific Radiation Work Permit (RWP). Personnel will don the required or specified PPE before starting RTR operations.
- 2.5.4 The RTR system generates x-rays (up to 225 kilovolts [kV]). Personnel will avoid radiation exposure by observing all warning devices and personnel barriers. An interlock system will de-energize x-ray generation when the x-ray enclosure door is opened.
- 2.5.4 RTR Operators will ensure electrical panels and junction boxes are closed, equipment and moving parts are clear of foreign objects, and personnel are clear of the equipment prior to start-up of the RTR system.
- 2.5.5 Workers who will be working in a radiation area must have read and signed the applicable RWP.
- 2.5.6 RTR Operators will ensure the x-ray enclosure door is clear of personnel and are closed prior to start-up of the x-ray system. To facilitate this, a Closed-Circuit Television (CCTV) system has been installed.
- 2.5.7 **DO NOT** attempt to **OPEN** the x-ray enclosure door when the x-ray system is in operation, it will cause the x-ray system to de-energize and could damage personnel in the area and/or the x-ray tube.

2.5.8 The RTR Operator will ensure that the x-ray enclosure door is clear of personnel prior to start-up of the x-ray system. This can be accomplished by observing the CCTV system.

2.5.9 DO **NOT** leave the system operating unattended at any time.

2.5.10 The x-ray cabinet is considered a confined space and requires a Confined Space Permit to enter the cabinet.

2.6 Prerequisite Actions

2.6.1 Conduct a safety walk-down of the equipment, **AND** record results in the Nondestructive Examination (NDE) Operational Logbook, in accordance with CCP-PO-005, *Conduct of Operations*.

2.6.2 VPM or designee, verify the RTR LO and RTR Operator(s) qualifications are current.

2.6.3 Obtain the x-ray Exposure Key from the lock box.

3.0 RESPONSIBILITIES

3.1 RTR Operator

- 3.1.1 Operates the RTR system.
- 3.1.2 Maintains the NDE Operational Logbook.

3.2 RTR Lead Operator (LO)

- 3.2.1 Ensures the technical quality in all aspects of the RTR examination process.
- 3.2.2 Provides supervision for the overall operation of the mobile RTR system and is, at a minimum, a qualified RTR Operator.
- 3.2.3 Ensures RTR Operators are trained and qualified; or trainees are under the direct supervision of a qualified Subject Matter Expert (SME)/Qualified RTR Operator in accordance with SNT-TC-1a and CCP-PO-005, *Conduct of Operations*.

3.3 Radiological Control Technician (RCT)

- 3.3.1 Prepares required RWPs for testing containers, **AND** performs a periodic Radiation Generating Device (RGD) x-ray vault radiation protection and contamination surveys of the RTR system.

3.4 Vendor Project Manager (VPM)

- 3.4.1 Ensures Central Characterization Project (CCP) personnel comply with environmental safety, security requirements, and CCP safety requirements.
- 3.4.2 Monitors the List of Qualified Individuals (LOQI) daily to confirm that only qualified personnel perform waste characterization and transportation activities.

4.0 PROCEDURE

4.1 RTR/X-Ray Equipment Set Up

4.1.1 Verify the RTR is labeled with a current RGD Inspection and Survey Due Date label, located on the window of the x-ray enclosure door.

[A] **IF** the RGD Inspection and Survey Date label has expired, **THEN DO NOT** proceed with the RTR operations until Radiation Services personnel perform and document a radiation leak check and certify the RTR system is operating within allowable limits.

4.1.2 Turn main power switch on the gray panel door in the control room ON.

4.1.3 Ensure Motion Enabled Switch is ON by ensuring that the green light is illuminated.

4.1.4 Ensure lights switch on control panel is ON.

4.1.5 Ensure recording device and video monitors are ON.

4.1.6 Press the OPEN button to open the x-ray enclosure.

4.1.7 Inspect the following areas of the x-ray system for apparent damage:

- X-ray enclosure
- Electrical cables
- High tension cables
- Cooling system

NOTE

The x-ray Key Switch on the MP1 Controller has three positions:

1. (Symbol O) power switched OFF to controller.
 2. (Symbol ~) main is ON.
 3. (Symbol I is a lightning bolt) High Tension (HT) on Enable.
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4.1.8 Insert x-ray Exposure Key into x-ray Exposure Key Switch.

4.1.9 Place x-ray Exposure Key to position 3.

4.1.10 Ensure no one is inside x-ray enclosure.

4.1.11 Perform x-ray enclosure interlock check as follows:

- [A] Adjust enclosure doors to create as small an opening as possible without engaging interlocks.
- [B] Press the x-ray ON button on the control panel.
- [C] **IF** the x-ray machine does NOT energize, the interlocks are functional,
THEN document test performance in the NDE Operational Logbook.
- [D] **IF** the x-ray machine energizes, the interlocks are not functional,
THEN press the x-ray OFF button on the control panel, **AND** notify supervision.

4.1.12 When x-ray enclosure interlock check has been completed, ensure x-ray Exposure Key Switch is in position 2.

4.2 X-Ray Tube Warm Up

NOTE

For idle periods of less than eight hours, full rated voltage may be applied immediately.

CAUTION

Energizing the x-ray tube without a drum or other suitable shielding in the x-ray beam may cause damage to the image intensifier (II).

- 4.2.1 Ensure a drum or other suitable items are properly placed to protect image intensifier (II).
- 4.2.2 Ensure no one is in the x-ray enclosure.
- 4.2.3 Ensure the "High Radiation Inside - Keep Out" Sign is outward facing Pad 4.
- 4.2.4 Place x-ray Exposure Key to position 3.
- 4.2.5 Press DOOR CLOSE buttons to close the x-ray enclosure doors.
- 4.2.6 Press the x-ray ON button on the control panel.
- 4.2.7 Verify the safety system light is flashing.
 - [A] **IF** the safety system light is flashing indicating x-rays are being generated,
THEN document proper operation of flashing light in the NDE Operational Logbook.
 - [B] **IF** the safety system light is **NOT** flashing,
THEN shutdown the RTR system by depressing the Red x-ray off button and notify the RTR LO and VPM. RTR operations will **NOT** be performed until the safety system light has been repaired or replaced.
- 4.2.8 Verify the warm-up has been completed and document the completion of the warm-up in the Operational Logbook.
- 4.2.9 Ensure x-ray is OFF.
- 4.2.10 Press the green OPEN button to open x-ray enclosure doors.

4.2.11 Ensure drum platform is **NOT** rotating.

4.2.12 Remove drum or item(s) used to protect image intensifier.

4.3 RTR/X-Ray Inspection

4.3.1 Ensure x-ray machine is powered up.
IF down for greater than eight hours,
THEN perform section 4.2.

4.3.2 Ensure drum is properly positioned on the x-ray enclosure turntable.

4.3.3 Ensure no one is in x-ray enclosure.

4.3.4 Transport the drum into the x-ray enclosure.

4.3.5 Ensure x-ray enclosure doors are closed.

4.3.6 Adjust drum as necessary by utilizing the controls on the control console.

4.3.7 Ensure x-ray Exposure Key is in position 3.

4.3.8 Press the x-ray ON button on the control panel.

4.3.9 Verify the safety system light is flashing indicating x-rays are being generated.

NOTE

Lead shutters may be used as necessary. The toggle switch is located on the control console.

4.3.10 Scan the drum by:

[A] Adjusting the high voltage kV and milliamp (mA) knobs until the image on the video monitor has the desired display.

[B] Rotate/scan the container so that a detailed inspection of items in the container is in accordance with the applicable procedure.

4.3.11 **WHEN** the desired x-ray scanning is completed,
THEN terminate x-rays by pushing the red x-ray off button on the MP1 Controller.

4.3.12 Press the green OPEN button to open x-ray enclosure doors.

4.3.13 Ensure drum platform is NOT rotating.

4.3.14 Remove the drum from the x-ray enclosure.

4.3.15 **IF** additional drums will be processed,
THEN repeat steps 4.3.2 through 4.3.15 as required to process
remaining drums.

4.4 RTR/X-Ray Equipment Shutdown

4.4.1 Ensure x-rays are OFF.

4.4.2 Ensure x-ray cooling system runs for at least two minutes after last exposure.

4.4.3 Ensure x-ray Exposure Key Switch has been placed in position 1, and remove the x-ray Exposure Key from the MP1 Controller.

4.4.4 Ensure lights switch, motion enabled switch, video monitors, and associated equipment are OFF.

4.4.5 Turn red main power switch located on panel door in Control Room to OFF.

4.4.6 Return the x-ray Exposure Key to the lock box.

5.0 RECORDS

- 5.1 The NDE Operational Logbook generated during the performance of this procedure are identified as quality assurance (QA) records and are maintained as QA records in accordance with CCP-QP-008, *CCP Records Management*.

QA/Nonpermanent

- 5.1.1 NDE Operational Logbook