

# CCP-TP-011

Revision 17

## CCP Radiography Inspection Operating Procedure

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APPROVED FOR USE

RECORD OF REVISION

Revision Number	Date Approved	Description of Revision
13	05/16/2002	Reformatted to current CCP-QP-010 format, and made numerous changes as a result of a WSRC Quality Assurance audit.
14	07/31/2003	IQ3 Certification Audit of March 2003 resulted in the following changes: Portions of Section 4.6 moved to Section 4.3, a Note inserted prior to step 4.7.12 [N], items added to Forms CCP-TP-011-A1, A2, A7, Attachment 2 and per CCP-QP-010, separated electronically fillable forms from the procedure.
15	03/08/2004	Added new Steps 4.7.12[D], 4.9.1 and 4.10.1. Incorporated changes that better define the requirements of the WAP and for ease of operation. Added forms CCP-TP-011-A1 through CCP-TP-011-A8 into procedure as Attachments 4 through 11.
16	05/02/2005	Revised in response to CAR #SRS-002-04; deleted requirement to close Nonconformance Reports (NCRs) prior to Batch Data Report (BDR) completion. Removed references to stand-alone fillable forms and added stand-alone fillable forms into procedure as attachments. Specified videotape as record in Section 5.0. Incorporated Carlsbad Field Office (CBFO) Document Review Record (DRR) comments.
17	11/16/2006	Revised to implement the Waste Isolation Pilot Plant Hazardous Waste Facility Permit requirements resulting from the Section 311/Remote-Handled (RH) Permit Modification Request (PMR).

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## 1.0 PURPOSE

This detailed technical procedure describes the safe operation of the mobile real-time radiography (RTR) system for containers.

### 1.1 Scope

This procedure specifies instructions for starting up and operating the RTR system (RTR1) at Savannah River Site (SRS).

## 2.0 REQUIREMENTS

### 2.1 References

- CCP-PO-004, *CCP/SRS Interface Document*
- CCP TP-053, *CCP Standard Real-Time Radiography (RTR) Inspection Procedure*

### 2.2 Training Requirements

2.2.1 Personnel performing this procedure will be trained prior to performing this procedure.

### 2.3 Equipment List

2.3.1 RTR system.

2.3.2 Test container, training container, and other test objects (i.e., lines-pair resolution test gauge).

2.3.3 Conveyor cart, container-handling equipment.

### 2.4 Software

2.4.1 None.

### 2.5 Precautions and Limitations

2.5.1 If this procedure can **NOT** be implemented as written, RTR personnel shall notify appropriate supervision. If it is determined that a portion of the work can **NOT** be accomplished as described in this procedure, or would result in an undesirable situation, work shall be stopped, and the Vendor Project Manager (VPM) and RTR Lead Operator (LO) shall be notified. Work will **NOT** be resumed until this procedure is modified or replaced by a new document that reflects the current work practice.

- 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 (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 High energy x-rays, high voltages, and pinch points are the potential hazards associated with the RTR system. These hazards are addressed in safety training for personnel who operate 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 The system includes the following interlocks and safety features:
- [A] X-ray exposure can **NOT** be initiated until the vault doors are in the closed position.
  - [B] After the x-ray ON Button is depressed, an amber beacon located inside the chamber is illuminated and an alarm sounds for 20 seconds as a warning that x-ray generation is to begin.
  - [C] Following the 20-second delay, x-ray exposure begins and the interior and exterior x-ray ON warning lights are illuminated.
  - [D] Anyone trapped inside the enclosure can prevent x-ray exposure by depressing the red E-STOP Button located on the junction box in the vault.
  - [E] X-ray exposure can **NOT** be re-activated after the E-STOP Button is depressed until the E-STOP Button is reset and the fault message is cleared at the X-ray Controller.
- 2.5.7 DO **NOT** enter the x-ray vault except to perform maintenance of equipment or visual inspection of equipment.
- 2.5.8 DO **NOT** override any of the safety interlocks.
- 2.5.9 DO **NOT** attempt to OPEN the vault door when the x-ray system is in operation.

2.5.10 DO **NOT** leave the system operating unattended at anytime.

2.5.11 The RTR Operator will ensure that the x-ray vault is clear of personnel prior to start-up of the x-ray system. This can be accomplished by observing the closed circuit television system or by direct observation.

## 2.6 Prerequisite Actions

2.6.1 Check the RTR warning lights, audible alarm, and the radiation leak check certification. Verify each item at the beginning of each day or any time after the Power Key Switch is turned OFF at the Operator's Bench Board before the RTR system is powered up and used to x-ray waste containers. Document successful completion of system checks, verifying that the system checks were performed, in the RTR Operations Logbook. If any of the system checks fail, notify the RTR LO **AND DO NOT** perform RTR operations until the failed system is repaired or replaced.

[A] Verify the interior and exterior x-ray ON warning lights, audible alarm, and RTR system interlocks as operating properly at the beginning of each day or any time after the Power Key Switch at the Operator's Bench Board is turned OFF.

[B] Verify the x-ray compliance label located on the Andrex Control Console to ensure the RTR radiation leak check is current after maintenance or after any modifications. If the radiation leak check is past due, **DO NOT** use the RTR system until personnel perform a radiation leak check and certify that the RTR system is radiation leak free.

[C] Verify a survey with a calibrated meter has been performed by RCT personnel prior to entering the vault and that the RCT continues to monitor the meter as long as personnel are in vault.

## 2.7 Definitions

2.7.1 None.

3.0 RESPONSIBILITIES

3.1 RTR Operator

3.1.1 Operates the RTR system.

3.2 Lead Operator (LO)

3.2.1 Provides supervision of the overall operation of the RTR system.

3.3 Radiological Control Technician (RCT)

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

3.4 Vendor Project Manager

3.4.1 Ensures operations are conducted in accordance with CCP-PO-004, *CCP/SRS Interface Document*.

## 4.0 PROCEDURE

### 4.1 Pre-start Operations

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#### NOTE

If during this operation, any abnormal conditions are observed, the operation must be stopped, equipment must be placed in a safe configuration, and the LO must be notified. The LO will notify the Vendor Project Manager (VPM).

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4.1.1 Perform the following pre-start operations before powering up the RTR system:

[A] Unlock **AND** OPEN the rear trailer doors, as required.

[B] Secure the trailer doors with holding brackets, as required.

[C] Visually check the conveyor tracks to make sure they are free from obstructions.

[D] Enter the control room, **AND** power on the system using the Power Key Switch at the Operator's Bench Board.

[E] Verify the surveillance system monitor displays an image for each security camera in use.

### 4.2 Powering the X-ray System

4.2.1 OPEN the shutters on the Image Intensifier.

4.2.2 Set the Image Intensifier Magnification Switch to the normal position at the Operator's Bench Board.

4.2.3 Check that the voltage and current controls are at their minimum settings (both controllers fully counterclockwise) at the Operator's Bench Board.

4.2.4 Power on the RTR system at the Andrex Control Console by completing the following:

[A] Insert the Safety Key, **AND** turn to the full right position.

[B] Insert the Voltage Key, **AND** turn to the 220V position.

[C] Check that the green stand-by light is illuminated.

- 4.2.5 Perform check on system interlocks as follows:
- [A] Depress the Emergency Stop Pushbutton at the Operator's Bench Board.
  - [B] Check that the green stand-by light is extinguished on the Andrex Control Console.
  - [C] Reset the Emergency Stop Pushbutton at the Operator's Bench Board.
  - [D] Turn the Power Switch Key to the ON position at the Operator's Bench Board.
  - [E] Check that the green stand-by light is illuminated on the Andrex Control Console.

**CAUTION**

Host site RCT must conduct a survey with a calibrated meter prior to entering the vault.

- 4.2.6 Request Host site RCT to support survey of the personnel x-ray vault door opening.
- 4.2.7 Remove the three cap screws from the personnel x-ray vault door.
- 4.2.8 Open the personnel x-ray vault door.
- 4.2.9 Check that the green light is extinguished on the Andrex Control Console.
- 4.2.10 Enter the x-ray vault accompanied by the Host site RCT, **AND** depress the system Emergency Stop Button.
- 4.2.11 Visually inspect the coolant level by looking at the inspection sight glass window, **AND** record in the RTR operations logbook.
- 4.2.12 **IF** the level is low, **THEN** add coolant as specified in the x-ray operating manual.
- 4.2.13 Visually inspect the x-ray vault interior for any foreign objects OR other possible obstructions.
- 4.2.14 Turn on the coolant pump by pressing the On/Off Toggle Switch.

- 4.2.15 Exit the x-ray vault, **AND** close the personnel x-ray vault door.
- 4.2.16 On the Andrex Control Console, check that the green light is extinguished.
- 4.2.17 Request the Host site RCT to re-survey the x-ray vault as the personnel vault door is opened.
- 4.2.18 Enter the x-ray vault accompanied by the Host site RCT, **AND** reset the system Emergency Stop Button.
- 4.2.19 Close personnel x-ray vault door.
- 4.2.20 Check that the green stand-by light is illuminated on the Andrex Control Console.
- 4.2.21 Install the three cap screws in the personnel x-ray vault door.

**WARNING**

If any RTR system interlock is **NOT** functional, work may **NOT** continue until all corrective actions have been completed, **AND** all interlocks are functional.

- 4.2.22 **IF** any RTR system interlocks are **NOT** functional, **THEN STOP WORK**, **AND** notify the LO.
- 4.2.23 Record interlock checks in the RTR Operations Logbook.

4.3 Scale Calibration Check

**NOTE**

The RTR Operator may shift the scale readout between pounds and kilograms as required to complete this section.

- 4.3.1 Open the rear vault doors, **AND** move the container conveyor to the rearmost position (loading position) with the joystick on the Operator's Bench Board.
- 4.3.2 Verify that scale calibration is current.
- 4.3.3 Request Host site personnel place 200 pounds of calibrated weights on the turntable.
- 4.3.4 Perform a weight check on the turntable scale.
- 4.3.5 Verify that the scale digital readout indicates 200 +/- 5 pounds.

4.3.6 Request Host site personnel remove the calibrated weights.

4.3.7 **IF** the test fails,  
**THEN** repeat the weight check.

4.3.8 **IF** the test fails a second time,  
**THEN STOP WORK, AND** notify the VPM and RTR LO.

4.3.9 Record results of scale verification in the RTR Operations Logbook.

#### 4.4 Container Loading

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##### **NOTE**

Prior to loading the first container of the day, the RTR Operator will ensure that the lines-pair resolution test gauge is affixed to the upper one-third of the container. The RTR Operator will also request that the lines-pair resolution test gauge is removed after the first container scan is complete.

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4.4.1 Verify that a container is loaded onto the conveyor at its rearmost position by Waste Handling personnel, by observing the vault monitor.

4.4.2 Ensure a measuring device is affixed to each container loaded for scanning, if desired.

4.4.3 Transport the container into the x-ray vault utilizing the joystick at the Operator's Bench Board.

4.4.4 **CLOSE** the rear doors using the Back Door Switch while maintaining visual surveillance on the video monitor at the Operator's Bench Board.

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##### **NOTE**

The remaining steps of this section are **ONLY** performed when loading the first container of the day.

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4.4.5 Position the container using the joystick to prevent direct illumination from the x-ray source to the Image Intensifier at the Operator's Bench Board.

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**NOTE**

The time required to perform a warm-up sequence will vary depending on the recent operating history of the installed system.

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- 4.4.6 Perform a warm-up sequence for the RTR system following the manufacturer's recommended procedure (Running-In Procedure as posted on system cover of Andrex Model CMA357).
- 4.4.7 Depress the IN Button at the Andrex Control Console.
- 4.4.8 Check both internal and external warning lamps and audible alarm.
- 4.4.9 **IF** RTR system interlock and alarm checks are **NOT** satisfactory, **THEN** depress the OUT Button at the Andrex Control Console, **AND** notify the LO.

4.5 RTR System Shutdown

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**NOTE**

This section is used to shutdown the RTR system after all scanning activities have been completed.

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- 4.5.1 Transport the container conveyor into the x-ray vault using the joystick at the Operator's Bench Board.
- 4.5.2 CLOSE the rear doors using the Back Door Switch while maintaining visual surveillance on the video monitor at the Operator's Bench Board.
- 4.5.3 Turn the Voltage Key to the OFF position, AND then remove the key from the Voltage Select Key Switch at the Andrex Control Console.
- 4.5.4 Turn the Safety Key to the left position, AND then remove the key from the Safety Key Switch at the Andrex Control Console.
- 4.5.5 CLOSE the shutters on the Image Intensifier.
- 4.5.6 Turn the Power Key to the OFF position, AND then remove the key from the Power Key Switch at the Operator's Bench Board.
- 4.5.7 Request that Host site RCT survey the vault.
- 4.5.8 Remove three cap screws from the personnel vault door.

**CAUTION**

Host site RCT must conduct a survey with a calibrated meter prior to entering the vault.

- 4.5.9 Enter the vault area.
- 4.5.10 Depress the ON/OFF Toggle Switch on the coolant pump to the OFF position.
- 4.5.11 Exit the vault area.
- 4.5.12 Replace the three cap screws in the vault personnel door.

5.0 RECORDS

5.1 There are no records generated during the performance of this procedure.