

CCP-CM-030

Revision 0

CCP

High Energy

Real-Time Radiography (Equipment # HE-RTR-01) Site Acceptance Test Plan for Hanford

EFFECTIVE DATE: 12/21/2010

Larry Porter

PRINTED NAME

APPROVED FOR USE

RECORD OF REVISION

Revision Number	Date Approved	Description of Revision
0	12/21/2010	Initial issue.

TABLE OF CONTENTS

1.0 INTRODUCTION..... 4

2.0 REQUIREMENTS 4

 2.1 References..... 4

3.0 RESPONSIBILITIES..... 5

 3.1 Testing Responsibilities 5

 3.2 Precautions and Limitations 6

 3.3 Initial Conditions 6

 3.4 Test Plan Description 7

4.0 TEST PLAN PROCEDURE 8

 4.1 Test results completion and submittal..... 8

5.0 RECORDS 9

LIST OF ATTACHMENTS

Attachment 1 – Site Acceptance Test Checklist..... 10

1.0 INTRODUCTION

The High Energy Real-Time Radiography System (HERTR) is a custom built system for carrying out non-destructive inspection of radioactive nuclear waste. This test will serve as the operational acceptance of all components that make up the HE-RTR. The test will also ensure that the concrete structure around the system meets exempt shielding status per ANSI N43.3, *Installations Using Non-Medical X-Ray and Sealed Gamma-Ray Sources, Energies up to 10 MeV* (Reference 1).

This testing will be performed in accordance with CCP-QP-027, *CCP Test Control*. The test equipment including Measuring and Test Equipment (M&TE) used will be identified and documented in the test report. Each section will list the tester qualifications as applicable. Mandatory hold points will be identified throughout the test plan, as applicable.

2.0 REQUIREMENTS

2.1 References

Baseline Documents

- CCP-QP-027, *CCP Test Control*

Referenced Documents

- ANSI/HPS N43.3-2008, *Installations Using Non-Medical X-Ray and Sealed Gamma-Ray Sources, Energies up to 10 MeV*
- CCP-QP-008, *CCP Records Management*

3.0 RESPONSIBILITIES

3.1 Testing Responsibilities

This section outlines the testing responsibilities of the organization involved with testing.

3.1.1 Central Characterization Project

Central Characterization Project (CCP) is responsible for providing the Site Acceptance Test (SAT) plan, technical support, and for coordinating the testing activities including date, time, and personnel involved. CCP is responsible for providing the support identified below to perform site acceptance testing.

Support Provided by CCP

- Test Container
- CCP Configuration Management Engineer (CME)
- CCP Quality Assurance (QA)
- VJ Technologies (VJT) Subject Matter Expert (SME)
- Mobile Characterization Services (MCS) Real-Time Radiography (RTR) Operator

3.1.2 Hanford

Hanford is responsible for providing a work package and technical support to support testing. Hanford is also responsible for providing the support identified below to perform testing activities.

Support provided by Hanford:

- Forklift
- Forklift Operators
- Radiation Survey Meter
- Radiological Control
- Electricians, if applicable

3.1.3 Other Organizations

Other organizations involved with the use of the HE-RTR may be invited to observe the SAT.

3.2 Precautions and Limitations

Prior to performing this test, assembly of the x-ray vault and installation of the HE-RTR equipment shall be complete.

While performing this test, to ensure that each item is tested accurately and safely, all requirements of ANSI N43.3 (Reference 1) shall be applied. For any items that require Hanford personnel or equipment that work will be performed in accordance with any Hanford procedures that may apply.

3.3 Initial Conditions

The following initial conditions/configurations shall be verified at the start of the test plan:

- Operability testing described in the HERTR construction work package and WRAP SAT work package successfully complete.
- A minimum of one qualified CCP operator or an appointed VJT SME is present to perform test.
- Radiation Control personnel are present as prescribed by the Host Site.
- Host Site has authorized initiation of Attachment 1, Site Acceptance Test Checklist.
- The system is completely shut down and powered off
- All Electrical disconnects/circuit breakers are open and all E-Stops are in normal position.
- No personnel are inside the vault.
- System key is in the off position.
- Imaging computer is off.
- Manipulator computer is off.

- Vault door is closed.
- Source/Detector switch is on "Source."
- Lock/Unlock switch is at "Unlock."

3.4 Test Plan Description

The SAT will be performed by CCP personnel with Hanford support and will include the following:

- Steps to verify that all components can be powered up and function properly.
- Steps to verify that emergency stops function properly.
- Steps to verify that the mechanical subsystems including; the vault doors, cart and rail system, turntable, and the source and detector lifts, function properly.
- Steps to verify that the shielded vault meets the criteria of exempt status per ANSI N43.3-2008.
- Steps to verify that all of the safety interlocks function properly.
- Steps to verify that the imaging software is installed and the system functions properly.

Attachment 1, Site Acceptance Test Checklist, will be completed documenting the results of the SAT.

4.0 TEST PLAN PROCEDURE

The detailed steps of the SAT are provided below in Attachment 1. The test results shall be recorded in the checklist provided.

4.1 Test results completion and submittal

CCP CME

4.1.1 Coordinate with the appropriate organizations to complete Attachment 1, as applicable.

4.1.2 Forward completed Attachment 1 to CCP QA.

NOTE

If additional pages are needed to address comments, they may be included as necessary and labeled per CCP-QP-008, *CCP Records Management*.

CCP QA

4.1.3 Review the test results in accordance with CCP-QP-027.

4.1.4 Print name, sign, and date Attachment 1.

4.1.5 Return signed Attachment 1 to the CCP CME.

CCP CME

4.1.6 Ensure page numbering is completed.

4.1.7 Submit to the Facility Records Custodian.

Facility Records Custodian

4.1.8 Receive, process, and maintain Attachment 1 in accordance with CCP-QP-008.

5.0 RECORDS

5.1 Records generated during the performance of this procedure are maintained as QA records in accordance with CCP-QP-008. The records are the following:

5.1.1 QA/Nonpermanent

[A] Attachment 1, Site Acceptance Test Checklist.

Attachment 1 – Site Acceptance Test Checklist

Page__ of __

The following steps shall be marked with a “P” if the test is passed or an instruction successfully carried out and an “F” if the test is failed. Initial comments can be recorded at each step and more detailed comments can be provided at the end of each test (if more room is needed to address comments, they can be attached to the checklist). All re-tests shall be documented using the comments sections. For items that involve verifying that no personnel are within the vault, provisions are provided to sign off and record the date and time. For items identified as a hold point, the person completing the checklist must print their name, sign, and date in the provided space when the item passes prior to continuing to the next item on the checklist. Provisions for signatures documenting satisfactory completion of Attachment 1, final approval can be given at the end of the attachment.

Section A: ELECTRICAL POWER UP

Qualifications: The test will be performed by a qualified CCP RTR Operator or an appointed VJT SME with qualified Host Site Supervision. The CCP Operator will be qualified, to operate CCP equipment, in accordance with all Hanford specific training requirements.

In order to properly check that all systems power up correctly the system needs to be completely shut down prior to going through this section

- | | |
|--|---------------------------|
| A.1. Verify Initial Conditions listed in Section 3.3 are met. | Signature Date Time |
| A.2. Verify that the equipment was inspected to the requirements of the NEC prior to SAT. | P/F___ Comment: |
| A.3. Ensure all disconnects/circuit breakers in main electric cabinet are open and all E-Stops are in normal position. | P/F___ Comment: |
| A.4 . Close Main Disconnect on Electrical Cabinet and verify that the 24V DC Power Supply output lamp is illuminated green. | P/F___ Comment: |
| A.5. Turn the system on key to “ Start ” position on the operator Control Console. Verify that Power On lamp is illuminated white. | P/F___ Comment: |
| A.6. Close breaker and turn on power to LINAC Cooling Unit . Ensure LINAC Cooling Unit Power On light is illuminated. | P/F___ Comment: |

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section A: ELECTRICAL POWER UP (Continued)

- A.7. Turn on power to **LINAC Modulator**. Ensure **LINAC Modulator POWER ON** light is illuminated. P/F__ Comment:
- A.8. Turn on power to **Detector power supply Unit**. Ensure **D** light is illuminated. P/F__ Comment:
- A.9. Turn on 110 V power to **Operator Console**. Ensure red light on power strip is illuminated. P/F__ Comment:
- A.10. Turn on servo drives for **Horizontal Motion** of the cart. Ensure light on the drive turns green. P/F__ Comment:
- A.11. Turn on servo drives for **Rotary Motion** of the cart. Ensure light on the drive turns green. P/F__ Comment:
- A.12. Turn on servo drives for **Vertical Motion** of the source lift. Ensure light on the drive turns green. P/F__ Comment:
- A.13. Turn on servo drives for **Vertical Motion** of the detector lift. Ensure light on the drive turns green. P/F__ Comment:
- A.14. Start **Imaging Computer (DOE-RTR)** and verify that no error message windows are displayed. P/F__ Comment:
- A.15. Start **Manipulator Computer (DOE-RTR-2)** and verify that no error message windows are displayed. P/F__ Comment:
- A.16. On boot-up of **Manipulator Computer**, verify that the MPEG Composer is running and that no error message windows are displayed. The software should display '**DOE.prd – Encoder**' in the title bar. P/F__ Comment:

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section A: ELECTRICAL POWER UP (Continued)

A.17. Start **Vi3** software on the **Imaging Computer** by double clicking the desktop icon labeled **DOE** and verify that no error message windows are displayed. P/F__ Comment:

A.18. Verify that the **RT Series Software** is automatically started on the **Manipulator Computer** after the **Vi3 Software** is running and that no error message windows are displayed. P/F__ Comment:

A.19. If **Vi3 Software** detects that the motion control axes are not homed; it will prompt the operator to perform a 'Composite Home.' Click 'OK' and verify that all the axes are homed. Homing is verified in **RT Series Software** by noting that the position for each axes is set to 0 inches after the axes is moved to a programmed limit. The homed axes is also colored BLUE on the display. P/F__ Comment:

Comments

CCP Engineer:

Printed Name

Signature

Date

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page ___ of ___

Section B: ELECTRICAL EMERGENCY STOPS

Qualifications: The test will be performed by a qualified CCP RTR Operator or an appointed VJT SME with qualified Host Site Supervision. The CCP Operator will be qualified, to operate CCP equipment, in accordance with all Hanford specific training requirements.

Before testing this section verify that the system is powered up and is functional according to the steps defined in Section A of this attachment:

- B.1. Verify all **E-Stop** and **push buttons** are in normal position. This will require entry into the vault. P/F___ Comment:
- B.2. Turn Power key switch on Operator Control Console to “**Start**” position (spring return to “On” position). P/F___ Comment:
- B.3. Ensure **Power ON** light is illuminated. P/F___ Comment:
- B.4. Ensure LINAC modulator is turned ON. P/F___ Comment:
- B.5. Ensure all circuit breakers (CBs) are closed. P/F___ Comment:
- B.6. Ensure all mechanical equipment has power by verifying the servo drives power ON light is illuminated. P/F___ Comment:
- B.7. Press **E-Stop 1** on Operator Control Console. P/F___ Comment:
- B.8. Verify that manipulator and Linatron power is cut off by observing:
 - 1. Linatron HMI display is off.
 - 2. Reset button lamp on Linatron modulator is off.
 - 3. The POWER ON lamp on the Operator Control Console is turned off.

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page ___ of ___

Section B: ELECTRICAL EMERGENCY STOPS (Continued)

B.9. Reset **E-Stop 1** and repeat steps B.2 through B.6. P/F___ Comment:

B.10. Press **E-Stop 2** inside the vault (by the door). P/F___ Comment:

B.11. Verify that manipulator and Linatron power is cut off by observing: P/F___ Comment:

1. Linatron HMI display is off.
2. Reset button lamp on Linatron modulator is off.
3. The POWER ON lamp on the Operator Control Console is turned off.

B.12. Reset **E-Stop 2** and repeat steps B.2 through B.6. P/F___ Comment:

B.13. Press **E-Stop 3** inside the vault (connected to pull plug). P/F___ Comment:

B.14. Verify that manipulator and Linatron power is cut off by observing: P/F___ Comment:

1. Linatron HMI display is off.
2. Reset button lamp on Linatron modulator is off.
3. The POWER ON lamp on the Operator Control Console is turned off.

B.15. Reset **E-Stop 3** and repeat steps B.2 through B.6. P/F___ Comment:

B.16. Press **E-Stop 4** inside the vault (connected to pull plug). P/F___ Comment:

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section B: ELECTRICAL EMERGENCY STOPS (Continued)

B.17. Verify that manipulator and Linatron power is cut off by observing: P/F__ Comment:

1. Linatron HMI display is off.
2. Reset button lamp on Linatron modulator is off.
3. The POWER ON lamp on the Operator Control Console is turned off.

B.18. Reset **E-Stop 4** and repeat steps B.2 through B.6. P/F__ Comment:

B.19. Press **E-Stop 5** inside the vault (connected to pull plug). P/F__ Comment:

B.20. Verify that manipulator and Linatron power is cut off by observing: P/F__ Comment:

1. Linatron HMI display is off.
2. Reset button lamp on Linatron modulator is off.
3. The POWER ON lamp on the Operator Control Console is turned off.

B.21. Reset **E-Stop 5** and repeat steps B.2 through B.6. P/F__ Comment:

B.22. Press **E-Stop 6** inside the vault (connected to pull plug). P/F__ Comment:

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section B: ELECTRICAL EMERGENCY STOPS (Continued)

B.23. Verify that manipulator and Linatron power is cut off by observing: P/F__ Comment:

1. Linatron HMI display is off.
2. Reset button lamp on Linatron modulator is off.
3. The POWER ON lamp on the Operator Control Console is turned off.

B.24. Reset **E-Stop 6** and repeat steps B.2 through B.6. P/F__ Comment:

B.25. Press **E-Stop 7** inside the vault (connected to pull plug). P/F__ Comment:

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section B: ELECTRICAL EMERGENCY STOPS (Continued)

B.26. Verify that manipulator and Linatron power is cut off by observing: P/F__ Comment:

1. Linatron HMI displays is off.
2. Reset button lamp on Linatron modulator is off.
3. The POWER ON lamp on the Operator Control Console is turned off.

B.27. Reset **E-Stop 7**.

Comments

CCP Engineer:

Printed Name

Signature

Date

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section C: MECHANICAL SUB-SYSTEM FUNCTIONAL TESTS

Qualifications: The test will be performed by a qualified CCP RTR Operator or an appointed VJT SME with qualified Host Site Supervision. The CCP Operator will be qualified, to operate CCP equipment, in accordance with all Hanford specific training requirements.

Before testing this section verify that the system is powered up and is functional according to the steps defined in Section A of this attachment:

- C.1. Open vault door by pressing the green OPEN button on the door section of the Operator Control Console. P/F___ Comment:
- C.2. Check safety bumpers on outside of each door by applying pressure to them while doors are opening verifying that the door movement is reversed (i.e., the door closes). P/F___ Comment:
- C.3. Release pressure on the bumpers to verify that the doors have stopped. P/F___ Comment:
- C.4. Press the OPEN button on the door section of the Operator Control Console to open the door. P/F___ Comment:
- C.5. Check the OPEN button to see if it is illuminated. P/F___ Comment:
- C.6. Verify that doors are open by physically checking and by video surveillance system. P/F___ Comment:
- C.7. Close vault doors by pressing the green CLOSE button on the door section of the operator control console. P/F___ Comment:
- C.8. Check safety bumpers on inside of each door by applying pressure to them while doors are closing verifying that the door movement is reversed (i.e., the door starts opening). P/F___ Comment:
- C.9. Release pressure on the bumpers to verify that the doors have stopped. P/F___ Comment:

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section C: MECHANICAL SUB-SYSTEM FUNCTIONAL TESTS (Continued)

- C.10. Press the CLOSE button on the door section of the Operator Control Console to close the door. P/F__ Comment:
- C.11. Check that the CLOSE button is illuminated. P/F__ Comment:
- C.12. Verify that doors are closed by physically checking and by video surveillance system. P/F__ Comment:
- C.13. Verify **Horizontal axis IN** travel and limit by moving the **(IN-OUT)** joystick left. Before operating **(IN-OUT)** joystick ensure the cart is in unloading area. Ensure that the travel limit switch operates and stops the cart. P/F__ Comment:
- C.14. Verify **Horizontal axis OUT** travel and limit by moving the **(IN-OUT)** joystick right. Before operating **(IN-OUT)** joystick ensure the cart is in inspection area. Verify that the travel limit switch start/stops the cart. P/F__ Comment:
- C.15. Verify **Rotary axis CCW** motion by moving the **CCW/CW** joystick left. The rotary axis has continuous motion. P/F__ Comment:
- C.16. Verify **Rotary axis CW** motion by moving the **CCW/CW** joystick right. The rotary axis has continuous motion. P/F__ Comment:
- C.17. Ensure **(Source/Detector)** switch is towards **Source and Lock/Unlock switch** is at **Unlock** position. Verify **Vertical Axis Raise** motion of **Source (LINAC) manipulator** by moving the **(Z+ /Z-)** joystick forward. Verify that the raise travel limit operates and stops the manipulator. P/F__ Comment:

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section C: MECHANICAL SUB-SYSTEM FUNCTIONAL TESTS (Continued)

- C.18. Ensure (**Source/Detector**) switch is towards **Source and Lock/Unlock switch** is at **Unlock** position. Verify **Vertical Axis Lower** motion of **Source (LINAC) manipulator** by moving the **(Z+ /Z-)** joystick back. Verify that the lower travel limit operates and stops the manipulator. P/F__ Comment:
- C.19. Ensure (**Source/Detector**) switch is towards **Detector and Lock/Unlock switch** is at **Unlock** position. Verify **Vertical Axis Raise** motion of **Detector manipulator** by moving the **(Z+ /Z-)** joystick forward. Verify that the raise travel limit operates and stops the manipulator. P/F__ Comment:
- C.20. Ensure (**Source/Detector**) switch is towards **Detector and Lock/Unlock switch** is at **Unlock** position. Verify **Vertical Axis Lower** motion of **Detector manipulator** by moving the **(Z+ /Z-)** joystick back. Verify that the lower travel limit operates and stops the manipulator. P/F__ Comment:
- C.21. Verify the **Lock/Unlock** operation. Turn the switch in **Lock** mode. Once done, move **(Z+ /Z-)** joystick up, the Detector and Source manipulator both should move up. If the **(Z+ /Z-)** joystick is moved down, the Detector and Source manipulator both should move down. During both operations, ensure that the upper and lower level travel limit operates and stops both manipulator. P/F__ Comment:
- C.22. Verify **LOAD UNLOAD** operation. The cart should move to the loading area of the vault when the switch is pressed. P/F__ Comment:
- C.23. Verify **INSPECTION** operation. The cart should move to the inspection area of the vault when the switch is pressed. P/F__ Comment:

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section C: MECHANICAL SUB-SYSTEM FUNCTIONAL TESTS (Continued)

C.24. Verify that cart motion can be interrupted when P/F__ Comment:
needed during either **LOAD UNLOAD** or
INSPECTION operations.

1. Perform **LOAD UNLOAD** operation, and once the cart is in motion press Abort. The cart should come to a standstill.
2. Perform **INSPECTION** operation, and once the cart is in motion press Abort. The cart should come to a standstill.

Comments

CCP Engineer:

_____ Printed Name

_____ Signature

_____ Date

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section D: RADIATION SURVEY

Qualifications: The test will be performed by a qualified CCP RTR Operator or an appointed VJT SME and Hanford Radiological Control.

- The CCP Operator will be qualified, to operate CCP equipment, in accordance with all Hanford specific training requirements.
- Radiological Control Personnel will be trained and qualified to Hanford's radiological control procedures

Before testing this section verify that the system is powered up and is functional according to the steps defined in Section A of this attachment:

- | | |
|--|---------------------------|
| D.1. Request Radiological Control support from Hanford to complete this section. | P/F__ Comment: |
| D.2. Ensure that no test container is in the vault. | P/F__ Comment: |
| D.3. Ensure no personnel are inside the vault.
(Operator's Signature required). | <hr/> Signature Date Time |
| D.4. Close the vault doors by pressing the green CLOSE button on the door section of the operator control console. | P/F__ Comment: |
| D.5. Verify that Doors are closed by physically checking and by looking at the video surveillance system. | P/F__ Comment: |
| D.6. Move the cart to load position using the LOAD UNLOAD switch. | P/F__ Comment: |
| D.7. Restart system by pressing the BEAM ON button. | P/F__ Comment: |
| D.8. Ramp up x-rays to full power and perform radiation survey of the outside of the vault. (Develop Radiation Survey Drawing, as applicable). | P/F__ Comment: |

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section D: RADIATION SURVEY (Continued)

D.9. Verify dose rate less than 0.5 mR/hr at all accessible locations of vault (**HOLD POINT**). P/F__ Comment:

/	/	
_____ Print name	_____ Signature	_____ Date

D.10. Stop x-rays by pressing the BEAM OFF button. P/F__ Comment:

D.11. Open vault door. P/F__ Comment:

D.12. Request containment movement from Hanford to place test container on the cart. P/F__ Comment:

D.13. Verify that the **test container** is placed correctly on the cart inside the vault. P/F__ Comment:

D.14. Ensure no personnel are inside the vault. (Operator's Signature required).	_____ Signature	_____ Date	_____ Time
---	--------------------	---------------	---------------

D.15. Close the vault doors by pressing the green CLOSE button on the door section of the operator control console. P/F__ Comment:

D.16. Verify that doors are closed by physically checking and by looking at the video surveillance system. P/F__ Comment:

D.17. Move the cart to load position using the INSPECTION switch. P/F__ Comment:

D.18. Restart system by moving the key to "Enable" and pressing the BEAM ON button. P/F__ Comment:

D.19. Move **test container** to approximate midpoint of the x-ray beam. P/F__ Comment:

D.20. Ramp up **x-rays** to full power and perform **radiation survey** of the outside of the vault (develop Radiation Survey Drawing, as applicable). P/F__ Comment:

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section D: RADIATION SURVEY (Continued)

D.21. Verify dose rate less than 0.5 mR/hr at all accessible locations of vault (**HOLD POINT**). P/F__ Comment:

	/	/
Print name	Signature	Date

D.22. Stop x-rays by pressing the BEAM OFF button. P/F__ Comment:

D.23. Open vault door. P/F__ Comment:

D.24. Request containment movement from Hanford to remove test container from the vault. P/F__ Comment:

M&TE

Radiation Survey Meter:		
	ID Number	Calibration Due Date

Comments

CCP Engineer:

Printed Name	Signature	Date

Hanford Radiological Control:

Printed Name	Signature	Date

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section E: SAFETY INTERLOCKS

Qualifications: The test will be performed by a qualified CCP RTR Operator or an appointed VJT SME with qualified Host Site supervision. The CCP Operator will be qualified, to operate CCP equipment, in accordance with all Hanford specific training requirements.

Before testing this section verify that the system is powered up and is functional according to the steps defined in Section A of this attachment:

- | | Signature | Date | Time |
|---|-----------|----------|------|
| E.1. Ensure no personnel are inside the vault.
(Operator's Signature required). | | | |
| E.2. Close the vault doors by pressing the green CLOSE button on the door section of the operator control console. | P/F___ | Comment: | |
| E.3. Verify that doors are closed by physically checking and by looking at the video surveillance system. | P/F___ | Comment: | |
| E.4. Power up the system (if system requires warm up, allow it to go through automatic warm up cycle). | P/F___ | Comment: | |
| E.5. Ensure all interlocks are satisfied on the Linatron HMI. | P/F___ | Comment: | |
| E.6. Turn keyed switch on LINAC to " Enable. " | P/F___ | Comment: | |
| E.7. Verify that the beacons inside the vault are flashing amber and an audible warning is given on initiation of x-rays. Verify this warning is given for a minimum of 20 seconds before x-rays are generated. | P/F___ | Comment: | |
| E.8. To start x-rays, press the Beam ON button. | P/F___ | Comment: | |
| E.9. When x-rays are generated, ensure that the x-ray ON sign at the load door is illuminated. | P/F___ | Comment: | |

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section E: SAFETY INTERLOCKS

E.10. Ensure all personnel are clear of vault door. (Operator’s Signature required)	Signature	Date	Time
---	-----------	------	------

E.11. Open the vault door. Ensure interlock operates and x-ray generation is cut off.	P/F__ Comment:
---	----------------

E.12. Close the vault door. Verify that the x-rays do not restart automatically (HOLD POINT) .	P/F__ Comment:
---	----------------

/	/	
Print name	Signature	Date

E.13. Start x-rays by moving the key to “Enable” and pressing the BEAM ON button.	P/F__ Comment:
--	----------------

E.14. Remove the lamp from the x-ray lighted sign. Ensure x-rays are turned off and x-rays do not restart (HOLD POINT) .	P/F__ Comment:
--	----------------

/	/	
Print name	Signature	Date

E.15. Replace lamp in the x-ray lighted sign.	P/F__ Comment:
---	----------------

E.16. Restart system by turning the keyed switch on LINAC to “Enable” and then pressing the BEAM ON button. Verify x-ray lighted sign is functioning.	P/F__ Comment:
--	----------------

E.17. Stop x-rays by pressing the BEAM OFF button.	P/F__ Comment:
---	----------------

E.18. Open vault door.	P/F__ Comment:
------------------------	----------------

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section E: SAFETY INTERLOCKS (Continued)

E.19. Radiological control personnel will enter the vault with a radiation source and hold it close to the Radiation Monitor. Verify that the radiation monitor detects the radiation and activates the e-stop. P/F__ Comment:

M&TE

Radiation Monitor: _____
ID Number Calibration Due Date

Radiation Source: _____
ID Number Calibration Due Date

Comments

CCP Engineer:

Printed Name Signature Date

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section F: IMAGING SYSTEM

Qualifications: the test will be performed by a qualified CCP RTR Operator or an appointed VJT SME. The CCP Operator will be qualified, to operate CCP equipment, in accordance with all Hanford specific training requirements.

Before testing this section verify that the system is powered up and is functional according to the steps defined in Section A of this attachment.

F.1. Request containment movement support from Hanford to place test container on the cart. P/F__ Comment:

F.2. Verify test container is placed on the cart correctly. P/F__ Comment:

F.3. Ensure no personnel are inside the vault. **(Operator's Signature required).** _____
Signature Date Time

F.4. Close the vault doors by pressing the green CLOSE button on the door section of the operator control console. P/F__ Comment:

F.5. Verify that doors are closed by physically checking and by looking at the video surveillance system. P/F__ Comment:

F.6. Move test container into the vault by pressing the console 'Inspection' switches. Verify that the cart is moved to the front of the detector. P/F__ Comment:

F.7. Start x-rays by pressing the 'BEAM ON' button on the x-ray control console. P/F__ Comment:

F.8. Click on the '**Grab – F3**' button in **Vi3** to enable live display of images from the detector. Verify that no error message windows are displayed. P/F__ Comment:

F.9. Press the 'F2' key once to enable the image to be displayed on the full screen. Verify that the test container can be seen on the display for the imaging computer. Note: The F2 key toggles full screen display. P/F__ Comment:

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section F: IMAGING SYSTEM (Continued)

F.16. Restart system by turning the keyed switch on LINAC to “Enable” and then pressing The BEAM ON button. Verify x-ray lighted sign is functioning. P/F___ Comment:

F.17. Move test container out of the vault by pressing the console ‘LOAD UNLOAD’ switches. Verify that the cart is moved to the unload position away from the front of the detector. P/F___ Comment:

Comments

CCP Engineer:

Printed Name

Signature

Date

Attachment 1 – Site Acceptance Test Checklist (Continued)

Page__ of __

Section G: FINAL APPROVAL

Upon satisfactory completion of this attachment provide final approval by signing and dating the appropriate space below.

CCP Engineer:

Printed Name

Signature

Date

CCP Quality Assurance:

Printed Name

Signature

Date