Att 4. (2)

JUL 07 1998

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 617464

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Distribution	Maintenance and Surveillance Engineering	N/A
5. Proj./Prog./Dept./Div.:	6. Design Authority/ Design Agent/Cog. Engr.:	7. Purchase Order No.:
W-320	Cog. Engr. - JM Jones	N/A
8. Originator Remarks: For Approval and Release		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: 241-C-106
11. Receiver Remarks: 11A. Design Baseline Document? [ ] Yes [X] No		12. Major Assm. Dwg. No.: H-2-818690
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: 7/9/98

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	HNF-2950	-	0	Tank 241-C-106 In-Tank Imaging System Operational Test Report	SQ	1	1	

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION
(See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Design Authority JM Bailey		6/12/98	S2-48
		Design Agent			
1	1	Cog.Eng. JM Jones		7-1-98	S2-33
1	1	Cog. Mgr. DG Baide		7-1-98	S5-12
1	1	QA KC Conrad		7/1/98	S2-48
1	1	Safety SU Zaman		7/6/98	S5-12
		Env.			

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	JR Bellomy		7-1-98	S2-48
1	1	JW Lentsch		7/6/98	S2-48
1	1	RR Bevins		7/6/98	S2-48
1	1	DB Smet		7-7-98	R1-56
3	3	Project Files (w-320)			R1-29

18. LT Pedersen — Signature of EDT Originator — Date 7/2/98

19. Authorized Representative for Receiving Organization — Date

20. Design Authority/ Cognizant Manager — Date 7-7-98

21. DOE APPROVAL (if required) Ctrl. No.
[ ] Approved
[ ] Approved w/comments
[ ] Disapproved w/comments

BD-7400-172-2 (05/96) GEF097

Tank 241-C-106 In-Tank Imaging System Operational Test Report

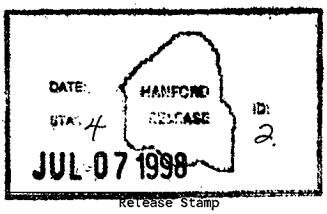
LT Pedersen
Lockheed Martin Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT: 617464 UC: 506
Org Code: 74720 Charge Code: D29PR
B&R Code: EW3130010 Total Pages: 42

Key Words: Project W-320, CCTV, camera, OTR, sluicing, C-106

Abstract: This document comprises the Operational Test Report for the Project W-320 In-Tank Imaging (CCTV) System. This document containes the completed copy of the Operational Test Procedure as an attachment.

Release Approval 7/7/98 Date



Release Stamp

Approved for Public Release

1.0 INTRODUCTION

1.1 PURPOSE

This document presents the results of operational testing of the 241-C-106 In-Tank Video Camera Imaging System. This imaging system was installed as a component of Project W-320 to monitor sluicing and waste retrieval activities in Tank 241-C-106.

1.2 SCOPE

Operational testing of the 241-C-106 In-Tank Video Camera System was performed in accordance with Tank Farm Plant Operating Procedure OTP-320-005, Rev. A-0, "Tank 241-C-106 In-Tank Imaging System Operational Test Procedure". This document reports the results of that testing.

1.3 OBJECTIVE

The objective of testing the 241-C-106 In-Tank Video Camera Imaging System was to verify that all imaging system equipment functions in accordance with design and operating requirements.

2.0 EQUIPMENT DESCRIPTION

The 241-C-106 In-Tank Video Camera Imaging System consists of the In-Tank Assembly, the Master Control Station, and the Local Control Station. The In-Tank Assembly is installed in Riser 7, located on the west side of Pump Pit 241-C-06A, and consists of the camera, lights, pan-and-tilt unit, and camera mast. The Master Control Station is located in the MO-211 Control Room in Cabinet CP-02, and consists of a camera controller, monitor, and video tape recorder. The Local Control Station is rack-mounted on Field Control Unit FCU-1361, on the north side of Tank 241-C-106, and consists of an auxiliary camera controller. Additional equipment, including the Hazardous Location Power Controller, Local Interface Unit, and Wash Down Solenoid are also rack-mounted on FCU-1361.

Control cables located in underground conduit runs connect the In-Tank Assembly, Master Control Station, and Local Control Station. Instrument quality compressed air for purging the camera and pan-and-tilt unit is routed in underground conduit from the Process Building (241-C-91) to the Hazardous Location Power Controller at FCU-1361. Filtered raw water for the camera wash down system is routed in underground conduit from the Process Building to the Wash Down Solenoid at FCU-1361. Above grade hoses carry the purge air and filtered water from FCU-1361 to the In-Tank Assembly.

3.0 TEST DESCRIPTION

Operational testing of 241-C-106 In-Tank Video Camera Imaging System consisted of:

- Aligning the compressed instrument air supply and testing the Hazardous Location Power Controller purge cycle timing and power interlocks.
- Aligning the filtered water supply and testing of the camera lens and lighting wash down solenoid valve operation from the Master Control Station and from the Local Control Station.
- Operation of the camera lens focus, zoom, and iris motor controls at the Master Control Station and the Local Control Station.
- Operation of the pan-and-tilt unit motor controls and electronic brake at the Master Control Station and the Local Control Station.
- Operation of the individual camera light controls at the Master Control Station and the Local Control Station.
- Operation of the S-VHS video tape recorder and monitor at the Master Control Station.

4.0 TEST RESULTS

4.1 DISCUSSION OF TEST RESULTS

Operational testing of the 241-C-106 In-Tank Video Camera Imaging System was completed satisfactorily. There was one exception recorded during testing. The exception is discussed in the next section.

The completed copy of OTP-320-005, Rev. A-0, "Tank 241-C-106 In-Tank Imaging System Operational Test Procedure," is found as an attachment to this document.

4.2 DISCUSSION OF TEST EXCEPTION

One test exception was noted during the performance of OTP-320-005, Rev. A-0. A high differential pressure alarm was observed when the camera wash down system was activated for testing. This alarm was initiated by Pressure Differential Indicating Switch PDISH-13615 which monitors for pressure buildup across 30 Micron Filter F-1361 in the raw water system. The filter element was subsequently changed. At the recommendation of the filter

manufacturer, PDISH-13615 was also replaced with a differential pressure switch having a wider range. The camera wash down system was retested following these changes and was found to perform satisfactorily.

5.0 CONCLUSION

Operational testing of the 241-C-106 In-Tank Video Camera Imaging System was successfully completed. The imaging system is acceptable for use during waste sluicing and retrieval in Tank 241-C-106.

6.0 REFERENCES

H-2-818592, Sh. 1	In-Tank Imaging Cab CP-02 Assembly and Section
H-2-818690, Sh. 1	C-Farm In-Tank Imaging (CCTV)
H-2-818704, Sh. 1	C-Farm Pump Pit Details
HNF-1824	Acceptance Test report for the Tank 241-C-106 In-Tank Imaging System
JCS#2E-97-2230	Job Control System Work Package, C-106 In-Tank Imaging (CCTV) Installation
OTP-320-005	Tank 241-C-106 In-Tank Imaging System Operational Test Procedure
VI No. 22668, Supp.105	Vendor Information, In-Tank Imaging System

ATTACHMENT

COMPLETED TANK FARM PLANT OPERATING
PROCEDURE OTP-320-005, REV. A-0

"TANK 241-C-106 IN-TANK IMAGING SYSTEM
OPERATIONAL TEST PROCEDURE"

TANK 241-C-106 IN-TANK IMAGING SYSTEM OPERATIONAL TEST PROCEDURE

Last Full Revision: A-0
Release Date: 5/11/98
USQ Screening Number: TF-98-0319
Approval Designator: ESQ

POSITION/ORG	DELEGATE	DATE
NCO	D.R. Jones	4/29/98
Shift Manager	K.J. Anderson	4/30/98
QA Engineer	W.L. Adams	4/30/98
Safety Engineer	S.U. Zaman	5/5/98
Environmental Eng.	P.C. Miller	5/6/98
RadCon Engineer	J. Pieper	4/30/98
COG Engineer	J.M. Jones	5/6/98
Acceptance Review	D.C. Ashworth	5/11/98
Approval Authority	T.J. Kelley	5/11/98

Justification: Engineering Request

Summary of Changes: New procedure for Project W-320

TABLE OF CONTENTS

PAGE

1.0 PURPOSE AND SCOPE

1.1 PURPOSE

This operational test procedure provides instructions for startup and testing of the Waste Retrieval Sluicing System (WRSS) In-Tank Imaging System. The In-Tank Imaging System monitors and records tank 241-C-106 waste retrieval and sluicing activities.

1.2 SCOPE

This procedure tests Imaging System equipment from both the Master Control Station, located in Control Room MO-211, and from the Local Control Station, located at Field Control Unit FCU-1361, adjacent to Tank 241-C-106. This test applies to operation of the in-tank camera, recording equipment, camera wash down system, and the camera purge and cooling/drying air system.

2.0 INFORMATION

2.1 TERMS AND DEFINITIONS

WRSS - Waste Retrieval Sluicing System

2.2 RESPONSIBILITIES

2.2.1 Test Engineer:

- Provides technical support during testing
- Provides programming support during testing
- Reviews test documents to validate acceptance
- Records equipment status and data per this procedure
- Records data exceptions and other notes as required on the OTP Data Sheets
- Prepares post testing documents.

2.2.2 Nuclear Chemical Operators (Surveillance Certified):

- Operate Imaging System equipment and components associated with this operational test procedure
- Perform all operations required by this operational test procedure.

2.2 RESPONSIBILITIES (Cont.)

2.2.3 Quality Control Inspector:

- Verifies that procedure sections were performed properly by witnessing procedure steps as they occur

2.2.4 Quality Assurance Engineer

- Reviews and approves exception resolutions as determined by the Test Director
- Reviews recorded test data for accuracy and completeness.

2.2.5 Test Director:

- Verifies prerequisites complete prior to start of test
- Provides overall control of the testing process and change record authorization for this operational test
- Ensures all required data is collected
- Ensures safe and productive accomplishment of testing
- Ensures safe working conditions and practices
- Ensures compliance with test documents and Technical Safety Requirements/Documents (TSRs/OSDs) during testing
- Communicates and coordinates testing with DST Shift Manager
- Ensures review and approval of all modifications to test procedures are completed prior to return to testing
- Acts as direct line of communication and centralized point of control during normal, abnormal, and casualty situations
- Conducts pre-job briefings as required
- Schedules/reschedules tests as required
- Conducts pre-job system walkdowns
- Reviews test documents to validate acceptance
- Verifies all test instrumentation is within current calibration cycle.

2.3 REFERENCES

- H-2-818559, Project W-320 P & ID Tank 241-C-106.
- H-2-818561, Project W-320 P & ID TK 241-C-106 HVAC.
- H-2-818562, Project W-320 P & ID Air & Water System.
- H-2-818592, Instrumentation In-Tank Imaging Cab CP-02 Assembly & Section.
- H-2-818678, Sht 3, Electrical C-Farm Process Bldg Plan & Details.
- H-2-818680, Electrical C-Farm One-Line Diagram.
- H-2-818690, Electrical C-Farm In-Tank Imaging System

2.4 GENERAL INFORMATION

2.4.1 CHANGE CONTROL

Change control shall be in accordance with HNF-IP-0842.

2.4.2 TEST EXCEPTIONS

Components that cannot be brought into the range of acceptance specified by the applicable inspection or testing maintenance procedure shall be identified, processed and controlled as test exceptions.

Test exceptions are used to document unexpected results and identify appropriate actions, not to circumvent performance requirements.

All test exceptions shall be given a sequential number and recorded on Attachment 1, OTP-320-005 TEST LOG.

Attachment 2, OTP-320-005 TEST EXCEPTION REPORT, shall be filled out to record and disposition each test exception.

2.4.3 ALARM RESPONSE

Alarm response procedure ARP-T-331-00004, Respond to Alarms at Service Building 241-C-73, identifies alarms associated with the Compressed Air and Raw Water Systems operated in support of this test and provides instructions for responding to those alarms.

Attachment 7, OTP-320-005 ALARM RESPONSE identifies air and water system alarms at Process Building 241-C-91 and Control Room MO-211 that may also be expected during this test and provides instructions for responding to those alarms.

Unexpected alarms received during testing, that are associated with this test, shall be logged as test exceptions and evaluated by the Test Director for effect on the test.

2.4.4 If changing conditions affect testing, or delays extend test duration past the end of the testing shift, the Test Director and Test Engineer need to be contacted for additional instructions.

2.4 GENERAL INFORMATION (Cont.)

2.4.5 If during performance of this procedure, any of the following conditions are found, **IMMEDIATELY** notify the assigned Test Director and Test Engineer:

- Any equipment malfunction which could prevent fulfillment of functional requirements
- Personnel error or procedural inadequacy which could prevent fulfillment of procedural requirements
- Any other unexpected anomalies.

The Test Director shall assess the effect on the system and the test, and direct either continuation of the test in the same section, proceeding to another attachment or section of the test, or suspension of the test per step 2.4.7 and establishing a safe condition for equipment.

2.4.6 SYSTEM STATUS

Record all changes in equipment configuration, comments and observations by participants, and any other data pertinent to the test on Attachment 1, OTP-320-005 TEST LOG.

2.4.7 SUSPENSION OF TEST AND RESUMING TEST

Test Director may unilaterally, for any reason, stop testing, and place equipment in a safe condition. All suspension of testing shall be documented on Attachment 1, OTP-320-005 TEST LOG.

If a section of the test is suspended for any reason prior to completing all steps, the Test Director shall establish initial conditions necessary to resume testing for that section. Previously completed sections need not be repeated unless directed by the Test Director to establish conditions required to resume the test.

2.5 RECORDS

The performance copy of the operational test procedure, including completed attachments, shall be filed as a permanent test record (Operational Test Report).

3.0 PRECAUTIONS AND LIMITATIONS

3.1 PERSONNEL SAFETY

- The flexible pneumatic hose downstream of valve HV-13676 may contain pressurized instrument air.
- The flexible hose downstream of valve HV-13657 may contain pressurized water.

3.2 RADIATION AND CONTAMINATION CONTROL

- Work in radiological areas will be performed using a Radiation Work Permit following review by Radiological Control Engineering and Technical Support.

3.3 LIMITS

- If testing is interrupted or the In-Tank Imaging System is shutdown for an extended period (longer than one hour), the viewing lights should be shut down to preserve component life.
- Viewing lights should be turned off and allowed to cool down for about 5 minutes before performing washdown. Lamps are rated for exposure to wash water while at full operating temperature; however, a brief cooldown period (5 minutes) before washing is desirable to preserve component life.

4.0 PREREQUISITES

4.1 SPECIAL TOOLS, EQUIPMENT, AND SUPPLIES

- Timing device
- Blank S-VHS format video tape
- Auxiliary TV monitor (for Local Control Station test)

4.2 PERFORMANCE DOCUMENTS

- TO-320-010, Operate WRSS Raw Water System.
- TO-320-012, Operate WRSS Compressed Air System.
- ARP-T-331-00004, Respond to Alarms at Service Building 241-C-73

4.3 CONDITIONS AND ACTIONS

4.3.1 Perform a Pre-Job Briefing with all personnel involved in the performance of this operational test. The pre-job briefing is an ongoing activity that is to be performed by each Test Director.

4.3.2 All personnel to be involved with performance of this procedure have completed Attachment 3, OTP-320-005 SIGNATURE LOG. Signature Log completion is an ongoing requirement for each individual that becomes involved in the performance of this operational test.

4.3.3 Electrical circuit breakers and disconnects associated with In-Tank Imaging System operation are positioned per Attachment 4, OTP-320-005 ELECTRICAL LINEUP, or as directed by Test Director.

5/14/98

Test Director Signature/Date

4.3 CONDITIONS AND ACTIONS (Cont.)

4.3.4 Camera flush water supply is aligned for service as follows:

- Flush water isolation valve, HV-13657 (located near CAMERA WASHDOWN CONTROL BOX on FCU-1361) is CLOSED.

CAUTION

The valve lineup in Attachment 5 isolates all Process Building 241-C-91 raw water service except to the In-Tank Imaging System.

- Process Building 241-C-91 raw water valves are aligned per Attachment 5, OTP-320-005 RAW WATER VALVE LINEUP, or as directed by Test Director.
- Raw Water System is in service per TO-320-010, Operate WRSS Raw Water System.

5-14-98
Test Director Signature/Date

4.3.5 Camera purge and cooling/drying air supply is aligned for service as follows:

- Purge air isolation valve, HV-13676 (located near Hazardous Location Power Controller on FCU-1361) is CLOSED.

CAUTION

This valve lineup isolates all Process Building 241-C-91 compressed air service except to the In-Tank Imaging System.

- Process Building 241-C-91 instrument air valves are positioned per Attachment 6, OTP-320-005 COMPRESSED AIR VALVE LINEUP, or as directed by Test Director.
- Compressed Air System is in service per TO-320-012, Operate WRSS Compressed Air System.

5-14-98
Test Director Signature/Date

5.0 PROCEDURE

5.1 ALIGN CAMERA FLUSH WATER

NOTE: Raw water supply pressure up to PCV-13620 is 110 to 150 psig.

5.1.1 **ENSURE** shutoff valve, HV-1367, inside FCU-1361 CAMERA WASHDOWN CONTROL BOX is OPEN.

5.1.2 **ENSURE** flexible water line from CAMERA WASHDOWN CONTROL BOX is connected to Upper Junction Box connector on 241-C-106 Camera Riser #7.

5.1.3 **OPEN** flush water valve HV-13657, located adjacent to CAMERA WASHDOWN CONTROL BOX on FCU-1361.

5.1.4 Section 5.1 has been satisfactorily completed.

5/14/98
Test Director Signature/Date

5/14/98
Quality Control Inspector Signature/Date

5.2 ALIGN AND TEST CAMERA PURGE AIR

5.2.1 **VERIFY** instrument air pressure is 90 to 110 psig on Process Building 241-C-91 pressure indicator, PI-13628.

5-14-98
Test Director Signature/Date

5.2.2 **ENSURE** flexible air line from Hazardous Location Power Controller is connected to upper junction box connector on 241-C-106 Camera Riser #7.

5.2.3 **OPEN** instrument air valve HV-13676, located near Hazardous Location Power Controller on FCU-1361.

5.2.4 **ENSURE** Hazardous Location Power Controller power ON/OFF switch is ON.

5.2.5 **VERIFY** Hazardous Location Power Controller INLET PRESSURE gage reads 30 to 40 psig.

5-14-98
Test Director Signature/Date

5.2 ALIGN AND TEST CAMERA PURGE AIR (Cont.)

NOTE - The Hazardous Location Power Controller will not allow camera startup until 10 purge volumes have passed through it (19 to 25 minutes).

5.2.6 **START** camera purge time delay period by pressing Hazardous Location Power Controller RESET pushbutton.

5.2.7 **VERIFY** Hazardous Location Power Controller red ENERGIZED lamp comes on after a purge time delay of 19 to 25 minutes.

5-14-98
Test Director Signature/Date

5.2.8 **IF** red ENERGIZED lamp does NOT come on after 25 minutes, **PRESS** Hazardous Location Power Controller RESET pushbutton, **AND**

NOTIFY Test Director.

5.2.9 **CLOSE** instrument air valve HV-13676.

NOTE - Hazardous Location Power Controller trips camera system power when low differential pressure in the pan and tilt enclosure is detected, or when low air flow is detected.

5.2.10 **VERIFY** red ENERGIZED lamp turns off.

5-14-98
Test Director Signature/Date

5.2.11 **OPEN** instrument air valve HV-13676.

NOTE - Operations personnel may proceed to Control Room MO-211 and prepare for Section 5.3 during camera purge time delay period.

5.2.12 **PRESS** Hazardous Location Power Controller RESET pushbutton.

5.2.13 Section 5.2 has been satisfactorily completed.

5-14-98
Test Director Signature/Date

5-14-98
Quality Control Inspector Signature/Date

5.3 TEST MASTER CONTROL STATION

5.3.1 **START** Color Camera Control Unit, TV Monitor, and Video Tape Recorder:

NOTE - This component configuration requires the Video Tape Recorder to be energized and tuned to channel A1 for an image to be transmitted to the TV Monitor, even if recording is not desired.

5.3.1.1 **PRESS** POWER pushbuttons on COLOR CAMERA CONTROL UNIT, Video Tape Recorder, and TV Monitor (indicator lights come ON).

5.3.1.2 **ENSURE** that the Video Tape Recorder is tuned to channel A1.

5.3.1.3 **CHECK** that TV Monitor is operational and a color image is present.

5.3.2 **TEST** camera lighting system and variable controllers:

5.3.2.1 **PLACE** LIGHTS toggle switch to ON.

5.3.2.2 **HOLD** each dimmer toggle DOWN for 10 seconds **AND**

VERIFY that intensity of each viewing light gets brighter.

5-14-98
Test Director Signature/Date

5.3.2.3 **HOLD** each dimmer toggle UP for 10 seconds **AND**

VERIFY that intensity of each viewing light gets dimmer.

5-14-98
Test Director Signature/Date

5.3.2.4 **SET** lights to desired intensity for viewing.

NOTE - Camera position is mid-range when on-screen position display reads PAN-180.

5.3.3 **TEST** left and right camera pan response:

5.3.3.1 **PRESS** LEFT and then RIGHT pan control buttons **AND**

VERIFY TV Monitor image pans left and then right and on-screen camera position display decreases and increases.

5-14-98
Test Director Signature/Date

5.3.3.2 **RETURN** camera to a mid-range pan position as desired.

5.3 TEST MASTER CONTROL STATION (Cont.)

5.3.4 **TEST** camera pan rate speed:

5.3.4.1 **PRESS AND HOLD** LEFT pushbutton.

5.3.4.2 **PRESS** PAN speed toggle control upwards and then downwards **AND**

VERIFY that camera pan speed increases and then decreases.

5-14-98
Test Director Signature/Date

5.3.4.3 **RELEASE** LEFT pushbutton.

5.3.4.4 **PRESS AND HOLD** RIGHT pushbutton.

5.3.4.5 **PRESS** PAN speed toggle control upwards and then downwards **AND**

VERIFY that camera pan speed increases and then decreases.

5-14-98
Test Director Signature/Date

5.3.4.6 **RELEASE** RIGHT pushbutton.

5.3.5 **TEST** pan motor electronic brake:

5.3.5.1 **PRESS AND HOLD** LEFT pushbutton until camera stop is reached **AND**

VERIFY pan electronic brake holds by observing that TV Monitor image and on-screen camera position display remain stationary.

5-14-98
Test Director Signature/Date

5.3.5.2 **PRESS AND HOLD** RIGHT pushbutton until camera stop is reached **AND**

VERIFY pan electronic brake holds by observing that TV Monitor image and on-screen camera position display remain stationary.

5-14-98
Test Director Signature/Date

5.3.5.3 **RETURN** camera to a mid-range pan position as desired.

5.3 TEST MASTER CONTROL STATION (Cont.)

NOTE - Camera position is mid-range when on-screen position display reads TILT-090.

5.3.6 **TEST** up and down camera tilt response:

5.3.6.1 **PRESS** UP and then DOWN tilt control buttons.

5.3.6.2 **VERIFY** TV Monitor image moves up and then down and on-screen camera position display decreases and increases.

5-14-98
Test Director Signature/Date

5.3.6.3 **RETURN** camera to a mid-range tilt position as desired.

5.3.7 **TEST** camera tilt rate speed:

5.3.7.1 **PRESS AND HOLD** UP pushbutton.

5.3.7.2 **PRESS** TILT speed toggle control upwards and then downwards **AND** **VERIFY** that camera tilt speed increases and then decreases.

5-14-98
Test Director Signature/Date

5.3.7.3 **RELEASE** UP pushbutton.

5.3.7.4 **PRESS AND HOLD** DOWN pushbutton.

5.3.7.5 **HOLD** TILT speed toggle control upwards and then downwards **AND** **VERIFY** that camera tilt speed increases and then decreases.

5-14-98
Test Director Signature/Date

5.3.7.6 **RELEASE** DOWN pushbutton.

5.3 TEST MASTER CONTROL STATION (Cont.)

5.3.8 **TEST** tilt motor electronic brake:

5.3.8.1 **PRESS AND HOLD** UP pushbutton until camera stop is reached **AND**

VERIFY tilt electronic brake holds by observing that TV Monitor image and on-screen camera position display remain stationary.

5-14-98
Test Director Signature/Date

5.3.8.2 **PRESS AND HOLD** DOWN pushbutton until camera stop is reached **AND**

VERIFY tilt electronic brake holds by observing that TV Monitor image and on-screen camera position display remain stationary.

5-14-98
Test Director Signature/Date

5.3.8.3 **RETURN** camera to a mid-range tilt position as desired.

5.3.9 **TEST** camera viewing controls:

5.3.9.1 **PRESS** FOCUS toggle control towards NEAR and then FAR **AND**

VERIFY camera focus adjusts to bring closeup and then far away objects into focus by observing TV Monitor image.

5-14-98
Test Director Signature/Date

5.3.9.2 **PRESS** IRIS toggle control towards OPEN and then CLOSE **AND**

VERIFY that camera iris opens and then closes by observing that TV Monitor image gets brighter and then dimmer.

5-14-98
Test Director Signature/Date

5.3.9.3 **PRESS** ZOOM control towards TELEPHOTO and then WIDE **AND**

VERIFY that TV Monitor image gets larger and then smaller.

5-14-98
Test Director Signature/Date

5.3.9.4 **ADJUST** FOCUS, IRIS and ZOOM controls as desired for viewing.

5.3 TEST MASTER CONTROL STATION (Cont.)

5.3.10 **TEST** camera water washdown system:

NOTE - Lamps are rated for exposure to wash water while at full operating temperature; however, a brief cooldown period before washing is desirable to preserve component life.

5.3.10.1 **PLACE** LIGHTS toggle switch to OFF **AND**

ALLOW lamps to cool for 5 minutes.

NOTE - The water washdown system requires a minimum of 10 seconds to activate.

5.3.10.2 **PRESS AND HOLD** the HOLD TO WASH pushbutton.

5.3.10.3 **PLACE** LIGHTS toggle switch to ON **AND**

VERIFY water washdown has activated by observing water spray on TV Monitor.

5-14-98

Test Director Signature/Date

5.3.10.4 **RELEASE** HOLD TO WASH button.

5.3.11 **TEST** Video Tape Recorder for recording and playback:

5.3.11.1 **ENSURE** S-VHS selector switch is set to ON.

5.3.11.2 **ENSURE** RECORDING SP/SLP switch is set to SP.

5.3.11.3 **PLACE** blank S-VHS format video tape into Video Tape Recorder.

5.3.11.4 **PRESS** REC button to begin recording.

5.3.11.5 **RECORD** a brief scene while panning and/or tilting camera viewing angle.

5.3.11.6 **PRESS** STOP button to end recording.

5.3.11.7 **PRESS** REW button to rewind video tape.

5.3.11.8 **PRESS** PLAY button to play video tape.

5.3 TEST MASTER CONTROL STATION (Cont.)

5.3.11.9 **VERIFY** TV Monitor image shifts to scene recorded in Step 5.3.11.5.

5-14-98
Test Director Signature/Date

5.3.11.10 **PRESS** REW button to rewind video tape.

5.3.11.11 **PRESS** EJECT button to remove video tape.

5.3.12 **PAN** north **AND TILT** up to minimize camera lens radiation exposure.

5.3.13 **PLACE** LIGHTS toggle switch to OFF.

5.3.14 Section 5.3 has been satisfactorily completed.

5-14-98
Test Director Signature/Date

5-14-98
Quality Control Inspector Signature/Date

5.4 TEST LOCAL CONTROL STATION

5.4.1 **START** COLOR CAMERA CONTROL UNIT and auxiliary TV Monitor:

5.4.1.1 **ENSURE** COLOR CAMERA CONTROL UNIT and auxiliary TV Monitor are properly connected.

5.4.1.2 **ENERGIZE** auxiliary TV Monitor **AND**

CHECK that a color image is present.

5.4.2 **TEST** camera lighting system and variable controllers:

5.4.2.1 **PLACE** LIGHTS toggle switch to ON.

5.4.2.2 **HOLD** each dimmer toggle down for about 10 seconds **AND**

VERIFY that intensity of each viewing light gets brighter.

K [illegible] 5-14-98
Test Director Signature/Date

5.4.2.3 **HOLD** each dimmer toggle up for about 10 seconds **AND**

VERIFY that intensity of each viewing light gets dimmer.

K [illegible] 5-14-98
Test Director Signature/Date

5.4.2.4 **SET** lights to desired intensity for viewing.

NOTE - On-screen camera position display does not read out at the Local Control Station. Camera position may be requested from the MO-211 Control Room Operator as required.

5.4.3 **TEST** left and right camera pan response:

5.4.3.1 **PRESS** LEFT and then RIGHT pan control buttons **AND**

VERIFY TV Monitor image pans left and then right.

K [illegible] 5-14-98
Test Director Signature/Date

5.4.3.2 **RETURN** camera to a mid-range pan position as desired.

5.4 TEST LOCAL CONTROL STATION (Cont.)

5.4.4 **TEST** camera pan rate speed:

5.4.4.1 **PRESS AND HOLD** LEFT pushbutton.

5.4.4.2 **PRESS** PAN speed toggle control upwards and then downwards **AND**

VERIFY that camera pan speed increases and then decreases.

5-14-98
Test Director Signature/Date

5.4.4.3 **RELEASE** LEFT pushbutton.

5.4.4.4 **PRESS AND HOLD** RIGHT pushbutton.

5.4.4.5 **PRESS** PAN speed toggle control upwards and then downwards **AND**

VERIFY that camera pan speed increases and then decreases.

5-14-98
Test Director Signature/Date

5.4.4.6 **RELEASE** RIGHT pushbutton.

5.4.5 **TEST** pan motor electronic brake:

5.4.5.1 **PRESS AND HOLD** LEFT pushbutton until camera stop is reached **AND**

VERIFY pan electronic brake holds by observing that TV Monitor image remains stationary.

5-14-98
Test Director Signature/Date

5.4.5.2 **PRESS AND HOLD** RIGHT pushbutton until camera stop is reached **AND**

VERIFY pan electronic brake holds by observing that TV Monitor image remains stationary.

5-14-98
Test Director Signature/Date

5.4.5.3 **RETURN** camera to a mid-range pan position as desired.

5.4 TEST LOCAL CONTROL STATION (Cont.)

NOTE - On-screen camera position display does not read out at the Local Control Station. Camera position may be requested from the MO-211 Control Room Operator as required.

5.4.6 **TEST** up and down camera tilt response:

5.4.6.1 **PRESS** UP and then DOWN tilt control buttons **AND**

VERIFY TV Monitor image moves up and then down.

5-14-98
Test Director Signature/Date

5.4.6.2 **RETURN** camera to a mid-range tilt position as desired.

5.4.7 **TEST** camera tilt rate speed:

5.4.7.1 **PRESS AND HOLD** UP pushbutton.

5.4.7.2 **PRESS** TILT speed toggle control upwards and then downwards **AND**

VERIFY that camera tilt speed increases and then decreases.

5-14-98
Test Director Signature/Date

5.4.7.3 **RELEASE** UP pushbutton.

5.4.7.4 **PRESS AND HOLD** DOWN pushbutton.

5.4.7.5 **HOLD** TILT speed toggle control upwards and then downwards **AND**

VERIFY that camera tilt speed increases and then decreases.

5-14-98
Test Director Signature/Date

5.4.7.6 **RELEASE** DOWN pushbutton.

5.4 TEST LOCAL CONTROL STATION (Cont.)

5.4.8 **TEST** tilt motor electronic brake:

5.4.8.1 **PRESS AND HOLD** UP pushbutton until camera stop is reached **AND**

VERIFY tilt electronic brake holds by observing that TV Monitor image remains stationary.

5-14-98
Test Director Signature/Date

5.4.8.2 **PRESS AND HOLD** DOWN pushbutton until camera stop is reached **AND**

VERIFY tilt electronic brake holds by observing that TV Monitor image remains stationary.

5-14-98
Test Director Signature/Date

5.4.8.3 **RETURN** camera to a mid-range tilt position as desired.

5.4.9 **TEST** camera viewing controls:

5.4.9.1 **PRESS** FOCUS toggle control towards NEAR and then FAR **AND**

VERIFY camera focus adjusts to bring closeup and then far away objects into focus by observing TV Monitor image.

5-14-98
Test Director Signature/Date

5.4.9.2 **PRESS** IRIS toggle control towards OPEN and then CLOSE **AND**

VERIFY that camera iris opens and then closes by observing that TV Monitor image gets brighter and then dimmer.

5-14-98
Test Director Signature/Date

5.4.9.3 **PRESS** ZOOM control towards TELEPHOTO and then WIDE **AND**

VERIFY that TV Monitor image gets larger and then smaller.

5-14-98
Test Director Signature/Date

5.4.9.4 **ADJUST** FOCUS, IRIS and ZOOM controls as desired for viewing.

5.4 TEST LOCAL CONTROL STATION (Cont.)

5.4.10 **TEST** camera water washdown system:

NOTE - Lamps are rated for exposure to wash water while at full operating temperature; however, a brief cooldown period before washing is desirable to preserve component life.

5.4.10.1 **PLACE** LIGHTS toggle switch to OFF **AND**

ALLOW lamps to cool for about 5 minutes.

NOTE - The water washdown system requires a minimum of 10 seconds to activate.

5.4.10.2 **PRESS AND HOLD** the HOLD TO WASH pushbutton.

5.4.10.3 **PLACE** LIGHTS toggle switch to ON **AND**

VERIFY water washdown has activated by observing water spray on TV Monitor.

5-14-98
Test Director Signature/Date

5.4.10.4 **RELEASE** HOLD TO WASH button.

5.4.11 **PAN** north **AND TILT** up to minimize camera lens radiation exposure.

5.4.12 **PLACE** LIGHTS toggle switch to OFF.

5.4.13 Section 5.4 has been satisfactorily completed.

5-14-98
Test Director Signature/Date

5-14-98
Quality Control Inspector Signature/Date

5.5 TEST CLOSEOUT

5.5.1 **DEPRESSURIZE** camera flush water supply.

5.5.1.1 **CLOSE** Process Building 241-C-91 Imaging System supply valve, HV-136108.

5.5.1.2 **PRESS AND HOLD** the HOLD TO WASH pushbutton for about 1 minute **AND**

OBSERVE pressure indicator on PCV-13620 to verify that the flush water line depressurizes.

5.5.1.3 **CLOSE** FCU-1361 flush water isolation valve HV-13657 (located near CAMERA WASHDOWN CONTROL BOX on FCU-1361).

5.5.2 **SHUT DOWN** Local Control Station equipment.

5.5.2.1 **DEENERGIZE** auxiliary TV Monitor.

5.5.2.2 **DISCONNECT** COLOR CAMERA CONTROL UNIT and Auxiliary TV Monitor.

NOTE - Duplex 15A GFCI receptacle on FCU-1361 (241-C-91, C106-PP1, breaker 9) is housed in a NEMA-4 weatherproof enclosure, and may be left energized for field use at the Test Director's discretion.

5.5.2.3 **POSITION** Process Building 241-C-91, C106-PP1 circuit breakers #6, IN-TANK CCTV FCU-1361, and #9, RECPT AT FCU-1361 to OFF.

5.5.3 **DEPRESSURIZE** camera purge air supply.

5.5.3.1 **CLOSE** Process Building 241-C-91 instrument air valve HV-1369.

5.5.3.2 **CLOSE** FCU-1361 instrument air valve HV-13676.

5.5.4 **SHUT DOWN** Master Control Station equipment.

5.5.4.1 **DEENERGIZE** COLOR CAMERA CONTROL UNIT, TV Monitor and Video Tape Recorder by pressing their respective POWER pushbuttons.

5.5.4.2 **POSITION** Control Room MO-211, PNL-MO211 circuit breaker #3, CP-02 IN TANK IMAGING RCPTS, to OFF.

5.5 TEST CLOSEOUT (Cont.)

5.5.5 Quality Control Inspector shall review completed test results for completeness and accuracy.

IF test documentation review is acceptable the Quality Control Inspector shall sign below.

5/14/98

Quality Control Signature Date

C.A. Sams QAE 5-14-98

5.5.6 All components and equipment are secure from testing. Testing is complete.

5-14-98

Test Director Signature/Date

ATTACHMENT 1 - OTP-320-005 TEST LOG

(This page may be reproduced as necessary)

PAGE 1 of 1

OTP TEST LOG		
Number	Date	Description
0815	5-14-98	Completed per JOB Brief
0944	5-14-98	Reset Hazardous Location Power Controller
1006:15	5-14-98	Hazardous Location Power controller
		Energized HV-13676 has packing leak
1046	5-14-98	Turned camera lights off for cooldown
1059	5-14-98	Completed Section 5.3
1254	5-14-98	Turned camera lights off for cooldown
1310	5-14-98	PDAH-13615 Raw water F.L Tec F-1361
		Press Diff High Alarmed During camera
		Wash OTP Exception 1
1337	5-14-98	Completed OTP
1355	6/25/98	Retested Camera/Air during OTP-320-004
		No Alarms Retest SAT

ATTACHMENT 2 - OTP-320-005 TEST EXCEPTION REPORT

(This page may be reproduced as necessary)

OTP step number: 5.4.10.c	OTP Exception Log Number: 1

Description of Exception: RAW WATER FILTER F-1361 PASS DIFF HIGH ALARMED DURING CAMERA WASH. PDISH-13615 (PDAH-13615) READ > 50 PSID.

Resolution of Exception: REPLACE FILTER AND RETEST

RETESTED WATER WASHDOWN OF CAMERA DURING OTP-320-004 6/25/98. RETEST COMPLETED SATISFACTORILY. .9 PSID

Date of Resolution:	6/25/98
Test Director signature:	
QA Engineer signature:	Charles G. Jones 6-29-98
Project Engineer signature:	

ATTACHMENT 3 - OTP-320-005 SIGNATURE LOG

All personnel participating in the performance of this operational test procedure shall enter their printed name, signature and initials below.

NAME (PRINT)	SIGNATURE	INITIALS
Jon Elliott	Jon Elliott	JE
M.C. Wingfield		MW
Brian Beku		BB
Jack Bottemiller		JB
AL Almquist		AA
DR Jones		DJ
CW Pleake	Charles W Pleake	CWP
Gregory J. Sullivan		GJS
Woodcock		MW
LT Pedersen		LTP
KJ Anderson		KJA
WH. CAWLEY	WH - Cawley	WHC.
Charles A. Sams		CAS 6-29-98 LMHC

ATTACHMENT 4 - OTP-320-005 ELECTRICAL LINEUP

DISCONNECT/BREAKER	LOCATION	POSITION	INITIAL	DATE
MCC-N1, 1FDR PROCESS BUILDING	Electrical Equipment Skid 241-C-51	ON		5/14/98
PNL-MO211, BKR #3 CP-02 IN TANK IMAGING RCPTS	Control Room MO-211	ON		5/14/98
DS-1, PROCESS BUILDING MAIN DISCONNECT SWITCH	Rack ER-1361	ON		5/14/98
SUPPLY-CB-01, PROCESS BLDG POWER PANEL PP-1	Rack ER-1361	ON		5/14/98
C106-PP1, PRIMARY MAIN	Process Building 241-C-91, Room 2	ON		5/14/98
C106-PP1, SECONDARY MAIN	Process Building 241-C-91, Room 2	ON		5/14/98
C106-PP1, BKR #5 INSTRUMENTATION	Process Building 241-C-91, Room 2	ON		5/14/98
C106-PP1, BKR #6 IN-TANK CCTV FCU-1361	Process Building 241-C-91, Room 2	ON		5/14/98
C106-PP1, BKR #9 RECPT AT FCU-1361	Process Building 241-C-91, Room 2	ON		5/14/98

ATTACHMENT 5 - OTP-320-005 RAW WATER VALVE LINEUP

VALVE	DESCRIPTION	POSITION	INITIAL	DATE
HV-13659	241-C-91 Bldg Iso	OPEN		5/14/98
HV-13694	Raw Water Drain	CLOSED		5/14/98
HV-13660	BP-1362 Inlet	OPEN		5/14/98
HV-13661	BP-1362 Outlet	OPEN		5/14/98
HV-136102	Hose Connect Iso	CLOSED		5/14/98
HV-136103	Seal Pot Fill	CLOSED		5/14/98
HV-13663	F-1361 Inlet	OPEN		5/14/98
HV-13699	PDISH-13615 Inlet	OPEN		5/14/98
HV-13698	PDISH-13615 Outlet	OPEN		5/14/98
HV-13664	F-1361 Outlet	OPEN		5/14/98
HV-13668	Hose Connect Iso	CLOSED		5/14/98
HV-13665	F-1362 Inlet	CLOSED		5/14/98
HV-136108	Imaging Sys Supply	OPEN		5/14/98

ATTACHMENT 6 - OTP-320-005 COMPRESSED AIR VALVE LINEUP

VALVE	DESCRIPTION	POSITION	INITIAL	DATE
HV-13687	241-C-91 Bldg Iso	OPEN	LSY	5/14/98
HV-13671	HV-13669 Iso	CLOSED	LSY	5/14/98
HV-13689	HV-13638 Iso	CLOSED	LSY	5/14/98
HV-13678	TK-1364 Inlet	CLOSED	LSY	5/14/98
HV-136158	Tank Press Iso	CLOSED	LSY	5/14/98
HV-13613	Vortex Iso	CLOSED	LSY	5/14/98
HV-1369	Imaging Sys Supply	OPEN	LSY	5/14/98
HV-13610	PI-13628 Iso	OPEN	LSY	5/14/98

ATTACHMENT 7 - OTP-320-005 ALARM RESPONSE

WHITE

RAW WATER FILTER F-1361 PRESS DIFF HIGH (PDAH-13615)

FACILITY: 241-C-91 Process Building

PANEL: ANN-1362

ALARM #: 3-4

SOURCE: PDISH-13615

SETPOINT: ≥ 30 in. wg

ALARM CLASS: Equipment Status

Alarm Description:	Differential pressure across Filter F-1361 is 30 in. wg or higher.
Automatic Action:	Activates MO-211 Control Room alarm, Cabinet CP-01, TANK 241-C-106 HVAC SYSTEM TROUBLE (XA-1368).
Operator Actions:	[1] **CHECK** differential pressure indication on PDISH-13615. [2] **IF** indication ≥ 30 in. wg, **CHECK** Filter F-1361 for leakage, or noticeable signs of plugging or clogging. [3] **NOTIFY** Shift Manager of findings.
Possible Causes:	1. Filter becoming plugged. 2. Instrument malfunction.
References:	H-2-818561-3 & -5, H-2-818603-6 TO-320-010

ATTACHMENT 7 - OTP-320-005 ALARM RESPONSE (Cont.)

FACILITY: MO-211 Control Room

CABINET: CP-01

PANEL: ANN-1361

ALARM #: 3-3

SOURCE: See Alarm Inputs Below

SETPOINT: N/A

ALARM CLASS: Equipment Status

WHITE

TANK 241-C-106
HVAC SYSTEM
TROUBLE
(XA-1368)

Alarm Description: Trouble with Process Building 241-C-91 HVAC System equipment.

Operator Actions:

[1] **NOTIFY** Shift Manager.

[2] **CHECK** Process Building 241-C-91 Room 2, Instrument Enclosure IE-1361, Annunciator ANN-1362 alarms.

[3] **NOTIFY** Shift Manager of findings.

Possible Causes:

1. Equipment becoming plugged
2. Equipment malfunction
3. Instrument malfunction
4. Power loss
5. Maintenance work

References: H-2-818561, H-2-818601, H-2-818603
TO-320-010, TO-320-012

Alarm Inputs:

IAH-13635	LAH-1369	PDAH-13611	RAH-1361	TAH-13620
	LAL-1368	PDAH-13612	RXA-1361	TAH-13621
	LAL-1369	PDAH-13613	RXA-1361	TAH-13622
		PDAH-13614		TAH-13623
		PDAH-13615		TAH-13624
				TAH-13625
				TAL-13623
				TAL-13624

ATTACHMENT 7 - OTP-320-005 ALARM RESPONSE (Cont.)

FACILITY: MO-211 Control Room

CABINET: CP-01

PANEL: ANN-1361

ALARM #: 6-1

SOURCE: LDS-1365

SETPOINT: N/A

WHITE

C-FARM SVCE BLDG LEAK DETECTED (LDA-1365A)

ALARM CLASS: Plant Stability

Alarm Description:	Service Building 241-C-73 Backflow Preventer BP-1361 is leaking.
Automatic Action:	Tank Monitor And Control System (TMACS) alarm is also activated.
Operator Actions:	[1] **NOTIFY** Shift Manager **AND** CASS/TMACS Operator. [2] **DETERMINE** if raw water is leaking in Building 241-C-73. [3] **PERFORM** actions required in ARP-T-331-00004, Respond to Alarms at Service Building 241-C-73.
Possible Causes:	1. Faulty, leaking backflow preventer 3. Broken pipe, leaking fitting 2. Faulty sensor, instrument malfunction
References:	H-2-818562, H-2-818601, H-2-818675, H-2-818677 TO-320-010

ATTACHMENT 7 - OTP-320-005 ALARM RESPONSE (Cont.)

FACILITY: MO-211 Control Room

CABINET: CP-01

PANEL: ANN-1361

ALARM #: 6-2

SOURCE: See Alarm Inputs below

SETPOINT: N/A

ALARM CLASS: Plant Stability

WHITE

C-FARM SVCE BLDG AIR & WATER SYS TROUBLE (XA-1367)

Alarm Description: Equipment trouble in Service Building 241-C-73.

Operator Actions:

[1] **NOTIFY** Shift Manager.

[2] **CHECK** Service Building 241-C-73, Annunciator ANN-1364 alarm indications.

[3] **RESPOND** to alarms at Air and Water Service Building 241-C-73 per ARP-T-331-00004.

Possible Causes:

1. Compressor CPR-1361 trouble
2. Air dryer D-1361 trouble
3. Plugged filter
4. Raw water strainer F-1363 becoming plugged
5. Building temperature high or low
6. Instrument malfunction

References: H-2-818562, H-2-818601, H-2-818675
TO-320-010, TO-320-012

Alarm Inputs: PAL-1364, PDAH-1365, TAH-13617, TAL-13617, XA-1363

PROCEDURE HISTORY SIGNATURE SHEET

RAW WATER USAGE DATA SHEET*

DATA SHEET 3

NOTE - One data sheet is to be used for each water usage activity.

Date 5-14-98 Time 1423

Tank farm area in which water is to be used: C-FARM

Description of water usage: FLUSH/WASH EQUIPMENT + LINES

Approximate amount of water needed: 75 GALLONS Leakage amount: 0

Where will this water drain: 241-C-106

If water drains to a single shell tank, approvals are required and documented below.

( ) Routine water usage for contamination control and construction support.

( ) Routine water addition to Tank C-106 using procedure TO-350-200 or Waste Retrieval Sluicing System HVAC procedure ATP-320-0012.

( ) Process memo issued by Tank Farm Systems Engineering authorizing water additions to support jet pump startup, or water addition authorized by procedure. 500 GALLON LIMIT

28-97-7238 OTP-320-005
Procedure Number or Process Memo Number

(X) If usage does not meet the above criteria, the following approvals are required prior to water usage.

Manager, Tank Farm Systems Engineering - Date 5-14-98

Manager, Tank Farm Operations - Date 5/14/98

Functional Test

Water meter functioning properly?
Yes[X] No[ ]

	Meter Readings
Final Reading	~~26.8~~ 28.1
Beginning Reading	~~28.1~~ 26.8
Actual Volume Used	1.3 gals

Water Meter Functional Verification Method DIGITAL INDICATION

Operator's Initials CWP

TFO Shift Manager Review 5-14-98