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Project Title/Work Order Acceptance/Operational Test Procedure 241-AN-107 Video Camera System		Date Nov. 9, 1994
		EDT No. 601311
		ECN No.

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OSTI (2)	L8-07	1			

2. To: (Receiving Organization) Distribution	3. From: (Originating Organization) Surveillance Systems Engineering/7CF80	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: 241-AN-107 Video Camera System	6. Cog. Engr.: LT Pedersen	7. Purchase Order No.: N/A
8. Originator Remarks: ETN-94-0079  For Approval		9. Equip./Component No.: N/A
		10. System/Bldg./Facility: 241-AN-107
11. Receiver Remarks:		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date:

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-WM-OTP-165	All	0	Acceptance/Operational Test Procedure 241-AN-107 Video Camera System	SQ	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	4. Review	1. Approved	4. Reviewed no/comment	
	2. Release	5. Post-Review	2. Approved w/comment	5. Reviewed w/comment	
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**Document Number:** WHC-SD-WM-OTP-165, REV.0

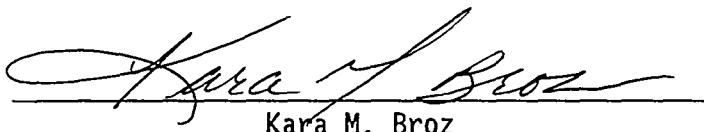
**Document Title:** Acceptance\Operational Test Procedure 241-AN-107  
Video Camera System

**Release Date:** November 18, 1994

**This document was reviewed following the  
procedures described in WHC-CM-3-4 and is:**

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November 18, 1994

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# SUPPORTING DOCUMENT

1. Total Pages 21

2. Title

Acceptance\Operational Test Procedure 241-AN-107 Video Camera System

3. Number

WHC-SD-WM-OTP-165

4. Rev No.

0

5. Key Words

Tank 241-AN-107  
Video Camera System  
Acceptance Test  
Operational Test  
Caustic Addition Project  
*KMB 11/18/94*

**APPROVED FOR  
PUBLIC RELEASE**

6. Author

Name: LT Pedersen

*[Signature]*  
Signature

Organization/Charge Code 7CF80/N2056

7. Abstract

This procedure describes and documents the acceptance and operational testing of the 241-AN-107 Video Camera System. This camera system will be installed in tank 241-AN-107 to monitor the Caustic Addition Project.

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## **ACCEPTANCE/OPERATIONAL TEST PROCEDURE 241-AN-107 VIDEO CAMERA SYSTEM**

### **1.0 PURPOSE**

This procedure will document the satisfactory operation of the 241-AN-107 Video Camera System. The camera assembly, including camera mast, pan-and-tilt unit, camera, and lights, will be installed in Tank 241-AN-107 to monitor activities during the Caustic Addition Project. See Figure 1 for a diagram of the camera assembly.

The testing portions of this procedure are performed in three separate sections (6.0, 7.0, and 11.0) identified below:

- Section 6.0 (Shop Test) will be performed in the 306 Building following shipment of the 241-AN-107 Video Camera System from the manufacturer to WHC. All components of the camera system, including the camera assembly, controllers, lights, monitor, video tape recorders, cables, video micrometer, and character generator will be assembled and tested. The camera assembly will be lifted with a 306 Building overhead crane by qualified facility personnel. The shop test will be performed while the assembly is suspended from the crane.
- Section 7.0 (Acceptance Test) will be performed at the 200 East Area at the 241-AN Tank Farm following installation of the master control station components, cables, and local interface panels. The camera assembly will be lifted by a mobile crane in accordance with an approved installation procedure. The acceptance test will be performed while the camera assembly is suspended from the crane prior to installation into tank 241-AN-107.
- Section 11.0 (Operational Test) is performed at the 200 East Area at the 241-AN Tank Farm following installation of the camera assembly into tank 241-AN-107.

### **2.0 TEST OBJECTIVES**

The objective of this procedure is to demonstrate and document the acceptance and operability of the 241-AN-107 camera system. The camera focus, zoom, and iris remote controls will be functionally tested. The resolution and color rendition of the camera will be verified using standard reference charts. The pan-and-tilt unit will be tested for required ranges of motion, and the camera lights will be functionally tested.

The master control station equipment, including the monitor, VCRs, printer, character generator, and video micrometer will be set up and performance tested in accordance

with original equipment manufacturer's specifications. The accuracy of the video micrometer to measure objects in the range of 0.25" to 6" will be verified.

The gas drying distribution system will be tested to ensure that a drying gas can be flowed over the camera and lens in the event that condensation forms on these components. This test will be performed by attaching the gas input connector, located in the upper junction box, to a pressurized gas supply and verifying that the check valve, located in the camera housing, opens to exhaust the compressed gas.

The 241-AN-107 camera system will also be qualified in accordance with WHC-SD-GN-PROC-20003. This qualification procedure assures acceptable resolution of the camera imaging components utilizing the camera system lights. A Surveillance Systems Engineering Test Engineer qualified in accordance with WHC-SD-GN-PROC-20002 will perform the camera system qualification test.

### 3.0 REFERENCES

H-2-85259	Caustic Addition Project ECN-702914 ECN-702915
WHC-SD-GN-PROC-20002,	"Qualification of Surveillance Systems Engineering CCTV Operators"
WHC-SD-GN-PROC-20003,	"Qualification of CCTV Systems"

### 4.0 RESPONSIBILITIES

#### 4.1 SURVEILLANCE SYSTEMS ENGINEERING

A Surveillance Systems Engineering (SSE) Test Engineer shall be responsible for the coordination, scheduling, performance and documentation of the test procedure.

#### 4.2 TEST WITNESSES

Tank Farm Operations and Quality Control will provide a representative to witness the satisfactory completion and approval of pertinent steps identified in this procedure. Witnesses are responsible for verifying that organizational requirements are met throughout the testing and documentation sequences of the procedure.



## 5.0 DOCUMENTATION

### 5.1 TEST RECORD

All personnel involved in the performance of this test including the SSE Test Engineer shall fill out a line in Section 9.0, Records.

Test results shall be recorded by the SSE Test Engineer. Test steps which require the recording of specific data shall be completed by the SSE Test Engineer. The signature(s) of the person(s) accepting the test sections will be entered in the appropriate place following the test section indicating compliance with the stated requirements or the successful completion of the given test steps. Unacceptable conditions or readings are to be recorded in Section 8.0, Exceptions.

The SSE Test Engineer will maintain a chronological test log documenting when various phases of the test are conducted and any pertinent information not recorded in the test procedure.

### 5.2 EXCEPTIONS

Exceptions by step number, and other notes, are to be recorded in Section 8.0. This section must be dispositioned (including the generation of any required ECNs) and signed off prior to final ATP/OTP acceptance. If no exceptions are encountered, this section may be so noted and closed out with the required signatures.

### 5.3 TEST EXECUTION RECORD

The final acceptance of the ATP/OTP results shall be indicated by signatures listed under Section 10.0, Test Execution Record.

**NOTE:** During the performance of this test, errors in text may be encountered which require correction/adjustment to complete the test. The correction is to be noted in the ATP/OTP and listed as an exception in Section 8.0.

## 6.0 PREREQUISITES

NOTE: During the shop test the SSE Test Engineer will verify each camera control is satisfactory and will initial in the space provided to signify completion. The SSE Test Engineer will also sign off in the space provided at the end of each section. The sequence of steps in the shop test section may be altered at the discretion of the SSE Test Engineer.

### 6.1 SHOP TEST MASTER CONTROL STATION EQUIPMENT

6.1.1 Set up S-VHS color monitor in accordance with owner's operation manual instructions. Monitor a scene from the test location and verify image quality.

SSE Engineer Initials\_\_\_\_\_

6.1.2 Set up S-VHS video tape recorder in accordance with owner's operation manual instructions. Record a scene from the test location and verify playback.

SSE Engineer Initials\_\_\_\_\_

6.1.3 Set up S-VHS time lapse video tape recorder in accordance with owner's operation manual instructions. Record a scene from the test location and verify playback.

SSE Engineer Initials\_\_\_\_\_

6.1.4 Set up the color printer in accordance with owner's operation manual instructions. Print a scene from the test location and verify image quality.

SSE Engineer Initials\_\_\_\_\_

6.1.5 Set up the character generator in accordance with owner's operation manual instructions. Verify that alpha and numeric characters and pointers can be placed on-screen.

SSE Engineer Initials\_\_\_\_\_

6.1.6 Set up the video micrometer in accordance with owner's operation manual instructions. Set camera zoom as recommended in video micrometer manual. Check that the camera is focused. Verify that video micrometer can measure the image of objects in the range of 0.25" to 6" with an accuracy of  $\pm 2\%$ .

SSE Engineer Initials \_\_\_\_\_

6.1.7 Steps 6.1.1 through 6.1.6 are complete.

SSE Test Engineer: \_\_\_\_\_/Date \_\_\_\_\_

## 6.2 SHOP TEST CAMERA

6.2.1 Using the camera zoom control, manipulate the zoom control to wide angle. Verify the zoom moves towards wide when operated towards "wide".

SSE Engineer Initials \_\_\_\_\_

6.2.2 Manipulate the zoom control to telephoto. Verify the zoom moves towards the telephoto when operated towards "tele".

SSE Engineer Initials \_\_\_\_\_

6.2.3 Using the camera iris control, manipulate the iris control to open. Verify that the iris opens when operated towards "open".

SSE Engineer Initials \_\_\_\_\_

6.2.4 Manipulate the iris control to close. Verify that the iris closes when operated towards "close".

SSE Engineer Initials \_\_\_\_\_

6.2.5 Using remote camera focus control, manipulate the focus control to far. Verify that the focus adjusts to far when operated towards "far".

SSE Engineer Initials \_\_\_\_\_

6.2.6 Manipulate the focus control to near. Verify that the focus adjusts to near when operated towards "near".

SSE Engineer Initials \_\_\_\_\_

6.2.7 Verify that camera will focus on objects in the range of 3 feet to infinity.

SSE Engineer Initials\_\_\_\_\_

6.2.8 Focus the camera on a standard resolution chart. Adjust the lens or camera distance so that the border of the chart just fills the monitor display. Observe the converging black and white lines near the center of the chart. Determine the point at which the individual vertical lines become indistinct. The numbers at the sides of the converging lines correspond to the number of TV lines resolved at that point. Record the number which corresponds to the locations where the vertical lines become indistinct.

NOTE: Horizontal resolution is expressed in terms of the vertical dimension of the picture. Therefore, the horizontal resolution number (measured by the vertical lines on the chart) must be multiplied by 4/3 (1.33) to obtain the actual number of resolvable horizontal lines.

Horizontal resolution number:\_\_\_\_\_

SSE Engineer Initials\_\_\_\_\_

6.2.9 Verify that the horizontal resolution equals or exceeds 460 TV lines.

SSE Engineer Initials\_\_\_\_\_

6.2.10 While the camera is focused on the standard resolution chart, verify that the picture is free of image defects such as ghost images, picture lag, distortion, hum, or smearing.

SSE Engineer Initials\_\_\_\_\_

6.2.11 Focus the camera on a standard color reference chart. Adjust the lens or camera distance so that the border of the chart just fills the monitor display. Simultaneously view the monitor and the chart. Verify colors are accurately rendered on the monitor display.

SSE Engineer Initials\_\_\_\_\_

6.2.12 Steps 6.2.1 through 6.2.11 are complete.

SSE Test Engineer:\_\_\_\_\_ /Date\_\_\_\_\_

**6.3 SHOP TEST PAN AND TILT**

6.3.1 Verify that the pan-and-tilt feedback potentiometers are operational and providing position information to the control monitor display.

SSE Engineer Initials\_\_\_\_\_

6.3.2 Using the tilt controls, position the camera to horizontal and tilt position display on monitor is 90°. Verify that the electronic brake holds.

SSE Engineer Initials\_\_\_\_\_

6.3.3 Using the pan controls, turn the camera until the pan position display on the monitor is 0°. Verify that the electronic brake holds.

SSE Engineer Initials\_\_\_\_\_

6.3.4 Pan the camera clockwise until the stop is reached. Record the pan position readout displayed on the monitor:\_\_\_\_\_.

SSE Engineer Initials\_\_\_\_\_

6.3.5 Pan the camera counter-clockwise until the stop is reached. Record the pan position readout displayed on the monitor:\_\_\_\_\_.

SSE Engineer Initials\_\_\_\_\_

6.3.6 Record the total camera panning capability:\_\_\_\_\_.

SSE Engineer Initials\_\_\_\_\_

6.3.7 Verify that camera is capable of panning a minimum of 350°.

SSE Engineer Initials\_\_\_\_\_

6.3.8 Using the tilt controls, position the camera to the vertical down position. Verify that the electronic brake holds. Record the tilt position readout displayed on the monitor:\_\_\_\_\_.

SSE Engineer Initials\_\_\_\_\_

6.3.9 Tilt the camera upward until the stop is reached. Verify that the electronic brake holds. Record the tilt position readout displayed on the monitor:

\_\_\_\_\_.

SSE Engineer Initials\_\_\_\_\_

6.3.10 Record the total camera tilting capability:\_\_\_\_\_.

SSE Engineer Initials\_\_\_\_\_

6.3.11 Verify that camera is capable of tilting a minimum of 120°.

SSE Engineer Initials\_\_\_\_\_

6.3.12 Steps 6.3.1 through 6.3.11 are complete.

SSE Test Engineer:\_\_\_\_\_ /Date\_\_\_\_\_

#### 6.4 SHOP TEST CONTROL STATIONS

NOTE: In this section it is not necessary to completely repeat the previous sections. The purpose of this section is to verify that the system controls function from the local control console as well as from the master control panel.

6.4.1 Verify that the lighting system is operable from the master control panel and from the local control console.

SSE Engineer Initials\_\_\_\_\_

6.4.2 Verify that camera controls for focus, zoom, and iris are operable from the master control panel and from the local control console.

SSE Engineer Initials\_\_\_\_\_

6.4.3 Verify that pan-and-tilt unit is operable from the master control panel and from the local control console.

SSE Engineer Initials\_\_\_\_\_

6.4.4 Attach the S-VHS output on the local control console to a S-VHS monitor utilizing a S-VHS video cable. Verify that the monitor displays a satisfactory color picture.

SSE Engineer Initials\_\_\_\_\_

6.4.5 Attach the NTSC output on the local control console to a composite monitor utilizing a coaxial video cable. Verify that the monitor displays a satisfactory color picture.

SSE Engineer Initials \_\_\_\_\_

6.4.6 Steps 6.4.1 through 6.4.5 are complete.

SSE Test Engineer: \_\_\_\_\_/Date \_\_\_\_\_

**6.5 SHOP TEST CABLING**

6.5.1 Verify that all cabling is operational.

SSE Engineer Initials \_\_\_\_\_

6.5.2 Step 6.5.1 is complete.

SSE Test Engineer: \_\_\_\_\_/Date \_\_\_\_\_

**6.6 SHOP TEST DRYING GAS DISTRIBUTION SYSTEM AND CHECK VALVE**

6.6.1 Set up camera system check valve as shown in Figure 2 and slowly pressurize the inlet side and record the pressure where bubbles are first noticed ("cracking" pressure).

Pressure: \_\_\_\_\_

SSE Engineer Initials \_\_\_\_\_

6.6.2 Verify that check valve "cracking" pressure is less than 3 PSI.

SSE Engineer Initials \_\_\_\_\_

6.6.3 Slowly decrease the inlet pressure and record the pressure where the bubbles stop.

Pressure: \_\_\_\_\_

SSE Engineer Initials \_\_\_\_\_

6.6.4 Verify that check valve closes before pressure decreases to 1 PSI.

SSE Engineer Initials \_\_\_\_\_

6.6.5 Steps 6.6.1 through 6.6.4 are complete.

SSE Test Engineer: \_\_\_\_\_/Date\_\_\_\_\_

**7.0 ACCEPTANCE TEST**

NOTE: During the acceptance test the SSE Test Engineer will verify each camera control is satisfactory and will initial in the space provided to signify completion. The SSE Test Engineer and witnesses will also sign off in the space provided at the end of each section. The sequence of steps in the acceptance test section may be altered at the discretion of the SSE Test Engineer.

**7.1 CAMERA SYSTEM CONTROL - MASTER CONTROL STATION**

NOTE: The Master Control Station is located in 241-AN-274 (Pump Control Skid).

7.1.1 Energize the monitor, video recorders, video printer, character generator, and video micrometer. Verify these components have power and are operational.

SSE Engineer Initials\_\_\_\_\_

7.1.2 Verify that the lighting system is operational and variable controllers are functioning.

SSE Engineer Initials\_\_\_\_\_

7.1.3 Using pan and tilt controls, pan in the clockwise direction until the stop is reached. Verify that the pan electronic brake holds.

SSE Engineer Initials\_\_\_\_\_

7.1.4 Pan in the opposite direction until the stop is reached. Verify that the pan electronic brake holds.

SSE Engineer Initials\_\_\_\_\_

7.1.5 Tilt the camera to the vertical down position. Verify that the electronic brake holds.

SSE Engineer Initials\_\_\_\_\_



7.1.6 Tilt camera upward until the stop is reached. Verify that the electronic brake holds.

SSE Engineer Initials\_\_\_\_\_

7.1.7 Manipulate the camera zoom control to wide angle. Verify zoom moves towards wide when operated towards "wide".

SSE Engineer Initials\_\_\_\_\_

7.1.8 Manipulate the camera zoom control to telephoto. Verify zoom moves towards telephoto when operated towards "tele".

SSE Engineer Initials\_\_\_\_\_

7.1.9 Manipulate the camera iris control to open. Verify that the iris opens when operated towards "open".

SSE Engineer Initials\_\_\_\_\_

7.1.10 Manipulate the camera iris control to close. Verify that the iris closes when operated towards "close".

SSE Engineer Initials\_\_\_\_\_

7.1.11 Manipulate the camera focus control to far. Verify that the focus adjusts to far when operated towards "far".

SSE Engineer Initials\_\_\_\_\_

7.1.12 Manipulate the focus control to near. Verify that the focus adjusts to near when operated towards "near".

SSE Engineer Initials\_\_\_\_\_

7.1.13 Steps 7.1.1 through 7.1.12 are complete

SSE Test Engineer: \_\_\_\_\_/Date \_\_\_\_\_

Operations: \_\_\_\_\_/Date \_\_\_\_\_

QC Representative: \_\_\_\_\_/Date \_\_\_\_\_

**7.2 CAMERA SYSTEM CONTROL - LOCAL CONTROL CONSOLE**

**NOTE:** The Local Control Console is located adjacent to Tank 241-AN-107, mounted to the Camera System Field Rack.

7.2.1 Attach an auxiliary monitor to the video output of the local control console. Verify that monitor is operational.

SSE Engineer Initials\_\_\_\_\_

7.2.2 Verify that the lighting system is operational and variable controllers are functioning.

SSE Engineer Initials\_\_\_\_\_

7.2.3 Using pan and tilt controls, pan in the clockwise direction until the stop is reached. Verify that the pan electronic brake holds.

SSE Engineer Initials\_\_\_\_\_

7.2.4 Pan in the opposite direction until the stop is reached. Verify that the pan electronic brake holds.

SSE Engineer Initials\_\_\_\_\_

7.2.5 Tilt the camera to the vertical down position. Verify that the electronic brake holds.

SSE Engineer Initials\_\_\_\_\_

7.2.6 Tilt camera upward until the stop is reached. Verify that the electronic brake holds.

SSE Engineer Initials\_\_\_\_\_

7.2.7 Manipulate the camera zoom control to wide angle. Verify zoom moves towards wide when operated towards "wide".

SSE Engineer Initials\_\_\_\_\_

7.2.8 Manipulate the camera zoom control to telephoto. Verify zoom moves towards telephoto when operated towards "tele".

SSE Engineer Initials\_\_\_\_\_

7.2.9 Manipulate the camera iris control to open. Verify that the iris opens when operated towards "open".

SSE Engineer Initials\_\_\_\_\_

7.2.10 Manipulate the camera iris control to close. Verify that the iris closes when operated towards "close".

SSE Engineer Initials\_\_\_\_\_

7.2.11 Manipulate the camera focus control to far. Verify that the focus adjusts to far when operated towards "far".

SSE Engineer Initials\_\_\_\_\_

7.2.12 Manipulate the focus control to near. Verify that the focus adjusts to near when operated towards "near".

SSE Engineer Initials\_\_\_\_\_

7.2.13 Steps 7.2.1 through 7.2.12 are complete

SSE Test Engineer: \_\_\_\_\_/Date \_\_\_\_\_

Operations: \_\_\_\_\_/Date \_\_\_\_\_

QC Representative: \_\_\_\_\_/Date \_\_\_\_\_



### 9.0 RECORDS

#### DATA/VERIFICATION LIST

NAME PRINT	NAME SIGN	INITIALS	POSITION	DATE

**10.0 TEST EXECUTION RECORD**

REFERENCE SECTION	ACCEPT / REJECT	REMARKS

**TEST WITNESSES:**

\_\_\_\_\_/\_\_\_\_\_  
 SSE Test Engineer / Date

\_\_\_\_\_/\_\_\_\_\_  
 QC Representative / Date

\_\_\_\_\_/\_\_\_\_\_  
 Tank Farm Operations / Date

**10.1 FINAL ACCEPTANCE**

Testing per this procedure is completed satisfactorily and the 241-AN-107 Video Camera System is ready for installation and service.

\_\_\_\_\_/\_\_\_\_\_  
 Tank Farm Manager / Date

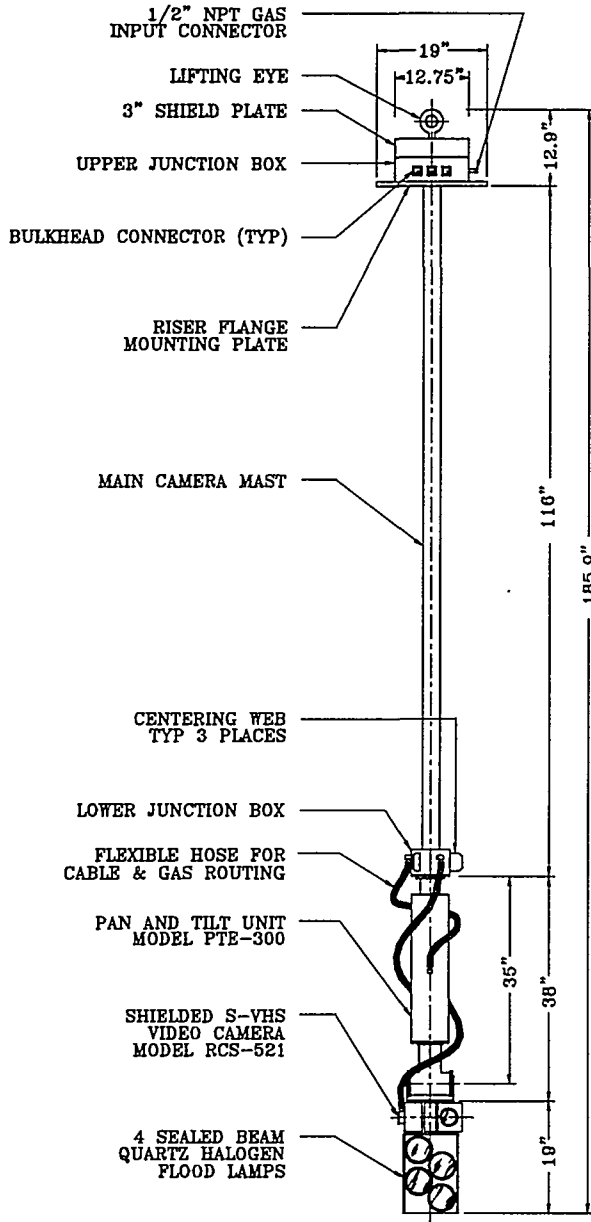
### 11.0 OPERATIONAL TEST

Repeat sections 7.1 and 7.2 of this procedure to ensure that the 241-AN-107 Video Camera System is operating satisfactorily after installation of the camera assembly into riser 7B. Any discrepancies found with the 241-AN-107 Video Camera System during this section of the ATP/OTP shall be noted below. Section 11.0 shall not be complete without the SSE Test Engineers signature.

NOTE: Testing of the quartz halogen lights used on the 241-AN-107 Camera Assembly determined that the rate of radiation induced "browning" is greatly reduced while the lights are energized. For this reason the lights should be left "on" at all times after installation, even when the camera system is not being used.

\_\_\_\_\_/\_\_\_\_\_  
 SSE Test Engineer                      /                      Date

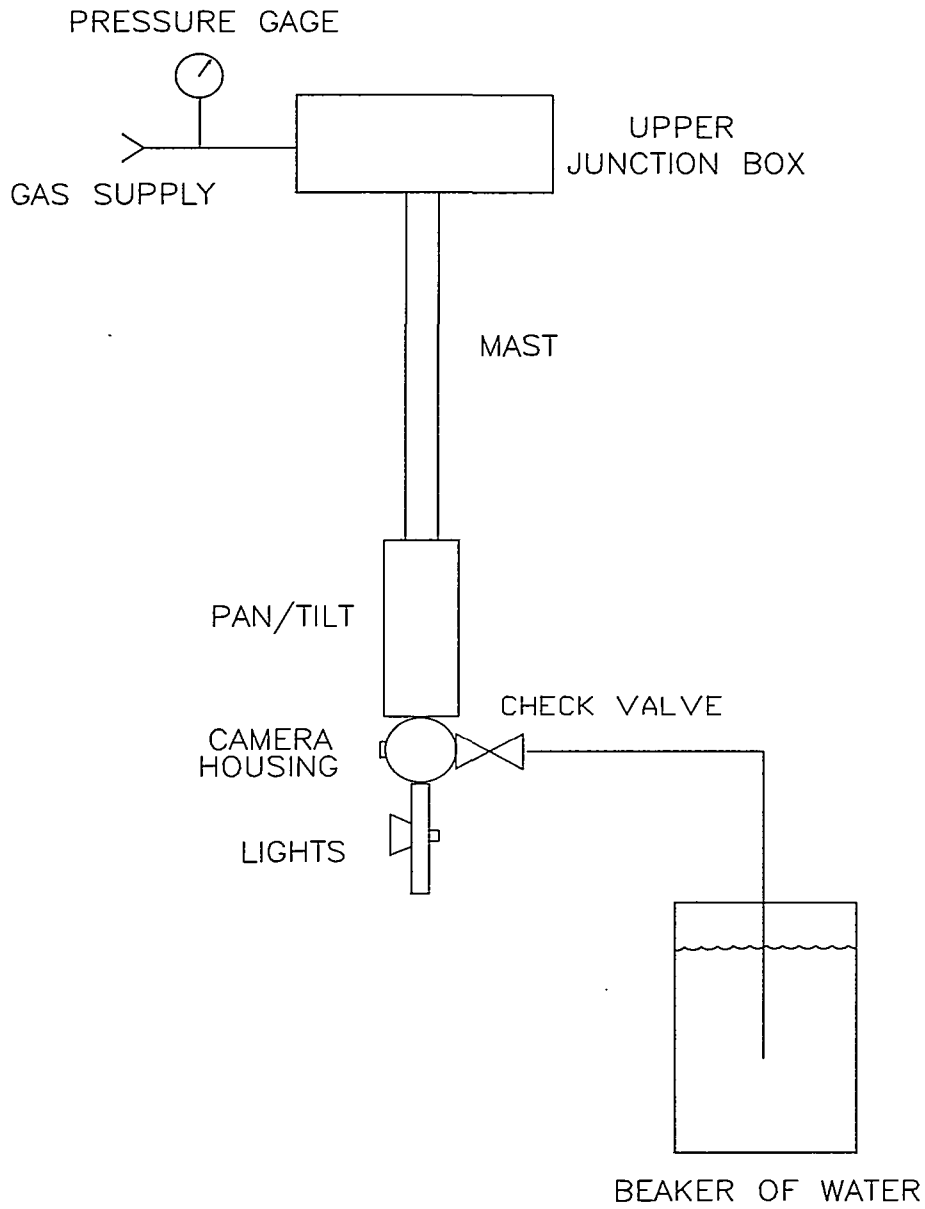
**FIGURE 1**



**241-AN-107 CAMERA ASSEMBLY**



**FIGURE 2**



**GAS DRYING SYSTEM AND CHECK VALVE TEST**