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ACCEPTANCE & OPERATIONAL TEST REPORT FOR TANK
241AN103 CAMERA & CAMERA PURGE CONTROL SYSTEM

Pages: 25

NOV 16 1995

ENGINEERING DATA TRANSMITTAL

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Reason	Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	Reason	Disp.
	1	Cog. Eng. JL Castleberry		11/16/95	N1-46						
	1	Cog. Mgr. TL Moore		11/16/95							
		QA									
		Safety									
		Env.									
	1	DB Smet		11-16-95	N1-46						
	1	RS Nicholson		11/16/95	1-67						

18. JL Castleberry Signature of EDT Originator Date 11/16/95	19. Authorized Representative for Receiving Organization Date 11/16/95	20. TL Moore Cognizant Manager Date 11-16-95	21. DOE APPROVAL (if required) Ctrl. No. <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/comments <input type="checkbox"/> Disapproved w/comments
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RELEASE AUTHORIZATION

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Document Title: Acceptance/Operational Test Report for Tank 241-AN-103 Camera and Camera Purge Control System

Release Date: 11/16/95

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:


Kara Broz


11/16/95

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SUPPORTING DOCUMENT

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241-AN-103 Camera and Camera Purge Control System

3. Number

WHC-SD-WM-OTR-181

4. Rev No.

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Name: JL Castleberry

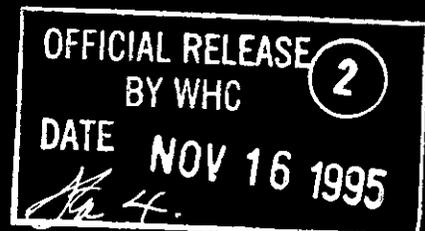

Signature

Organization/Charge Code 74770/N2089

7. Abstract

This Acceptance/Operational Test Report documents the successful acceptance and operability testing of the 241-AN-103 camera system and camera purge control system.

8. RELEASE STAMP



**WHC-SD-WM-OTR-181
REV. 0**

**ACCEPTANCE/OPERATIONAL TEST FOR
103-AN CAMERA AND CAMERA PURGE CONTROL
SYSTEM**

ETN-94-0171

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ACCEPTANCE/OPERATIONAL TEST PROCEDURE
103-AN TANK CAMERA PURGE SYSTEM
AND 103-AN VIDEO CAMERA SYSTEM

1.0 PURPOSE

This Acceptance/Operational Test Procedure (ATP/OTP) will document the satisfactory operation of the camera purge panel, purge control panel, color camera system and associated control components destined for installation. The final acceptance of the complete system will be performed in the field. The purge panel and purge control panel will be tested for its safety interlock which shuts down the camera and pan-and-tilt inside the tank vapor space during loss of purge pressure and that the correct purge volume exchanges are performed as required by NFPA 496. This procedure is separated into seven sections (6.1, 6.2, 6.3, 6.4, 6.5, 7.1, 7.2 and 7.3) identified below:

- 1) Section 6.1 is performed in the 400 Area on the AN-103 purge panel prior to delivery to the 306 building for system shop testing. This section involves the following:
 - Leak checking all fittings on the Purge Panel for leakage using a "Snoop" solution and resolving the leakage at a pressure of 10 ± 2 psig.
 - Purge panel instrumentation has been calibrated and calibration stickers have been affixed.
- 2) Sections 6.2, 6.3, 6.4, and 6.5 test the purge panel and purge control panel for pressure settings, time delay relay settings, camera interface and camera system operation. Sections 6.2, 6.3, 6.4, and 6.5 will be performed in the 306E building.
- 3) Section 7.1 verifies that PR-1, the regulator which maintains a positive pressure within the volume (camera and pneumatic lines), is properly set. In addition the yellow light (PRESSURIZED) (located on the Purge Control Panel) is verified to turn on at 10 ± 2 in. w.g. and after the time delay relays (TDR-1 and TDR-2) have timed out. Section 7.1 will be performed in the AN tank farm at 200 East Area.
- 4) Section 7.2 verifies that the purge cycle functions properly, the green light (PURGING) comes on, and that the correct flowrate is obtained to trip the flowswitch. Section 7.2 will be performed in the AN tank farm at 200 East Area.

- 5) Section 7.3 verifies that the pan and tilt, camera, associated controls and components operate correctly. This section also verifies that the safety interlock system operates correctly during loss of purge pressure. Section 7.3 will be performed in the AN tank farm at 200 East Area.

2.0 TEST OBJECTIVES

- 2.1 The objective of this procedure is to demonstrate and document the acceptance and operability of the 241-AN-103 camera system and Camera Purge System (CPS). 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.

3.0 REFERENCES

P&ID	H-14-020601
Electrical Drawings	H-14-030601
Mechanical Drawing	H-14-100156

4.0 RESPONSIBILITIES

4.1 SYSTEMS SURVEILLANCE ENGINEERING

A Systems Surveillance Engineering (SSE) Test Engineer shall be responsible for the coordination, scheduling, performance and documentation of this test procedure. The Purge System Engineer will be responsible for acceptance of section 6.1.

4.2 TEST WITNESSES

Tank Farm Operations and Quality Assurance will provide a representative to witness the satisfactory completion and approval of pertinent steps identified in this ATP/OTP.

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. Unless specific data is required, the initials of the person accepting the item will be entered in each test sheet blank to indicate compliance with the stated requirements or the successful completion of the given test step. Unacceptable conditions or readings are to be referred to Section 8.0, EXCEPTIONS. A complete working copy of this procedure and all exception records generated shall be maintained as permanent records in accordance with WHC-CM-3-5.

5.2 EXCEPTIONS

Exceptions by step number, and other notes are to be recorded under 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 shall be so noted and closed out with the required signatures. 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.

5.3 TEST EXECUTION RECORD

Approval of the ATP/OTP results shall be accepted by the Tank Farm Manager as indicated by signature in Section 10.0.

6.0 PREREQUISITES

6.1 TEST PURGE PANEL

NOTE: Sequence of steps in section 6.1 can be altered per the Purge System Engineer discretion.

6.1.1 Pressurize each leg (supply and return side) of the Purge Panel to approximately 10 psig and "Snoop" each fitting and resolve any leakage by tightening the fitting. If the leakage continues then replace the fitting. Purge System Engineer signoff below that the Purge Panel is acceptable.

Purge System
Engineer  Date 9/13/95

6.1.2 Purge System Engineer signoff below that the instrumentation listed below has been calibrated and a calibration sticker has been affixed.

- Pressure Switch Pt. No. H-14-100156-11 is set to 10 ± 2 in. w.g..
- A 4-20mA Calibration Curve performed on pressure transmitter Pt. No. H-14-100156-10.
- Pressure Gage, Pt. No. H-14-100156-14.
- Pressure Gage, Pt. No. H-14-100156-15.
- Flowmeter, Pt. No. H-14-100156-9.
- Flowswitch, Pt. No. H-14-100156-7 set to 1.5 cfm.

Purge System
Engineer  Date 9/13/95

6.1.3 Test Relief Valve, Pt. No. H-14-100156-62.

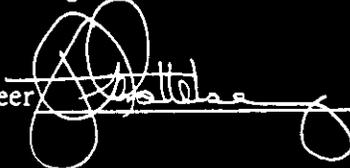
- A. Attach a hose or hard line to the pressure relief valve vent line and insert it into a beaker of water. (See Figure 1).
- B. With the relief valve installed on the purge panel, slowly supply an air or argon pressure of up to 20 ± 2 psig on the return side and record below the pressure where the bubbles are first noticed. Continue to increase pressure and record below the flow as read from the flowmeter at 20 ± 2 psig.

Pt. No. H-14-100156-62

Pressure: Value did not bubble at 20-22 psi. SEE EXCEPTION. JDC
Value bubbles at 25 psi. SEC. 8.0

Flow at 20 ± 2 psig: Unable to able to obtain flow rate. JDC

6.1.4 Purge System Engineer signoff below that Section 6.1 has been performed satisfactorily.

Purge System Engineer 

/Date 9/13/95

6.2 SHOP TEST - PURGE PANEL

NOTE: Sections 6.2, 6.3, 6.4, and 6.5 are performed in the 306E building.

- 6.2.1 Connect a full K-size N_2 bottle or dry air to the purge panel and 120 VAC power to the Purge Control Panel (PCP). Connect camera and lighting circuits to PCP switched power outlet.
- 6.2.2 Open the N_2 bottle or dry air supply valve and adjust PR-2 to 45 ± 5 psig.
- 6.2.3 Adjust PR-1 to 15 ± 3 in. w.g read off of pressure transmitter, H-14-100156-10. It may be necessary to open the calibration port valve, Pt. No. H-14-100156-20 to decrease pressure.

6.2.4 SSE Test Engineer signoff below that Section 6.2 has been performed satisfactorily.

SSE Test Engineer *[Signature]* /Date 9/14/95

6.3 SHOP TEST - PURGE CONTROL PANEL

NOTE: The volume of the camera housing, purge panel lines and the hoses is approximately 2.0 ft.³ [1.1 ft.³ (camera volume) + .16 ft.³ (purge panel lines volume) + .41 ft.³ (hose volume)]. Per NFPA 496 requirements, ten volumes of purge gas, 20 ft.³, must flow through the assembly. PR-2 will be adjusted so that the flowswitch is tripped at a min. flow of 1.5 cfm through the camera system. TDR-2 is adjusted to 14 minutes (20 ft.³/1.5 cfm) to flow 20 ft.³.

6.3.1 TDR-1 and TDR-2 will be adjusted to 5 minutes instead of 14 minutes to save purge gas. At the Purge Control Panel set the time delay relays (TDR 1 and TDR 2) to 5 minutes and turn the Control Switch (CS) to "Purge" and hold momentarily until the green light (PURGING) comes on indicating that the purge has just begun.

6.3.2 Signoff below that the green light comes "ON".

SSE Test Engineer *[Signature]* /Date 9/14/95

6.3.3 Slowly adjust the purge pressure at PR-2 to a flowrate of 1.5 - 2.0 cfm as read off of (H-14-100156-7), this will trip the flowswitch (H-14-100156-7).

6.3.4 Record the pressure, off of H-14-100156-14, and the flowrate, off of H-14-100156-9, and H-14-100156-7 below where the flowswitch trips.

Pressure (H-14-100156-14): 1.5 psi Flowrate (H-14-100156-9): 1 cfm

Flowrate (H-14-100156-7): 2 cfm

SSE Test Engineer *[Signature]* /Date 9/14/95

- 6.3.5 Verify the pan and tilt and camera control unit has been plugged into Purge Control Panel switched power outlet. Turn on the power switches to the pan and tilt and camera controls.
- 6.3.6 On the Purge Control Panel verify the yellow light (system pressurized above 10" w.g.) is "ON".
- 6.3.7 Upon completion of the purge cycle verify green light is "OFF".
- 6.3.8 Verify that power is being provided to the pan and tilt, and camera.
- 6.3.9 Verify that camera lights are operational.
- 6.3.10 Step 6.3 is accepted [Signature] SSE Test Engineer.

6.4 SHOP TEST- MASTER CONTROL STATION

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

SSE Engineer Initials [Signature]

- 6.4.2 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 [Signature]

- 6.4.3 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 [Signature]

- 6.4.4 Steps 6.4.1 through 6.4.3 are acceptable.

SSE Test Engineer [Signature] /Date 9/14/95

6.5 SHOP TEST - CAMERA AND PAN & TILT

NOTE: During this portion of the test the SSE Test Engineer shall verify each camera control is satisfactory and will then initial in the space provided for each step.

- 6.5.1 Using the remote pan and tilt controls, pan in the clockwise direction. Verify that the pan electronic break holds *PE*
- 6.5.2 Pan in the opposite direction. Verify that the pan electronic break holds *PE*. Verify that the panning operation has covered approximately 360°.
- 6.5.3 Tilt the camera to the extreme down position. Verify that the camera is pointing downward and that the electronic break holds *PE*.
- 6.5.4 Tilt camera up to the extreme upward position. Verify that the camera is approximately vertical and that the electronic break for the pan and tilt holds *PE*.
- 6.5.5 Using remote camera zoom control, manipulate the zoom control to wide angle. Verify the zoom moves towards wide and when operated towards "wide" *PE*
- 6.5.6 Manipulate the zoom control to telephoto. Verify the zoom moves towards the telephoto when operated towards "tele" *PE*
- 6.5.7 Using the remote camera iris control, manipulate the iris control to open. Verify that the iris opens when operated towards "open" *PE*
- 6.5.8 Manipulate the iris control to close. Verify that the iris closes when operated towards "close" *PE*
- 6.5.9 Using remote camera focus control, manipulate the focus control to far. Verify that the focus adjusts to far when operated towards "far" *PE*
- 6.5.10 Manipulate the focus control to near. Verify that the focus adjusts to near when operated towards "near" *PE*

6.5.11 Verify that camera will focus on object in the range of 3 feet to infinity.

SSE Engineer Initials

6.5.12 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: 470

SSE Engineer Initials

6.5.13 Verify the horizontal resolution equals or exceeds 400 TV lines.

SSE Engineer Initials

6.5.14 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

6.5.15 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

6.5.16 Steps 6.5.1 through 6.5.15 are acceptable.

SSE Test Engineer [Signature] / Date 9/14/75

7.0 ACCEPTANCE/OPERABILITY TEST

NOTE: Sections 7.1, 7.2, and 7.3 are performed in the 200 East Area at 241-AN Tank Farm.

7.1 PURGE PANEL ACCEPTANCE

7.1.1 Turn on breakers #1, #5, and #8 in the new distribution panel (EDS-DP-110) located inside the 241-AN-271 Instrument building.

7.1.2 Open and adjust PR-2 to 45 ± 5 psig.

7.1.3 Adjust PR-1 to 15 ± 3 in. w.g read off of pressure transmitter, H-14-100156-10. It may be necessary to open the calibration port valve, Pt. No. H-14-100156-20 (return side) to decrease pressure.

7.1.4 Step 7.1 is complete [Signature] SSE Test Engineer.

7.2 PURGE CONTROL PANEL ACCEPTANCE

NOTE: This portion of the test will be performed with the camera system outside the tank.

NOTE: The volume of the camera housing, purge panel lines and the hoses is approximately 2.0 ft.^3 [1.1 ft.^3 (camera volume) + $.16 \text{ ft.}^3$ (purge panel lines volume) + $.65 \text{ ft.}^3$ (hose volume)]. Per NFPA 496 requirements, ten volumes of purge gas, 20 ft.^3 , must flow through the assembly. PR-2 will be adjusted so that the flowswitch is tripped at a min. flow of 1.5 cfm through the camera system. TDR-2 is adjusted to 14 minutes ($20 \text{ ft.}^3/1.5 \text{ cfm}$) to flow 20 ft.^3 .

7.2.1 At the Purge Control Panel set the time delay relays (TDR-1 and TDR-2) to 14 minutes and turn the Control Switch (CS) to "Purge" and hold momentarily until the green light (Purge ON) comes on indicating that the purge has just begun.

7.2.2 Signoff below that the green light comes "ON".

OPS [Signature] /Date 10-19-95

SSE Test Engineer [Signature] /Date 10/19/95

7.2.3 Verify the flow rate is 2.0 CFM as obtained from step 6.3.4 from Pt. No. H-14-100156-7.

SSE Test Engineer [Signature] /Date 10/19/95

7.2.4 Record the pressure, off of Pt. No. H-14-100156-14, and the flowrate, off of Pt. No. H-14-100156-9 below.

Pressure/Flowrate 2 psi / 1 CFM

SSE Test Engineer [Signature] /Date 10/19/95

7.2.5 Plug pan and tilt and camera control unit into Purge Control Panel controlled power sources. Turn on the power switches to the pan and tilt and camera controls.

7.2.6 After the purge has completed its purge cycle verify green light is "OFF" and that power is being provided to the pan and tilt and camera.

7.2.7 Verify that camera lights are operational.

7.2.8 On the Purge Control Panel, located in the 241-AN-271 Instrument building, verify the yellow light (system pressurized above 10" w.g.) is "ON".

SSE Test Engineer [Signature] /Date 10/19/95

7.2.9 Step 7.2 is complete [Signature] SSE Test Engineer.

7.3 CAMERA AND PAN AND TILT ACCEPTANCE

NOTE: During this portion of the test the SSE Test Engineer shall verify each camera control is satisfactory and will then initial the space provided with each step.

7.3.12 Verify that there is a color image on the Video Camera System monitor located in the 241-AN-271 Instrument building. Verify that color image is acceptable per QC and Camera Cog. Engineer.

Paul M. Werner 110-19-95
QC /Date

[Signature] 110/19/95
SSE Test Engineer /Date

7.3.13 Turn off valve PR-2 and allow the gas to bleed off to the setpoint on PS (low pressure switch) 10 ± 2 in. w.g. Verify that power is no longer being supplied to the pan and tilt and camera. QC signoff below that power was no longer supplied to pan and tilt and camera at 10 ± 2 in. w.g.

Paul M. Werner 110-19-95
QC /Date

7.3.14 Step 7.3 is accepted [Signature] SSE Test Engineer.

8.0 EXCEPTIONS

ITEM	STEP	PAGE	DESCRIPTION/REASON	DISPOSITION/RESOLUTION
6.1	6.1.3	5	Relief valve Pt. No 62 did not break at 20±2 psi -	New valve springs have been ordered and will be replaced in field after installation. <i>9/13/95</i>
				"Accept as is", relief valve broke at 25 psi. This is acceptable per engineering and within the safety parameters of the system design. <i>11/15/95</i>

TEST APPROVED WITH EXCEPTIONS

[Signature]
SSE Test Engineer

[Signature] 11-15-95
Quality Control

[Signature] 11-15-95
Tank Farm Operations

10.0 TEST EXECUTION RECORD

REFERENCE SECTION	ACCEPT / REJECT	REMARKS
6.1	Accept	Relief valve springs will be replaced after installation. *
6.2	Accept	
6.3	Accept	
6.4	Accept	
6.5	Accept	
7.1	Accept	
7.2	Accept	
7.3	Accept	

TEST WITNESSES:

* Relief valve is acceptable per engineering. See note, Section 8, Pg. 14.

 11/15/95

 10/19/95
SSE Test Engineer / Date

 11-15-95
Quality Control / Date

 11-15-95
Tank Farm Operations / Date

10.1 FINAL ACCEPTANCE

Testing per this procedure is completed satisfactorily and the camera is ready for installation and service.

 11/15/95
East Tank Farm Manager / Date

11.0 POST INSTALLATION TEST

Repeat sections 7.1, 7.2, and 7.3 of this procedure to ensure that the Tank Camera Purge System and Video Camera System are operating satisfactorily after installation of the camera into the 20" multi-flange located in riser 5B. During the performance of sections 7.2 and 7.3, verify that the flowrate is the same flowrate from (H-14-100156-7) as was established in Step 6.3.4 of this procedure. Any discrepancies found with the Tank Camera Purge System and Video Camera System in accordance with this section of the ATP/OTP shall be noted below. Section 11.0 shall not be complete without SSE Test Engineers signature.

 10/19/95
SSE Test Engineer /Date

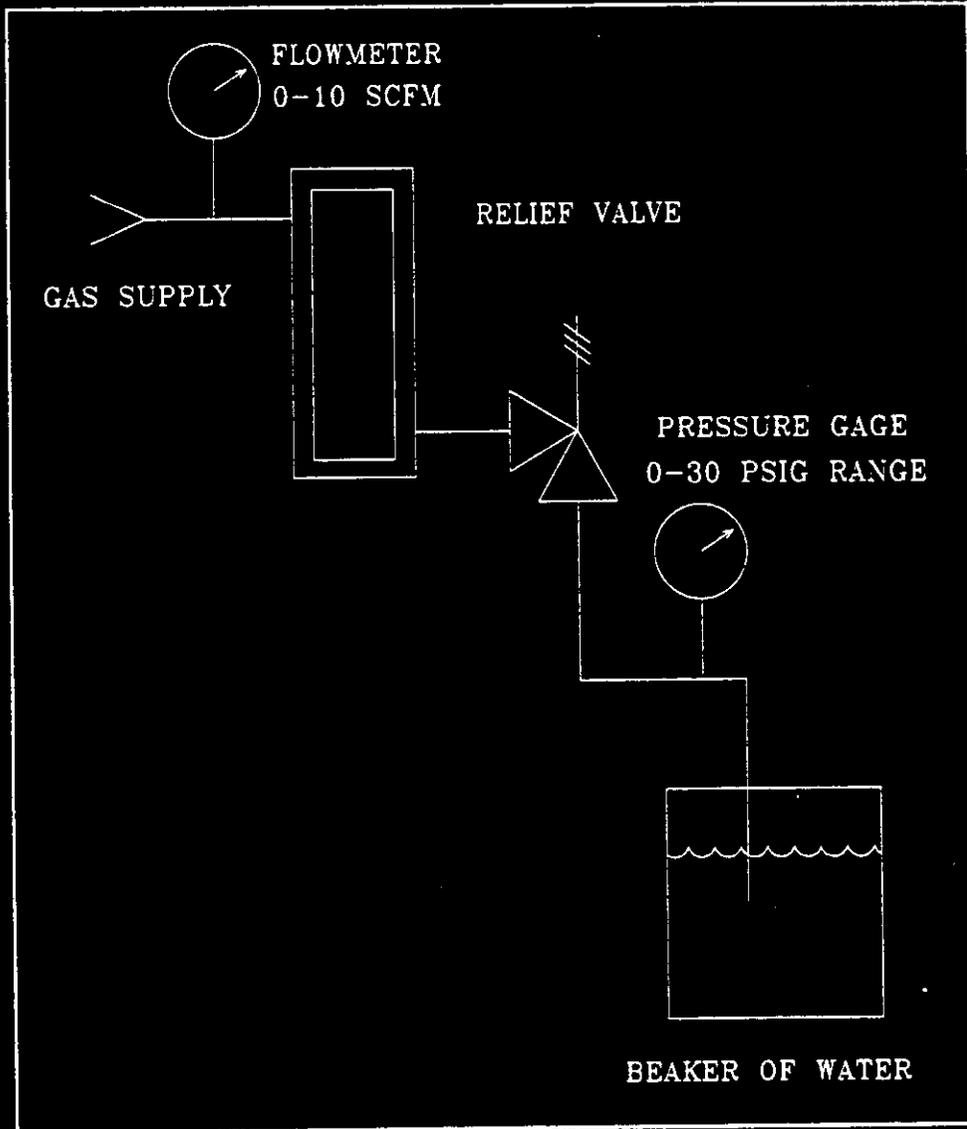


FIGURE 1

DISTRIBUTION SHEET

To Distribution	From Surveillance Systems Engineering/74770	Page 1 of 1
		Date November 16, 1995
Project Title/Work Order Acceptance/Operational Test Report for Tank 241-AN-103 Camera and Camera Purge Control System		EDT No. 601292
		ECN No.

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
JL Castleberry	N1-46	1			
JE Dunks	E6-27	1			
RA Harding	N1-46	1			
OB Haugen	S5-10	1			
R Leyva	N2-02	1			
TL Moore	H5-09	1			
RM Nelson	R3-01	1			
RS Nicholson	R1-67	1			
LT Pedersen	N1-46	1			
DB Smet	N1-46	1			
DW Vandyke	S5-03	1			
JJ Verderber	S1-57	1			