



Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

August 9, 2011

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 2
NRC Docket No. 50-391

Subject: Watts Bar Nuclear Plant (WBN) Unit 2 - Submittal of Pre-op Test Instruction

The following approved WBN Unit 2 Pre-op Test Instruction (PTI) is enclosed:

PTI NUMBER	Rev.	TITLE
2-PTI-072-02	0	Containment Spray System Air Flow Test

If you have any questions, please contact Pete Olson at (423) 365-3294.

Respectfully,

David Stinson
Watts Bar Unit 2 Vice President

Enclosure
cc (Enclosure):

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NRR

WATTS BAR NUCLEAR PLANT
UNIT 2 PREOPERATIONAL TEST

TITLE: CONTAINMENT SPRAY SYSTEM AIR FLOW TEST

Instruction No: 2-PTI-072-02

Revision No: 0000

PREPARED BY: Chris Bordreux Chris Bordreux DATE: 5-23-11
PRINT NAME / SIGNATURE

REVIEWED BY: Kurt McCormack / Kurt McCormack DATE: 5/23/11
PRINT NAME / SIGNATURE

INSTRUCTION APPROVAL

JTG MEETING No: 2-11-013

JTG CHAIRMAN: [Signature] DATE: 7/20/11

APPROVED BY: [Signature] DATE: 7/20/11
PREOPERATIONAL STARTUP MANAGER

TEST RESULTS APPROVAL

JTG MEETING No: _____

JTG CHAIRMAN: _____ DATE: _____

APPROVED BY: _____ DATE: _____
PREOPERATIONAL STARTUP MANAGER

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Revision Log

Revision or Change Number	Effective Date	Affected Page Numbers	Description of Revision/Change
0000	7/28/11	All	Initial Issue based on PTI-072-02, Rev 0.

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1.0 INTRODUCTION

1.1 TEST OBJECTIVES

This test provides detailed steps to verify the spray nozzles for the Residual Heat Removal and Containment Spray System function properly.

1.2 SCOPE

This test will demonstrate the capability of the spray headers and nozzles to function properly using compressed air at elevated temperature and an infrared camera to verify flow for the Unit 2 systems listed below:

- A. Containment Spray System Train A
- B. Containment Spray System Train B
- C. Residual Heat Removal System Train A
- D. Residual Heat Removal System Train B

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2.0 REFERENCES

2.1 PERFORMANCE REFERENCES

- A. SMP-7.0, WATTS BAR NUCLEAR PLANT UNIT 2 CONTROL OF CLEANNESS, LAYUP AND FLUSHING.
- B. SMP-9.0, WATTS BAR NUCLEAR PLANT UNIT 2 CONDUCT OF TEST.
- C. NPG-SPP-18.4.6, CONTROL OF FIRE PROTECTION IMPAIRMENTS
- D. TI-31.07, INFRARED THERMOGRAPHY INSPECTIONS.
- E. TI-64, BREACHING HAZARD BARRIERS.
- F. TI-65, BREACHING THE CONTAINMENT ANNULUS ABSCE OR CONTROL BUILDING PRESSURE BOUNDARIES.
- G. TVA Safety Manual, Procedure Number 705, COMPRESSED AIR.

2.2 DEVELOPMENTAL REFERENCES

- A. Final Safety Analysis Report (FSAR)
 - 1. FSAR-Amendment 104
 - a. Section 6.2.2
 - b. Table 14.2-1 Sheet 25 of 90, Containment Spray System Test Summary
- B. Drawings
 - 1. Flow Diagrams
 - a. 2-47W812-1, FLOW DIAGRAM CONTAINMENT SPRAY SYSTEM, Rev 3.
 - 2. Electrical
 - a. None

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2.2 DEVELOPMENTAL REFERENCES (continued)

3. Mechanical

- a. 47W437-4, MECHANICAL CONTAINMENT SPRAY SYSTEM PIPING, Rev 19.
- b. 47W437-5, MECHANICAL CONTAINMENT SPRAY SYSTEM PIPING, Rev 17.

4. Logical/Control

- a. None

5. Schematic Drawings

- a. 2-45W760-72-3, WIRING DIAGRAMS CONTAINMENT SPRAY SYSTEM SCHEMATIC DIAGRAM, Rev 0.
- b. 2-45W760-72-4, WIRING DIAGRAMS CONTAINMENT SPRAY SYSTEM SCHEMATIC DIAGRAM, Rev 0.

C. Other Documents

1. Test Scoping Documents

- a. 2-TSD-72-1, CONTAINMENT HEAT REMOVAL SPRAY SYSTEM, Rev 0

2. Surveillance Instructions

- a. 1-SI-72-1-A, AIR TEST OF CONTAINMENT SPRAY NOZZLES - TRAIN A, Rev 5.
- b. 1-SI-72-1-B, AIR TEST OF CONTAINMENT SPRAY NOZZLES - TRAIN B, Rev 5.
- c. 1-SI-74-1-A, AIR TEST OF RHR SPRAY NOZZLES TRAIN A, Rev 6.
- d. 1-SI-74-1-B, AIR TEST OF RHR SPRAY NOZZLES TRAIN B, Rev 6.

3. System Description

- a. WBN2-72-4001, CONTAINMENT HEAT REMOVAL SPRAY SYSTEM, Rev 1.

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2.2 DEVELOPMENTAL REFERENCES (continued)

4. System Operating Instructions

- a. SOI-30.02, CONTAINMENT PURGE SYSTEM OPERATING INSTRUCTION, Rev 21.

To be verified against 2-SOI-30.02, CONTAINMENT PURGE SYSTEM OPERATING INSTRUCTION [Later] in Appendix A.

5. Test Basis

- a. Memorandum (L27 820924 803), Containment Spray Nozzle Flow Verification - Thermography Method.

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3.0 PRECAUTIONS AND LIMITATIONS

- A. Standard precautions are contained in TVA Safety Manual, Procedure Number 705, AND are to be observed when working with compressed air.
- B. Steps may be repeated if all components cannot be tested in a step. However, if the test has been exited, prerequisite steps must be re-verified and a Chronological Test Log (CTL) entry made.
- C. All hoses (compressed air, etc.) are to be at least 7 feet off the floor where they cross walkways.
- D. Ensure there are no adverse effects to the operation of Unit 1 structures, systems, or components.
- E. The areas through which the air hoses are routed are to be posted with DANGER signs warning personnel of the heat hazard.
- F. Leather cut level 3 gloves or welding gloves shall be used if handling the hose while it is hot.
- G. Water flow through the following valves must **NOT** be permitted.
 - 2-FCV-72-2, CNTMT SPRAY HDR B ISOLATION VLV.
 - 2-FCV-72-39, CNTMT SPRAY HDR A ISOLATION VLV.
 - 2-FCV-72-40, RHR SPRAY HDR A ISOLATION VLV.
 - 2-FCV-72-41, RHR SPRAY HDR B ISOLATION VLV.
- H. This instruction involves discharging 1200 cfm of air into containment for several hours during testing. Necessary precautions to avoid overpressurization of containment are to be taken.
- I. It is recommended that all four spray headers be drained downstream of their isolation valves if water has been introduced to the piping. A clearance boundary shall be established to ensure that these isolation valves remain closed throughout the test.
- J. Doors which are part of the Auxiliary Building Secondary Containment Enclosure (ABSCE) or the Control Building pressure boundary may require a Breaching Permit if they must be held open to allow routing a test hose through them.

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3.0 PRECAUTIONS AND LIMITATIONS (continued)

- K. A Breaching Permit may be necessary if a test hose is routed through a penetration inside the Auxiliary Building.
- L. Exercise caution to minimize fall hazards when performing inspections from the polar crane wall and from areas near the ice condenser doors. Avoid walking on the ice condenser doors wherever possible. However, if it is necessary to walk on the ice condenser doors, use caution to avoid damaging insulation and insulation seals. Walking near the edge of the polar crane wall should be avoided.
- M. Test hose connections should be secured with lanyards to prevent whipping if the sections are inadvertently disconnected or separated.
- N. Only clean, oil free, and filtered air shall be used in the performance of this test.
- O. Discrepancies between component ID tags and the description in a procedure/instruction if the UNIDs match, exclusive of place keeping zeros and train designators (e.g.; 2-HS-31-468 vs. 2-HS-031-0468) and the noun description is sufficient to identify the component. This condition does not require a TDN in accordance SMP-14.0. If the component label needs to be changed, a Tag Request Form (TR Card) should be processed in accordance with TI-12.14. Make an entry in the Chronological Test Log (CTL) and continue testing.
- P. All open problems are to be tracked by a corrective action document and entered on the appropriate system punchlist.
- Q. Problems identified during the test shall be annotated on the CTL from SMP-9.0 including a description of the problem, the procedure step when/where the problem was identified, corrective action steps taken to resolve the problem, and the number of the corrective action document, if one was required.
- R. This test should be performed from the Polar Crane to minimize frequent relocation of the Infrared Viewer. After initial positioning of the viewer, rotation of the Polar Crane will allow complete viewing of the header.
- S. Regulation of air hose and spray header air pressure should be controlled at the temporary air compressor to minimize air hose pressure fluctuations.

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4.0 PREREQUISITE ACTIONS

NOTE

Prerequisite steps may be performed in any order unless otherwise stated and should be completed as close in time as practicable to the start of the instruction subsection to which they apply.

4.1 Preliminary Actions

- [1] IF equivalent compressor is **NOT** already available, **THEN**

INITIATE a direct charge Procurement Request to rent the following air compressor or equivalent: _____

Supplier: Atlas Copco Comptec, Inc.
2346 Mellon Ct.
Decatur, GA 30035

Air Compressor: Flow rate \geq 1200 cfm, Discharge pressure \geq 100 psig, Discharge temperature \sim 250°F, and 100% oil-free with relief capability.

Miscellaneous: Attachments and hoses to perform this test.

Lead Time: 5 - 7 weeks.

- [2] IF required, **THEN**

OBTAIN RWP. _____

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4.1 Preliminary Actions (continued)

[3] **OBTAIN** a clearance on the following components:

- A. 2-FCV-72-41, RHR SPRAY HDR B ISOLATION VLV. _____
- B. 2-FCV-72-40, RHR SPRAY HDR A ISOLATION VLV. _____
- C. 2-FCV-72-39, CNTMT SPRAY HDR A ISOLATION VLV. _____
- D. 2-FCV-72-2, CNTMT SPRAY HDR B ISOLATION VLV. _____
- E. 2-BKR-72-41, 480V RX MOV BD 2B1 BKR, Compartment 14D. _____
- F. 2-BKR-72-40, 480V RX MOV BD 2A1 BKR, Compartment 14A. _____
- G. 2-BKR-72-39, 480V RX MOV BD 2A1 BKR, Compartment 13E. _____
- H. 2-BKR-72-2, 480V RX MOV BD 2B1 BKR, Compartment 14A. _____

[4] **RECORD** LO/TO Number from 4.1[3]

LO/TO# _____

[5] **ENSURE** WO has been initiated and is ready to provide support such as removing blind flanges, opening sleeves, and re-foaming sleeves.

WO# _____

[6] **INITIATE** TI-65 breach permit request for breaching the ABSCE boundary through sleeve 0-SLV-304-A2088AM and 0-SLV-304-A2089AM on Elevation 737 of the Auxiliary Building. _____

[7] **INITIATE** Fire Protection Impairment Permit request for breaching Door A131 on Elevation 737 of the Aux Building. _____

[8] **VERIFY** the test/performance copy of this Preoperational Test Instruction (PTI) is the current revision including any change notices and as needed, each test person assisting in this test has the current revision including any change notices. _____

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4.1 Preliminary Actions (continued)

- [9] **OBTAIN** copies of the applicable forms from the latest revision of SMP-9.0, **AND**

ATTACH to this PTI for use during the performance of this PTI. _____

- [10] **ENSURE** changes to the references listed on "Test Procedure and Instruction Reference Review", Appendix A, have been reviewed, and determined NOT to adversely affect the test performance. _____

- [11] **VERIFY** current revisions and change paper for referenced drawings has been reviewed and determined NOT to adversely affect the test performance, **AND**

ATTACH documentation of current drawing revision numbers and change paper that were reviewed to the data package. _____

- [12] **EVALUATE** items on Open Watts Bar Integrated Task Equipment List (WITEL), **AND**

ENSURE that they will NOT adversely affect the test performance.

[12.1] Subsection 6.1 _____

[12.2] Subsection 6.2 _____

[12.3] Subsection 6.3 _____

[12.4] Subsection 6.4 _____

- [13] **ENSURE** required Component Testing has been completed prior to start of test.

[13.1] Subsection 6.1 _____

[13.2] Subsection 6.2 _____

[13.3] Subsection 6.3 _____

[13.4] Subsection 6.4 _____

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4.1 Preliminary Actions (continued)

- [14] **ENSURE** outstanding Design Change Notices (DCN's), Engineering Document Construction Release (EDCR's) or Temporary Alterations (TA's) do NOT adversely impact testing, **AND**

ATTACH documentation of DCN's, EDCR's and TA's that were reviewed to the data package. _____

- [15] **ENSURE** a review of outstanding Clearances has been coordinated with Operations for impact to the test performance, **AND**

RECORD in Appendix B, Temporary Condition Log if required. _____

- [16] **VERIFY** System cleanliness as required for the performance of this test has been completed in accordance with SMP-7.0. _____

- [17] **PERFORM** a pretest walkdown on equipment to be tested to ensure NO conditions exist that will impact test performance. _____

- [18] **ENSURE** components contained within the boundaries of this test are under the jurisdictional control of Preoperational Startup Engineering (PSE) and/or Plant Operations. _____

- [19] **CONDUCT** a pretest briefing with Test and Operations personnel in accordance with SMP-9.0 using information in Appendix I. _____

- [20] **ENSURE** that communications are available for areas where testing is to be conducted. _____

- [21] **ENSURE** that all piping supports required for testing are installed and adjusted as required. _____

- [22] **IF** polar crane is going to be moved during the test, **THEN**

ENSURE availability of the U2 Polar Crane and a crane operator. _____

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4.1 Preliminary Actions (continued)

[23] **IF** polar crane is not going to be moved during the test, **THEN**

OBTAIN a clearance on the crane and document below.

LO/TO# _____

[24] **ENSURE** the Unit 2 Containment Building Equipment Hatch at Elevation 757 is removed.

A. Subsection 6.1 _____

B. Subsection 6.2 _____

C. Subsection 6.3 _____

D. Subsection 6.4 _____

[25] **VERIFY** Measuring and Test Equipment (M&TE) required for test performance has been (as required) filled, vented, place in service and recorded on Measuring and Test Equipment Log.

A. Subsection 6.1 _____

B. Subsection 6.2 _____

C. Subsection 6.3 _____

D. Subsection 6.4 _____

[26] **VERIFY** Measuring and Test Equipment (M&TE) calibration due dates will support the completion of this test performance.

A. Subsection 6.1 _____

B. Subsection 6.2 _____

C. Subsection 6.3 _____

D. Subsection 6.4 _____

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4.2 Special Tools, Measuring and Test Equipment, Parts , and Supplies

CAUTION

If compressor furnished does NOT have relief capability, a temporary relief valve must be installed to ensure relief capability is provided.

[1] **OBTAIN** the following Special Test Equipment:

- A. Air compressor (Atlas Copco PTS or equivalent) which is capable of supplying at least 1200 cfm of air that is ≥ 100 psig, 250°F, and 100% oil-free, with necessary attachments and hoses, to enable a safe connection to the Containment Spray header air test lines.

[2] **OBTAIN** the following M&TE:

DESCRIPTION	MINIMUM RANGE	ACTUAL RANGE	ACCURACY	TVA ID NO.	CALIBRATION DUE DATE
Infrared Viewer: AGEMA Thermovision 870 or equivalent	N/A	N/A	N/A		N/A
Pressure Gauge	0 - 300 psig		$\pm 3\%$ full scale		
Temperature Gauge	0 - 300 °F		$\pm 1\%$ full scale		

[3] **FABRICATE OR PURCHASE** a test manifold, complete with five isolation valves and a pressure gauge test connection, to receive one supply hose from the compressor and to be able to discharge to any of the four ring header test valves.

[4] **IDENTIFY** and **LABEL** all five test manifold valves to reflect the supply valve and to which test valve and header each discharge valve supplies.

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4.2 Special Tools, Measuring and Test Equipment, Parts , and Supplies (continued)

[5] **ENSURE** the following test equipment is available:

- A. 500' of 3 inch diameter, 175 psi, 350°F air hose. _____
- B. One test valve, 3/4 inch or 1 inch. _____
- C. Drain hose, 3/4 inch or 1 inch diameter and length as necessary. _____

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4.3 Field Preparations

- [1] **PERFORM** the valve lineup listed in Appendix C _____
- [2] **ENSURE** an acceptable drainage container/drain is available
for the drain hose installed in step 4.3[3]. _____

NOTE

Only one drain assembly will be used during this test. It should be installed on whatever Section is currently being performed, removed under the step text for the Section, and re-installed as a field preparation for the next Section being performed.

- [3] **ENSURE** the pipe caps have been removed for the following
drain valves, **AND**
- INSTALL** TDA-1, TEMPORARY DRAIN ASSEMBLY, at the
spray header low point drain valve similar to the shown in
Appendix L.
- A. Subsection 6.1, 2-DRV-72-570, CNTMT SPRAY HEADER
A TEST DRAIN. _____
- B. Subsection 6.2, 2-DRV-72-569, CNTMT SPRAY HEADER
B TEST DRAIN. _____
- C. Subsection 6.3, 2-DRV-72-572, RHR SPRAY HEADER A
TEST DRAIN. _____
- D. Subsection 6.4, 2-DRV-72-571, RHR SPRAY HEADER B
TEST DRAIN. _____

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4.3 Field Preparations (continued)

[4] **ENSURE** scaffolding is erected to provide access to the spray header air test connections.

A. Subsection 6.1, 2-TV-72-544, CNTMT SPRAY HDR A AIR TEST CONNECTION. _____

B. Subsection 6.2, 2-TV-72-545, CNTMT SPRAY HDR B AIR TEST CONNECTION. _____

C. Subsection 6.3, 2-TV-72-558, RHR SPRAY HDR A AIR TEST CONNECTION. _____

D. Subsection 6.4, 2-TV-72-559, RHR SPRAY HDR B AIR TEST CONNECTION. _____

[5] **VERIFY** air compressor, attachments, and hoses are on-site AND available for use. _____

[6] **ENSURE** a final filter and dryer/moisture separator is installed prior to air test connections. _____

[7] **ENSURE** TI-65 breach permit for Auxiliary Building sleeve 0-SLV-304-A2088AM and 0-SLV-304-A2089AM and Fire Protection Impairment Permit have been approved. _____

[8] **VERIFY** air compressor will operate. _____

[9] **ENSURE** a safety relief valve has been set to 135 to 140 psig using a calibrated pressure gauge. _____

[10] **TEST** air compressor relief valve operation. _____

[11] **OPEN** Auxiliary Building sleeve 0-SLV-304-A2088AM and 0-SLV-304-A2089AM for routing of air hose AND **RECORD** WO used to perform work.

WO# _____

[12] **ASSEMBLE** test hose and connect to air compressor. _____

[13] **SECURE** test hose to prevent whipping. _____

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4.3 Field Preparations (continued)

[14] **ROUTE** test hose from compressor through sleeve 0-SLV-304-A2088AM and 0-SLV-304-A2089AM and through Door A131 to test manifold. _____

[15] **REFOAM** Auxiliary Building sleeve 0-SLV-304-A2088AM and 0-SLV-304-A2089AM as needed AND **RECORD** WO used to perform work. _____

WO# _____

[16] **INSTALL** M&TE temperature and pressure gauges on test manifold. _____

[17] **PERFORM** the following steps for Section 6.1:

[17.1] **ENSURE** the blind flange has been removed from 2-TV-72-544, CNTMT SPRAY HDR A AIR TEST CONNECTION AND **RECORD** WO used to perform work. _____

WO# _____

[17.2] **PERFORM** Appendix M until cleanliness has been verified for the temporary air hose. _____

[17.3] **ROUTE AND CONNECT** test hose from test manifold to test valve 2-TV-72-544, CNTMT SPRAY HDR A AIR TEST CONNECTION. _____

1st

CV

[17.4] **ESTABLISH** communications between test locations and Main Control Room as necessary. _____

[17.5] **ESTABLISH** communications between polar crane operator and infrared viewer operator as necessary. _____

[18] **PERFORM** the following steps for Section 6.2:

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4.3 Field Preparations (continued)

- [18.1] **ENSURE** the blind flange has been removed from 2-TV-72-545, CNTMT SPRAY HDR B AIR TEST CONNECTION.

WO# _____

- [18.2] **PERFORM** Appendix M until cleanliness has been verified for the temporary air hose.

- [18.3] **ROUTE AND CONNECT** test hose from test manifold to test valve 2-TV-72-545, CNTMT SPRAY HDR B AIR TEST CONNECTION.

1st

CV

- [18.4] **ESTABLISH** communications between test locations and Main Control Room as necessary.

- [18.5] **ESTABLISH** communications between polar crane operator and infrared viewer operator as necessary.

- [19] **PERFORM** the following steps for Section 6.3:

- [19.1] **ENSURE** the blind flange has been removed from 2-TV-72-558, RHR SPRAY HDR A AIR TEST CONNECTION.

WO# _____

- [19.2] **PERFORM** Appendix M until cleanliness has been verified for the temporary air hose.

- [19.3] **ROUTE AND CONNECT** test hose from test manifold to test valve 2-TV-72-558, RHR SPRAY HDR A AIR TEST CONNECTION.

1st

CV

- [19.4] **ESTABLISH** communications between test locations and Main Control Room as necessary.

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4.3 Field Preparations (continued)

[19.5] **ESTABLISH** communications between polar crane operator and infrared viewer operator as necessary. _____

[20] **PERFORM** the following steps for Section 6.4:

[20.1] **ENSURE** the blind flange has been removed from 2-TV-72-559, RHR SPRAY HDR B AIR TEST CONNECTION.

WO# _____

[20.2] **PERFORM** Appendix M until cleanliness has been verified for the temporary air hose. _____

[20.3] **ROUTE AND CONNECT** test hose from test manifold to test valve 2-TV-72-559, RHR SPRAY HDR B AIR TEST CONNECTION. _____

1st

CV

[20.4] **ESTABLISH** communications between test locations and Main Control Room as necessary. _____

[20.5] **ESTABLISH** communications between polar crane operator and infrared viewer operator as necessary. _____

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4.4 Approvals and Notifications

CAUTION

Overpressurization of containment could occur during this test. Steps to avoid such overpressurization must be taken. (Refer to Precaution and Limitation 3.0.H and 2-SOI-30.02 or equivalent draft.)

- [1] Prior to the start of the test, **OBTAIN** permission of the Preoperational Startup Manager to start the test.

Preoperational Startup Manager
Signature

Date

- [1] Prior to the start of the test, **OBTAIN** the Unit 2 Supervisor's (US/SRO) or Shift Manager's (SM) or Designee's (DS) authorization.

U2 US/SRO/SM/DS Signature

Date

- [2] Prior to the start of the test, **OBTAIN** the Unit 1 Supervisor's (US/SRO) or Shift Manager's (SM) or Designee's (DS) authorization.

U1 US/SRO/SM/DS Signature

Date

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5.0 ACCEPT CRITERIA

- [1] The Containment Spray system Train A spray header and nozzles function properly by detecting free flow of air through each spray nozzle.
(Step 6.1[14])
- [2] The Containment Spray system Train B spray header and nozzles function properly by detecting free flow of air through each spray nozzle.
(Step 6.2[14])
- [3] The Residual Heat Removal system Train A spray header and nozzles function properly by detecting free flow of air through each spray nozzle.
(Step 6.3[14])
- [4] The Residual Heat Removal system Train B spray header and nozzles function properly by detecting free flow of air through each spray nozzle.
(Step 6.4[14])

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6.0 PERFORMANCE

NOTES

- 1) Subsections 6.1, 6.2, 6.3, and 6.4 of this procedure may be performed in any order.
- 2) Once the temporary air compressor begins supplying hot air to the spray ring, 1 or 2 hours may elapse before the ring is sufficiently heated to provide clear definition of nozzle flow through the infrared viewer.

6.1 Containment Spray Header Train A Nozzle Air Test

- [1] **VERIFY** prerequisites listed in Section 4.0 for Subsection 6.1 have been completed. _____
- [2] **ENSURE** containment purge is in service per 2-SOI-30.02 or equivalent draft. _____
- [3] **ENSURE** the following test manifold valves are CLOSED:
 - A. Supply valve from compressor. _____
 - B. Discharge valve 1 to 2-TV-72-544, CS Header "A". _____
 - C. Discharge valve 2 to 2-TV-72-545, CS Header "B". _____
 - D. Discharge valve 3 to 2-TV-72-558, RHR Header "A". _____
 - E. Discharge valve 4 to 2-TV-72-559, RHR Header "B". _____
- [4] **ENSURE** 2-FCV-72-39, CNTMT SPRAY HDR A ISOLATION VLV, is CLOSED AND tagged. _____
- [5] **OPEN** the following valves:
 - A. 2-DRV-72-542, CNTMT SPRAY HEADER A TEST DRAIN. _____
 - B. 2-DRV-72-570, CNTMT SPRAY HEADER A TEST DRAIN. _____

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6.1 Containment Spray Header Train A Nozzle Air Test (continued)

- [6] **DRAIN** any residual water from the Containment Spray Header Train A low point using the TDA-1, TEMPORARY DRAIN ASSEMBLY, **THEN**
- CLOSE** TDA-1. _____
- [7] **OPEN** the following test manifold valves:
- A. Supply valve from compressor. _____
- B. Discharge valve 1 to 2-TV-72-544, CS Header "A". _____
- [8] **OPEN** Valve 2-TV-72-544, CNTMT SPRAY HDR A AIR TEST CONNECTION to allow flow through CS Header 2A. _____

CAUTIONS

- 1) Maximum Spray Header Design Pressure is 150 psig. Regulate temporary air compressor output to maintain spray header pressure less than or equal to 140 psig as read on the pressure gauge located at the test manifold.
- 2) Maximum Spray Header Design Temperature is 190°F. Monitor spray header temperature at the test manifold using a temperature gauge. Maintain compressor outlet temperature at this location less than or equal to 170°F. Air flow testing shall be suspended in the event this temperature limit cannot be maintained.

- [9] **START** the Temporary Air Compressor. _____
- [10] **MONITOR** pressure and temperature in the Containment Spray header piping using installed M&TE gauges. _____
- [11] **ADJUST** Temporary Air Compressor output to maintain pressure at test manifold less than or equal to 140 psig. _____
- [12] **IF** air being supplied to the containment spray header piping can NOT be maintained BELOW a pressure of 140 psig and a temperature of 170°F based on observed M&TE gauge readings, **THEN**
- STOP** the Temporary Air Compressor. _____

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6.1 Containment Spray Header Train A Nozzle Air Test (continued)

NOTES

- 1) The Containment Spray Ring Header 2A is the second ring out from the center of the Reactor Building (the outer ring of the two inner rings).
- 2) After initial heatup of the header and nozzles, all nozzles should glow in equal intensity. When scanning nozzles in the following step, nozzles which appear cold (**NOT** glowing) or of a lower intensity than adjacent nozzles shall be treated as suspect and identified as such by Test Deficiency Notice.

- [13] **SCAN** each Containment Spray Header Train A nozzle sequentially, using the infrared viewer, **AND**

RECORD results on Appendix E, Containment Spray Train A Nozzle Flow Verification. _____

- [14] **VERIFY** from Appendix E, Containment Spray Train A Nozzle Flow Verification, the Containment Spray Header Train A spray nozzles (263 total) freely flow air. **ACC CRIT 5.0**[1]. _____

- [15] **STOP** the Temporary Air Compressor. _____

- [16] **CLOSE** the following test manifold valves: _____

A. Supply valve from compressor. _____

B. Discharge valve 1 to 2-TV-72-544, CS Header "A". _____

- [17] **CLOSE** the following valves: _____

A. 2-TV-72-544, CNTMT SPRAY HDR A AIR TEST CONNECTION. _____

B. 2-DRV-72-542, CNTMT SPRAY HEADER A TEST DRAIN. _____

C. 2-DRV-72-570, CNTMT SPRAY HEADER A TEST DRAIN. _____

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6.1 Containment Spray Header Train A Nozzle Air Test (continued)

- [18] **REMOVE** the temporary drain assembly at Valve 2-DRV-72-570, CNTMT SPRAY HEADER A TEST DRAIN.

1st

CV

- [19] **DISCONNECT** the temporary air hose from the air test connection flange at Valve 2-TV-72-544, CNTMT SPRAY HDR A AIR TEST CONNECTION.

1st

CV

- [20] **COORDINATE** with U2 Ops to determine whether containment purge should be left in service.

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6.2 Containment Spray Header Train B Nozzle Air Test

- [1] **VERIFY** prerequisites listed in Section 4.0 for Subsection 6.2 have been completed. _____
- [2] **ENSURE** containment purge is in service per 2-SOI-30.02 or equivalent draft. _____
- [3] **ENSURE** the following test manifold valves are CLOSED:
 - A. Supply valve from compressor. _____
 - B. Discharge valve 1 to 2-TV-72-544, CS Header "A". _____
 - C. Discharge valve 2 to 2-TV-72-545, CS Header "B". _____
 - D. Discharge valve 3 to 2-TV-72-558, RHR Header "A". _____
 - E. Discharge valve 4 to 2-TV-72-559, RHR Header "B". _____
- [4] **ENSURE** 2-FCV-72-2, CNTMT SPRAY HDR B ISOLATION VLV, is CLOSED AND tagged. _____
- [5] **OPEN** the following valves:
 - A. 2-DRV-72-543, CNTMT SPRAY HEADER B TEST DRAIN. _____
 - B. 2-DRV-72-569, CNTMT SPRAY HEADER B TEST DRAIN. _____
- [6] **DRAIN** any residual water from the Containment Spray Header Train B low point using the TDA-1, TEMPORARY DRAIN ASSEMBLY, **THEN**

CLOSE TDA-1. _____
- [7] **OPEN** the following test manifold valves:
 - A. Supply valve from compressor. _____
 - B. Discharge valve 2 to 2-TV-72-545, CS Header "B". _____
- [8] **OPEN** Valve 2-TV-72-545, CNTMT SPRAY HDR B AIR TEST CONNECTION to allow flow through CS Header 2B. _____

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6.2 Containment Spray Header Train B Nozzle Air Test (continued)

CAUTIONS

- 1) Maximum Spray Header Design Pressure is 150 psig. Regulate temporary air compressor output to maintain spray header pressure less than or equal to 140 psig as read on the pressure gauge located at the test manifold.
- 2) Maximum Spray Header Design Temperature is 190°F. Monitor spray header temperature at the test manifold using a temperature gauge. Maintain compressor outlet temperature at this location less than or equal to 170°F. Air flow testing shall be suspended in the event this temperature limit cannot be maintained.

- [9] **START** the Temporary Air Compressor. _____
- [10] **MONITOR** pressure and temperature in the Containment Spray header piping using installed M&TE gauges. _____
- [11] **ADJUST** Temporary Air Compressor output to maintain pressure at test manifold less than or equal to 140 psig. _____
- [12] **IF** air being supplied to the containment spray header piping can NOT be maintained BELOW a pressure of 140 psig and a temperature of 170°F based on observed M&TE gauge readings, **THEN**
- STOP** the Temporary Air Compressor. _____

NOTES

- 1) The Containment Spray Ring Header 2B is the first ring out from the center of the Reactor Building (the inside ring of the two inner rings)
- 2) After initial heatup of the header and nozzles, all nozzles should glow in equal intensity. When scanning nozzles in the following step, nozzles which appear cold (**NOT** glowing) or of a lower intensity than adjacent nozzles shall be treated as suspect and identified as such by Test Deficiency Notice.

- [13] **SCAN** each Containment Spray Header Train B nozzle sequentially, using the infrared viewer, **AND**

RECORD results on Appendix F, Containment Spray Train B Nozzle Flow Verification. _____

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6.2 Containment Spray Header Train B Nozzle Air Test (continued)

- [14] **VERIFY** from Appendix F, Containment Spray Train B Nozzle Flow Verification, the Containment Spray Header Train B spray nozzles (263 total) freely flow air. **ACC CRIT 5.0[2]**.

- [15] **STOP** the Temporary Air Compressor.

- [16] **CLOSE** the following test manifold valves:

 - A. Supply valve from compressor. _____
 - B. Discharge valve 2 to 2-TV-72-545, CS Header "B". _____

- [17] **CLOSE** the following valves:

 - A. 2-TV-72-545, CNTMT SPRAY HDR B AIR TEST CONNECTION. _____
 - B. 2-DRV-72-543, CNTMT SPRAY HEADER B TEST DRAIN. _____
 - C. 2-DRV-72-569, CNTMT SPRAY HEADER B TEST DRAIN. _____

- [18] **REMOVE** the temporary drain assembly at Valve 2-DRV-72-569, CNTMT SPRAY HEADER B TEST DRAIN.

1st

CV
- [19] **DISCONNECT** the temporary air hose from the air test connection flange at Valve 2-TV-72-545, CNTMT SPRAY HDR B AIR TEST CONNECTION.

1st

CV
- [20] **COORDINATE** with U2 Ops to determine whether containment purge should be left in service.

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6.3 Residual Heat Removal (RHR) Spray Header Train A Nozzle Air Test

- [1] **VERIFY** prerequisites listed in Section 4.0 for Subsection 6.3 have been completed. _____
- [2] **ENSURE** containment purge is in service per 2-SOI-30.02 or equivalent draft. _____
- [3] **ENSURE** the following test manifold valves are CLOSED:
 - A. Supply valve from compressor. _____
 - B. Discharge valve 1 to 2-TV-72-544, CS Header "A". _____
 - C. Discharge valve 2 to 2-TV-72-545, CS Header "B". _____
 - D. Discharge valve 3 to 2-TV-72-558, RHR Header "A". _____
 - E. Discharge valve 4 to 2-TV-72-559, RHR Header "B". _____
- [4] **ENSURE** 2-FCV-72-40, RHR SPRAY HDR A ISOLATION VLV, is CLOSED AND tagged. _____
- [5] **OPEN** the following valves:
 - A. 2-DRV-72-556, RHR SPRAY HEADER A TEST DRAIN. _____
 - B. 2-DRV-72-572, RHR SPRAY HEADER A TEST DRAIN. _____
- [6] **DRAIN** any residual water from the Residual Heat Removal Header Train A low point using the TDA-1, TEMPORARY DRAIN ASSEMBLY, **THEN**

CLOSE TDA-1. _____
- [7] **OPEN** the following test manifold valves:
 - A. Supply valve from compressor. _____
 - B. Discharge valve 3 to 2-TV-72-558, RHR Header "A". _____
- [8] **OPEN** Valve 2-TV-72-558, RHR SPRAY HDR A AIR TEST CONNECTION to allow flow through RHR Header 2A. _____

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6.3 Residual Heat Removal (RHR) Spray Header Train A Nozzle Air Test (continued)

CAUTIONS

- 1) Maximum Spray Header Design Pressure is 150 psig. Regulate temporary air compressor output to maintain spray header pressure less than or equal to 140 psig as read on the pressure gauge located at the test manifold.
- 2) Maximum Spray Header Design Temperature is 190°F. Monitor spray header temperature at the test manifold using a temperature gauge. Maintain compressor outlet temperature at this location less than or equal to 170°F. Air flow testing shall be suspended in the event this temperature limit cannot be maintained.

- [9] **START** the Temporary Air Compressor. _____
- [10] **MONITOR** pressure and temperature in the Residual Heat Removal header piping using installed M&TE gauges. _____
- [11] **ADJUST** Temporary Air Compressor output to maintain pressure at test manifold less than or equal to 140 psig. _____
- [12] **IF** air being supplied to the residual heat removal header piping can NOT be maintained BELOW a pressure of 140 psig and a temperature of 170°F based on observed M&TE gauge readings, **THEN**
- STOP** the Temporary Air Compressor. _____

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6.3 Residual Heat Removal (RHR) Spray Header Train A Nozzle Air Test (continued)

NOTES

- 1) The RHR Spray Ring Header 2A is the last ring out from the center of the Reactor Building (the outer ring of the two outside rings).
- 2) After initial heatup of the header and nozzles, all nozzles should glow in equal intensity. When scanning nozzles in the following step, nozzles which appear cold (**NOT** glowing) or of a lower intensity than adjacent nozzles shall be treated as suspect and identified as such by Test Deficiency Notice.

- [13] **SCAN** each Residual Heat Removal Header Train A nozzle sequentially, using the infrared viewer, **AND**

RECORD results on Appendix G, Residual Heat Removal Train A Nozzle Flow Verification. _____

- [14] **VERIFY** from Appendix G, Residual Heat Removal Train A Nozzle Flow Verification, the Residual Heat Removal Header Train A spray nozzles (146 total) freely flow air. **ACC CRIT 5.0[3]**. _____

- [15] **STOP** the Temporary Air Compressor. _____

- [16] **CLOSE** the following test manifold valves: _____

A. Supply valve from compressor. _____

B. Discharge valve 3 to 2-TV-72-558, RHR Header "A". _____

- [17] **CLOSE** the following valves: _____

A. 2-TV-72-558, RHR SPRAY HDR A AIR TEST CONNECTION. _____

B. 2-DRV-72-556, RHR SPRAY HEADER A TEST DRAIN. _____

C. 2-DRV-72-572, RHR SPRAY HEADER A TEST DRAIN. _____

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6.3 Residual Heat Removal (RHR) Spray Header Train A Nozzle Air Test (continued)

- [18] **REMOVE** the temporary drain assembly at Valve 2-DRV-72-572, RHR SPRAY HEADER A TEST DRAIN.

1st

CV

- [19] **DISCONNECT** the temporary air hose from the air test connection flange at Valve 2-TV-72-558, RHR SPRAY HDR A AIR TEST CONNECTION.

1st

CV

- [20] **COORDINATE** with U2 Ops to determine whether containment purge should be left in service.

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6.4 Residual Heat Removal (RHR) Spray Header Train B Nozzle Air Test

- [1] **VERIFY** prerequisites listed in Section 4.0 for Subsection 6.4 have been completed. _____
- [2] **ENSURE** containment purge is in service per 2-SOI-30.02 or equivalent draft. _____
- [3] **ENSURE** the following test manifold valves are CLOSED:
 - A. Supply valve from compressor. _____
 - B. Discharge valve 1 to 2-TV-72-544, CS Header "A". _____
 - C. Discharge valve 2 to 2-TV-72-545, CS Header "B". _____
 - D. Discharge valve 3 to 2-TV-72-558, RHR Header "A". _____
 - E. Discharge valve 4 to 2-TV-72-559, RHR Header "B". _____
- [4] **ENSURE** 2-FCV-72-41, RHR SPRAY HDR B ISOLATION VLV, is CLOSED AND tagged. _____
- [5] **OPEN** the following valves:
 - A. 2-DRV-72-557, RHR SPRAY HEADER B TEST DRAIN. _____
 - B. 2-DRV-72-571, RHR SPRAY HEADER B TEST DRAIN. _____
- [6] **DRAIN** any residual water from the Residual Heat Removal Header Train A low point using the TDA-1, TEMPORARY DRAIN ASSEMBLY, **THEN**

CLOSE TDA-1. _____
- [7] **OPEN** the following test manifold valves:
 - A. Supply valve from compressor. _____
 - B. Discharge valve 4 to 2-TV-72-559, RHR Header "B". _____
- [8] **OPEN** Valve 2-TV-72-559, RHR SPRAY HDR B AIR TEST CONNECTION to allow flow through RHR Header 2B. _____

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6.4 Residual Heat Removal (RHR) Spray Header Train B Nozzle Air Test (continued)

CAUTIONS

- 1) Maximum Spray Header Design Pressure is 150 psig. Regulate temporary air compressor output to maintain spray header pressure less than or equal to 140 psig as read on the pressure gauge located at the test manifold.
- 2) Maximum Spray Header Design Temperature is 190°F. Monitor spray header temperature at the test manifold using a temperature gauge. Maintain compressor outlet temperature at this location less than or equal to 170°F. Air flow testing shall be suspended in the event this temperature limit cannot be maintained.

- [9] **START** the Temporary Air Compressor. _____
- [10] **MONITOR** pressure and temperature in the Residual Heat Removal header piping using installed M&TE gauges. _____
- [11] **ADJUST** Temporary Air Compressor output to maintain pressure at test manifold less than or equal to 140 psig. _____
- [12] **IF** air being supplied to the residual heat removal header piping can NOT be maintained BELOW a pressure of 140 psig and a temperature of 170°F based on observed M&TE gauge readings, **THEN**
- STOP** the Temporary Air Compressor. _____

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6.4 Residual Heat Removal (RHR) Spray Header Train B Nozzle Air Test (continued)

NOTES

- 1) The RHR Spray Ring Header 2B is the third ring out from the center of the Reactor Building (the inner ring of the two outside rings).
- 2) After initial heatup of the header and nozzles, all nozzles should glow in equal intensity. When scanning nozzles in the following step, nozzles which appear cold (**NOT** glowing) or of a lower intensity than adjacent nozzles shall be treated as suspect and identified as such by Test Deficiency Notice.

- [13] **SCAN** each Residual Heat Removal Header Train B nozzle sequentially, using the infrared viewer, **AND**

RECORD results on Appendix H, Residual Heat Removal Train B Nozzle Flow Verification. _____

- [14] **VERIFY** from Appendix H, Residual Heat Removal Train B Nozzle Flow Verification, the Residual Heat Removal Header Train B spray nozzles (146 total) freely flow air. **ACC CRIT 5.0[4].** _____

- [15] **STOP** the Temporary Air Compressor. _____

- [16] **CLOSE** the following test manifold valves:

- A. Supply valve from compressor. _____
- B. Discharge valve 4 to 2-TV-72-559, RHR Header "B". _____

- [17] **CLOSE** the following valves:

- A. 2-TV-72-559, RHR SPRAY HDR B AIR TEST CONNECTION. _____
- B. 2-DRV-72-557, RHR SPRAY HEADER B TEST DRAIN. _____
- C. 2-DRV-72-571, RHR SPRAY HEADER B TEST DRAIN. _____

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6.4 Residual Heat Removal (RHR) Spray Header Train B Nozzle Air Test (continued)

- [18] **REMOVE** the temporary drain assembly at Valve 2-DRV-72-571, RHR SPRAY HEADER B TEST DRAIN.

1st

CV

- [19] **DISCONNECT** the temporary air hose from the air test connection flange at Valve 2-TV-72-559, RHR SPRAY HDR B AIR TEST CONNECTION.

1st

CV

- [20] **COORDINATE** with U2 Ops to determine whether containment purge should be left in service.

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7.0 POST-PERFORMANCE ACTIVITIES

NOTE

Post-performance steps may be performed in any order after 7.0[1] is complete unless otherwise stated and should be completed as close in time as practicable to the end of the instruction performance

- [1] **BLEED** air pressure from manifold and temporary air lines. _____
- [2] **INSTALL** the blank flanges on the Containment Spray and Residual Heat Removal System spray header air test connections:
 - A. 2-TV-72-544, CNTMT SPRAY HDR A AIR TEST CONNECTION. _____

1st

CV
 - B. 2-TV-72-545, CNTMT SPRAY HDR B AIR TEST CONNECTION. _____

1st

CV
 - C. 2-TV-72-558, RHR SPRAY HDR A AIR TEST CONNECTION. _____

1st

CV
 - D. 2-TV-72-559, RHR SPRAY HDR B AIR TEST CONNECTION. _____

1st

CV

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7.0 POST-PERFORMANCE ACTIVITIES (continued)

[3] **INSTALL** the pipe caps on the spray header low point drain valves:

A. 2-DRV-72-570, CNTMT SPRAY HEADER A TEST DRAIN.

1st

CV

B. 2-DRV-72-569, CNTMT SPRAY HEADER B TEST DRAIN.

1st

CV

C. 2-DRV-72-572, RHR SPRAY HEADER A TEST DRAIN.

1st

CV

D. 2-DRV-72-571, RHR SPRAY HEADER B TEST DRAIN.

1st

CV

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7.0 POST-PERFORMANCE ACTIVITIES (continued)

[4] **ENSURE** Scaffolding had been removed from the spray header air test connection areas:

A. 2-TV-72-544, CNTMT SPRAY HDR A AIR TEST CONNECTION.

1st

CV

B. 2-TV-72-545, CNTMT SPRAY HDR B AIR TEST CONNECTION.

1st

CV

C. 2-TV-72-558, RHR SPRAY HDR A AIR TEST CONNECTION.

1st

CV

D. 2-TV-72-559, RHR SPRAY HDR B AIR TEST CONNECTION.

1st

CV

[5] **REMOVE** M&TE test gauges.

[6] **REMOVE** test air supply.

1st

CV

[7] **REFOAM** Auxiliary Building sleeve 0-SLV-304-A2088AM and 0-SLV-304-A2089AM AND **RECORD** WO used to perform work.

WO# _____

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7.0 POST-PERFORMANCE ACTIVITIES (continued)

- [8] **ENSURE** RADCON surveys hose AND
REMOVE hose from RCA is permissible, OR
STORE or **DISPOSE** per RADCON directions.

- [9] **ENSURE** Hold Orders have been released.

- [10] **CLOSE** out all breach permits, AND

ATTACH copies to this package.

- [11] **NOTIFY** the Unit 2 Supervisor (US/SRO) or Shift Manager (SM) or Designee (DS) of the test completion and System alignment.

U2 US/SRO/SM/DS Signature

Date

- [12] **NOTIFY** the Unit 1 Supervisor (US/SRO) or Shift Manager (SM) or Designee (DS) of the test completion and System alignment.

U1 US/SRO/SM/DS Signature

Date

- [13] **ENSURE** participants who initialed or signed steps in the prerequisite and instruction sections, test logs, or data sheets enter their initials and signature on Appendix D, Signature Log.

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8.0 RECORDS

A. QA Records

Completed Test Package

B. Non-QA Records

None

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8.0 RECORDS (continued)

Appendix A (Page 1 of 1)

TEST PROCEDURES/INSTRUCTIONS REFERENCE REVIEW

NOTES			
1) Additional copies of this table may be made as necessary.			
2) Initial and date indicates review has been completed for impact.			

PROCEDURE/ INSTRUCTION	REVISION/CHANGES	IMPACT Yes/No	INITIAL AND DATE. (N/A for no change)
FSAR SECTION 6.2.2			
FSAR Section 14.2 Sheet 25 of 90			
2-TSD-72-1			
WBN2-72-4001			
1-SI-72-1-A			
1-SI-72-1-B			
1-SI-74-1-A			
1-SI-74-1-B			
SOI-30.02			

Reviewed By: _____ / _____

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**Appendix C
(Page 1 of 1)
Valve Lineup**

NOMENCLATURE	LOCATION	POSITION	UNID	PERF INITIAL	VERIFIER INITIAL
BIT ROOM					
RHR SPRAY HEADER A TEST DRAIN	A11/V EL 721	CLOSED	2-DRV-72-556		CV
RHR SPRAY HEADER B TEST DRAIN	A11/V EL 722	CLOSED	2-DRV-72-557		CV
RHR SPRAY HEADER B TEST DRAIN	A11/V EL 722	CLOSED	2-DRV-72-571		CV
RHR SPRAY HEADER A TEST DRAIN	A11/V EL 722	CLOSED	2-DRV-72-572		CV
VENTILATION & PURGE AIR ROOM					
CNTMT SPRAY HEADER A TEST DRAIN	A12/W EL 744	CLOSED	2-DRV-72-542		CV
CNTMT SPRAY HEADER B TEST DRAIN	A12/W EL 744	CLOSED	2-DRV-72-543		CV
CNTMT SPRAY HEADER B TEST DRAIN	A12/W EL 743	CLOSED	2-DRV-72-569		CV
CNTMT SPRAY HEADER A TEST DRAIN	A12/W EL 743	CLOSED	2-DRV-72-570		CV
CNTMT SPRAY HDR A AIR TEST CONNECTION	A12/W EL 753	CLOSED	2-TV-72-544		CV
CNTMT SPRAY HDR B AIR TEST CONNECTION	A12/W EL 753	CLOSED	2-TV-72-545		CV
RHR SPRAY HDR A AIR TEST CONNECTION	A12/W EL 753	CLOSED	2-TV-72-558		CV
RHR SPRAY HDR B AIR TEST CONNECTION	A12/W EL 753	CLOSED	2-TV-72-559		CV

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Containment Spray Train A Nozzle Flow Verification

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The mechanical piping drawing for this spray header is 47W437-5 (ref subsection 2.2B.3.b). This drawing shall be available to the Test engineer when performing this inspection.

This data sheet is set up to perform the inspection in a COUNTER-CLOCKWISE direction as viewed from the Polar Crane, starting at azimuth 305° where the pipe riser tees into the spray ring.

This data sheet is divided into sections which correspond to azimuth locations of spray header pipe supports as shown on drawing 47W437-5.

There are a total of 263 nozzles on this spray ring.

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**Appendix E
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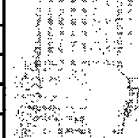
Containment Spray Train A Nozzle Flow Verification

Data Package:Page _____ of _____

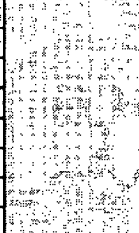
Sector A:

Between Chicago Bridge & Iron (CBI) Supports CBI-28 (Az 328°) and CBI-22 (Az 20°)

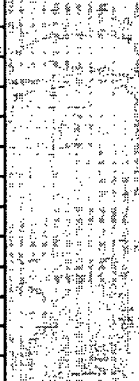
6 each - Nozzle Type "D" (inboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
1	335	<input type="checkbox"/>	<input type="checkbox"/>		4	357	<input type="checkbox"/>	<input type="checkbox"/>
2	342	<input type="checkbox"/>	<input type="checkbox"/>		5	004	<input type="checkbox"/>	<input type="checkbox"/>
3	349	<input type="checkbox"/>	<input type="checkbox"/>		6	013	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
7	330	<input type="checkbox"/>	<input type="checkbox"/>		13	356	<input type="checkbox"/>	<input type="checkbox"/>
8	334	<input type="checkbox"/>	<input type="checkbox"/>		14	000	<input type="checkbox"/>	<input type="checkbox"/>
9	339	<input type="checkbox"/>	<input type="checkbox"/>		15	004	<input type="checkbox"/>	<input type="checkbox"/>
10	343	<input type="checkbox"/>	<input type="checkbox"/>		16	008	<input type="checkbox"/>	<input type="checkbox"/>
11	347	<input type="checkbox"/>	<input type="checkbox"/>		17	013	<input type="checkbox"/>	<input type="checkbox"/>
12	351	<input type="checkbox"/>	<input type="checkbox"/>		18	017	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "F" (outboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
19	329	<input type="checkbox"/>	<input type="checkbox"/>		30	356	<input type="checkbox"/>	<input type="checkbox"/>
20	331	<input type="checkbox"/>	<input type="checkbox"/>		31	359	<input type="checkbox"/>	<input type="checkbox"/>
21	334	<input type="checkbox"/>	<input type="checkbox"/>		32	001	<input type="checkbox"/>	<input type="checkbox"/>
22	336	<input type="checkbox"/>	<input type="checkbox"/>		33	004	<input type="checkbox"/>	<input type="checkbox"/>
23	339	<input type="checkbox"/>	<input type="checkbox"/>		34	006	<input type="checkbox"/>	<input type="checkbox"/>
24	341	<input type="checkbox"/>	<input type="checkbox"/>		35	009	<input type="checkbox"/>	<input type="checkbox"/>
25	344	<input type="checkbox"/>	<input type="checkbox"/>		36	011	<input type="checkbox"/>	<input type="checkbox"/>
26	346	<input type="checkbox"/>	<input type="checkbox"/>		37	014	<input type="checkbox"/>	<input type="checkbox"/>
27	349	<input type="checkbox"/>	<input type="checkbox"/>		38	016	<input type="checkbox"/>	<input type="checkbox"/>
28	351	<input type="checkbox"/>	<input type="checkbox"/>		39	019	<input type="checkbox"/>	<input type="checkbox"/>
29	354	<input type="checkbox"/>	<input type="checkbox"/>					

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Containment Spray Train A Nozzle Flow Verification

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Sector B:

Between Chicago Bridge & Iron (CBI) Supports CBI-22 (Az 20°) and CBI-23 (Az 72°)

6 each - Nozzle Type "D" (inboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
40	27	<input type="checkbox"/>	<input type="checkbox"/>		43	49	<input type="checkbox"/>	<input type="checkbox"/>
41	34	<input type="checkbox"/>	<input type="checkbox"/>		44	56	<input type="checkbox"/>	<input type="checkbox"/>
42	42	<input type="checkbox"/>	<input type="checkbox"/>		45	65	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
46	22	<input type="checkbox"/>	<input type="checkbox"/>		52	48	<input type="checkbox"/>	<input type="checkbox"/>
47	26	<input type="checkbox"/>	<input type="checkbox"/>		53	52	<input type="checkbox"/>	<input type="checkbox"/>
48	31	<input type="checkbox"/>	<input type="checkbox"/>		54	56	<input type="checkbox"/>	<input type="checkbox"/>
49	35	<input type="checkbox"/>	<input type="checkbox"/>		55	60	<input type="checkbox"/>	<input type="checkbox"/>
50	39	<input type="checkbox"/>	<input type="checkbox"/>		56	65	<input type="checkbox"/>	<input type="checkbox"/>
51	43	<input type="checkbox"/>	<input type="checkbox"/>		57	69	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "F" (outboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
58	21	<input type="checkbox"/>	<input type="checkbox"/>		69	48	<input type="checkbox"/>	<input type="checkbox"/>
59	23	<input type="checkbox"/>	<input type="checkbox"/>		70	51	<input type="checkbox"/>	<input type="checkbox"/>
60	26	<input type="checkbox"/>	<input type="checkbox"/>		71	53	<input type="checkbox"/>	<input type="checkbox"/>
61	28	<input type="checkbox"/>	<input type="checkbox"/>		72	56	<input type="checkbox"/>	<input type="checkbox"/>
62	31	<input type="checkbox"/>	<input type="checkbox"/>		73	58	<input type="checkbox"/>	<input type="checkbox"/>
63	33	<input type="checkbox"/>	<input type="checkbox"/>		74	61	<input type="checkbox"/>	<input type="checkbox"/>
64	36	<input type="checkbox"/>	<input type="checkbox"/>		75	63	<input type="checkbox"/>	<input type="checkbox"/>
65	38	<input type="checkbox"/>	<input type="checkbox"/>		76	66	<input type="checkbox"/>	<input type="checkbox"/>
66	41	<input type="checkbox"/>	<input type="checkbox"/>		77	68	<input type="checkbox"/>	<input type="checkbox"/>
67	43	<input type="checkbox"/>	<input type="checkbox"/>		78	70	<input type="checkbox"/>	<input type="checkbox"/>
68	46	<input type="checkbox"/>	<input type="checkbox"/>					

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Containment Spray Train A Nozzle Flow Verification

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Sector C:

Between Chicago Bridge & Iron (CBI) Supports CBI-23 (Az 72°) and CBI-24 (Az 124°)

6 each - Nozzle Type "D" (inboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
79	79	<input type="checkbox"/>	<input type="checkbox"/>		82	101	<input type="checkbox"/>	<input type="checkbox"/>
80	86	<input type="checkbox"/>	<input type="checkbox"/>		83	109	<input type="checkbox"/>	<input type="checkbox"/>
81	94	<input type="checkbox"/>	<input type="checkbox"/>		84	117	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
85	74	<input type="checkbox"/>	<input type="checkbox"/>		91	100	<input type="checkbox"/>	<input type="checkbox"/>
86	78	<input type="checkbox"/>	<input type="checkbox"/>		92	104	<input type="checkbox"/>	<input type="checkbox"/>
87	83	<input type="checkbox"/>	<input type="checkbox"/>		93	108	<input type="checkbox"/>	<input type="checkbox"/>
88	87	<input type="checkbox"/>	<input type="checkbox"/>		94	112	<input type="checkbox"/>	<input type="checkbox"/>
89	91	<input type="checkbox"/>	<input type="checkbox"/>		95	117	<input type="checkbox"/>	<input type="checkbox"/>
90	95	<input type="checkbox"/>	<input type="checkbox"/>		96	121	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "F" (outboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
97	73	<input type="checkbox"/>	<input type="checkbox"/>		108	100	<input type="checkbox"/>	<input type="checkbox"/>
98	75	<input type="checkbox"/>	<input type="checkbox"/>		109	103	<input type="checkbox"/>	<input type="checkbox"/>
99	78	<input type="checkbox"/>	<input type="checkbox"/>		110	105	<input type="checkbox"/>	<input type="checkbox"/>
100	80	<input type="checkbox"/>	<input type="checkbox"/>		111	108	<input type="checkbox"/>	<input type="checkbox"/>
101	83	<input type="checkbox"/>	<input type="checkbox"/>		112	110	<input type="checkbox"/>	<input type="checkbox"/>
102	85	<input type="checkbox"/>	<input type="checkbox"/>		113	113	<input type="checkbox"/>	<input type="checkbox"/>
103	88	<input type="checkbox"/>	<input type="checkbox"/>		114	115	<input type="checkbox"/>	<input type="checkbox"/>
104	90	<input type="checkbox"/>	<input type="checkbox"/>		115	118	<input type="checkbox"/>	<input type="checkbox"/>
105	93	<input type="checkbox"/>	<input type="checkbox"/>		116	120	<input type="checkbox"/>	<input type="checkbox"/>
106	95	<input type="checkbox"/>	<input type="checkbox"/>		117	123	<input type="checkbox"/>	<input type="checkbox"/>
107	98	<input type="checkbox"/>	<input type="checkbox"/>					

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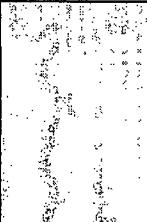
Sector D:

Between Chicago Bridge & Iron (CBI) Supports CBI-24 (Az 124°) and CBI-25 (Az 176°)

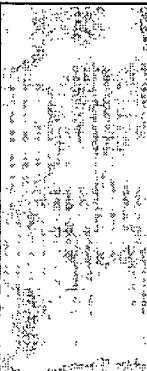
6 each - Nozzle Type "D" (inboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
118	131	<input type="checkbox"/>	<input type="checkbox"/>		121	153	<input type="checkbox"/>	<input type="checkbox"/>
119	138	<input type="checkbox"/>	<input type="checkbox"/>		122	161	<input type="checkbox"/>	<input type="checkbox"/>
120	146	<input type="checkbox"/>	<input type="checkbox"/>		123	169	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
124	126	<input type="checkbox"/>	<input type="checkbox"/>		130	152	<input type="checkbox"/>	<input type="checkbox"/>
125	130	<input type="checkbox"/>	<input type="checkbox"/>		131	156	<input type="checkbox"/>	<input type="checkbox"/>
126	135	<input type="checkbox"/>	<input type="checkbox"/>		132	160	<input type="checkbox"/>	<input type="checkbox"/>
127	139	<input type="checkbox"/>	<input type="checkbox"/>		133	164	<input type="checkbox"/>	<input type="checkbox"/>
128	143	<input type="checkbox"/>	<input type="checkbox"/>		134	169	<input type="checkbox"/>	<input type="checkbox"/>
129	147	<input type="checkbox"/>	<input type="checkbox"/>		135	173	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "F" (outboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
136	125	<input type="checkbox"/>	<input type="checkbox"/>		147	152	<input type="checkbox"/>	<input type="checkbox"/>
137	127	<input type="checkbox"/>	<input type="checkbox"/>		148	155	<input type="checkbox"/>	<input type="checkbox"/>
138	130	<input type="checkbox"/>	<input type="checkbox"/>		149	157	<input type="checkbox"/>	<input type="checkbox"/>
139	132	<input type="checkbox"/>	<input type="checkbox"/>		150	160	<input type="checkbox"/>	<input type="checkbox"/>
140	135	<input type="checkbox"/>	<input type="checkbox"/>		151	162	<input type="checkbox"/>	<input type="checkbox"/>
141	137	<input type="checkbox"/>	<input type="checkbox"/>		152	165	<input type="checkbox"/>	<input type="checkbox"/>
142	140	<input type="checkbox"/>	<input type="checkbox"/>		153	167	<input type="checkbox"/>	<input type="checkbox"/>
143	142	<input type="checkbox"/>	<input type="checkbox"/>		154	170	<input type="checkbox"/>	<input type="checkbox"/>
144	145	<input type="checkbox"/>	<input type="checkbox"/>		155	172	<input type="checkbox"/>	<input type="checkbox"/>
145	147	<input type="checkbox"/>	<input type="checkbox"/>		156	175	<input type="checkbox"/>	<input type="checkbox"/>
146	150	<input type="checkbox"/>	<input type="checkbox"/>					

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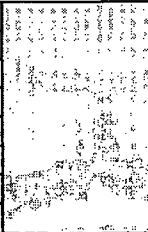
Sector E:

Between Chicago Bridge & Iron (CBI) Supports CBI-25 (Az 176°) and CBI-26 (Az 228°)

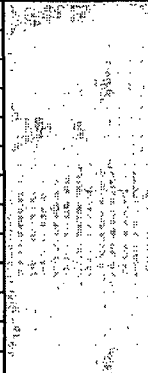
6 each - Nozzle Type "D" (inboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
157	183	<input type="checkbox"/>	<input type="checkbox"/>		160	205	<input type="checkbox"/>	<input type="checkbox"/>
158	190	<input type="checkbox"/>	<input type="checkbox"/>		161	213	<input type="checkbox"/>	<input type="checkbox"/>
159	198	<input type="checkbox"/>	<input type="checkbox"/>		162	221	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
163	178	<input type="checkbox"/>	<input type="checkbox"/>		169	204	<input type="checkbox"/>	<input type="checkbox"/>
164	182	<input type="checkbox"/>	<input type="checkbox"/>		170	208	<input type="checkbox"/>	<input type="checkbox"/>
165	187	<input type="checkbox"/>	<input type="checkbox"/>		171	212	<input type="checkbox"/>	<input type="checkbox"/>
166	191	<input type="checkbox"/>	<input type="checkbox"/>		172	216	<input type="checkbox"/>	<input type="checkbox"/>
167	195	<input type="checkbox"/>	<input type="checkbox"/>		173	221	<input type="checkbox"/>	<input type="checkbox"/>
168	199	<input type="checkbox"/>	<input type="checkbox"/>		174	225	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "F" (outboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
175	177	<input type="checkbox"/>	<input type="checkbox"/>		186	204	<input type="checkbox"/>	<input type="checkbox"/>
176	179	<input type="checkbox"/>	<input type="checkbox"/>		187	207	<input type="checkbox"/>	<input type="checkbox"/>
177	182	<input type="checkbox"/>	<input type="checkbox"/>		188	209	<input type="checkbox"/>	<input type="checkbox"/>
178	184	<input type="checkbox"/>	<input type="checkbox"/>		189	212	<input type="checkbox"/>	<input type="checkbox"/>
179	187	<input type="checkbox"/>	<input type="checkbox"/>		190	214	<input type="checkbox"/>	<input type="checkbox"/>
180	189	<input type="checkbox"/>	<input type="checkbox"/>		191	217	<input type="checkbox"/>	<input type="checkbox"/>
181	192	<input type="checkbox"/>	<input type="checkbox"/>		192	219	<input type="checkbox"/>	<input type="checkbox"/>
182	194	<input type="checkbox"/>	<input type="checkbox"/>		193	222	<input type="checkbox"/>	<input type="checkbox"/>
183	197	<input type="checkbox"/>	<input type="checkbox"/>		194	224	<input type="checkbox"/>	<input type="checkbox"/>
184	199	<input type="checkbox"/>	<input type="checkbox"/>		195	227	<input type="checkbox"/>	<input type="checkbox"/>
185	202	<input type="checkbox"/>	<input type="checkbox"/>					

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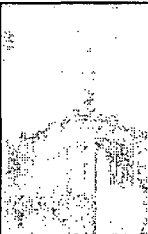
Sector F:

Between Chicago Bridge & Iron (CBI) Supports CBI-26 (Az 228°) and CBI-27 (Az 280°)


6 each - Nozzle Type "D" (inboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
196	235	<input type="checkbox"/>	<input type="checkbox"/>		199	257	<input type="checkbox"/>	<input type="checkbox"/>
197	242	<input type="checkbox"/>	<input type="checkbox"/>		200	265	<input type="checkbox"/>	<input type="checkbox"/>
198	250	<input type="checkbox"/>	<input type="checkbox"/>		201	273	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
202	230	<input type="checkbox"/>	<input type="checkbox"/>		208	256	<input type="checkbox"/>	<input type="checkbox"/>
203	234	<input type="checkbox"/>	<input type="checkbox"/>		209	260	<input type="checkbox"/>	<input type="checkbox"/>
204	239	<input type="checkbox"/>	<input type="checkbox"/>		210	264	<input type="checkbox"/>	<input type="checkbox"/>
205	243	<input type="checkbox"/>	<input type="checkbox"/>		211	268	<input type="checkbox"/>	<input type="checkbox"/>
206	247	<input type="checkbox"/>	<input type="checkbox"/>		212	273	<input type="checkbox"/>	<input type="checkbox"/>
207	251	<input type="checkbox"/>	<input type="checkbox"/>		213	277	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "F" (outboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
214	229	<input type="checkbox"/>	<input type="checkbox"/>		225	256	<input type="checkbox"/>	<input type="checkbox"/>
215	231	<input type="checkbox"/>	<input type="checkbox"/>		226	259	<input type="checkbox"/>	<input type="checkbox"/>
216	234	<input type="checkbox"/>	<input type="checkbox"/>		227	261	<input type="checkbox"/>	<input type="checkbox"/>
217	236	<input type="checkbox"/>	<input type="checkbox"/>		228	264	<input type="checkbox"/>	<input type="checkbox"/>
218	239	<input type="checkbox"/>	<input type="checkbox"/>		229	266	<input type="checkbox"/>	<input type="checkbox"/>
219	241	<input type="checkbox"/>	<input type="checkbox"/>		230	269	<input type="checkbox"/>	<input type="checkbox"/>
220	244	<input type="checkbox"/>	<input type="checkbox"/>		231	271	<input type="checkbox"/>	<input type="checkbox"/>
221	246	<input type="checkbox"/>	<input type="checkbox"/>		232	274	<input type="checkbox"/>	<input type="checkbox"/>
222	249	<input type="checkbox"/>	<input type="checkbox"/>		233	276	<input type="checkbox"/>	<input type="checkbox"/>
223	251	<input type="checkbox"/>	<input type="checkbox"/>		234	279	<input type="checkbox"/>	<input type="checkbox"/>
224	254	<input type="checkbox"/>	<input type="checkbox"/>					

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Sector G1:

Between Chicago Bridge & Iron (CBI) Support CBI-27 (Az 280°) and Supply Header (Az 302°)

2 each - Nozzle Type "D" (inboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
235	285	<input type="checkbox"/>	<input type="checkbox"/>		236	296	<input type="checkbox"/>	<input type="checkbox"/>

5 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
237	282	<input type="checkbox"/>	<input type="checkbox"/>		240	294	<input type="checkbox"/>	<input type="checkbox"/>
238	286	<input type="checkbox"/>	<input type="checkbox"/>		241	297	<input type="checkbox"/>	<input type="checkbox"/>
239	290	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "F" (outboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
242	281	<input type="checkbox"/>	<input type="checkbox"/>		245	290	<input type="checkbox"/>	<input type="checkbox"/>
243	284	<input type="checkbox"/>	<input type="checkbox"/>		246	293	<input type="checkbox"/>	<input type="checkbox"/>
244	287	<input type="checkbox"/>	<input type="checkbox"/>		247	297	<input type="checkbox"/>	<input type="checkbox"/>

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Sector G2:

Between Supply Header (Az 302°) and Chicago Bridge & Iron (CBI) Support CBI-28 (Az 328°)

3 each - Nozzle Type "D" (inboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
248	310	<input type="checkbox"/>	<input type="checkbox"/>		250	322	<input type="checkbox"/>	<input type="checkbox"/>
249	316	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
251	306	<input type="checkbox"/>	<input type="checkbox"/>		254	318	<input type="checkbox"/>	<input type="checkbox"/>
252	310	<input type="checkbox"/>	<input type="checkbox"/>		255	322	<input type="checkbox"/>	<input type="checkbox"/>
253	314	<input type="checkbox"/>	<input type="checkbox"/>		256	326	<input type="checkbox"/>	<input type="checkbox"/>

7 each - Nozzle Type "F" (outboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
257	305	<input type="checkbox"/>	<input type="checkbox"/>		261	318	<input type="checkbox"/>	<input type="checkbox"/>
258	308	<input type="checkbox"/>	<input type="checkbox"/>		262	322	<input type="checkbox"/>	<input type="checkbox"/>
259	312	<input type="checkbox"/>	<input type="checkbox"/>		263	326	<input type="checkbox"/>	<input type="checkbox"/>
260	315	<input type="checkbox"/>	<input type="checkbox"/>					

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Containment Spray Train B Nozzle Flow Verification

Data Package:Page _____ of _____

The mechanical piping drawing for this spray header is 47W437-5 (ref subsection 2.2B.3.b). This drawing shall be available to the Test engineer when performing this inspection.

This data sheet is set up to perform the inspection in a COUNTER-CLOCKWISE direction as viewed from the Polar Crane, starting at azimuth 305° where the pipe riser tees into the spray ring.

This data sheet is divided into sections which correspond to azimuth locations of spray header pipe supports as shown on drawing 47W437-5.

There are a total of 263 nozzles on this spray ring.

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Containment Spray Train B Nozzle Flow Verification

Data Package: Page _____ of _____

Sector A:

Between Chicago Bridge & Iron (CBI) Supports CBI-28 (Az 328°) and CBI-22 (Az 20°)

6 each - Nozzle Type "A" (inboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
1	335	<input type="checkbox"/>	<input type="checkbox"/>		4	357	<input type="checkbox"/>	<input type="checkbox"/>
2	342	<input type="checkbox"/>	<input type="checkbox"/>		5	004	<input type="checkbox"/>	<input type="checkbox"/>
3	349	<input type="checkbox"/>	<input type="checkbox"/>		6	013	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "B" (outboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
7	330	<input type="checkbox"/>	<input type="checkbox"/>		13	356	<input type="checkbox"/>	<input type="checkbox"/>
8	334	<input type="checkbox"/>	<input type="checkbox"/>		14	000	<input type="checkbox"/>	<input type="checkbox"/>
9	339	<input type="checkbox"/>	<input type="checkbox"/>		15	004	<input type="checkbox"/>	<input type="checkbox"/>
10	343	<input type="checkbox"/>	<input type="checkbox"/>		16	008	<input type="checkbox"/>	<input type="checkbox"/>
11	347	<input type="checkbox"/>	<input type="checkbox"/>		17	013	<input type="checkbox"/>	<input type="checkbox"/>
12	351	<input type="checkbox"/>	<input type="checkbox"/>		18	017	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "C" (outboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
19	329	<input type="checkbox"/>	<input type="checkbox"/>		30	356	<input type="checkbox"/>	<input type="checkbox"/>
20	331	<input type="checkbox"/>	<input type="checkbox"/>		31	359	<input type="checkbox"/>	<input type="checkbox"/>
21	334	<input type="checkbox"/>	<input type="checkbox"/>		32	001	<input type="checkbox"/>	<input type="checkbox"/>
22	336	<input type="checkbox"/>	<input type="checkbox"/>		33	004	<input type="checkbox"/>	<input type="checkbox"/>
23	339	<input type="checkbox"/>	<input type="checkbox"/>		34	006	<input type="checkbox"/>	<input type="checkbox"/>
24	341	<input type="checkbox"/>	<input type="checkbox"/>		35	009	<input type="checkbox"/>	<input type="checkbox"/>
25	344	<input type="checkbox"/>	<input type="checkbox"/>		36	011	<input type="checkbox"/>	<input type="checkbox"/>
26	346	<input type="checkbox"/>	<input type="checkbox"/>		37	014	<input type="checkbox"/>	<input type="checkbox"/>
27	349	<input type="checkbox"/>	<input type="checkbox"/>		38	016	<input type="checkbox"/>	<input type="checkbox"/>
28	351	<input type="checkbox"/>	<input type="checkbox"/>		39	019	<input type="checkbox"/>	<input type="checkbox"/>
29	354	<input type="checkbox"/>	<input type="checkbox"/>					

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Containment Spray Train B Nozzle Flow Verification

Data Package: Page _____ of _____

Sector B:

Between Chicago Bridge & Iron (CBI) Supports CBI-22 (Az 20°) and CBI-23 (Az 72°)

6 each - Nozzle Type "A" (inboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
40	27	<input type="checkbox"/>	<input type="checkbox"/>		43	49	<input type="checkbox"/>	<input type="checkbox"/>
41	34	<input type="checkbox"/>	<input type="checkbox"/>		44	56	<input type="checkbox"/>	<input type="checkbox"/>
42	42	<input type="checkbox"/>	<input type="checkbox"/>		45	65	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "B" (outboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
46	22	<input type="checkbox"/>	<input type="checkbox"/>		52	48	<input type="checkbox"/>	<input type="checkbox"/>
47	26	<input type="checkbox"/>	<input type="checkbox"/>		53	52	<input type="checkbox"/>	<input type="checkbox"/>
48	31	<input type="checkbox"/>	<input type="checkbox"/>		54	56	<input type="checkbox"/>	<input type="checkbox"/>
49	35	<input type="checkbox"/>	<input type="checkbox"/>		55	60	<input type="checkbox"/>	<input type="checkbox"/>
50	39	<input type="checkbox"/>	<input type="checkbox"/>		56	65	<input type="checkbox"/>	<input type="checkbox"/>
51	43	<input type="checkbox"/>	<input type="checkbox"/>		57	69	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "C" (outboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
58	21	<input type="checkbox"/>	<input type="checkbox"/>		69	48	<input type="checkbox"/>	<input type="checkbox"/>
59	23	<input type="checkbox"/>	<input type="checkbox"/>		70	51	<input type="checkbox"/>	<input type="checkbox"/>
60	26	<input type="checkbox"/>	<input type="checkbox"/>		71	53	<input type="checkbox"/>	<input type="checkbox"/>
61	28	<input type="checkbox"/>	<input type="checkbox"/>		72	56	<input type="checkbox"/>	<input type="checkbox"/>
62	31	<input type="checkbox"/>	<input type="checkbox"/>		73	58	<input type="checkbox"/>	<input type="checkbox"/>
63	33	<input type="checkbox"/>	<input type="checkbox"/>		74	61	<input type="checkbox"/>	<input type="checkbox"/>
64	36	<input type="checkbox"/>	<input type="checkbox"/>		75	63	<input type="checkbox"/>	<input type="checkbox"/>
65	38	<input type="checkbox"/>	<input type="checkbox"/>		76	66	<input type="checkbox"/>	<input type="checkbox"/>
66	41	<input type="checkbox"/>	<input type="checkbox"/>		77	68	<input type="checkbox"/>	<input type="checkbox"/>
67	43	<input type="checkbox"/>	<input type="checkbox"/>		78	70	<input type="checkbox"/>	<input type="checkbox"/>
68	46	<input type="checkbox"/>	<input type="checkbox"/>					

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Containment Spray Train B Nozzle Flow Verification

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Sector C:

Between Chicago Bridge & Iron (CBI) Supports CBI-23 (Az 72°) and CBI-24 (Az 124°)

6 each - Nozzle Type "A" (inboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
79	79	<input type="checkbox"/>	<input type="checkbox"/>		82	101	<input type="checkbox"/>	<input type="checkbox"/>
80	86	<input type="checkbox"/>	<input type="checkbox"/>		83	109	<input type="checkbox"/>	<input type="checkbox"/>
81	94	<input type="checkbox"/>	<input type="checkbox"/>		84	117	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "B" (outboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
85	74	<input type="checkbox"/>	<input type="checkbox"/>		91	100	<input type="checkbox"/>	<input type="checkbox"/>
86	78	<input type="checkbox"/>	<input type="checkbox"/>		92	104	<input type="checkbox"/>	<input type="checkbox"/>
87	83	<input type="checkbox"/>	<input type="checkbox"/>		93	108	<input type="checkbox"/>	<input type="checkbox"/>
88	87	<input type="checkbox"/>	<input type="checkbox"/>		94	112	<input type="checkbox"/>	<input type="checkbox"/>
89	91	<input type="checkbox"/>	<input type="checkbox"/>		95	117	<input type="checkbox"/>	<input type="checkbox"/>
90	95	<input type="checkbox"/>	<input type="checkbox"/>		96	121	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "C" (outboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
97	73	<input type="checkbox"/>	<input type="checkbox"/>		108	100	<input type="checkbox"/>	<input type="checkbox"/>
98	75	<input type="checkbox"/>	<input type="checkbox"/>		109	103	<input type="checkbox"/>	<input type="checkbox"/>
99	78	<input type="checkbox"/>	<input type="checkbox"/>		110	105	<input type="checkbox"/>	<input type="checkbox"/>
100	80	<input type="checkbox"/>	<input type="checkbox"/>		111	108	<input type="checkbox"/>	<input type="checkbox"/>
101	83	<input type="checkbox"/>	<input type="checkbox"/>		112	110	<input type="checkbox"/>	<input type="checkbox"/>
102	85	<input type="checkbox"/>	<input type="checkbox"/>		113	113	<input type="checkbox"/>	<input type="checkbox"/>
103	88	<input type="checkbox"/>	<input type="checkbox"/>		114	115	<input type="checkbox"/>	<input type="checkbox"/>
104	90	<input type="checkbox"/>	<input type="checkbox"/>		115	118	<input type="checkbox"/>	<input type="checkbox"/>
105	93	<input type="checkbox"/>	<input type="checkbox"/>		116	120	<input type="checkbox"/>	<input type="checkbox"/>
106	95	<input type="checkbox"/>	<input type="checkbox"/>		117	123	<input type="checkbox"/>	<input type="checkbox"/>
107	98	<input type="checkbox"/>	<input type="checkbox"/>					

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Containment Spray Train B Nozzle Flow Verification

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Sector D:

Between Chicago Bridge & Iron (CBI) Supports CBI-24 (Az 124°) and CBI-25 (Az 176°)

6 each - Nozzle Type "A" (inboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
118	131	<input type="checkbox"/>	<input type="checkbox"/>		121	153	<input type="checkbox"/>	<input type="checkbox"/>
119	138	<input type="checkbox"/>	<input type="checkbox"/>		122	161	<input type="checkbox"/>	<input type="checkbox"/>
120	146	<input type="checkbox"/>	<input type="checkbox"/>		123	169	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "B" (outboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
124	126	<input type="checkbox"/>	<input type="checkbox"/>		130	152	<input type="checkbox"/>	<input type="checkbox"/>
125	130	<input type="checkbox"/>	<input type="checkbox"/>		131	156	<input type="checkbox"/>	<input type="checkbox"/>
126	135	<input type="checkbox"/>	<input type="checkbox"/>		132	160	<input type="checkbox"/>	<input type="checkbox"/>
127	139	<input type="checkbox"/>	<input type="checkbox"/>		133	164	<input type="checkbox"/>	<input type="checkbox"/>
128	143	<input type="checkbox"/>	<input type="checkbox"/>		134	169	<input type="checkbox"/>	<input type="checkbox"/>
129	147	<input type="checkbox"/>	<input type="checkbox"/>		135	173	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "C" (outboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
136	125	<input type="checkbox"/>	<input type="checkbox"/>		147	152	<input type="checkbox"/>	<input type="checkbox"/>
137	127	<input type="checkbox"/>	<input type="checkbox"/>		148	155	<input type="checkbox"/>	<input type="checkbox"/>
138	130	<input type="checkbox"/>	<input type="checkbox"/>		149	157	<input type="checkbox"/>	<input type="checkbox"/>
139	132	<input type="checkbox"/>	<input type="checkbox"/>		150	160	<input type="checkbox"/>	<input type="checkbox"/>
140	135	<input type="checkbox"/>	<input type="checkbox"/>		151	162	<input type="checkbox"/>	<input type="checkbox"/>
141	137	<input type="checkbox"/>	<input type="checkbox"/>		152	165	<input type="checkbox"/>	<input type="checkbox"/>
142	140	<input type="checkbox"/>	<input type="checkbox"/>		153	167	<input type="checkbox"/>	<input type="checkbox"/>
143	142	<input type="checkbox"/>	<input type="checkbox"/>		154	170	<input type="checkbox"/>	<input type="checkbox"/>
144	145	<input type="checkbox"/>	<input type="checkbox"/>		155	172	<input type="checkbox"/>	<input type="checkbox"/>
145	147	<input type="checkbox"/>	<input type="checkbox"/>		156	175	<input type="checkbox"/>	<input type="checkbox"/>
146	150	<input type="checkbox"/>	<input type="checkbox"/>					

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Containment Spray Train B Nozzle Flow Verification

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Sector E:

Between Chicago Bridge & Iron (CBI) Supports CBI-25 (Az 176°) and CBI-26 (Az 228°)

6 each - Nozzle Type "A" (inboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
157	183	<input type="checkbox"/>	<input type="checkbox"/>		160	205	<input type="checkbox"/>	<input type="checkbox"/>
158	190	<input type="checkbox"/>	<input type="checkbox"/>		161	213	<input type="checkbox"/>	<input type="checkbox"/>
159	198	<input type="checkbox"/>	<input type="checkbox"/>		162	221	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "B" (outboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
163	178	<input type="checkbox"/>	<input type="checkbox"/>		169	204	<input type="checkbox"/>	<input type="checkbox"/>
164	182	<input type="checkbox"/>	<input type="checkbox"/>		170	208	<input type="checkbox"/>	<input type="checkbox"/>
165	187	<input type="checkbox"/>	<input type="checkbox"/>		171	212	<input type="checkbox"/>	<input type="checkbox"/>
166	191	<input type="checkbox"/>	<input type="checkbox"/>		172	216	<input type="checkbox"/>	<input type="checkbox"/>
167	195	<input type="checkbox"/>	<input type="checkbox"/>		173	221	<input type="checkbox"/>	<input type="checkbox"/>
168	199	<input type="checkbox"/>	<input type="checkbox"/>		174	225	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "C" (outboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
175	177	<input type="checkbox"/>	<input type="checkbox"/>		186	204	<input type="checkbox"/>	<input type="checkbox"/>
176	179	<input type="checkbox"/>	<input type="checkbox"/>		187	207	<input type="checkbox"/>	<input type="checkbox"/>
177	182	<input type="checkbox"/>	<input type="checkbox"/>		188	209	<input type="checkbox"/>	<input type="checkbox"/>
178	184	<input type="checkbox"/>	<input type="checkbox"/>		189	212	<input type="checkbox"/>	<input type="checkbox"/>
179	187	<input type="checkbox"/>	<input type="checkbox"/>		190	214	<input type="checkbox"/>	<input type="checkbox"/>
180	189	<input type="checkbox"/>	<input type="checkbox"/>		191	217	<input type="checkbox"/>	<input type="checkbox"/>
181	192	<input type="checkbox"/>	<input type="checkbox"/>		192	219	<input type="checkbox"/>	<input type="checkbox"/>
182	194	<input type="checkbox"/>	<input type="checkbox"/>		193	222	<input type="checkbox"/>	<input type="checkbox"/>
183	197	<input type="checkbox"/>	<input type="checkbox"/>		194	224	<input type="checkbox"/>	<input type="checkbox"/>
184	199	<input type="checkbox"/>	<input type="checkbox"/>		195	227	<input type="checkbox"/>	<input type="checkbox"/>
185	202	<input type="checkbox"/>	<input type="checkbox"/>					

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Containment Spray Train B Nozzle Flow Verification

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Sector F:

Between Chicago Bridge & Iron (CBI) Supports CBI-26 (Az 228°) and CBI-27 (Az 280°)

6 each - Nozzle Type "A" (inboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
196	235	<input type="checkbox"/>	<input type="checkbox"/>		199	257	<input type="checkbox"/>	<input type="checkbox"/>
197	242	<input type="checkbox"/>	<input type="checkbox"/>		200	265	<input type="checkbox"/>	<input type="checkbox"/>
198	250	<input type="checkbox"/>	<input type="checkbox"/>		201	273	<input type="checkbox"/>	<input type="checkbox"/>

12 each - Nozzle Type "B" (outboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
202	230	<input type="checkbox"/>	<input type="checkbox"/>		208	256	<input type="checkbox"/>	<input type="checkbox"/>
203	234	<input type="checkbox"/>	<input type="checkbox"/>		209	260	<input type="checkbox"/>	<input type="checkbox"/>
204	239	<input type="checkbox"/>	<input type="checkbox"/>		210	264	<input type="checkbox"/>	<input type="checkbox"/>
205	243	<input type="checkbox"/>	<input type="checkbox"/>		211	268	<input type="checkbox"/>	<input type="checkbox"/>
206	247	<input type="checkbox"/>	<input type="checkbox"/>		212	273	<input type="checkbox"/>	<input type="checkbox"/>
207	251	<input type="checkbox"/>	<input type="checkbox"/>		213	277	<input type="checkbox"/>	<input type="checkbox"/>

21 each - Nozzle Type "C" (outboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
214	229	<input type="checkbox"/>	<input type="checkbox"/>		225	256	<input type="checkbox"/>	<input type="checkbox"/>
215	231	<input type="checkbox"/>	<input type="checkbox"/>		226	259	<input type="checkbox"/>	<input type="checkbox"/>
216	234	<input type="checkbox"/>	<input type="checkbox"/>		227	261	<input type="checkbox"/>	<input type="checkbox"/>
217	236	<input type="checkbox"/>	<input type="checkbox"/>		228	264	<input type="checkbox"/>	<input type="checkbox"/>
218	239	<input type="checkbox"/>	<input type="checkbox"/>		229	266	<input type="checkbox"/>	<input type="checkbox"/>
219	241	<input type="checkbox"/>	<input type="checkbox"/>		230	269	<input type="checkbox"/>	<input type="checkbox"/>
220	244	<input type="checkbox"/>	<input type="checkbox"/>		231	271	<input type="checkbox"/>	<input type="checkbox"/>
221	246	<input type="checkbox"/>	<input type="checkbox"/>		232	274	<input type="checkbox"/>	<input type="checkbox"/>
222	249	<input type="checkbox"/>	<input type="checkbox"/>		233	276	<input type="checkbox"/>	<input type="checkbox"/>
223	251	<input type="checkbox"/>	<input type="checkbox"/>		234	279	<input type="checkbox"/>	<input type="checkbox"/>
224	254	<input type="checkbox"/>	<input type="checkbox"/>					

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Containment Spray Train B Nozzle Flow Verification

Data Package: Page _____ of _____

Sector G1:

Between Chicago Bridge & Iron (CBI) Support CBI-27 (Az 280°) and Supply Header (Az 302°)

2 each - Nozzle Type "A" (inboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air		Nozzle	Approx Az	Passes Air	
		Yes	No			Yes	No
235	288	<input type="checkbox"/>	<input type="checkbox"/>	236	296	<input type="checkbox"/>	<input type="checkbox"/>

5 each - Nozzle Type "B" (outboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air		Nozzle	Approx Az	Passes Air	
		Yes	No			Yes	No
237	284	<input type="checkbox"/>	<input type="checkbox"/>	240	296	<input type="checkbox"/>	<input type="checkbox"/>
238	288	<input type="checkbox"/>	<input type="checkbox"/>	241	299	<input type="checkbox"/>	<input type="checkbox"/>
239	292	<input type="checkbox"/>	<input type="checkbox"/>				

6 each - Nozzle Type "C" (outboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air		Nozzle	Approx Az	Passes Air	
		Yes	No			Yes	No
242	281	<input type="checkbox"/>	<input type="checkbox"/>	245	293	<input type="checkbox"/>	<input type="checkbox"/>
243	285	<input type="checkbox"/>	<input type="checkbox"/>	246	297	<input type="checkbox"/>	<input type="checkbox"/>
244	289	<input type="checkbox"/>	<input type="checkbox"/>	247	300	<input type="checkbox"/>	<input type="checkbox"/>

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Containment Spray Train B Nozzle Flow Verification

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Sector G2:

Between Supply Header (Az 302°) and Chicago Bridge & Iron (CBI) Support CBI-28 (Az 328°)

3 each - Nozzle Type "A" (inboard side of header at 40° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
248	310	<input type="checkbox"/>	<input type="checkbox"/>		250	322	<input type="checkbox"/>	<input type="checkbox"/>
249	316	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "B" (outboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
251	308	<input type="checkbox"/>	<input type="checkbox"/>		254	319	<input type="checkbox"/>	<input type="checkbox"/>
252	312	<input type="checkbox"/>	<input type="checkbox"/>		255	322	<input type="checkbox"/>	<input type="checkbox"/>
253	315	<input type="checkbox"/>	<input type="checkbox"/>		256	326	<input type="checkbox"/>	<input type="checkbox"/>

7 each - Nozzle Type "C" (outboard side of header at 45° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
257	308	<input type="checkbox"/>	<input type="checkbox"/>		261	320	<input type="checkbox"/>	<input type="checkbox"/>
258	311	<input type="checkbox"/>	<input type="checkbox"/>		262	323	<input type="checkbox"/>	<input type="checkbox"/>
259	314	<input type="checkbox"/>	<input type="checkbox"/>		263	326	<input type="checkbox"/>	<input type="checkbox"/>
260	317	<input type="checkbox"/>	<input type="checkbox"/>					

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**Appendix G
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RHR Spray Train A Nozzle Flow Verification

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The mechanical piping drawing for this spray header is 47W437-4 (ref subsection 2.2B.3.a). This drawing shall be available to the Test engineer when performing this inspection.

This data sheet is set up to perform the inspection in a COUNTER-CLOCKWISE direction as viewed from the Polar Crane, starting at azimuth 309° where the pipe riser tees into the spray ring.

This data sheet is divided into sections which correspond to azimuth locations of spray header pipe supports as shown on drawing 47W437-4.

There are a total of 146 nozzles on this spray ring.

Nozzle detail "H" and detail "J" shown on section C4-C-4 of drawing 47W437-4 are plug couplings, no nozzle is installed at these 6 locations. Note that they are **NOT** included in the total count. These plugs are located at azimuth 350°, 45°, 120°, 210°, 250° and 290°.

Sector A:

Between Chicago Bridge & Iron (CBI) Supports CBI-20 (Az 314°) and CBI-21 (Az 339°)

3 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
1	319	<input type="checkbox"/>	<input type="checkbox"/>		3	336	<input type="checkbox"/>	<input type="checkbox"/>
2	327	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "D" (outboard side of header 5°above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
4	317	<input type="checkbox"/>	<input type="checkbox"/>		7	329	<input type="checkbox"/>	<input type="checkbox"/>
5	321	<input type="checkbox"/>	<input type="checkbox"/>		8	333	<input type="checkbox"/>	<input type="checkbox"/>
6	325	<input type="checkbox"/>	<input type="checkbox"/>		9	338	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
10	331	<input type="checkbox"/>	<input type="checkbox"/>

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Sector B:

Between Chicago Bridge & Iron (CBI) Supports CBI-21 (Az 339°) and CBI-8 (Az 4°)

3 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
11	344	<input type="checkbox"/>	<input type="checkbox"/>		13	360	<input type="checkbox"/>	<input type="checkbox"/>
12	352	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
14	342	<input type="checkbox"/>	<input type="checkbox"/>		17	354	<input type="checkbox"/>	<input type="checkbox"/>
15	346	<input type="checkbox"/>	<input type="checkbox"/>		18	358	<input type="checkbox"/>	<input type="checkbox"/>
16	350	<input type="checkbox"/>	<input type="checkbox"/>		19	002	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
20	356	<input type="checkbox"/>	<input type="checkbox"/>

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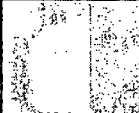
RHR Spray Train A Nozzle Flow Verification

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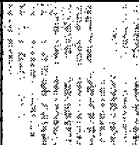
Sector C:

Between Chicago Bridge & Iron (CBI) Supports CBI-8 (Az 4°) and CBI-9 (Az 28°)

3 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
21	008	<input type="checkbox"/>	<input type="checkbox"/>		23	024	<input type="checkbox"/>	<input type="checkbox"/>
22	016	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
24	006	<input type="checkbox"/>	<input type="checkbox"/>		27	018	<input type="checkbox"/>	<input type="checkbox"/>
25	010	<input type="checkbox"/>	<input type="checkbox"/>		28	022	<input type="checkbox"/>	<input type="checkbox"/>
26	014	<input type="checkbox"/>	<input type="checkbox"/>		29	026	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
30	020	<input type="checkbox"/>	<input type="checkbox"/>

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Sector D:

Between Chicago Bridge & Iron (CBI) Supports CBI-9 (Az 28°) and CBI-10 (Az 61°)

4 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
31	032	<input type="checkbox"/>	<input type="checkbox"/>		33	049	<input type="checkbox"/>	<input type="checkbox"/>
32	041	<input type="checkbox"/>	<input type="checkbox"/>		34	057	<input type="checkbox"/>	<input type="checkbox"/>

8 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
35	030	<input type="checkbox"/>	<input type="checkbox"/>		39	047	<input type="checkbox"/>	<input type="checkbox"/>
36	034	<input type="checkbox"/>	<input type="checkbox"/>		40	051	<input type="checkbox"/>	<input type="checkbox"/>
37	039	<input type="checkbox"/>	<input type="checkbox"/>		41	055	<input type="checkbox"/>	<input type="checkbox"/>
38	043	<input type="checkbox"/>	<input type="checkbox"/>		42	059	<input type="checkbox"/>	<input type="checkbox"/>

2 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
43	037	<input type="checkbox"/>	<input type="checkbox"/>		44	053	<input type="checkbox"/>	<input type="checkbox"/>

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Sector E:

Between Chicago Bridge & Iron (CBI) Supports CBI-10 (Az 61°) and CBI-11 (Az 85°)

3 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
45	065	<input type="checkbox"/>	<input type="checkbox"/>		47	081	<input type="checkbox"/>	<input type="checkbox"/>
46	073	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
48	063	<input type="checkbox"/>	<input type="checkbox"/>		51	075	<input type="checkbox"/>	<input type="checkbox"/>
49	067	<input type="checkbox"/>	<input type="checkbox"/>		52	079	<input type="checkbox"/>	<input type="checkbox"/>
50	071	<input type="checkbox"/>	<input type="checkbox"/>		53	083	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
54	077	<input type="checkbox"/>	<input type="checkbox"/>

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Sector F:

Between Chicago Bridge & Iron (CBI) Supports CBI-11 (Az 85°) and CBI-12 (Az 110°)

3 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
55	089	<input type="checkbox"/>	<input type="checkbox"/>		57	106	<input type="checkbox"/>	<input type="checkbox"/>
56	097	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
58	087	<input type="checkbox"/>	<input type="checkbox"/>		61	100	<input type="checkbox"/>	<input type="checkbox"/>
59	091	<input type="checkbox"/>	<input type="checkbox"/>		62	104	<input type="checkbox"/>	<input type="checkbox"/>
60	095	<input type="checkbox"/>	<input type="checkbox"/>		63	108	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
64	102	<input type="checkbox"/>	<input type="checkbox"/>

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Sector G:

Between Chicago Bridge & Iron (CBI) Supports CBI-12 (Az 110°) and CBI-13 (Az 134°)

3 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
65	114	<input type="checkbox"/>	<input type="checkbox"/>		67	130	<input type="checkbox"/>	<input type="checkbox"/>
66	122	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
68	112	<input type="checkbox"/>	<input type="checkbox"/>		71	124	<input type="checkbox"/>	<input type="checkbox"/>
69	116	<input type="checkbox"/>	<input type="checkbox"/>		72	128	<input type="checkbox"/>	<input type="checkbox"/>
70	120	<input type="checkbox"/>	<input type="checkbox"/>		73	132	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
74	126	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train A Nozzle Flow Verification

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Sector H:

Between Chicago Bridge & Iron (CBI) Supports CBI-13 (Az 134°) and CBI-14 (Az 166°)

4 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
75	138	<input type="checkbox"/>	<input type="checkbox"/>		77	154	<input type="checkbox"/>	<input type="checkbox"/>
76	146	<input type="checkbox"/>	<input type="checkbox"/>		78	163	<input type="checkbox"/>	<input type="checkbox"/>

8 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
79	136	<input type="checkbox"/>	<input type="checkbox"/>		83	152	<input type="checkbox"/>	<input type="checkbox"/>
80	140	<input type="checkbox"/>	<input type="checkbox"/>		84	156	<input type="checkbox"/>	<input type="checkbox"/>
81	144	<input type="checkbox"/>	<input type="checkbox"/>		85	161	<input type="checkbox"/>	<input type="checkbox"/>
82	148	<input type="checkbox"/>	<input type="checkbox"/>		86	165	<input type="checkbox"/>	<input type="checkbox"/>

2 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
87	142	<input type="checkbox"/>	<input type="checkbox"/>		88	158	<input type="checkbox"/>	<input type="checkbox"/>

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Sector I:

Between Chicago Bridge & Iron (CBI) Supports CBI-14 (Az 166°) and CBI-15 (Az 191°)

3 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
89	171	<input type="checkbox"/>	<input type="checkbox"/>		91	187	<input type="checkbox"/>	<input type="checkbox"/>
90	179	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
92	169	<input type="checkbox"/>	<input type="checkbox"/>		95	181	<input type="checkbox"/>	<input type="checkbox"/>
93	173	<input type="checkbox"/>	<input type="checkbox"/>		96	185	<input type="checkbox"/>	<input type="checkbox"/>
94	177	<input type="checkbox"/>	<input type="checkbox"/>		97	189	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
98	175	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train A Nozzle Flow Verification

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Sector J:

Between Chicago Bridge & Iron (CBI) Supports CBI-15 (Az 191°) and CBI-16 (Az 216°)

3 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
99	195	<input type="checkbox"/>	<input type="checkbox"/>		101	211	<input type="checkbox"/>	<input type="checkbox"/>
100	203	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
102	193	<input type="checkbox"/>	<input type="checkbox"/>		105	205	<input type="checkbox"/>	<input type="checkbox"/>
103	197	<input type="checkbox"/>	<input type="checkbox"/>		106	209	<input type="checkbox"/>	<input type="checkbox"/>
104	201	<input type="checkbox"/>	<input type="checkbox"/>		107	213	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
108	199	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train A Nozzle Flow Verification

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Sector K:

Between Chicago Bridge & Iron (CBI) Supports CBI-16 (Az 216°) and CBI-17 (Az 240°)

3 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
109	219	<input type="checkbox"/>	<input type="checkbox"/>		111	236	<input type="checkbox"/>	<input type="checkbox"/>
110	228	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
112	217	<input type="checkbox"/>	<input type="checkbox"/>		115	230	<input type="checkbox"/>	<input type="checkbox"/>
113	222	<input type="checkbox"/>	<input type="checkbox"/>		116	234	<input type="checkbox"/>	<input type="checkbox"/>
114	226	<input type="checkbox"/>	<input type="checkbox"/>		117	238	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
118	224	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train A Nozzle Flow Verification

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Sector L:

Between Chicago Bridge & Iron (CBI) Supports CBI-17 (Az 240°) and CBI-18 (Az 272°)

4 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
119	244	<input type="checkbox"/>	<input type="checkbox"/>		121	260	<input type="checkbox"/>	<input type="checkbox"/>
120	252	<input type="checkbox"/>	<input type="checkbox"/>		122	268	<input type="checkbox"/>	<input type="checkbox"/>

8 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
123	242	<input type="checkbox"/>	<input type="checkbox"/>		126	258	<input type="checkbox"/>	<input type="checkbox"/>
124	246	<input type="checkbox"/>	<input type="checkbox"/>		127	262	<input type="checkbox"/>	<input type="checkbox"/>
					128	266	<input type="checkbox"/>	<input type="checkbox"/>
125	254	<input type="checkbox"/>	<input type="checkbox"/>		129	270	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
130	264	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train A Nozzle Flow Verification

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Sector M:

Between Chicago Bridge & Iron (CBI) Supports CBI-18 (Az 272°) and CBI-19 (Az 297°)

3 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
131	276	<input type="checkbox"/>	<input type="checkbox"/>		133	293	<input type="checkbox"/>	<input type="checkbox"/>
132	284	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "D" (outboard side of header 5° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
134	274	<input type="checkbox"/>	<input type="checkbox"/>		137	287	<input type="checkbox"/>	<input type="checkbox"/>
135	278	<input type="checkbox"/>	<input type="checkbox"/>		138	291	<input type="checkbox"/>	<input type="checkbox"/>
136	283	<input type="checkbox"/>	<input type="checkbox"/>		139	295	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "E" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
140	280	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train A Nozzle Flow Verification

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Sector N1:

Between Chicago Bridge & Iron (CBI) Support CBI-19 (Az 297°) and Supply Header (Az 306°)

1 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air	
		Yes	No
141	301	<input type="checkbox"/>	<input type="checkbox"/>

2 each - Nozzle Type "D" (outboard side of header 5°above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
142	299	<input type="checkbox"/>	<input type="checkbox"/>		143	303	<input type="checkbox"/>	<input type="checkbox"/>

Sector N2:

Between Supply Header (Az 306°) and Chicago Bridge & Iron (CBI) Support CBI-20 (Az 314°)

1 each - Nozzle Type "C" (bottom of header)

Nozzle	Approx Az	Passes Air	
		Yes	No
144	311	<input type="checkbox"/>	<input type="checkbox"/>

2 each - Nozzle Type "D" (outboard side of header 5°above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
145	309	<input type="checkbox"/>	<input type="checkbox"/>		146	313	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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The mechanical piping drawing for this spray header is 47W437-4 (ref subsection 2.2B.3.a). This drawing shall be available to the Test engineer when performing this inspection.

This data sheet is set up to perform the inspection in a COUNTER-CLOCKWISE direction as viewed from the Polar Crane, starting at azimuth 311° where the pipe riser tees into the spray ring.

This data sheet is divided into sections which correspond to azimuth locations of spray header pipe supports as shown on drawing 47W437-4.

There are a total of 146 nozzles on this spray ring.

Nozzle detail "G" and detail "I" shown on section C4-C-4 of drawing 47W437-4 are plug couplings, no nozzle is installed at these 6 locations. Note that they are **NOT** included in the total count. These plugs are located at azimuth 330°, 75°, 140°, 200°, 250° and 284°.

Sector A:

Between Chicago Bridge & Iron (CBI) Supports CBI-20 (Az 314°) and CBI-21 (Az 339°)

3 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
1	319	<input type="checkbox"/>	<input type="checkbox"/>		3	336	<input type="checkbox"/>	<input type="checkbox"/>
2	327	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
4	317	<input type="checkbox"/>	<input type="checkbox"/>		7	329	<input type="checkbox"/>	<input type="checkbox"/>
5	321	<input type="checkbox"/>	<input type="checkbox"/>		8	333	<input type="checkbox"/>	<input type="checkbox"/>
6	325	<input type="checkbox"/>	<input type="checkbox"/>		9	338	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
10	323	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector B:

Between Chicago Bridge & Iron (CBI) Supports CBI-21 (Az 339°) and CBI-8 (Az 4°)

3 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
11	344	<input type="checkbox"/>	<input type="checkbox"/>		13	360	<input type="checkbox"/>	<input type="checkbox"/>
12	352	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
14	342	<input type="checkbox"/>	<input type="checkbox"/>		17	354	<input type="checkbox"/>	<input type="checkbox"/>
15	346	<input type="checkbox"/>	<input type="checkbox"/>		18	358	<input type="checkbox"/>	<input type="checkbox"/>
16	350	<input type="checkbox"/>	<input type="checkbox"/>		19	002	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
20	348	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector C:

Between Chicago Bridge & Iron (CBI) Supports CBI-8 (Az 4°) and CBI-9 (Az 28°)

3 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
21	008	<input type="checkbox"/>	<input type="checkbox"/>		23	024	<input type="checkbox"/>	<input type="checkbox"/>
22	016	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
24	006	<input type="checkbox"/>	<input type="checkbox"/>		27	018	<input type="checkbox"/>	<input type="checkbox"/>
25	010	<input type="checkbox"/>	<input type="checkbox"/>		28	022	<input type="checkbox"/>	<input type="checkbox"/>
26	014	<input type="checkbox"/>	<input type="checkbox"/>		29	026	<input type="checkbox"/>	<input type="checkbox"/>

2 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
30	012	<input type="checkbox"/>	<input type="checkbox"/>		31	026	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector D:

Between Chicago Bridge & Iron (CBI) Supports CBI-9 (Az 28°) and CBI-10 (Az 61°)

4 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
32	032	<input type="checkbox"/>	<input type="checkbox"/>		34	049	<input type="checkbox"/>	<input type="checkbox"/>
33	041	<input type="checkbox"/>	<input type="checkbox"/>		35	057	<input type="checkbox"/>	<input type="checkbox"/>

8 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
36	030	<input type="checkbox"/>	<input type="checkbox"/>		40	047	<input type="checkbox"/>	<input type="checkbox"/>
37	034	<input type="checkbox"/>	<input type="checkbox"/>		41	051	<input type="checkbox"/>	<input type="checkbox"/>
38	039	<input type="checkbox"/>	<input type="checkbox"/>		42	055	<input type="checkbox"/>	<input type="checkbox"/>
39	043	<input type="checkbox"/>	<input type="checkbox"/>		43	059	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
44	045	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector E:

Between Chicago Bridge & Iron (CBI) Supports CBI-10 (Az 61°) and CBI-11 (Az 85°)

3 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
45	065	<input type="checkbox"/>	<input type="checkbox"/>		47	081	<input type="checkbox"/>	<input type="checkbox"/>
46	073	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
48	063	<input type="checkbox"/>	<input type="checkbox"/>		51	075	<input type="checkbox"/>	<input type="checkbox"/>
49	067	<input type="checkbox"/>	<input type="checkbox"/>		52	079	<input type="checkbox"/>	<input type="checkbox"/>
50	071	<input type="checkbox"/>	<input type="checkbox"/>		53	083	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
54	069	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector F:

Between Chicago Bridge & Iron (CBI) Supports CBI-11 (Az 85°) and CBI-12 (Az 110°)

3 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
55	089	<input type="checkbox"/>	<input type="checkbox"/>		57	106	<input type="checkbox"/>	<input type="checkbox"/>
56	097	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
58	087	<input type="checkbox"/>	<input type="checkbox"/>		61	100	<input type="checkbox"/>	<input type="checkbox"/>
59	091	<input type="checkbox"/>	<input type="checkbox"/>		62	104	<input type="checkbox"/>	<input type="checkbox"/>
60	095	<input type="checkbox"/>	<input type="checkbox"/>		63	108	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
64	093	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector G:

Between Chicago Bridge & Iron (CBI) Supports CBI-12 (Az 110°) and CBI-13 (Az 134°)

3 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
65	114	<input type="checkbox"/>	<input type="checkbox"/>		67	130	<input type="checkbox"/>	<input type="checkbox"/>
66	122	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
68	112	<input type="checkbox"/>	<input type="checkbox"/>		71	124	<input type="checkbox"/>	<input type="checkbox"/>
69	116	<input type="checkbox"/>	<input type="checkbox"/>		72	128	<input type="checkbox"/>	<input type="checkbox"/>
70	120	<input type="checkbox"/>	<input type="checkbox"/>		73	132	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
74	118	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector H:

Between Chicago Bridge & Iron (CBI) Supports CBI-13 (Az 134°) and CBI-14 (Az 166°)

4 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
75	138	<input type="checkbox"/>	<input type="checkbox"/>		77	154	<input type="checkbox"/>	<input type="checkbox"/>
76	146	<input type="checkbox"/>	<input type="checkbox"/>		78	163	<input type="checkbox"/>	<input type="checkbox"/>

8 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
79	136	<input type="checkbox"/>	<input type="checkbox"/>		83	152	<input type="checkbox"/>	<input type="checkbox"/>
80	140	<input type="checkbox"/>	<input type="checkbox"/>		84	156	<input type="checkbox"/>	<input type="checkbox"/>
81	144	<input type="checkbox"/>	<input type="checkbox"/>		85	161	<input type="checkbox"/>	<input type="checkbox"/>
82	148	<input type="checkbox"/>	<input type="checkbox"/>		86	165	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
87	150	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector I:

Between Chicago Bridge & Iron (CBI) Supports CBI-14 (Az 166°) and CBI-15 (Az 191°)

3 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
88	171	<input type="checkbox"/>	<input type="checkbox"/>		90	187	<input type="checkbox"/>	<input type="checkbox"/>
89	179	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
91	169	<input type="checkbox"/>	<input type="checkbox"/>		94	181	<input type="checkbox"/>	<input type="checkbox"/>
92	173	<input type="checkbox"/>	<input type="checkbox"/>		95	185	<input type="checkbox"/>	<input type="checkbox"/>
93	177	<input type="checkbox"/>	<input type="checkbox"/>		96	189	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
97	175	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector J:

Between Chicago Bridge & Iron (CBI) Supports CBI-15 (Az 191°) and CBI-16 (Az 216°)

3 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
98	195	<input type="checkbox"/>	<input type="checkbox"/>		100	211	<input type="checkbox"/>	<input type="checkbox"/>
99	203	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
101	193	<input type="checkbox"/>	<input type="checkbox"/>		104	205	<input type="checkbox"/>	<input type="checkbox"/>
102	197	<input type="checkbox"/>	<input type="checkbox"/>		105	209	<input type="checkbox"/>	<input type="checkbox"/>
103	201	<input type="checkbox"/>	<input type="checkbox"/>		106	213	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
107	207	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector K:

Between Chicago Bridge & Iron (CBI) Supports CBI-16 (Az 216°) and CBI-17 (Az 240°)

3 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
108	219	<input type="checkbox"/>	<input type="checkbox"/>		110	236	<input type="checkbox"/>	<input type="checkbox"/>
109	228	<input type="checkbox"/>	<input type="checkbox"/>					

6 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
111	217	<input type="checkbox"/>	<input type="checkbox"/>		114	230	<input type="checkbox"/>	<input type="checkbox"/>
112	222	<input type="checkbox"/>	<input type="checkbox"/>		115	234	<input type="checkbox"/>	<input type="checkbox"/>
113	226	<input type="checkbox"/>	<input type="checkbox"/>		116	238	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
117	232	<input type="checkbox"/>	<input type="checkbox"/>

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Sector L:

Between Chicago Bridge & Iron (CBI) Supports CBI-17 (Az 240°) and CBI-18 (Az 272°)

4 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
118	244	<input type="checkbox"/>	<input type="checkbox"/>		120	260	<input type="checkbox"/>	<input type="checkbox"/>
119	252	<input type="checkbox"/>	<input type="checkbox"/>		121	268	<input type="checkbox"/>	<input type="checkbox"/>

8 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
122	242	<input type="checkbox"/>	<input type="checkbox"/>		126	258	<input type="checkbox"/>	<input type="checkbox"/>
123	246	<input type="checkbox"/>	<input type="checkbox"/>		127	262	<input type="checkbox"/>	<input type="checkbox"/>
124	250	<input type="checkbox"/>	<input type="checkbox"/>		128	266	<input type="checkbox"/>	<input type="checkbox"/>
125	254	<input type="checkbox"/>	<input type="checkbox"/>		129	270	<input type="checkbox"/>	<input type="checkbox"/>

2 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
130	242	<input type="checkbox"/>	<input type="checkbox"/>		131	264	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector M:

Between Chicago Bridge & Iron (CBI) Supports CBI-18 (Az 272°) and CBI-19 (Az 297°)

2 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
132	276	<input type="checkbox"/>	<input type="checkbox"/>		133	293	<input type="checkbox"/>	<input type="checkbox"/>

6 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
134	274	<input type="checkbox"/>	<input type="checkbox"/>		137	287	<input type="checkbox"/>	<input type="checkbox"/>
135	278	<input type="checkbox"/>	<input type="checkbox"/>		138	291	<input type="checkbox"/>	<input type="checkbox"/>
136	283	<input type="checkbox"/>	<input type="checkbox"/>		139	295	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "F" (inboard side of header on the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
140	288	<input type="checkbox"/>	<input type="checkbox"/>

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RHR Spray Train B Nozzle Flow Verification

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Sector N1:

Between Chicago Bridge & Iron (CBI) Support CBI-19 (Az 297°) and Supply Header (Az 308°)

1 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air	
		Yes	No
141	301	<input type="checkbox"/>	<input type="checkbox"/>

3 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air			Nozzle	Approx Az	Passes Air	
		Yes	No				Yes	No
142	299	<input type="checkbox"/>	<input type="checkbox"/>		144	307	<input type="checkbox"/>	<input type="checkbox"/>
143	303	<input type="checkbox"/>	<input type="checkbox"/>					

Sector N2:

Between Supply Header (Az 308°) and Chicago Bridge & Iron (CBI) Support CBI-20 (Az 314°)

1 each - Nozzle Type "A" (top of header - rolled 10° inboard from vertical)

Nozzle	Approx Az	Passes Air	
		Yes	No
145	311	<input type="checkbox"/>	<input type="checkbox"/>

1 each - Nozzle Type "B" (outboard side of header 10° above the pipe centerline)

Nozzle	Approx Az	Passes Air	
		Yes	No
146	313	<input type="checkbox"/>	<input type="checkbox"/>

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**Appendix I
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Pretest Briefing Notes

It is recommended that the test performers who will be observing air flow through the containment spray header nozzles find an appropriate location on the polar crane to observe the nozzles.

It is recommended that the observer who uses the infrared viewer communicate with the polar crane operator with a sound powered headset or similar device.

It is recommended that the polar crane be rotated in increments during the test.

Nozzles passing flow will show up brighter than the spray ring header in the infrared viewer. Clogged nozzles will look the same as the header. (Refer to Memorandum L27820924803, Containment Spray Nozzle Flow Verification - Thermography Method.)

Once the air compressor starts supplying hot air to the spray ring header, it can take up to several hours to be able to observe the heating effects through the infrared viewer. Nozzle observations may begin when nozzles start to heat up and are clearly distinguishable from the spray ring header through the infrared viewer.

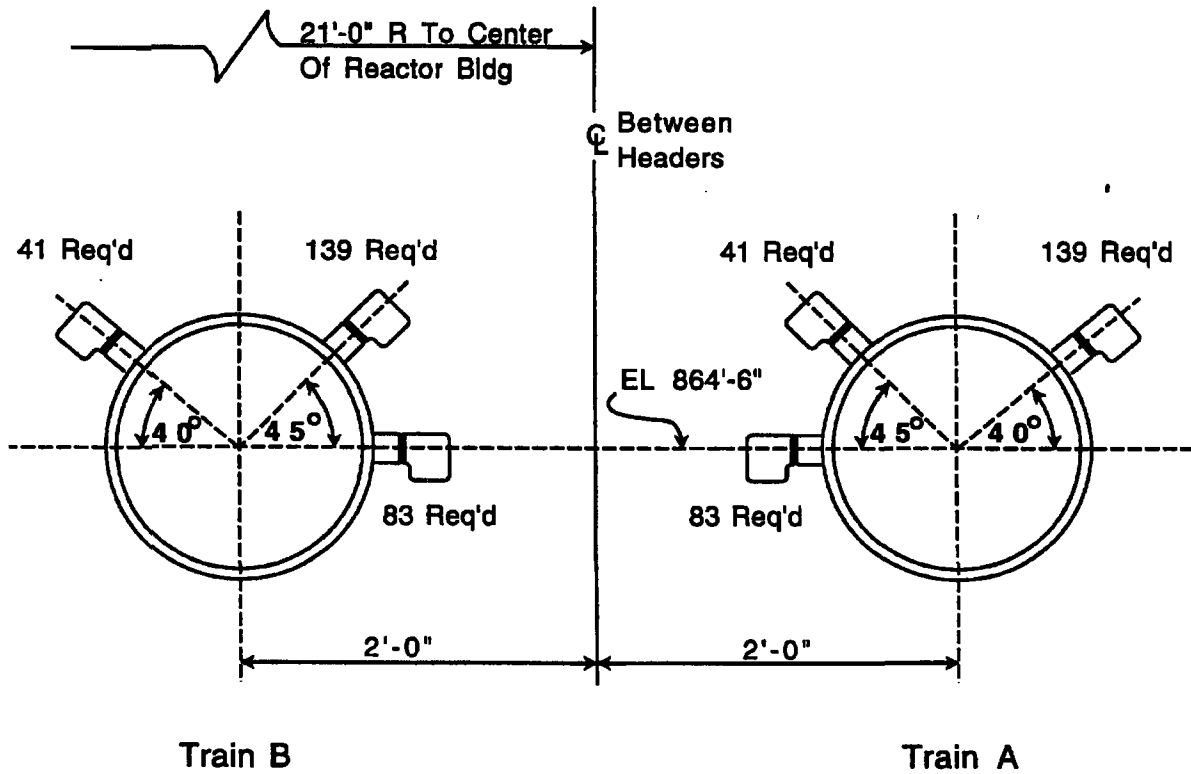
The spray ring header may initially appear to get warmer than the section of riser piping between the containment penetration and the spray ring header. This occurs because any residual water in the containment spray header is most likely to collect in this riser piping. The residual water has to evaporate before heating effects can be observed.

Exercise caution to minimize fall hazards when performing inspections from the polar crane wall and from areas near the ice condenser doors. Avoid walking on the ice condenser doors wherever possible. However, if it is necessary to walk on the ice condenser doors, use caution to avoid damaging insulation and insulation seals. Walking near the edge of the polar crane wall should be avoided.

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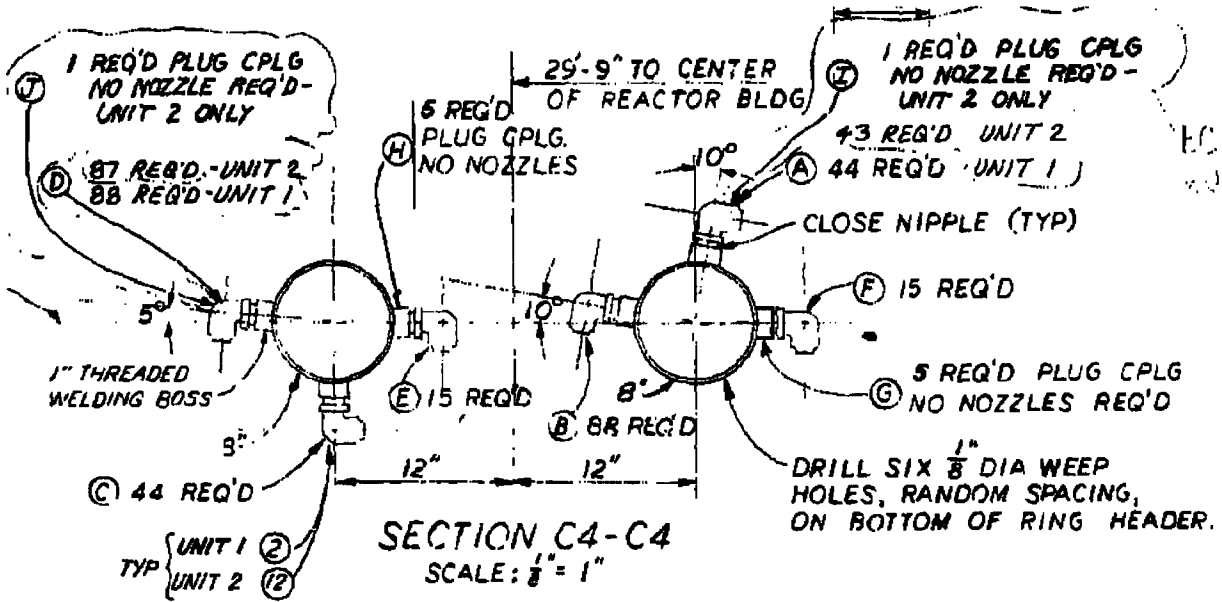
Containment Spray System Nozzle Orientation



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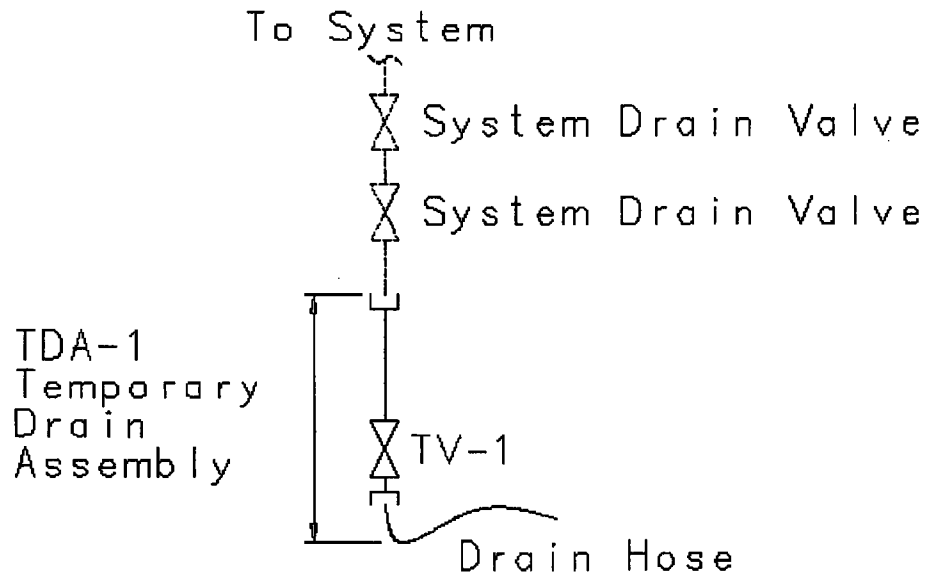
RHR Spray System Nozzle Orientation



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Temporary Drain Assembly (TDA) Connection



Typical Temporary Drain Assembly

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**Appendix M
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Air Blow Cleanliness**

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NOTES

- 1) This Appendix will be used to verify the cleanliness of the temporary air connections used in this procedure.
- 2) Additional copies of this Appendix can be made as needed.

[1] **IDENTIFY** which temporary air connection is being verified.

- | | |
|----------------------------|--------------------------|
| A. Containment Spray A | <input type="checkbox"/> |
| B. Containment Spray B | <input type="checkbox"/> |
| C. Residual Heat Removal A | <input type="checkbox"/> |
| D. Residual Heat Removal B | <input type="checkbox"/> |

[2] **OBTAIN** a clean white cloth. _____

WARNING

The air being tested will be at a high temperature and can cause personnel injury if appropriate precaution is not taken.

[3] **SECURE** the cloth to the discharge of the temporary air connection being verified. _____

[4] **SECURE** the temporary air hose to prevent whipping. _____

[5] **ENSURE** the pressure gauge on the test manifold is at greater than or equal to 70 psig AND **RECORD** the value.

_____ psig _____

[6] **BLOW** air through the line for at least 2 minutes. _____

[1] **IF** cloth shows any particulates, oil, moisture, or discoloration as determined by visual examination,
GO BACK to step [2].
 (Mark "N/A" if cloth is acceptable) _____

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- [7] **VERIFY** the test cloth shows no particulates, oil, moisture, or discoloration as determined by visual examination. _____

_____ **QC Inspector Signature** _____ **Date**