Sta. 4 (3)

OCT 29 1997 ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT 607820

2. To: (Receiving Organization) W-030 TEST REVIEW BOARD		3. From: (Originating Organization) DISPOSAL PROJECTS		4. Related EDT No.: 616326							
5. Proj./Prog./Dept./Div.: PROJECT W-030		6. Design Authority/ Design Agent/Cog. Engr.: D.B. Cole/S.R. Pierce		7. Purchase Order No.: NA							
8. Originator Remarks: Release of test report for pre-operational test of W-030 Raw Water System. Project W-030 provides the AY/AZ tank farms ventilation upgrade.				9. Equip./Component No.: NA							
				10. System/Bldg./Facility: AY/AZ Tank Farms							
				12. Major Assm. Dwg. No.: NA							
11. Receiver Remarks: 11A. Design Baseline Document? ☐ Yes ☒ No				13. Permit/Permit Application No.: NA							
				14. Required Response Date: Sept. 5, 1997							
15. DATA TRANSMITTED											
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition			
1	HNF-SD-W030-TD-006	-	0	W030 AY/AZ TANK FARM PREOP. TEST, RAW WATER SYSTEM	Q	2	1				
16. KEY											
Approval Designator (F)		Reason for Transmittal (G)			Disposition (H) & (I)						
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)		1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)			1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged						
17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
2	1	Design Authority	SR Pierce	9/3/97	55-13	2	1	GP Hopkins	9/3/97	10/21/97	
-	---	Design Agent	NA			3	---	LF Hill			
2	1	Cog. Eng.	DB Cole	9/3/97		3	---	MD Gerken			
2	1	Cog. Mgr.	KA Colosi	9/3/97		1	1	Jim Kenton	9-22-97	RI-56	
2	1	QA	HM Chafin	9-3-97							
3	---	Safety	WP Nelson								
18. Signature of EDT Originator		19. Authorized Representative for Receiving Organization		20. Design Authority/Cognizant Manager		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments					

BD-7400-172-2 (05/96) GEF07

BD-7400-172-1 (07/91)

PREOPERATIONAL TEST REPORT, RAW WATER SYSTEM

FT CLIFTON

NUMATEC HANFORD COMPANY, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: 607820 UC: 2030
Org Code: 8C473 Charge Code: NH107
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Key Words: TEST, WATER, VENTILATION, UPGRADE

Abstract: Preoperational test report for Raw Water System, Project W-030. Project W-030 provides a ventilation upgrade for the four Aging Waste Facility tanks.

The system supplies makeup water to the W-030 recirculation evaporative cooling towers for tanks AY101, AY102, AZ101, AZ102. The Raw Water pipe riser and associated strainer and valving is located in the W-030 diesel generator building. The tests verify correct system operation and correct indications displayed by the central Monitor and Control System.

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[Signature]
Release Approval

10/29/97
Date

Approved for Public Release

**W030 AY/AZ TANK FARM PREOPERATIONAL TESTING,
RAW WATER SYSTEM TEST REPORT**

ATTACHMENTS

Attachment 1 - Test Report Checklist.

Attachment 2 - Copy of original test procedure with recorded data, including:

Appendix A - List of Instrumentation Requiring Calibration Verification

Appendix B - Raw Water System Manual Valves Alignment

Appendix C - Manual Valve Cycle List

Appendix D - Signature/Initial Verification Table

Appendix E - Test Log

Test Data Sheets from Backflow Preventer Test Procedure S-CC-0044

Attachment 3 - Calculation: Maximum Required Raw Water System Flow

Attachment 4 - Calibration, Grooming, and Alignment (CGA) data

REFERENCES

1. WHC-SD-W030-POTP-006, Rev. 0 *Preoperational Test Procedure, Raw Water System*
2. SD-600-FDC-001, Rev. 3-B *Functional Design Criteria for the Tank Farm Ventilation Upgrade Project W-030*
3. H-2-131074 *P&ID Raw/Process Water Systems*
4. WHC-SD-W030-SUP-003 Rev. 0 *Startup Test Plan, W-030*

INTRODUCTION

Preoperational Test WHC-SD-W030-POTP-006 was performed in April 1996 without exceptions or deficiencies. All system instrumentation was calibrated and all system instrument loop checks were completed prior to testing in accordance with a Project W030 internal CGA Plan. CGA data are included in Attachment 4 to this report. All test actions were initiated and/or verified at the central control room graphic screens of the Monitor and Control System (MCS).

This test report includes a copy of the final approved test procedure, annotated with field test data and initialed by the Test Engineer. Recorded data were required primarily for information.

The Raw Water System operates as designed, and all components tested by this procedure operate satisfactorily, meeting the test objectives as outlined in reference-4 for the applicable system which is designed as shown on reference-3. Additional flow testing of the system will be performed in conjunction with the Recirc Condenser Cooling System Preoperational Test.

SUMMARY OF RESULTS

Acceptance Criteria: The following criteria were evaluated in the course of testing:

ITEM/FUNCTION	ACCEPTANCE CRITERIA	TEST RESULT
MANUAL VALVES	VALVES OPERATE PROPERLY	CRITERIA MET
HIGH DP ALARM ON STRAINER	ALARM ANNUNCIATES ON HIGH DP, RESETS ON RETURN	CRITERIA MET
LOW SYSTEM PRESSURE ALARM	ALARM ANNUNCIATES ON LOW SYSTEM PRESSURE, RESETS ON RETURN	CRITERIA MET
FLOW REGULATOR	MAINTAINS SYSTEM (DOWNSTREAM) PRESSURE AT 50 PSIG IN A FLOW CONDITION	CRITERIA MET
DUPLEX STRAINER	PRODUCES 0-3 PSID PRESSURE LOSS IN CLEAN CONDITION, WITH FLOW	CRITERIA MET
SYSTEM FLOW	MAX. 10 GAL/MIN REQUIRED; SUPPLIES ESTABLISHED TEST FLOW WITHOUT LOSS OF MAIN SUPPLY PRESSURE	CRITERIA MET (BASED ON FLOW OF 8 GAL/MIN ESTABLISHED FOR TESTING)
BACKFLOW PREVENTION VALVE ASSEMBLIES	PASSES MANDATED SITE OR INDUSTRY STANDARD TEST	CRITERIA MET

System Valve Tests: All manual valves were cycled and checked for proper operation. The system pressure control valve was verified to maintain a raw water supply pressure of 50 psig with demand (flow) on the system.

The Raw Water System contains two backflow prevention valve assemblies, both of which were tested in January 1996, prior to the preoperational test. Copies of the backflow preventer test data sheets are attached to this report for information.

System Alarm Tests: System alarms were verified during the preoperational test. Conditions were established locally to force the alarms for low system pressure and high differential pressure across the system strainer. The alarms were verified on applicable Monitor and Control System (MCS) computer graphics screens in the control room in Building 241-AZ-271.

Duplex Strainer and Flow Tests: A system flow of 7 to 8 gal/min was established via a hose bib to determine the differential pressure associated with a clean strainer and to verify the expected performance (0-3 psid). Only one side of the strainer was tested, as the opposite side was assumed to perform similarly. The test flow rate provides somewhat less than the maximum heat sink capability required for the system per the original design criteria (ref. SD-600-FDC-001, see also Attachment 3 to this report). However, the test flow rate was sufficient to demonstrate that the system can perform as designed.

Testing demonstrated that the system can supply at least 8 gal/min with no significant loss of supply (upstream) pressure, based on data recorded per Steps 5.2, 5.4, and 5.10. Initial readings, taken in a no-flow condition, included system pressure, upstream and downstream of the pressure regulator, and flow. In addition to local gauge pressure readings required by the procedure, a MCS readout for downstream pressure was recorded for comparison.

The readings were repeated after establishing flow, and again after adjusting the pressure regulator.

Test Notes: The test procedure required a Test Engineer's signature (but not the date of the signature) on some of the test steps. Signatures along with dates were provided on calibration verification sheets, valve alignment checklists, and valve cycling checklists (see Appendices A, B, and C), as well as the "prerequisite" steps in Sec. 4.0. Performance dates for specific test steps may be verified from archived work packages containing the original test record (see Attachment 1).

Test steps requiring a Test Engineer's signature were those which entailed either recording data, or verifying pretest conditions, system configuration, or expected operating conditions or responses which constitute the acceptance criteria for the test. Recorded data were required primarily for information.

ATTACHMENT 1 - TEST REPORT CHECKLIST			
ITEM	REQUIRED ACTION TO BE VERIFIED	INITIALS	DATE
1	Test completed per approved procedure	JTC	10/8/97
2	Required enclosures provided	JTC	10/8/97
	a. Summary of test results	JTC	10/8/97
	b. Signed/dated procedure validation sheet	JTC	10/8/97
	c. Applicable ECNs and NCRs N/A	JTC	10/8/97
	d. Onsite vendor test procedures/reports N/A	JTC	10/8/97
	e. Applicable/important vendor data N/A	JTC	10/8/97
	f. CVI list, Major equipment N/A	JTC	10/8/97
	g. Instrument and Loop calibration data	JTC	10/8/97
3	Test Exceptions (TEs) - Qty. <u>0</u>	JTC	10/8/97
	a. All listed in TE Log N/A	JTC	10/8/97
	b. All TE reports closed/signed/dated N/A	JTC	10/8/97
4	All applicable test steps signed/dated ⁽¹⁾	JTC	10/8/97
5	Test personnel	JTC	10/8/97
	a. All qualified ⁽²⁾	JTC	10/8/97
	b. All have signed/dated signature log	JTC	10/8/97
6	Recorded test data	JTC	10/8/97
	a. Summary of acceptance criteria incl.	JTC	10/8/97
	b. All required data entered	JTC	10/8/97
	c. All data meets acceptance criteria ⁽³⁾	JTC	10/8/97
7	Related Acceptance Test Report (ATR) ⁽⁴⁾	JTC	10/8/97
	a. Report No: N/A	JTC	10/8/97
	b. TEs covered in this test: N/A ⁽⁴⁾	JTC	10/8/97
8	Filename, original test record <u>ZE-96-00282</u>	JTC	10/8/97

- NOTES: 1. All test steps are signed off by the responsible person. Where the signoff date is not noted, the test summary presents appropriate disposition (Test Notes).
2. No personnel qualification standard was established for this test beyond that required to perform the responsibilities listed in section 2.3. The individuals assigned were deemed qualified by their management.
3. Where acceptance criteria was not specified in the procedure, it is addressed in the test report.
4. For description of ATR issues, see Test Report (Test Notes).

ATTACHMENT 2

COPY OF ORIGINAL TEST PROCEDURE

WITH RECORDED DATA

VERIFICATION / VALIDATION CHECKSHEET

PROCEDURE NUMBER: WHC-SD-W030-POTP-006 REVISION NUMBER: 0

PROCEDURE TITLE: Preoperational Testing, Raw Water

VERIFICATION

PROCEDURE WRITER: Gary Howell DATE: 3/6/1996

PEER REVIEWER: Shall Meyer DATE: 3/7/1996

VALIDATION

OPERATOR: T.K. Meyer DATE: 3/8/1996

The operator performing the validation must be familiar with area and the systems involved. If there are any NO responses, the Operator shall document the reason in the DISCREPANCIES Section and ensure that the pertinent information is forwarded to the Procedure Writer for resolution.

Shift Manager/RE Review: A. Stithing DATE: 3/8/96

VERIFICATION

COGNIZANT ENGINEER: Carol R. R. R. DATE: 3/16/96

Review validation comments and ensure proper disposition of validation comments.

Verify that this checksheet can be completed without any NO responses. If there are any NO responses, the justification shall be explained and documented in the DISCREPANCIES Section.

PREOPERATIONAL TESTING, RAW WATER SYSTEM

HNF-SD-W030-TD-006,
REV. 0, PAGE 7Revision No. 0

Effective Date _____

Author/Cognizant Engineer

J.V. Johnston
Print Name/SignatureAPPROVAL DESIGNATOR SO

PROCEDURE APPROVAL BY TEST REVIEW BOARD (TRB)

<u>James Clifton</u> TRB Chair	<u>3/28/96</u> Date	<u>M.D. Landry</u> TWRS Operations	<u>3/28/96</u> Date
<u>[Signature]</u> TWRS Engineering	<u>3/28/96</u> Date	<u>W.P. O'Neal</u> TWRS Safety	<u>4/1/96</u> Date
<u>Thomas B. Howell</u> Construction Projects Startup	<u>3/28/96</u> Date	<u>Harold M. Chapin</u> Quality Assurance	<u>3/28/96</u> Date
<u>[Signature]</u> Project Management	<u>4/1/96</u> Date	<u>N/A</u> ICF-KH Construction	<u> </u> Date

The original signatures are on file.

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ATTACHMENTS:

Attachment A - PREOPERATIONAL TESTING, RAW WATER SYSTEM

PREOPERATIONAL TESTING, RAW WATER SYSTEM

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1.0 PURPOSE

- 1.1 This procedure has been prepared to verify the Raw Water System (RWS) operates in accordance with system design.

2.0 INFORMATION

2.1 SCOPE

- 2.1.1 This procedure will demonstrate the operation of the following "components" and "system" operations in the RWS (supplies makeup water to Evaporative Fluid Cooling Towers) for Tanks AY101, AY102, AZ101 and AZ102:

Components

- Duplex Strainer
- Backflow Preventers (2)
- PCV Control Valve
- RWS Instrumentation

- 2.1.2 Interfacing systems include Recirculation Condenser Cooling (provides make-up water to the Evaporative Fluid Cooling Towers) and Monitoring and Control.

- 2.1.3 This test will demonstrate the mechanical and electrical operation for both local and remote functions.

2.2 TERMS AND DEFINITIONS

- 2.2.1 HS - Hand Switch
2.2.2 LOI - Local Operator Interface device
2.2.3 MCS - Monitoring Control system
2.2.4 PCV - Pressure Control Valve
2.2.5 PCL - Process Logic Control
2.2.6 PI - Pressure Indicator
2.2.7 POTP - Preoperational Testing Procedure
2.2.8 RPBA - Backflow Preventer

2.3 RESPONSIBILITIES

- 2.3.1 The Craft (TWRS Maintenance and/or Construction Forces) personnel are responsible for:
- Providing assistance during POTP testing.

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2.3.2 Test Director (TD) responsibilities:

- Safe and productive accomplishment of the tests necessary to achieve startup.
- Ensure safe working conditions and practices.
- Ensure compliance with test documents, Operational Safety Requirements/Documents (OSRs/OSDs) during testing.
- Communicate and coordinate the tests with the East Tank Farm Shift Manager.
- Ensure appropriate review/approval of any modifications to test procedures are completed prior to returning to work
- Direct line of communication and centralized point of control during normal, abnormal, and casualty situations.
- Provides the M&TE equipment found in STEP 4.8 of this procedure.
- Conducts pre-job planning meeting as necessary.
- Scheduling/rescheduling of the test as required.
- Delegates any of the above responsibilities as needed to a deputy.

2.3.3 The Test Engineering Personnel (TEP) responsibilities:

- Providing technical support during testing.
- Providing programming support during testing.
- Forcing data in PLC program during testing.
- Direct preoperational testing
- Review test documents to validate acceptance.
- Prepare post testing documents
- Records equipment status and data per this procedure.
- Conducts pre-job system walkdown.
- Recording data exceptions and other notes as required on the POTP Data Sheets.

2.3.4 Operations Personnel (OP) responsibilities:

- Observing test activities for training purposes.

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2.4 CHANGE CONTROL

2.4.1 Test procedure administrative or editorial changes required during testing may be accommodated as exceptions in the released test report, if the changes will not affect operating facility safety, function, or performance and will not compromise or influence test data. Requirement changes, changes to acceptance criteria, or changes to Danger, Caution, Special Precautions, or other safety or environmental instructions in test procedures prepared as supporting documents must be made by engineering change notice.

2.5 EXCEPTIONS

2.5.1 Exceptions to results or to the test procedure will be given a sequential number and recorded on Appendix G, Test Exception log sheet. A test exception report, Appendix F, will be filled out to record and disposition each test exception.

2.6 REFERENCES

2.6.1 The following documents were used to write or are referenced in this procedure:

- Project W-030 Startup Test Plan Rev 0, WHC-SD-W030-SUP-003
- H-2-131074 Rev 0, Sht 1 of 1, P&ID Raw/Process Water Systems
- H-2-131067 Rev 0, Sht 1 of 1, P&ID AY101EW Recirc Cond Cooling
- H-2-131068 Rev 0, Sht 1 of 1, P&ID AY102EW Recirc Cond Cooling
- H-2-131069 Rev 0, Sht 1 of 1, P&ID AZ101EW Recirc Cond Cooling
- H-2-131070 Rev 0, Sht 1 of 1, P&ID AZ102EW Recirc Cond Cooling
- Tank Farm Ventilation Upgrade, W-030-C2
- Tank Farm Ventilation Upgrade, W-030-C3
- W-030-P1 Rev 1 (12/14/93) Evaporative Cooling Tower
- W-030-P9 Rev 0 (9/10/92) Tank Farm Pressure Transmitter Enclosure

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2.7 ENVIRONMENTAL

- 2.7.1 Hazardous and mixed waste should be disposed of according to TO-100-052, or by calling Environmental Waste Operations at 372-1208.

2.8 SAFETY

Warning - In addition TO contamination hazards, operators should be aware of the possibility of coming into contact with poisonous snakes and spiders.

- 2.8.1 The following administrative procedures control work performed in this POTP:

- Safety Manual, WHC-CM-1-10
- Industrial Hygiene Manual, WHC-CM-1-11
- Tank Farm Health and Safety Plan, (HASP)
WHC-SD-WM-HSP-002

2.9 RADIATION AND CONTAMINATION CONTROL

- 2.9.1 The work covered by this procedure is performed outside of the tank farm and does not require entry into a radiation/contamination control area.

2.10 QUALITY ASSURANCE

- 2.10.1 No Quality Assurance witness, holdpoints or verifications are required in this procedure. Quality Assurance shall review and approve the test procedure, the final test report and the disposition of all test exceptions.

2.11 GENERAL INFORMATION

- 2.11.1 Active RWS interlocks - NONE.

PREOPERATIONAL TESTING, RAW WATER SYSTEM

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2.12 LIMITS AND PRECAUTIONS

- 2.12.1 If during performance of this procedure, any of the following conditions are found, immediately notify the assigned TD and TEP:
- Any equipment malfunction which could prevent fulfillment of it's functional requirements.
 - Personnel error or procedural inadequacy which could prevent fulfillment of procedural requirements.
- 2.12.2 The TD and TEP may choose TO stop work and place equipment in a safe condition based on the significance of the malfunction, error or inadequacy.
- 2.12.3 Contact TD and TEP for additional instructions if changing plant conditions affect work or delays in work extend past end of the (testing) shift.
- 2.12.4 If any waste is generated during performance of this instruction consult Facility/Plant/Area Hazardous Waste Coordinator for specific instructions TO ensure compliance with WHC and DOE environmental standards, as applicable, for correct disposal. Waste water from this test will be used in testing the Primary Vent Condensate System.
- 2.12.5 Comply with WHC and plant/facility specific lock and tag or over-tagging requirements, as applicable.
- 2.12.6 All Measuring and Test Equipment (M&TE) used during performance of this procedure TO collect qualitative data with the exception of "timing devices", shall meet the following requirements:
- Be within its current calibration cycle as evidenced by an affixed calibration label.
 - Be capable of the desired range.
 - Have an accuracy (consistent with state-of-the-art limitations) equal TO or greater than the accuracy specified in the procedure.
 - Any M&TE used in the test should be recorded in the Test Log.

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- 2.12.7 Timing measurements shall be made with commercially available timing devices.
- 2.12.8 The Test Director (TD) has overall control of the testing process and change record authorization for this POTP. The TD is responsible for conducting the test, data collection, and ensuring compliance with all POTP requirements.
- 2.12.9 All test data readings are to be taken and recorded for each location where the capability exists (i.e. local instrument, LOI, OS).

3.0 RECORDS

- 3.1 This RWS POTP as well as all completed attachments/appendices will be filed as a permanent test record.

4.0 PREREQUISITES

NOTE: Unless otherwise specified, prerequisite actions may be performed in any order.

- 4.1 Perform a pretest briefing for all personnel involved in the performance of this POTP.
Test Director [Signature] Date 4/4/96
- 4.2 Perform a walkdown inspection of the systems tested by this POTP.
Test Director [Signature] Date 4/4/96
- 4.3 Two way portable radio communication between the control room and equipment locations has been verified.
Test Director [Signature] Date 4/4/96
- 4.4 The official POTP copy and all other photocopies that will be used during testing have been verified to be the latest approved/released document revision.
Test Director [Signature] Date 4/4/96
- 4.5 The Test Director has verified, by reviewing the TAG LOGBOOK and walkdown of RWS systems being tested, that all components within and including the test boundary have been "BLUE" tagged.
Test Director [Signature] Date 4/4/96

PREOPERATIONAL TESTING, RAW WATER SYSTEM

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- 4.6 All open items have been evaluated and verified to not affect the POTP performance (Quality Assurance Nonconformance Reports <NCRs>, Construction Punch Lists, outstanding Engineering Change Notices <ECNs>, Startup-originated Design Change Requests <CRs>, Test Deficiency Reports, and Master System Punch List items).

Test Director *[Signature]* Date 4/3/96

- 4.7 All personnel who will be involved with this procedure have provided the required signature verification information in Appendix D.

Test Director *[Signature]* Date 4/4/96

4.8 EQUIPMENT/INSTRUMENTS

4.8.1 A 50 foot length of standard garden hose.

4.8.2 A clean 55 gallon drum for water collection.

4.8.3 A Buffalo Valve operator.

5.0 PROCEDURE

- 5.1 Preoperational testing of the Raw Water System shall be performed using "Attachment A" of this procedure.

PREOPERATIONAL TESTING, RAW WATER SYSTEM

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ATTACHMENT A

Effective Date _____

1.0 INITIAL CONDITIONS

None

- 2.0 VERIFY all system instrumentation in Appendix A is calibrated and has a current calibration tag affixed to each instrument and that all system loop calibrations are complete.

Test Engineer: ZB/H

- 3.0 VERIFY the SYSTEM IS ALIGNED for preoperational testing in accordance with Appendix B.

Test Engineer: ZB/H

- 4.0 CYCLE all MANUAL VALVES, listed in Appendix C, full travel and verify proper operation. (See steps 4.1 and 4.2 for Cycling Manual Valves HV-AZRW-14A AND HV-AZRW-14B)

Test Engineer: ZB/H

- 4.1 CYCLE MANUAL VALVE HV-AZRW-14A as follows:

4.1.1 CLOSE MANUAL VALVE HV-AZRW-13A

4.1.2 CYCLE MANUAL VALVE HV-AZRW-14A

4.1.3 OPEN MANUAL VALVE HV-AZRW-13A

Test Engineer: ZB/H

- 4.2 CYCLE MANUAL VALVE HV-AZRW-14B

4.2.1 CLOSE MANUAL VALVE HV-AZRW-13B

4.2.2 CYCLE MANUAL VALVE HV-AZRW-14B

4.2.3 OPEN MANUAL VALVE HV-AZRW-13B

Test Engineer: ZB/H

- 4.3 RECORD ALL Valve Deficiencies in Appendix E, Test Log.

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ATTACHMENT A

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5.0 DUPLEX STRAINER (AZ-RW-F-1)

- 5.1 CONNECT garden hose to hose bib HV-AZRW-14A and ~~PLACE free end of~~ ^{4 1/2"} hose in clean 55-gallon drum. ~~at~~ ^{During Test Spray on Ground,}

- 5.2 RECORD the following system data:

System Pressure at PI-AZRW-1A	<u>154</u>	psig (local)
System Pressure at PI-AZRW-1B	<u>54</u>	psig (local)
Duplex Strainer D/P at DPI-AZRW-1	<u>0</u>	psid (MCS)
System Flow at FI-AZRW-1	<u>0</u>	gpm (MCS)
System Total flow	<u>0.00</u>	gallons (MCS)
	<u>55</u>	psig (MCS) <u>787H</u>

Test Engineer: 787H

- 5.3 OPEN hose bib HV-AZRW-14A fully to establish flow on Raw Water System.

- 5.4 RECORD the following system data:

System Pressure at PI-AZRW-1A	<u>152</u>	psig (local)
System Pressure at PI-AZRW-1B	<u>46</u>	psig (local)
Duplex Strainer D/P at DPI-AZRW-1	<u>0</u>	psid (MCS)
System Flow at FI-AZRW-1	<u>7</u>	gpm (MCS)
System Total flow	<u>0.00</u>	gallons (MCS)
	<u>44</u>	psig <u>787H</u>

Test Engineer: 787H

- 5.5 ADJUST PCV-AZRW-1 as necessary to maintain downstream pressure at approximately 50 psig.

- 5.6 SLOWLY CLOSE PDIT-AZRW-1 low side isolation valve. HV-AZRW-5, to initiate the high differential pressure alarm at the MCS.

- 5.7 VERIFY High Differential Pressure alarm PDAH-AZRW-1 is received on the MCS.

Test Engineer: 787H

- 5.8 OPEN PDIT-AZRW-1 low side isolation valve. HV-AZRW-5.

- 5.9 VERIFY High Differential Pressure alarm PDAH-AZRW-1 is reset on the MCS.

Test Engineer: 787H

PREOPERATIONAL TESTING, RAW WATER SYSTEM

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ATTACHMENT A

Effective Date _____

5.10 RECORD the following system data:

System Pressure at PI-AZRW-1A	<u>153</u>	psig (local)
System Pressure at PI-AZRW-1B	<u>50</u> 50 ⁵⁰	psig (local)
Duplex Strainer D/P at DPI-AZRW-1	<u>0</u>	psid (mcs)
System Flow at FI-AZRW-1	<u>8</u>	gpm (MCS)
System Total flow	<u>19</u>	gallons (MCS)
	<u>50 psig (mcs)</u> ⁵⁰	

Test Engineer: ZAH

5.11 CLOSE hose bib HV-AZRW-14A.

NOTE - The water collected in the 55 gallon drum will be used in testing the Primary Vent Condensate System.

5.12 DISCONNECT the garden hose and store for future use.

5.13 VERIFY that PCV-AZRW-1 maintained RWS pressure at approximately 50 psig in step 5.10.

Test Engineer: ZAH

5.14 CLOSE PT-AZRW-1 isolation valve HV-AZRW-7.

5.15 LOOSEN fitting at valve and BLEED pressure from instrument line.

5.16 VERIFY low pressure alarm PAL-AZRW-1 is received at MCS.

Test Engineer: ZAH

5.17 TIGHTEN fitting at valve.

5.18 OPEN PT-AZRW-1 isolation valve HV-AZRW-7.

5.19 VERIFY low pressure alarm PAL-AZRW-1 is reset at MCS.

Test Engineer: ZAH

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6.0 BACK FLOW PREVENTION VALVES (AZ-RW-BP-1 & 2)

- 6.1 PERFORM, if necessary, RPBA (AZ-RW-BP-1) testing using Maintenance Procedure S-CC-0044, Test Reduced Pressure Backflow Assemblies Using Midwest Model 830 Test Kit.

Test Engineer: ZAH

- 6.2 PERFORM, if necessary, RPBA (AZ-RW-BP-2) testing using Maintenance Procedure Maintenance Procedure S-CC-0044, Test Reduced Pressure Backflow Assemblies Using Midwest Model 830 Test Kit.

Test Engineer: ZAH

7.0 Secure From POTP

- 7.1 VERIFY that all temporary test equipment has been removed from the RWS.

Test Engineer: ZAH

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APPENDIX A - List of Instrumentation Requiring Calibration Verification

Equipment Number	Functional Description	Signature	Date/Time
PI-AZRW-1A	Raw Water Pressure Indicator (PI) located before Duplex Strainer in North East Room of 241-AZ-701.	R. Gutierrez	4/3/96 1500
PDIT AZRWF-1	Raw Water Duplex Strainer (AZ-RW-F-1) Differential Pressure Indicating Transmitter in North East Room of 241-AZ-701.	R. Gutierrez	4/3/96 1600
PI-AZRW-1B	Raw Water Pressure Indicator (PI) located before Flow Totalizer Indicator in North East Room of 241-AZ-701.	R. Gutierrez	4/3/96 1600
PT AZRW-1	Raw Water Pressure Transmitter located before Flow Totalizer in North East Room of 241-AZ-701.	R. Gutierrez	4/3/96 1600
FT AZRW-1	Raw Water Flow Transmitter in North East Room of 241-AZ-701.	R. Gutierrez	4/3/96 1600

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Appendix B - RWS Manual Valves Alignment

VALVE NUMBER	VALVE NAME	REQUIRED POSITION	INITIALS	IV
HV-AZRW-1	2" Raw Water System (PCV) Block Valve in ^{241-AZ-701} handhole outside of 241-AZ-701	OPEN	RG	cl
HV-AZRW-2	2" RW-AZ400-M5 Header Block Valve in North East Room of 241-AZ-701	OPEN	CR	T.L.R.
HV-AZRW-3	Gauge PI-AZRW-1A Isolation Valve in North East Room of 241-AZ-701	OPEN	RG	cl
HV-AZRW-4	XMTR PDT-AZRW-1 Isolation Valve (Hi leg) in North East Room of 241-AZ-701	OPEN	RG	cl
HV-AZRW-5	XMTR PDT-AZRW-1 Isolation Valve (Lo leg) in North East Room of 241-AZ-701	OPEN	RG	cl
HV-AZRW-6	1/2" RW-AZ401-M5 Diesel Generator Building Swamp Cooler, ECU-1, supply valve in North East Room of 241-AZ-701	CLOSED	RG	cl
HV-AZRW-7	XMTR PT-AZRW-1 Isolation Valve in North East Room of 241-AZ-701	OPEN	RG	cl
HV-AZRW-8	2" Transmitter FT-AZRW-1 Isolation Valve (upstream) in North East Room of 241-AZ-701	OPEN	RG	cl
HV-AZRW-9	2" Transmitter FT-AZRW-1 Isolation Valve (downstream) in North East Room of 241-AZ-701	OPEN	RG	cl
HV-AZRW-10	2" Transmitter FT-AZRW-1 Bypass Valve in North East Room of 241-AZ-701	CLOSED	RG	cl
HV-AZRW-11	1 1/2" RW-AY402-M5 Branch Block Valve in North East Room of 241-AZ-701	OPEN	CR	T.L.R.
HV-AZRW-12	1 1/2" RW-AY402-M5 Branch Block Valve in North East Room of 241-AZ-701	OPEN	CR	T.L.R.
HV-AZRW-13A	1" RW-AZ405-M5 Branch Block Valve in North East Room of 241-AZ-701	CLOSED	RG	cl

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Appendix B - RWS Manual Valves Alignment

VALVE NUMBER	VALVE NAME	REQUIRED POSITION	INITIALS	IV
HV-AZRW-13B	1" RW-AZ406-M5 Branch Block Valve in North East Room of 241-AZ-701	CLOSED	RG	<i>[Signature]</i>
HV-AZRW-14A	1" RW-AZ405-M10 Hose Bib With Block Valve located outside of 241-AZ-702 North East Side	CLOSED	RG	<i>[Signature]</i>
HV-AZRW-14B	1" RW-AZ406-M10 Hose Bib With Block Valve located outside of 241-AZ-702 South West Side.	CLOSED	RG	<i>[Signature]</i>
HV-AY101-RW-1	1" Tower AY101-EW-T-1 Raw Water Supply Block Valve at AY101 Evaporator Skid	CLOSED	RG	<i>[Signature]</i>
HV-AY102-RW-1	1" Tower AY102-EW-T-1 Raw Water Supply Block Valve at AY102 Evap Skid	CLOSED	RG	<i>[Signature]</i>
HV-AZ101-RW-1	1" Tower AZ101-EW-T-1 Raw Water Supply Block Valve at AZ101 Evap Skid	CLOSED	RG	<i>[Signature]</i>
HV-AZ102-RW-1	1" Tower AZ102-EW-T-1 Raw Water Supply Block Valve at AZ102 Evap Skid	CLOSED	RG	<i>[Signature]</i>
	Back Flow Preventer AZ-RW-BP-1 Inlet isolation valve in North East Room of 241-AZ-701	OPEN	RG	<i>[Signature]</i>
	Back Flow Preventer AZ-RW-BP-1 Outlet isolation valve in North East Room of 241-AZ-701	OPEN	RG	<i>[Signature]</i>
	Back Flow Preventer AZ-RW-BP-2 Inlet isolation valve in North East Room of 241-AZ-701	OPEN	RG	<i>[Signature]</i>

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Appendix B - RWS Manual Valves Alignment

VALVE NUMBER	VALVE NAME	REQUIRED POSITION	INITIALS	IV
	Back Flow Preventer AZ-RW-BP-2 Outlet isolation valve in North East Room of 241-AZ-701	OPEN	RG
	Diesel Generator Building Swamp Cooler, ECU-1, supply line drain valve in North East Room of 241-AZ- 701	CLOSED	RG
IV-AZRW-15	Raw Water Supply to Control Room Humidifier located inside of humidifier cabinet.	OPEN	RG

rmcd
Rich Gutierrez RG 4-3-96 Verified BY

Gary Helms CH 4-5-96
PRINT NAME INITIALS DATE

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APPENDIX C - MANUAL VALVE CYCLE LIST

Valve Number	Valve Description	Signature/ Date/Time
HV-AZRW-1	2" Raw Water System (PCV) Block Valve in valve pit outside of 241-AZ-701.	<i>C. Hanning</i> 4-4-96 0900
HV-AZRW-2	2" RW-AZ400-M5 Header Block Valve in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
HV-AZRW-3	Gauge PI-AZRW-1A Isolation Valve in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
HV-AZRW-4	XMTR PDT-AZRW-1 Isolation Valve (Hi leg) in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
HV-AZRW-5	XMTR PDT-AZRW-1 Isolation Valve (Lo leg) in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
HV-AZRW-6	1/2" Diesel Generator Building Swamp Cooler, ECU-1, Supply Valve in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
HV-AZRW-7	XMTR PT-AZRW-1 Isolation Valve in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
HV-AZRW-8	2" Transmitter FT-AZRW-1 Isolation Valve (upstream) in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
HV-AZRW-9	2" Transmitter FT-AZRW-1 Isolation Valve (downstream) in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
HV-AZRW-10	2" Transmitter FT-AZRW-1 Bypass Valve in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
HV-AZRW-11	1 1/2" RW-AY402-M5 Branch Block Valve in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
HV-AZRW-12	1 1/2" RW-AY402-M5 Branch Block Valve in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
IV-AZRW-13A	1" RW-AZ405-M5 Branch Block Valve in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900
IV-AZRW-13B	1" RW-AZ406-M5 Branch Block Valve in North East Room of 241-AZ-701	<i>C. Hanning</i> 4-4-96 0900

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APPENDIX C - MANUAL VALVE CYCLE LIST

Valve Number	Valve Description	Signature/ Date/Time
IV-AY101-RW-1	1" Tower AY101-EW-T-1 Raw Water Supply Block Valve at AY101 Evap Skid	<i>Colburn</i> 4-4-96 0900
IV-AY102-RW-1	1" Tower AY102-EW-T-1 Raw Water Supply Block Valve at AY102 Evap Skid	<i>Colburn</i> 4-4-96 0900
IV-AZ101-RW-1	1" Tower AZ101-EW-T-1 Raw Water Supply Block Valve at AZ101 Evap Skid	<i>Colburn</i> 4-4-96 0900
HV-AZ102-RW-1	1" Tower AZ102-EW-T-1 Raw Water Supply Block Valve at AZ102 Evap Skid	<i>Colburn</i> 4-4-96 0900
	Back Flow Preventer AZ-RW-BP-1 Inlet isolation valve in North East Room of 241-AZ-701	<i>Colburn</i> 4-4-96 0900
	Back Flow Preventer AZ-RW-BP-1 Outlet isolation valve in North East Room of 241-AZ-701	<i>Colburn</i> 4-4-96 0900
	Back Flow Preventer AZ-RW-BP-2 Inlet isolation valve in North East Room of 241-AZ-701	<i>Colburn</i> 4-4-96 0900
	Back Flow Preventer AZ-RW-BP-2 Outlet isolation valve in North East Room of 241-AZ-701	<i>Colburn</i> 4-4-96 0900
	Diesel Generator Building Swamp Cooler, ECU-1, supply line drain valve in North East Room of 241-AZ-701	<i>Colburn</i> 4-4-96 0900
HV-AZRW-15	Raw Water Supply to Control Room Humidifier located inside of humidifier cabinet.	<i>Colburn</i> 4-4-96 0900

Effective Date _____

persons involved in procedure performance, data recording, and verification or evaluation test steps shall provide their name, job title, signature, and initials in the following e.

[illegible]

ATTACHMENT A

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TEST LOG

TEST NUMBER:

TEST LOG
PAGE NUMBER:

 of

TEST TITLE:

PCTP - 206 RAW WATER

TIME/DATE

[illegible]

0500 / 4-4-96

TEST COMPLETED SAT.

U. P. J.

MAINTENANCE ENGINEERING SERVICES	APPROVAL LEVEL SQ	PROC. NO. S-CC-0044
MAINTENANCE PROCEDURE		REV. 1, CHG. B
TEST REDUCED PRESSURE BACKFLOW ASSEMBLIES		PAGE 13 of 14
USING MIDWEST MODEL 830 TEST KIT		

DATA SHEET (Sheet 1 of 2)

W-030-C2 spec.
(FPA)

6.0 PREREQUISITES

6.1 & 6.3 Applicable notifications completed.

E. F. ENLOE JR
PIC/Supervisor

1/3/96
Date

6.2 Instrument Type MIDWEST 830
Calibration No. 535-31-04-053

Expiration Date 3/12/96

6.4 Test equipment calibration is current.

E. F. ENLOE JR.
PIC/Supervisor

1/3/96
Date

7.0 INSTRUCTIONS

7.1.2 Device WATTS 55 P. HGT 2" 65782
Manufacturer Model Size Ser. No.

Building No. 241-AZ-701 Location GENERATOR FACILITY

TEST	7.2.15* RELIEF VALVE	7.3.2/7.3.3** CHECK VALVE NO. 1	7.4.5/7.4.6 CHECK VALVE NO. 2
RESULTS	1. Opened @ <u>3</u> psid 2. Did Not Open <u> </u>	1. Leaked <u> </u> 2. Closed Tight <u>X</u> @ <u>8.3</u> psid	1. Leaked <u> </u> 2. Closed Tight <u>X</u> @ <u>8.7</u> psid

*Valve must open at 2 psi or higher.

**Pressure Difference (subtract 7.2.15 from 7.3.2): 5.0 psid (>3 psid O.K.
<3 psid alert)

Unit Passed Test E. F. ENLOE JR
Tester

Unit Failed Test
Tester

MAINTENANCE ENGINEERING SERVICES APPROVAL LEVEL SQ	PROC. NO. S-CC-0044
MAINTENANCE PROCEDURE	REV. 1, CHG. B
TEST REDUCED PRESSURE BACKFLOW ASSEMBLIES	PAGE 13 of 14
USING MIDWEST MODEL 830 TEST KIT	

DATA SHEET (Sheet 1 of 2)

W-030-C2 Spec
(FPA)

6.0 PREREQUISITES

6.1.8 Applicable notifications completed.

6.3 E. F. ENLOE JR
PIC/Supervisor

1/3/96
Date

6.2 Instrument Type MIDWEST 830
Calibration No. 535-31-04-053

Expiration Date 3 123 196

6.4 Test equipment calibration is current.

E. F. ENLOE JR
PIC/Supervisor

1/3/96
Date

7.0 INSTRUCTIONS

7.1.2 Device WATTS QT 1" 58920
Manufacturer Model Size Ser. No.

Building No. 24-AZ-701 Location GENERATOR FACILITY

TEST	7.2.15* RELIEF VALVE	7.3.2/7.3.3** CHECK VALVE NO. 1	7.4.5/7.4.6 CHECK VALVE NO. 2
RESULTS	1. Opened @ <u>3</u> psid 2. Did Not Open <u> </u>	1. Leaked <u> </u> 2. Closed Tight <u>X</u> @ <u>7.3</u> psid	1. Leaked <u> </u> 2. Closed Tight <u>X</u> @ <u>6.8</u> psid

*Valve must open at 2 psi or higher.

**Pressure Difference (subtract 7.2.15 from 7.3.2): 4.3 psid (>3 psid O.K.
<3 psid alert)

Unit Passed Test Enloe
Tester

Unit Failed Test
Tester

ATTACHMENT 3: CALCULATION OF MAXIMUM REQUIRED RAW WATER SYSTEM DEMAND.

The following calculation shows that the maximum demand on the W-030 Raw Water System will be 10 gal/min or less (neglecting additional cooling provided by primary exhaust ventilation).

Given:

Per SD-600-FDC-001, Rev. 3-B, the ventilation system must remove a total heat load of 4.66 million Btu/hr from the waste tanks (1.66 million Btu/hr from AZ-101 and 1 million from each of the other tanks). Heat removal is achieved by a combination of recirculation cooling and once-through (primary) ventilation flow.

Assume the Recirc. Cooling System consumes (evaporates) 1 lb of water for every 1000 Btu of heat removed, to be replaced at a constant makeup rate by the Raw Water System.

Neglect heat removal by the primary airflow (conservative).

Neglect raw water consumed by the Generator Building swamp cooler, the control room humidifier, and the hose bibs, as minor intermittent uses. Also, the system P&ID shows no raw water uses other than those mentioned here.

Find: Raw water demand, in gallons per minute.

Solution:

$$\begin{aligned}\text{DEMAND, gal/min} &= 4,660,000 \text{ Btu/hr} \\ &\div [(1000 \text{ Btu/lb}_{\text{H}_2\text{O}})(8.3 \text{ lb}_{\text{H}_2\text{O}}/\text{gal}_{\text{H}_2\text{O}})(60 \text{ min/hr})] \\ &= 9.4 \text{ gal/min } (\approx 10 \text{ gal/min})\end{aligned}$$

ATTACHMENT 4

CALIBRATION, GROOMING, AND ALIGNMENT PLAN WITH CALIBRATION DATA

CONTENTS:

1. Calibration, Grooming, and Alignment Plan for Project W-030 (unreleased document).
2. Instrument Loop Signoff Sheets with list of applicable loop drawings (see note below).
3. Instrument loop calibration sheets, each followed by related field instrument cal. sheets.
4. Instrument cal. sheets for (non-loop) local instruments.

NOTE: Generally, "loops" refers to those instruments related to the central Monitor and Control System (MCS), although there are some non-MCS "local loops" as noted in the signoff sheets. Loop data sheets are attached in the order shown on the loop signoff sheets. Generally, each loop will include a loop-test data sheet, followed by its associated field-instrument calibration data sheet (with the most recent data presented first) and any other relevant calibration information. Additional supporting data may be found in the archived original test records.

CALIBRATION, GROOMING, AND ALIGNMENT PLAN

FOR PROJECT W-030

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TANK FARM VENTILATION UPGRADE

PLAN APPROVAL

<u> </u>	<u>3/6/96</u>	<u> </u>	<u>3-7-96</u>
Startup Manager	Date	TWRS Operations	Date
<u> </u>	<u>3/6/96</u>	<u> </u>	<u>3-7-96</u>
TWRS Engineering	Date	TWRS Maintenance	Date
<u> </u>	<u>3-6-96</u>	<u> </u>	<u>3-7-96</u>
Construction Projects Startup	Date	Quality Assurance	Date
<u> </u>	<u>3/7/96</u>	<u> </u>	<u>3/6/96</u>
Project Management	Date	Lowell Hill	Date

The original signatures are on file.

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Attachment D-	Recirculation Ventilation System Test Package
Attachment E-	Primary Ventilation Condensate Cooling System Test Package
Attachment F-	Primary Tank Ventilation System Test Package
Attachment G-	Vent Building Ventilation System Test Package

1.0 PURPOSE AND SCOPE

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The purpose of this Calibration, Grooming, and Alignment (CGA) Plan is to provide a safe, uniform, and expeditious method for verifying calibration of instrumentation and associated instrument loops in the Project W-030, Tank Farm Ventilation Upgrade.

- 1.1 The instrument loops will be calibrated on a system basis and will be identified in a list as part of each system CGA package.

2.0 REFERENCES

- 2.1 Drawing H-2-131000, Shts. 1 thru 4 (W-030 Drawing List).
- 2.2 Drawing ES-W030-Y00, Shts. 1 thru 5 (W030 MCS Logic Diagram Drawing List).
- 2.3 Memorandum Of Understanding (MOU), Project W-030 Test Configuration Control, EDT No. 614741.

3.0 CHANGE CONTROL

Administrative or editorial changes required to this plan, during testing, may be accommodated as exceptions in the released test report, if the changes will not affect operating facility safety, function, or performance and will not compromise or influence test data. Addition or deletion of steps or major changes to this plan will be accomplished by revision and approval by the original signature authorities.

4.0 EXCEPTIONS

Exceptions to results or to the test procedure will be given a sequential number and recorded on Test Exception log sheet in the applicable CGA Package attachment. A test exception report will be filled out to record and disposition each test exception.

5.0 PERSONNEL REQUIREMENTS

- 5.1 Instrument Technician (2).
- 5.2 MCS Operator (1).
- 5.3 Electrician (as needed).
- 5.4 Test Engineer (1)

6.0 PRECAUTIONS AND LIMITATIONS

- 6.1 During the performance of this procedure, if any of the following conditions are found, immediately stop work, place equipment in a safe condition, and notify the Test Engineer and take appropriate action to resolve the problem quickly:
 - 6.1.1 Stop work if any condition could jeopardize personnel safety or jeopardize damage to equipment/components.
 - 6.1.2 Stop work if personnel error or procedural error/inadequacy could prevent fulfillment of this procedure.
 - 6.1.3 Stop work if any un-safe condition exists.
- 6.2 Review hazards in the work area (if any), prior to start of this test.
- 6.3 Sections or steps within sections of this procedure (except for prerequisites, Section 6.0) may be performed out of sequence under direction and authority of the Test Engineer.
- 6.4 Performance of this procedure requires stationing of an Operator in the Control Room.

7.0 Special Tools, Equipment, and Materials

- 7.1 The following is a general list of test equipment that may be required to perform the testing under this procedure:
 - 7.1.1 Digital Multimeter (DMM).
 - 7.1.2 Decade Box.
 - 7.1.3 Calibrated Pressure Source.
 - 7.1.4 Calibrated Pressure Gauge.
 - 7.1.5 Calibrated Power Supply.
 - 7.1.6 Two-Way Radios or Sound Powered Phones to communicate between field devices and Control Room.

7.2 The Measuring and Test Equipment (M&TE) used to collect test data during performance of this procedure shall meet the following requirements:

7.2.1 It shall be within its current calibration cycle as evidenced by an affixed calibration label.

7.2.2 It shall be capable of providing the desired range.

7.2.3 It shall have an accuracy consistent with state-of-the-art limitations. It shall be equal to or greater than the input tolerance specified on the Data Sheets or if device being calibrated is not recall related, at least 4 times greater than the specified device tolerance.

8.0 PREREQUISITES

8.1 Perform a pre-job meeting and walkdown prior to testing.

8.2 Identify safety concerns (if any) related to the testing and assure compliance with safety requirements.

8.3 Establish communications between field devices and Control Room.

8.4 Personnel radiological safety will be as specified by a Radiation Work Procedure for instrumentation/instrument loops requiring entry into the tank farm.

8.5 Equipment and materials entering a contamination control area shall be minimized.

9.0 PROCEDURE

9.1 Test Boundaries

This procedure provides boundaries within which the test personnel can work, allowing them flexibility to perform the testing and still work in a safe manner. These boundaries are as follows:

9.1.1 Test personnel must work within the site Lock and Tag procedures and identify those pieces of equipment that must be tagged out prior to the test.

9.1.2 Test personnel shall have the freedom to lift leads for diagnostic testing. The circuits being tested shall be restored to a normal configuration upon completion of testing or at the end of the shift, if testing of that loop does not continue on the next shift.

- 9.1.3 Test personnel shall have the freedom to change the order in which the testing is being performed.
- 9.1.4 Test personnel shall have the authority to change the system configuration to match the drawing configuration if wiring is found not to be in accordance with the construction drawings and applicable ECN's on systems that have been turned over to WHC. The change must be noted/logged in the daily test log located in the Control Room. The contractor should be notified in cases where the system has not been turned over to WHC.
- 9.1.5 If the system configuration does not work as designed and is installed according to the contract drawings, the problem shall be noted in the daily test log and the design engineer shall be notified immediately to begin processing an ECN to correct the problem.
- 9.1.6 Test personnel, when completing a loop test, shall document it in the daily test log and initial for completion on the package instrument list. Also items found that are not installed per construction drawings, and any other problems/fixes shall be documented in the daily test log.

9.2 Test Execution

The test should be performed in accordance with the following steps:

- 9.2.1 The Test Engineer shall identify and initiate any system alignments that may be required for the loops to be tested.
- 9.2.2 Identify on Loop Test Data Sheet, the sensor actuation method to be used. Record the test instrument type (ie: pressure source, etc.), instrument number, model, and calibration due date at the bottom of the Data Sheet (M&TE Inst. No.).
- 9.2.3 Identify if instrument calibration has been performed or will be performed as part of the loop test. This information will be provided on the calibration data sheet attached to the Loop Test Data Sheet.
- 9.2.4 Connect the sensor actuation device to the loop to be tested.

- 9.2.5 Loop tolerances are determined using the "Square Root of the Sum of the Squares (SRSS)" method as noted in ANSI/ASME PTC 19.1-1985, Part 1, "Measurement Uncertainties," and ANSI/ISA-S67.04-1988, Section 4.4.1. Loop tolerances will be pre-calculated and shown on the Loop Calibration Data Sheet.
- 9.2.6 Initiate the process input as shown on the Loop Calibration Data Sheet and then record the results in the spaces provided (LOI and MCS Screens) as applicable.
- 9.2.7 Verify annunciator setpoints and record the actual setpoint in the space provided on the Loop Test Data Sheet.
- 9.2.8 Additional remarks or comments may be recorded in the space provided on the Loop Test Data Sheet.
- 9.2.9 If there are any problems with the test that cannot be resolved quickly, then initiate a Test Exception on the form provided as part of each test package.
- 9.2.10 When all loop tests for a system have been completed, then the Test Engineer shall review the test data and sign in the space titled "Loop Complete" on Loop Test Data Sheets.
- 9.2.11 The associated P&ID shall be highlighted as loops are completed as a method of tracking test completion.

9.3 DOCUMENT CONFIGURATION CONTROL

All personnel involved with this CGA Procedure and the actual testing shall handle all documentation in accordance with EDT No. 614741, Memorandum of Understanding, Project W-030 Test Configuration Control. The Test Engineer shall review this EDT with all personnel involved in the testing to ensure everyone understands the scope of this document.

10.0 RESTORATION

- 10.1 Upon completion of loop testing, restore the loop to it's design configuration.
- 10.2 Remove/disconnect all test equipment used to perform the loop test.
- 10.3 Verify loop restoration by observing that loop indications, alarms and/or computer points are consistent with expected conditions.

11.0 RECORDS

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- 11.1 All data sheets, test exception logs and test exception forms will become part of the system preoperational test report that will be developed upon completion of each system Preoperational Test Procedure.

12.0 ATTACHMENTS

- 12.1 The attachments to this document will be laid out by system and will contain the following items for each instrument loop in that system:

- Instrument Loop Sign-Off Sheet
- Instrument Test Data Sheet
- Loop Calibration Data Sheet
- System P&ID
- Test Exception Log
- Test Exception Form

- 12.2 The following system test packages will be developed for testing and will become attachments to this document:

Attachment A-	Raw Water System Test Package
Attachment B-	Primary Ventilation Condensate System Test Package
Attachment C-	Recirculation Condenser Cooling System Test Package
Attachment D-	Recirculation Ventilation System Test Package
Attachment E-	Primary Ventilation Condensate Cooling System Test Package
Attachment F-	Primary Tank Ventilation System Test Package
Attachment G-	Vent Building Ventilation System Test Package

INSTRUMENT LOOP SIGN-OFF SHEET

for the
RAW WATER SYSTEM

CGA PACKAGE #1 INSTRUMENT LIST RAW WATER SYSTEM

Tag	Complete
FI-AZRW-1	D.J. 4/1/96
PI-AZRW-1	D.J. 9/4/96
PDI-AZRWF-1	D.J. 4/1/96

RAW/PROCESS WATER SYSTEM

LOOP DIAGRAMS

1. H-2-131348 Sht. 1
2. H-2-131348 Sht. 2

3/9/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-006,
REV. 0, PAGE 40

Tag: FI_AZ_RW_1 I/O Type: AI Description: RawWater Flow

Cntlr: 24 Chan No: 12 P&ID: H-2-131074 Logic:

Remarks: _____

Location: _____

Actuation Method: Disconnect^{at} sensor - apply 4-20mA input.(LOOP WILL BE VERIFIED DURING PRE-OP)

Sensor Calibration:

☒ 5 pt calper procedure VENDOR DATA (data attached) D.G.
(signoff)Loop Tolerance: $1.8\% = \sqrt{(\text{sensor})^2 + (\text{xmitter})^2 + (1.8\%)^2 + (0.2\%)^2}$

Units: GPM

Process Input

Readout Tolerance

LOI

Screen1

Screen2

Screen3

LCU3-27

05Water.

Lo: 0.00

-.88 - .88

.01

LCU3-27

.02

05Water.

Hi: 50.00

49.12 - 50.88

49.95

49.95 49.97

Annunciator(s):	Priority	Setpoint	Tolerance	Trip Point
Max:	0	99999.99	-	_____
HiHi:	0	99999.99	-	_____
Hi:	0	99999.99	-	_____
Lo:	0	-9999.99	-	_____
LoLo:	0	-9999.99	-	_____
Min:	0	-9999.99	-	_____

Other: _____

MTE Instr. No: 1050393
817-35-40-013Due Date: 3/26/97

(signoff)

Loop Complete: Thomas J. HowellDate: 4/4/96

Tag: FT-AZRW-1

P&ID:

LOOP:

HNF-SD-W030-TD-006,
REV. 0, PAGE 41

Manufacturer: BADGER Model No.: PFT420 M Serial No: RCDL-70
817.45.08.062
 MTE Instr. No: 817.23.01.015 Due Date: 6.4.97
817.51.01.011

Input Range 0 - 77.92 pulses/secTolerance $\pm 1\%$ Units: pulses/sec

Input	Output	Lo:	Hi:	As Found	In/Out	As Left
0	4.0	3.84	4.16	4.00	IN	4.00
19.48	8.0	7.84	8.16	8.00	IN	8.00
38.96	12.0	11.84	12.16	12.01	IN	12.01
58.44	16.0	15.84	16.16	16.04	IN	16.04
77.92	20.0	19.84	20.16	20.06	IN	20.06

(signoff) Calibrated By: Paul M. ZylowskiDate: 2.6.97Location: Raw Water Utility Room

Comments

93.5 ppg , 20 ma = 50 gpmINPUT = (+) pulse, delay = .1 μ s, rise time = .05 μ s, fall time = .1 μ s, single pulse

~~BB~~

FT-AERW-1

BADGER

MOD # PFT420
SER # 54032147

INPUT 0-109.8 ~~HEAT~~ PULSE/SEC

OUTPUT: 4-20 ma

TEST EQUIP: 817-23-01-005
817-45-08-055

DUE DATE: 1-2-77
11-8-96

INPUT	OUTPUT	LOW	HIGH	AS FOUND	IN/OUT	AS LEFT
0 PPG	4	3.84	4.16	4.00	IN	4.00
25 27.45	8	7.84	8.16	7.98	IN	7.99
50 54.9	12	11.84	12.16	11.98	IN	12.00
75 82.35	16	15.84	16.16	15.98	IN	16.01
109.8	20	19.84	20.16	19.99	IN	20.02

Calibrated by: *Rm zyliniski / 5149mm* Date: 1/31/96

Calibration sticker attached for 1 year

TOLERANCE: $\pm 5\%$ $\pm 1\%$

COMMENTS 52.5 PPG 20 ma = 706 PM

3/9/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-006,
REV. 0, PAGE 43

Tag: PI_AZ_RW_1 I/O Type: AI Description: RawWater Press

Cntlr: 24 Chan No: 11 P&ID: H-2-131074 Logic:

Remarks: _____

Location: _____

Actuation Method: DISCONNECT SENSING LINE AND INSTALL
PRESSURE SOURCE

Sensor Calibration:

☒ 5 pt cal☐per procedure PSCP-6-289 (data attached) D.L.
(signoff)Loop Tolerance: $5.0\% = \sqrt{\text{(sensor)}^2 + \text{(xmitter)}^2 + 5.0\%^2 + 0.2\%^2}$

Units: PSI

Process Input	Readout Tolerance	LOI LCU3-27	Screen1 05Water.	Screen2 02 main YELLOW ALARM @ 200PSI	Screen3
Lo: 0.00	-5.00 - 5.00	-0.1	0.0		
Hi: 100.00	95.00 - 105.00	99.8	99.9		

Annunciator(s):	Priority	Setpoint	Tolerance	Trip Point
Max:	0	99999.99	-	
HiHi:	0	99999.99	-	
Hi:	0	99999.99	-	
Lo:	2	20.00	15.00 - 25.00	19.97
LoLo:	0	-9999.99	-	
Min:	0	-9999.99	-	

Other: _____

MTE Instr. No: 817-35-40-013Due Date: 5/12/96

(signoff)

Loop Complete: D.L.Date: 5/12/96

1/16/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-006,
REV. 0, PAGE 44

Tag: PT-AZRW-1

P&ID: H-2-131074, SH 1

LOOP: H-2-131348, SH 1

Manufacturer: FOXBORO Model No.: 843DP-C2IISK Serial No: 94231285MTE Instr. No: 817.45.08.040 Due Date: 2.5.97
817.35.40.011 3.22.97

Input Range 0-100		Tolerance 5%			
Units: PSI					
Input	Output	Lo:	Hi:	As Found	In/Out As Left
0	4.0	<u>3.2</u>	<u>4.8</u>	<u>3.99</u>	<u>IN 3.99</u>
25	8.0	<u>7.2</u>	<u>8.8</u>	<u>8.00</u>	<u>IN 8.00</u>
50	12.0	<u>11.2</u>	<u>12.8</u>	<u>12.00</u>	<u>IN 12.00</u>
75	16.0	<u>15.2</u>	<u>16.8</u>	<u>16.00</u>	<u>IN 16.00</u>
100	20.0	<u>19.2</u>	<u>20.8</u>	<u>20.00</u>	<u>IN 20.00</u>

(signoff) Calibrated By:

Paul M. ZylinskiDate: 2.4.97

Location:

RW utility Room

Comments

PERFORM 5 POINT CALIBRATION

PT-AZRW-1

FOXBORO

MODEL # 843DP-C2IISK
SERIAL # 94231285

INPUT 0-100 PSI

OUTPUT 4-20 mA

TEST EQUIP: 817-32-40-011
817-43-08-055

DUG DATE: 5-1-86
11-8-86

INPUT	OUTPUT	LOW	HIGH	AS FOUND	IN/OUT	AS LEFT
0	4	53.2	45 4.8	NA	NA	4.00
25	8	207.2	20 8.8			8.01
50	12	4511.2	12 8			12.00
75	16	15.2	16.8			16.00
100	20	19.2	20.8	↓	↓	19.99

Tolerance $\pm 5\%$

LOCATION: RW UTILITY ROOM

CALIBRATED BY: STACY FITZSIMMONS DATE: 1/29/96

Calibration Label attached

3/9/96

W-030 LOOP TEST DATA SHEET

HNF-SD-W030-TD-006,
REV. 0, PAGE 46

Tag: PDI_AZ_RWF_1 I/O Type: AI Description: RawWater Dp

Cntlr: 24 Chan No: 10 P&ID: H-2-131074 Logic:

Remarks: _____

Location: _____

Actuation Method: DISCONNECT SENSING LINE AND INSTALL
PRESSURE SOURCE

Sensor Calibration:

☒ 5 pt cal☐ _____per procedure PSCP-6-289 (data attached) D.J.
(signoff)Loop Tolerance: $8.0\% = \sqrt{\begin{matrix} \text{(sensor)}^2 & + & \text{(xmitter)}^2 & + & 8.0\% ^2 & + & 0.2\% ^2 \\ & & & & \text{(other)} & & \text{(DCS)} \end{matrix}}$

Units: PSID

Process Input

Readout Tolerance

LOI

LCU3-27

Screen1

05Water.

Screen2

02MAIN

Screen3

Lo: 0.00

-.80 - .80

- .03- .01YELLOW Alarm @ 9.00

Hi: 10.00

9.20 - 10.80

9.889.88

Annunciator(s):

Priority

Setpoint

Tolerance

Trip Point

Max:

0

99999.99

-

HiHi:

0

99999.99

-

Hi:

2

9.00

8.20 - 9.80

9.01

Lo:

0

-9999.99

-

LoLo:

0

-9999.99

-

Min:

0

-9999.99

-

Other: _____

MTE Instr. No: 817-35-40-013Due Date: 5/17/96

(signoff)

Loop Complete: D.J.Date: 4/11/96

1/16/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-006,
REV. 0, PAGE 47

Tag: PDIT-AZRWF-1

P&ID: H-2-131074, SH 1

LOOP: H-2-131348, SH 1

Manufacturer: Foxboro Model No.: 843DP-1E1SK Serial No: 94130592
MTE Instr. No: 817.45.08.040 Due Date: 2.5.97
817.35.40.030 7.31.97

Input Range 0-10		Tolerance 5%				
Units: PSI						
Input	Output	Lo:	Hi:	As Found	In/Out	As Left
0	4.0	<u>3.2</u>	<u>4.8</u>	<u>3.95</u>	<u>IN</u>	<u>3.95</u>
2.5	8.0	<u>7.2</u>	<u>8.8</u>	<u>7.95</u>	<u>IN</u>	<u>7.95</u>
5.0	12.0	<u>11.2</u>	<u>12.8</u>	<u>11.94</u>	<u>IN</u>	<u>11.94</u>
7.5	16.0	<u>15.2</u>	<u>16.8</u>	<u>15.93</u>	<u>IN</u>	<u>15.93</u>
10.0	20.0	<u>19.2</u>	<u>20.8</u>	<u>19.93</u>	<u>IN</u>	<u>19.93</u>

(signoff) Calibrated By:

Paul M. ZylinskiDate: 2.4.97

Location:

RW Utility Room

Comments

PERFORM 5 POINT CALIBRATION

PDIT-AERWFL

FOXBORO

MODEL # 843DP-111SK
SER # 94130592

INPUT 0-10 PSI

OUTPUT 4-20 mA

TEST EQUIP: 817-35-40-011
817-45-08-060

DUE DATE: 5-1-96
2-3-96

INPUT	OUTPUT	LOW	HIGH	AS FOUND	IN/OUT	AS LEFT
0	4	3.2	4.8	NA	NA	4.0
2.5	8	7.2	8.8			8.03
5	12	11.2	12.8			12.04
7.5	16	15.2	16.8			16.04
10	20	19.2	20.8			20.05

Tolerance $\pm 5\%$

LOCATION: RW UTILITY ROOM

Calibrated by Paul Zylinski 1-29-96

Attached 1 YEAR CAL STICKER

1/16/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-006,
REV. 0, PAGE 49

Tag: PI-AZRW-1A

P&ID: H-2-131074, SH 1

LOOP:

Manufacturer: ASHCROFT Model No.: DURALIFE Serial No: 25-000709MTE Instr. No: 817.35.40.011 Due Date: 5.22.97

Input Range 0-300		Tolerance 2%				
Units: PSI						
Input	Output	Lo:	Hi:	As Found	In/Out	As Left
0	0	-6	6	0.0	IN	0.0
75	75	69	81	75.0	IN	75.0
150	150	144	156	150.0	IN	150.0
225	225	219	231	227.5	IN	227.5
300	300	294	306	305.0	IN	305.0

(signoff) Calibrated By:

Paul M. Zyflinski

Date:

2.4.97

Location:

Rw Utility RoomComments Depressurize; isolate before removing for cal.
PERFORM 5 POINT CALIBRATION

PI-A2RW-1B ASHCROFT ~~DURALIFE~~ DURALIFE 0-160 PSI

TEST EQUIP:- 817-35-40-011 DUE DATE: 5-1-96
817-45-08-060 2-3-96

INPUT	LOW	HIGH	AS FOUND	IN/OUT	AS LEFT
0	-1.6	1.6	0	IN	0
80	78.4	81.6	80.0	IN	80.0
160	158.4	161.6	160.0	IN	160.0

Tolerance = $\pm 1\%$

LOCATION: RW UTILITY ROOM

Calibrated by: Paul M. Zylinski 1/29/96
Attached a 1 year cal sticker.

1/16/97

W-030 CALIBRATION DATA SHEET

HNF-SD-W030-TD-006,
REV. 0, PAGE 51

Tag: PI-AZRW-1B

P&ID: H-2-131074, SH 1

LOOP:

Manufacturer: ASHCROFT Model No.: DURALIFE Serial No: 2E-000710MTE Instr. No: 817-35-40-011 Due Date: 5-22-97

Input Range 0-160		Tolerance 2%				
Units: PSI						
Input	Output	Lo:	Hi:	As Found	In/Out	As Left
0	0	-3.2	3.2	1.0	IN	1.0
40	40	36.8	43.2	40.0	IN	40.0
80	80	76.8	83.2	80.0	IN	80.0
120	120	116.8	123.2	120.0	IN	120.0
160	160	156.8	163.2	160.0	IN	160.0

(signoff) Calibrated By:

Paul M. ZyluskaDate: 2-4-97Location: RW UTILITY ROOM

Comments

PERFORM 5 POINT CALIBRATION

DISTRIBUTION SHEET

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